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Centre for Research in Rural and Industrial Development
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THE ENVIRONMENTAL AND SOCIO-ECONOMIC IMPACT OF COAL MINING ON LOCAL LIVELIHOODS AND HEALTH: A CASE STUDY OF RANIGANJ COALFIELDS IN WEST BENGAL, INDIA

Suchismita Mondal Sarkar[1] and Debleena Banerjee[2]

Abstract: Coal mining proved to be a miracle worldwide in terms of economic development, but has also raised several concerns of environment eco-system services. Though, it provides both direct and indirect opportunities to the people but at the cost of causing immense damage to the environment, biodiversity and health of living beings. This paper attempts to assess the environmental and socio-economic impact of coal mining on livelihood and health of the local communities residing in Raniganj Coal-field area of West Bengal. The analysis is based on a survey of 120 households conducted in the region using a structured questionnaire. Analysis of water and soil from the surrounding area was done using standard methods. It is evident from the result that pollution created from coal dust has tremendous impact on health and environment. The water and the soil tests clearly indicate about its poor quality. In general, the paper concludes that even though mining acts as an earning opportunity, for the local people, the negative externality generated from it, poses a serious question.

Keywords: Coal-Mining, Pollution, Livelihood, Health, Income Diversification.

Introduction

Coal has been recognised as the most valuable mineral and is valued for its energy content. Mining of coal has done miracle in terms of its contribution towards economic development but on the contrary has bestowed us with several conflicts. While it has supported the country's initiative to move into the

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trajectory of rapid growth and harness the natural resource to accomplish the developmental goals, it has proved to be an environmentally, unfriendly substance.

Mining has a wide range of indirect impact both in terms of positive and negative externalities upon the local residents, their environment and livelihood. The coal mines are generally found to be in semi-agricultural zones which are not economically and socially developed. As such mining activities momentarily generate employment opportunities and support livelihood in the vicinity. Infrastructural developments are also made. But along with it comes other issues of severe concern such as displacement of local people, land acquisition and sometimes the skilled labour being forced to work in mines. Often, they lose their home, land and land-based livelihood. Mining activities produce enormous amount of waste thereby degrading the surroundings. The environment degrades with each passing day polluting the air and water bodies around. The deterioration is mainly caused due to inappropriate measures taken in this front. Several studies have indicated the potentially adverse impact of mining on the natural ecosystem, society, health and communities in close proximity. The loss thus created cannot be compensated by economic means. The local community's dominion is found to be threatened as their livelihood conditions are mostly neglected (Areeparampil, 1996). The benefits are accrued by the coal industry and the mining workforce depriving the local people, who only bears the environmental cost and are left out at the mercy of the government.

Basically, coal is comprised of soil, volatile matter, carbon, sulphur and hence the coal dust generated during mining causes health and environmental hazards. The sulphur dioxide, dust particles, ozone, etc. generated by mining operation reduces human life expectancy while carbon monoxide cause congestive heart, black lungs and chronic bronchitis. Mercury released from coal damages memory and nervous system. It is to be noted that the diseases and environmental problems are the results of major heavy elements produced during coal combustion (Munaver, 2017). Air and soil get contaminated by coal dust while coal fires emissions ruins vegetation in the surrounding area (Saini et. al., 2016). The sounds of drilling, blasting, motor vehicles and coal loaded trains on merry go round railway lines have been causes of noise pollution in the vicinity (Goswami, 2015). The contaminated ash contained water, released wastes from open cast, underground mines and coal washeries which flow into the water bodies of the surroundings thus polluting them.

Working in coal mines is also a dangerous activity. Hazards occur due to mine wall failures, flooding and vehicle collisions. Underground mining hazards include suffocation, gas poisoning, roof collapse, rock burst and gas explosions. The abandoned opencast mines and inadequate filling of land holes cause land sinking along with landslides.

Researchers pointed out that despite the versatile benefit of coal mining and its potential contribution as an important energy source, the negative externality generated in the process is too challenging. However, to meet the rising demand for energy, use of coal can neither be denied nor compromised. The primary concern therefore at the regional level is to design appropriate technology in an efficient and eco-friendly manner. This study attempts to evaluate the socioeconomic and environmental impact of coal mining on livelihood and health of the local community. The main research objectives addressed in this study are:

i. To identify and examine how mining activities influence livelihood of the local people.
ii. To examine the impact on environment in terms of air, water and soil.
iii. To assess the local people's perception regarding the impact of mining on environment and health.
iv. To suggest interventions to design policy tools to combat the problems.

The paper is divided into four sections, Section 1 includes an introduction to the coal mining scenario in Raniganj; Section 2 contains the methodology, giving details about the study area, data collection and methods of analysis; Section 3 deals with the results and discussions and the fourth and final section suggests policies interventions to combat the problems.

Methodology

Study Area

The study was conducted in the Raniganj coalfields of West Bengal which is a part of Eastern Coalfields Limited (ECL) of India covering an area of 443.50 km^2 having a total coal reserve of 49.17 billion tonnes, spreading across states of West Bengal and Jharkhand. The area bounded by latitudes 23°35'N to 23° 55'N and longitudes 86° 45'E to 87° 20'E and is the most important coalfield in West Bengal (Paschim Burdwan District). It lies in the Damodar valley region surrounded by the Durgapur-Asansol Industrial belt. The areas of ECL covered by Raniganj coalfields are Raniganj-Pandaveswar, Kajora, Jhanjra, Bankola, Kenda, Sonepur, and Salanpur (partly). The active coal mining in this area over the centuries have changed the land form in the area. This change is visible when we particularly concentrate on climatic constituents especially rainfall, temperature and relative humidity. Apart from coal mining people here are mostly engaged as cultivators, agricultural labourers, household industry workers and other workers.

Data Collection and Sampling Procedure

Data for the study was obtained from primary and secondary sources. A survey was made using a semi-structured questionnaire containing all relevant

information. The first section of the questionnaire consisted of demographic characteristics and general information, the second part dealt with occupational diversification and the third section was related to environment and health. Using the method of purposive sampling, 120 households were selected from 8 villages surrounding 8 major mines (15 households from each village) in the concerned area covering a population of 519 persons. The collieries were selected in such an order so that north, south, east and west regions of the Raniganj Coal fields are broadly covered. The villages selected are adjacent to the respective collieries, namely Ikra (Kunustoria Colliery), Kajora (Mahabir Colliery), Bansra (North Searsole Colliery), Mangalpur (Topsi colliery), Achra (Dabar Colliery), Bogra (J.K Nagar Colliery), Satgram (South Searsole Colliery), Harbhanga (Nimcha Colliery). Focussed group interviews were also conducted to capture the people's perception about mining and its consequent impact on the region and their livelihood.

Methods of Analysis

Water and soil samples were collected for tests. The water samples were collected from the surroundings of open cast mines and soil samples were collected from the surrounding agricultural fields where crops were sown. The testing of water and soil was carried out by several chemical tests as suggested by different researchers. Tests were performed in the laboratory of biotechnology department of the University of Burdwan.

Information obtained from the villagers through interviews was utilised for estimating the damages incurred due to pollution from coal dust. To assess their perceptions about the health status the respondents were asked to rate their responses according to the Likert scale.

Coal mining influences all activities as such people often adopt different livelihood strategies which results in diverse livelihood outcomes. Livelihood diversification provides security of financial earnings and stability in repaying debt. Hence, to capture the extent of livelihood diversification, Berry's index was used. This Index of diversification is represented as:

$$D_b = 1-\Sigma h_i^2$$

Where, h_i = Income share of each member in total household income. D_b lies from 0 to 1. $D_b = 0$, if there is single earning member and it increases as the household diversifies into an increasing number of working members.

Results and Discussions

Socio-Economic Profile of the Sample Population

Table-1 provides the socio-economic profile of the sample population. It is evident that 68.33 per cent of the population belongs to the non-poor section.

Most of the people reside in pucca houses. About 94.16 per cent of households have pucca or semi pucca toilets while about 5.84 per cent of the households do not have toilet within their premises. Hinduism is followed or practised by majority of the creed. About 66.28 per cent of the sample population belongs to the working-class age group (18-60 years) with 17.53 per cent of the population being illiterate.

Table-1
Socio- Economic Profile of Sample Household

Indicators	Type	Frequency	Percentage
Economic Status	APL	82	68.33
	BPL	38	31.66
Caste	General	51	42.50
	SC	40	33.33
	ST	23	17.16
	OBC	6	5.00
Religion	Hindu	111	92.5
	Muslim	5	4.16
	Christian	4	3.33
House Conditions	Own	106	88.33
	Rent	14	11.66
House Type	Pucca	60	50.00
	Kutcha	8	6.66
	Semi-Pucca	52	43.33
Toilet Type	Pucca	46	38.33
	Semi-Pucca	67	55.83
	No facility	7	5.84
Education	Primary School	151	29.09
	High School	260	50.09
	Graduation	14	2.69
	Above	3	0.57
	Illiterate	91	17.53
Age	0-6	47	9.05
	7-18	107	20.61
	19-60	344	66.28
	60-above	21	4.04

Source: Field survey 2018

Coal mining in this region has a long history, which dates to nearly two and a half centuries back. With the advent of industrialisation, coal mining increased with starting of opencast mining. By 2012-13 coal mining started providing employment to almost 73 thousand people. It gave both direct and indirect opportunities to the people, with tax revenues and foreign exchange earnings for the government. Basic infrastructural facilities were created as an externality to coal mining such as developing of transportation, educational and health infrastructures.

However, with increase in opencast mining, the area came under the clutches of illegal mining. This aggravated pollution and the poor resource management pushed the region into a dystopian future. People carrying large quantities of coal on their bicycles and vans are common feature seen on the roads of this region. Another misery with which people of this region live is land inundation and displacement. Often due to illegal mining the land collapses and people have to shift to different places losing their homes. Basically, they are trapped for livelihood. Though mining provided livelihood opportunities it has destroyed agricultural land. People are forced to recreate alternative livelihood sources. Table-2 captures livelihood diversification in the concerned region, we have categorised the households for the purpose of expositional convenience into different categories.

1. Households solely dependent on mining.
2. Households, dependent both on mining and non-mining categories.
3. Households dependent only on non-mining categories.

Captured data suggest that about 51.83 per cent of people are not dependent on mining while 31.67 per cent of the people solely depending on mining. Dependence of sample population on mining and other sectors is shown in the following table.

Table-2
Dependence of Sample Population on Mining and Non-Mining Sectors

Number of Households	Village-wise								
	Ikra	**Kajora**	**Bansra**	**Mangalpur**	**Achra**	**Bogra**	**Satgram**	**Harbhanga**	**Combined villages**
With only Mining	4	2	7	7	8	3	1	6	38 (31.67)
With only mining and one more occupation	4	3	0	4	1	0	0	1	13 (10.83)
With mining and two more occupation	0	1	0	0	1	1	3	2	8 (6.67)
Without mining	7	9	8	4	5	11	11	6	61 (50.83)
Total	15	15	15	15	15	15	15	15	120

Source: Field Survey, 2018.
Note: Percentages are given in parentheses

Impact on Environment

Coal mining imposes tremendous stress on the surrounding environment, biodiversity, vegetation, soil strata, water bodies and human health. The effects

are everlasting. The people in the surroundings reported that the place is covered with a thin layer of coal dust especially in the winters. The black smoke (partial burned carbon) coming from the coal mines covers the sky causing suffocation. Combustion of coal emits carbon dioxide, nitrous oxide and methane which contribute to air pollution and global warming. Sounds of drilling and blasting are common to the people of the area. They are accustomed to live amidst noise pollution and accepted this way of living with pain. Houses which are comparatively closer to the mining areas are found to have closed windows throughout the day to protect themselves from the pollutants resulting in an increase in electricity bills. Due to the dust particles settling and acid rain encroaching the walls of the buildings there is a hike in maintenance cost. Mining not only covers up agricultural land, but encroaches forest land and causes top soil loss. In many places the top soil subsided and people were displaced. Acidic waters and leaching from washeries degrade the water quality. Ponds and other water bodies in the vicinity are covered with a thin layer of coal dust thus contaminating the water. Referring to water treatment process people are found to consume untreated water with some people adopting the filtration and sedimentation process for purifying water.

Microbiological properties of water samples and physicochemical properties of both water and soil samples collected from different open cast mines and adjacent areas of Raniganj Coal-field were done in the department of biotechnology using standard methods.

Results of the Water Tests

Table-3
Predominant Bacterial Species Present in Water Samples

Sl. No.	Sample	Predominant bacterial species	Harmful effects
1.	Ikra	Shigella sp.	Diarrhea, abdominal pain
2.	Kajora	Enterobacter sp., Salmonella sp.	Typhoidal fever, Acute gastroenteritis, Enterocolitis
3.	Bansra	E.coli, Klebsiella sp.	Urinary infection, upset stomach with severe pain and cramps; Pneumonia, high fever, wound infection, Urinary Tract Infection (UTI)
4.	Mangalpur	Klebsiella sp.	Pneumonia, high fever, wound infection, Urinary Tract Infection (UTI)
5.	Achra	E.coli	Urinary infection, upset stomach with severe pain and cramps
6.	Bogra	Salmonella sp.	Typhoidal fever, Acute gastroenteritis
7.	Satgram	Vibrio sp., E.coli	Acute diarrhea, Septicemia, gastroenteritis; Urinary infection, upset stomach with severe pain and cramps
8.	Harbhanga	Pseudomonas sp., Enterobacter sp.	pneumonia, severe coughing and congestion Enterocolitis

Source: Field survey, 2018.

Microbiological tests of the water samples were done using standard method. On the basis of microscopic morphological observation, staining properties, biochemical characteristics, preliminary identification of bacterial species were done using Bergey's manual (Bergey, 1923). All these species are gram negative and belong to the family Enterobacteriaceae. The predominant bacterial species found in the water samples are listed in the Table-3:

Physicochemical properties of water like pH, conductivity, total solids and presence of some elemental constituents of the water were measured and tested by respective standard methods of estimation and are depicted in the Table-4.

Table-4
Physicochemical properties of water samples

Area from which the water sample was collected	Physicochemical parameters							
	pH	Manganese (Mn, in ppm/L)	Total solids (mg/L)	Boron (B, in mg/L)	Chloride (Cl^-, ppm/L)	Nitrate (NO_3, mg/L)	Calcium (Ca, mg/L)	Iron (Fe, mg/L)
Ikra	8.3	0.03	384	Nil	13	1.30	51.90	0.06
Kajora	8.1	0.01	338	0.137	10	0.94	48.90	0.25
Bansra	8.1	Nil	427	0.026	13	2.87	50.30	0.18
Mangalpur	7.9	0.01	317	Nil	09	0.82	46.98	0.31
Achra	8.3	Nil	561	0.169	17	1.06	53.80	0.37
Bogra	8.0	Nil	358	0.019	19	0.55	53.30	0.13
Satgram	7.8	0.03	497	Nil	14	1.16	49.40	0.20
Harbhanga	8.2	0.02	430	0.180	14	2.23	50.60	0.09
Safety standard/ critical limit	Around 7	0.05	300	2	250	10	Greater than 30mg/L	3

Source: Author's calculations

All these bacterial species found in water bodies of open cast mines in different areas of Raniganj coal belt are harmful human pathogens capable of producing several diseases (Table-3). Presence of such pathogenic micro-organisms clearly indicates that the water of these water bodies cannot be used as drinking water as well as for domestic purposes without proper treatment. On the other hand, physicochemical properties of the same samples of water were found to be unusable for agricultural use.

Results of the Soil Tests: The soil samples collected were also tested and the results are presented in Table-5. The parameters used primarily focus on the suitability of the land for agricultural purposes. Results clearly indicate the barren nature of the soil from agricultural point of view. Both physical and chemical tests highlight the very poor soil fertility. High bulk density, very poor amount of available water, presence of some trace elements generally decreases soil fertility. Balanced (NPK Nitrogen-Phosphorus-Potassium) ratio is a basic criterion for agriculture. The NPK level is much lower or approaching lowest level than the recommended amount for both continuous and seasonal farming. The nearby

fields cannot support agriculture without massive and planned treatment of the soil.

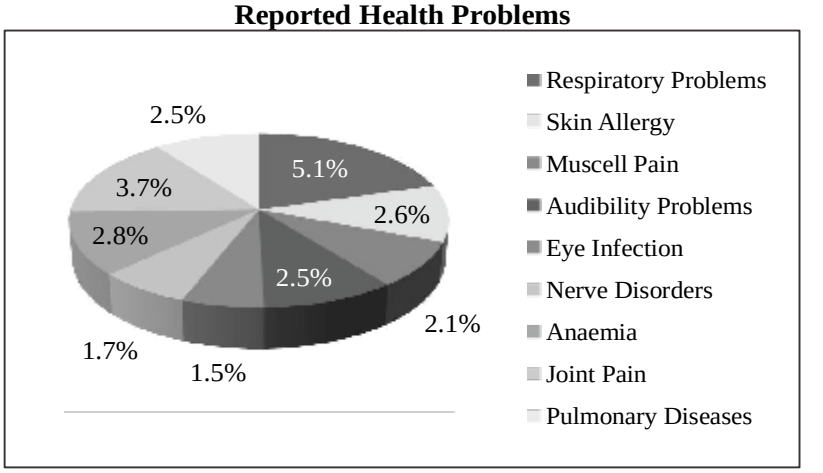
Table-5
Physico-chemical characteristics of soil sample

Sl. No.	Area from which the water sample was collected	Parameters						
		Bulk density (g/cm^3)	Available water (cm^3/cm^{-3})	Nitrogen (ppm)	Phosphorus (ppm)	Potassium (ppm)	Iron (ppm)	Magnesium (ppm)
1.	Ikra	1.79	0.88	06	2.36	125	7.05	13.90
2.	Kajora	1.82	0.91	08	2.51	128	8.96	10.80
3.	Bansra	2.05	1.06	11	1.99	118	8.43	11.32
4.	Mangalpur	1.94	1.35	08	2.07	109	6.47	13.00
5	Dabor Salanpur	2.00	1.20	05	1.87	97	9.88	14.18
6.	Bogna	1.79	0.98	10	1.62	92	9.35	13.65
7.	Satgram	1.88	1.31	14	2.23	126	5.65	11.97
8.	Harbhanga	2.18	1.36	08	1.90	131	6.79	12.57
	Deficiency limits	≤1.3	1-1.5 cm^3 cm^{-3}	≤10	≤20	≤75	≤3.5	≤7.4
	Toxic limits	≥1.9	≥2	≥30	≥100	≥800	≥4	≥40

Source: Author's calculations

Impact on Human Health

Figure-1
Reported Health Problems



Air, water and soil quality of a region greatly influence the quality of life of the local people residing in the concerned area. The aetiology most human diseases are related to the status of living and their environment. The pollution of the environmental resources has tremendous impact on human health. Prolonged exposure to coal dust is harmful to human health. Coal ash results in respiratory problems. Partially burnt black carbonic (black smoke) is highly dangerous to the health. It is observed from the survey results that people in the surrounding areas suffer from skin and respiratory problems due to the coal ash coming from the

coal mines. Cough and cold resulting from dust allergies is quite common. Elderly people often suffer from respiratory troubles which reduce life expectancy. The quality of health care services is quite inadequate. There is a lack of cheap health related services, availability of life saving drugs and doctors in case of any emergency. Hence, sometimes people refer to traditional healing techniques or homeopathy as much in favour of redemption. Figure-1 shows the diagrammatic representation of the health problems.

Table-6
Age Wise Classification of Common Disease

Type of diseases	Age group	Villages *								Total	Grand total
		V1	V2	V3	V4	V5	V6	V7	V8		
Respiratory Problems	0-6									0	26
	7-18			1						1	(5.01)
	19-60	2	4	1	1	1		6	1	10	
	61- above	5		1			2		1	9	
Skin Allergy	0-6								2	2	14
	7-18				1		1			2	(2.69)
	19-60	1	2	1	1	1		1	2	12	
	61- above		1							1	
Muscle Pain	0-6									0	11
	7-18				1					1	(2.11)
	19-60	1		1	1	1	3		1	8	
	61- above				1			1		2	
Audibility Problems	0-6					1				1	13
	7-18	1							2	3	(2.50)
	19-60			2	2	2			1	7	
	61- above					1	1			2	
Eye Infection	0-6									0	8
	7-18			1	1			2		4	(1.54)
	19-60						2	1	1	4	
	61- above									0	
Nerve Disorders	0-6				1		1			2	9
	7-18					1				1	(1.73)
	19-60			3			2		1	6	
	61- above									0	
Anaemia	0-6									0	15
	7-18	1	1		2					4	(2.89)
	19-60	1	1		8				1	11	
	61- above										
Joint Pain	0-6									0	17
	7-18									0	(3.27)
	19-60	1	2	5	2		2	3	1	16	
	61- above		1							1	
Pulmonary Disease	0-6							1		1	13
	7-18		1	2	1	1		1		6	(2.50)
	19-60					2	1	1	1	5	
	61- above						1			1	

Source: Primary survey, 2018. Note: Percentages (approx.) are given in parentheses.
* Villages- V1-Ikra, V2-Kajora, V3-Bansra, V4-Mangalpur, V5-Achra, V6-Bogra, V7-Satgram, V8-Harbhanga.

Table-6 concludes that respiratory and skin problems are much common among the working class. Changes in behaviour and in psychological wellbeing are observed due to pollution. Some of the local people are found to be ignorant

of their changes in behaviour. The people who reported behavioural change confessed that they are prone to much more anxiety and frequent mood swings. People wear mask to cover up their nose so that less pollutants are inhaled when they move out of their house. Dry and cracked skin, which was generally a winter phenomenon, is found to prevail throughout the year due to excessive coal dust present in the atmosphere.

Table-7
Surveyed Reciprocation on Effects of Mining on Health

Disease	Community status (n=120)		Frequency (n=120)
	Mining	***Non-Mining***	**Total**
Respiratory Problems	21(17.5)	5(4.16)	26(21.66)
Skin Allergy	8(6.66)	6(5)	14(11.66)
Muscle Pain	7(5.83)	4(3.33)	11(9.16)
Audibility Problems	8(6.66)	5(4.16)	13(10.83)
Eye Infection	4(3.33)	4(3.33)	8(6.66)
Nerve Disorders	7(5.83)	2(1.67)	9(7.5)
Anaemia	10(8.33)	5(4.16)	15(12.5)
Joint Pain	8(6.66)	9(7.5)	17(14.16)
Pulmonary Disease	10(8.33)	3(2.5)	13(10.83)

Source: Field survey 2018
Note: Percentages are given in parentheses

Constant Disposal of the wastes leads to environmental contamination, which has a serious impact on the health of the mine workers and local people. Table-7 shows the surveyed reciprocation of effects of mining on health. Comparing the mining and non-mining sector it is found that, people associated to mining suffer more from ill health, than the non-mining community.

General Perception about Healthcare Service and Infrastructure

In an endeavour to understand the quality of health service and health infrastructure as perceived by the residents of the region a number of questions were asked to which three-point Likert scale was applied to grade the possible responses into i) Good ii) Bad iii) Fair or Medium

It is evident from Table-8 that major percentage of the sample population has rated the initial health care service and related infrastructure to be fair. But in case of severe emergency, they need to move out to the district hospitals. Overall, the respondents were nonchalant in their attitude towards the health care system. However, at present the occurrence of accidents have come down due to some measures being taken on this front by coal authority. Hospitals have been built for coal workers and their living conditions of their quarters have been improved. Many workers suffer ailments from the continuous underground work. Long exposure to coal dust leads to the lung disease and pneumoconiosis. Presently there is a block primary health centre at Raniganj. Other hospitals include

Marwari Relief Society Hospital and Annandale Hospital. Primary health centres are also present in the villages. Kalna hospital serves as a boon for the ECL workers. The collieries also have a tie with some renowned hospitals for serious health mishap.

Table-8
Perceptions about Health Infrastructure

Perceptions	Good	Bad	Fair
Quality of health Status	23 (19.16)	6 (5)	91 (75.83)
Level of Satisfaction with the present health care services	2 (1.67)	29 (24.17)	89 (74.17)
Perception related to Health Infrastructure	3 (2.5)	47 (39.17)	70 (58.33)

Source: Primary survey, 2018, Note: Percentages (approximately) are given in parentheses.

Analysis of Livelihood Diversification

Diversification at the household or individual level simply means adding new activities as the source of income or livelihood. It can be described as a process by which each household constructs an array of activities in order to survive and enhance its living. In recent times the increased recognition of multi - occupational and cross-sectoral activities have become fundamental for designing developmental policies.

Table-9
Diversification Index Across Households

Village name															
Ikra		Kajora		Bansra		Mangalpur		Achra		Bogra		Satgram		Harbhanga	
HH. No	DI	HH. No	DI	HH. No	DI	HH. No	DI	HH. No	DI	HH. No	DI	HH. No	DI	HH. No	DI
1	0	16	0	31	0	46	0	61	0	76	0	91	0	106	0
2	0.55	17	0	32	0	47	0	62	0	77	0	92	0	107	0
3	0	18	0.46	33	0	48	0	63	0	78	0.49	93	0.49	108	0.67
4	0	19	0	34	0	49	0.36	64	0.56	79	0.65	94	0	109	0
5	0.5	20	0.49	35	0	50	0.49	65	0.46	80	0	95	0	110	0
6	0.47	21	0	36	0	51	0	66	0	81	0	96	0.41	111	0
7	0	22	0	37	0	52	0	67	0	82	0	97	0	112	0
8	0.8	23	0.75	38	0	53	0	68	0	83	0	98	0	113	0
9	0.5	24	0	39	0	54	0	69	0	84	0	99	0	114	0.45
10	0	25	0	40	0	55	0	70	0	85	0.94	100	0	115	0
11	0.65	26	0	41	0	56	0	71	0	86	0	101	0	116	0
12	0	27	0	42	0	57	0.49	72	0.5	87	0	102	0.74	117	0
13	0	28	0	43	0	58	0.65	73	0	88	0	103	0.48	118	0
14	0	29	0.75	44	0	59	0	74	0.49	89	0	104	0	119	0
15	0	30	0.46	45	0	60	0	75	0.49	90	0.49	105	0	120	0.16

Source: Author's calculation

Households generally facing environmental risks focus on diversification of income (Livelihood diversification being measured on income scale). With an aim to reduce or avoid unexpected financial shortfalls, the households diversify their livelihood sources. The extent of diversification measured by Berry's index is presented in Table-9.

It is assumed that livelihood diversification is greatly influenced by mining in the surrounding area, hence, in order to capture the factors influencing diversification, a multiple regression analysis is carried out taking diversification index (DI) as the dependent variable and a set of independent variables presented in table 9.The regression equation is:

$DI = a_0 + a_1\ ECO_ST + a_2\ FAMILY_SZ + a_3\ AGE + a_4 INC + a_5\ EDU + a_6\ DR + a_7 MINING_LBR + e_i$.

Where e_i = Error term.

Table-10
Description of the Independent Variables

Variable name	Description of the variables	Expected sign
ECO_ST	Economic status is denoted by '1' for APL and '0' for BPL families. (1 and 0 are used as dummy)	+(ve)
FAMILY_SZ	Family size is the total number of members in the household.	+(ve)
AGE	Age of the highest paid member of the family is considered	-(ve)
INC	Income of the highest earning member in the family is considered.	+(ve)
EDU	Education of the highest paid member of the family is represented by years of schooling.	+(ve)
DR	Dependency ratio defines, the ratio of nonearning members to that of the earning members.	+(ve)
MINING_LBR	Presence of any labour associated with mining. A dummy value of 1 is taken if the family has a mining labour and 0 otherwise.	+(ve)

Results of the Regression Model

The results of the regression analysis are presented in Table-11. Out of seven independent variables only three variables are significant and resembles their expected signs. However, the R square and Adjusted R square values are 0.739 and 0.723 respectively which represents the model is a good fit. It is found family size; household income and dependency ratio significantly influence livelihood diversification in the region.

Table-11
Results of the Regression Model

Variable	Co-efficient	P>│t│	t stat	Standard error
ECO_ST	0.0251	0.338	-1.108	0.089
FAMILY_SZ	0.1249	0.000	0.963	0.026
AGE	-0.002	0.851	8.793	0.014
INC	4.32e	0.000	-0.189	0.001
EDU	-0.004	0.361	3.620	0.000
DR	0.1438	0.000	-0.918	0.005
MINING_LBR	0.0042	0.862	-10.603	0.014
CONSTANT	0.0981	0.270	0.174	0.024

Source: Author's calculations
Summary: R Square: 0.739, Adjusted R Square: 0.723, Standard Error: 0.129
Observations: 120, F:45.267, Significance F: 0.00

Conclusion: Development or Conservation?

Overall, the study tries to assess the impact of coal mining on livelihood, environment and health. The results clearly reveal that though coal mining has positive impact on the local economy but it poses great threats to the environment and human health. The pollution created from mining has tremendous socio economic and environmental impact on its surrounding. The coal dust particulates, sulphur dioxide released and acid deposition often destroys the vegetation around and degrades the soil and the water bodies in the vicinity. Drilling and blasting add to the noise pollution. The result of the water and the soil test indicate its poor quality. Result of the regression analysis shows that family size, household income and dependency ratio significantly affect livelihood diversification. Summing up, the paper concludes that even though mining acts as an earning opportunity for the local people, but the negative externality generated, poses a serious question of development or conservation.

Stopping coal mining is not a viable option as it is related to development. Sustainable livelihood framework should be stressed upon. The local people bear a disproportionate share of social and eco-system cost which receives less benefit against the costs incurred. The government definitely needs to play a role here. Retention of environment is important for human survival. Hence, a balance is needed between development and environmental protection. Mine spoil restoration should be given emphasis. The opencast mines which are left exposed after completion of mining activities can be transformed into useful economic projects like pisciculture, small parks, etc. Afforestation of waste dumps around the open water bodies can also increase the aesthetic value of the abandoned place.

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Notes

Water samples collected from different areas of opencast mines viz., Ikra, Kajora, Bansra, Mangalpur, Achra, Bogra, Satgram, and Harbhanga which were diluted up to 10^{-5} with Mili-Q water and microbiological study were performed. 0.1 ml of sample was inoculated in a number of petri-dishes containing suitable nutrient agar medium. Plates were then incubated in a shaker incubator at 37 °C overnight condition for producing colonies. Pure cultures of bacterial species were then prepared by isolating colonies collected from the composite bacterial colonies. The bacterial species from pure cultures were subjected to gram staining and IMVC Test series (Indole Test, MR Test, VP Test and Citrate test).

The NPK level is recommended by: Allan Fulton, Farm Advisor, Tehema, Glenn, Colusa and Shasta Counties for Potassium (K); M A. [Mojid, G. C. L. Wyseure and S. K. Biswas, Department of Irrigation and Water Management, Bangladesh Agricultural University, Mymensingh, Bangladesh for Phosphorus (P); Centre for Agriculture, Food and Environment, University of Massachusetts Amherst, USA for Nitrogen (N)]

Acid deposition sometimes may occur even in the high pH level. It may due to conversion of acidic substances to different salts, especially bicarbonate which breaks into hydroxyl ion as one of the constituents raising the pH level of the water.

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ECONOMICS OF CASH CROP CULTIVATION IN COLD DRY ZONE OF HIMACHAL PRADESH

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Abstract: Vegetable production has the potential to increase the economic prosperity of the farmers in the hilly regions due to its high returns. It is highly evident in the form of changing cropping pattern towards horticultural crops in the hilly areas. The present study is undertaken to analyse the cost and return structure of green pea which is the major cash crop of district Lahaul and Spiti which lies in the cold dry zone of Himachal Pradesh. The results are based on the primary survey conducted in the year 2018 in two selected representative villages of Lahaul block and Spiti block each. Apart from the primary survey, the study also relies on secondary data which was collected from various state government departments for the time period 2005-06 to 2016-17. The cost of cultivation was found to be higher for Spiti block in comparison with Lahaul block. The net returns were higher in Spiti block. To further increase the profitability, support from government agencies becomes essential for the adoption of modern techniques, better marketing facilities and encouraging organic farming in the district.

Keywords:Cost of cultivation, organic farming, cash crop, cold dry zone, Lahaul and Spiti, green pea.

Introduction

The economic prosperity of an agrarian economy depends significantly upon the profitability of the crops cultivated by the farmers. To ensure better returns from their farm produce, farmers aim at minimising the cost of cultivation and maximising their returns, although they have very little control over the prices of the crops. Their decision regarding the choice of crops mainly depends upon the

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cost and returns from a particular crop. Over the years farmers have shifted towards the cultivation of high-value cash crops like fruits and vegetables to earn a higher return. An analysis of the review of related literature reveals that the hilly regions have attained notable progress in the socio-economic sphere with the help of these transformations in agriculture and horticulture (Chand, 1996). Off-season vegetable cultivation is a highly remunerative enterprise in hilly areas and has the potential to increase economic prosperity among farmers (Singla, Chahal & Kataria, 2006; Bala, Sharma & Sharma, 2011).

Since Lahaul and Spiti district falls in the temperate zone, it has offered farmers with numerous opportunities to diversify towards high-value temperate fruits and vegetables which provide an opportunity to improve the income of the farmers and in creating gainful employment. (Shashni, 2019). High-value temperate fruits and vegetables like apple, green pea, cabbage, cauliflower, etc. are grown in the district. Over a hundred years ago crops like barley, buckwheat, wheat and mustard were cultivated in the district (Bajpai, 1987). Seed Potato was introduced in the district in the 1960s and Lahaul Potato Society (LPS) was created in 1966 for the marketing of potatoes (Singh, Ram and Kuniyal, 1997**)**. Major crops till 1980s were Barley, wheat, black pea and potato whereas green pea was commercially introduced as a cash crop duringthe 1980s in Lahaul and Spiti.

Later, cultivation of hops was also started in the district which was used as a flavouring and stabilising agent in beer. But eventually, the farmers could not get a good price for the organic hops as they could not withstand the competition from the imported hops which were sold at much cheaper prices by foreign countries in India. As a result, the local farmers incurred huge losses, so they shifted towards the cultivation of other temperate vegetables to earn a better livelihood. Cauliflower cultivation also became prominent in the district with a tremendous increase in the area under cauliflower from 29 hectares to 658 hectares from the year 2005-06 to 2016-17. Initially few farmers started cultivating cauliflower. These farmers got very good returns from cauliflower cultivation, which ultimately motivated other farmers to follow suit (Shashni, 2019).

Farmers in Lahaul and Spiti had also tried to cultivate flowers like Gladiolus and Lilium for commercial purposes. But the area under these flowers never increased much due to the presence of numerous problems like exploitative middlemen, the shorter shelf life of flowers, far off market destination in Delhi and poor conditions of roads which further aggravated the risk related to marketing of these flowers. Farmers have reported that many times the middlemen never came back to make payments to the farmers. So, to avoid such risk, farmers generally stick to vegetable crops which have comparatively longer shelf life as compared to flowers.

Black pea has been replaced by green pea and varieties of barley are also on the verge of extinction due to rapidly changing cropping pattern (Bodh & Mehta, 2018). There is crop diversification mainly towards the horticultural cash crops which ensure higher returns as compared to grain crops. Barley is the main traditional crop grown in Lahaul and Spiti which is used mainly for domestic consumption and livestock purposes and a very small quantity of barley is sold in the local markets of Lahaul and Spiti. Barley has remained an important grain crop of the district, although the area under barley decreased from 608 hectares in 2005-06 to 430 hectares in 2016-17. The choice of growing Barley lies in the age-old practices, traditions and consumption patterns of the native people. The farmers of Spiti region grow barley every year to make an offering to the royal families who later donate it as a collective offering from the people to the monasteries. Barley is an important ingredient used in religious ceremonies and auspicious occasions in the Buddhist culture, so even if it has very little commercial significance, it has great religious and cultural importance (Shashni, 2019). Barley is locally consumed as 'sattu' (i.e., roasted and ground barley) and sold in the local markets of Lahaul and Spiti. It is one of the exceptional traditional crops which still holds an important place as far as the area under cultivation is concerned.

The secondary data collected for the study revealed that green peas remained the highest cultivated crop in the district from 2005 to 2017. Green peas occupied around 64 per cent of the cultivated area in 2005-06 and around 46 per cent of the cultivated area in 2016-17. The area under green pea cultivation was 3890 hectares in 2005-06 and 3223 hectares in 2016-17. Therefore, green pea was chosen as the representative cash crop and an attempt was made to evaluate the cost and return structure of green pea in district Lahaul and Spiti. Green pea is grown mainly for commercial purposes and a very small quantity is kept for self-consumption. It fetches a good price in the market. The average price of green peas was Rs 30 per kilogram in Lahaul block and Rs 45 per kilogram in Spiti block in 2017, which was much higher than the average price of other crops grown in the district.

The farmers have been encouraged and supported by various government agencies to cultivate high-value cash crops in the district. For example, the Department of Agriculture in the district provide seed samples of cash crops like potatoes, green peas, cauliflower etc. to the farmers. They also recommend insecticides, pesticides and fertilizers that should be used while cultivating these crops and help farmers achieve a higher yield. Krishi Vigyan Kendras in the district also provide extension services through Kisan Melas and Kisan Ghosthi and help educate the farmers about cultivation of various cash crops.

The empirical studies reveal that diversification towards cash crops has considerably helped in increasing the income and employment situation in the

hilly regions (Sharma & Chauhan, 2013). Government institutions like Department of Agriculture, Department of Horticulture, Krishi Vigyan Kendrashave facilitated the process of crop diversification by providing information regarding proper cultivation techniques and provision of subsidized inputs like seeds and fertilizers to the farmers to ensure profitable cultivation of these cash crops. Along with that, the process of diversification has also been accelerated due to better road connectivity to remote villages in the hilly areas which have broken the barriers of inaccessibility (Sharma, 2011). It connected the isolated villages to the far-off markets in cities where farmers can sell their farm produce. Although the farmers are connected to the markets in Punjab and Delhi they have to depend on middlemen or traders to sell their produce. In such situations where marketing facilities like sabzi mandis are neglected by the government, a share of farmers profit goes to these middlemen (Devkota & Sharma, 2014).

Unique Characteristics of the Study Area

The study area is district Lahaul and Spiti of Himachal Pradesh, which lies in the western Himalayas. The district is known for its rough terrain, less availability of fertile land and extremely cold climatic conditions. Due to rough geographical terrain, the district is industrially backward and the inhabitants are largely dependent on agriculture to earn their livelihood. The economy of the district is mainly agrarian (District Census Handbook, 2011) . Lahaul and Spiti district has only a single cropping season i.e. from April to September due to heavy snowfall during the months between October to March. The area receives snowfall during winters from October to March; so all the agricultural activities come to a halt during this period (Padigala, 2016). Lahaul and Spiti falls in the rain shadow area, so the only source of water for irrigation is snowmelt water. Irrigation is done by an elaborate kuhl system, earthen channels which harness water from snowmelt glacier water.

The majority of farms are small and marginal in the district.Out of 4,274 operational holdings, 1838 are marginal, 1275 are small, 929 are semi-medium, 221 are medium and only 11 are large operational holdings (Statistical Abstract of Himachal Pradesh, 2017-18). Seventy-two per cent of the operational farms in the district are small and marginal holdings. So, it becomes extremely important for these small and marginal farmers to make the choice of crop based on the cost and return structure of that crop.

The district consists of two blocks namely the Lahaul block and Spiti block, both the blocks are geographically distinct entities. The soil in Spiti valley is silty in texture, has very low water holding capacity and is low in nitrogen, whereas soil in Lahaul valley has clay-loam texture and is comparatively fertile. Spiti is a cold desert region and receives very little rainfall. The lower parts of Lahaul receive showers of rain in July and August, but in Spiti, there are very few

light showers of rain (Bajpai, 1987). Both the blocks have a different sowing and maturing time for crops due to their climatic differences. All these differences in soil quality and climatic conditions lead to differential needs of various inputs used for the cultivation.

Objectives

1. To evaluate the cost and return structure of green pea cultivated in the Lahaul block and Spiti block of district Lahaul and Spiti.
2. To highlight the reasons behind the difference in cost and returns structure of green pea in the two blocks of district Lahaul and Spiti.

Data and Methodology

The present study is an attempt to analyse the cost and returns from green pea cultivation in district Lahaul and Spiti of Himachal Pradesh. The study was based on both primary and secondary data. The primary data was collected in 2018 whereas the secondary data for the study was collected from 2005 to 2017 from the various state government departments. The cost and returns from green pea are calculated separately for both the blocks of district named 'Lahaul block' and 'Spiti block'. This was done because of their geographical differences, difference in soil quality and climatic conditions which led to their varying input needs, leading to differentcost structures in both blocks.

The primary data was collected from 100 sample households which were chosen by using the multi-stage random sampling procedure. In the first stage, both the blocks were selected, named Lahaul block and Spiti block. In the second stage, one village was selected from each block for the study. Since district Lahaul and Spiti is very sparsely populated, so only those villages which had more than 60 households were considered for this purpose. According to the District Census Handbook of 2011, there were only 13 villages in Spiti and 8 villages in Lahaul block with more than 60 households. So out of these villages, village Losar and village Ghoshal which also had agriculture as their main occupation and green pea as their main cash crop were selected from Spiti block and Lahaul block respectively. According to the District Census Handbook of 2011, the total population of Ghoshal was 390 and of Losar was 320. The total number of households in Ghoshal and Losar were 79 and 65 respectively. All the households in Ghoshal and Losar cultivated green peas as their major cash crop.In the third stage, 50 green pea-growing farm households were randomly selectedfrom each village out of 79 households in Ghoshal and out of 65 households in Losar. The data for the study were collected through a structured questionnaire by personal interview method.

Along with that, the secondary data for twelve years from 2005-06 to 2016-17 was used to understand the cropping pattern of the district for the given

12 years[1]. The secondary data has been collected from the various issues of Statistical Abstract of Himachal Pradesh and various records from government departments like Directorate of Horticulture, Agriculture and Directorate of Economics and Statistics.

The cost of cultivation was measured using cost concepts defined by CACP (Commission for Agricultural Costs and Prices). These cost conceptsare given below:

Cost A_1 includes value of hired human labour, value of hired and owned bullock labour, value of hired and owned machine labour, value of seed, value of manures, cost of fertilisers, plant protection charges (insecticide/pesticide), irrigation charges, land revenue, interest on working capital, depreciation and miscellaneous expenses.

Cost A_2: Cost A_1+ Rent paid for leased land.

Cost B_1: Cost A_1+ Interest on fixed capital (excluding land).

Cost B_2: Cost B_1+ Rental value of owned land+ Rent for leased land.

Cost C_1: Cost B_1+ Imputed value of family labour.

Cost C_2: Cost B_2+ Imputedvalue of family labour.

Cost C_3: Cost C_2+ 10 per cent of Cost C_2 as management cost.

Various farm income measures used are given below**.**

Gross income represents the total value of produce valued at the prevailing market price.

Farm Business Income = Gross Income - Cost A_1

Own Farm Business Income = Gross Income - Cost A_2

Family Labour Income = Gross Income – Cost B_2

Net Income = Gross Income – Cost C_3

All the calculations for cost of cultivation and farm income measures for green peas were calculated on‘per acre’[2] basis.

Results and Discussion

Table-1 shows the secondary data for the area under major crops grown in Lahaul and Spiti from 2005-06 to 2016-17, which reveals that green pea was the major crop cultivated in the district throughout the study period. Green pea was cultivated on 3223 hectares in 2016-17 and accounted for 46.49 per cent of area out of the total area under major crops in Lahaul and Spiti.

The data provided by the Directorate of Agriculture in Keylong (Government of Himachal Pradesh) for the year 2016-17, also shows that Green Pea was the major cash crop grown in both the blocks individually as well, i.e. for Lahaul block and Spiti block. The area under Green Pea cultivation in Lahaul block was 900 hectares and for Spiti block, was 2323 hectares in 2016-17.

For the analysis of cost and return structure, the data is based on the primary survey conducted in 2018 in village Ghoshal of Lahaul block and village Losar of Spiti block. The analysis of data is done separately for both Lahaul valley and Spiti valley due to a clear difference in the cost and return structures of Green Pea cultivation in the two blocks.

Table-1
Area under Crops in District Lahaul and Spiti (2005-06 to 2016-17)

Year	Cauliflower	Potato	Green pea	Cabbage	Wheat	Barley	Apple
2005-06	33	759	3890	29	75	608	621
2006-07	35	755	3923	33	64	545	685
2007-08	30	824	3797	41	63	554	734
2008-09	32	788	3820	42	57	511	812
2009-10	23	747	3885	44	72	403	959
2010-11	31	748	3885	40	49	429	1320
2011-12	45	769	3965	20	44	449	1410
2012-13	57	742	3930	26	55	490	1473
2013-14	67	606	3960	32	42	461	1579
2014-15	607	607	3280	68	54	571	1653
2015-16	608	690	3275	71	54	571	1673
2016-17	658	800	3223	73	66	430	1682

Source: Statistical Abstract of Himachal Pradesh (various issues), Directorate of Horticulture, Directorate of Agriculture and Directorate of Economics and Statistics (Himachal Pradesh).

Cost of Cultivation of Green Pea in Lahaul valley

Table-2 presents the A, B, C cost measures for green pea grown in Lahaul valley of district Lahaul and Spiti. The cost A_1, A_2, B_1, B_2, C_1, C_2 and C_3 turned out to be Rs 81405, Rs 81405, Rs 81405, Rs 131405, Rs 101405, Rs 151405 and Rs 166545 respectively. The analysis of the cost of cultivation for green pea reveals that Cost A_1 is 50 per cent of Cost C_3. It can be seen through the table that there is no difference between Cost A_1 and Cost A_2 which implies that cultivation is not done on leased land. The difference between Cost B_1 and Cost C_1 is 23 per cent which reveals that around one-fourth of cultivation was done with the help of family labour. Generally, farmers having smaller landholdings use more family labour for cultivation. But still, the dependence on hired labour is quite high due to the lesser use of machines for cultivation due to the prevalence of small and

fragmented landholdings and the hilly terrain of the region. As a result, green pea cultivation is a highly labour-intensive process.

In addition to that, there is a sudden rise in demand for hired labour during the sowing and harvesting seasons due to the time constraint involved in these seasons. And every farmer has to depend on hired labour during these two seasons. The rest of the major work for green pea cultivation is also done manually whether it is weeding or adding manure and fertiliser to the crop. The labour wages are also high due to the unavailability of hired labour in the district itself and due to low population density and migration of rural youth to pursue higher education or explore job opportunities outside the district. As a result, only the old parents are left to work in the fields, leading to higher dependence on hired labour. Hence there is a high dependence on labour (mainly from Bihar and Nepal), so the wages are quite high. Apart from the daily wages paid to the hired labour, three meals per day are also provided to them by the farmers who employ them, which has not been added while calculating the total cost of cultivation.

Table-2
Cost of Cultivation of Green Pea in Lahaul Valley (Cost/Acre)

Cost measures	Value (Rs/Acre)
Cost A_1	81405
Cost A_2	81405
Cost B_1	81405
Cost B_2	131405
Cost C_1	101405
Cost C_2	151405
Cost C_3	166545

Source: Computed from the field survey conducted in village Ghoshal in 2018.

Input-wise Cost of Cultivation

Table-3 represents the various input-wise cost of cultivation for green pea in the Lahaul region of district Lahaul and Spiti calculated by data collected from sample households of village Ghoshal. The labour cost is evaluated by adding the cost of hired labour and the imputed value of the family labour which is Rs 44000 and Rs 20000 respectively which adds up to Rs 64000 per acre.So the total labour cost was 38.4 per cent of the total cost of cultivation, where 26.4 per cent cost was contributed by hired labour and 12 per cent by family labour. The labour cost is so high because green pea is a labour -intensive crop and the use of machines for cultivation is very low. Only land preparation for sowing the seeds is generally done by using a power tiller or tractor. The remaining major work for green pea cultivation is done manually whether it is weeding, adding manure and fertiliser or plucking the green pea. Irrigation is sometimes done manually by

labour through kuhls and sometimes by using sprinklers. In addition to that, the labour wages are also high due to the unavailability of hired labour in the district itself and the high dependence on migrant labours.

Seeds were also a major component of cost, with an 8.4 per cent contribution to the total cost amounting to Rs14000 per acre. This was mainly due to the thick sowing done by the farmers. It was found in the primary survey that the farmers generally prefer thick sowing (which means planting more seeds than what is required) as their complete income is dependent on this single Kharif season and any type of risk like germination failure or picking of seeds by birds can have a significant impact on their income.

Table-3
Input-wise Cost of Cultivation of Green Pea for Lahaul Valley (Cost/Acre)

Inputs	Rs/Acre	Per cent
Hired labour	44000	26.4
Family labour	20000	12
Machine	4000	2.4
Seed	14000	8.4
Manure	4500	2.7
Chemical fertilizers	3000	1.8
Insecticides and Pesticides	2500	1.5
Irrigation	500	0.3
The rental value of land	50000	30.1
other expenses	24045	14.4
Cost/Acre	**166545**	**100**

Source: Computed from the field survey conducted in village Ghoshal in 2018.

Returns from Green Pea Cultivation in Lahaul valley

Table-4 shows the returns from green pea cultivation evaluated by using various income measures like gross income, farm business income, own farm business income, family labour income and net income. It presents the various income measures computed for village Ghoshal on per acre basis. The farmers reported that on average they could produce 6000 kilograms of green pea from one acre of land. They had sold their produce at Rs 30 per kilogram. The gross income, farm business income, own farm business income, family labour income and net income were found to be Rs 180000, Rs 98595, Rs 98595, Rs 48595 and Rs 13455 respectively.

The net income was Rs 13455 per acre which was about 7.5 per cent of gross income. The net returns from green pea cultivation in Lahaul valley was Rs 13455 which is not very high. So the farmers of Lahaul valley have slowly started shifting towards other profitable cash crops like cauliflower which was reported by the farmers during their interview and was also visible from the secondary data in Table-1 that showed an increase in area under cauliflower cultivation from 2014-15 onwards.

Table-4
Income Measures of Green Pea Cultivation in Lahaul Valley (Rs/Acre)

Income measures	Rs/Acre
Gross income	180000
Farm business income	98595
Own farm business income	98595
Family labour income	48595
Net income	13455

Source: Computed from the field survey conducted in village Ghoshal in 2018.

Cost of Cultivation of Green Pea in Spiti Valley

Table-5 presents the ABC cost measures for green pea grown in Losar village of Spiti valley. The cost A_1, A_2, B_1, B_2, C_1, C_2 and C_3 turned out to be Rs 115780, Rs 115780, Rs 115780, Rs 115780, Rs 190780, Rs 137780, Rs 212780 and Rs 234060 respectively.

The present analysis of the cost of cultivation shows that Cost A_1 is 45.9 per cent of Cost C_3 which can be seen in Table-5. There is no difference between Cost A_1 and Cost A_2 which implies that cultivation is not done on leased land in Spiti valley as well.The difference between Cost B_1 and Cost C_1 is 22.2 per cent which reveals that less than one-fourth of cultivation was done by the family labour. The dependence on hired labour is quite high due to the very limited use of machines for cultivation. The labour force used for green pea cultivation was slightly higher in Spiti as compared to the Lahaul region due to comparatively less use of machines like power tillers and tractors for land preparation.

Seed cost was high due to thick sowing and also due to the use of unsubsidised seeds bought from the market. The farmers said that they prefer using the best quality seeds bought from the market instead of using subsidised seeds provided by government agencies. Farmers reported that in the past they had experienced complete crop failure by using subsidised seeds. They speculated that it could either be due to the substandard quality of subsidised seeds (provided by the government agencies) or due to the unsuitability of these subsidised seeds for Spiti. So, they preferred using the best quality seeds purchased from the market instead of facing a complete crop failure by using subsidised seeds provided by government agencies.

Table-5
Cost of Cultivation of Green Pea in Spiti Valley (Cost/Acre)

Cost measures	Value (Rs/Acre)
Cost A_1	115780
Cost A_2	115780
Cost B_1	115780
Cost B_2	190780
Cost C_1	137780
Cost C_2	212780
Cost C_3	234060

Source: Computed from the field survey conducted in village Losar in 2018.

Input-wise Cost of Cultivation for Green Pea in the Spiti Region

Table-6 represents the various inputwise cost of cultivation for green pea in the Spiti region. Among the various input costs, the hired labour contributed to 21.3 per cent of the total cost, whereas family labour contributed to 9.4 per cent of the total cost. So the total labour cost was 30.7 per cent of the total cost of cultivation, where 21.3 per cent cost was contributed by hired labour and 9.4 per cent by family labour. The labour cost is evaluated by adding the cost of hired labour and the imputed value of the family labour which is Rs 50000 and Rs 22000 respectively which adds up to Rs 72000 per acre.

The labour cost was so high because green pea was a labour-intensive crop and the use of machines for cultivation was very low. A primary survey of farmers of Losar village revealed that land preparation for sowing the seeds is generally done manually by labour or with the help of bullocks instead of using a power tiller or tractor as compared to Lahaul valley. So, the dependence on labour was higher in Spiti valley. Moreover, sprinklers were found unsuitable for irrigation due to the silty nature of snow melt water which led to the clogging of pipes. So, additional labour was required for irrigation of the fields through kuhls in Spiti valley as compared to Lahaul valley.

The rental value of land was also a major component of the total cost, this was due to the scarcity of fertile cultivable land and good returns from the cash crops which increased its rental value. Survey results revealed that cultivation was very rarely done on rented land, as farmers were generally unwilling to rent their land to other farmers as most of them are small or marginal farmers who prefer to earn the best returns by cultivating land on their own.

The green pea cultivated in village Losar of Spiti block was grown organically, so no cost was incurred on chemical fertilisers, insecticides and pesticides. Organic farming was possible due to the cold climatic condition of the region due to which it was less prone to pest infestations and other diseases. Since farmers completely relied on the local manure to increase the productivity of land, they ended up using a higher quantity of manure when compared to Lahaul

valley. So the overall cost of manure was higher in Spiti valley. The seed was also an important component in total cost with a 16.2 per cent contribution to the total cost of cultivation. It was so because seeds were bought from the market and not from government agencies at subsidised rates. The farmers in Spiti did not use sprinklers for irrigation due to the silty nature of snow melt water which could clog the pipes, making it an unsuitable option for irrigating their land. So they had to rely on Kuhls for irrigating their land. Since the irrigation charges only accounted for rent on hired sprinklers and excluded the labour used for irrigating crops, hence the irrigation charges were zero in Spiti valley.

Table-6
Input-wise Cost of Cultivation of Green Pea for Spiti Valley (Cost/Acre)

Inputs	Rs/Acre	Per cent
Hired Labour	50000	21.3
Family labour	22000	9.4
Bullock	4500	1.9
Seed	43750	18.7
Manure	6750	2.9
Chemical fertilizers	0	0
Insecticides and Pesticides	0	0
Irrigation	0	0
The rental value of land	75000	32.1
other expenses	32060	13.7
Cost/ Acre	**234060**	**100**

Source:Computed from the field survey conducted in village Losar in 2018.

Returns from Green Pea Cultivation in Spiti Valley

Table-7 shows the various income measures computed for the farms of the village Losar on per acre basis. The farmers reported that on average they could produce 6000 kilograms of Green pea from one acre of land. The organic green pea of Spiti fetches a good price in the market. Farmers had sold their produce at Rs 45 per kilogram. The gross income, farm business income, own farm business income, family labour income and net income were found to be Rs 270000, Rs 154220, Rs 154220, Rs 79220 and Rs 35940 respectively. The net income was Rs 35940 per acrewhich was about 13.3 per cent of gross income.

Table-7
Income Measures of Green Pea Cultivation in Spiti Valley (Rs/Acre)

Income measures	Rs/Acre
Gross income	270000
Farm business income	154220
Own farm business income	154220
Family labour income	79220
Net income	35940

Source: Computed from the field survey conducted in village Losar in 2018.

Conclusion

The analysis has revealed that the cost of cultivation of green pea grown in both the blocks differed due to the differences in the method of cultivation, soil type and its quality, availability of water for irrigation and usage of inputs like pesticides and fertilisers. The cost of cultivation shown by Cost C_3 was Rs. 166545 for Lahaul and Rs. 234060 for Spiti. The seed cost was lower in Lahaul due to the use of subsidised seeds and much higher in Spiti due to the use of non-subsidised seeds bought from the market. The rental value of land is also much higher for Spiti as compared to Lahaul.

From the above analysis, one can also conclude that green pea cultivation was more profitable in Spiti because it was produced organically and hence fetched a good price in the market. But in the case of Lahaul, the price of green pea is much lower as compared to the price of organic green pea cultivated in Spiti. Another reason for the higher price of green pea produced in Spiti is that it matures in the off-season when there is no competition from sellers of other areas. The green pea grown in Lahaul matures in July which is earlier as compared to green pea grown in Spiti which matures in August. The net returns from green pea cultivation in Lahaul valley was Rs 13455 and from Spiti, it was Rs 35940 per acre. So, the farmers of Lahaul valley have slowly started shifting towards another profitable cash crop like cauliflower while farmers of Spiti continue to grow green pea as their only major cash crop.

Vegetable production has the potential to increase the income of farmers, so government agencies must provide the best quality inputs and updated information regarding scientific techniques for increasing productivity and reducing the cost of cultivation. Organic farming practices should also be encouraged to reduce the cost of plant protection. The farmers have to depend on middleman to sell their produce in the markets of Punjab and Delhi since there is no sabzi mandi in the entire district of Lahaul and Spiti. So Sabzi mandi should be created by government in the district to eliminate the problem of exploitative middlemen and hence help farmers get better prices for their farm produce.

Notes

1. The data for the area under major crops is taken from the year 2005-06 to 2016-17 as this was the data available with the various government departments of Himachal Pradesh during the time of data collection.
2. One Acre is equal to 5 Bigha in district Lahaul and Spiti, whereas one Hectare is equal to 12.35 Bigha.

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ASSESSING SOCIO-ECONOMIC PERFORMANCE IN NON-SPECIAL CATEGORY STATES OF INDIA (1990-2019)

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Abstract: Analysing budgetary trends and resource allocation alone does not provide a complete understanding of an individual state's development performance. To gain a broader and more comprehensive view, it is essential to examine the socio-economic progress of the states. The socio-economic progress of a state reflects the status of people on the basis of social and economic variables like health and education. The progress of a state in terms of these variables reflects the quality of life of its people. With this purpose, this paper aims to understand the dynamics of socio-economic performance of the states in India. It focuses on 17 non-special category (NSC) states. Utilising data from 1990 to 2019 to measure the socio-economic performance of the states, a composite index called as the Socio-Economic Performance Index (SEPI) has been constructed. For constructing the composite index, the study follows relative distance method. The findings indicate a considerable improvement in socio-economic performance at the state level, although, this progress varies significantly across the states. Additionally, the paper also conducted a correlation analysis between the SEPI scores and the states' expenditure [using the Public Expenditure Index (PEI)] to analyse whether public expenditure has any impact on socio-economic performance or not. The analysis of public expenditure and socio-economic performance analysis at the state level suggests that there is positive relationship between these two.

Keywords: Socio-Economic Performance Index (SEPI), Public Expenditure Index (PEI), Non-special Category States, Composite Index.

Introduction

Mere analysis of budgetary trends and resource-allocation is not sufficient for a clear picture or scenario of an individual state to assess the development

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performance. The states are having differences in their geographical size, resource endowment, demographic features, and level of socio-economic development (Ramji, et. al., 2001). To get a wider and more comprehensive picture of a state, there should be a detailed analysis of the socio-economic progress of the state. The socio-economic progress of a state shows the status of people on a socio-economic scale determined by social and economic variables. The progress of a state in terms of these variables reflects the quality of life of its people.

Further, achieving balanced progress among all the states is the prime objective of the policy makers in India (Goli, et. al., 2018). The distribution of social and economic services is crucial not only for promoting economic growth and development but also for assuring social justice and improvement in the quality of life. In the post-independence period of India, several attempts have been made by the researchers to measure the socio-economic progress of states and also the disparity among them (e.g. Mishra, 1969; Rao, 1984; Dholakia, 1985; Pradhan, 1988; Roy Choudary, 1992, 1993; Dholakia, 1994; Ghosh et. al., 1998; Kurian, 2000; Ahluwalia, 2002; Trivedi, 2002; Dholakia & Ravindra, 2003; Bhattacharya et. al., 2004; Jha, 2004; Dreze' & Khera, 2012 as cited by Goli, et. al., 2018). The examination of socio-economic progress in these studies reveals inequalities in accessibility of resources and issues related to privilege, power, and control.

Sen (1998) observed that economic variables like per capita income can be considered as important indicators of development but they may not be adequate to capture the standard of living or quality of life of the people. Therefore, a more meaningful way of testing the convergence in the regional imbalances is the analyses of convergence in terms of standard of living by using multiple socio-economic indicators across states over time (Goli, et. al., 2018). The socio-economic status of a country or state is the combination of both economic and sociological factors, which include demographic characteristics, health, education, gross domestic product, per capita income, occupational status, level of poverty, etc. These indicators provide background and assist in understanding the socio-economic scenario in a country and state. For the progress of states, the government through its five-year plans, since the 1950s, ha done concerted and coordinated efforts. There are, indeed, many areas of socio-economic development, in which India's progress is creditable. However, these consistent and enormous strides towards the achievement of its goal of development and economic growth are insufficient. India lags in several aspects including reduction in poverty, inequality, employment to all, etc. (Das, 1999). The remarkable disparity among states provides a motive to study the issue. Against this background, this paper aims to examine the socio-economic progress for the NSC states in India.

Objective of the study

The broad objective of this paper is to assess the socio-economic performance of the NSC states in India during the period from 1990 to 2019. In particular, the study attempts to analyse the differences in educational and health performance among the NSC states in India. Further, it aims to map the economic performance of the NSC states during the same period. Additionally, the paper also attempts to examine the relationship between public expenditure and socio-economic performance among the NSC states.

Methodological approach

This paper has analysed the socio-economic performance of the states using a composite index termed as socio-economic performance index. Further, the study has undertaken a correlation analysis of socio-economic performance index with aggregate public expenditure. Based on this, the paper examined whether any relationship exists between these two or not. In other words, the paper tried to answer the question, does public expenditure affect socio-economic performance?

Construction of Socio-Economic Performance Index (SEPI)

Table-1
Structure of Socio-Economic Performance Index

Main Index	Major Indices	Minor Indices
Socio-Economic Performance Index	Health Index	Life Expectancy Index
		IMR Index
		MMR Index
		Immunization Index
	Education Index	Literacy Index
		Mean years of schooling index
		Expected years of Schooling index
		Enrollment Index
	Economic Index	Per Capita NSDP Index
		Poverty Index
		Unemployment Index

Source: Author's own construction.

The objective of constructing the socio-economic performance index is to track the progress of Indian states in terms of social and economic indicators. The proposed SEPI is a multi-dimensional index comprising three major dimensions i.e. health, education and standard of living. This index is an equal-weighted composite index incorporating eleven indicators (eleven minor indices reflecting various facets of socio-economic performance). These eleven minor indices are grouped into three major indices which are the education index, health index,

and economic index. These three major indices are combined to shape the SEPI. The composite index is an equal-weighted geometric mean of various indicators grouped as major and minor indices. The index is calculated to measure the socio-economic status of the states for the base and the reference years. Details of selected indicators under each dimension are given in the Table-1. The details of the SEPI including indicators, and major, minor, and sub-minor indices are depicted in the above Table-1.

These indicators have been selected based on their importance and relevance in the study. The data is collected from multiple sources which include the Sample Registration System (SRS), Census of India, Global Data Lab, Economic and Political Weekly Research Foundation (EPWRF) India Time Series, Unified District Information System for Education (UDISE) Plus, and RBI's Handbook of Statistics on Indian Economy. The data is ranging from 1990-91 to 2019-20.

The Relative Distance Method

In construction of the minor and major indices of the SEPI, the study followed the same methodology as adopted in construction of the HDI, by the UNDP as well as Morris and McAlpin (1982); Panda and Bhide (2002); and Dholakia (2005), among others. After collecting data on indicators from above mentioned sources, the composite socio-economic performance index is calculated using the relative distance method. In 1989, this method was used in a project to calculate a multi-dimensional composite index called the HDI by the UNDP (Mohanty and Mishra, 2016). In this method, each indicator value is scaled or normalized from 0 to 100 based on the nature of the indicator. This method of calculating the index is unique in nature as it can take both positive and negative indicators simultaneously to construct a composite index. The index calculated for positive indicators is called improvement index, while the index for negative indicators is known as deprivation index. The scaled or normalised value of both the indicators lies between 0 to 100 as mentioned above, where 0 refers to the worst performance and 100 refers to the best performance. The formula of calculation for both improvement and deprivation index are given below as equation 1 and 2 respectively.

Improvement Index = [(X)– Minimum (X)] / [maximum (X) – minimum (X)] x 100

… **(1)**

Deprivation Index = [Maximum (X) – (X)] / [maximum (X) – minimum (X)] x 100

… **(2)**

Where, X refers to the actual value of the indicator of the state and Maximum (X) and Minimum (X) are the maximum and minimum values of the indicator of the states in a specified period.

Table-2
Critical Values and Formula for Estimation of Indices for SEPI

Indicator	Maximum (Best) value (=100)	Minimum (Worst) value (=0)	Formula
IMR (D)	3(5-2) Goa (2019-20)	115.1(112.1+3) Odisha (1990-91)	(115.1-X)/(115.1-4) ×100
MMR (D)	17(19-2) Kerala (2019-20)	609(606+3) UP (1996-97)	(609-X)/(609-17) ×100
Life Expectancy (I)	80(77+3) Kerala (2019-20)	52.2(54.2-2) UP (1990-91)	(X-52.2)/(80-52.2) ×100
Immunization (I)	93.5(90.5+3) Odisha (2019-20)	6.8(8.8-2) Jharkhand (1996-97)	(X-6.8)/(93.5-6.8) ×100
Literacy Rate (I)	99.25(97.25+2) Kerala (2019-20)	35.49(37.49-2) Bihar (1990-91)	(X-35.49)/(99.25-35.49) ×100
GER (I)	124.26(121.26+3) Goa (2019-20)	52.1(54.1-2) UP (1990-91)	(X-52.1)/(124.26-52.1) ×100
MYS (I)	11.1(10.1+1) Kerala (2019-20)	1.05(2.05-1) Rajasthan (1990-91)	(X-1.05)/(11.1-1.05) ×100
EYS (I)	16.42(15.42+1) Jharkhand (1990-91)	4.8(5.8-1) Bihar (1990-91)	(X-4.8)/(16.42-4.8) ×100
PCNSDP (I)	13.66(12.66+1) Goa (2019-20)	8.41(9.41-1) Bihar (1990-91)	(X-8.41)/(13.66-8.41) ×100
Unemployment Rate (D)	0.3(0.5-0.2) Rajasthan (1990-91)	14.87(13.87+1) Goa (2014-15)	(14.87-X)/(14.87-0.3) ×100
Poverty (D)	2.4(4.4-2) Goa (1996-97)	60.2(57.2+3) Odisha (2002-03)	(60.2-X)/(60.2-2.4) ×100

Note: D= Deprivation indicator, I= Improvement indicator.

Further, in construction of indices, to aid the calculation, the study has taken the best and worst value of indicator a bit outside the corresponding actual value so that the indices of the indicator take the value within 0 and 100 and are not exactly equal to 0 and 100. For this, in case of improvement minor indices, some value added to the best value and subtracted some value from the worst

value of that specific indicator. Whereas, in the case of deprivation indicators, the process has been reversed i.e. some value subtracted from the best value and added some value to the worst value of the indicators respectively. The details of the best and worst value of each indicator considered in the estimation of indices along with formula are depicted in Table-2.

Result and Discussion

Socio-economic Performance Index

Social Performance of the States

Social performance is the reflection of the social status of people living in a state. This mainly includes the education and health status of people. In order to gauge the social performance of the states, two major indices, education and health have been utilised.

Educational Performance of the States

The education index, based on four minor indices, which are literacy index, mean years of schooling index, expected years of schooling index, and gross enrollment ratio index, measures the educational performance of the states. Before analysing the education performance of the states using composite education index, it is important to describe about the indicator for which the minor index is calculated.

Education Index (EDUI):

The education index is constructed from four minor indices. The estimated four minor indices for 17 NSC states of India for six different periods are shown as an appendix (A1). The composite education performance of all the states in terms of educational index is depicted in Table-3. It is learnt that the educational status at the sub-national level of India is improving over the years. In 1990-91, Kerala tops the list with the score value 54.13. This score value means Kerala's performance is best in terms of all four minor indices used to construct the education index. Other states like Goa, Maharashtra, Tamil Nadu, and Gujarat followed Kerala with score values of 47.47, 35.02, 34.32 and 30.75 respectively to secure top five positions. In this period, Bihar followed by Rajasthan, Uttar Pradesh, Madhya Pradesh and Andhra Pradesh were the least performers with score values of 7.45, 9.07, 13.39, 15.79 and 16.07 respectively. The other states fell in the medium category of educational status.

During the second sub-period (1996-97), the positions of the states were almost same with few exceptions like Karnataka, Rajasthan, West Bengal, Punjab and Haryana. Karnataka and West Bengal improved their position by 5 and 2 notches respectively while Punjab and Jharkhand pushed down to 9th and 12th position from 6th and 9th position respectively. In the third sub-period (2002-03), the performance was almost stagnant with slight changes in the position of the

states. Jharkhand in this period further pushed down to 16th position from its previous 12th position. However, in the sub-period (2008-09), Jharkhand improved its position significantly to 7th position with a score value of 58.15. Sub-period (2014-15) was the best for West Bengal and Haryana, they improved their rankings by 3 and 5 notches respectively and secured 9th and 6th position respectively. Similarly, the sixth sub-period (2019-20) was the best for Bihar and UP, as they achieved their best position during the entire period of analysis. They secured 12th and 10th position with the score value of 58.37 and 58.66 respectively.

Table-3
State Wise Education Index

States	1990-91	R 1	1996-97	R 2	2002-03	R 3	2008-09	R 4	2014-15	R 5	2019-20	R 6
Andhra Pradesh	16.07	13	22.70	14	33.93	13	44.67	16	50.45	15	51.01	16
Bihar	7.45	17	10.05	17	15.08	17	38.16	17	46.85	17	58.37	12
Chhattisgarh*	29.89	7	35.24	7	48.60	5	59.93	5	55.96	10	56.89	13
Goa	47.47	2	39.94	5	62.69	2	70.79	2	79.85	1	86.10	1
Gujarat	30.75	5	39.97	4	45.76	6	57.66	8	59.48	8	64.75	8
Haryana	28.76	8	31.82	10	40.26	9	51.36	11	62.99	6	66.64	5
Jharkhand*	27.91	9	25.95	12	28.10	16	58.15	7	53.07	13	53.24	15
Karnataka	25.68	11	36.15	6	44.56	7	54.77	9	59.63	7	65.56	6
Kerala	54.13	1	57.44	1	65.43	1	72.97	1	78.04	2	84.31	2
Madhya Pradesh	15.79	14	25.03	13	35.38	12	54.30	10	54.19	12	45.68	17
Maharashtra	35.02	3	45.40	2	53.33	4	62.17	4	67.92	3	67.62	4
Odisha	19.44	12	28.93	11	36.29	11	50.02	13	54.64	11	55.56	14
Punjab	30.01	6	34.13	9	37.53	10	58.69	6	67.27	5	63.11	9
Rajasthan	9.07	16	18.73	15	32.67	14	45.49	15	48.96	16	58.44	11
Tamil Nadu	34.32	4	42.28	3	54.40	3	66.11	3	67.58	4	69.01	3
Uttar Pradesh	13.39	15	10.71	16	31.30	15	47.68	14	52.43	14	58.66	10
West Bengal	27.35	10	34.83	8	40.89	8	50.35	12	58.36	9	65.11	7

Note: 1. *****the value of Chhattisgarh and Jharkhand for 1990-91 and 1996-97 is taken from their parent states Madhya Pradesh and Jharkhand respectively.
2. R1= Rank 1 (1990-91); R2= Rank 2 (1996-97); R3= Rank 3 (2002-03); R4= Rank 4 (2008-09); R5= Rank 5 (2014-15); R6= Rank 6 (2019-20).

Source: Author's calculation.

The analysis of educational status based on index scores suggests that there is a significant improvement in the educational performance of the states. The overall transition during the study period suggests that the large-scale transition in terms of improvement is observed for Bihar, Haryana, Karnataka, and Rajasthan. On the other hand, the large-scale transition in terms of deterioration is observed for Chhattisgarh, Jharkhand, and Andhra Pradesh. The large-scale transition of rankings or positions is defined as the change in rankings of the states between two or more periods by at least three notches, whether it is positive or negative.

Health Performance of the States

Health is an important indicator for tracking the status of human development of a state. For this purpose, the paper calculated the health index taking four minor indices, which are life expectancy, infant mortality rate, maternal mortality rate and immunization. For each of these indicators, the study prepared an index to assess the performance of the states. The details about the estimated minor indices of health index are presented as an appendix (A2).

Health Index (HI):

The health index is a composite form of all the minor indices mentioned above. The measurement of health performance of the NSC states using composite health index for the period of 1990-91 to 2019-20 is presented in Table-4. It is evident from the table that the performance of the states in terms of health parameters have improved significantly over the years. For measurement of the health performance, the study period is divided into six sub-periods. In 1990-91, Goa topped the table with a score of 68.76 showing overall good performance in all the parameters used in the study. Kerala which was at the top in educational performance during the same time period stood second in terms of health performance followed by Maharashtra, Punjab and Tamil Nadu. Again, the states like UP, Bihar, Odisha, MP, and Rajasthan performed badly as in case of educational status during this period. The remaining states fall in the medium health performance category of the states. The scores of these medium category states range between 39.64 (Karnataka) to 20.41 (Madhya Pradesh) during 1990-91.

In period two (1996-97), the position of states in terms of health performance was almost same with slight variation in their position. Odisha, however has shown a big shift as it moved upwards to 11th position. In Period three (2002-03), some changes in position of the states in terms of health performance took place. West Bengal improved its position from 10th position to the 5th position during this period, while, Gujarat slipped down from 6th to 9th position during the same period. The position of others states was almost constant with little variation. In period four (2008-09), however, there was a change in

index scores of the states but their relative position was almost same. Same thing happened during fifth sub period (2014-15) of the study. The sixth sub period (2019-20) of the study is crucial for some states as they improved their position as well as index scores as compared to previous period. During this period, Gujarat, Karnataka, and Odisha improved their index scores along with improvement in their rankings. Chhattisgarh, Haryana and Punjab deteriorated in terms of health performance during the same period. This happened because their relative position in terms of life expectancy and immunization index worsened. Given the consistency, the dismal health performance of Uttar Pradesh cannot be denied here.

Table-4
State Wise Health Index

States	1990-91	R 1	1996-97	R 2	2002-03	R 3	2008-09	R 4	2014-15	R 5	2019-20	R 6
Andhra Pradesh	37.25	8	51.84	9	50.58	10	57.00	10	70.55	9	78.62	9
Bihar	11.44	15	16.57	15	37.86	13	44.81	14	63.93	14	73.18	14
Chhattisgarh*	31.60	10	26.34	12	44.18	12	52.91	11	66.82	11	70.54	15
Goa	68.76	1	76.72	2	78.05	2	83.49	2	88.76	2	89.02	3
Gujarat	37.76	7	54.22	6	51.62	9	57.06	9	66.51	12	80.21	8
Haryana	36.75	9	53.69	7	59.25	7	64.39	7	71.11	8	78.02	10
Jharkhand*	17.55	14	16.26	16	45.79	11	51.40	12	67.11	10	76.89	11
Karnataka	39.64	6	53.16	8	55.18	8	62.07	8	73.40	7	85.07	4
Kerala	63.01	2	79.95	1	83.19	1	85.44	1	89.80	1	91.70	1
Madhya Pradesh	20.41	13	20.55	13	32.22	15	43.37	15	57.70	16	67.73	16
Maharashtra	52.56	3	64.77	4	63.25	4	69.99	4	74.68	6	84.07	5
Odisha	10.89	17	29.95	11	37.24	14	48.88	13	66.50	13	76.47	12
Punjab	52.40	4	58.28	5	61.12	6	65.90	6	81.14	3	80.81	7
Rajasthan	24.92	12	19.77	14	28.82	16	39.30	16	60.55	15	75.78	13
Tamil Nadu	43.83	5	65.91	3	70.98	3	78.47	3	80.48	4	89.33	2
Uttar Pradesh	11.28	16	7.88	17	22.57	17	33.54	17	55.28	17	65.20	17
West Bengal	30.31	11	46.79	10	61.38	5	68.19	5	79.35	5	83.58	6

Note: 1. *****the value of Chhattisgarh and Jharkhand for 1990-91 and 1996-97 is taken from their parent states Madhya Pradesh and Jharkhand respectively.
2. R1= Rank 1 (1990-91); R2= Rank 2 (1996-97); R3= Rank 3 (2002-03); R4= Rank 4 (2008-09); R5= Rank 5 (2014-15); R6= Rank 6 (2019-20).

Source: Author's calculation.

The health analysis based on the composite index scores suggests that there is an improvement in overall health performance of the states. However, this improvement in their performance is not balanced. It is observed that the large-scale transition occurred for states like Odisha and West Bengal in terms of improvement in rankings by 5 notches respectively during the period 1990-91 to 2019-20. Large-scale transition in terms of deterioration in rankings is observed for Chhattisgarh, Madhya Pradesh and Punjab, as their position slipped down by 5, 3 and 3 points respectively.

Economic Performance of the States

Economic Performance of the states is an indicator reflecting standard of living, level of employment and availability of resources to meet the basic minimum needs of the people. For assessment of the economic performance of the states, we have employed multiple indicators. It includes per capita net state domestic product (NSDP), rate of unemployment and level of poverty in the states.

Economic Index (ECOI):

Assessing economic performance of the states is a difficult task as it is multidimensional in nature. To make it easier, a composite index called Economic Index is developed. This index is composite in nature covering multiple economic dimensions such as per capita net state domestic product, poverty, and unemployment. For each of these indicators, a sub-minor index has been estimated. These indices are combined using the geometric mean to develop the major index known as economic index. Thus, economic index is a composite index, which covers multiple economic aspects to measure the economic performance of the states. The estimated minor indices for NSC states for the period 1990-91 to 2019-20 divided into 6 points of time presented in the appendix table (A3). However, the composite economic index is given in Table-5.

Table-5 clearly reveals the inter-state disparity in economic performance of the states. It is evident from the table that in all points of time, while the top three states keep on changing, Bihar is at the bottom of the table. In 1990-91, Punjab (68.83) is at the top followed by Haryana, Andhra Pradesh, Gujarat, and Rajasthan. Bihar (24.51) followed by Odisha, Madhya Pradesh, Uttar Pradesh and West Bengal were at the bottom in terms of economic performance during the same period. In 1996-97, the performance of the states is same as in 1990-91 with little changes. During this period, Gujarat and Kerala have improved their positions, while, Madhya Pradesh has slipped down to 14th position from 12th position during this period. In 2002-03, Goa improved its position and secured 1st rank with an index score of 71.21. In this period, major improvement was registered by the states like Karnataka (58.92), Tamil Nadu and West Bengal. However, the position of the states like Chhattisgarh (50.28), Gujarat, and Rajasthan in terms of economic performance deteriorated in this period.

Table-5
State Wise Economic Index

States	1990-91	R 1	1996-97	R 2	2002-03	R 3	2008-09	R 4	2014-15	R 5	2019-20	R 6
Andhra Pradesh	59.24	3	64.40	6	58.85	5	67.32	8	70.06	1	72.53	3
Bihar	24.51	17	35.86	17	26.18	16	29.18	17	42.31	16	47.78	17
Chhattisgarh*	45.32	11	51.57	12	40.47	14	44.25	16	51.79	11	53.18	15
Goa	54.37	6	37.39	16	50.28	10	76.27	1	36.75	17	71.10	5
Gujarat	57.63	4	68.37	3	58.20	6	67.90	6	68.29	2	76.97	1
Haryana	61.59	2	71.98	2	63.36	1	70.07	2	61.34	9	69.87	6
Jharkhand*	27.42	16	42.53	14	41.93	12	46.39	15	44.71	15	52.02	16
Karnataka	54.27	7	65.05	4	58.92	3	69.06	4	65.54	4	69.48	7
Kerala	47.69	10	52.96	9	40.81	13	61.67	10	50.95	12	58.93	11
Madhya Pradesh	43.43	14	48.59	13	39.15	15	52.43	12	53.52	10	58.53	12
Maharashtra	51.66	8	60.29	8	54.10	7	67.83	7	67.92	3	73.27	2
Odisha	37.33	15	38.94	15	22.21	17	52.21	13	49.39	14	53.29	14
Punjab	68.83	1	72.55	1	62.29	2	68.85	5	63.36	7	66.08	9
Rajasthan	57.15	5	64.78	5	53.06	8	63.89	9	64.57	5	67.15	8
Tamil Nadu	50.27	9	60.79	7	58.90	4	69.83	3	63.47	6	71.54	4
Uttar Pradesh	44.53	13	51.79	11	45.54	11	50.04	14	49.46	13	54.69	13
West Bengal	45.03	12	52.01	10	51.08	9	60.04	11	61.46	8	63.51	10

Note 1. *****the value of Chhattisgarh and Jharkhand for 1990-91 and 1996-97 is taken from their parent states Madhya Pradesh and Jharkhand respectively.

2. R1= Rank 1 (1990-91); R2= Rank 2 (1996-97); R3= Rank 3 (2002-03); R4= Rank 4 (2008-09); R5= Rank 5 (2014-15); R6= Rank 6 (2019-20).

Source: Author's calculation.

In 2008-09, the economic performance of the states like Punjab and Uttar Pradesh deteriorated, whereas, Madhya Pradesh, Maharashtra, and Odisha improved their position. The improvement in economic performance was due to an improvement in unemployment and NSDP for Odisha while Madhya Pradesh improved its economic position with an improvement in poverty and NSDP situation. The economic performance of the states such as Gujarat, Kerala,

Maharashtra, and Punjab during 2014-15 improved further as it was in the previous period. Of these states, Gujarat, Kerala and Maharashtra each improved their position by two positions, whereas, Punjab improved its position significantly by six places to 3rd position from 9th position in 2008-09. In the same period, Haryana and Karnataka lose their position by four and five places from 2nd and 3rd position to 6th and 8th positions respectively. Their position deteriorated mainly due to bad performance at the unemployment front. In 2019-20, the performances of the states like Andhra Pradesh, Chhattisgarh, Karnataka and West Bengal improved in comparison to previous points of time. However, Haryana, Punjab and Rajasthan deteriorated in terms of economic performance during the same. In 2019-20, Gujarat (76.97) reaches the top followed by Maharashtra, Andhra Pradesh, Tamil Nadu, and Goa. On the lower side are the states of Bihar (47.78) followed by Jharkhand, Chhattisgarh, Odisha and Uttar Pradesh. However, if the distribution of the scores across the years examine, there is not much variation and the data has a small range only.

Based on actual data of the states for economic indicators, it is observed that there is an improvement in economic performance of all the NSC states during the study period. This improvement is also reflected in large-scale transition over the years. It is evident from the Table-5 that positive large-scale transition has occurred for the states such as Gujarat, Maharashtra, Tamil Nadu and West Bengal as they improved their economic position by at least 3 or more notches between two or more sub periods. Similarly, in terms of deterioration, the large-scale transition is observed for Chhattisgarh, Haryana, Punjab, Rajasthan and Uttar Pradesh.

Socio-economic Performance of the States

The measurement of socio-economic performance of the states is important to track the development of the states. For this purpose, SEPI has been constructed in the study, which consists of three major indices namely education, health and economic index. The analysis of the performance based on the SEPI is discussed in the following section.

Three dimensions of socio-economic performance index are divided into 11 indicators considered to construct the composite SEPI. As mentioned above, the objective of constructing the SEPI is to track the socio-economic progress at the sub-national level in India. The composite SEPI for 17 NSC states is presented in Table-6. It is learnt from the SEPI that the performance of the states on socio-economic front improved over the years. However, there is a large variation in inter-state performance in terms of different minor indices justifying the use of multiple socio-economic indicators for assessing the socio-economic performance of the NSC states. During 1990-91, Goa (56.20), Kerala and Punjab were at top three positions followed by Maharashtra and Tamil Nadu securing 4th and 5th rank respectively. The top three states draw their strength from all three

major indices namely health, education and economic. Goa topped in health index while Kerala and Punjab topped the list in education and economic index respectively during this period. Goa being the best performer in health indicator also has the better relative position in remaining two indices; the same is true for other two states as well. Bihar (12.78), Odisha and Uttar Pradesh were the least performers followed by Madhya Pradesh and Rajasthan in terms of SEPI as their relative position in all three parameters was poor in comparison to other states. The other states fall in the category of medium socio-economic performance.

Table-6
State Wise SEPI Index

States	1990-91	R 1	1996-97	R 2	2002-03	R 3	2008-09	R 4	2014-15	R 5	2019-20	R 6
Andhra Pradesh	32.85	11	42.32	10	46.57	10	55.55	10	62.94	10	66.26	11
Bihar	12.78	17	18.14	16	24.63	17	36.81	17	50.22	17	58.88	16
Chhattisgarh*	34.98	9	36.31	11	44.29	11	51.97	11	57.85	11	59.76	13
Goa	56.20	1	48.57	8	62.66	1	76.68	1	63.86	9	81.68	1
Gujarat	40.60	6	52.92	4	51.61	8	60.68	8	64.65	8	73.67	5
Haryana	40.23	7	49.73	7	53.27	5	61.42	7	65.01	7	71.35	7
Jharkhand*	23.77	13	26.18	15	37.79	12	51.76	12	54.20	15	59.72	14
Karnataka	38.08	8	50.00	6	52.52	6	61.69	6	65.95	5	72.91	6
Kerala	54.59	2	62.42	1	60.56	3	72.72	2	70.95	1	76.95	2
Madhya Pradesh	24.10	12	29.24	13	35.47	14	49.80	14	55.11	14	56.57	17
Maharashtra	45.65	4	56.18	2	56.72	4	66.58	4	70.10	4	74.68	4
Odisha	19.92	15	32.31	12	31.08	16	50.35	13	56.40	13	60.95	12
Punjab	47.66	3	52.45	5	52.28	7	64.34	5	70.19	2	69.59	9
Rajasthan	23.47	14	28.84	14	36.83	13	48.52	15	57.63	12	66.75	10
Tamil Nadu	42.29	5	55.33	3	61.04	2	71.29	3	70.15	3	76.12	3
Uttar Pradesh	18.88	16	16.35	17	31.81	15	43.09	16	52.34	16	59.36	15
West Bengal	33.42	10	43.93	9	50.42	9	59.07	9	65.78	6	70.18	8

Note: 1. *****the value of Chhattisgarh and Jharkhand for 1990-91 and 1996-97 is taken from their parent states Madhya Pradesh and Jharkhand respectively.

2. R1= Rank 1 (1990-91); R2= Rank 2 (1996-97); R3= Rank 3 (2002-03); R4= Rank 4 (2008-09); R5= Rank 5 (2014-15); R6= Rank 6 (2019-20).

Source: Author's calculation.

In 1996-97, the socio-economic performance was quite similar to 1990-91 with few exceptions. In this period, two of top three states slipped down from their positions. Goa slipped down to 8th position from the top position and Punjab slipped down to 5th position from 3rd position in this period. In the same period, Odisha improved their position whereas the position of other states was almost similar to previous one. In 2002-03, Kerala (60.56) slipped to 3rd position and Goa (62.66) secured top position again because of the significant improvement in all three dimensions of the SEPI. Kerala, Tamil Nadu, Maharashtra and Haryana were other states among the top five states. In this period, Bihar (24.63), Odisha, Uttar Pradesh and Jharkhand were the least performers as they secured the bottom five ranks respectively. The socio-economic performance of the states in terms of the SEPI were to a great extent similar to the previous point of time in 2008-09 and 2014-15. However, in 2019-20, the socio-economic performance of the states changed considerably. Because of a significant decline in SEPI scores, Chhattisgarh, Madhya Pradesh, and Punjab were pushed down to lower positions. Their position deteriorated by four, five and six places respectively. Bihar and Uttar Pradesh have stuck to their bottom most positions thoroughly across all years.

In terms of the SEPI, it is observed that the socio-economic performance at the sub national level in India has improved considerably. However, this improvement has significant variation among states. To measure the variation in socio-economic performance of the states, the large-scale transition analysis has been done.

The large-scale transition in terms of deterioration is observed for Chhattisgarh, Madhya Pradesh, and Punjab. These states were pushed down to 13th, 17th, and 9th positions in 2019-20 from 9th, 12th and 3rd position in 1990-91 respectively. The large-scale deterioration in these states is due to severe decline in all three dimensions of socio-economic performance. However, the large-scale transition in terms of improvement during the overall period is recorded for the states like Odisha, Rajasthan, and West Bengal by three, four, and two places respectively. The improvement in socio-economic performance of these states was observed because their composite SEPI scores improved as compared to other states. Either the other states retained their position over the years or the transition was marginal.

Public Expenditure Performance of the States

The pattern and performance of public expenditure is a matter of concern as it plays a significant role in socio-economic development of the nation and the states. The allocation of resources especially in social and economic services is important because it creates social and physical infrastructure. A portion of aggregate expenditure spent as capital expenditure on different items is equally

important as it generates positive externalities not only in the present but also for the future.

Public Expenditure and Socio-economic Performance

Public expenditure is an important determinant of the socio-economic development. Ample amount of research has been done on the relationship between public expenditure and economic development by the researchers. The research on the issue includes various empirical researches establishing positive and negative impact of public expenditure on growth and development (Ray, et. al., 2019). In General, it is assumed that there is positive relationship between these two (Barrow, 1990; Baffes et. al., 1993 as cited in Ray, et. al., 2019). Whereas there are studies such as Sheehey (1993), Vedder and Gallaway (1998), Folster and Henrekson (2001), Furceri and Ribeiro (2008), Romer & Romer (2010) as cited in Ray et. al., (2019) that have shown a negative relationship as well. To examine the relationship between socio-economic progress and expenditure pattern of the states, we have made a correlation analysis of socio-economic performance index with expenditure pattern of states using an index called public expenditure index.

The correlation analysis (Table-7) clearly depicts that in initial phases i.e. 1990-91 to 2002-03, the value of correlation coefficients was smaller and statistically insignificant too, suggesting a weak relationship between these two. However, from 2008-09 onwards it increases sharply with significant p-values. The value of correlation co-efficient during 2008-09 was 0.562 with significant p-value at 1% level of significance, which increased to 0.779 (2014-15) and 0.768 (2019-20) with increase in significance level. The statistically significant correlation coefficients establish the positive relationship between public expenditure and socio-economic performance at the sub-national level in India. In other words, it cannot be denied that a higher public expenditure has reflected in the corresponding better socio-economic performance of the Indian states across the years. Thus, in India's case the empirical relationship between the two does prove public expenditure to be a crucial determinant of socio-economic development at sub-national level.

Table-7
Correlation between SEPI and Aggregate Public Expenditure

Year	Correlation Value	P- Value
1990-91	0.362	0.15309
1996-97	0.479	0.05181
2002-03	0.361	0.15427
2008-09	0.562	0.01885
2014-15	0.779	0.00023
2019-20	0.768	0.00032

Source: Author's calculation.

Conclusion

This paper has measured the performance of socio-economic development in India across NSC states using the SEPI. SEPI has been computed utilising three dimensions spread into 11 indicators. It is found that Goa topped the list with the highest values followed by Kerala and Tamil Nadu for the year 2019-20. In terms of the SEPI, it is observed that the socio-economic performance at the sub-national level in India has improved considerably. However, this improvement has significant variation among states. What is noticeable here is that mostly the states which were doing well initially are the ones doing well in the later years also. It needs to be examined that which are the institutional or policy factors that led to some states growing faster than some states which remain in the same development bracket. There are also contradictions in results of social and economic indices which means that the states doing great in terms of social indicators are not necessarily the states performing well in terms of economic indicators. But when we look at the combined results, then, the same states i.e. Goa, Kerala and Punjab, making it to the best performance and Bihar, Uttar Pradesh and Odisha to the least performing states across the time. Thus, a presence of regional imbalance is getting reflected in the results too.

Further, the analysis of public expenditure and socio-economic performance analysis at the sub-national level of India suggest that there is a statistically significant positive relationship between these two. Socio-economic patterns are in synch with the public expenditure levels. However, the important outcome is increasing significance of the public expenditure in determining state's development level. The findings show, that initially the relationship was insignificant as well, which has significantly improved not only in terms of degree but their statistical significance level also. It implies that states' public expenditure and their composition do affect their development level. For the examination of causality relationship, a disaggregated advanced econometrics analysis of public expenditure and socio-economic performance could be used to get better results.

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Table-A1
Scores of estimated minor indices of education index

State	1990-91				1996-97				2002-03			
	LI	GER	MYS	EYS	LI	GER	MYS	EYS	LI	GER	MYS	EYS
Andhra Pradesh	13.47	-	14.52	21.20	13.47	42.09	18.96	24.72	39.18	43.81	25.60	30.16
Bihar	3.14	-	15.30	8.60	3.14	10.52	19.74	15.66	18.05	5.83	25.15	19.50
Chhattisgarh	11.64	-	25.31	90.62	11.64	63.46	30.05	69.54	45.75	55.02	35.12	63.08
Goa	62.77	-	34.69	49.14	62.77	18.64	44.44	48.97	72.96	72.85	58.02	50.09
Gujarat	40.46	-	22.64	31.73	40.46	69.50	31.14	29.13	52.78	63.77	41.13	31.66
Haryana	31.93	-	20.27	36.76	31.93	28.31	28.47	39.85	50.85	32.76	38.42	41.03
Jharkhand	9.25	-	25.70	91.39	9.25	22.91	30.50	70.14	28.34	9.69	35.62	63.77
Karnataka	32.23	-	20.03	26.22	32.23	62.96	28.31	29.72	48.79	61.09	38.24	34.58
Kerala	85.19	-	36.73	50.69	85.19	52.74	47.47	51.03	86.84	63.18	61.61	54.22
Madhya Pradesh	14.40	-	13.97	19.58	14.40	54.67	19.96	25.00	44.31	43.18	27.46	29.82
Maharashtra	46.08	-	25.15	37.06	46.08	68.46	33.64	40.04	64.92	64.58	46.01	41.94
Odisha	21.33	-	13.41	25.68	21.33	55.34	20.05	29.61	43.27	46.44	28.34	30.45
Punjab	36.10	-	20.59	36.37	36.10	28.34	31.27	42.40	53.58	19.84	43.77	42.65
Rajasthan	4.80	-	9.95	15.65	4.80	64.27	16.58	24.08	39.08	41.89	24.40	28.51
Tamil Nadu	42.61	-	24.68	38.43	42.61	60.46	31.42	39.48	59.54	79.03	41.18	45.18
Uttar Pradesh	8.19	-	16.10	18.23	8.19	2.77	22.21	26.13	32.59	32.11	30.05	30.51
West Bengal	34.83	-	24.29	24.18	34.83	49.58	29.71	28.69	51.99	46.73	36.63	31.41

State	2008-09				2014-15				2019-20			
	LI	GER	MYS	EYS	LI	GER	MYS	EYS	LI	GER	MYS	EYS
Andhra Pradesh	49.45	50.97	31.01	50.95	49.45	52.44	38.45	64.97	60.84	37.22	43.87	68.16
Bihar	41.26	48.18	27.73	38.46	41.26	64.43	31.32	57.83	71.79	76.61	34.95	60.41
Chhattisgarh*	54.56	95.17	36.69	67.73	54.56	72.88	41.22	59.81	64.14	54.75	46.52	64.11
Goa	83.45	60.70	71.57	69.28	83.45	75.11	81.39	79.69	94.80	95.84	79.24	76.33
Gujarat	66.72	76.33	46.45	46.73	66.72	63.73	54.04	54.48	82.45	61.34	58.97	58.95
Haryana	62.83	43.52	45.06	56.45	62.83	64.37	56.76	68.59	76.16	57.77	63.92	70.14
Jharkhand*	48.49	92.58	37.21	68.42	48.49	69.71	39.51	59.38	73.48	41.30	42.44	62.39
Karnataka	62.55	65.57	42.86	51.20	62.55	64.18	50.75	62.05	78.11	59.52	57.86	68.67
Kerala	91.77	60.62	71.54	71.26	91.77	62.89	83.36	77.11	96.86	73.32	90.05	79.00
Madhya Pradesh	53.06	110.52	32.09	46.21	53.06	73.42	39.46	56.11	62.58	26.33	44.76	59.04
Maharashtra	73.48	63.32	55.27	58.09	73.48	67.85	62.56	68.24	82.65	55.78	66.13	68.59
Odisha	58.66	74.26	34.03	42.23	58.66	66.01	41.86	54.99	76.44	44.75	45.97	60.59
Punjab	63.28	65.90	51.33	55.42	63.28	76.22	62.29	68.16	73.86	45.11	67.56	70.48
Rajasthan	48.02	73.20	28.39	42.93	48.02	60.35	35.84	55.34	57.81	79.25	41.56	61.27
Tamil Nadu	69.95	85.91	48.74	65.23	69.95	70.54	58.68	72.03	81.31	57.46	65.69	73.92
Uttar Pradesh	50.49	63.41	34.86	46.30	50.49	62.79	42.23	56.45	72.01	59.60	47.84	57.66
West Bengal	63.94	52.95	40.85	46.47	63.94	65.72	46.44	59.47	77.22	71.38	50.93	64.03

Note: 1. *****the value of Chhattisgarh and Jharkhand for 1990-91 and 1996-97 is taken from their parent states Madhya Pradesh and Jharkhand respectively.

2. LI= Literacy Index; GER= Gross Enrolment Index; MYS= Mean Years of Schooling Index; EYS= Expected Years of Schooling Index.

Source: Author's calculation.

Table-A2
Scores of estimated minor indices of health index

State	1990-91				1996-97				2002-03			
	IMR	MMR	LE	IMMU	IMR	MMR	LE	IMMU	IMR	MMR	LE	IMMU
A. Pradesh	39.88	-	29.42	44.06	46.48	69.59	37.30	59.86	47.37	69.93	43.71	45.21
Bihar	23.10	-	14.39	4.50	39.34	13.18	26.26	5.54	48.26	40.20	35.32	29.99
Chhattisgarh*	26.67	-	45.79	25.84	18.82	28.38	52.12	17.30	37.56	38.85	54.03	48.33
Goa	74.22	-	55.76	78.55	85.73	-	60.25	87.43	87.51	-	65.61	82.81
Gujarat	41.39	-	26.22	49.60	47.37	95.10	36.01	53.29	49.15	73.82	44.17	44.29
Haryana	37.29	-	24.71	53.86	42.02	79.90	38.38	64.48	47.37	75.51	51.08	67.47
Jharkhand*	23.10	-	52.01	4.50	39.34	13.18	58.53	2.31	57.18	40.20	60.50	31.60
Karnataka	44.34	-	26.83	52.36	55.40	61.49	38.20	61.36	53.61	64.36	48.35	55.59
Kerala	81.45	-	55.94	54.90	91.97	77.53	68.13	84.08	93.76	84.29	76.69	79.01
M. Pradesh	26.67	-	12.34	25.84	18.82	28.38	18.31	18.22	26.85	38.85	26.73	38.64
Maharashtra	57.63	-	38.13	66.09	60.75	74.83	46.87	82.58	62.53	77.70	54.93	59.98
Odisha	2.68	-	14.28	33.79	17.04	44.43	24.96	42.56	25.07	42.40	34.86	51.90
Punjab	54.77	-	41.33	63.55	57.18	55.57	48.20	75.32	57.18	72.80	54.53	61.48
Rajasthan	37.91	-	24.75	16.49	26.85	17.06	27.55	12.11	33.10	27.70	33.13	22.72
T. Nadu	42.28	-	29.71	67.01	55.40	80.74	44.60	94.58	63.43	80.24	58.35	85.47
U. Pradesh	13.56	-	7.05	14.99	26.85	0.51	18.35	15.46	31.31	15.54	28.56	18.69
W. Bengal	35.50	-	24.82	31.60	53.61	51.69	40.54	42.68	58.97	70.10	51.76	66.32

State	2008-09				2014-15				2019-20			
	IMR	MMR	LE	IMMU	IMR	MMR	LE	IMMU	IMR	MMR	LE	IMMU
A. Pradesh	56.29	80.24	51.69	45.21	67.89	90.37	59.86	67.47	81.27	95.27	64.64	76.36
Bihar	52.72	58.78	43.38	29.99	65.21	75.00	53.92	63.32	78.59	82.94	59.42	74.05
Chhattisgarh	51.83	57.43	54.50	48.33	64.32	73.65	52.41	80.28	68.78	79.73	53.71	84.08
Goa	93.76	-	74.96	82.81	93.76	-	79.24	94.12	98.22	-	82.91	86.62
Gujarat	58.07	77.87	52.91	44.29	71.45	87.50	62.23	50.29	82.16	93.24	67.41	80.16
Haryana	54.50	77.03	60.68	67.47	70.56	85.81	66.08	63.90	77.70	84.29	69.96	80.85
Jharkhand	61.64	58.78	60.97	31.60	72.35	75.00	58.81	63.55	80.37	93.41	60.14	77.39
Karnataka	62.53	72.80	58.63	55.59	76.81	84.63	69.39	64.36	85.73	91.22	75.11	89.16
Kerala	91.97	89.19	82.23	79.01	91.97	95.10	85.61	86.85	97.32	99.66	89.03	81.89
M. Pradesh	40.23	57.43	39.64	38.64	56.29	73.65	49.53	53.98	64.32	73.65	54.78	81.08
Maharashtra	73.24	85.30	64.03	59.98	83.05	92.57	71.01	56.98	88.40	97.30	75.50	76.93
Odisha	41.12	59.29	45.11	51.90	58.97	72.47	55.25	82.81	70.56	82.77	60.65	96.54
Punjab	66.10	73.82	62.88	61.48	81.27	82.26	68.31	94.93	86.62	85.14	72.23	80.05
Rajasthan	46.48	49.16	45.97	22.72	61.64	69.26	56.87	55.36	74.13	83.78	62.55	84.89
T. Nadu	75.02	86.49	68.38	85.47	84.83	91.72	74.32	72.55	91.08	93.75	78.45	95.04
U. Pradesh	42.91	42.23	37.37	18.69	59.86	68.92	44.32	51.10	68.78	74.66	48.60	72.43
W. Bengal	71.45	78.38	58.20	66.32	77.70	85.81	66.44	89.50	85.73	85.47	71.29	93.43

Note 1. *****the value of Chhattisgarh and Jharkhand for 1990-91 and 1996-97 is taken from their parent states Madhya Pradesh and Jharkhand respectively.

2. IMR= Infant Mortality Rate Index; MMR= Maternal Mortality Ratio Index; IMMU= Immunization Index; LE= Life Expectancy Index.

Source: Author's calculation.

Table-A3
Scores of estimated minor indices of economic index

State	1990-91			1996-97			2002-03		
	UI	PI	PCNSDP	UI	PI	PCNSDP	UI	PI	PCNSDP
Andhra Pradesh	94.51	65.74	33.46	92.45	76.82	37.61	93.00	52.42	41.82
Bihar	86.27	9.00	18.97	85.59	30.45	17.70	89.22	10.03	20.05
Chhattisgarh*	93.14	30.62	32.63	94.51	39.45	36.78	95.81	18.69	37.03
Goa	36.86	78.37	55.64	8.72	96.54	62.13	31.98	60.90	65.24
Gujarat	91.08	62.28	33.74	96.57	79.76	41.50	94.92	49.13	42.27
Haryana	91.08	60.73	42.23	93.82	89.10	44.61	84.21	62.46	48.36
Jharkhand*	86.27	9.00	26.57	85.59	30.45	29.52	87.85	25.78	32.55
Karnataka	92.45	46.71	37.01	92.45	69.55	42.80	93.55	46.37	47.15
Kerala	49.21	60.21	36.61	43.03	82.18	42.00	20.73	70.07	46.79
Madhya Pradesh	93.14	30.62	28.72	94.51	39.45	30.77	95.88	20.07	31.19
Maharashtra	89.02	40.31	38.43	82.16	60.90	43.79	89.02	38.24	46.53
Odisha	87.65	20.07	29.58	84.21	22.49	31.18	61.22	5.19	34.48
Punjab	89.02	83.74	43.75	87.65	93.43	46.64	73.51	67.99	48.36
Rajasthan	98.63	56.75	33.36	96.57	77.68	36.24	94.23	44.64	35.52
Tamil Nadu	85.59	43.60	34.05	84.21	67.65	39.44	88.68	54.15	42.56
Uttar Pradesh	94.51	33.39	27.98	92.45	50.17	29.95	94.44	33.39	29.96
West Bengal	78.04	42.39	27.61	74.61	57.44	32.83	78.38	44.81	37.94

State	2008-09			2014-15			2019-20		
	UI	PI	PCNSDP	UI	PI	PCNSDP	UI	PI	PCNSDP
Andhra Pradesh	91.15	67.65	49.49	71.31	88.24	54.66	69.94	88.24	61.82
Bihar	84.42	11.59	25.39	52.78	45.85	31.29	66.03	45.85	36.04
Chhattisgarh	96.02	19.90	45.36	79.55	35.12	49.73	79.75	35.12	53.69
Goa	70.69	89.10	70.43	6.86	95.33	75.86	46.60	95.33	80.90
Gujarat	94.23	64.36	51.61	69.05	75.43	61.15	88.19	75.43	68.53
Haryana	88.33	69.38	56.13	42.96	84.78	63.36	57.45	84.78	70.03
Jharkhand	72.61	36.51	37.66	49.00	40.14	45.43	73.16	40.14	47.94
Karnataka	94.03	63.32	55.32	68.84	67.99	60.16	73.03	67.99	67.56
Kerala	51.06	83.39	55.07	23.47	91.87	61.34	33.36	91.87	66.79
Madhya Pradesh	94.51	40.66	37.52	71.52	49.31	43.48	81.67	49.31	49.78
Maharashtra	91.49	61.76	55.22	68.50	74.05	61.78	80.23	74.05	66.20
Odisha	80.58	40.14	44.01	53.12	47.75	47.49	58.68	47.75	54.02
Punjab	79.14	76.64	53.81	48.59	89.79	58.29	51.54	89.79	62.33
Rajasthan	96.91	61.25	43.94	67.40	78.72	50.75	71.11	78.72	54.10
Tamil Nadu	87.10	74.57	52.43	50.03	84.60	60.41	65.41	84.60	66.16
Uttar Pradesh	92.52	38.93	34.80	58.41	53.29	38.88	71.31	53.29	43.05
West Bengal	85.31	57.96	43.78	70.21	69.55	47.55	69.80	69.55	52.77

Note 1: *****the value of Chhattisgarh and Jharkhand for 1990-91 and 1996-97 is taken from their parent states Madhya Pradesh and Jharkhand respectively.
Note 2: UI= Unemployment Rate Index; PI= Poverty Index; PCNSDP= Per Capita Net State Domestic Product Index.
Source: Author's calculation.

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MGNREGA AND FINANCIAL INCLUSION IN RURAL KASHMIR: A CASE STUDY OF DISTRICT BUDGAM

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Abstract: The present study is an attempt to investigate the impact of MGNREGA on financial inclusion in the Budgam district of the Kashmir Valley. In order to accomplish its specific objectives, the study utilises both primary and secondary data. The study shows that MGNREGA is a significant contributor to the inclusion of rural people in formal banking. It has led to the opening of new bank accounts at a considerable level. The results show that apart from receiving the direct wage payments, most of the sampled beneficiaries of the scheme did not avail of other banking services such as saving money in these accounts, availing credit from the banks, use of cheque books, credit and debit cards and also using e-banking facilities. The objectives of this study is also to identify the socioeconomic factors that predict whether a respondent will enroll in institutional banking using binary logistic regression. The results reveal that economic status, household income and literacy play a significant role in determining the possibility of financial inclusion for the respondent. It is recommended that more and more financial literacy should be spread in rural areas so that people can take advantage of different banking services that can make their lives better off.

Keywords: MGNREGA, Financial Inclusion, Socio-economic, Binary Logistic Regression.

Introduction

Historically it has been seen that exclusion in any form has led to the exploitation of the unprivileged. The notion of inclusion rests on the premise of justice itself. We can't have a just society if a person or a group is excluded. Social and

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economic inclusion forms the basis for a just society. Financial inclusion is one of the key constituents of social inclusion and plays a prominent role in reducing poverty and bridging the gap in income by opening new opportunities to make lives of the people better (Omar & Inaba, 2020). Financial inclusion is an important constituent of inclusive growth. It forms the basis for the modern idea of inclusive growth in which finances play a prominent role in moving towards a better and prosperous future. Financial inclusion is the process that assures people at large have easy access to a formal financial system (Raichoudhury, 2020). It not only guarantees cost effective access to financial products and services but also saves millions of people from being exploited by age old credit system particularly in rural areas. Certain segments of the population remain outside the formal financial systems even in the well-developed financial systems (Sarma, 2008). India is a developing economy with a significant informal sector, a vast majority of rural India, and a significant portion of urban India, do not avail of financial services (Singh & Verma, 2014).

After the 5th of August 2019, the state of J&K was divided into two Union Territories (J&K and Ladakh). The UT of J&K has two divisions, i.e. Jammu Division and Kashmir Division, with 20 districts. MGNREGA is operational in all 20 Districts comprising 289 CD blocks further divided into 4352 Gram Panchayats. The total number of households granted job cards from the day of inception of the scheme till 2021-22 is 14.16 lakhs and employment provided is 406.29 lakh person-days involving 7.25 lakh households (https://mnregaweb2.nic.in/)

It is a fact that banking penetration remains higher in the areas of high population density and industries (Kaur & Abrol, 2018) and in our case where more than 70 per cent of population live in rural areas and industries remain a distant dream, banking penetration has always remained a challenge. It is due to the continuous efforts of regional government and RBI that more branches are being opened in remote areas to bring more people under the umbrella of formal banking. In all, there are 46 banks operating in the region with 2385 branches (104th JKSLBC report). Out of the 28 states, the (erstwhile) state of Jammu and Kashmir is ranked at the 21st rank on the index of financial inclusion (Raichoudhury, 2020), which is not a healthy indication.

MGNREGA and Financial Inclusion

MGNREGA has been instrumental program in enhancing inclusive growth. The direct transfer of wages in the bank or post office accounts has led to the biggest "*financial inclusion*" in terms of magnitude. The transfer of money in terms of wages from the government to rural households has enabled a large chunk of the Indian population to have a bank or post office account. Thereby it has proved to be a prime factor to bring rural people to have access to the banking facilities.

The wage payment through banks and post offices has led to greater transparency and reliability for payment and has also inculcated banking habits among rural people of India (Meera & Kaleeswaran, 2017). Under this scheme, more than ten crore bank accounts have been opened till now, and over 90 per cent of funds have been disbursed through these accounts. Such a massive disbursement of funds from the state to poor rural households gives a great opportunity to bring millions of people into the fold of formal banking (Azeez N.P., 2020).

The direct transfer of wages has saved the cost of payment delivery. The direct transfer has reduced fictitious or duplicate beneficiaries, and more importantly, it has brought millions of people under the garb of the formal banking system. It has also made it possible for the rural people to borrow money and save money using these bank accounts. It has increased transparency and strengthened the integrity of wage payment system under MGNREGA.

Financial Inclusion or Inclusive Finance as elucidated by the "C. Rangarajan committee on financial inclusion" 2008 is the "process of ensuring access to financial services and timely and adequate credit where needed by vulnerable groups such as weaker sections and low-income groups at an affordable cost."

However, a significant portion of rural families still lack access to banking institutions. Though several initiatives, like MGNREGA, have been implemented and the state has repeatedly attempted to instill banking habits in the rural population to address this issue. Though financial inclusion is not the basic aim of the programme but for overall rural development, financial inclusion is of crucial importance. It was in May 2008 that the Government of India decided to make remuneration payments under the "Mahatma Gandhi National Rural Employment Guarantee Act" through formal banks and post offices accounts so that payment of wages to workers can be assured on time and to achieve the objectives of financial inclusion in rural areas, The present study considers the proportion of respondents having access to a bank or post office as a main indicator of financial inclusion. Having a bank account allows poor households to save money outside the house in a safe manner, avail or to gain access to credit, repayment of loans, making premium payments and transfer money. Thus, having an account in a bank helps in determining usage and access to many other financial services.

MGNREGA has been one of the main instruments that have brought millions of rural people under the umbrella of the formal banking sector. The direct transfer of wage payments in the bank/post office accounts of the beneficiaries has prompted MGNREGA workers to have a bank account. In this study, we try to assess the impact of MGNREGA on financial inclusion by identifying the number of beneficiaries who have opened bank accounts because

of MGNREGA and who did not have an account earlier. We also aim to find out the amount of wages that have been disbursed through these bank accounts during the last couple of financial years. For this purpose, both primary and secondary data has been used. Since it is a well-known fact that having a bank account only does not suffice all the objectives of inclusive finance, it is important to know that to what extent MGNREGA workers use these bank accounts in day to day life in order to carry out their financial activities. Since availability and accessibility are significant determinants of a financially well-included society (Dixit & Ghosh, 2013), an attempt to get a glimpse about the usage of different financial services provided by banks was also envisaged. It is from the sampled beneficiaries that we try to find out that whether or not these bank accounts are being used for other purposes like depositing of money, availing credit facilities, debit cards, credit card, e-banking facilities etc.

Literature Review

Burgess & Pande (2005) found that opening new branches led to the reduction in rural poverty. The study also found that the reduction in rural poverty was linked to increased savings mobilization and credit provision in rural areas. Sahoo, (2013) found that opening of MGNREGA accounts have been growing over the years. The study reiterates that opening an account does not imply "financial inclusion" in the true sense of the term instead there have to be frequent financial transactions via these accounts to attain its true aim. The study also found that the problem of delayed payments is mainly due to scarce penetration of banks and post offices in rural Odisha. In addition to it, institutional incapacity of banks in rural areas to manage a large number of accounts was also found as a factor for ineffective inclusion.

Based on the household-level data to study the influence of "Mahatma Gandhi National Rural Employment Guarantee Scheme" on "financial inclusion" in 29 states of India during 2013-15, Ghosh, (2017) found that accessibility to bank accounts has increased by 12.1 per cent owing to the implementation of the MGNREGA. The results of the study reveal that the probability of accessibility to finance is higher by 4.1 per cent in districts where MGNREGS was introduced early. The results indicate that MGNREGA has a substantial impact on financial access however; it does not produce a significant impact on the use of financial services. The degree of activity in "Savings and Fixed Deposit" accounts was lower in the districts suggesting that financial access is not alternate to the use of financial services (Swamy & Reddy (2018) discovered that workers had a favourable attitude towards bank payments. Furthermore, MGNREGA wage payments through banks and post offices aided in the acceleration of financial inclusion. Ahmed, Sharma, & Mujtaba, (2018) conducted a study in the (erstwhile) state of Jammu and Kashmir. The study finds that financial know how from various sources and awareness from self-help groups, Kisan credit card, are

some of the influential factors leading to financial inclusion. It also finds that distance from the banks and post office significantly determine the possibility of inclusion.

Research Gap

Despite the implementation of MGNREGA in rural Kashmir, there is a lack of empirical research on its impact on financial inclusion in the region. While several studies have examined the program's effects on employment, poverty, and rural development, few have investigated its role in enhancing financial inclusion among rural households in Kashmir. Specifically, there is a need to explore the extent to which MGNREGA has increased access to formal financial services among rural households in Kashmir as well as the impact of MGNREGA on socio-economic dimensions of rural households of Kashmir. Further, there is a need to explore the relationship between MGNREGA participation and financial inclusion outcomes such as savings, credit etc. among rural households in Kashmir. Addressing these research gaps will provide valuable insights into the effectiveness of MGNREGA in promoting financial inclusion in rural Kashmir and inform policy recommendations to enhance the program's impact on this critical development outcome.

Rationale of the Study

Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) is a flagship social security scheme in India, aiming to provide employment and enhance livelihood security for rural households. While its impact on employment and poverty has been extensively studied, its role in promoting financial inclusion in rural areas remains understudied. This study seeks to explore the impact of MGNREGA on financial inclusion in rural Kashmir, a region with limited financial access.

Financial inclusion is critical for rural development, as it enables households to access formal financial services, manage risk, and improve their overall well-being. However, rural Kashmir lags behind in financial inclusion, with limited access to formal banking services, high dependency on informal sources of credit, and low levels of financial literacy.

MGNREGA has the potential to address these challenges by providing a platform for financial inclusion. The scheme's mandate to pay wages through bank accounts and promote financial literacy among beneficiaries can help increase access to formal financial services. Moreover, MGNREGA's focus on women's empowerment and social inclusion can help address gender and social disparities in financial access.

This study aims to investigate the impact of MGNREGA on financial inclusion in rural Kashmir, exploring the following research questions:

- Has MGNREGA improved access to formal financial services among rural households in Kashmir?
- Which socio-economic factors govern the probability of a rural household to be included in the formal banking system.
- Has MGNREGA reduced dependency on informal sources of credit among rural households in Kashmir?

By exploring these questions, this study aims to contribute to the existing literature on MGNREGA and financial inclusion, providing insights into the scheme's effectiveness in promoting financial inclusion in rural Kashmir. The findings will have implications for policy and practice, helping to inform strategies to enhance the impact of MGNREGA on financial inclusion and rural development in Kashmir.

Objectives

- To assess the contribution of MGNREGA in enhancing Financial Inclusion.
- To assess the extent to which banking services are availed by the workers.
- To find out the socio-economic determinants of financial inclusion.

Data and Methodology

Sources of Data

In order to analyse the Impact of MGNREGA on financial inclusion, both Primary and secondary data have been used. The primary data was collected with the help of a well-structured interview schedule during the summer of 2022. Secondary data was collected from the official website of MGNREGA.

Study Area

The field survey for the present study was carried out in of Kashmir valleys district Budgam. The selection was done on the rural population in the district.

Sampling

Purposive stratified cum random sampling technique was employed for the current study. Budgam's administrative district is made up of 6 municipal committees and 17 community development blocks. We only focused on CD Blocks because our study relates to rural areas. The 17 blocks in the district of Budgam are serviced by MGNREGA through 281 gram panchayats. Six of the 17 blocks were chosen based on the highest, middle, and lowest concentration of people with job cards, and two villages were randomly chosen from each block.

Thus, 12 villages in total were chosen. Ten MGNREGA beneficiaries were arbitrarily chosen from each village. In this way, we had 120 respondents in our sample.

Methods

Financial inclusion is typically measured by the number of accounts created or the number of persons having access to banking services (Helms et. al., 2006). In the present study, the number of "bank and post office accounts" opened post MGNREGA period has been used as the prime indicator of financial inclusion. It is a well-known fact that only opening a bank or post office account does not mean financial inclusion rather, there should be financial transactions through these accounts to achieve the broader aims of financial inclusion (Das, 2009; Sahoo, 2013). A person may be called to have access to formal banking services only if he is able to access such services in an appropriate form at ease whenever he needs them.

Availing facilities like credit, cheque books, e-banking and credit card and debit cards also do indicate the level to which banking habits have been inculcated in the minds of rural people that in turn indicate financial inclusion in a broader sense. In the present study also, the extent to which the workers are using these banking facilities has been used to know the depth of financial inclusion. This was done by directly asking the sampled beneficiaries about it.

In addition, binary logistic regression has been used to find out the socio-economic determinants that influence financial inclusion. The present study takes "availing the credit facility" from the bank, which is a binary response variable, as an indicators of financial inclusion as it is being considered as one of the crucial indicators of the inclusion.

The regression equation of the following form was estimated:

$$Logit\ (Pinc) = ln\ \frac{Pinc}{1-Pinc} = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \mu(i)$$

Where, *Pinc* is the "probability of being included",

α= Intercept,

$\beta_1 \ldots \beta_6$= regression coefficients to be estimated.

$X_1 \ldots X_6$ = are the independent variables

The dependent variable here *(Pinc)* is the probability of being included or excluded in formal banking. We have used availing credit from the bank as a proxy for financial inclusion. The dependent variable is a binary response variable. Among the independent variables, age, years of schooling, size of land holdings and total household income are continuous variables, where as economic status (BPL or APL) and occupation (agriculture or non-agriculture) are

status (BPL or APL) and occupation (agriculture or non-agriculture) are dichotomous variables, and μ is the error term. For the purpose of categorizing respondents as Above Poverty Line (APL) or Below Poverty Line (BPL), we employed a straight forward approach by inquiring about their ration card status. Specifically, we asked respondents to reveal the type of ration card they possess - either APL or BPL. This method aligns with the government's established procedure and criteria for determining poverty status. Such determinants promote inclusion and thus, a clear picture of these determinants is a must have for strategy and policy makers (Kumar Vaid et. al., 2020).

Table-1
List of Independent Variables used in Regression Analysis

S. No	Independent Variable	Notation	Description
1	Age	Age	In years
2	Economic Status	EcoStat	Dummy (BPL=1, otherwise=0)
3	Occupation	Occ	Dummy(Agriculture=1, otherwise=0)
4	Years of schooling	Yos	In years
5	Size of Land Holdings	SizeLH	In Kanals
6	Monthly Household Income	THinc	In Rupees

Empirical Analysis

The empirical analysis for the study is subdivided into two sections. In the first section, we have given a general overview of the socio-economic and demographic status of the respondents. In the second part, data analysis and results have been reported.

Section I

Socio-economic Background of Sample Beneficiaries

Socio-economic status includes not only income but also educational attainment and occupation of a person or a group. It also encompasses other attributes like social standing of an individual or group in a society that affects the overall quality of life.

Table-2
Educational Level of Sampled Beneficiaries

Level of Education	Frequency	Percentage
No schooling	84	70.0
Primary level	19	15.8
Middle level	5	4.2
Secondary Level	4	3.3
Higher Secondary level	5	4.2
Graduation and Above	3	2.5
Total	120	100.0

Source: Field survey

Table-3
Monthly Household Income of the Respondents

Total Monthly Household Income (in Rs.)	Frequency	Percentage
Less than 5000	105	87.5
5001 to 10000	15	12.5
10001 and Above	0	0
Total	120	100.0

Source: Field survey

Table-4
Distribution of the Respondents with Respect to the Economic Status

Category	Frequency	Percentage
BPL	84	70
APL	36	30.0
Total	120	100.0

Source: Field survey

Table-5
Age Wise Distribution of Sampled Beneficiaries

Age group in years	Frequency	Percentage
18 to 30	9	7.5
31 to 40	46	38.3
41 to 50	49	40.8
51 to 60	15	12.5
61 and Above	1	0.8
Total	120	100.0

Source: Field survey

Table-6
Distribution of the Size of Land Holdings Among the Respondents who own Land

Size of Land Holdings	Frequency	Percentage
No Land	19	15.8
1 to 5 kanals	88	73.3
6 to 10 kanals	10	8.3
11 to 15 kanals	1	0.8
16 to 20 kanals	1	0.8
21 to 25 kanals	1	0.8
Total	120	100.0

Most of the sampled beneficiaries have been found not to have received any formal education. It can be seen from Table-2 that with the increase in education levels, the concentration of sampled beneficiaries decreases. It was also

found that the majority of sampled beneficiaries had a poor economic background as the majority of the sample beneficiaries has a monthly household income of less than INR 5000 (see Table-3). It can also be seen in Table-4 that the majority was living below the poverty line. As far as the age structure of the respondents is concerned, a majority has been found in their Middle Age (see Table-5). During the field survey, it was found that the majority was having less than 5 kanal of land out of which some had no land, as reported in Table-6.

Section II

This section deals with the data analysis and results, keeping in view the objectives of the study. Firstly we deal with the impact of MGNREGA on the opening of new bank and post office accounts followed by investigating the extent to which different banking facilities are being availed by the respondents. The analysis part concludes with finding the socio-economic determinants of financial inclusion.

Table-7
Number of Bank Accounts Opened and Amount Disbursed in District Budgam for the Year 2016- 17 to2020-21

Year	Number of registered job card holders		Number of bank accounts opened		Number of post office accounts opened		Total accounts opened	Amount disbursed through bank accounts (Rupees in lakhs)
	Households	Persons	Individual	Joint	Individual	Joint		
2016-17	60801	90534	64055	601	4	0	64660	1009.37
2017-18	64652	92931	68920	80	4	0	69004	2159.63
*2018-19	66904	96385	74411	129	4	0	74519	2100.63
2019-20	69156	99838	79902	121	4	0	80033	2041.63
2020-21	73168	104793	85068	132	4	0	85204	3579.89
2021-22	77204	110555	90902	163	4	0	91069	2973.67

Source: http://mnregaweb2.nic.in
(*Missing data has been calculated by taking averages)

Table-7 shows the extent to which bank accounts have been opened by the workers of MGNREGA and the amount of wage payment distributed among these workers during the last few years. It is clear from the table that the number of total bank accounts opened during these years have increased from 64660 in 2016-17 to 91069 in 2021-23, i.e. by a margin of 26409 accounts which turns to be approximately 40.8 per cent increase and the amount of wages disbursed

during the reference period has gone up from INR 1009.37 lakhs in 2016-17 to INR 2763.67lakhs in 2021-22 which is almost threefold increase. The enormous increase in the fund transfer to the workers is because of the fact that there has been a huge jump in the employment generation in the scheme during the reference period. It is also important to mention here that the number of post office accounts opened was negligible and no amount of wage payments was disbursed through post office accounts. This shows that banks play a crucial role in order to bring rural people under the ambit of the formal banking system.

It was found during the field survey that all the sampled beneficiaries were having an active bank account and all were receiving wages through these bank accounts. The current study tries to find out that whether all these sampled beneficiaries had a bank account prior to implementation of MGNREGA or not and how many of them opened the bank account in order to receive MGNREGA wages directly in their accounts so that we can assess the role of MGNREGA in encouraging the sample beneficiaries to be part of formal banking system.

Table-8
Frequency of Sampled Beneficiaries who Opened Bank Accounts because of MGNREGA

	Frequency	**Percentage**
Opened bank accounts post MGNREGA	43	35.83
Already had bank/post office account	77	64.16
Total	**120**	**100.0**

Source: Field survey

Table-8 reveals the frequency of sample beneficiaries who were not operating a bank account prior to the inception of MGNREGA and opened bank account only after direct transfer of wages was made mandatory in the disbursement of wages in MGNREGA. It can be seen from the table that 43 percent of the sampled beneficiaries opened bank accounts because of MGNREGA and 64 per cent of sampled beneficiaries already had bank accounts prior to the implementation of MGNREGA.

It is important to mention here that despite having bank accounts linked to the job card of the sampled beneficiaries none of the sampled beneficiaries reported to have received wages on time. In most of cases the delay was of more than a month that too without any compensation for late payment.

It is a well-established fact that having only a bank account does not fulfill the broader objectives of financial inclusion. It includes the reduction in the role of traditional sources of credit by availing the credit facilities from the formal banking institutions, which is an important canon of inclusive finance. In addition, availing credit from formal institutions, saving money in banks, using cheque books etc. show the level of financial inclusion in society. With the

advancement in the digital services, technology has emerged as a significant factor while availing of financial services (Sharma & Kukreja, 2013). And accordingly, the present study includes availing facilities like e-banking and the use of credit and debit cards to indicate the level to which the banking system is inclusive.

Table-9
Frequency of Sampled Beneficiaries who use their Bank Accounts for other Purposes in Addition to Receiving Wages in DBT Mode

Nature of banking service	Yes	No	Total
Credit Facility (during last two years)	42 (35%)	78 (65%)	120
Saving	45 (37.5%)	75 (62.5%)	120
Cheque book	24 (20%)	96 (80%)	120
ATM card	59 (49.1%)	61 (50.83%)	120
Kisaan Credit Card	56 (46.6%)	64 (53.3%)	120
E- Banking	0 (0%)	120 (100%)	120

Source: Field survey

Table-9 reveals the frequency of sampled beneficiaries who avail the banking facilities in addition to receiving the wages and other direct transfers. It is shown that only 35 per cent of sampled beneficiaries have availed credit facility and the majority kept themselves away from taking any type of credit from the banks. It was observed from the field study that people in rural areas were reluctant to take loans from the banks even when they need money fearing the delays in the repayment might cause them to repay more amount of money in terms of interest. It can be seen from the table that only 20 per cent of sampled beneficiaries were using cheque books for withdrawing money from the bank and to make payments to others while 80 per cent of the beneficiaries do not possess cheque books. It was also found that 49 per cent of sampled beneficiaries were possessing ATM debit cards to withdraw their money from their respective bank accounts. It is important to mention here that those respondents, who do not possess cheque book as well as the ATM card, personally visit the bank branches to carry out such financial transactions. Since agriculture has been the main occupation of the district, it was found that approximately 47 per cent of the sample beneficiaries possessed kisan credit cards. It was observed that this type of credit facility at affordable costs and easy to avail from the banks has actually brought many cultivators under the ambit of formal banking and has made a considerable advance towards achieving the broader aims of financial inclusion in

which includes not only having a bank account but also reducing the role of traditional moneylenders in rural areas. The table also shows that none of the sampled beneficiaries was actually using internet banking.

Socio-Economic Determinants of Financial Inclusion among MGNREGA Workers

The present study also tried to investigate the underlying socio-economic factors that determine the probability to be included in the formal banking system.

Table-10
Impact of Socio-Economic Determinants on Availing Credit Facility by the sampled Beneficiaries of MGNREGA (using Binary Logistic Regression)

	B	S.E.	Wald	df	Sig.	Odds Ratio
Age	-.055	.039	1.962	1	.161	0.946
Economic Status	-1.882	.671	7.868	1	.005*	0.152
Occupation	-.076	.226	.112	1	.738	0.927
Years of Schooling	.563	.121	21.812	1	.000*	1.756
Size of Land Holdings	-.017	.083	.043	1	.836	0.983
Total Household Income	.346	.067	26.667	1	.011**	1.414
Constant	1.351	2.010	.452	1	.501	3.867

*Significant at 1 per cent level of significance
**Significant at 5 per cent level of significance

An odds ratio of 0.946 means that for each additional year of age of the respondent, the odds of the outcome occurring decreases by a factor of 0.946. In other words, an increase in age of a respondent by one year reduces the odds of being included in institutional banking by approximately 1- 0.946 = 0.0541 or 5.4 per cent. However, the variable age seems to have insignificant impact on the outcome variable. Similarly, size of landholdings and occupational status also does not significantly determine financial inclusion. However, if the number of persons belonging to BPL category increases by one person, the odds of being included in institutional banking are reduced approximately by 84.8 per cent. On the other hand, the results show that if the level of education of a person increases by one year, the odds of being included in institutional banking are increased approximately by 76 per cent. Similarly, a unit increases in income of person increases his odds of being included in institutional banking by about 41 per cent.

We can conclude that economic status, educational status and income level are significant predictors of institutional banking. Specifically, as educational status and income level increase, the likelihood of being included in institutional banking also increases. On the other hand, as economic status declines, the likelihood of being included in institutional banking also declines. Age of the respondent, size of landholdings and occupational does not appear to be significant predictors of the institutional banking.

Discussion and Conclusion

Rural people, by and large, have remained away from formal banking sector and have remained dependent on traditional money lenders whenever they needed finance. MGNREGA has not only provided livelihood security to the rural people by providing guaranteed 100 days of wage employment but also aims at the financial inclusion of the rural people by bringing them under the ambit of formal banking system. Our results reveal that there has been considerable increase in number of households registered and number of bank accounts opened during the reference period. In district Budgam alone the amount disbursed through these bank accounts has increased from INR 1009.36 lakh in 2016-17 to INR 2763.67 lakhs in 2021-22, which is a threefold increase. During our field survey it was found that out of the total sample beneficiaries 35 per cent opened bank accounts only because of the MGNREGA. This clearly implies the effectiveness of the scheme to bring the rural people under formal banking. It is a well-known fact only opening a bank or post office account does not mean financial inclusion; rather, there should be financial transactions through these accounts to achieve financial inclusion in the real sense (Sahoo, 2013). In the current study, we also tried to find out the extent to which these workers are using these bank accounts. Our results reveal that majority of the sample beneficiaries have not availed banking services like credit facilities, cheque books, ATM cards and e-banking. It was also found that a minority among these beneficiaries use these bank accounts to save their money. This is a clear indication that, apart from the direct transfer of wages and other targeted cash benefits, most of the banking services are not being used in rural areas. There is a need to make rural people aware of these banking facilities so that the broader objectives of "Financial Inclusion" may be achieved. So, we can say MGNREGA has a substantial impact on financial access to the rural people; however, it doesn't produce a significant impact on the use of all financial services (Ghosh, 2017).

Since the economic status and income of the household are positive and significant, it can be interpreted in the sense that as the person or household moves out of the poor economic conditions, his probability to get associated with formal banking rises significantly. It also infers that persons living in poorer conditions tend to b away from institutional banking. Households with better economic conditions tend to be more financially inclusive.

We also found that literacy is significantly in increasing the probability of respondents to come under the umbrella of formal banking. Our results show that with each year of schooling, the probability of being a part of institutional banking rises significantly. A person who is richer and more educated favour financial inclusion (Zins & Weill, 2016). Our results clearly show that the Building of financially inclusive societies requires attempts to enhance income and literacy levels, as also put forth by (Sarma & Pais, 2011).The results are in

conformity with Nimal A, (2007),Fischer, (2011), Abel et al., (2018)and Rastogi & Ragabiruntha, (2018).

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SOCIO-CULTURAL DIMENSIONS OF MENSTRUAL HEALTH AND HYGIENE AMONGST ADOLESCENT GIRLS OF WEST-TRIPURA DISTRICT

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Abstract: Menstrual Hygiene Management (MHM) is an important aspect of maintaining proper hygienic practices during menstruation from menarche to menopause. Under the National Health Mission, 2011, and later the Swachh Bharat Mission guidelines of 2015, MHM became an integral part of sustaining equitable menstrual practices amongst adolescent menstruators in the urban-rural divide. This research project aims to understand the socio-cultural dimensions of Menstrual Health and Hygiene, amongst the girl students of the Government Schools within the West-Tripura District. As such, the objective focuses on these three domains: to understand how demography and location impact menstrual health and hygiene practices among school girls; to explore the cultural impact in shaping the taboos related to menstrual health and hygiene amongst school girls; and to gauge the effectiveness of government schemes in addressing menstrual health and hygiene of school girls. This research employs a mixed-method methodology which ranges from 'Cluster Sampling' method for selecting schools and the district, and 'Systematic Random Sampling' for selecting the students within those schools. It implies both qualitative and quantitative approaches for substantiating the findings. The 'Cluster Sampling' method has been used for selecting the 10 Government Schools within the West-Tripura District, pertaining to the influence of socio-economic disparities in the formulation of cultural perception towards menstruation. Whereas, the 'Systematic Random Sampling method' has been used in selecting the samples for conducting the research. A survey has been conducted through the questionnaire mode (in the time frame of 23rd June, 2023 till 13th July, 2023). The primary finding focuses on how MHM schemes of the State Government have impacted in dismantling taboos and challenging gender stereotypes by promoting scientific education and empowerment amongst adolescent girls. This research, therefore, pursues the missing dialectics and discourses on

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the deep-rooted menstrual stigmas and taboos permeating the cultural identities of the school-goers, in the capital of a small hilly state of Northeast India.

Keywords: MHM, Socio-cultural identities, Northeast India.

Introduction

Menstruation is a basic human biological occurrence, more so a female biological function, yet is considered as a polluted state, leading to restrictions and taboos, particularly for women**.** Cultures and customs, however, varied around the world, are somewhere always similar to an extent when it comes to women, more so, the 'menstruating bodies'. The biological phenomenon of menstruation significantly influences the cultural, religious, and economic treatment of women across various societies worldwide. The prejudices and taboos surrounding menstruation have been passed down through the generations and across different cultures. In the case of women in particular, menstruation has not only been used to cast doubt on their capabilities, but menstrual blood has always been feared, considered unpleasant, and has been the subject of cultural taboos and concealing standards for a very long time. From the Victorian West to religiously diverse oriental cultures as well as ethnically rich African societies, menstruation has been a socio-cultural construct rooted in different menstrual practices, rituals, and perceptions (Thakuria, 2018). As Roberts and Goldberg (2010) mention, women's bodies have always been looked at through the dual prism of either being an object of worship and reverence or possessing animalistic attributes. As civilisations advanced through religious and socio-economic transformation, there has been a constant attempt to contain the threatening aspect of the female body by imbuing it with a symbolic connotation of nature and portraying it as a bearer of cultural values. It is in these……strategies of defense that we can better understand the duality of cultural reactions toward women and their bodies, which range, for example, from confinement to menstrual huts to the idealisation of the female "nude" in both art and advertising (Goldberg and Roberts, 2010). Historically, this dichotomy has persisted from Plato's 'Wandering Uterus' to Freud's 'Castration Anxiety' to the various religious conventions, as "Christian theologians argued that "original sin" occurred in the Garden of Eden because women's nature made them more susceptible to the passions of the body, rendering them incapable of higher human morality and reason" (Weitz, 1998) In many texts of Buddhism, women are condemned because of their bodies as the polluted, not-quite-human sex (Sponberg, 1992), and Orthodox Jewish men thank God every day that they were not born with the body of a female (Gilmore, 2021). Hence, menstrual blood has been an object of 'terror' and menstruation as 'creatureliness'. In the case of women in particular, menstruation has not only been used to cast doubt on their capabilities, but menstrual blood has always been feared, considered unpleasant, and has been the subject of cultural taboos and concealing standards for a very long time. Directives prohibiting contact with

women while they are menstruating have been found all the way from the Bible to the Quran. These religious directives reflect the view that women are polluting and that menstrual blood might have a contaminating effect. Numerous indigenous societies exhibit profound apprehensions about the presence of menstrual blood. The New Guinea Mae Enga, for example, believes that contacting a menstruating woman will "sicken a man and cause persistent vomiting, kill his blood so that it turns black, corrupt his vital juices so that his skin darkens and hangs in folds as his flesh wastes, permanently dull his wits, and eventually lead to a slow decline and death" (Delaney et. al., 1988).

In 1960 an anthropological study conducted in rural China and Taiwan found that historically women's menstrual blood often functioned as a source of both power and danger (Ahern, 1979). The pollution of blood often removed women from participating in ancestral rites and implied that men could become sick or infected if they came into contact with menstrual blood (Ahern, 1979). Even in modern Chinese societies today, the taboos and practices of menstruation are imposed as self-objectification by the women themselves, who believe that knowledge of menstruation in public would result in a loss of face in the public realm.

As Jiang (2019) points out, menstruation and menstrual blood are viewed as 'pollutants', having contaminating powers if seen or spoken of in public discourse. China's media regulator has banned the advertisements of feminine hygiene products on TV at lunchtime and during prime time, reasoning that commercials, along with ads for hemorrhoid treatments and foot disease remedies, were "disgusting", (2019). This observation suggests the existence of distinct societal restrictions surrounding menstruation, including the communication and visual representation of menstruation and associated products, within contemporary Chinese society.

Even a study conducted among adolescent girls in middle England in 2020, brings out the archaic beliefs of menstruation being kept a 'secretive affair' away from being discussed with 'fathers' or 'boys at school'. Most of the participants even expressed concerns about feeling distressed and shame while discussing their periods, and only two of them felt comfortable enough to consult a GP for persistent symptoms of menarche (Sykes et. al., 2020).

Another study on menstruation and social inequities conducted among 22,823 women in Spain in 2021, points out the cross-sectional impact of economic inequalities that women face in terms of period poverty and acquiring scientific know-how of menstruation and the hygienic aspect of dealing with it (Perucha et. al., 2023). In this study, 73.5 per cent of the total participants believed that all menstrual products were very expensive. When it comes to social taboos of menstruation, the study has found that most women and people who menstruate (83.3%) disclosed feeling scared of staining their clothes with

menstrual blood in public, 58.5 per cent had concealed menstruation, 44.5 per cent had felt discriminated or judged for menstruating, and 19.2 per cent were embarrassed to discuss menstruation (Perucha et. al., 2023). In the Indian context, a study conducted on the Paniya and Kurichya tribes of Kerala (Babu & Kumar, 2020), the research underscored that, a significant majority of the participants, specifically 95.14 per cent, reported adhering to various forms of cultural prohibitions during menstruation. These limits encompassed dietary limitations as well as abstaining from engagement in religious practices. The paper highlights that the menarche of girls was celebrated in a grand way among the Kurichya community, and the celebration was called 'thirandu kalyanam'. This celebration was considered more important for a Kurichya girl than her actual marriage. It also highlights the menarche of a girl belonging to the Paniya community is called 'ritumathy kalyanam' and is celebrated as a grand celebration for them. Similarly, in Assamese society, the menarche of a girl is celebrated as ‘Tuloni Biya’, in a long drawn religious context. As such Thakuria, in her 2018 article (Thakuria, 2018) talks about the “bio-cultural patterns of Menstrual Behaviour in Assamese society”, while focusing a subjective look into the practice of ‘Tuloni Biya’ and exploring the hidden misogyny within the celebration of femininity, as in, although the first period of a girl is celebrated, she is still bonded within the existing taboos and practices stereotypical to menstruation in India. In another study conducted in Tamil Nadu (Selvi & Ramachandran, 2012), examines the influence of background characteristics on the adherence to particular socio-cultural taboos across a sample of respondents residing in both rural and urban settings. The research reveals the existence of socio-cultural prohibitions associated with menstruation in both rural and urban regions of Tamil Nadu. The classification of the practice of these taboos is contingent upon the socio-economic background of the respondents. The prevalence of social taboos is notably higher among urban respondents, namely Hindus, respondents from non-scheduled castes, and those belonging to joint households. Additionally, the research reveals that these cultural prohibitions have a significant impact on the everyday experiences of women residing in the area, resulting in inadequate adherence to menstrual hygiene practices and heightened vulnerability to reproductive tract infections. Another recent study conducted in Uttar Pradesh (McCammon et. al., 2020), found out that at the individual level, young women lacked knowledge about menstruation and received incorrect information. At the social level, young women experienced stigma around menstruation, lacked opportunities to discuss menstruation, and experienced limitations around mobility and other activities during menstruation. At the institutional level, there were few resources to support menstruating young women in schools, as toilets were dirty and doors were broken. The study concludes that addressing these challenges requires a multi-level approach that involves education, policy change, and community engagement.

Focusing on North East India, the socio-cultural dimensions of menstruation are quite similar to the customs, cultures, and traditions prevailing in other contemporary societies around the world. The socio-economic conditions of the menstruators in Northeast India seem to have a significant influence on their ideas and practices related to menstruation.

Nagar and Aimol (2017) reported that among adolescent girls in the Rongram block of the West Garo Hills district in Meghalaya, India, a significant association was observed between menstrual awareness and family income. This implies that there is a positive correlation between the respondent's knowledge about menstruation and the income level of their families, as a manifestation of the inherent corporeal nature of female existence. In another study conducted at Manipur in 2019 (Pao and Meitei, 2022), revealed that a significant proportion of adolescent females lacked prior awareness regarding menstruation in advance of their personal experience of it. The study additionally discovered the presence of detrimental attitudes and perceptions regarding menstruation, including the perception of it as unclean and disgraceful. There was a significant correlation observed between the age and educational level of the adolescents and their attitude and perception towards menstruation. The research highlights the necessity of comprehensive and precise education regarding menstrual health and hygiene in order to effectively tackle the misunderstandings and societal taboos surrounding menstruation. The paper underscores the significance of advocating for the dissemination of knowledge, raising awareness, and implementing efficacious interventions pertaining to menstruation.

In contrast to the research available on ‘menstrual health and hygiene’, studies conducted in Tripura in the last decade or so are limited to only three. A 2014 ‘Study on Reproductive Health problems amongst rural adolescent girls of Mohanpur block of West Tripura” (Baidya, 2014) assess the knowledge of reproductive health and the health care-seeking behaviour of rural adolescent girls. The study found that 14.50 per cent of the respondents suffered from menstrual irregularity, 5.50 per cent had heavy menstrual bleeding, and 6 per cent had scanty menstrual bleeding. 25.00 per cent of the respondents had longer bleeding durations. 90.50 per cent of the respondent adolescents had cycle lengths greater than or equal to 28 days. 8.50 per cent of the adolescent girls perceived premenstrual syndrome. The present study found that only 8.55 per cent of the adolescent girls in rural areas had knowledge about Sexually Transmitted Diseases (STDs). The respondents in the present study were found to have poor knowledge regarding STDs, HIV & AIDS. This study highlights that adolescent girls in rural areas often suffer in silence from the pain and discomfort associated with menstruation. The 2015 study, ‘Age at Menarche in Adolescent Chakma Girls of Tripura’ (Saha & Sil, 2015) entails a scholarly investigation into the phenomenon of menarche, specifically focusing on its occurrence among 346 Chakma girls residing in the region of Tripura, India. The research additionally

investigates the impact of socio-economic factors on the onset of menarche. Socio-economic factors, such as income and birth order, can influence the age at menarche. The study suggests that higher living standards and smaller family sizes may be associated with earlier menarche. It, thus, contributes to the existing knowledge on menarcheal age in different populations and highlights the importance of understanding the factors that influence the timing of menarche. 'A cross-sectional study on menstrual hygiene practices among the village women attending a primary health centre, in Tripura' (Das et. al., 2019)examines the hygiene practices employed by women of reproductive age (15-49 years) during their menstrual periods in the region of Tripura, India. Conducted upon 141 respondents revealed that effective hygienic practices encompassed various factors, such as the utilisation of absorbent materials, including sanitary pads or alternative options. The research revealed that a significant proportion of the participants utilised cloth as their primary absorbent material, accounting for 44.0per cent of the respondents. This was closely followed by sanitary napkins, which were used by 36.2per cent of the participants. A total of 47.5per centof the participants engaged in the practice of reusing the cloth material. A mere 2.1per cent of the participants in the study exhibited a frequency of material change that was less than twice per day. A significant majority of the study participants, exceeding 90per cent, engage in regular hygiene practices for their intimate areas (Das et. al., 2019). Thus, these aforementioned studies form the basis of our research, aiming to understand the socio-cultural dimensions of Menstrual Health and Hygiene, amongst the girl students of the Government Schools within the West-Tripura District. This research, therefore, pursues the missing dialectics and discourses on the deep-rooted menstrual stigmas and their socio-cultural impact. The study tries to find out the influence of government schemes in dealing with menstrual taboos through the successful implementation of MHMs.

Objectives

The objectives of this study are: to understand the impact of demographyand location on menstrual health and hygiene practices among school girls; to explore the impact of taboos in shaping the socio-cultural practices related to menstrual health and hygiene amongst adolescent girls; and to examine the impact of State Government schemes related to menstrual health and hygiene of school girls.

Methodology

This research employs a mixed-method methodology which ranges from 'Cluster Sampling' method for selecting schools and the district, and 'Random Sampling' for selecting the students within those schools. It implies both qualitative and quantitative approaches for substantiating the findings. The 'Cluster Sampling' method has been used for selecting the 10 Government Schools, out of which 5 clusters were made based on the proximity between the schools pertaining to the

influence of socio-economic disparities in the formulation of cultural perception towards menstruation. Whereas, the 'Systematic Random Sampling' method (2nd girl from each class) has been used in selecting a total of 996 samples for conducting the research. A survey has been conducted through the questionnaire mode, in the time frame of 23rd June, 2023 till 13th July, 2023.

Research Gap

This paper is set within a distinctive context since it examines samples from schools that represent diverse religious, socio-economic, and cultural identities. The five clusters, on the basis of geographical proximity, helped in identifying the missing socio-economic impact on the intensity of the taboos and safe menstrual practices. Upon reviewing the various literatures, this paper delves into understanding the impact of taboos in shaping the cultural dimensions of menstrual practices. Since no research has been conducted on the subject in West-Tripura schools and menstruation taboos, this study aims to fill that gap by exploring how different schools with varying backgrounds handle the topic of menstruation. By examining the socio-cultural identities of these schools, it shed light on how taboos surrounding menstruation impact safe menstrual practices among the school girls. This paper will provide valuable insights into the role of taboos in shaping cultural perspectives on menstruation within school settings. It takes schoolgirls from 10 different government schools as samples to explore the intensity of myths and how they transform into stereotypes and rigid practices. This study also dives into the effective implementation of Menstrual Health Management initiatives within the framework of state government policies.

Findings and Discussion

This study approaches 996 students from 10 different Government schools (Kamini Kumar Singha Memorial HS School, Maharani Tulsibati Girls' HS School, Sakhicharan, Vidyaniketan HS Senior Secondary School, Bijoy Kumar Girl's HS School, Gandhigram HS School, Charipara HS School, Sukhamoy HS School and Narsingarh HS School) spread over the capital city of Agartala. The bar graph (Figure-1) shows the variation of respondents of girls from each school. The schools are further clustered into five groups, on the basis of the geographical proximity, where schools closest to each other have been clubbed together into one cluster. The study wished to maintain a uniformity of 100 girls from each school, however, given the differences in the enrollment rate of the co-ed and the only girls' schools, the division of girls from each school is therefore disproportionate, which did not affect the overall objective of the study. Out of the 996 respondents, there were 40 girls, 4.01per cent of the collected responses where the girls haven't experienced menarche yet, hence, the survey questions related to menstruation per se and denoting queries related to menstrual health and hygiene only takes into account the responses of 956 girls.

Figure-1
Total Number of Responses Divided into 5 Clusters (N=996)

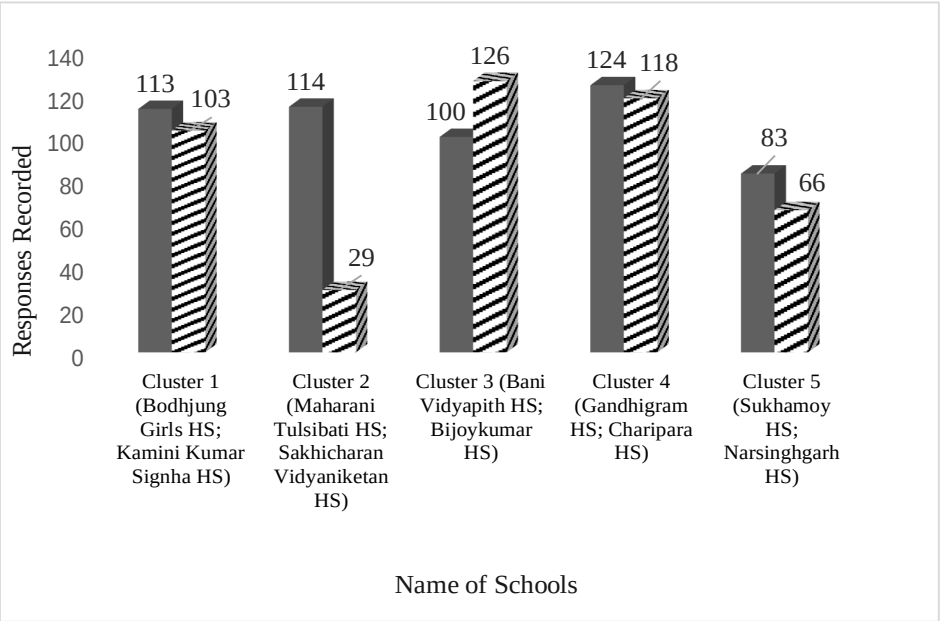


Figure-1, thus denotes, the comparison for respondents from 2 schools in each cluster, where 10 Government Schools were divided in, based on the proximity between the schools, to gauge the influence of socio-economic disparities in the formation of taboos and beliefs surrounding menstruation.

Table-1
Class-Wise Distribution of Respondents

Classes	Respondents (in numbers)	Respondents (in percentages)
7	153	15.40
8	171	17.20
9	255	25.60
10	160	16.10
11	95	9.50
12	162	16.20

Source: Field survey

Respondents (Table-1) were taken from class 7-12 (ages 13-18), and the 2nd girl from each class was approached for the survey. The age bracket for the study was decided on the basis of the previous literature studied placing the mean age of girls as 13.5 at menarche (Saha & Sil, 2015).

General discourses on menstrual awareness

The pie chart in Figure-2 shows the percentages of those who are aware of menstruation out of the 996 respondents. Figure-3 shows the sources from where the respondents were first made aware of their biological occurrence and as the pie-chart shows, the conversation regarding menstruation is still very much limited to the familial spheres. At the same time, during the unstructured interactive sessions, the participants have reported that the discussions they have had regarding their periods with their brothers or fathers are often limited to the buying of pads, Figure-4. Thus, periods or menstruation is still very much a 'women's topic', the discussion of which needs to happen in closed spaces.

Figure-2
Percentage of Respondents Aware of Menstruation

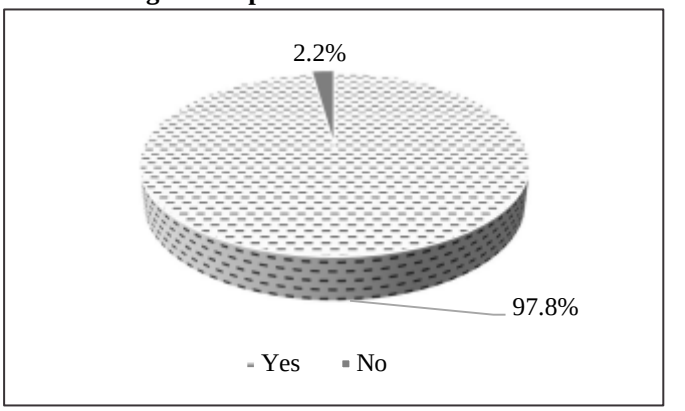


Figure-3
Primary Source of Awareness About Menstruation for the Respondents

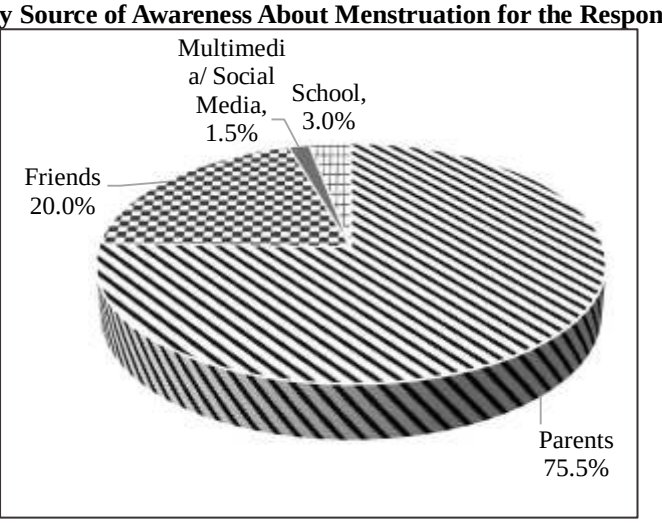


Figure-4
Percentage of Respondents on Menstruation as the Topic of Discussions with their Male (Father/Brother/etc.) Family Members

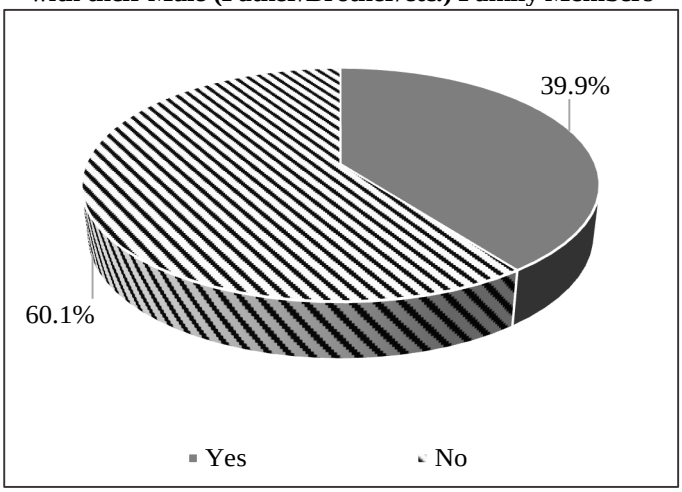
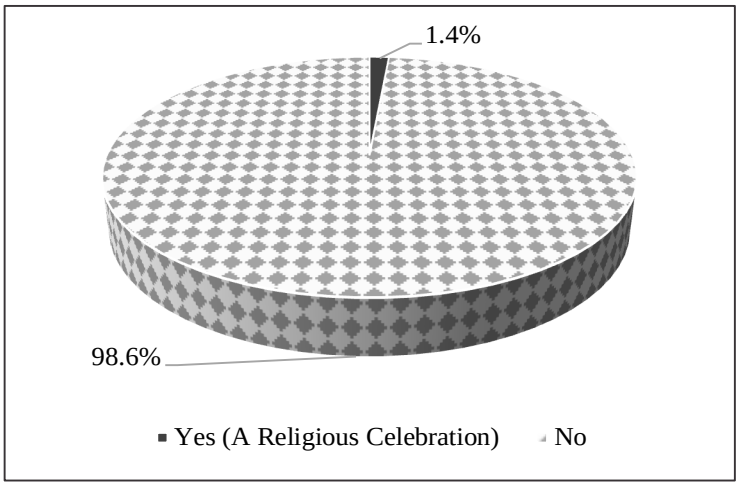


Figure-5
Percentage of Respondents who had Rituals/Celebration to Honour Menarche



In Assamese culture the first period of a girl is celebrated through a ritual called, 'Tuloni Biya', where the girl is adorned with new clothes and jewellery, almost similar toa wedding ceremony without the groom (Thakuria, 2018). Similarly in Kerala in the 'Kurichya' tribal community, 'Thirandu Kalyanam' is celebrated honouring the first period and is considered more important than her actual wedding (Babu & Kumar, 2020). Since this research entailed a 'socio-cultural' dimension, it was pertinent to look for similar cultural or religious

practices, if any amongst the communities of the West Tripura district. As such, the survey revealed that in 98.6 per cent cases, no celebration of menarche was observed; as for the rest, a small and quiet religious mass was organised for the wellbeing of the girls, as represented in Figure-5.

The survey was also aimed at finding out the taboos and myths associated with menstruation, more so if the present generation of school-going girls, are still adhered to such taboos emerging out of religious beliefs or not. Given that religious customs and traditions define much of the discourses and conversations around menstrual health and hygiene, the most common taboo/myth reigning over the menstruator's behaviour was related to religious places and the conception of being impure or unholy on their periods. Out of the 956 respondents, 94.2 per cent of them reported to avoid religious places or places of worship, represented in the Figure-6; while 64 per cent of them considered period blood as being impure, as shown in Figure-7. Hence, religious directives act as a rigid norm to be observed during periods thus, reflecting the view that women are polluting and that menstrual blood might have a contaminating effect. More often than not, in the interactive sessions conducted in unstructured settings, the respondents have expressed feeling a sense of being impure during the first three days of bleeding, thus cleaning themselves thoroughly after the cycle ends, to just wash off the contaminated state of menstruation.

Figure-6
Percentage of Respondents on Myths, Taboos and Rituals on Visiting Religious Places (Temples/Churches/Mosques/etc.) during Menstruation

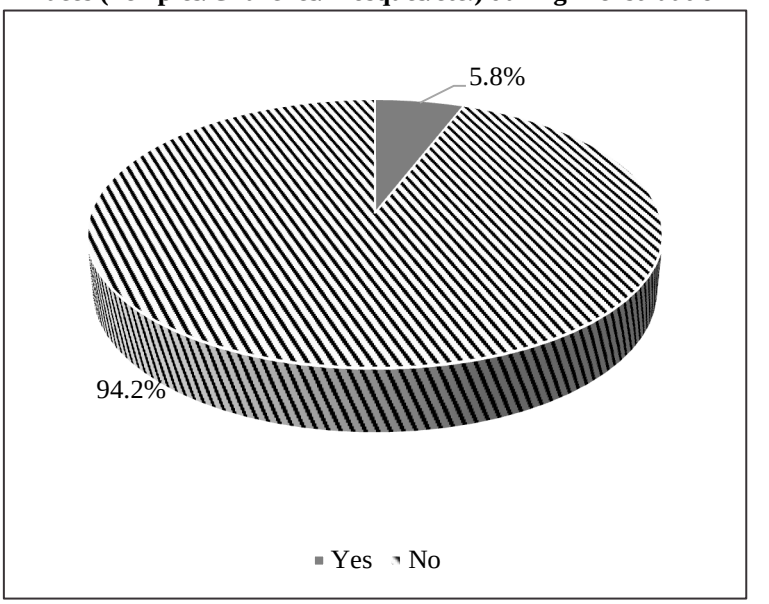


Figure-7
Percentage of Respondents on Whether Period Blood is Impure

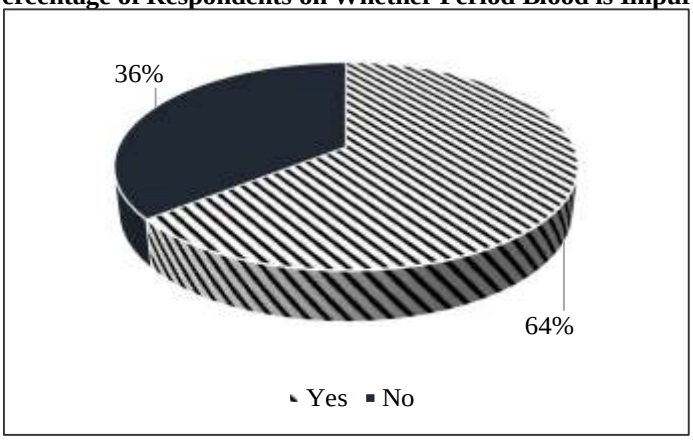
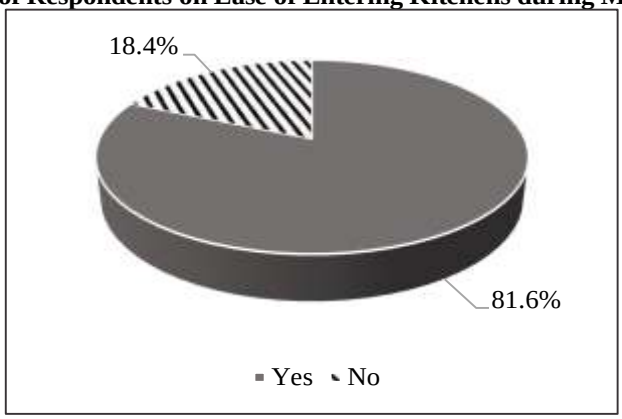


Figure-8
Percentage of Respondents on Ease of Entering Kitchens during Menstruation



The other most common myth permeating the urban-semi urban sphere is the one related to the entry of menstruating women in the kitchens. As evident from a study, as recent as 2019, conducted in the Pindar Valley region of Himachal Pradesh (Joshi et. al., 2019), women in the villages are still subjected to spend at least 10 days in cowsheds, away from their homes, in order to undergo purification and only then return to their homes where almost 75per cent of them still needs to withstand harsh environment conditions and go down to the streams for defection and washing themselves up, as they aren't allowed to use the washrooms at their houses, for the risk of contaminating men, as menstrual blood is considered harmful for them. Hence it is evident that the myth of being away from the kitchen revolves around the concept of purity, while ‘fire’ is considered pure, menstruating bodies are often regarded to be ‘impure’. But the fact that this

particular research entails urban-semi urban families, and 65.6per cent of our respondents' hail from the nuclear families, it is quite understandable, this myth of staying away from the kitchen has almost been disregarded amongst the nuclear family setting, as evident through Figure-8.

Following the impact of myths on the practices and beliefs of the respondents, this research therefore, also aimed at finding out the other most common myths believed and staunchly followed by the girls. Table-2, thus, gives an overview of the other set of most common myths that have made their way to the young minds. Most often than not, these myths have been passed down through generations, as cautionary tales, hence, even though scientific vigour has been introduced through the educational systems, these bizarre myths continue to impact the socio-cultural relations of the young girls throughout their menstruating lives. For instance, there is no scientific evidence to support the belief that sour foods cause excessive bleeding or even painful period cramps. Rather, as a 2015 study (Garg & Anand, 2015) highlights, girls and women suffer from malnourishment and irregular diets due to the restrictions and food related myths, thus causing more physical harm, alongside the mental stigma. The myth related to exercise has also been debunked and there are rather scientific proofs that exercising during periods ensures painless and proper menstruation. A study on Indian girls from the ages of 17-20, proved that 30 minutes of exercise during menstruation actually leads to lesser cramps and even helps in maintaining a regular menstrual cycle (Janse de & Xanne, 2003). Thus, it is very much evident that though some myths have found their way out of the minds of the younger generations, there are rather some very deep-rooted ones which require a hands-on approach to be eradicated.

Table-2
Numbers of Respondent who Believe in the Common Myths Surrounding Menstruation

Sl. No	Myths/Beliefs	Number of respondents who believe in the myths (each out of 956)
1.	Not allowed in rooms of worship, religious celebrations or anything considered holy.	419
2.	Sour foods are not allowed during periods	369
3.	Does not exercise or play during periods due to the fear of excessive bleeding	570
4.	Not allowed to leave home during periods	54
5.	Not allowed to touch male family members, elders, male friends during periods fearing it might hamper them	45
6.	Does not follow or believes in any myth	101

Source: Field survey

MHM Scheme/s and its Impact

The last of the objectives dealt with the existence and implementation of Menstrual Health Management schemes of the State Government of Tripura. The Tripura Kishori Suchita Abhiyan (NHM, Tripura 2021), started in 2023, is a MHM scheme of the State Government which provides monthly Sanitary Pads at government schools to be distributed amongst the girl students. As per the 'Tripura Kishori Suchita Abhiyan', the pads provided by the government are distributed free of cost. It is therefore observed that because of the donation of sanitary napkins by the schools, around 97.5 per cent of the respondents, use sanitary napkins and even continue to use them throughout their menstrual cycles. Not just that, under this scheme, the schools are advised to conduct regular menstrual awareness sessions, irrespective of genders, however, only 48.9 per cent of the respondents have reported having attended such sessions at schools. Related to the question of health and hygiene, 96.2 per cent of them have responded having clean and proper toilets at home, 75.5 per cent of the respondents reported having unclean, smelly and unsafe sanitation facilities at their schools. As such 97.5 per cent of the respondents have agreed to receive pads free of cost from schools during emergencies, as advised under the 'Kishori Suchita Scheme', but at a few schools, as 4.3 per cent respondents have reported, Rs. 5/- is charged when students ask for pads during an emergency. Hence, although the public policy if rightly formulated, it is therefore important to seek constant vigilance on whether the schemes are functioning without any loopholes per se. Nevertheless, it is highly appreciable that because of the successful implementation of the MHM of the State Government, 'Tripura Kishori Suchita Abhiyan', most girls continue to use sanitary pads which in turns adds to safe hygienic practices.

All of the 10 Government schools approached for the study, informed of having conducted regular health camps by the State Government, however, only 15.3 per cent of the respondents reported having ever visited a Gynaecologist. Shockingly enough, 84.7 per cent of the 956 respondents have no proper idea of who or what a 'gynaecologist' is and even if they do have some vague idea, it's limited to that of a mere pregnancy doctor. Therefore, there is a huge gap that needs to be covered in order to free the young minds, in order to deal with the taboos and stereotypes related to menstruation.

As recently as February, 2023, a PIL was filed at the Supreme Court of India (Dharbamulla, 2023), regarding the implementation of period leaves at schools, colleges and workplaces. The issue of 'Period Leaves' is one of much contention, not just in India, but around the world and many of the Scandinavian countries including Spain, does provide school goers with the option of 'menstrual leave', to be availed accordingly every month. The Supreme Court of India, has however directed the PIL to the Ministry of Women and Child

Development (Dharbamulla, 2023). A 2023, study conducted on "preventing school absenteeism during menstruation", which was recently published in Indian Journal of Youth and Adolescent Health (Jaiswal, 2023), involving 97,070 girls from the ages 10-19, across the country, found that 1 in 4 girls already miss their classes during periods, due to cramps, or inability of proper sanitation at school and due the fear of staining their uniforms. As per the respondents of this particular research, 72 per cent of the respondents voted in favour of period leaves, highlighting the fact that they already miss classes during the heavy flow days or due to cramps, thus providing them with the option of availing the leave, if necessary, would act as a positive input to educational system, rather than acting as a detriment. Given the fact that 'period leaves will act as a 'positive discrimination' on the premise of 'equity principle', this is merely a suggestion and it is very much up to the policy makers to decide and debate upon the importance and necessity of the measure.

As Anna Jiang (2019), mentions, more often than not, the menstruators, self-stigmatise themselves into following the bizarre menstrual taboos to just save 'face' in their established societies. Even, in this study, out of 956 respondents, it is ironic to note that although the participants have reported believing and following quite a number of myths and taboos which restricts them under certain stereotypes, 86.4 per cent reported not feeling discriminated against by these rigid norms that only they have to follow during menstruation. It is therefore evident that the taboos are so deeply rooted, that the participants self objectifies and self-stigmatises themselves, without even realising the hidden discrimination.

Therefore, it is pertinent that although there has been an undeniable positive impact of MHM schemes and proper scientific vigour in dealing with menstruation and its taboos and stereotypes, there is a farther road to cover, destigmatising the issue from the shackles of religious and cultural dogmas.

Conclusion

This research thus employs a mixed-method methodology in conducting a both qualitative and quantitative study on the basis of the data collected from the 10 Government schools. The schools situated in the urban clusters, i.e. Clusters 1-3 had participants who reported the least number of myths and restrictions they adhere to. Therefore, in contrast to our first objective, it is seen that girls in schools closer to the areas situated in more economically affluent urban settings have been able to move further away from the shackles of bizarre practices associated with menstruation; in contrast to our second objective it has been observed that the taboos associated with religious beliefs have influenced the minds of the school girls as 94.2 per cent of them still consider going to temple or entering puja rooms forbidden during periods; finally as per our third and final objective, it is noted that the successful implementation of the MHM (Menstrual Health Management) scheme - 'Tripura Kishori Suchita Abhiyan' ensures

97 per cent usage of safe sanitary products, although there is a requirement of safe and proper sanitation at schools.

It has also been observed that in some schools, it is the educators who continue to impose the gender biased taboos associated with menstruation, thus continuing the dogmatic practices. It is thus suggested that there is a first and foremost need for 'sensitising sessions' for the educators. The lack of knowledge on Puberty and Adolescence also brings out the need for Sex Education, inclusive of genders. From a study conducted in Manipur, among the adolescents of the Poumai community (Pao & Meitei, 2022), it is revealed that a significant proportion of adolescent females lacked prior awareness regarding menstruation in advance of their personal experience of it. The study additionally discovered the presence of detrimental attitudes and perceptions regarding menstruation, including the perception of it as unclean and disgraceful. In this research also, a significant correlation was observed between the age and educational level of the adolescents and their attitude and perception towards menstruation. Thus, there is a necessity of comprehensive and precise education regarding menstrual health and hygiene in order to effectively tackle the misunderstandings and societal taboos surrounding menstruation, quite similar to the study conducted in Manipur (Pao & Meitei, 2022) which underscored the significance of advocating for the dissemination of knowledge, raising awareness, and implementing efficacious interventions pertaining to menstruation. Similarly, in another study based in Assam, which interprets the "bio-cultural patterns of Menstrual Behaviour in Assamese society" (Thakuria, 2018), focuses a subjective look into the practice of 'Tuloni Biya', the custom of celebrating of menarche in Assamese culture. It explores the hidden misogyny within the celebration of femininity, as in, although the first period of a girl is celebrated, she is still bound within the existing taboos and practices stereotypical to menstruation in India. The paper goes on to discuss the rise of menstrual activism, mostly the Pan-Indian movements which were made possible for the extensive reach provided by social media and how the youth got involved with the discussions of menstrual health and hygiene, however also criticising the ambiguity of these movements, from an 'Indian' point of view. Likewise, there is a pressing need to address and counteract the prevalence of erroneous beliefs, misconceptions, societal limitations, and cultural stigmas pertaining to menstruation, with a specific focus on adolescent girls within educational settings of the West district of Tripura as well. The utilisation of both qualitative and quantitative research methodologies used in this present research is imperative in order to gain a comprehensive understanding of the nature of women's menstrual complaints and their subsequent effects on women's overall well-being. This research has the potential to inform the development of more accurate and reliable survey questions pertaining to menstrual dysfunction, thus contributing to the advancement of future studies on gynaecological morbidity. It is imperative for professionals in the health sector and education

field to adopt a proactive stance in order to enhance awareness, facilitate the dissemination of information, and implement effective treatment strategies pertaining to menstruation. This research has found out the significance of prioritising health communication efforts aimed at providing public education on menstruation and its associated matters. Also, by promoting Menstrual Activism which concentrates in eradicating stigmas surrounding 'periods' would further impact in changing the discourse of menstrual health and hygiene in different communities. Pinarayi Vijayan, the Chief Minister of Kerala, announced on social media on January 19, 2023, that the state will offer menstrual leave to female students at all state universities under the Department of Higher Education. This followed the decision by the Cochin University of Science and Technology (CUSAT) to grant all female students' menstrual leave. According to the directive, each female pupil is entitled to 2 per cent of their total attendance as a benefit (Althaf, 2023).

The aim of the 21st century, should be to realise the necessity of proper health and hygiene, the eradication of subjugation of women bound by the chains of orthodox religious dogmas, and the internalised self-objectification and self-stigmatisation by women through years of socio-cultural prejudices against them. Therefore, it can be rightly said, that along with the academic approach to pointing out and critiquing the hidden inaccuracies of how the female body is perceived and the new age 'menstrual activism' movement provides the necessary impetus for eradication of social and religious dogmas from the sheer biological aspect of menstruation. Alongside, this emerging discourse as a socio-political and economic issue requiring attention, points out the need to bridge the gap of economic intersectionality to highlight the issues and suffering from period poverty plaguing our contemporary societies. Last but not the least, as Dr. Chris Bobel, one of the foremost academic and activists on Gender and Women Sexuality, of University of Massachusetts, Boston says, *"those working on period health in the developing world are focused on handing out products. They should be combating stigma"* (Bobel, 2019).

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Ethic's approval &consent to participate

The survey was conducted with prior permission granted by the Directorate of Secondary Education, Government of Tripura as mentioned in No. F. 13(1-8) SE/GL-I/2022(Vol- 1) dated 12th June, 2023. Prior written permission was also taken from each of the principals of each of the 10 Government Schools before the surveys were conducted. The respondents also gave their verbal consent for their participation in the survey process.

Availability of data and materials

The datasets generated and analysed during the current study are not publicly available to maintain participants' anonymity and confidentiality but are available from the corresponding author on reasonable request. The materials used for this study can also be accessed by contacting the corresponding author.

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ECONOMIC VIABILITY AND CHALLENGES FACED BY POTTERY WORKERS IN KUMBARAPALAYAM IN PALAKKAD DISTRICT, KERALA

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Abstract: The pottery-making business in India exemplifies the entrepreneurial journey from "Mud to Money," transforming a traditional craft into a vital economic activity. This industry, blending tradition and modern entrepreneurship, significantly contributes to employment and income generation, especially in rural areas. Despite its potential, the pottery sector faces numerous challenges, including high production costs, fluctuating raw material prices, outdated techniques, and limited market access. A study conducted in Kumbarapalayam, Palakkad,+ highlighted the socio-economic conditions of the Kumbharan community, revealing issues such as low income, poor living conditions, and limited education. The analysis showed a strong positive correlation between total cost and profit, underscoring the potential for profitability if challenges are addressed. Key problems identified include high production costs, lack of government support, raw material scarcity, and market access difficulties. The study emphasises the need for targeted interventions, including policy support, modern training programs, and better marketing strategies, to sustain and enhance the pottery industry, ensuring the preservation of this cultural heritage and improving the livelihoods of artisans.

Key Words: Challenges, Cost, Correlation, Livelihood, Pottery, Profit.

Introduction

The pottery making business in India epitomises the entrepreneurial journey from "Mud to Money." Over the years, pottery has evolved from a simple craft into an intricate form of ceramic art, providing daily utility and serving as a significant income source for many. Entrepreneurs in this field have explored their creative sides, manufacturing diverse pottery patterns and building careers based on this

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creativity. This industry has become a substantial employment generator, uplifting standards of living for both rural and urban populations, and contributing immensely to India's economy. The pottery making business is a beautiful blend of tradition and entrepreneurship. It showcases how an ancient craft can evolve into a significant economic activity, providing livelihoods and contributing to the economy.

Pottery, one of the oldest crafts known to humanity, has played a crucial role in the daily lives of many people throughout history. Classified as a small-scale industry, the pottery business in India employs a massive workforce from both rural and urban areas. Pottery, one of the oldest crafts known to humanity, has played a crucial role in the daily lives of many people throughout history. The recognition of such traditional crafts in contemporary contexts demonstrates the ongoing relevance and potential for growth within the pottery sector. The industry is crucial for economic development, providing jobs and supporting livelihoods. Singh and Fatima (2015) emphasised the economic role of the handicraft sector, and its contribution to the state's economic development by generating employment opportunities. This underscores the potential of the pottery industry as a driver of regional economic growth. In 2019-20, India exported pottery worth USD 9.97 million to over 140 countries, with a volume of around 5,164,429 units. Commonly exported items include chemical porcelains, handicraft art ware, and ceramic utensils. This international demand underscores the industry's global relevance and its role in enhancing India's trade footprint. The pottery industry in India is instrumental in reducing poverty by offering budding entrepreneurs' opportunities to thrive. Artisans can work throughout the year, producing crafts even in their leisure time. The cost of manufacturing pottery items is relatively low since most materials are locally sourced, eliminating the need for expensive imports. This affordability classifies the pottery industry as a small-scale or household industry, often referred to as a "women's trade." The entire pot-making process is carried out by men, whereas women are mainly involved in the final finishing stage and the selling of the pots, Savya (2023). Women, in particular, can contribute significantly to the family income by working from home, thus balancing their domestic responsibilities while participating in economic activities.

Despite its historical significance, the pottery industry today is facing a significant decline, influenced by numerous challenges that threaten its sustainability. In 2018, Mujeeb Parakkandi explored the decline and resurgence of the Kumbharan community's pottery trade in Kerala. More recently, (2023) Savya highlighted the existential crisis the Kumbharan community faces regarding their traditional occupation. As noted by Shashi Prakash Mishra and Abdul Jilani Mansuri (2016), this industry remains vital in rural India, providing income for artisans who rely on traditional methods. However, Akilandeeswari

and Pitchai (2016) underline the lack of scientific and technical knowledge due to illiteracy and poverty means that production techniques are outdated, leading to issues with standardization and quality. Artisans, often based in rural areas, operate in small-scale units and encounter difficulties such as obtaining geological permissions for clay collection and dealing with the fluctuating prices of raw materials. Regon (2019) exploring the problems and future prospects of the pottery industry, highlighted issues such as high cost of production which includes expenses for raw materials, kiln fuel, lack of space for drying and equipment maintenance, further exacerbates the situation, Prakash Shrestha (2018) leading to reduced profit margins and the need for government support to promote the industry globally. This underscores the necessity of policy interventions to create a conducive environment for the growth of the pottery sector. Health issues related to the physically demanding nature of the work also contribute to the decline.

Despite modern advancements, this community continues to use ancestral techniques, preserving their cultural heritage. This demonstrates the importance of maintaining traditional methods while also exploring opportunities for modernization to enhance the industry's economic viability, Sikdar and Chaudhuri (2015). Giriraj (2017) noted the significant developments in the use of ceramic glazes and the impact of government support on the industry’s growth. This illustrates the potential for traditional pottery to evolve and thrive in a modern industrial context. Sumathi and V Sujadevi (2016), emphasised the impact of globalization and technological revolution on the traditional pottery industry signifying the dynamic nature of the pottery industry and the importance of skill development for its sustainability. Bhamu et. al. (2020) developed an assessment framework for lean sustainability in the pottery industry. Lalithambika (2015) revealed significant educational and social backwardness among potter communities, largely due to the nature of their occupation. Issues such as lack of permanent clay sources and mechanisation were identified, highlighting the need for targeted interventions to improve the living and working conditions of these communities. As a result, the younger generation shows little interest in continuing the craft, preferring more stable and prestigious white-collar jobs. This shift in career preferences, coupled with the advent of substitute products, poses a significant threat to the pottery industry. If these challenges are not addressed, the skill and heritage associated with pottery risk being lost, leading to the disappearance of this ancient and culturally rich craft. The introduction of modern machinery has given new hope to potters, demonstrating the potential for government support to enhance the industry’s economic viability Akanksha Agnihotri (2022).Subrata Kumar Pal (2021) underscores the importance of effective marketing strategies for the growth of the pottery industry.

Research Gap

Generalising the experience of pottery workers across the state or concentrated on urban pottery market, the traditional artisans are completely neglected and still continue to struggle, Srinivasan (2018). Literature has explored the decline of traditional pottery industries in Kerala but has not specifically addressed the economic viabilities and their unique challenges. Limited studies provided a comprehensive understanding of the specific factors impacting their sustainability, Thomas (2021). Hence, the study focussed on the artisan's livelihood, socio-economic challenges persistence of their craft.

Significance of the Study

A major source of livelihood for many families, pottery making industry are at the verge of risk due to changing dynamics, modernisation and shift in consumers preferences (Srinivasan, 2018). In the phase of industrialisation and globalisation a study on the economic viability of the units provided insights into the viability of sustaining traditional industries and the challenges they face, Kerala State Planning Board (2019). The study area of Kumbarapalayam has a number of artisans still engaged in this craft (Nair, 2020)). Moreover, the study is a miniature of the larger issue faced by the potters across Kerala.

Objectives

- To analyse the cost determinants in pottery production.
- To identify the problems faced by the pottery workers.
- To identify the sustaining factors and future prospects of the industry in Pulinelli.

Materials and Methods

Historically, the community, engaged in pottery work in Kerala belong to several sub castes: Kumbharan, Kusava, Adi Andhra, Tamil cultured Kumbharan, Mannudayan, Kulala, Anthur Nair, Andhra Nair, Velan, Pandy Velan, Odan and Oorali Kumbharan (12 communities). Palakkad District comprises of the Kumbharan, Tamil Kumbharan, Kulala and Velan community. Kumbarapalayam, situated in the Kottayi gram panchayat of Alathur taluk in Palakkad district, is renowned for its pottery-making heritage. This craft is predominantly practiced by the Kumbharan community, particularly and only in the Pulinelli area. Historically, the community, classified as backward, has relied on pottery as a primary means of livelihood alongside agriculture. In the Kottayi Gram Panchayat, there are 15 wards, with the potter community residing exclusively in Ward 9. Among the total households residing in ward 9 of the grama panchayath, 48 households exclusively belong to this artisan group (Kumbharan community). Presently, all 48 households within this community are engaged in pottery, with

44 actively involved in production. The art of pottery in Kumbarapalayam is a hereditary occupation, passed down through generations without formal education or written guides. Instead, skills are taught by family elders, typically fathers or grandfathers. The community lives in close-knit villages and communicates in a unique dialect, which lacks a written script. For a comprehensive analysis of the socio-economic conditions of the pottery community, all 48 households are considered. However, for an in-depth study of business profiles and production-related challenges, only the 44 active production units are included. The Kumbharan community's dedication to their craft is evident, as they continue to sustain and flourish their traditional skills, ensuring the survival and relevance of their cultural heritage in modern times.

In the realm of pottery production, understanding the factors that influence total costs is crucial for optimising efficiency and profitability. A detailed cost-benefit analysis has been conducted, focusing on various inputs and their impact on total costs incurred by pottery workers. The study employs a multiple linear regression model to establish relationships between independent variables (raw material costs and other factors) and the dependent variable (total production costs). The total cost incurred during pottery production serves as the dependent variable in this analysis. It encompasses both fixed costs (such as kiln and machinery expenses) and variable costs (including raw materials like clay, wood, hay, and husk, as well as costs related to depreciation, transportation, and potential damages).Finding the correlation between cost and profit is significant as it helps businesses understand their financial dynamics, informs strategic decision-making, and aids in efficient resource allocation. It highlights how changes in costs impact profits therefore, a correlation coefficient was calculated to measure the linear relationship between cost and profit.

Multiple regions face some common challenges while some may be unique to local region. As far as Kerala is concerned lack of raw materials and high production cost hinder their entrance in competitive market. But the common concerns were the decline in traditional pottery due to the changing tastes and preference of consumers towards product and the availability of alternative products which accentuates the role of innovation and govt. support. A Mean Rank Analysis was used to rank the Likert scale responses primarily to determine the severity of challenges faced by the potters in Pulinelli based on the respondents' rankings.

Results and Discussion

The data from Table-1 paints a vivid picture of the demographic profile prevalent among the pottery-making families. The family structure indicates a predominant preference for nuclear families, with only 2 out of 48 families still adhering to the traditional joint family system. This shift towards nuclear families, comprising 96 per cent of the respondents, might be reflective of broader societal changes or

economic pressures that make smaller family units more viable. Housing conditions are indicative of the community's economic status. A mere 8 per cent of the families live in houses with reinforced cement (RC) roofs, while a significant majority, 92 per cent, reside in tiled houses. These houses often serve multiple purposes; they are not only living spaces but also act as production centres and storage units for their pottery. This dual functionality of their homes results in crowded living conditions, with limited space for personal activities like sleeping, highlighting the constraints these families face.

Table-1
Respondents' demographic overview

Factor	Type	Frequency	Percentage
Family Type	Joint	2	4
	Nuclear	46	96
	Total	48	100
Type of House	RC	4	8
	Tiled	44	92
	Total	48	100
Type of Ration Card	APL	3	6
	BPL	45	94
	Total	48	100
Educational Status	Illiterate	11	23
	Upper Primary	15	31
	High School	20	42
	Higher Education	2	4
	Total	48	100
Income level	5000- 10000	9	19
	10000-15000	20	42
	15000-20000	18	37
	20000-25000	1	2
	Total	48	100

Source: Computed

The type of ration card held by the respondents further underscores their economic struggles. An overwhelming 94 per cent of the families possess Below Poverty Line (BPL) cards, indicating their low-income levels and dependence on government aid for sustenance. Only 6 per cent of the families have Above Poverty Line (APL) cards, reflecting their slightly better economic status but still not significantly above the poverty threshold. Educational attainment among these families shows a varied picture. About 23 per cent of the respondents are illiterate, while a combined 73 per cent have achieved education up to high school level, including 31 per cent with upper primary education and 42 per cent having completed high school. A small fraction, 4 per cent, have pursued higher education. This distribution reveals that while basic education is relatively

accessible, higher education remains largely unattainable for many due to economic constraints or lack of resources. Income levels among the pottery families are modest. A significant portion, 42 per cent, earn between 10,000 to 15,000 rupees per month, followed by 37 per cent earning between 15,000 to 20,000 rupees. About 19 per cent have an income between 5,000 to 10,000 rupees, and only 2 per cent earn above 20,000 rupees monthly. This income distribution clearly depicts the economic challenges faced by the majority, with most families earning just enough to meet their basic needs. Overall, the study highlights the socio-economic backwardness of the pottery community, characterised by low-income levels, crowded living conditions, limited educational attainment, and reliance on government assistance. These factors collectively underscore the need for targeted interventions to uplift this community and improve their living standards.

Occupational Overview of the Respondents

The occupational overview of the respondents in the pottery-making community provides a comprehensive view of their experience, working conditions, production methods, and marketing strategies. This analysis sheds light on the intricacies of their trade and the socio-economic challenges they face.

Table-2 reveals that pottery is a hereditary occupation for these families, with no respondents having less than 10 years of experience. The majority, 57 per cent, have been involved in pottery for 20-30 years, while 23 per cent have 10-20 years of experience. Only 4 per cent have been in the trade for 40-50 years. This extensive experience underscores their expertise and commitment to the craft, which is passed down through generations. Pottery production is a family endeavour. In 64 per cent of the households, two workers are involved, typically the husband and wife. Another 27 per cent have three workers, often including an elder family member, such as a grandmother. Only 9 per cent have four workers, which might include children helping in the production process. No external labour is hired; all work is done by family members, emphasising the close-knit nature of these businesses. There has been a significant shift towards modern production methods in the pottery community. A substantial 84 per cent of the households use modern technology, while 16 per cent use a combination of traditional and modern methods. The traditional method, known for being time-consuming and labour-intensive, is being gradually replaced due to the efficiency and comfort provided by modern machinery. This change highlights the community's adaptability and willingness to embrace new technologies to improve productivity. The average daily production varies significantly among households. About 7 per cent produce 10 products per day, 36 per cent produce 20 products, and another 7 per cent produce 25 products. The largest group, 41 per cent, produces 30 products per day. Only 2 per cent and 7 per cent of the households produce 35 and 40 products per day, respectively. This variation

reflects differences in capacity, resources, and perhaps the scale of operations among the families. The working hours are substantial, with 61 per cent of the respondents working 2-8 hours a day and 39 per cent working 8-12 hours. Given that the production units are typically within their homes, these long hours reflect the blending of work and personal life, with family members continuously involved in production activities throughout the day.

Table-2
Occupational Summary

Factor	Category	Frequency	Percentage
Years Involved in Pottery	10-20	10	23
	20-30	25	57
	30-40	7	16
	40-50	2	4
	Total	44	100
Number of family members involved in Business	2	28	64
	3	12	27
	4	4	9
	Total	44	100
Production Method	Traditional	-	-
	Modern	37	84
	Both traditional and modern	7	16
	Total	44	100
Average number of products produced (per day)	10	3	7
	20	16	36
	25	3	7
	30	18	41
	35	1	2
	40	3	7
	Total	44	100
Hours of Work (per day)	2-8	27	61
	8-12	17	39
	Total	44	100
Product Type (Kitchen Utensils)	Meen chatty	44	100
	Curry chatty	44	100
	Pathiri manda	6	14
	Dosa kallu	9	20
Marketing	Direct	3	7
	Market agent	33	75
	Both direct and agent	11	25
	Total	44	100

Source: Computed

The product range is diverse, with all respondents producing meen chatty and curry chatty. Additionally, 14 per cent produce pathiri manda and 20 per cent produce dosa kallu. These products cater to both local and broader markets,

showcasing the versatility and demand for their pottery. Besides these staple products, they also manufacture plates and mugs based on customer orders, indicating a degree of customisation in their offerings. Marketing is primarily conducted through market agents, with 75 per cent of the respondents relying on them to sell their products. Another 25 per cent use both direct sales and agents, while only 7 per cent market their products directly. The heavy reliance on market agents highlights the challenges these families face in accessing broader markets independently. Online marketing is non-existent among them due to a lack of technical knowledge and education, pointing to a significant area for potential growth and support.

Cost Benefit Structure of Potters

The pottery production process entails both fixed and variable costs, essential for creating high-quality products. Fixed costs, which remain constant regardless of production levels, include the investment in machinery and the kiln. These are significant initial expenses that provide the foundational infrastructure necessary for production. Machinery is crucial for shaping and forming the pottery, while the kiln is indispensable for firing and finishing the pieces, ensuring they achieve the desired strength and durability. These fixed costs are substantial but do not vary with the volume of production, allowing potters to amortize these expenses over time as production scales up.

On the other hand, variable costs fluctuate with the level of production, directly impacting the total cost based on the amount of output.

TC= TFC+TVC

Fixed Costs = {Kiln, Machinery}

Variable Costs = {Clay, Wood, Hay, Husk, Transportation Cost, Depreciation Cost, Damage Cost}

Multiple Linear regression has been fit in order to study and examine the impact of the various inputs used on the total cost.

The standard structure of the model takes the following form.

$$Y= \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \mu$$

In this model, Y is the dependent variable, Xs are the set of independent variables (cost of factor inputs both fixed and variable) α being the constant, βs represent the coefficients and μ is the standard error term.

In this regression analysis (Table-3), we aim to understand the relationship between several independent variables (machinery, kiln, clay, wood, hay, husk, depreciation, transportation, and damage) and a dependent variable, which could represent a specific measure of output or cost in a production process. The regression model's R-squared value of 0.9918 indicates that approximately 99.12 per cent of the variation in the dependent variable is explained by the model. An F value of 460.935 with a significance level of 0.000 suggests that the overall regression model is statistically significant.

Table-3
Determinants of Production Cost Metrics

Model	Unstandardised coefficients		Standardised coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	12680.673	7455.851		1.701	0.098
Machinery	-0.03	0.082	-0.008	-0.368	0.715
Kiln	0.02	0.028	0.015	0.71	0.483
Clay	1.232	0.055	0.826	22.528	0.000
Wood	0.363	0.126	0.078	2.872	0.007
Hay	0.646	0.592	0.032	1.09	0.283
Husk	0.028	0.688	0.001	0.04	0.067
Depreciation	2.399	0.71	0.111	3.379	0.002
Transportation	0.784	1.028	0.025	0.762	0.451
Damage	3.839	2.055	0.068	1.868	0.07
R Square			0.9918		
F Value			460.935		
Significance of F Value			0		

Source: Computed

The regression analysis reveals that several independent variables significantly influence the dependent variable. The coefficient for clay is 1.232 ($p < 0.001$), suggesting that for every unit increase in clay, the dependent variable increases by 1.232 units, holding all other factors constant. This indicates a strong and positive relationship between clay usage and the dependent variable. The coefficient for wood is 0.363 ($p = 0.007$), meaning that each additional unit of wood contributes to a 0.363-unit increase in the dependent variable. Depreciation also shows a significant positive effect, with a coefficient of 2.399 ($p = 0.002$), indicating that higher depreciation costs are associated with an increase of 2.399 units in the dependent variable. These results highlight the importance of clay, wood, and depreciation in explaining variations in the dependent variable, suggesting that these factors are key drivers in the production process or cost structure being analysed. Damage (3.839, $p = 0.07$) and husk (0.028, $p = 0.067$) are significant at the 10 per cent level, indicating their potential relevance in the model.

Table-4
Cost Structure Analysis

Range (?)	Frequency	Percent
60001-84100	3	6.82
84101-108200	5	11.36
108201-132300	14	31.82
132301-156400	22	50.00
Total	44	100.00

Source: Computed

The cost structure of the respondents (Table-4) reveals a diverse distribution across various cost ranges. The majority of respondents, 50 per cent, fall into the cost range of ? 132,301 to 156,400. This suggests that a significant portion of the population experiences higher production costs. Meanwhile, 31.82 per cent of respondents have costs between ? 108,201 and 132,300, indicating a sizable group with moderate expenses. Fewer respondents, 11.36 per cent, fall within the 84,101 to 108,200 range, and only 6.82 per cent have costs between 60,001 and 84,100. This distribution highlights a concentration of higher costs among respondents, with a smaller percentage experiencing lower cost structures.

Table-5
Profitability Analysis

Range (?)	Frequency	Percent
17501.0 - 70900.0	21	47.73
70901.0 - 124300.0	13	29.55
124301.0 -177700.0	7	15.91
177701.0 - 231100.0	3	6.82
Total	44	100

Source: Computed

The profit structure among the respondents in Table-5 demonstrates a varied distribution across different profit ranges. The largest group, representing 47.73 per cent, has profits between 17,501 and 70,900, indicating a majority with lower to moderate profit margins. A significant portion, 29.55 per cent, falls within the ?70,901 to ?124,300 range, reflecting moderate profit levels. In contrast, 15.91 per cent of respondents, report profits between ?124,301 and ?177,700, showing higher profitability. Only 6.82 per cent have profits ranging from ?177,701 to ?231,100, suggesting a smaller segment with very high profits. This distribution highlights a predominance of lower to moderate profits, with fewer respondents achieving higher profit levels.

Table-6
Chi-Square Test

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1760.000[a]	1640	.020
Likelihood Ratio	324.691	1640	1.000
Linear-by-Linear Association	27.706	1	.000
N of Valid Cases	44		

Source: Computed

The Table-6 above illustrate a correlation between the costs and benefits for pottery workers in my study area. The test results are significant, with a value of 1760.0 at a 5 per cent significance level, confirming this association.

Table-7
Correlation Result

		total cost	profit
Total cost	Pearson Correlation	1	.803**
	Sig. (2-tailed)		.000
	N	44	44
Profit	Pearson Correlation	.803**	1
	Sig. (2-tailed)	.000	
	N	44	44

Source: Computed

The Pearson correlation coefficient between total cost and profit is 0.803, indicating a strong positive relationship. This suggests that as the total cost increases, the profit also tends to increase. The correlation is statistically significant at one percent.

Table-8
Cost Structure and Corresponding Mean Profit

Total cost (?)	N	Mean Profit	Std. Deviation
60001.0 - 84100.0	3	41833.3	4072.26
84101.0 - 108200.0	5	126885.7	11923.66
108201.0 - 132300.0	14	139160.0	29717.89
132301.0 - 156400.0	22	176312.5	43964.64

Source: Computed

The cost structure analysis, Table-8 provides insights into the relationship between total cost and mean profit among the respondents. Trend indicates a positive correlation, where higher costs are associated with higher mean profits among the respondents. For the cost range of ?60,001.0 to ?84,100.0, there are 3

respondents, with a mean profit of ?41,833.3 and a standard deviation of ?4,072.3, indicating relatively low variability in profits within this group. In the next range, ?84,101.0 to ?108,200.0, 5 respondents report a higher mean profit of ?126,885.7 with a standard deviation of ?11,923.7, showing moderate variability. The ?108,201.0 to ?132,300.0 range, with 14 respondents, has a mean profit of ?139,160.0 and a higher standard deviation of ?29,717.9, indicating greater variability. Lastly, the ?132,301.0 to ?156,400.0 range includes 22 respondents with the highest mean profit of ?176,312.5 and a standard deviation of ?43,964.6, reflecting significant variability in this group.

Challenges Encountered by Pottery Artisans

Potters face a multitude of challenges that threaten their craft and livelihood. Chief among these issues identified in the study are price fluctuations, high cost of production, lack of raw materials, lack of training programs, market agent problems, lower demand for pottery, Low marketing facilities, evolving taste and preferences, availability of substitutes and lack of government support.

Table-9
Ranking of the Problems Faced by the Potters

PROBLEMS	Mean Rank	Rank
High cost of production	3.8	1
Lack of government support	4.55	2
Lack of raw materials	4.68	3
Price fluctuations	4.83	4
Lack of training program	5.26	5
Market agent problem	5.75	6.5
Substitute available in the market	6.48	6.5
Taste and preference of people	6.84	8
Low marketing facilities	6.36	9
Lower demand	6.45	10

Source: Computed

The ranking of problems faced by potters, determined by mean ranks in the above Table-9, provides a clear picture of the most pressing challenges impacting their craft. The results with lower mean ranks indicating more severe issues, help prioritise these problems effectively. At the top of the list is the high cost of production, which holds the lowest mean rank of 3.8. This problem encompasses the significant expenses incurred for raw materials, labour, and other essential inputs. Addressing this issue requires strategies to reduce costs, such as improving production efficiency, sourcing cheaper materials without compromising quality, and potentially benefiting from government subsidies or financial assistance programs. The lack of government support, with a mean rank

of 4.55. The third major challenge is the lack of raw materials, reflected by a mean rank of 4.68. Scarcity of essential materials hampers production and can lead to increased costs and delays. Establishing stronger supply chains, encouraging the local production of raw materials, and creating buffer stocks to manage periods of shortage. Price fluctuations, with a mean rank of 4.83, also pose a significant problem. Unstable prices for raw materials and finished goods create financial uncertainty, making it difficult for potters to plan and budget effectively. Competition from machine-made or synthetic alternatives pressures potters to differentiate their products. The lack of training programs, which holds a mean rank of 5.26, is another notable problem. Without access to proper training, potters struggle to improve their techniques, adopt new technologies, and enhance their productivity. Market agent problems, with a mean rank of 5.75, indicate challenges related to middlemen and brokers who control market access and pricing, often exploiting potters. The availability of substitutes in the market, sharing the same mean rank of 5.75, also presents a challenge. Competition from machine-made or synthetic alternatives pressures potters to differentiate their products. Taste and preference of people, with a mean rank of 6.84, indicate that changing consumer preferences can reduce the appeal of traditional pottery. Adapting to these preferences through innovative designs and new materials can help potters maintain their relevance. Low marketing facilities, with a mean rank of 6.36, restrict potters' ability to reach broader markets and attract customers. Improving marketing infrastructure, both physical and digital, is essential for showcasing products and driving sales. Finally, lower demand, reflected by a mean rank of 6.45, poses a threat to the sustainability of pottery businesses. Understanding market trends, diversifying product offerings, and enhancing product appeal through effective marketing campaigns can help stimulate demand. By tackling these problems comprehensively, potters can improve their livelihoods and contribute to the preservation and growth of their craft.

Based on the ranking of challenges faced by potters, it was clear that two main categories of issues emerged: production-related and marketing-related problems. Studies such as those by Rao and Prakash (2015), Kumar and Joshi (2018), and Sharma and Bansal (2020) identified similar issues within the pottery and handicraft sectors, confirming that both production and marketing problems were critical obstacles to the growth and success of pottery businesses.

Production and Marketing Problems of the Potters

The study identifies the following core production-related issues faced by the Pulinelli potter community:

Raw Materials:

- Scarcity of raw materials
- High cost of acquiring raw materials

- Inconsistent quality and supply of raw materials

Manpower:

- Increasing wages, compounded by economic inflation
- Shortage of skilled labour
- Lack of government-supported skill development programs

Process and Product-Related Issues:

- Reliance on manual clay processing (hand/leg pugging)
- Absence of automation in production processes
- Challenges related to firing in traditional kilns/chulahs
- Product damage during the firing process
- Limited capacity of kilns/chulahs
- Issues with warehousing and storage of products
- Insufficient innovation in product design and techniques
- Increased competition from machine-made and synthetic alternatives

The study identifies the following marketing-related issues faced by potters in Pulinelli, Palakkad:

- Reliance on traditional sales channels, such as fairs and local markets
- Seasonal demand for products, particularly during festivals
- Dependence on intermediaries for product sales
- High transportation costs for moving goods to market
- Lack of an online presence for pottery products and limited access to digital platforms
- Absence of a cooperative society to enhance market presence and facilitate sales in diversified markets

Factors that Sustain Pottery

Several interrelated factors force them to stay back in the business. Their culture and tradition are deep rooted in their business. To many of them, it is not only a source of livelihood and income but a part of their identity and heritage Since their education and skill development programs access are limited in rural areas, they find it difficult to transfer to other profession, Sumathi and Sujadevi (2019). Inspite of a lower income, it is the only viable revenue source for the potter community, Deepak (2019). Many potters feel a sense of pride in their craft and

continue the tradition to preserve their community's cultural legacy (IRTC, n.d.). Furthermore, while younger generations are reluctant to enter the profession, many potters have few other options due to the lack of skills or educational qualifications to enter more lucrative or skilled labour markets (New Kerala, 2023).

Identified Factors:

- Identity and heritage
- Lack of alternative livelihood
- Economic necessity
- Lack of skill and educational qualification.

Addressing these challenges requires a multifaceted approach that includes reducing production costs, ensuring a steady supply of raw materials, increasing government support, providing effective training, resolving market agent issues, enhancing marketing facilities, and adapting to changing consumer preferences.

Economic Conditions: The Kumbharan community faces significant economic challenges, with low-income levels, poor living conditions, and limited access to education and healthcare.

Production Costs: There is a strong positive correlation between total production cost and profit, indicating that managing production costs effectively can lead to better profitability.

Challenges Identified:

High Production Costs: Rising costs of raw materials and labor impact profitability.

Lack of Government Support: Insufficient support and subsidies from government bodies hinder growth.

Raw Material Scarcity: Limited availability of quality raw materials affects production efficiency.

Market Access: Difficulty in accessing wider markets limits sales opportunities and revenue.

Socio-economic Impact: The study highlighted the socio-economic struggles of the pottery artisans, emphasising the need for improved living conditions and educational opportunities.

Effective solutions are required, including government policies, modern training programs, and better market strategies, to enhance the industry's sustainability and profitability.

Conclusion

In conclusion, the study on the pottery-making business in Kumbarapalayam provides critical insights into their livelihood and production processes. The analysis revealed their struggle with low-income level, poor living conditions, poor educational attainment which aggravate their socio-economic backwardness. Production cost was notably high but signified a strong positive correlation between cost and profit, featuring an effective management of the units but far more to go to achieve a sustainable growth. The study revealed a pressing issue of limited market access, and inadequate government support significantly impacting profitability and overall industry sustainability. Hence measures may be taken to foster growth and improve living standards, including enhanced government subsidies, better access to quality raw materials, and the implementation of modern training programs.

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CONTOURS OF TRANSFORMATION IN FEMALE WORK PARTICIPATION: ANALYSIS OF NSSO & PLFS DATA OF UTTAR PRADESH

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Abstract: The present paper utilises consecutive rounds of data from the National Sample Survey Organization spanning from 2004-05, 2011–12, as well as the latest PLFS (2017-18 & 2021-2022) first visit unit level data, to outline the trends and patterns in labour force participation of females (FLPR) in Uttar Pradesh. It also assesses the magnitude of the ongoing decrease in female labor force participation and extensively investigates the impact of different demographic and socio-economic factors on the decision of women in the state to join the workforce. Based on the statistics, female labour force participation decreased by 1.55 percentage points in rural areas and 1.43 percentage points in urban areas from 2004–05 to 2021–22. The study focuses on women aged 15-59 to understand their choice related to economic activity.

Keywords: Female labour force, Participation rates, Supply and demand constraints, Logistic regression

Introduction

Increased female education and declining fertility rates are two effects of economic growth that have been linked to higher rates of FLPR (Female Labour Force Participation) in other nations (Presser and Sen, 2000; Mason, 1995). Since Boserup's ground-breaking study in 1970, the U-shaped linkage between women's participation in the labour force and economic development has been acknowledged by researchers (Goldin, 1995; Pampel and Tanaka, 1986). Understanding prevails that economic growth brought about decline in the

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importance of the agriculture sector where women were increasingly concentrated thus bringing about drastic decline in female involvement in labour force until alternate employment opportunities are generated due to economic growth that ensues. According to Becker, (1993) increasing levels of education and decreasing birth rates are factors that are expected to increase female labour force participation. However, these assumptions are regularly refuted by empirical data.

Research has shown that in societies where extended families are prevalent and women are heavily involved in self-employment, having children does not significantly hinder women's involvement in the workforce (Lloyd, 1991; Desai and Jain, 1994). There are significant policy ramifications regardless of whether supply or demand restrictions are to blame for these falling participation rates. However, the precipitous decline in female work participation rates in the last decade or more i.e., 2004–2005, 2011–2012, 2017-18 and 2021-22 compels one to investigate and identify causes behind such declines. Existing literature proclaims two explanations: firstly, that increased household incomes and higher education levels lead to a decrease in the labor supply (Mehrotra and Parida, 2017). Which is sort of voluntary not requiring policy interventions (Desai S and Joshi O, 2019); secondly, labour market changes have caused women to leave agricultural jobs, and alternative employment options have not emerged, causing decreased demand for women's labour (Klasen and Pieters, 2015). Another factor contributing to this trend is the evolving labour market conditions, which exacerbate inaccuracies in measuring labour force participation, as observed by several scholars (Himanshu, 2011; Hirway, 2012).

There is discussion on women leaving the workforce because they are having trouble finding work. These difficulties point to the need for public policies that prioritise assisting women in obtaining employment and opening up job prospects. The paper rely on NSSO rounds of 2004-05, 2011-12, and PLFS data 2017-18 and 2021-22. In addition, the present paper explores the influence of commonly overlooked cultural norms on shaping women's response to evolving employment situation, thereby enhancing the depth of the analysis.

The present paper aims to comprehend and explain Uttar Pradesh's startlingly low and steadily dropping Female Labour Force Participation (FLFP). Additionally, in order to comprehend the contemporary discourse surrounding female employment, it is imperative to scrutinise the historical patterns of employment in Uttar Pradesh, a sizable state whose densely populated areas shape the national policy framework. The paper is arranged in different sections. The data and empirical methodology of the study are covered in the next section. The third section examines trends in Female Labour Force Participation (FLFP). The fourth section delves into the rates of female Work- force participation rates. The fifth section addresses the distribution of rural female labour force participation rates in rural Uttar Pradesh and urban female labour force

participation rates in urban Uttar Pradesh. The sixth section discusses the factors influencing the decline in the female work force while the last section deals with closing thoughts and recommendations for future research.

Data and Methods

This analysis is based on unit level data obtained from the National Sample Survey for the years 2004–05, 2011–12, and PLFS 2017–18 and 2021–22. In particular, information from the 61st and 68th rounds of the NSSO/PLFS first visit data is derived from the schedule of inquiry (Schedule 10 of the NSSO and Schedule 10.4 of the PLFS) regarding employment and unemployment in Uttar Pradesh.

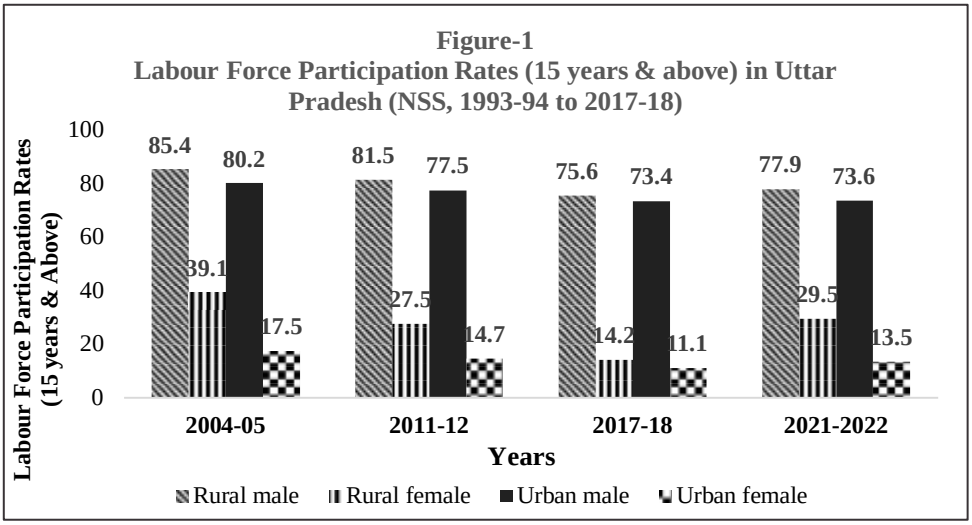
The paper examines the Labour Force Participation Rate (LFPR) which is defined as the percentage of persons in the labour force among the persons in the population. Female Labour Force Participation (FLFP) specifically denotes the percentage of women who are either employed or actively seeking employment within the working-age population. Female Worker Population Ratio (FWPR) is the percentage of females employed among the females in the population. Labour force, or in others words, the 'economically active' population includes both 'employed' and 'unemployed' persons. Following the norms followed by NSSO & PLFS usually, estimates of the labour force are obtained based on the following two approaches: firstly, according to the usual status (ps+ss) approach, i.e., by considering usual principal and subsidiary activity together, and secondly, according to the current weekly status approach.

The estimate of the labour force in the usual status (ps+ss) includes (a) the persons who either worked or were seeking/available for work for a relatively long part of the 365 days preceding the date of survey and also (b) those persons from among the remaining population who had worked at least for 30 days during the reference period of 365 days preceding the date of survey (PLFS, 2021-22). The paper considers PS+SS status in the analysis of labour force participation and work participation rates, not the labour force in current weekly status. The paper attempts to classify usually employed females according to age-groups to give a clear understanding as to which age-group dominates in the labour market. Even Caste -wise/Education-wise classification has been done in the analysis.

The study offers crucial information on labor market variables linked to the labor force participation rates. The paper contributes to the existing body of literature on FLFP in Uttar Pradesh by empirically examining the socio-economic and demographic dynamics underlying the downslide in FLFP during the period of economic growth, in addition to gathering data on socio-economic and demographic variables at the individual level. The study first analyzes the patterns and trends in FLFP in Uttar Pradesh (UP) before attempting to pinpoint the factors such as age cohort, economic group, social group, education level, etc.

that may be responsible for the severity of the FLFP slump and provide insight into the underlying mechanisms of the phenomenon. Finally, an attempt has been made to determine the relative importance of the main determinants of the FLFP decision in urban and rural areas, and whether such information might shed light on the circumstances contributing to the recent reduction in FLFP.

Trends in Female Labour Force Participation Rate



Source: Different NSSO Rounds and PLFS data

In this section, the trend of female labour force participation rate (a ratio of the number of women who are part of the labour force to the number of women in the working age (greater than 15 years of age). A woman is considered to be a part of the labour force if she is either employed or actively looking for work). Figure-1 shows FLFP in Uttar Pradesh focusing on the NSSO 2004-05, 2011-12, and 2017-18 and 2021-22 PLFS rounds. In 2004-05, female labour force participation rates were highest with 39.1 per cent in rural and 17.5 per cent in urban Uttar Pradesh, which fell to 24.5 per cent in rural and 13.5 per cent in urban in 2021-22. (Figure-1). However, after 2004-2005 female participation rates continued to decline.

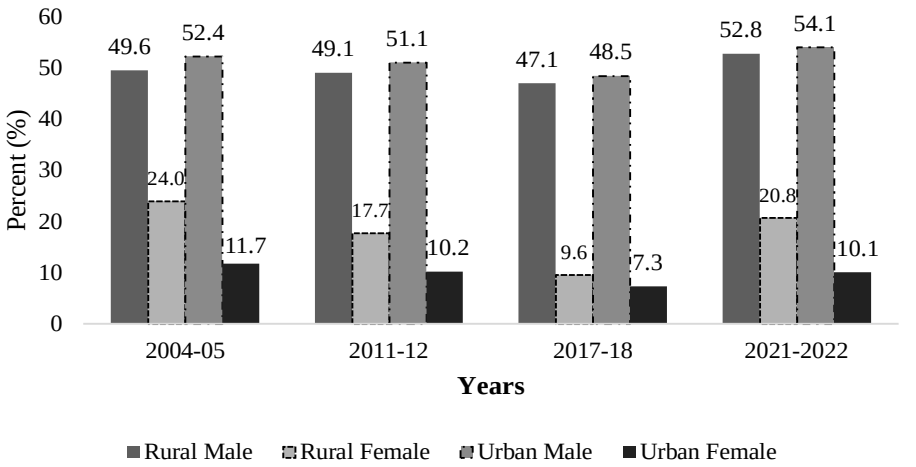
Trends in Female Work Participation Rate

Worker-Population Ratio (WPR) refers to the fraction of the population (15 years and above) who are employed in principal and subsidiary status. It is a statistical measure that indicates the percentage of women in a population who are actively participating in the workforce. People who are unable to find a job or who have given up their quest after understanding that no work was available for them, as

well as those who are engaged in other activities (such as study or housework), are not covered by this.

In India, a vast majority of the workforce, about 83 per cent, is employed in the informal sector. This sector encompasses various types of work, including self-employment, casual labour, and home-based activities, often lacking formal contracts and benefits. Over 90 per cent of informal workers are either self-employed or casual workers (Raveendran and Vanek, 2020). This category includes self-employed workers (i.e., self-employed on their own farm, shopkeeper or street vendor) and also casual wage-employed workers. The Worker Population Ratio (WPR) includes all employed individuals in the population, regardless of the number of days they work per year, according to MoSPI. The WPR is defined as the number of employed persons per 1,000 persons in the population.

Figure-2
Percentage of Usually Employed in Principal Status and Subsidiary Status in Uttar Pradesh



Source: Different NSSO Rounds and PLFS data

Figure 2 presents work participation rates (WPR) of male and female from different NSSO rounds in usual principal and subsidiary status category (PS+SS) and highlights two trends: firstly, that rural women are more involved in agriculture and hence have higher work participation rates (WPR) as compared to their urban counterparts. Female WPR declined between the period 2004-05 and 2011-12 and further declined in 2017-18 to all time low 9.6 per cent, but showed an increase in 2021-22 to 20.8 per cent in rural Uttar Pradesh. The impervious improvement in WPR is primarily observed in rural areas. Second, female work

participation rates declined in urban Uttar Pradesh too and similar to rural UP increased in 2021-22.

Distribution of Females by Employment Status

This section delas with an important aspect of quality of employment is the composition of the workforce in terms of employment status. Majorly this employment status has three categories: self-employment (which is the dominant category of employment), regular employment and casual work. Regular employment is generally regarded as providing better-quality jobs due to the regularity of employment and associated social security benefits (Annual Report: Periodic Labour Force Survey, 2020–21). In contrast, casual work offers relatively poor-quality jobs due to its irregular nature and lower daily earnings. This is the lowest category in terms of labour conditions among the three.

Table-1 shows that there was a significant continuous decrease in female self-employment in the State between 2004-05, 2011-12 and 2017-18 both in rural and urban Uttar Pradesh (Table-1). In general, the percentage of female self-employed workers fell from 85.2 per cent in rural Uttar Pradesh in 2004–05 to 78.5 per cent in 2017–18, and from 72.3 per cent in 2004–05 to 46.2 per cent (2017-18) in urban parts of the State. But in 2021–2022, self-employment has increased both in the urban and rural areas, as the government's present employment strategy is obviously geared toward encouraging self-employment. The Ministry of Skill Development and Entrepreneurship has created various initiatives, including Start-Up India, Made in India, and the Pradhan Mantri Kaushal Vikas Yojana, to assist individuals in transitioning from job seekers to job creators (Rawal and Bansal, 2019). However, for the state there is no positive trends for females in overall employment as their share as regular-employed and casual employed experienced a constant waning in recent period. Following the release of the employment and unemployment data from the PLFS surveys, which showed that the rate of unemployment was 6.1 per cent and was at an all-time high at the national level, there was a great deal of controversy.

Table-1
Usually Employed Females by Category of Employment in Uttar Pradesh

Sector	2004-05	2011-12	2017-18	2021-22	CAGR % 2004-05 to 2011-12	CAGR % 2011-12 to 2017-18	CAGR % 2017-18 to 2021-22
Rural							
Self employed	85.2	80.8	78.5	87.9	-0.75	-0.48	2.87
Regular employees	1.7	4.0	7.6	3.8	13	11.29	-15.91
Casual labour	13.1	15.3	13.9	8.3	2.24	-1.59	-12.09
Urban							
Self employed	72.3	67.6	46.2	60.5	-0.96	-6.15	6.97
Regular employees	18.0	21.6	46.2	34.3	2.64	13.51	-7.18
Casual labour	9.7	10.8	7.6	5.2	1.55	-5.69	-9.05

Source: Tabulated from unit level data of different NSSO Rounds and PLFS data.

Figure-3A & 3B shows the Compound Annual Growth Rates (CAGR) of usually employed females by employment status i.e., whether self-employed, regular employed or casual employed. The study found that self-employment amongst females has increased in recent time i.e., 2021-22, but regular and casual employment has registered a decline both in rural and urban Uttar Pradesh. Reasons for such decline whether as regular-employed or as casual employed needs further investigation, which has been attempted in the following section.

Figure-3A
Growth (CAGR) of Usually employed Females by Category of Employment in Rural Uttar Pradesh

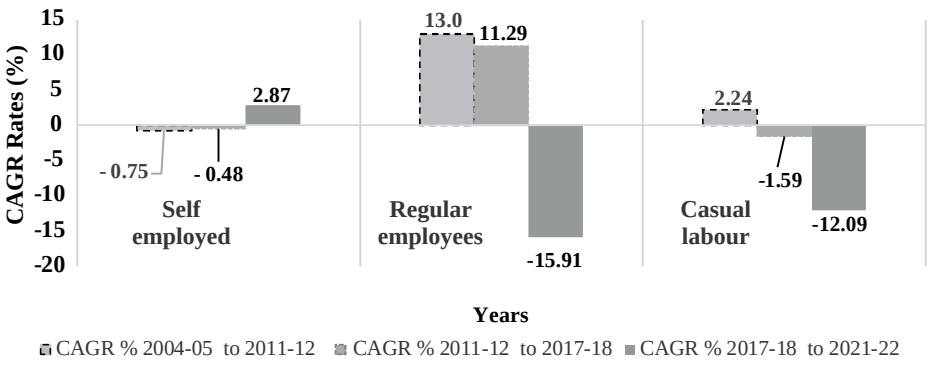
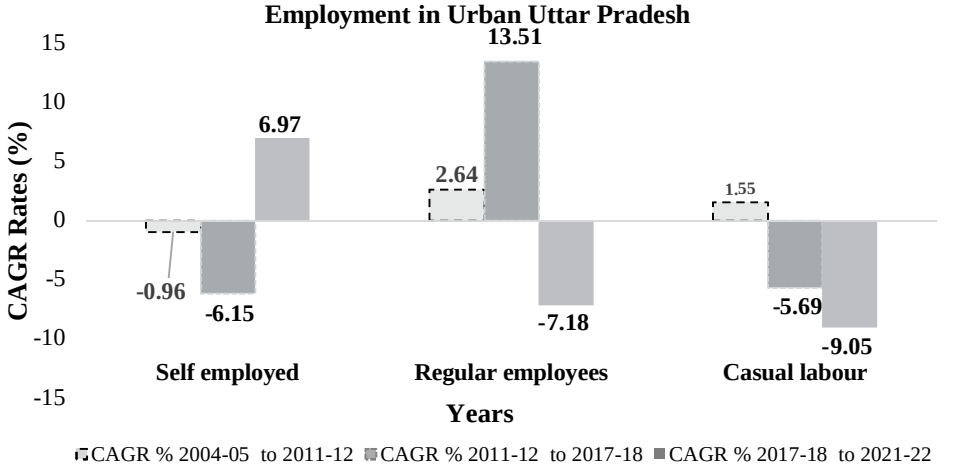


Figure-3B
Growth (CAGR) of Usually Employed Females by Category of Employment in Urban Uttar Pradesh



Source: Author's calculations

Reasons Assigned for Recent Declining Trends

Academician are at work to investigate the reasons behind already low participation rates of women to yet precarious drop in the economy which is mind throttling. Two explanations that is looming large in academia. Firstly, there is usually less labour available when household incomes rise and education levels rise (Mehrotra and Parida, 2017). Furthermore, women who were employed in agriculture have been displaced by mechanisation in labour markets, and the lack of other alternatives has led to a decrease in the demand for labour (Klasen and Peters, 2015). Scholars studying labour force data have observed that measurement mistakes have increased as a result of changes in labour market conditions (Himanshu, 2011; Hirway, 2012). This is just one line of evidence supporting this theory. A change in sample procedure, according to official arguments, prevents the figures from the Periodic Labour Force Survey (PLFS) from being compared to previous Employment and Unemployment Surveys.

Nevertheless, Rawal and Bansal, (2019) contend that this assertion is unfounded because the sample size in its entirety, not the sampling ratio, determines how reliable survey estimates are. Like the previous Surveys of NSS, the PLFS survey is based on a sizable, randomly selected, stratified sample that was scientifically constructed. Such a sample, neither more nor less, accurately captures its sampling frame. The sampling frame is generated in the same manner for each of the two survey rounds. There has been a change in the sample plan. However, according to Rawal and Bansal (2019), estimates from both surveys use unbiased estimators that take into consideration multipliers based on their distinct sampling strategies. Keeping this in mind the paper seeks to compare the FLFP rates in the State of Uttar Pradesh over different NSSO rounds and recent PLFS data set.

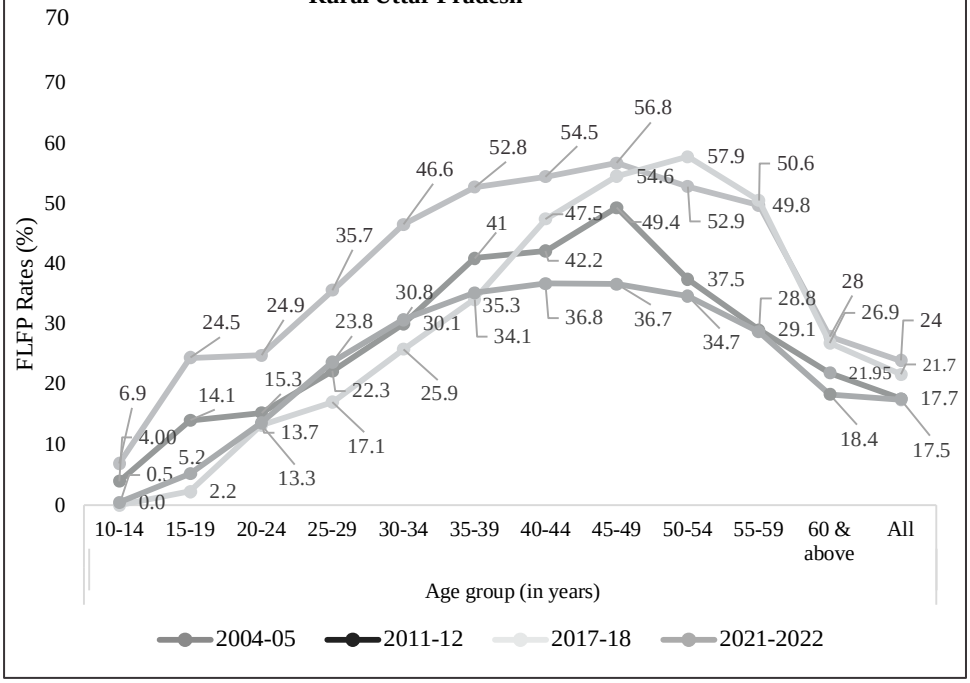
Scenario of Age Group and Female Labour Force Participation Rates

Tracking declining FLFP amongst different age groups during the periods 2004-05 to 2011-12, 2011-12 to 2017-18 and 2017-18 to 2021-22, it reveals that approximately 19.8 per cent rural and 18.1 per cent urban FLFP dropped within the younger cohort (i.e., the age group of 15 to 24 years). To measure the impact of age, changes in the LFPR have been suitably understood through changes in the age-specific participation rates. Austen and Seymour, (2006) have tried to understand the age effect amongst the women's participation rates which changes within each cohort as they move through the life course. Other studies too corroborated that labour force participation varies significantly throughout life, following the well-known inverted U-shaped curve, which is highest during the working years (Baller et. al., 2009).

The FLFP rate by age group shows an inverted U-shaped pattern across all years, as predicted, in rural regions (Figures-4). The age profile of women

shows a downward trend since 2004-05 across all age groups in the period, 2011-12, 2017-18 and 2021-2022 in Figures-7 and 8. According to Desai and Joshi, (2019), these findings imply that the decline in rural women's WPR seen in the NSS data should be read cautiously and that it is impossible to completely rule out the possibility of measurement mistakes. Studies show that the growing number of younger age groups enrolling in school may be somewhat to blame for this declining trend, but the drop's observation across all age groups is still puzzling. In this context, Kannan, (2012) examines the missing labour force profile and argues that the decline in female labour force participation cannot be explained by an increase in educational attainment. All age groups have seen a decline, nevertheless, especially the 30-34-year age group in metropolitan regions (Figure-5). This scenario implies that women's education is not the only factor contributing to their exit from the labor force. A 'U'-shaped inversion of the age-specific cohort's LFPR curve is seen. This indicates that while the cohort in the peak age (35–50 years) has a high participation rate, the younger generation (under 25 years) and the elderly cohort (over 50 years) have low participation rates. This is because different factors affect a woman's engagement in the labor force based on her age.

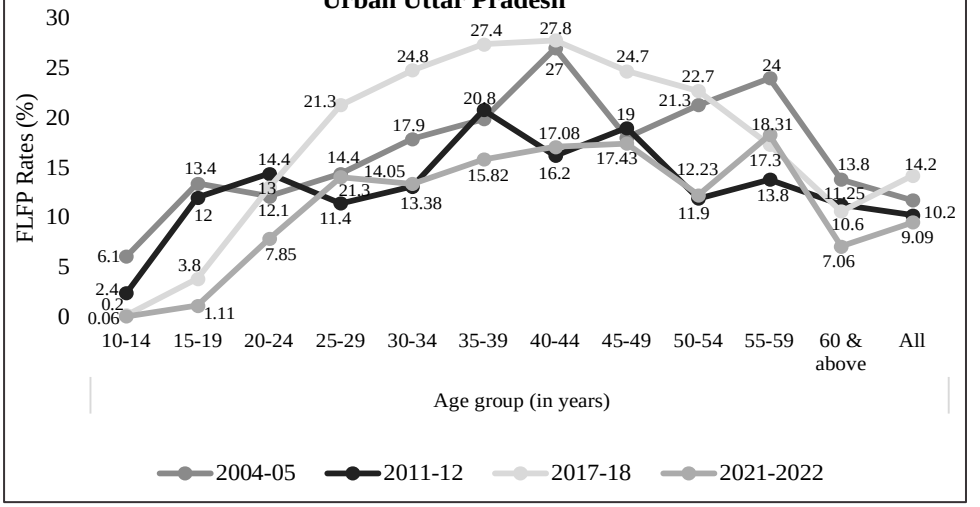
Figure-4
Age Specific Female Labour force Participation Rate in Rural Uttar Pradesh



Source: Different NSSO Rounds and PLFS data

Dev and Venkatanarayana (2011), for instance, contend that an increase in adult involvement has counterbalanced the income drop brought about by younger cohorts quitting the workforce to pursue higher education. For this reason, compared to the other age cohort, the 35+ age group has a higher participation rate.

Figure-5
Age Specific Female Labour Force Participation Rates in Urban Uttar Pradesh



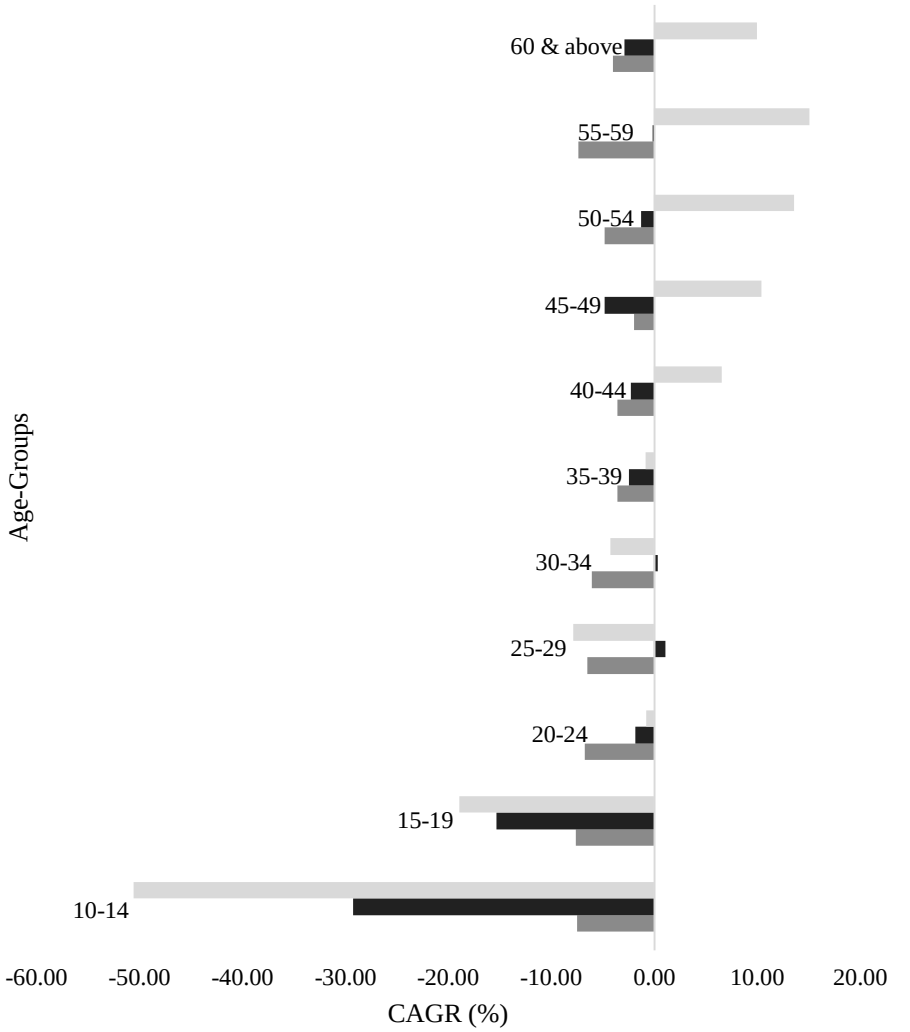
Source: Different NSSO Rounds and PLFS data

Figure 4 illustrates the fact that, according to the NSSO 2011–2012, 68th cycle, about 80 per cent of the female labor force is based in rural areas. The distribution of rural female labor force participants by age cohort throughout various NSSO Rounds is depicted in this figure. It also clarifies the steadily declining LFPR in the 10–14 and 15–19 age groups, which suggests that rural women in these age groups work in the education sector. Comparably, the LFPR reduction in 2017–18 and 2021–2022 is nearly equivalent to that seen in 2011–12 in the age cohorts of 20–24 and 25–29 years. Figure 5 illustrates the FLFP rate peak for rural Uttar Pradesh in the age range of 35 to 49 years. With the exception of 2004–2005, when there was an increase in labour force participation, the state-level scenario for LFPR achieves its peak in the age range of 30-49 years in 2011–12, 2017–18, and 2021–22. After that, the FLFPR is expected to continue declining precariously.

Figure-6 & Figure-7 highlights growth of age-specific worker population ratio in rural and urban Uttar Pradesh. Recent data reveals a that fall in almost every age cohort in rural areas of the State (except in age group 40-59 in 2021-22), but the situation is reverse in urban Uttar Pradesh (figure 8). There is a

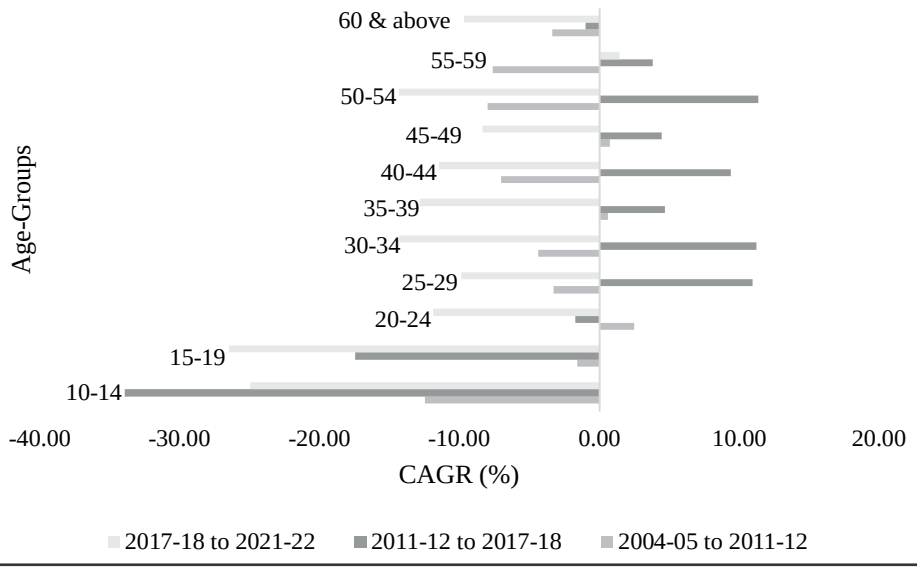
drastic fall in 10-14 and 15-19 age cohorts in 2011-12 to 2021-22 period. For every other age cohort i.e., 40-44 to 55-59 age cohorts there is increase in usual worker population ratios in rural areas in most recent period i.e., 2020-2022.

Figure-6
Age Specific Growth in Usual Worker Population Ratio in Rural Uttar Pradesh



Source: Different NSSO Rounds and PLFS data

Figure-7
Age Specific Growth in Usual Worker Population Ratio in Urban Uttar Pradesh



Source: Different NSSO Rounds and PLFS data

Education Effect and withdrawal from the Labour Force

A decline in the participation rates over the previous few decades have been reported (Abraham, 2013; Chatterjee, Murgai, and Rama, 2015). A number of variables, such as the transition of cohorts from low to intermediate and upper secondary education, can be ascribed to this (Afridi, Dinkelman, and Mahajan, 2016). as quoted in Desai and Joshi, 2018.

In order to gain a deeper insight into the association between educational attainment and sectoral FLFP rates, it was found that there was a clear non-linear relationship with informal employment scenarios and both formal and unemployed employment. The current study investigates the connection between educational attainment and FLFP rate by analysing unit level data (Appendices-1 and 2). Between 2004–2005 and 2021–2022, there was a significant shift in the educational makeup of the working-age female population (those in the 15–59 age group). A greater percentage of women now have secondary and high school education, although these women are less likely to enter the workforce. Overall, the percentage of women who lack literacy has dropped, while the percentage of women who have completed diploma and certificate programs and are highly educated has sharply increased—especially in urban areas.

After examining the correlation between the FLFP rate and educational attainment, it was found that women in Uttar Pradesh were not driven to enter the workforce by having secondary or higher secondary education (Figure-8A & 8B). Among individuals with educational backgrounds at the secondary and post-secondary (10+2) levels, the incidence of FLFP rates was found to be the lowest, followed by those with educational levels below the secondary level. A high FLFP rate is found among illiterates, primary level literates and college graduates. Thus, projecting 'U-shaped' relationship between FLFP and level of education in the State, across all rounds of NSSO surveys for the study period.

According to a study by Klasen and Peters (2013), there exists a U-shaped association between education and the participation of females in the labor force (FLFP) in urban India. In a study conducted by Klasen and Peters, (2013), it was found that there is a relationship between FLFP and education. Specifically, economic pressures often compel women with minimal or no education to enter the labor force, whereas women with moderate education tend to refrain from joining the workforce even when their income levels increase. It is interesting to note that highly educated women do enter the labour force because they want to work in higher-paying jobs. While examining the Delhi labor market, Sudarshan and Bhattacharya, (2009) asserted in a similar manner that the relationship between FLFP and education becomes meaningful only at the college or higher education level (World Bank, 2017).

Figure-8A
Growth (CAGR) in Education Specific Worker Population Ratio of Females 15 years and above in Uttar Pradesh Rural

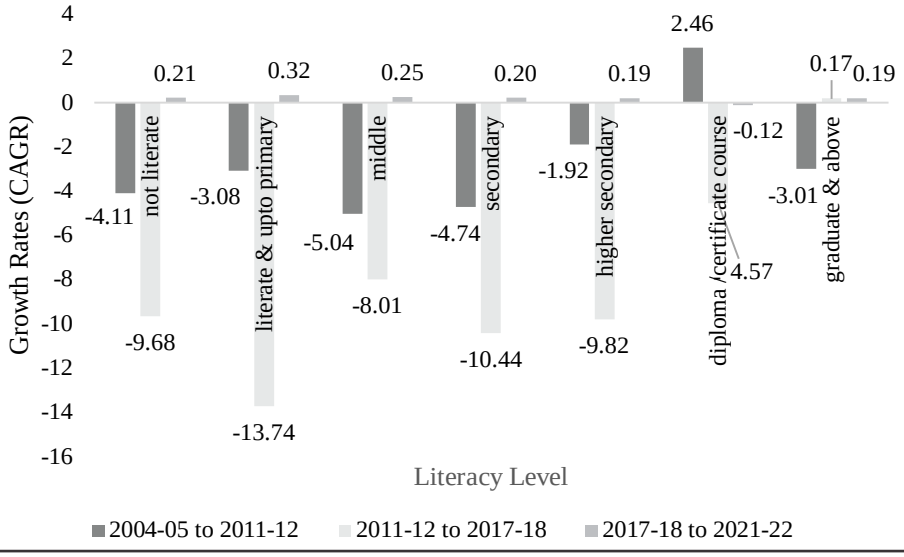
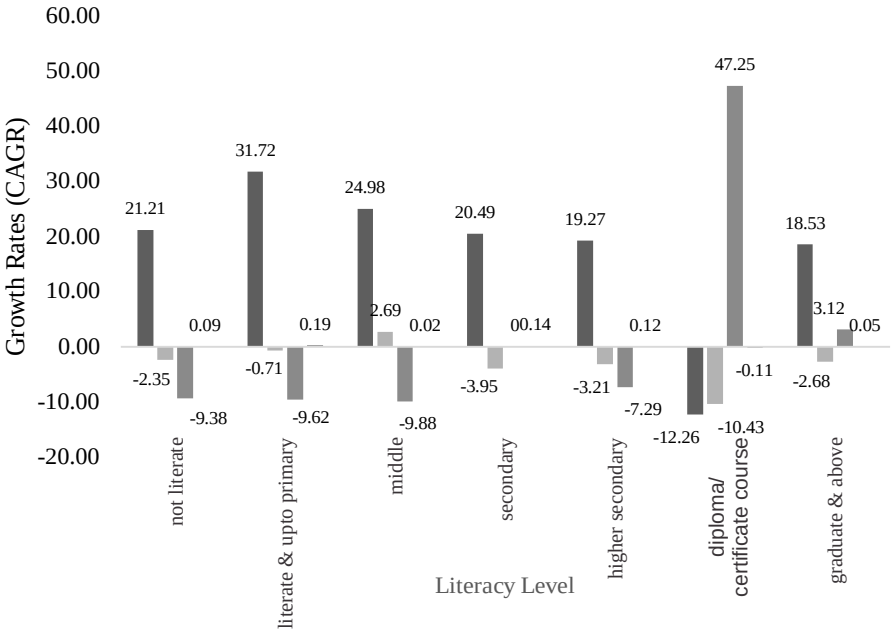


Figure 8-B
Growth (CAGR) in Education Specific Worker Population Ratio of Female 15 years and above in Uttar Pradesh Urban



Source: Based on unit level data of different NSSO Rounds and PLFS data.

There has been a noticeable decrease in female labor force participation (FLFP) in the past several years. Regardless of whether people live in rural or urban settings, this reduction is seen in all educational categories. Hence, it can be concluded that the motivation for women to actively engage in the workforce has undergone a reverse trend over the specified period. The FLFP rate decreased between 2004–05 and 2011–12 for all educational levels, from illiterate to graduate and advanced degree holders. Interestingly, individuals who were initially classified as illiterate or possessed a graduation level education and above accounted for the highest rates of participation. However, in recent period, 21.2 per cent increase in the FLFP rate among illiterate females, and for educated female graduates the increase by 18.5 per cent has been noticed during the recent period (Table-2). Whereas in urban areas, increase of 8.7 per cent in case of LFP of illiterate females and 5.2 per cent, respectively in case of graduate females (Figure-8B) is registered. Contrary to this, drastic decline can be seen among diploma holders' female workers in rural as well as in urban Uttar Pradesh in the recent period.

Table-2
Education Specific Worker Population Ratio for Females 15 years & above in UP

Sector /Period	not literate	literate & up to primary	middle	secondary	higher secondary	diploma /certificate course	graduate & above
Rural Female							
2004-05	45.2	29	23.7	17.7	18.1	50.7	23.6
2011-12	33.7	23.3	16.5	12.6	15.8	60.1	19.1
2017-18	18.3	9.6	10	6.5	8.5	45.4	19.3
2021-22	39.5	28.9	24.4	13.7	17.2	26.9	38.1
Urban Female							
2004-05	24.1	16.4	9.3	6.1	9.3	13.4	17.9
2011-12	20.4	15.6	11.2	4.6	7.4	6.2	14.8
2017-18	11.3	8.5	6	4.6	4.7	63.2	17.8
2021-22	15.8	17.1	6.4	7.8	7.3	38.8	21.8
Rural Female (CAGR %)							
2004-05 to 2011-12	-4.11	-3.08	-5.04	-4.74	-1.92	2.46	-3.01
2011-12 to 2017-18	-9.68	-13.74	-8.01	-10.44	-9.82	-4.57	0.17
2017-18 to 2021-22	21.21	31.72	24.98	20.49	19.27	-12.26	18.53
Urban Female (CAGR %)							
2004-05 to 2011-12	-2.35	-0.71	2.69	-3.95	-3.21	-10.43	-2.68
2011-12 to 2017-18	-9.38	-9.62	-9.88	0	-7.29	47.25	3.12
2017-18 to 2021-22	8.74	19.10	1.63	14.11	11.64	-11.48	5.20

Source: Tabulated from unit level data of different NSSO Rounds and PLFS data.

Income Effect and Withdrawal from the Labour Force

There seems to be less dependence on women's earnings inside homes as household incomes rise. As a result, women may decide to devote their time to taking care of the home and their children (Neff et. al., 2012). It is observed that women's participation rates in the workforce is negatively correlated with household income levels. Nevertheless, it remains uncertain whether this cross-sectional association fully elucidates the factors contributing to the decrease in women's workforce participation over time. In order to assess the effect of income on FLFP, information from unit level data of NSSO rounds for 2004-05, 2011-12, 2017-18 and 2020-2022 was collated and was formulated as income groups. Three groups of income i.e., low, medium and high were formed and data of FLFP was tabulated accordingly. Comparing the data according to income group shows that during the period 2004-05 to 2011-12, 2011-12 to 2017-18 and 2017-18 to 2021-2022 there was a decline in each income groups (except low-income group) in rural areas as well as urban areas of the State. Notably, the large fall in female participation (FLFP) observed during 2011-12 and 2021-22, has contributed to an overall decline in the FLFP rate for the entire period, notwithstanding an increase in lower income categories between 2017-18 and 2021-2022. Based on the aforementioned study, it can be stated that the large reduction in the FLFP rate between 2004-05 and 2011-12 was mostly due to the observed decrease in rural areas during that time. It is also noteworthy that between 2011-12 and 2017- 18, there was a significant 53.8 per cent point

increase in urban areas in medium income group and 72.5 per cent increase in high income groups (Table-3).

Table-3
FLFPR (%) by Income Groups in Uttar Pradesh

Sector	FLFPR, %				CAGR %		
	2004-05	2011-12	2017-18	2021-22	2004-05 to 2011-12	2011-12 to 2017-18	2017-18 to 2021-22
Rural							
Low	34.52	27.42	3.91	12.35	-3.76	-27.7	33.3
Medium	4.56	0.05	6.61	5.60	-53.39	128.21	-4.1
High	0.03	0	0.06	0.02	-100	0	-24.3
Total	39.11	27.46	10.58	17.97	-5.72	-14.69	14.2
Urban							
Low	13.54	14.08	1.26	4.93	0.65	-33.1	40.7
Medium	3.67	0.57	7.54	4.78	-26.69	53.83	-10.7
High	0.27	0.07	1.93	0.11	-19.71	72.5	-50.9
Total	17.48	14.72	10.74	9.83	-2.82	-5.12	-2.2

Source: Tabulated from unit level data of different NSSO Rounds and PLFS data.

Marriage Effect and Withdrawal from the Labour Force

Table-4 illustrates the distribution of female labour force participation by marital status for the years 2004–05, 2011–12, 2017–18, and 2021–2022, indicating a higher proportion of married females in both rural and urban areas for each decade. This information is useful in assessing the impact of marital status on FLFP. The data presented in Table-4 suggests that a greater proportion of married female workers than single female workers joined the workforce, primarily in order to increase their household income. Nonetheless, married women's labor force participation declined between 2004-05 and 2011-12 and between 2011-12 and 2017-18 (i.e., by 2.2% in the first period and 11.5% in the second). But the rate of rural married female labour participation has increased between 2017-18 and 2021-2022, with some notable increases. As a result, any modification to FLFP (Female Labour Force Participation) that is determined by marital status can be seen as a direct result of that modification. It was observed that there was no residence-specific variation in the relationship between marital status and FLFP. Over the course of the study, married women's FLFP rates were substantially higher than that of single women in both rural and urban settings. Using 2021-22 as a guide, the FLFP rate for married women was 14.9 per cent in rural regions and 5.8 per cent in urban areas, compared to 1.2 per cent in rural areas and 2.4 per cent in urban areas for single women.

An additional analysis of the FLFP rate for four time periods shows that, in both rural and urban areas, the difference in the labor force participation rate between married and single women remained generally steady throughout all time periods. Nonetheless, compared to urban areas, there was a bigger drop in the percentage of married and single women participating in the labor force in

rural areas. The FLFP rate for married women living in rural regions fell by 6.1 per cent between 2004-2005 and 2011-2012, and by 15.8 per cent between 2011-12 and 2017-18. The drop in the rural FLFP rate is responsible for the overall decline of 5.7 per cent from 2004-05 to 2011-12 and 14.7 per cent from 2011-12 to 2017-18. In contrast, FLFP shows a 17.7 per cent increase in 2021-2022. During 2004-05 and 2011-12, married women a greater decline in their rural FLFP rate was evident than among the unmarried women. It is evident that following an increase in the unmarried FLFP rate for urban areas from 2004-05 to 2011-12, female participation rates declined between 2011-12 and 2017-18, resulting in an overall reduction in the FLFP rate for both married and unmarried women. As a result, marriage status has a big impact on women's labor market participation rates.

Table-4
Marriage Effect and Withdrawal from the Labour Force

Marital Status					**CAGR %**		
Rural	**2004-05**	**2011-12**	**2017-18**	**2021-22**	**2004-05 to 2011-12**	**2011-12 to 2017-18**	**2017-18 to 2021-22**
Never married	3.7	2.94	1.36	1.18	-3.74	-12.13	-3.5
Currently married	32.01	21.91	7.78	14.93	-6.13	-15.84	17.7
Widow	3.24	2.45	1.43	1.83	-4.57	-8.54	6.4
Divorced/Separated	0.13	0.17	0.01	0.03	4.66	-33.85	31.1
All	39.08	27.46	10.58	17.97	-5.71	-14.69	14.2
Urban							
Never married	4.19	4.58	2.52	2.43	1.5	-9.51	-0.9
Currently married	10.81	8.3	6.66	5.77	-4.3	-3.61	-3.5
Widow	2.43	1.6	1.49	1.51	-6.77	-1.16	0.4
Divorced/Separated	0.05	0.24	0.08	0.11	28.27	-17.6	8.8
All	17.48	14.72	10.74	9.83	-2.82	-5.12	-2.2

Source: Tabulated from unit level data from different rounds of NSSO.

Caste effect and Withdrawal from the Labour Force

Social stratification exists in the Indian society, thus, socially linking it with employment opportunities determines not only the income earning capacity of social groups but also their economic mobility. An examination of the FLFPR for various socio-economic categories reveals that, in rural areas between 2004–05 and 2011-12, the general caste had the highest FLFP rate. However, in the year 2017-2018 and 2021-2022 the labour force participation rate of general caste females declined significantly i.e., from 16.3 per cent in 2011-12 to 2.2 per cent in 2017-18 to 1.7 per cent in 2021-2022. The decline in FLFP has been noticed during the periods of 2004-05 to 2011-12 for the general caste only (Table-5).

Furthermore, in the case of OBC, an increase in rural female labour force participation rate has been observed recently (i.e., from 2.8% in 2011-12 to 5.5% in 2017-18 and 10.9% in 2021-22). Contrary to this, participation rate among general and SC/ST caste female workers in rural areas experienced the largest drop in LFP rate during 2004-05 to 2011-12 and 2011-12 to 2017-18, (i.e., 5.3%

in 2004-05 to 2011-12, 28.4% during 2011-12 -2017-18 and 6.5% in 2021-2022) in case of general caste females and 6.1% in 2004-05 to 2011-12 and 16.1% during 2011-12 to 2017-18 in case of SC&ST). This decline implies that factors other than income may play a role in elucidating this trend, potentially linked to the insufficiency of suitable employment opportunities for these women (Dubey, 2015). It is surprising that SC households, who are among the state's most economically challenged rural households, have continued to decline in their labour force participation. However, in the year 2021-2022 FLFP amongst ST/SC has increased by 16.8 per cent. Table-5 suggests that the drop in FLFP between2011-12 to 2017-18 was about three times than that of the period between 2004-05 and 2011-12 in rural areas due to large fall in female labour force participation rate among general caste female, indicating the fact that females belonging to higher caste were engaged largely on their own field (as self-employed) in rural areas or were excluded from working outside due to societal norms and traditions. Though in urban areas this gap is lower during the different time periods as compared to rural areas, the urban FLFP rate also registered declining trend during this period. The general caste (others) females reveal a decline in FLFP in the urban areas: 3.8 per cent from 2004-05 to 2011-12, 10.3 per cent from 2011-12 to 2017-18, and 5.4 per cent from 2021-2022.Thus, the level of decline in FLFP is significant across social groups.

Table-5
Caste Effect and Withdrawal from the Labour Force

Caste	2004-05	2011-12	2017-18	2021-22	CAGR %		
					2004-05-2011--12	2011-12-2017-18	2017-18 to 2021-22
Rural							
SC/ST	12.15	8.34	2.91	5.42	-6.07	-16.1	16.8
OBC	4.35	2.83	5.48	10.86	-6.91	11.65	18.7
Others	22.61	16.29	2.2	1.68	-5.32	-28.39	-6.5
All	39.11	27.46	10.58	17.97	-5.72	-14.69	14.2
Urban							
SC/ST	2.63	2.34	2.45	1.88	-1.95	0.76	-6.4
OBC	6.29	5.59	4.75	5.10	-1.95	-2.66	1.8
Others	8.56	6.79	3.54	2.84	-3.78	-10.3	-5.4
All	17.48	14.72	10.74	9.83	-2.82	-5.12	-2.2

Source: Tabulated from unit level data from different rounds of NSSO.

Decline in Labour Force can be Traced to Data Quality

"Strangely, the one explanation we have not looked at is whether the declining quality of economic statistics may account for this trend," as Desai, (2019) correctly points out the limitation. Though the most authentic source of data is used for analysis, the possibility of discrepancies remains and is beyond the scope of the paper. A separate study may be devoted to address the discrepancies in data set before addressing the reasons for a declining trend in labour force. "Is the

decline in women's labour force participation real or is it a function of the way that employment data are collected?" remains one of Desai's queries.

Determinants of FLFP

After analysing the impact of different household and individual factors on FLFP rates in Uttar Pradesh in the above section, the paper attempts to examine how these factors affect FLFP in combination with socio-economic and demographic factors to determine their impact on the decline in FLFP rates. The logit model of regression was used to investigate the effect of a selected variable on each of the three categories of FLFPR separately for rural and urban areas in order to quantify the magnitudes of these combined effects. For this purpose, the dependent variable, three types of female labour force participation viz. FLFP in SE (Self-Employment), FLFP in RE (Regular Employment), and FLFP in CE (Casual Employment) is binary and takes values 1 for a woman who is employed and 0 for otherwise. Table-6 & 7 provides spatial (rural-urban) variations in the relative effect of each independent variable for the year 2011-2012 and 2021-2022.

In the earlier section, it was evident that a woman's involvement in the labour force is significantly affected by age, education, wealth, caste, and marital status. Hence, the independent variables considered here are, three income group i.e., low, medium and high, four age-group viz. 15-24, 25-34, 35-44, 45-59, proportion of unmarried and currently married females, educational attainment (illiterate, primary, graduate & post-graduate) and social groups (SC/ST, OBC & Others). The sample was restricted to female workers, aged 15 years and above.

In model-I, the impact of income in female participation in self-employment is not significant in 2011-12, whereas in the year 2021-22, negative and strong effect of low (β=-0.234, p=0. 01) has been found in FLFP, explaining that with the increase of income, FLFP in (SE) self-employment declines. Female labour force participation in self-employment has not significantly been affected by social groups in 2011-12 however in 2021-2022 self-employment among SC/ST group declined (Table-6). Similarly, negative and significant effect of higher education on FLEP in self-employment has been noticed in the year 2011-12 as well as in 2021-22, suggesting the fact that as the proportion of females who are graduates and postgraduates increases, the probability of participation in self-employment decreases in rural areas. Contrary to this, strong and positive impact of illiteracy on FLFP in self-employment in the year 2021-22 increases the probability of participation of females in self-employment in rural areas. Significant effect of variables related to marital status on FLEP in SE indicates that in 2011-2012, married and unmarried women both had probability of participation in the labour force while in 2021-2022 only married women have more chances of participating in the labour-force.

Table-6
Model I-Determinants of FLFP in Rural Uttar Pradesh (Logistic Regression)

	FLFP in Self- employment		FLFP in Regular Employment		FLEP in Casual employment	
	2011-2012	2021-2022	2011-2012	2021-2022	2011-2012	2021-2022
	Regression 1		Regression 2		Regression 3	
Income Effect						
Low	1.077	-0.234***	-2.21***	-0.264	(omitted)	0.749**
Medium	(omitted)	(omitted)	(omitted)	(omitted)	(omitted)	(omitted)
HIGH	(omitted)	(omitted)	(omitted)	(omitted)	(omitted)	(omitted)
Caste Effect						
SC/ST	-0.842	-0.632**	-0.44	-0.051	1.092	2.804**
OBC	0.03	0.420	-0.78	-0.715**	0.172	1.552
General	0.635	(omitted)	-0.95	(omitted)	-0.551	(omitted)
Education Effect						
Illiterate	0.003	0.726***	-2.14***	0.000	0.966***	1.036**
Primary	0.186	0.200	-0.87**	-1.956***	0.332	1.077**
Graduate	-2.233***	-1.705***	2.68***	-0.912**	-1.184	(omitted)
Post Graduate	-3.007***	-2.024***	3.53***	(omitted)	(omitted)	(omitted)
Marriage Effect						
Unmarried	1.551***	0.492	-2.89***	-0.988	-0.700**	-0.173
Married	1.184***	0.792***	-1.56***	-1.298***	-0.925***	-0.445
Age Effect						
15-24	-1.282***	-1.312	0.09	-2.469***	1.324***	2.713*
25-34	-0.291	0.740*	-0.47	-1.113*	0.482**	1.053*
35-44	-0.571***	0.292	-0.03	2.286***	0.670***	0.341
45-59	-0.285**	0.000	-0.36	2.676***	0.405***	0.000
_cons	-0.32	1.105***	2.434**	-0.029	-2.360***	-5.915***
No. of observation	2507	1706	2507	1706	2475	1626
LR chi2(16)	297.11	123.83	306.46	211.34	244.39	78.18
Probability > chi2	0	0.000	0	0.000	0	0.000
Pseudo R2	**0.1216**	**0.0979**	**0.3014**	**0.2757**	**0.1214**	**0.0991**

Significance level: *** (P<0.001), ** (p<0.01), *(p<0.05)
Source: Author's calculations

Looking at the age variable, it is found that age is significantly and negatively associated with FLFP (SE), implying that an increase in one year of age reduces the possibility of female labour force participation in 2011-12, in contrast to the significant and positive effect of the 25 to 34 age cohort on FLFP in the 2021-22 model, which indicates that an increase in one year of age increases the probability of female labour force participation. Overall, this regression accounts for 12 per cent of the variation (2011-12) in female labour force participation in self-employment, compared to 9 per cent in 2021-22.

Estimating the impact of selected explanatory variables on FLFP in RE (regular employment) indicates that the effect of low-income group, and higher education attainment is significant in 2011-12 with pseudo R2=30 per cent. And in 2021-2022 significant negative effect of primary and graduate level education on FLFP in RE have been noticed. Moreover, some other variables in the model

related to social groups (OBC), low level of education (primary) and graduate, marital status (married), age groups (15-24 and 25-34) show negative effect on female participation in regular employment.

Looking at the effect of selected independent variables on FLFP in casual employment (CE), significant and positive effect of illiteracy and age (all four groups) on the FLFP in CE is visible in 2011-12. Similarly, during 2021-22, low income, SC/ST illiteracy, low level education and age groups (35-44, 45-59) strongly effects the FLFP in CE. This result is realistic because most employers prefer elderly females, who are more responsible, experienced and focused towards their work. Other variables such as general caste, graduates married and unmarried in 2011-12 and, married and unmarried in 2021-2022 show negative association with FLEP. In this regression, pseudo R2 is higher for 2011-2012 (12%) than 2021-2022 (9%) (Table-7).

Table-7
Model II-Determinants of FLFP in Urban Uttar Pradesh (Logistic Regression)

	FLFP in Self- employment		**FLFP in Regular Employment**		**FLEP in Casual employment**	
	2011-2012	**2021-2022**	**2011-2012**	**2021-2022**	**2011-2012**	**2021-2022**
	Regression 1		**Regression 2**		**Regression 3**	
Income Effect						
Low	-0.257	0.906	0.12	-1.021	(omitted)	0.686
Medium	(omitted)	1.028	(omitted)	-1.004	(omitted)	(omitted)
HIGH	(omitted)	(omitted)	(omitted)	(omitted)	(omitted)	(omitted)
Caste Effect						
SC/ST	1.146	-0.425	0.9	0.159	-2.24***	1.773**
OBC	2.862**	0.799***	-0.76	-0.857**	-3.28***	0.873
General	2.151**	(omitted)	-0.28	0.000	-2.45***	(omitted)
Education Effect						
Illiterate	0.346	0.123394	-0.89***	-0.519*	0.608**	1.540*
Primary	0.780**	0.418886	-0.66	-0.579	-0.68	0.897*
Graduate	-1.735***	-0.65738	2.03***	0.648*	-1.15	(omitted)
Post Graduate	-2.397***	-1.29337***	2.68***	1.250**	-1.48	(omitted)
Marriage Effect						
Unmarried	0.886**	0.543	-0.76	-0.503	-0.44	-0.857
Married	0.848***	1.165***	-1.08***	-1.489***	0.11	1.705*
Age Effect						
15-24	-0.242	(omitted)	-0.54	(omitted)	1.24	(omitted)
25-34	-0.11	0.480	-0.47	-0.882*	0.92	2.168**
35-44	-0.917***	-0.162	0.18	0.091	1.65	0.085
45-59	-0.502**	(omitted)	0.33	(omitted)	0.64	(omitted)
_cons	-1.458*	-1.745	-0.28	2.091*	-0.80*	-7.02***
No. of observation	747	501	747	501	721	456
LR chi2(16)	196.71	91.19	219.36	116.03	**54.18**	26.68
Probability > chi2	0	0	0	0	0	0.0016
Pseudo R2	**0.2048**	**0.1322**	**0.2576**	**0.171**	**0.1254**	**0.1743**

level of significance: *** (P<0.001), ** (p<0.01), *(p<0.05)
Source: Author's calculations

Further our urban model reveals that the high educational attainment level is the most significant predictor of FLFP in regular employment in 2011-2012 and 2021-2022, whereas illiteracy in 2011-2012 and 2021-2022 show significant effect on FLFP in CE (Table-7). The effect of illiteracy on FLFP in CE during 2021-2022 in our urban model reflects a significantly higher FLFP in casual employment among illiterate and less educated females in urban areas. This suggests that females with less education and illiteracy are more likely to work in the casual labor market than their counterparts with higher education. Age emerged to be negatively and significantly related to female labour force participation in regular employment during 2011-12 (Table-7). This implies that elderly females (35-44 and 45-59), have less opportunities of participating in the labour market in urban areas. Consequently, the coefficient of -0.882 confirms the fact that a younger woman has a 5 per cent less likelihood of effectively participating in the labour market than an elderly woman in 2021-2022 in regular employment in model II. The total explained variation of the model is greater in 2021-2022 (17%) than in 2011-2012 (12%).

According to the aforementioned analysis, higher education attainment makes female workers more productive and hence more likely to be employed in both rural and urban locations. A powerful and significant association of higher education of women with FLFP emerges in the urban model, which suggests, that, the higher the level of education especially up to graduate and post-graduate level, the lesser the woman's chances of participating in casual jobs whereas a preponderance of the illiterate or less educated females is evident to be working as casual workers. Chatterji Esha et. al., (2018) have also confirmed that less educated women are more likely to work on family farms or as wage laborers, whereas college graduates are more likely to be absorbed in secure and prominent salaried positions. Secondly, both married and unmarried women are more secure in self-employment in Model-I and Model-II. As far as female's participation in regular employment is concerned, variables related to marital status of females (married and unmarried females) show negative effect. These results signify that married as well as unmarried women in the urban and rural areas have a lesser chance to participate in regular employment. Thirdly, in both the models, income effect does not turn out to be particularly important in terms of explanatory power of the model despite its practical significance.

Summary and Conclusion

The realities discussed in this research pertain to low and deteriorating FLFP rates, which should alarm policymakers. As correctly argued by Desai, (2020), it is high time to shift our focus towards quantifying women's work instead of solely focusing on women workers. With economic reforms trickling into states and growing economic growth, it is critical to guarantee that the labour force becomes fully inclusive of underrepresented groups, such as women. This will

necessitate significant policy and programmatic initiatives, both locally and nationally; failing to do so will only exacerbate the uncertainties surrounding women's economic involvement in the country's economy (World Bank, 2017).

The major findings indicate that the reduction was mostly caused by characteristics such as education attainment, income level, and household structure. The study reveals a U-shaped link between education attainment and female labour force participation, as well as an inverted U-shaped relationship across age groups. To capture the intricacies of these combined effects, the logit regression model is used to analyse the effect of chosen variables on three categories of FLFPR separately in rural and urban locations. According to the findings, a variety of factors influence women's decisions to join or leave the workforce. Family economic stability, as evidenced by the increased proportion of regular wage earners in total family labour supply and the decline in casual labor, has caused female family members to drop out of the labor force rather than join.

The findings of this paper reinforce the idea that the conventional wisdom that increases female labor force participation by education and skills is not enough and focus of policy model should be on making it "normal" for women to work and improving the attractiveness of economic sectors to women.

The employment situation of the State at present is a formidable challenge for the economy and policy formulators. The initiatives undertaken by the government to enhance skill development is not showing the desired results and females are largely found in informal employment. Skilled women do not get employment and hence, compromise and resolve to work as casual labour. A recent decline in this category raises concern about the absorption capacity of the labour market for females.

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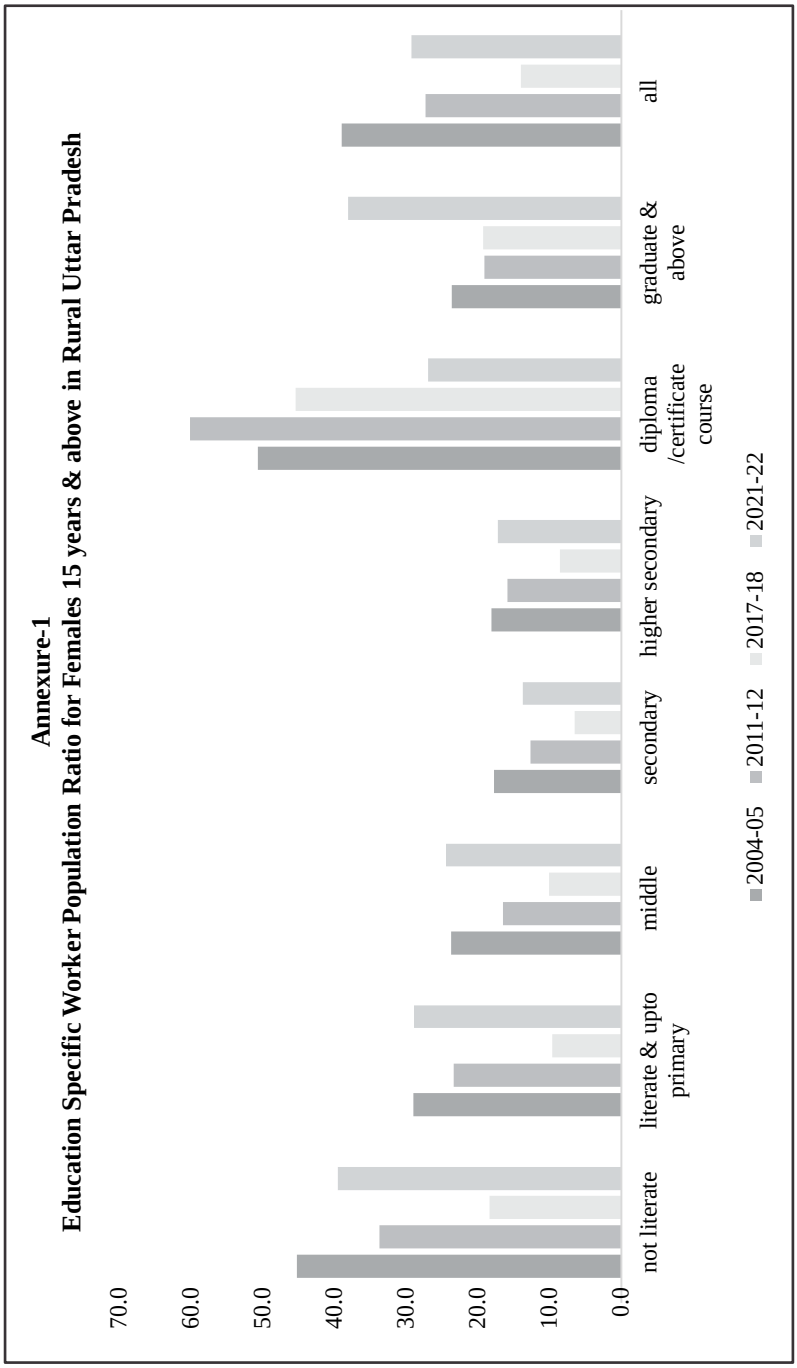
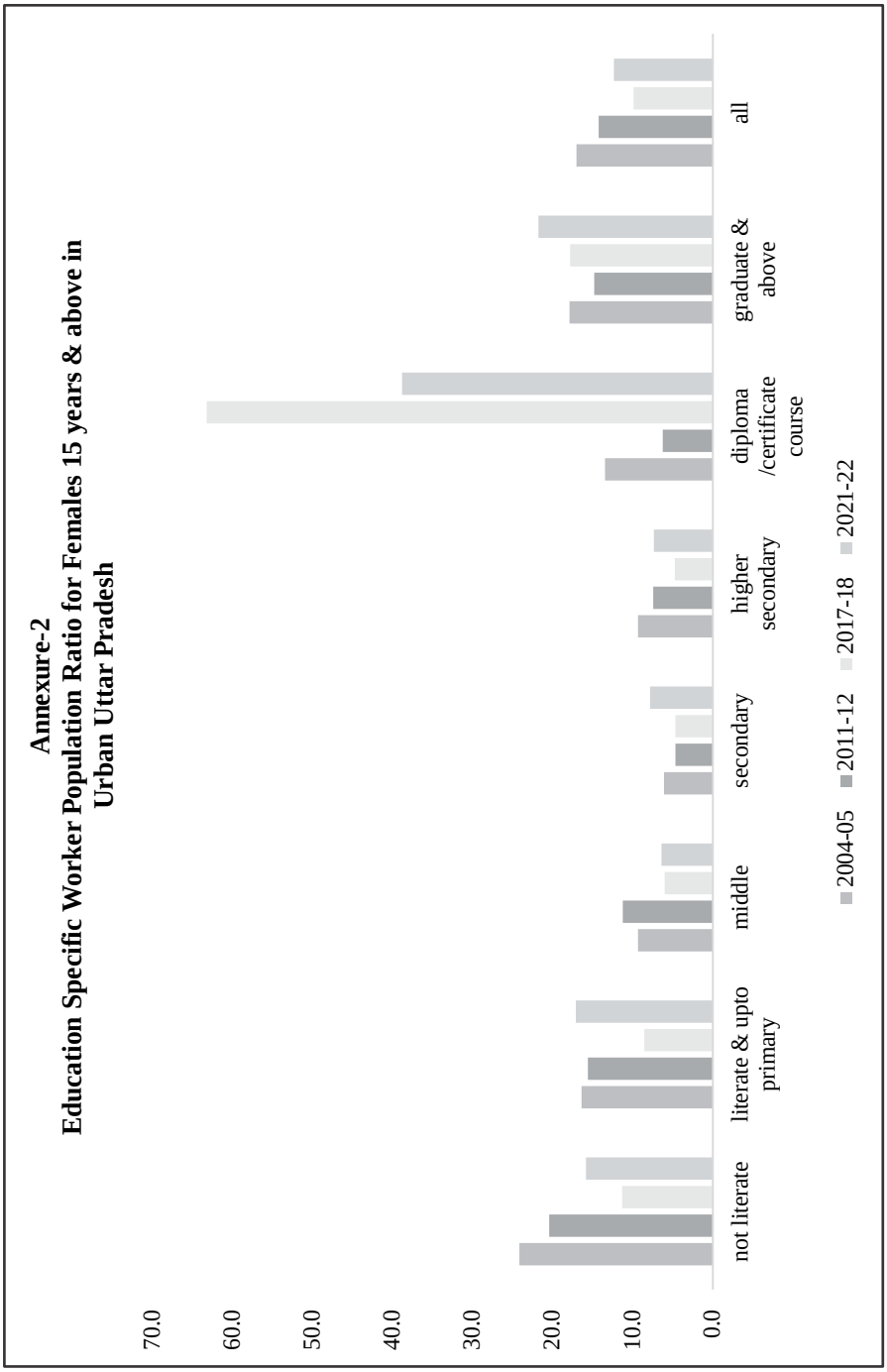


Source: Different NSSO Rounds and PLFS data

Annexure-2

Education Specific Worker Population Ratio for Females 15 years & above in Urban Uttar Pradesh



Source: Different NSSO Rounds and PLFS data

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