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A study on effect of Change in Prices of inputs and outputs on food security of Agricultural Households in Coastal Saline Zone of West Bengal

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ABSTRACT

The study was conducted in Kakdwip block of South 24 Parganas district of West Bengal. Primary data were collected from 56 agricultural households belonging to two villages by the technique of Simple Random Sampling without Replacement. The reference years of the study are 2001-02 and 2011-12 agril years. The study aimed at finding change in income of the agricultural households earned from crop production in a period from 2001-02 and 2011-12 agricultural years owing to changes in price of inputs and agricultural commodities. The study also attempted to find capabilities of agricultural households in maintaining food security with their income earned from crop production at two points in time. Requirement of food commodities of agricultural households was estimated on the basis of dietary guidelines regarding balanced diet for people given by National Institute of Nutrition under the aegis of Indian Council of Medical Research. Results of the study revealed that agricultural land was allocated to a number of crops like aman paddy, lathyrus, vegetables boro paddy and betelvine. Cropping intensity was found to decrease with the higher size classes of farms. Percentage of irrigated land was noted to be the highest in marginal size class. Cost per farm was found to escalate by 139 per cent due to increase in prices of inputs. Gross return per farm went up by 122 per cent. Net income earned from crop production could meet only 26% of expenditure on food materials in 2001-02. In 2011-12 only 21 percent of the food security was insured by this income.

Keywords: Nutrition ,marginal,cropping,expenditure

The term food security means availability of food materials to all the people at all times in adequate quantity for active and healthy life. Food and Agriculture Organization (1983) defined food security as ensuring that all people at all time have both physical and economic access to basic food they need. World Development Report (1986) defined food security as access by all people at all time to enough food for an active, healthy life. Basic problem of food security originates from shortage of food for consumption requirement of people in a geographical area. Purchasing power of people is an important factor for attaining food security. People with adequate purchasing power are able to ensure their food security. On the other hand poor people cannot attain their food security due to lack of adequate purchasing power.

Majority of households in rural areas are engaged in crop production. They carry on agricultural operations either in owned land or leased-in land or both. The agricultural households are not self-sufficient for producing all sorts of food commodities needed for consumption for healthy and active life. Either the necessary food commodities have to be produced in their farms or have to be procured from outside. Procurement of food commodities by agricultural households requires availability of sufficient amount of money with them, i.e. they must have adequate purchasing power. A Lion share of

Table 1: Allocation of operational holding (hectare) to various crops in different size classes of farms along with some agro-Economic parameters in 2001 – 02

Size Class	Number of	Allocation of operational holding (hectatre)							Agro-economic parameters			
		Aman paddy			Betel-vine	Boro paddy	Net cropped area (NCA)	Gross cropped area (GCA)	Percentage distribution of NCA	Cropping intensity	Percentage of irrigated area to total NCA	Per capita operational holding (ha)
Col-1	Col-II	Col-III	Col-IV	Col-V	Col-VI	Col-VII	Col-VIII	Col-IX	Col-X	Col-XI	Col-XII	Col-XIII
Marginal (< 1hectare)	44 (78.57)	13.5861 (68.10)	1.6331 (8.19)	4.0648 (20.37)	0.4333 (2.17)	0.2333 (1.17)	14.0194 (0.3186)	19.9506 (100.00)	43.46	142.30	33.73	0.0577
Small (1 - 2 hectare)	9 (16.07)	10.8398 (70.06)	2.7733 (17.92)	1.7927 (11.59)	0.0666 (0.43)	-	10.9064 (1.2118)	15.4724 (100.00)	33.81	141.86	16.74	0.2600
Semi-medium (2 - 4 1hectare)	3 (5.36)	7.3333 (93.22)	0.40 (5.08)	0.1333 (1.69)	-	-	7.3333 (2.4444)	7.8666 (100.00)	22.73	107.27	30.07	0.3861
All Farms	56 (100.00)	31.7592 (73.36)	4.8064 (11.10)	5.9908 (13.84)	0.4999 (1.15)	0.2333 (0.54)	32.2591 (0.5760)	43.2896 (100.00)	100.00	134.19	20.71	0.1062

N.B. (i) Figure in parenthesis in Colum-II indicates percentage of agricultural households in each size class
(ii) Vegetable crops include Brinjal, Tomato, Chilli, Potato, Spinach, Cauliflower, Cabbage, Onion, Cowpea and Bhindi
(iii) Figure in parenthesis for each of the crops indicates percentage of GCA in respective size class
(iv) Figure in parenthesis below NCA indicates average size per agricultural households.

their family earning is accrued from crop production in which various types of inputs applied to fixed factors get transformed into output. So prices of inputs and outputs are strongly related to the earnings of the agricultural households. Sometimes farmers express views that earning from crop production is at a low ebb. Rise in prices of inputs has posed a threat on continuation of farming in India. Though some time prices of agricultural commodities go up, it is not proportionate to increase in input prices. Moreover, farmers face some uncertainties in crop production arising from vagaries of nature. This study aimed at finding change in income of the agricultural households earned from crop production between 2001-02 and 2011-12 agricultural years. In this study it was also attempted to find capability of agricultural households in maintaining food security with their income earned from crop production at these two points in time.

Methodology

The study was conducted in Kakdwip block of South 24 Parganas district. For the purpose of the study two villages namely Haribasar and Santrapara were selected purposively. Out of 186 agricultural households 56 which accounted for 30 percent of the total were selected as samples from these two villages by the technique of Simple Random Sampling Without Replacement. The reference years of the study are 2001-02 and 2011 – 2012 agricultural years. The study is based on primary as well as secondary data. Tabular method of analysis was extensively used in the study. It was assumed that area under crops remained same. Likewise quantity of various outputs and level of input use per unit area were considered to remain unchanged in both the agricultural years under study. Gross return and net return of each of the agricultural households were estimated at two points in time. Size of family was also assured to remain unchanged between these two time periods. Requirement of food commodities was estimated and considered to be same in those two years for each of the households. The estimation was based on dietary guidelines regarding balanced diet for people given by National Institute of Nutrition working under the aegis of Indian Council of Medical Research. Consumption requirement of food commodities for agricultural households was estimated in conformity with the prescription regarding nutritious food for healthy living. It was attempted in the study to find capabilities of agricultural households to maintain their food security with their earnings accruing from crop production. These capabilities of the households were compared at two points in time mentioned above. The study was conducted in respect of agricultural households belonging to different size classes.

Results and Discussion

The results of this study are presented below through a number of tables along with explanations.

The table 1 exhibits the allocation of operational holding and some agro-economic parameters. In respect of allocation of operational holding it was found that agricultural land was allocated by the cultivators to various crops like aman paddy, lathyrus, vegetables, boropaddy and bettlevine. Farmers only in marginal size class were reported to allocate land to boro paddy. The crop like betelvine was not undertaken by the cultivators in semi-medium size class. Irrespective of the size classes it was observed that agricultural land allocated to vegetable crops, lathyrus and betlevine accounted for 14 per cent, 11 per cent and 1 per cent respectively of the total gross cropped area (GCA). A small percentage of GCA was found to be allocated to boro paddy. Among agro-economic parameters percentage distribution of net cropped area, cropping intensity, percentage of irrigated area and per capita operational holding were taken into consideration. A positive relationship was found between percentage distribution of net cropped area and percentage distribution of agricultural households to different size classes. Cropping intensity was found to be higher in smaller size class than in larger size class of agricultural households. This was more or less same in marginal and small size classes of agricultural households. Percentage of irrigated area was found to be highest in marginal size class and lowest in small size class of agricultural households. Irrespective of size classes, net cropped area was found to be 0.5760 ha. Cropping intensity was found to be 134.19. Irrigated area accounted for 20.71 per cent of the net cropped area. Per capita operational holding was noted to be 0.1062 ha.

The Table 2 exhibits size of family alongwith distribution of population to different size classes

Table 2. Size of Family and distribution of population to different size classes of agricultural households in 2001-02 and 2011-12 agricultural years.

Size Class	Year	Men	Women	Boys	Girls	Children	Total	Percentage increase
Marginal	2001 – 02	1.61 (71)	1.68 (74)	0.70 (31)	0.59 (26)	0.93 (41)	5.52 (243)	8.64
	2011 – 12	2.38 (105)	2.31 (102)	0.31 (14)	0.27 012)	0.70 (31)	6.00 (254)	
Small	2001 – 02	1.44 (13)	1.22 (11)	0.66 (6)	0.55 (5)	0.77 (7)	4.66 (42)	16.66
	2011 – 12	2.11 (19)	1.66 (15)	0.22 (2)	0.44 (4)	1.00 (9)	5.44 (49)	
Semi-medium	2001 – 02	2.00 (6)	2.00 (6)	0.33 (1)	0.33 (1)	1.66 (5)	6.33 (19)	26.31
	2011 – 12	2.33 (7)	2.00 (6)	0.66 (2)	0.66 (2)	2.33 (7)	8.00 (24)	
All farms	2001 – 02	1.61 (90)	1.62 (91)	0.67 (28)	0.57 (32)	0.94 (53)	5.42 (304)	10.85
	2011 – 12	2.33 (131)	2.19 (123)	0.32 (18)	0.32 (18)	0.83 (47)	6.01 (337)	

N.B,: Figure in parenthesis indicates size of population

Table 3. Effect of increase in prices of inputs on escalation of cost of cultivation and effect of increase in price of agricultural commodities on gross return

Size Class	Percent increase in cost of inputs							Percent increase in total cost	Percent increase in gross return
	Seed	Human Labour	Machinery and Implement	Manure	Ferti-lizer	Irriga-tion	Plant protection chemical		
Marginal	127	156	84	175	119	172	70	140	118
Small	107	157	85	173	102	134	80	139	137
Semi-Medium	91	157	85	182	83	133	63	138	116
All Farms	121	156	85	175	111	163	71	139	122

Table 4 Age-group wise distribution of population of agricultural households in 2001-02

Size class	Age - group																Grand total
	6-12		1-3 years		4-6 years		7-9 years		10-12 years		13-18 years		Adults		Total		
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	
Marginal	4	3	-	1	10	8	8	7	17	14	14	12	71	74	124	119	243
	(2.88)		(0.41)		(7.41)		(6.17)		(12.76)		(10.70)		(59.67)		(51.03)	(48.97)	(100.00)
Small	-	-	1	2	1	2	1	-	3	3	3	2	13	11	22	20	42
	-		(7.14)		(7.14)		(2.38)		(14.29)		(11.90)		(57.14)		(52.38)	(47.62)	(100.00)
Semi-medium	1	1	-	1	-	1	-	1	1	-	1	-	6	6	9	10	19
	(10.53)		(5.26)		(5.26)		(5.26)		(5.26)		(5.26)		(63.16)		(47.37)	(52.63)	(100.00)
All farms	5	4	1	4	11	11	9	8	21	17	18	14	90	91	155	149	304
	(2.96)		(1.64)		(7.24)		(5.59)		(12.50)		(10.53)		(59.14)		(50.96)	(49.04)	(100.00)

N.B.: Figure in parenthesis indicates percentage of population in the concerned age-group to total population in the respective size class.

Table 5. Average requirement of food materials for balanced diet per agricultural household per year and its expenditure (in rupee) in 2001-02 and 2011-12 agricultural years.

Food groups	Year	Price of food commodity (₹/kg)	Size Class wise requirement of food materials and expenditure (Rupee)							
			Marginal		Small		Semi-Medium		All Farms	
			Quantity of food materials	Expen-diture	Quantity of Food materials	Expen-diture	Quantity of food materials	Expen-diture	Quantity of food materials	Expen-diture
Cereals (Kg)	2001-02	8.5	926.14	7872.19	777.45	6608.32	1029.30	8749.05	907.77	7716.04
	2011-12	17		15744.38		13216.65		17498.10		15432.09
Pulse (Kg)	2001-02	24	151.93	3646.32	125.92	3022.08	166.07	3985.68	148.51	3564.24
	2011-12	50		7596.50		6296		8303.50		7425.50
Toned Milk (litre)	2001-02	8	767.32	6138.56	657	5256	863.83	6910.64	754.76	6038.08
	2011-12	20		15346.40		13140		17276.60		15095.20
Roots and Tubers (Kg)	2001-02	5.5	333.89	1836.39	273.75	1505.62	371.08	2040.94	323.28	1778.04
	2011-12	12		4006.68		3285		4452.96		3879.36
Green leafy Vegetables (Kg)	2001-02	3	189.34	568.02	158.17	474.51	200.75	602.25	184.94	554.82
	2011-12	10.5		1988.07		1660.78		2107.87		1941.87
Other Vegetables (Kg)	2001-02	4	189.34	757.36	158.17	632.68	200.75	803	184.94	739.76
	2011-12	16		3029.44		2530.72		3212		2959.04
Fruits (Kg)	2001-02	12	201.57	2418.84	170.33	2043.96	231.17	2774.04	198.14	2377.68
	2011-12	30		6047.10		5109.90		6635.10		5944.20
Sugar (Kg)	2001-02	17	84.65	1439.05	70.97	1206.49	97.33	1654.61	83.13	1413.21
	2011-12	36		3047.40		2554.92		3503.88		2992.68
Oils (Kg)	2001-02	40	76.35	3054	64.48	2579.20	86.38	3455.20	74.98	2999.20
	2011-12	75		5726.25		4836		6478.50		5623.50
Total	2001-02			27730.73		23328.86		30975.41		27181.07
	2011-12			62532.22 (125.49)		52629.97 (125.60)		69468.51 (124.68)		61293.44 (125.50)

N.B.: Price of toned milk given in term of ₹ / litre

Table 6. Net income per agricultural household earned from crop production and its percentage share in maintaining food security in 2001-02 and 2011-12 agricultural years.

Size class	Year	Net income from crop production (Rupee)	Expenditure on food materials (Rupee)	Net income expressed as percentage to total expenditure on food materials	Real Earning from crop production (Rupee)
Marginal	2001 – 02	7249	27730.73	26.14	2557.42
	2011 – 12	14754	62532.22	23.59	2526.36
		(90.40)	(125.49)		
Small	2001 – 02	1477	23328.86	6.33	487.46
	2011 – 12	3119	52629.97	5.93	534.07
		(111.17)	(125.60)		
Semi-medium	2001 – 02	11635	30975.41	37.56	3839.93
	2011 – 12	19708	69468.51	28.37	3374.65
		(69.38)	(124.68)		
All Farms	2001 – 02	6949	27181.07	25.56	2293.39
	2011 – 12	13150	61293.44	21.45	2251.71
		(89.24)	(125.50)		

N.B.: Figure in parenthesis indicates percent increase of net income

of households in 2001-02 and 2011-12 agricultural years. It was observed that increase in population was higher across the larger size classes of agricultural households. Irrespective of the size classes the growth of population in the concerned time period was about 11 per cent. Average size of family increased to 6.01 from 5.42.

Change in cost owing to change in prices of inputs is furnished in Table 3. It was found that the highest percent increase was recorded in case of manure. The increase in cost due to increase in prices of various inputs was found to range from 71 per cent to 175 per cent. No wide difference was noted in percentage increase in cost per farm among the size classes of agricultural households. The increase in gross return was observed to range from 116 per cent to 137 per cent. Irrespective of the size classes cost of cultivation of agricultural households was noted to go up by 139 per cent. Gross return increased by 122 per cent.

The table 4 displays age-group wise distribution of population of agricultural households. It was observed that the highest percentage of population belonged to adult age-group in each of the size classes. In terms of percentage distribution of population, age-group of 10-12 years was found to be the second largest group in marginal and small size classes of farms. In semi-medium size class age-group of 6-12 months was observed to be the second largest one. Irrespective of size classes the first and second largest groups were found to the same age-groups as in cases of marginal and small size classes.

The Table 5 displays average requirement of food materials for balanced diet per agricultural households and estimated expenditures in two periods of time. It was noted that average expenditure on food materials per agricultural households was the highest in semi-medium size class of farms. This was found to be lowest in small size class. Percent increase in expenditure on food materials was more or less same in marginal and small size classes of farms. This was estimated to be lower in semi-medium size class of farms. It was also found that the relative position of agricultural households requiring expenditure on balanced diet was consistent with the size of family in different size classes of farms.

Capability of Agricultural households in maintaining food security with earning from crop production is presented in Table 6. It was found that increase in

net income from crop production ranged from 69 to 111 per cent in the time period between 2001-02 and 2011-12 agricultural years. Increase in expenditure on food materials was found to vary from 124 per cent to 126 per cent in this time period. It was also noted that percent increase in expenditure on food materials was higher than that in net income from crop production in all the size classes of farms. It was also observed that income from crop production could meet only 26 percent of the total expenditure in 2001-02. Contribution of the income earned from crop production was found to decline in 2011-12 agricultural years. In this year only 21 per cent of the food security was ensured by this income. Further it was noted that real earning from crop production slightly went down in 2011-12 agricultural year.

Conclusion

Effect of increase in prices of inputs used in crop production was stronger them the effect of increase in prices of output. Stronger effect of the farmer resulted in reduction in income of the agricultural households. High momentum in rise in prices of inputs needs to be arrested for reducing cost of cultivation. Moreover, an efficient instrument is necessary for ensuring remunerative prices of agricultural commodities produced by the farmers. Prices of food commodities are much concerned to the issue of food security. This matters, as a whole, calls for the intervention of the government in controlling market forces.

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