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Exploring fertility differentials between tea and ex-tea garden laborers of Assam

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ABSTRACT

Addressing the issue of high fertility rates among tea garden laborers in Assam is critical due to its adverse effects on the health of both mothers and children, diminished investment in human capital, stunted economic growth, and exacerbated environmental challenges. To effectively tackle this challenge, we need to delve into two key questions: What perpetuates high fertility rates, and how can we mitigate them? The solution lies in a comprehensive analysis of the immediate and underlying factors influencing fertility. Fertility is a multifaceted demographic phenomenon influenced by both direct and indirect determinants. In this study, we investigate the impact of various proximate and distant factors on fertility among two groups: The tea garden labor community in Assam and the ex-tea garden labor community, comprising individuals who have transitioned to other forms of employment. Our research identifies significant factors such as wife's age at marriage, breastfeeding duration, educational attainment, family size, duration of married life, child mortality, respondent category, and wife's occupational status that affect fertility levels in Assam's tea garden community. The study's findings indicate the need for implementing targeted family planning and reproductive health education programs within tea garden communities. These programs should offer comprehensive information and resources to assist individuals in making informed decisions regarding family size and reproductive health.

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1. INTRODUCTION

Assam Tea or Assamica, a native classic black tea matured in the northeast region of India, as a brew has carved a niche for itself not only in the national market but also in the international market and has become the elixir that most Indians thrive on since several ages. The fame and stature of the brew can be gauged by the fact that more than 50% of the country's total production is from Assam [1], [2]. One of the world's largest curl, tear, and crush (CTC) Tea Auction Centre is in Assam, exporting to Europe, Middle East and also Egypt, Japan and Israel to name a few. As of today, Assam tea has retained its international standards and commands a significant share in the world market [3]. In production, the Assam Tea industry is only second to China in the world. In fact, China and Assam are the only two regions in the world with native tea plants [4]. However, the tea garden labor community who makes Assam tea happen is amongst the most backward and exploited tribe in India [5]. Worryingly, even after so many years of economic planning in India, multiple childbirths and wife beating, child labor, early marriage, early and quick child bearing, high child and maternal mortality are a common phenomenon and are very pertinent in this community [6]–[9].

Owing to such distress and hardships, the tea garden labor community have started to out-migrate to other avenues of work in a quest for a better life for oneself and family [10] thus creating another community called as the ex-tea garden labor community. Scores of research endeavors have been undertaken to explore the socio-economic and demographic status of tea garden laborers in Assam. However, a notable gap exists in scholarly discussions regarding the impact of occupational transitions or job changes on the socio-economic and demographic makeup of these laborers. The primary objective of this study is to investigate potential shifts in fertility patterns within the tea garden and ex-tea garden labor communities. By examining both immediate and distant determinants influencing fertility levels, the research aims to uncover the key factors contributing to the notably high fertility rates in this community. Elevated fertility rates can adversely affect maternal health, socio-economic circumstances, and strain governmental resources allocated for community welfare initiatives [11], [12]. Therefore, the correlation between fertility and its immediate as well as distant determinants has been a subject of ongoing and extensive investigation among demographers, economists, sociologists, and researchers worldwide. Though a large and growing demographic, economic and social literature has aimed at understanding the determinants of fertility, the set of factors (social, economic and demographic) identified as the key drivers of fertility are in striking contrast with the empirical evidence which suggests that the key drivers are highly context specific, with diverging patterns across countries and time [13]–[15]. The study of the causes of fertility levels and their determinants has a broad appeal to policymakers, as they do pinpoint mechanisms susceptible to manipulation by official policy.

Fertility is a multidimensional demographic phenomenon which is affected by both the proximate or intermediate (direct) determinants and the distant or background (indirect) determinants. The intermediate fertility variables are the biological and behavioral factors which affect fertility directly. While the various social, cultural, economic, demographic and environmental factors which affect fertility are called as the distant or the indirect determinants of fertility. When it comes to the relationships between the intermediate variables and fertility, the pioneering works of Kingsley Davis and Judith Blake in the mid-1950s are worth mentioning. In the year 1956, Davis and Blake developed a framework considering three stages of human reproduction i: e intercourse, conception and gestation in order to describe the proximate (direct) determinants of fertility [16]. However, even though Davis and Blake made the pioneering attempts to study the relationship between the direct determinants and fertility, it did not prove much fruitful to quantify the relationship between the two variables to produce a simple reproductive model [17], [18]. Therefore, to facilitate quantification, Bongaarts in the year 1978, using the ideas of Davis and Blake, used those intermediate fertility variables, and they are wife's age at marriage, contraceptive use and breastfeeding. On the other hand, the distant determinants are the contextual determinants of fertility, which have an indirect influence on fertility. The background variables are the social, cultural, economic, institutional, psychological, health and environmental factors that can affect fertility only indirectly by modifying the biological and behavioral factors i: e the proximate determinants of fertility.

The high fertility rates among tea garden laborers in Assam raise significant concerns [19]. To effectively tackle this issue, it is imperative to comprehensively examine the multitude of direct and indirect factors that impact fertility patterns. Our research sheds light on significant factors influencing fertility levels within Assam's tea garden community, including the wife's age at marriage [20], duration of breastfeeding [21], educational attainment [22], family size [23], duration of married life [24], child mortality [25], respondent category, and the wife's occupational status [26]. These findings are expected to guide targeted interventions by governmental bodies and tea garden owners, aiming to reduce both childbirth and mortality rates. Such interventions aim to initiate a positive cycle that enhances the quality of life for tea garden laborers, encompassing improved literacy rates, reduced school dropouts, a healthier domestic environment, enhanced hygiene and sanitation practices, ultimately leading to an overall better standard of living. Furthermore, our study indicates that tea garden laborers exhibit higher fertility rates compared to those who have transitioned out of tea garden employment for better opportunities elsewhere. Hence, targeted education and awareness campaigns within this community are essential to optimize fertility levels. Given the surplus of unskilled labor in the tea industry, our study suggests policy implications focused on facilitating the transition of this labor force to other sectors. This could be achieved through targeted skill development programs, incentivized transition schemes, improved infrastructure in their new areas of work, public-private partnerships, awareness campaigns, and policy support for sector diversification. These initiatives aim not only to alleviate pressure on the tea industry but also to promote inclusive growth by empowering these laborers and offering them opportunities for socioeconomic advancement in alternative sectors.

2. METHOD

2.1. The participants and recruitment procedure

To investigate the impact of the direct and distant determinates of fertility levels of both the tea garden labor community and the ex-tea garden labor community and to check if there was any difference in fertility pattern after job change, a total of 584 tea garden laborers and 343 ex-tea garden laborers who were

willing to participate in the study were considered. This study focused on Assam, India, using empirical data collected from primary sources. Assam is divided into five administrative divisions: North, Lower, Central, Upper, and Barak Valley. To ensure diversity, we selected one district with the most tea gardens from each division. As a result, primary data was gathered from five key tea plantation districts in the state: Dibrugarh, Sonitpur, Nagaon, Baksa, and Silchar. Employing a multi-stage random sampling method, two development blocks were chosen from each district. Subsequently, two tea estates or gardens were sampled from each selected development block. From each tea estate, a total of at least 20% of the total households were considered for the study. We collected primary data from both tea garden and ex-tea garden labor households. Tea garden labor households relied on tea garden employment, while ex-tea garden labor households did not, even though their ancestors did. These households were categorized based on current employment status. Primary data were collected through an appropriately designed sample survey using a well-designed interview schedule containing both close-ended and open-ended questions. A few focus group discussions were also held to get more information, which was otherwise difficult to get from individual household schedules.

Since the research focuses specifically on the tea and ex-tea garden labor communities in Assam, India, the conclusions drawn from this study might not be universally applicable to other regions or communities with different socioeconomic backgrounds or occupational structures. The dynamics influencing occupational mobility and its impact on demographic status could vary significantly based on cultural, geographical, or economic differences in other parts of India or in different countries altogether. Another limitation of this study is the relatively small sample size. While efforts were made to recruit participants representative of the target population, the sample size may limit the generalizability of the findings to broader populations. However, with regard to checking if the sample size provides sufficient statistical power to detect meaningful effects or relationships in the data, bootstrapping which is a resampling technique used in statistics to estimate the sampling distribution of a statistic by repeatedly sampling from the observed data with replacement was carried out. The bootstrap estimates of the coefficients which include estimates of the bias, standard error and significance level were calculated using SPSS software and the results were found satisfactory. Table 1 summarizes district wise number of sample data of the study.

Since there are limited secondary data on ex-tea garden households, we gathered primary information on their socioeconomic aspects, using the snowball sampling technique or the referral method. We interviewed 584 tea garden and 343 ex-tea garden households during field visits. We used a well-structured interview schedule with close-ended and open-ended questions and conducted some focus group discussions for additional insights.

2.2. Data analysis

To identify the different direct and indirect determinants of fertility and to examine their influence on the fertility level (which is measured by the number of live births), multiple regression analysis is used. Based on the conceptual framework, the number of live births will be considered as the dependent variable while the variables on which live births (LB) depends will be considered as the independent or the explanatory variables. Data analysis has been done using the STATA and SPSS software.

Table 1. District-wise numbers of sample data of the study

No.	District name	Total number of samples of tea garden laborers	Total number of samples of ex-tea garden laborers
1	Nagaon	140	61
2	Sonitpur	130	62
3	Dibrughar	130	58
4	Baksa	90	78
5	Cachar	94	84
	Total	584	343

3. RESULTS AND DISCUSSION

The regression analysis was conducted on a dataset comprising 927 observations to explore the comparative influence and relationship between various independent variables and the dependent variable. The dependent variable in focus is LB, which is influenced by twelve independent variables. To delve into the impact of these 12 variables on LB, a multivariate regression function has been postulated.

$$LB_i=\beta o+\beta_1 R+\beta_2 AM+\beta_3 BF+\beta_4 CU+\beta_5 E+\beta_6 SES+\beta_7 CL+\beta_8 NFM+\beta_9 WO+\beta_{10} TF+\beta_{11} YM+\beta_{12} CR+U_i$$

where, βo, β_1, β_2, β_3, β_4, β_5, β_6, β_7, β_8, β_9, β_{10}, β_{11}, and β_{12} are the coefficient(s) to be estimated and U_i is the random error term. Table 2 presents the independent variables, which have an impact on live birth, along with their respective codes and units of measurement used in the analysis.

Data on the 12 independent factors impacting fertility, either directly (known as proximate determinants) or indirectly (referred to as distant determinants), were collected from a total of 927 respondents encompassing both the tea garden community and the ex-tea garden community from the five administrative divisions of Assam. This information was collected through an interview schedule comprising structured and unstructured questions. To gauge the socio-economic status of these communities, a socio-economic status (SES) index was employed. The SES index was created using principal component analysis (PCA) in order to gain insights into the living conditions of both the tea garden and ex-tea garden labor communities. The construction of the SES index followed the methodology outlined by Rutstein and Johnson [27] and Vyas and Kumaranayake [28]. Initially, a comprehensive set of 35 socioeconomic indicators or variables was considered, aiming to reduce sampling bias and achieve a more balanced representation of households. Additionally, several focus group discussions were also conducted to gather insights that were challenging to obtain solely through individual household surveys.

However, prior to applying PCA, a thorough assessment of the identified variables was essential. This involved data cleaning, with a focus on selecting only those variables that effectively distinguished between households classified as ‘relatively wealthy’ and 'relatively less wealthy’. A general guideline used in the study was to exclude indicators or variables possessed by either more than 80% or less than 20% of the sampled households. Furthermore, the standardized scores of the socio-economic variables used in creating the SES index were computed. Any responses with z scores outside the range of +3.3 and -3.3 were identified as statistical outliers and subsequently excluded from the analysis. Consequently, certain indicators such as chairs, landline phones, wristwatches, computers, refrigerators, and cars were excluded from the analysis. Ultimately, a total of 24 indicators (out of the original 35) were utilized in constructing the SES index. The descriptive statistics of the selected indicators and the variables are presented in Table 3.

Table 2. Independent variables and their unit of measurement

No	Independent variables affecting live birth	Code	Unit of measurement
1	Religion	R	1 if Hindu and 0 if otherwise
2	Wife’s age at marriage	AM	In years
3	Breastfeeding	BF	In months
4	Contraceptive use	CU	1 if ever used and 0 otherwise
5	Educational attainment level of the wife	E	1 if wife is having education of primary school and beyond and 0 otherwise
6	Socio-economic status of the household	SES	Measured through SES index
7	Child loss experience	CL	1 If any incidence of miscarriage, still birth or child death and 0 otherwise
8	Number of family members	NFM	In numbers
9	Wife’s occupation	WO	1 if employed and 0 otherwise
10	Type of family	TF	1 for nuclear and 0 otherwise
11	Years of marriage	YM	In years
12	Category of the respondent	CR	1 for Tea Garden labor and 0 otherwise

Table 3. Descriptive statistics of the indicators used for construction of socio-economic index

No.	Socioeconomic indicators	Mean	Std. deviation
1	Separate bedroom for couple (1 for Yes and 0 for No)	.679	.466
2	Separate bedroom for children (1 for Yes and 0 for No)	.594	.491
3	Type of latrine (1 for Pucca and 0 for Otherwise)	.271	.444
4	Type of bathroom (1 for Pucca and 0 for Otherwise)	.217	.412
5	Private source of water (1 for Yes and 0 for No)	.667	.471
6	Water treatment (1 for Yes and 0 for No)	.455	.498
7	Type of house (1 for Pucca and 0 for Otherwise)	.276	.447
8	Ownership of house (1 for Own and 0 for Otherwise)	.253	.435
9	Type of floor (1 for Concrete and 0 for Otherwise)	.359	.480
10	Boundary demarcation if present (1 for Yes and 0 for No)	.737	.440
11	Possession of goats (1 for Yes and 0 for No)	.239	.426
12	Possession of pigs (1 for Yes and 0 for No)	.215	.411
13	Possession of sofa (1 for Yes and 0 for No)	.206	.472
14	Possession of dining table (1 for Yes and 0 for No)	.213	.449
15	Possession of study table (1 for Yes and 0 for No)	.207	.440
16	Possession of mobile (1 for Yes and 0 for No)	.770	.421
17	Possession of color TV (1 for Yes and 0 for No)	.320	.466
18	Possession of D2H (1 for Yes and 0 for No)	.200	.400
19	Possession of bicycle (1 for Yes and 0 for No)	.606	.488
20	Possession of motorcycle (1 for Yes and 0 for No)	.211	.410
21	Possession of wall clock (1 for Yes and 0 for No)	.406	.518
22	Possession of steel Amirah (1 for Yes and 0 for No)	.226	.436
23	Pressure cooker use (1 for Yes and 0 for No)	.436	.496
24	Energy source of cooking (1 for LPG and 0 for Otherwise)	.214	.410

PCA, a technique for data reduction, produces weights or factor scores for each socioeconomic variable or indicator collected from the survey respondents. This process effectively reduces the dimensionality of the dataset by replacing numerous interrelated variables with a set of primary uncorrelated "principal components". In doing so, it unveils new meaningful underlying variables and unobservable characteristics within the population, which can explain a significant portion of the variation [29]. Therefore, PCA is a multivariate technique which derives weights or factor scores for socioeconomic variables collected from participants, condensing the dataset by replacing correlated variables with uncorrelated principal components. PCA identifies directions, or principal components, where data variation is maximized. These components are linear combinations of original features, with the first explaining the most variance, followed by successive components. Subsequently, the factor analysis procedure standardizes these scores to align with a standard normal distribution, characterized by a mean of zero and a standard deviation of one. This standardization generates the SES index score for both the tea garden and ex-tea garden communities. The descriptive statistics of the 12 independent variables are presented in Table 4.

The estimates of the regression analysis are presented in Table 5. The interpretation of the key components of the output indicates that the model as a whole is statistically significant; the value of 'F-statistic' being 438.14. Since the observed F value far exceeds the critical F value even at the 1% level of significance, it clearly indicates the rejection of the null hypothesis that together these variables have no effect on live birth. Again, the R^2 value being 0.7877 suggests that approximately 78.77% of the variation in the dependent variable is explained by the independent variables incorporated in the model. To put it differently, the model fits the data relatively well, since the independent variables explain more than three fourths of the variation in the dependent variable. The variance inflating factor (VIF) in respect of all the variables is much below five, which indicates the absence of multicollinearity among the regressors included in the regression model. Similarly, the closer to 1 tolerance (TOL) values (in almost seven cases) also provides evidence of no collinearity among the regressors of the model. Robust standard error is used to avoid heteroscedasticity problem.

By examining the coefficient estimates and their corresponding p-values from the regression results, it was found that wife's age at marriage, duration of breastfeeding, educational status of the wife, total members in the family, years of married life lived, child death incidence, category of the respondent and occupational status of the wife are statistically significant variables impacting live birth. Coefficient estimate of the variable "wife's age at marriage" suggests that a one-unit increase in the wife's age at marriage is associated with a decrease of approximately 0.063 in the dependent variable, holding other variables constant. This is because women who marry late tend to have a shorter period of exposure to the potential of pregnancy than to women who marry early, on average. This is in align with studies which have found that marrying at a young age often leads to an early onset of childbearing and higher fertility rates [30], [31]. It's important to recognize that the age at which individuals marry can be influenced by various factors such as religious beliefs, geographic location, urban or rural residence, and the educational level of their spouses. Additionally, economic status plays a role, as women from financially disadvantaged households are notably more prone to marry at a younger age compared to those from wealthier backgrounds [32]. On examining the relative importance of the independent variables, studies have revealed how duration of breastfeeding to a newborn has been impactful in examining fertility patterns [33], [34]. In this study, it has been found that the partial regression coefficient (β_3) of the duration of breastfeeding in months (BF) is -0.161 indicating that a one-unit increase in "BF" is associated with a decrease of approximately 0.161 units in the dependent variable (LB), holding other variables constant. The coefficient is statistically significant (p-value=0.000). Along with delaying subsequent births, studies have also revealed that the longer a woman breastfeeds her infant, the greater the benefits for both her own and her child's health. Breastfed infants have a decreased risk of infections, including gastrointestinal diseases, sepsis, wheezing respiratory tract infections, necrotizing enterocolitis, meningitis, and urinary tract infections [35].

Table 4. Descriptive statistics of the independent variables affecting fertility

No.	Independent variables affecting fertility	Tea garden labor community				Ex-tea garden labor community			
		Mean	St. dev	Min.	Max.	Mean	St. dev	Min.	Max.
1	Religion (R)	0.917	0.27	0	1	0.79	0.40	0	1
2	Wife's age at marriage (AM)	18.37	3.63	15	35	19.21	4.98	16	33
3	Breastfeeding (BF)	9.313	7.61	0	36	10.87	9.15	1	38
4	Contraceptive use (CU)	0.166	0.37	0	1	0.20	0.40	0	1
5	Educational attainment level of the wife (E)	0.330	0.47	0	1	0.34	0.46	0	1
6	Socio-economic status of the household (SES)	0.131	1.12	0.01	1.12	-0.02	0.73	-1.63	2.13
7	Child loss experience (CL)	0.203	0.40	0	2	0.17	0.37	0	1
8	Number of family members (NFM)	4.52	1.48	3	9	5.35	1.47	3	10
9	Wife's occupation (WO)	0.69	0.46	0	1	0.69	0.45	0	1
10	Type of family (TF)	0.38	0.48	0	1	0.74	0.43	0	1
11	Years of marriage (YM)	22.0	8.90	1	45	21.52	7.82	1	30
12	Category of respondent (CR)	0.99	0.00	0	1	0.00	0.00	0	1

Table 5. Estimates of regression analysis of live birth

No.	Factors/variables	Coeff.	Robust standard error	Z	P≥|z|	VIF	TOL
1.	Wife's age at marriage	-0.063	0.0102	-2.75	0.006	1.73	0.579
2.	Breastfeeding	-0.161	0.0068	-5.37	0.000	2.55	0.392
3.	Contraception use	-0.039	0.1171	-1.63	0.104	1.74	0.575
4.	Religion	-0.002	0.0849	-0.15	0.881	1.08	0.921
5.	Educational attainment of wife	-0.088	0.1302	-2.73	0.007	2.98	0.335
6.	Child death incidence	0.014	0.0690	0.31	0.006	1.36	0.737
7.	Family type	-0.002	0.0643	0.12	0.906	1.37	0.732
8.	Total members in the family	0.562	0.0372	13.27	0.000	3.63	0.275
9.	Years of marriage	0.072	0.0047	3.34	0.001	1.49	0.673
10.	Wife's occupation	-0.064	0.0659	-4.01	0.000	1.54	0.651
11.	Category of respondent	0.018	0.0591	0.09	0.008	1.10	0.910
12.	SES	0.001	0.0276	0.07	0.942	1.04	0.961
13.	Constant	1.002	0.3647	5.49	0.00		

Studies have revealed that educational attainment level has a far-reaching effect in determining fertility levels in any community [36]–[40]. The variable educational attainment level of the wife (E) has a coefficient estimate of -0.088 suggesting that a one-unit increase in educational level is associated with a decrease of approximately 0.088 units in the depending on variable, other variables held constant. The coefficient is also statistically significant. A study conducted in China investigating the impact of compulsory schooling reforms on fertility found that each additional year of female education reduces births by 0.24, mainly by decreasing the average number of children per woman without increasing childlessness. Multiple channels, including socio-economic factors, were explored as potential mechanisms linking women's education to fertility outcomes [41].

Estimates of coefficient hint that the increase in the total members of family members is also associated with an increase of live births in the family. Our findings point to the substantial role played by family networks in women's fertility behavior in the tea garden community of Assam. Apparently, various social mechanisms such as social support, social pressure, social influence and social learning exert influence on women's fertility decision-making processes [42]. With more years spent in a married life, results have revealed that a one-unit increase in the 'duration of married life spent by a couple' is associated with an increase of 0.072 units in the dependent variable, ruling out the effect of other variables. The coefficient is found statistically significant (p-value=0.001). Therefore, with each year of marriage, the dependent variable increases, indicating that the duration of married life is positively associated with fertility levels [43]–[47].

Scores of literatures enumerates that the occupational status of females also contributes a lot towards explaining fertility levels and trends [48]. Controlling the effects of all other factors, the coefficient estimates of the variable, 'Wife's occupational status' suggests that a one-unit increase in WO is associated with a decrease of approximately 0.064 units in the dependent variable (LB). This indicates that the fertility of working women is lower than the non-working wives. Therefore, it can be concluded that occupation has a negative effect on the dependent variable since for each unit increase in wife's occupation, the dependent variable decreases by 0.064 units. This conclusion is reinforced by numerous studies indicating that the increased educational attainment among women in contemporary society has led to greater participation in the workforce. Consequently, this shift has altered their priorities, with fewer women prioritizing childbearing over other goals. Additionally, higher education has empowered women with greater autonomy across various aspects of life [49].

Child mortality is also an important factor when it comes to studying fertility levels in any community [50]. Any incidence of child loss (either a still birth experience or infant death experience) has had a positive impact on LB. Estimates of regression coefficient of child death incidence being 0.014 hints that one-unit increase of any such incident has led to an increase of 0.014 units in the LB, holding the effect of other variables constant. This aligns with numerous studies that have shown a correlation between high fertility rates in countries and relatively lower rates of child survival [51]. Even though, an unintended spontaneous termination of a pregnancy can be a traumatic experience affecting the subsequent life course, it has received little attention in socio-demographic studies on fertility intentions or behavior [52]. Again, the estimate of coefficient of the category of respondent hints that tea garden laborer has more LB in comparison to ex-tea garden labor. This suggests that mobility and migration is also important while studying fertility patterns [53], [54]. This also hints that fertility decisions and patterns have also changed with the outmigration of laborers to other avenues of work, thus implying demographic changes due to occupational mobility.

Apart from this, the impact of variables like contraception use, religious affiliation, SES and type of family, was found statistically not significant. Even though contraception use is an important determinant of fertility level [55]–[57], the effect of this variable in the present study was found not significant. Thus, these results illuminate the intricate interplay of socio-demographic factors that shape fertility patterns in any community [54], [58], [59].

4. CONCLUSION

High fertility poses a pressing concern among tea garden laborers in Assam. To address this issue effectively, it is crucial to thoroughly investigate the various direct and indirect factors influencing fertility patterns. High fertility rates can have detrimental effects on maternal health, socio-economic conditions, and strain government investments aimed at community welfare. Our research highlights significant factors such as wife's age at marriage, breastfeeding duration, educational attainment, family size, duration of married life, child mortality, respondent category, and wife's occupational status impacting fertility levels in Assam's tea garden community. Lowering fertility levels in this community is essential to enable them to benefit from government schemes and alleviate social challenges associated with high fertility rates. Our findings suggest raising the age at marriage for women to curb fertility, as studies have found that early age at marriage, often results in early age at child bearing and high fertility since women who marry early will have, on average, longer exposure to the risk of pregnancy. Extending breastfeeding duration can also reduce fertility rates, as shorter durations correlate with higher fertility among women. Moreover, the habit of breastfeeding ensures better child-mother survival, which in turn is consequential to low fertility. This is to align with many studies which have revealed that high fertility countries are characterized by relatively poor child survival. Encouraging women's education and workforce participation is crucial, as studies indicate educated, employed women tend to have fewer children. This finding is supported by the findings of scores of studies which have found that higher educational achievement of women in today's world has contributed to higher female labor force participation, which in turn has changed their desires for children as compared to other goals, and provided them with greater autonomy in many spheres of life. Increasing the age at marriage naturally reduces the years of active married life lived, thus lowering fertility levels. The study found that tea garden laborers have higher fertility rates than the ones who have left the tea garden jobs and have settled outside the confines of the tea gardens for a better life for oneself and family, therefore, targeted education and awareness campaigns within this community are imperative to optimize fertility levels. With the tea industry facing an excess of unskilled labor, the study suggests policy implications focused on facilitating this labor force's transition to other sectors through targeted skill development programs, incentivized transition schemes, improved infrastructure in their new areas of work, public-private partnerships, awareness campaigns, and policy support for sector diversification. These initiatives aim not only to ease the strain on the tea industry, but also to foster inclusive growth by empowering these laborers and providing them with opportunities for socioeconomic advancement in alternative sectors.

Therefore, addressing the high fertility rates among tea garden laborers in Assam require a comprehensive policy strategy. Initiatives should focus on raising the legal age of marriage for women, promoting extended breastfeeding practices, empowering women through education and employment, and conducting targeted education and awareness campaigns within the community. Additionally, implementing skill development and sector transition programs, along with incentivized schemes, can facilitate the labor force's movement to alternative sectors, easing the strain on the tea industry and fostering inclusive growth. Improved infrastructure, public-private partnerships, and policy support for sector diversification are crucial components to ensure successful implementation and socioeconomic advancement for tea garden laborers settling outside the confines of the tea gardens.

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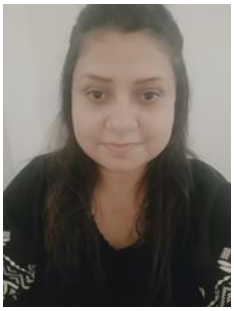

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