



Research Paper

Study On Adoption Level of the Livestock Farmers of Aspirational Districts of West Bengal, India

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Abstract: The rural poor's ability to generate a sustained income depends heavily on their livestock. The NITI Aayog, the Government of India, identified five aspirational districts in West Bengal, and the study was performed on the adoption level of the farmers in those districts. For the current study, 5000 farmers made up the overall sample size, which was randomly chosen from one block in each district. For a more accurate interpretation of the study's findings, the data were collated and statistically evaluated after being obtained using a pre-tested structured interview schedule. Education, training, occupation, and land ownership were found to have a highly significant impact on the adoption index. The adoption index among farmers in the South Dinajpur district appeared to be substantially greater than it was in the other four districts, Malda, Murshidabad, Birbhum, and Nadia. The findings suggested that farmers from South Dinajpur district were more used to modern methods of fisheries and animal husbandry. In compared to the other four districts, it had been noted that the majority of Birbhum's farmers had poor adoption rates.

Keywords: Animal Husbandry, Adoption, Aspirational Districts.

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I. Introduction

The rural poor in India depend heavily on livestock for a stable way of life and generating revenue. Particularly in rural areas, livestock farming offers enormous potential for generating money and jobs (Singh et al., 2015). This is crucial in giving millions of resource-poor farmers self-employment through supplemental income and serves as a safety net in crisis times like famine and drought (Bhattacharjee et al., 2021). Livestock is an important component of the Indian economy. 20.5 million people worldwide depend on livestock to survive. Compared to all rural households, small farm households received 16 percent of their revenue from livestock. Livestock is the primary source of income for two thirds of rural areas. Additionally, it employs about 8.8% of the Indian workforce. There is an abundance of livestock in India. 4.11 percent of the nation's GDP comes from the livestock sector, and 25.6 percent of the GDP from agriculture.

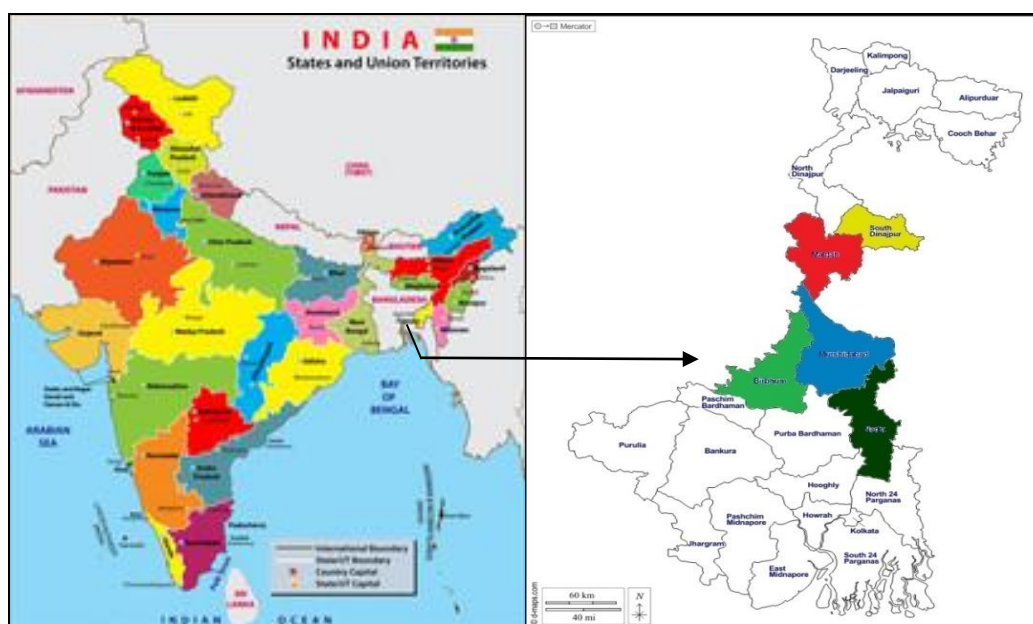
The improvement of the livelihood of the rural labour force through substantial capacity building, including skill upgradation on different enhanced animal husbandry practices is an important tool (Bhattacharjee et al., 2022). Training improves farmers' performance, perception, and level of knowledge (Senthil kumar et al., 2015). Adoption is the decision to employ an innovation fully as the best alternative available (Rogers, 1961). This entails the adoption and continuing use of better practices and facilitates the frequent application of any new or enhanced technology or methods. Adoption is the acceptance and ongoing application of better methods.

The NITI Aayog, Government of India, identified five aspirational districts in the state of West Bengal: Birbhum, Nadia, Malda, South Dinajpur, and Murshidabad. These districts were chosen for the study based on factors such as poverty, poor health, educational status, socio-economic characteristics, etc. The adoption rate of the farmers in several Aspirational Districts of West Bengal, India, has been attempted to be studied in light of this context.

II. Materials and Methodology

This study was carried out in five aspirational districts in the state of West Bengal that were specifically chosen by the NITI Aayog, the Government of India, after taking into account factors such as poverty, poor health, educational status, socio-economic characteristics, etc. One block from each district (Ilambazar Block from Birbhum District, Haringhata Block from Nadia District, Bamongola Block from Maldah District, Kusmandi Block from South Dinajpur, and Murshidabad-Jianganj Block from Murshidabad District) have been selected purposively. A sample of 1000 number of farmers was purposively selected as respondents from each block of each district and a total of 5000 farmers were randomly chosen to participate in the survey.

All of the chosen factors were assessed using a developed schedule, a pre-established scale, or a test. The data were gathered using a pre-tested structured interview schedule, and they were then assembled, tabulated, and statistically analysed using methods like Mean+SE, chi-square, and correlation coefficient analysis for a clear understanding of the results and to draw better interpretation of the study.



Study Area Map

III. Results and Discussion

In order to estimate their adoption level, the current study was conducted among the 5000 farmers of the five aspirational districts of West Bengal (Birbhum, Nadia, Malda, South Dinajpur, and Murshidabad) as identified by NITI Aayog. The analytical studies are shown as follows:

Adoption index (Mean & SEM) calculated using standard practice (Dasgupta, 1968) among the farmers in the aspirational districts of West Bengal in relation to improved farm practices of animal husbandry and fishery like vaccination against contagious diseases, deworming for parasitic disease, cultivation of green fodder, feeding of concentrated mixture, feeding of green fodder, feeding of urea and molasses treated straw, feeding of colostrum to new-born kid, castration by bradizzo castrator, value addition of milk and meat has been represented in the Table 1.

Table 1: Adoption Index (Mean ± SEM) and ADOPTION LEVEL of the farmers of Aspirational districts of West Bengal (N = 5000)

Category	Different factors	Adoption Index	Adoption level (%)			
		(Mean ± SEM)	Low (<5.00)	Medium (>5.00 <6.5)	High (>6.5)	Chi square value
OVERALL		5.95 ± 1.05	58.35	32.80	8.85	72.14**
Districts	Birbhum	5.57 ± 0.93	62.10	28.30	9.60	60.44**
	Nadia	5.20 ± 1.16	57.86	31.46	10.67	
	Malda	6.02 ± 1.01	60.66	29.37	9.96	
	South Dinajpur	6.07 ± 0.99	46.97	39.60	13.43	
	Murshidabad	6.01 ± 1.03	54.08	34.29	11.63	
Age	Young Group (Up To 30 Years)	6.09 ± 0.92	52.71	35.31	11.98	82.49**
	Most Active Group (30-60 years.)	5.90 ± 1.03	56.45	32.52	11.03	
	Elder Group (Above 60 Years.)	5.88 ± 0.93	55.07	33.55	11.38	
Religion	Hindu	5.86 ± 1.01	58.28	31.15	10.57	75.33**
	Muslim	5.12 ± 1.13	57.83	31.49	10.68	
Marital Status	Married	5.41 ± 0.96	58.67	30.86	10.47	64.84**
	Unmarried	5.19 ± 1.05	60.35	29.61	10.04	
	Widow/ Widower	5.45 ± 1.28	58.36	31.09	10.55	
Occupation	Labour	5.99 ± 0.72	46.59	39.88	13.53	68.94.**
	Caste Occupation	5.06 ± 1.00	61.34	28.87	9.79	
	Migrants Labour	5.46 ± 0.98	56.95	38.40	4.65	
	Business	5.04 ± 1.10	61.49	28.75	9.75	
	Independent	5.55 ± 0.89	57.60	31.66	10.74	
	Cultivation	5.95 ± 1.09	62.18	28.24	9.58	
Caste	General	5.82 ± 1.02	58.59	30.92	10.49	67.28**
	Schedule Caste	5.52 ± 0.97	57.83	31.49	10.68	
	Schedule Tribe	5.37 ± 0.88	58.97	30.64	10.39	
	Other Backward Caste	4.74 ± 1.06	63.78	27.04	9.17	
Education of the farmers	Illiterate	5.04 ± 1.05	61.49	28.75	9.75	74.44**
	Can Read Only	5.29 ± 1.02	59.58	30.18	10.24	
	Can Read & Write	5.41 ± 1.06	58.67	30.86	10.47	
	Primary	5.72 ± 1.02	56.30	32.63	11.07	
	Middle School	5.85 ± 1.04	55.30	33.37	11.32	
	High School	6.09 ± 0.86 (646)	53.47	34.74	11.79	
	Graduate	6.22 ± 1.12 (417)	60.12	29.78	10.10	
Family type	Nuclear Family	5.85 ± 1.12 (1237)	55.33	33.35	11.31	104.22**
	Joint Family	5.96 ± 1.06 (3048)	49.97	37.36	12.67	
Family Size	Small	5.66 ± 0.99 (1041)	47.17	39.45	13.38	79.94**

	Medium	5.59 ± 1.00 (3224)	47.82	38.96	13.22	
	Large	5.57 ± 1.11	48.01	38.82	13.17	
House Type	No house	5.49 ± 0.97 (281)	42.22	43.14	14.63	47.84**
	Hut	5.72 ± 0.92 (585)	43.81	41.96	14.23	
	Kutch House	5.55 ± 1.08 (1255)	48.20	38.68	13.12	
	Mixed House	6.02 ± 1.01 (1886)	43.81	41.96	14.23	
	Pucca House	6.09 ± 0.87 (137)	43.16	42.44	14.40	
	Mansion	5.32 ± 1.04 (136)	50.34	37.08	12.58	
Land Holding	No land/Land less	5.54 ± 1.07 (1139)	48.29	38.61	13.10	77.74**
	Up to 1 hectare	5.92 ± 1.09 (1560)	44.74	41.26	14.00	
	Up to 2 hectares	6.45 ± 1.09 (1231)	39.77	44.97	15.26	
	Above 2 hectares	7.63 ± 0.92 (350)	34.35	49.02	16.63	
Training	Training Received	7.89 ± 1.08 (679)	42.24	39.82	17.94	87.22**
	Training not received	5.42 ± 1.01 (3606)	56.95	38.40	4.65	

Table 2 summarises the results of the analysis of variance in relation to gender, age, religion, marital status, employment, caste, education, family type, family size, house type, training received, and land holding capacities of the farmers. Education, training, occupation, and land ownership were found to have a highly significant ($p < 0.01$) impact on the adoption index. It is found that the South Dinajpur district's adoption index (6.070 ± 99) among farmers was much higher than that of the other four districts, namely Maldah (6.021 ± 01), Murshidabad (6.011 ± 03), Birbhum (5.570 ± 93), and Nadia (5.201 ± 16). According to the findings, farmers in the South Dinajpur district were better suited to modern methods of fisheries and animal husbandry.

Table 2: ANOVA of Adoption Index of different category of the farmers of Aspirational districts of West Bengal (N = 5000)

SOV	df	Mean Square From	F value
Sex	1	10.92	1.16
Age	2	8.07	0.86
Religion	1	10.13	1.07
Marital status	2	15.00	1.59
Family type	1	12.98	1.38
Education	2	44.49	4.72**
Training	1	130.51	13.84**
Occupation	5	43.54	4.62**
Caste	3	18.05	1.91
House Type	5	15.28	1.62
Land Holding	3	40.83	4.33**
ERROR	4254	9.43	

** $p < 0.01$ * $p < 0.05$

In compared to individuals with lesser educational level, those who were graduates or had higher educational degrees had a considerably ($p < 0.01$) higher adoption index (6.221 ± 12). Similar to this, people who worked as labourers and engaged in agriculture had a considerably ($p < 0.01$) higher adoption index than people in other professions. In comparison to farmers who had not received any training (5.421 ± 01), those who had

(7.891±08) had a considerably ($p<0.01$) higher adoption index. It was clear that the farmers who had received training were more knowledgeable about fisheries and animal husbandry techniques. These farmers therefore favoured the deployment of upgraded technologies. The adoption of more advanced technologies was chosen by the farmers in terms of land holding patterns.

The adoption index of farmers with land holdings above 2 hectares was significantly ($p<0.01$) higher (7.63±0.92) than that of the other three groups, including landless (5.54±1.07), marginal (5.92±1.09), and small farmers (6.45±1.09) (in terms of land holding pattern). Farmers with land, especially agricultural land larger than 2 acres, preferred to raise animals as a form of secondary income. Their ability to do scientific livestock rearing required improved technology, which is why the adoption rate was comparatively higher. Other variables like age, religion, education, caste, marital status, family size, and type of housing had no significant effect on those farmers' adoption levels.

A major indicator of how important the advanced technology was to these farmers was the adoption rate. The value was shown in Table 1 and the adoption level was divided into three categories: low, medium, and high. In comparison to the other four districts, it was found that the majority of farmers in Birbhum district (62.1%) had lower adoption rates than those in the other four districts. Low level of adoption was more common among the unmarried (60%) and those who were farmers (62.18%) and illiterates (61.49%), respectively.

In comparison to other castes, farmers from other backward castes had a low adoption rate. The chi-square test (Table 1) revealed a highly significant effect ($p<0.01$) of the variation in these farmers' adoption levels based on different categories. The primary goal of the current study was to examine how small and marginal farmers in West Bengal's underdeveloped (aspirational) districts adopted technology.

The findings were consistent with the observations made by Jeelani et al. (2015) in his study in Jammu and Kashmir regions. The results had shown a low degree of acceptance among these farmers, indicating their lacking in applying improved fishing and animal husbandry techniques. The current study was done mostly with small and marginal farmers in West Bengal's underdeveloped (aspirational districts) areas. Similar types of observations were also found in Bihar by Kumar et al. (2015). The findings of Podukunju et al. (2002) were in disagreement with the outcome because they had conducted their study among tribal women who were less interested in implementing new technology in goat husbandry.

Table 3 provides the correlation coefficients for each personal and socio-economic characteristics with the respondents' adoption level. Overall, among the 11 independent variables in the five districts, it was found that 7 of them (religion, occupation, education, family type, house type, land ownership, and training) showed highly significant relationship ($p<0.01$), while caste showed significant correlation ($p<0.05$) with the adoption level of farmers in the five aspirational districts of West Bengal.

Table 3: Spearman Correlation of Adoption Index with different factors among the farmers of Aspirational districts of West Bengal (N = 5000)

Factors	Age	Religion	Marital status	Occupation	Caste	Education of the farmers	Family type	Training	House Type	Land Holding	Adoption Index
Age	1.00	0.01	.164**	-0.11	-.396*	.150*	0.12	0.11	-0.03	0.10	0.07
Religion		1.00	-.269**	.403**	.127*	.333**	.418*	0.11	-0.07	0.03	.362**
Marital status			1.00	-.358**	-.223*	.528**	-0.12	0.10	-.218*	.317**	-0.06
Occupation				1.00	.444*	0.01	.353*	.245**	-0.01	.353**	.440**
Caste					1.00	-.153*	0.07	-0.08	0.07	.203**	.162*
Education of the farmer						1.00	.267*	.41**	-.337*	.401**	.273**
Family type							1.00	0.11	0.06	.125*	.356**
Training								1.00	-0.05	.248**	.256**
House Type									1.00	-.323**	-.269**
Land Holding										1.00	.373**

Adoption Index											1.00
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The adoption rate of farmers in five aspirational districts in West Bengal was not significantly correlated with the other two variables, age, or marital status. Although there was a negative correlation between marital status and the adoption index, it was not statistically significant. Although Ghosh et al. (2004) and Roy and Tiwari (2017) had conducted their research in various areas, that revealed similar results that age and education of the respondents were significantly correlated with adoption of improved animal husbandry practises among socio-economic variables.

Table 4: Adoption of different technologies among the farmers of Aspirational districts of West Bengal (N = 5000)

CATEGORY	Birbhum	Nadia	Malda	South Dinajpur	Murshidabad	Overall
	(%)	(%)	(%)	(%)	(%)	(%)
Vaccination against contagious disease	67.94	73.96	71.95	82.14	76.01	74.14
Deworming for parasitic control	66.08	64.02	66.5	71.67	67.93	67.19
Cultivation of Green fodder	35.88	35.74	36.68	26.67	37.12	34.42
Feeding of green fodder	36.18	29.23	32.23	39.52	36.49	34.8
Feeding of Concentrate Mixture	43.82	26.51	34.14	52.98	42.05	40.09
Feeding of Colostrum to new born kid	27.84	20	26.78	30.83	28.16	26.74
Feeding of Urea & molasses treated straw	24.02	18.22	23.35	23.93	24.49	22.82
Castration by Bradizzo Castrator	30	25.33	25.13	34.05	26.39	28.31
Value addition of Milk & Meat	21.96	25.56	26.14	33.1	32.2	27.51

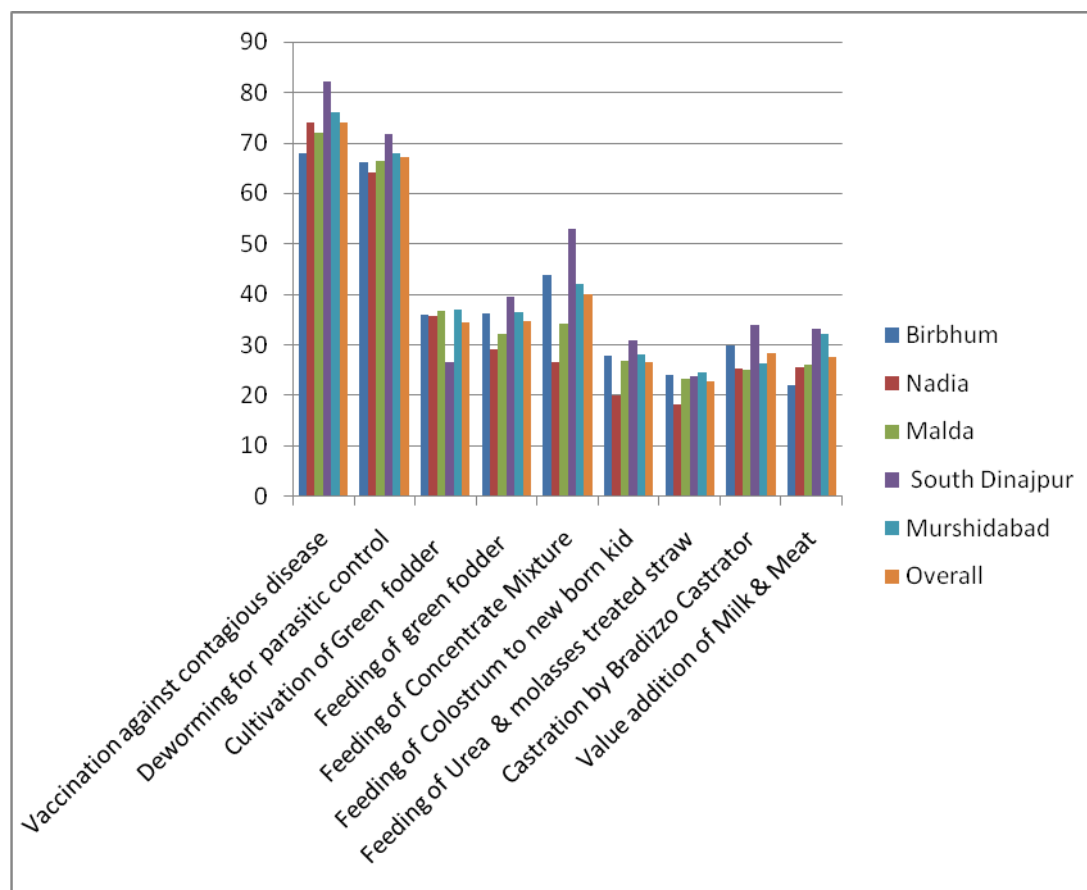


Figure 1: Adoption of Different Technologies among the Farmers of Aspirational Districts of West Bengal

Therefore, in the future, extensive farmers training and awareness must be created to strengthen farmers' ability to support themselves through livestock raising. The higher adoption rate for immunisation was in the South Dinajpur district (82.14%), followed by Murshidabad district (76.01%), Nadia district (73.96%), Malda district (71.95%), and Birbhum district (67.94%). The findings were consistent with that of Roy and Tiwari's (2017) research, notably in West Bengal.

IV. Conclusion:

It had been shown that the adoption index was significantly impacted by education, training, occupation, and land ownership. The adoption index among farmers in the South Dinajpur district appeared to be substantially greater than it was in the other four districts, Malda, Murshidabad, Birbhum, and Nadia. The findings suggested that farmers from South Dinajpur district were more used to modern methods of fisheries and animal husbandry. In compared to the other four districts, it had been noted that the majority of Birbhum's farmers had poor adoption rates. Therefore, a thorough HRD programme should be implemented for greater livelihood generation. For a sustainable livelihood-driven work plan has to be undertaken in the future and the adoption rate among the farmers needs to be evaluated. Given this situation, a viable plan that links the science and technology that is already accessible has to be promoted for improving the farmers' quality of life in West Bengal's aspirational districts. In the future, a thorough farmers training and demonstration programme needs to be carried out in these regions for the improved standard of living of the farmers. For the development of appropriate policies to improve sustainable livelihood in these districts, the adoption level of farmers with regard to livestock rearing must be evaluated.

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