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INVESTMENT BEHAVIOUR OF TRADITIONAL AND 'MODERN' FARM—A COMPARATIVE STUDY

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There are clear evidences in our country of a transition from traditional stagnant agriculture to modern agriculture based on the use of high-yielding crop seeds and the application of science and technology in the methods of cultivation. Most of the farmers have become aware of the possibilities of increasing productivity through the use of the new agricultural devices, and they are ready to adopt the full "package of improved production practices." This is evident from the rise in fertilizer consumption and the spread of new seeds.

It is again very natural that where agricultural output has been raised and the volume of total production increased beyond the existing low level, the rate and the form of capital outlay will also undergo significant change. Because, the greater is gross profit the greater will be the level of internally generated funds and therefore, greater will be the rate of investment. The purpose of this paper is to compare and contrast the form and extent of capital expenditure on farms following traditional methods of cultivation with those following modern techniques.

It is assumed that cross-sectional studies will better reveal the investment behaviour of farms labelled 'modern' in the sense that they have partly adopted the modern techniques, but they are fully aware of its potentialities and are on the threshold of accepting it as a feasible business proposition. Owner operated farms following traditional methods of cultivation have been selected from the two villages, *viz.*, Sahajapur and Jungul, surveyed by the Agro-Economic Research Centre, Visva-Bharati under the continuous village survey scheme, and similar farms following modern methods have been taken from Iswarpur and Bara, surveyed in connection with the study of the High-Yielding Varieties Programme (HYVP) in the district of Birbhum. Statistics on expenditure relating to the building up of fixed capital structure refer to a five-year period preceding the date of survey and statistics on variable capital expenditure refer to one year period—the year of survey.

It has already been stated that both these types of farms belong to the same district and are not far away from each other. As a result the infra-structure development has touched all the farms almost equally. Both are served by the same canal and the area irrigated constituted more than 90 per cent of the total area in both the cases (Table I). The soil condition and the distribution of holdings are also not much different. But compared by the yardstick of the level of activity and management principle, they seem to fall in two distinctly separate

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TABLE I—INTENSITY OF CROPPING AND AVERAGE YIELD BY SIZE-GROUP OF HOLDINGS

Size-group (acres)	No of farms		Total operated area	Percentage of area irrigated	Intensity	Percentage of area under paddy and wheat to total gross cropped area		HYV paddy area as percentage of total paddy area	Percentage of HYV wheat to total wheat area	Average yield of crops (per acre in kgs.)			
	No.	percentage of total				Paddy	Wheat			Ordinary paddy	HYV paddy	Ordinary wheat	HYV wheat
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Traditional farm													
0·01 — 5·00	10	28·6	38·22	88·3	1·04	95·3	0·3	—	—	749	—	373	—
5·01 — 10·00	11	31·5	78·42	88·7	1·09	90·9	1·1	—	—	784	—	448	—
10·01 — 15·00	8	22·8	98·45	92·6	1·12	87·9	1·1	—	—	821	—	373	—
15·01 — 20·00	4	11·4	50·66	89·3	1·12	87·5	1·1	—	—	746	—	373	—
20·01 and above	2	5·7	43·48	93·6	10·09	89·7	0·8	—	—	858	—	410	—
Total	35	100·0	309·23	90·8	1·10	88·8	0·9	—	—	784	—	410	—
Modern farm													
0·01 — 5·00	9	30·0	30·99	84·0	1·21	80·8	7·9	27·5	100·0	896	1,700	—	746
5·01 — 10·00	9	30·0	65·82	95·3	1·22	80·0	11·8	27·1	100·0	933	1,743	—	793
10·01 — 15·00	3	10·0	37·33	96·0	1·17	86·8	8·0	17·5	100·0	988	1,803	—	721
15·01 — 20·00	3	10·0	54·33	87·1	1·20	87·9	10·8	14·6	100·0	982	1,735	—	783
20·01 and above	6	20·0	175·00	96·5	1·42	71·5	19·3	51·1	100·0	1,051	1,829	—	970
Total	30	100·0	363·47	93·8	1·32	77·3	15·6	35·8	100·0	979	1,802	—	901

zones. The intensity of cropping (ratio of gross cropped area to net cultivated area) is much higher in 'modern' farms than in the traditional farms and the pattern of cropping in the former group to some extent is guided by maximization principle in the face of risk and uncertainty. The traditional farms appear to be unconcerned about risk and uncertainty and are in the habit of putting all their eggs in the same basket. In contrast, the modern farms have started adjusting the product combination on commercial lines to maximize earning. This is, however, not to say that these farms are guided fully by the motives of a commercialised economy. In fact they are in the stage of transition from a monocultural subsistence economy to a commercialised economy.

Another important fact to be noted is that there exist little differences in the intensity of cropping and the average yield rate of crops between the different size-group of farms in the traditional farms. But in the modern farms there is a wide difference in the intensity of cropping as well as the average yield of crops between the large-sized farms on the one hand and the small and medium farms on the other. It is, however, expected that in the transitional phase the entrepreneurs who are less dynamic will trail behind their more dynamic counterpart in adopting hitherto unknown techniques and product mix. Moreover, the availability of funds may also limit the wider application of already experimented techniques.

For our study the investment outlay has been classified into two groups : (1) variable capital and (2) fixed capital. The former includes the expenditure on current production inputs, such as, seed, fertilizers and manures, pesticides, water and hired labour. The latter includes expenditure for the acquisition of land, livestock, tools, equipments and machineries and also expenditure on construction of house and buildings and land improvement including irrigation works.

As compared to traditional farm, expenditure on current inputs both per acre and per farm in the 'modern' group indicates a complete departure from the past practices. The use of chemical fertilizers and manures per acre in modern farms stood at Rs. 66 as against Rs. 16 in the traditional farm and at Rs. 2,905 and Rs. 441 per farm respectively (Table II). Moreover, the use of new inputs like improved seeds, plant protection materials, etc., is absent in the traditional farms. The total investment outlay on variable inputs per farm differed between the two categories of farms by Rs. 2,464 and on per acre basis by Rs. 188. This shift in the production function, however, has not only benefited the owner of the means of production but to some extent it has also benefited the working class in the form of greater employment opportunities. As can be seen from Table I the average yield of ordinary paddy per acre in modern farm stood at 979 kgs. as compared to 784 kgs. in the traditional farms and per acre yield of HYV paddy was as high as 1,802 kgs. In the case of wheat, the average yield was more than double in the modern farms. It is however to be noted that production in the 'modern' farms has been boosted up not only by the use of more capital input, but also by increasing labour hours within the production period. Our contention is that the new technology that has been adopted by the farmers is not labour-saving. The stage has not yet reached when profit can be increased by using labour-saving technology. It is also desirable that in an over-populated agrarian economy, such technology will be adopted which will not replace labour and figures in our tables show that there exists the scope of this type of investment which can increase both production and labour-share at the same time.

TABLE II——EXPENDITURE ON VARIABLE CAPITAL

(*in Rs.*)

Size-group (acres)	Traditional farms						Modern farms					
	Fertilizer and manure	Irrigation	Improved seed	Pesticides	Hired labour	Total	Fertilizer and manure	Irrigation	Improved seed	Pesticides	Hired labour	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
					Per acre (net cultivated area)							
0·01—5·00 ..	12·60	9·15	—	—	15·25	37·00	41·03	14·10	5·80	9·44	85·01	155·38
5·01—10·00 ..	13·81	8·54	—	—	22·14	44·49	40·77	14·20	6·79	9·17	117·72	188·65
10·01—15·00 ..	15·23	9·04	—	—	21·19	45·46	34·81	10·24	4·26	8·10	112·48	169·89
15·01—20·00 ..	18·10	9·63	—	—	26·45	54·18	42·52	10·67	3·86	5·72	121·44	184·21
20·01 and above	21·14	9·80	—	—	56·35	87·29	93·98	17·47	7·14	16·25	171·42	306·26
Total ..	16·01	9·13	—	—	26·53	51·67	66·06	14·83	6·18	11·98	140·07	239·12
					Per farm							
0·01— 5·00 ..	37	35	—	—	58	130	41	48	20	32	293	434
5·01—10·00 ..	63	61	—	—	158	182	298	104	50	67	860	1,379
10·01—15·00 ..	187	111	—	—	262	560	433	127	53	101	1,400	2,114
15·01—20·00 ..	229	122	—	—	335	686	770	193	70	103	2,200	3,336
20·01 and above	460	213	—	—	1,225	1,898	2,741	509	208	474	5,000	8,932
Total ..	126	81	—	—	234	441	800	179	75	145	1,706	2,905

The pattern of the use of variable inputs depend to a large extent on the structure and adjustment of capital stocks. In this section, an attempt will be made to analyse the behaviour of modern farm relating to the building up of fixed capital structure.

Tables III and IV indicate that the purchase of land constituted the major form of investment in traditional farms, accounting for 49 per cent of total investment expenditure. This was followed by the construction of house and buildings and the purchase of livestock, accounting for 22 and 17 per cent of total investment. Investment on land improvement such as bunding, digging and reclamation was very insignificant. As regards the pattern of investment in modern farms, it is seen that investment on improved implements and equipments and machineries constituted the major portion of the total. This was followed by land improvement including irrigation works. There was no investment on irrigation works in traditional farms, but in modern farms the amount of expenditure on this head was Rs. 1,128 per farm, forming 19 per cent of total investment. The realization of the full benefits of the new technology, such as intensive crop production and intensive use of technical inputs demanded not only perennial irrigation but also controlled irrigation. Thus wells and shallow tube-wells came into use to supplement the canal irrigation. Investment on improved implements and machineries was very significant. Since the introduction of the high-yielding varieties programme the use of pump sets became more and more popular, and the farmers had also started utilizing the services of improved ploughs, seed drills, threshers, crushers and spraying equipments.

Investment per acre in traditional farms did not vary to any considerable extent between the different size-groups, except on land purchase. But in modern farms, investment per acre on all the items except land purchase was much higher in the large-sized farms than that in the medium and small farms.

It is quite evident that the investment behaviour of the two categories of farms differs significantly. The tradition-bound farmers still consider land as the most important of all assets for augmenting their income. But the modernized group seems to have acquired the knowledge that income can be raised by increasing the economic supply of land in contrast to physical supply, through the use of new technology. This is revealed by the allocation of funds to different items of capital accumulation. The share of expenditure on land acquisition constituted half of the total outlay in the case of traditional farms as against 6 per cent in the modern farms. But the latter group has improved the quality of land by adopting different land development measures and irrigation works.

It is revealed from the foregoing analysis that the pattern of investment followed by the traditional farms is just to maintain the existing level of production. According to Schultz,[1] the traditional farmers operate near the equilibrium level within their traditional resource framework, and the only way to stimulate growth in such farms is to raise the level of efficiency of the factor inputs which involve substantial amounts of expenditure for the development of infra-structure. But it is also true that public investment on infra-structure will not simply lead to growth in productivity. Such investment creates the condition and farmers may also be fully aware of the production potentialities of supplementary investment,

1. T. W. Schultz: Transforming Traditional Agriculture, Yale University Press, New Haven, U.S.A., 1964.

TABLE III—EXPENDITURE ON FIXED CAPITAL PER ACRE (NET CULTIVATED AREA)

(*in Rs.*)

Size-group (acres)	Purchase of land	Construction of house and buildings	Purchase of live-stock	Tools, implements and machineries			Land improvement			Total
				Ordinary tools and implements	Improved implements and machinery	Total	Bunding, reclamation	Irrigation works	Total	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
					Traditional farm					
0·01 — 5·00 ..	21	50	76	21	—	21	21	—	21	189
5·01 — 10·00 ..	83	108	55	21	—	21	18	—	18	285
10·01 — 15·00 ..	126	46	49	14	—	14	19	—	19	254
15·01 — 20·00	442	68	57	16	—	16	24	—	24	607
20·01 and above	138	86	47	16	—	16	18	—	18	305
Total ..	156	71	55	17	—	17	20	—	20	319
					Modern farm					
0·01 — 5·00 ..	48	84	90	30	162	192	44	38	82	496
5·01 — 10·00 ..	76	68	55	21	173	194	48	43	91	484
10·01 — 15·00 ..	54	67	40	17	102	119	28	32	60	340
15·01 — 20·00 ..	55	83	46	15	134	149	33	24	57	390
20·01 and above	—	69	33	10	269	279	117	60	177	558
Total ..	32	72	45	15	209	224	93	37	130	503

TABLE IV—EXPENDITURE ON FIXED CAPITAL PER FARM

(*in Rs.*)

Size-group (acres)	Purchase of land	Construction of house and buildings	Purchase of live-stock	Tools, implements and machineries			Land improvement			Total
				Ordinary tools and implements	Improved implements and machinery	Total	Bunding, reclamation	Irrigation works	Total	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
					Traditional farm					
0·01 — 5·00 ..	80	190	290	80	—	80	79	—	79	719
	(11·1)	(26·4)	(40·3)	(11·1)		(11·1)	(11·1)		(11·1)	(100·0)
5·01 — 10·00 ..	594	769	390	148	—	148	131	—	131	2,032
	(29·2)	(37·8)	(19·2)	(7·3)		(7·3)	(6·5)		(6·5)	(100·0)
10·01 — 15·00 ..	1,550	564	606	177	—	177	233	—	233	3,130
	(49·5)	(18·0)	(19·4)	(5·7)		(5·7)	(7·4)		(7·4)	(100·0)
15·01 — 20·00 ..	5,600	863	720	205	—	205	300	—	300	7,688
	(72·8)	(11·2)	(9·4)	(2·7)		(2·7)	(3·9)		(3·9)	(100·0)
20·01 and above	3,000	1,875	1,025	350	—	350	400	—	400	6,650
	(45·1)	(28·2)	(15·4)	(5·3)		(5·3)	(6·0)		(6·0)	(100·0)
Total ..	1,375	631	485	153	—	153	174	—	174	2,818
	(48·8)	(22·4)	(17·2)	(5·4)		(5·4)	(6·2)		(6·2)	(100·0)
					Modern farm					
0·01— 5·00 ..	166	289	311	105	556	661	150	130	280	1,770
	(9·7)	(16·9)	(18·2)	(6·2)	(32·6)	(38·8)	(8·8)	(7·6)	(16·4)	(100·0)
5·01 — 10·00 ..	556	500	400	156	1,267	1,423	467	311	778	3,657
	(15·2)	(13·7)	(10·9)	(4·3)	(34·6)	(38·9)	(12·8)	(8·5)	(21·3)	(100·0)
10·01 — 15·00 ..	667	833	500	213	1,267	1,480	333	400	733	4,213
	(15·8)	(19·8)	(11·9)	(5·0)	(30·1)	(35·1)	(7·9)	(9·5)	(17·4)	(100·0)
15·01 — 20·00 ..	1,000	1,500	833	267	2,433	2,700	2,267	430	2,697	8,730
	(11·5)	(17·2)	(9·5)	(3·0)	(27·9)	(30·9)	(26·0)	(4·9)	(30·9)	(100·0)
20·01 and above	—	2,000	967	283	7,833	8,116	3,417	1,167	4,584	15,667
		(12·8)	(6·2)	(1·8)	(50·0)	(51·8)	(21·8)	(7·4)	(29·2)	(100·0)
Total ..	383	870	540	186	2,530	2,716	1,128	449	1,577	6,086
	(6·3)	(14·3)	(8·9)	(3·0)	(41·6)	(44·6)	(18·5)	(7·4)	(25·9)	(100·0)

but the lack of internally as well as externally available funds may act as barrier for them to escape the low-level equilibrium trap. The individual farmers are unable to incur the heavy capital outlay required for the purpose, and therefore require appropriate institutions to carry out the programmes. In the case of modern farms, evidences nevertheless indicate that the development and introduction of the new technology accompanied with capital investment by Government tended to induce capital expenditure by the farmers. The large as well as the small farmers not only positively responded to the new technology but also showed their readiness to invest on the requisite items such as irrigation works, purchase of costly machines, etc., to fit the current phase of agricultural innovations.

Availability of credit in adequate quantity at appropriate interest rates has also a bearing on the extent of capital investment by farmers. It should be pointed out that the rate of interest will come to play an important role in determining the volume of investment in the first phase of modernization.

Therefore, for the purpose of planning, studies on the input-output relationship of modern farms should be undertaken to determine the most profitable form of investment in the context of India's overall development. This is more urgent because such technology should not be introduced which will replace labour. On the other hand, the adoption of technology in the agrarian sector should be kept at a level which will stimulate industrial development. The creation of home market which is necessary for self-sustained economic growth will be difficult if closer relation between the two sectors is not maintained in the modernization process.

CAPITAL FORMATION IN AGRICULTURE OF THE TARAI REGION OF UTTAR PRADESH

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At the foot hills of Uttar Pradesh, Himalayas is an agroclimatic belt called the Tarai. This stretches from West to East and comprises a part of the districts of Nainital, Rampur, Lakhimpur-Kheri, Pilibhit, Gorakhpur, Bahraich and Gonda. This region is agriculturally very rich. The annual rainfall is about 60″. The area has several rainfed streams. It has a high water table, good natural contours for drainage and the soil can hold water.