

# Determinants of Fertility: A Study on the Tea Garden Labour Community of Assam

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## ABSTRACT

This study examines the levels and determinants of fertility among the tea garden labour community of Assam. The determinants of fertility are highly specific to the context of the populations that live under diverse socio-economic backdrop. Living in the vicinity of tea estates, the tea garden labour community has developed unique socio-cultural and economic characteristics. Applying multiple regression on the data collected from 1304 tea garden labour community households, selected randomly from 23 sample tea estates, the study finds that female age at marriage, ever use of contraceptives and duration of breast feeding are the significant proximate determinants of fertility. Likewise, education of wives, per capita family income, place of work of the husband, infant and child mortality experience and desired family size are the significant background determinants of fertility. Thus, the socio-demographic and economic characteristics of the tea garden labour community have impact on their fertility level. While education of the wives has significant negative impact on fertility, husbands' education is not found significant. The place of work of the husbands is a significant determinant but that of the wives is not a significant predictor of their fertility. Infant and child mortality affects fertility, but it has not promoted fertility by shortening the period of post-partum amenorrhea. Reproductive health awareness and popularization of family planning services can be effective strategies to regulate fertility. Female education should receive priority in the development programmes.

## Keywords

Live birth, Proximate Determinants, Background Determinants

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## Introduction

Identification of factors influencing fertility has been a subject of continued study in theoretical and applied demography. The findings of the studies on the determinants of fertility have shown the impact of a set of variables on fertility. The most commonly reported factors that directly affect fertility are female age at marriage (Yadav & Badari, 1997; Mahapatro, 2003; Maitra, 2004), use of contraceptive (Visaria, 1999; Arokiasamy, 2009) and breast feeding (Chaudhry, 1990). In addition to these, the linkage of fertility with different socio-economic factors has also received considerable attention. Some studies report strong effect of education on fertility (Kaur, 2000; Dreze & Murthi, 2001; Mubarak & Mahanta, 2014). Type of family is said to have an impact on the family size (Gaisie, 2000). Literature has also documented a significant negative relationship between economic growth and fertility (Eastwood & Lipton, 1999; Bhattacharya, 2006). Increase in nonwage income of both man and woman lowers the number of children in the household (Klawon & Tiefenthaler, 2001). Occupational status of the husband is found as a significant predictor of fertility (Zhang, 1990). Many studies have found

infant and child mortality experience as a significant determinant of fertility (Dreze & Murthi, 2001; Akin, 2005; Mohanty et. al., 2016). However, evidences on the empirical relationship between the key determinants of fertility and the level of fertility are contrasting, because the determinants are highly specific to the context of the populations that live under diverse socio-economic backdrop. For example, while female education is found to have significant negative impact on fertility, positive or no impact of male education has been documented (Dreze & Murthi, 2001; Akin, 2005; Jain & Ross, 2012). Likewise, some studies (Dreze, & Murthi, 2001; Bbaale & Mpuga, 2011) have shown that women with higher level of education tend to have less number of children while some others (Parikh & Gupta, 2001) report no significant relation between women education and fertility. In contrast to the reporting of negative impact of economic growth on fertility by some studies, some others have reported no or limited association between fertility and poverty (Jain & Ross, 2012; Mohanty et. al., 2016). Contrasting relationship between income and fertility have been reported by few earlier studies concerned, some studies have confirmed

the inverse relationship between them (Chaudhuri, 1977; Kaur, 2000; Black et.al., 2013).

Low quality of Reproductive Health delivery programs in terms of infrastructure and facilities particularly in rural and far flung areas and the lack of adequate Reproductive Health information and sexuality education, poor systems, and procedures are some of the challenges of global reproductive health (Blanco, 2016). Although many studies have been made to explore the determinants of fertility in India (Visaria, 1999; Kaur, 2000; Dreze & Murthi, 2001; Mohanty et. al., 2016) and abroad (Mason & Palan, 1981; Warren et.al. 1992; Chi & Hsin, 1996; Bbaale & Mpuga, 2011), studies on the fertility pattern and its determinants among the tea garden labour community is absolutely scanty.

Living in the vicinity of tea gardens, the tea garden labour community has developed unique socio-cultural and economic characteristics. High child birth, wife beating (Hazarika, 2012), early marriage, early and quick child bearing (Goswami, 2005), superstitious beliefs, alcoholism (Devi, 2014) etc. are some of the problems prevailing among this community. The demographic, socio-cultural, economic, environmental factors associated with their life may influence their fertility behaviour. It is said that overall socioeconomic development is inversely related to fertility rates (Amonker & Brinker, 2007). A comprehensive study on the correlates of fertility shall help in suggesting ways for fertility regulation.

The present study, therefore, examines the levels and determinants of fertility among the tea garden labour community of Assam. While dealing with the objective the paper attempts to address the research question as to whether or not socio-demographic and economic characteristics of the tea garden community affect their fertility level.

### Theoretical Framework

The level of fertility within a couple or in a population is determined by a number of proximate variables and socio-economic or background variables. The proximate determinants include all biological and behavioral factors through which the background variables operate to affect fertility while the background variables include social, cultural, economic, institutional, psychological, health, and environmental variables. The principal

characteristic of the proximate determinants is their direct influence on fertility. In contrast, socioeconomic variables can affect fertility only indirectly by modifying the proximate determinants (Bongaarts, Frank & Lesthaeghe, 1984). They must work through the proximate determinants that affect reproduction directly (Menken, 1987).

### Proximate Determinants

Bongaarts (1978) talked about four factors, such as marriage, contraception, lactation and induced abortion, variations in which are the primary proximate causes of fertility variations among populations. Fertility differences among populations and trends in fertility level in a population over time can always be attributed to variations in one or more of the proximate determinants (Bongaarts, 2015). As information on the induced abortion is not available, this study considers age at marriage, contraceptive use and duration of breast feeding as the proximate determinants of fertility.

Age at marriage of the females has a significant influence on fertility, particularly in societies where childbearing is permitted within marriage. The effective reproductive span, during which a woman is fertile, begins with marriage (Menken, 1987). Early married women are exposed to fertility for a longer period as early marriage increases the duration of effective married life and hence, they are more likely to experience more child birth in their lifetime. Delayed marriage reduces the number of children born to a woman. It is expected that age at marriage would be inversely related to fertility.

Use of contraceptives is inversely related to fertility (Kaur, 2000). However, regional differences in the use of contraception persist in India and close to half of contraceptive users of Assam used traditional methods (Visaria, 1999). Past study (Mahanta & Goswami, 2014) has shown low practice of contraceptives among the tea garden labour community of Assam. Considering the low contraceptive prevalence, the level of fertility among them is expected to be high.

Breastfeeding, in addition to many maternal and child health benefits, is associated with delay in postpartum fertility return. With the increase in the duration of breastfeeding, the duration of amenorrhoea rises (Visaria, 1999). Where the use

of artificial contraceptives is low, breast feeding can be a natural method of birth spacing. The women who suckle are less likely to become pregnant.

### Background Determinants

The levels of education of husband and wife may influence their fertility behavior through several ways. High level of education can reduce fertility by encouraging more practice of contraceptives. Very strong positive association between current use of contraception and education has been reported (Warren et al. 1992). Fertility intentions are an important channel through which education affects fertility. Highly educated women revise their birth intentions downwards more frequently than less educated women (Testa, 2014). Schooling may alter the couple's preferences for children or their attitude towards desired family size. However, it is misleading to draw general conclusions about a factor as complex as education, because inverse relation is also found under differing social and economic conditions (Hazel Denton, 1979). It is hypothesized here that education of the couples will have negative impact on fertility.

It is expected that poor families have more fertility as in such families children may be treated as a potential source of income and security at old age of the parents. Leibenstein (1974) theorizes that as the per capita income grows the number of children for the representative family falls. It is also stated that fertility might rise with increasing income when income is low and decrease when income is high (Pörtner, 2001).

Occupation of both husband and wife can influence the level of fertility. It has been observed that women working in the non agriculture sector have fewer children than those in agriculture, while those who are not employed have the highest fertility. Likewise, the wives with husbands employed in the agriculture sector have higher fertility than the wives with husbands having non-agricultural occupation (Nguyen-Dinh, 1997). Tea garden works require intensive use of labour. Both males and females take part in different stages of tea production. With regard to wives occupation it can be hypothesized that participation of wives in garden related activities can restrict fertility as childbearing will require them going out of work without pay. On the

contrary, husbands' working in tea garden is likely to contribute to fertility. Because, they may treat an additional child not as an economic burden for long as works in the garden will be available for their children.

The child loss reduces the period of post-partum amenorrhea through abrupt termination of breast feeding (Mensch, 1985). Experience of child mortality may motivate parents to have high fertility values either to compensate for the child loss or to provide for an insurance against expected deaths (Kimani, 2001; Sandberg, 2006). Parents try to replace any child death as a strategy to maintain the desired number of surviving offspring at the end of the reproductive life. Parents may also bear children beyond the preferred size of family to insure that the desired number of children eventually survives (Palloni & Rafalimanana, 1999). It is, therefore, expected that the infant and child mortality experience will increase the level of fertility. Likewise, desired family size is also assumed to have positive influence on the actual reproductive performance. High fertility may be achieved if the burden of child rearing can be shared with the household members (Chi & Hsin, 1996). In households with more members the responsibility of upbringing and educating the children may be shared. Such bonding is a source of security and protection against economic hardship and hence encourages fertility.

### Data and Methodology

The data for the study have been collected through a sample survey. The samples have been drawn following a multi-stage sampling design. Firstly, five districts of Assam, namely Dibrugarh, Tinsukia, Jorhat, Sivsagar and Lakhimpur have been taken as sample districts as they together share majority (i.e. 58.82 percent) of the tea estates of Assam. These five districts have 20.40, 13.16, 12.11, 11.84 and 1.32 percent respectively of the total tea estates of Assam.

In the second-stage, 5 percent of the total tea estates of each sample district have been taken randomly as the sample tea estates. The study, thus, has covered total 23 randomly selected tea estates. In the next stage 10 percent of the total tea garden labour community households from each of the sample tea estates have been selected randomly as the sample households. As many as 1,304 households have been taken as the sample households. Required data have been collected

from one currently married women of the reproductive age-group of each sample household using an interview schedule. Prior consent of the respondents was taken and strict confidentiality of the information was ensured.

To identify the determinants of fertility, multiple regression analysis is made. In the regression

model, the number of live births ever born to the respondents has been taken as the dependent variable, while independent variables have been considered based on the theoretical framework explained earlier.

**Table 1**

*Independent Variables and their Units of Measurement*

<b>Independent Variables</b>	<b>Unit</b>
Age at marriage of the respondent females	Years
Use of contraceptive	1= If ever used, 0= If not used
Average breast feeding	In months
Education of wife	1= If more than primary, 0 = Otherwise
Education of husband	1= If more than primary, 0 = Otherwise
Occupation of Wife	1 = If engaged in Garden Work, 0 = Otherwise
Occupation of Husband	1 = If engaged in Garden Work, 0 = Otherwise
Monthly per capita Income	Rs.100/-
Infant and Child Mortality	1 = If experienced, 0 = Not experienced
Desired Family Size	Number
Number of family members	Number

### Results and Discussion

The level of fertility measured by the number of live births ever born to the women of the reproductive age-group is found to 2.55 per women. The survey data has shown that 52.6 percent of the couples have experienced 2 or less live births, 22.85 percent have given birth to 3 or more children and the rest 3.60 percent couples have not yet experienced any birth.

The number of children ever reproduced by women depends, to a large extent, on the start of the effective reproductive life which in most societies initiates from the time of marriage. The age at marriage in India has been reported to be low. NFHS-4 has revealed that 26.8 percent of the women aged 20-24 years in India got married before age 18 years. Low age at marriage results teenage childbearing. NFHS-4 reported that 8 percent of the women aged 15-19 in India have begun childbearing. This study finds that the age at marriage of 48.4 percent of the wives' is less than 18 years while that of 21.6 percent wives is 21 & above years. The mean age at marriage of the sample females is found to be 18.19 years. It is found that the mean fertility is the highest among the women who got married before 18 years. In order to test the statistical significance of the difference among the mean fertility levels of the women marrying at different age groups, analysis

of variance (ANOVA) is made. The F-value (i.e. 107.02) is significant at 0.01 level which signifies that the difference is statistically significant.

Contraceptive prevalence is very low in India. NFHS-4 reported that 47.8 percent of the currently married women aged 15-49 in India and only 37 percent in Assam have used any modern method of family planning. The present study finds that 65.5 percent sample couples have not ever used any modern contraceptive. The mean fertility among the couples who have never used contraception is much higher than those who have ever used. The statistical significance of the difference between the mean fertility levels is tested by t-test. The t-statistic (i.e. 21.70) is significant at 0.01 level indicating that the difference is statistically significant.

It is found that 23.3 percent of the sample women have breast fed their babies up to 12 months or less. Majority of them (i.e. 66 percent) breast fed for 12 to 24 months. The mean duration of breast feeding is found to be 19.18 months. The mean fertility is the highest among those women who suckled less and vice versa. ANOVA also confirms that the difference among the mean fertility levels is significant.

**Table 2**  
*Descriptive Statistics of the Independent Variables*

Particulars	No. of persons	%	Mean fertility	t/F – statistic
Age at marriage of females (in years)				
Below 18	631	48.4	3.15	
Between 18-20	391	30.0	1.96	107.02***
21 and above	282	21.6	2.05	
Contraception				
Ever used	450	34.5	1.59	21.70***
Never used	854	65.5	3.06	
Breast feeding (in months)				
12 or less	304	23.3	2.81	
12 to 24	861	66.0	2.66	95.60***
Beyond 24	139	10.7	1.30	
Education of the wives				
Illiterate and up to class V	1194	91.56	2.66	11.91***
More than class V	110	8.44	1.36	
Education of the husbands				
Illiterate and up to class V	1020	78.22	2.83	16.38***
More than class V	284	21.78	1.56	
Monthly per capita income (in Rs.)				
Up to 500	469	35.97	2.76	18.44***
501-1000	406	31.13	2.72	
1001-1500	220	16.87	2.42	
1501 and more	209	16.03	1.90	
Place of work of the wives				
Within the tea garden	1071	82.13	2.57	0.197
Otherwise	233	17.87	2.55	
Place of work of the husbands				
Within the tea garden	943	72.31	2.58	-1.093
Otherwise	361	27.69	2.48	
Infant and child mortality experience				
Experienced	58	4.45	3.68	-5.95***
Not experienced	1246	95.55	2.48	
Desired family size				
Up to 2	494	37.88	1.65	-21.07***
More than 2	810	62.12	3.10	
Number of household members				
Up to 5	634	48.62	2.01	-13.37***
6 or more	670	51.38	3.07	

Note: \*\*\* = significant 1% level

Education exposes people to information on contraception and they can practice it through better intra-spousal communication. However, the state of literacy among the tea garden labour community is still low. The literacy rate of the sample population has been found to be 53.84 percent which is lower than the literacy rate of the State (73.18%) and national literacy rate (74.04%) as per 2011 Census. Moreover, wide gender gap

in literacy rate in the sample population has also been seen. Against 51.65 percent male literacy rate, the female literacy rate is found to be only 41.05 percent.

The survey revealed that 30.06 percent of the husbands have never received any formal education while 48.16 percent have attained education up to the class V only. The rest 21.78 percent have studied beyond class V including just

2.84 percent who attended education beyond class X. Likewise, 36.0 percent of the wives never attended school whereas 55.56 percent have received education up to class V. The remaining 8.44 percent received education beyond class V. It is seen that the mean fertility is higher among those wives and husbands who are either illiterate or literate up to class V as compared to the others. The majority of the sample households (i.e. 35.97 percent) have their monthly per capita income up to Rs. 500/- only followed by 31.13 percent with monthly per capita income between Rs. 501/- to Rs.1000/- while 16.03 percent of the sample households have above Rs. 1500/- per month. The average monthly income of the sample households is Rs. 5128/- whereas the average per capita monthly income of the sample households is Rs. 948/-. The Table 2 shows that the mean fertility level varies inversely with the monthly per capita income. The ANOVA results suggest that the difference between the means is statistically significant.

The study reveals that 72.31 percent of the husbands are engaged in works within the tea garden. 35.20 percent of the husbands are engaged permanently in the tea gardens while 37.11 percent are temporarily engaged in the tea gardens. The rest 27.69 percent work outside the tea gardens as daily wage earners; drivers, watchman etc. in govt./non-govt. agencies; shop keepers, govt. or private sector jobs etc. On the other hand, 82.13 percent of the wives work in the garden. It is reported that 29.75 percent wives are permanently engaged and 52.38 percent are temporarily engaged in the tea garden works. The rest of them (i.e. 17.87 percent) work outside the tea gardens as daily labourers; cleaners, sales

girls, etc. in govt./non-govt. agencies; small vending like beauty parlour, tailoring shop, hotels, etc. and a few are non-workers. Although the mean fertility of the wives whose husbands are engaged in tea garden is higher than others, the difference in fertility is not significant.

The majority of the couples, i.e., 95.55 percent have not experienced infant and child mortality. The mean fertility among the wives experiencing infant and child mortality is significantly higher than that among those who have not.

The desired family size reflects the fertility intent of a couple. Out of the sample wives 37.88 percent prefer to have maximum two children. The rest 62.12 percent wives desire to have more than two children in their reproductive life and the average level of fertility is significantly higher among them than the others.

Concerning the number of household members, it has been found that 48.62 percent of the sample wives have up to 5 members and the remaining 51.38 percent wives have more than 5 household members. The average number of household members is 6.82. The mean fertility among the wives with household members up to 5 is 2.01 while that among those wives who have more than 5 household members is 3.07. The difference between the means is found statistically significant.

Having examined the bivariate relation between fertility and the selected determinants of fertility, the paper now examines the impact of these determinants on fertility in a multivariate regression framework and identifies the factors which have significantly influenced the fertility level among the tea garden labour community.

**Table 3**  
*Determinants of Fertility: Multiple Regression Results*

<b>Variables</b>	<b>B</b>	<b>T</b>	<b>VIF</b>
Constant	3.140	10.324	
Age at Marriage of the respondent	-0.041	-4.371***	1.229
Contraceptive Use	-0.624	-6.550***	1.913
Breast Feeding	-0.059	-12.039***	1.057
Education of Wife	-0.465	-3.446***	1.311
Education of Husband	-0.177	-1.683	1.767
PCI	-0.247	-3.512***	2.141
Place of Work of the Wife	0.030	0.267	1.764
Place of Work of the Husband	0.266	2.731***	1.770
Infant and Child Mortality	0.368	2.597***	1.065
Desired Family Size	0.510	11.574***	1.638

Total Family members	0.009	0.742	1.779
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Note: Dependent variable= Live births ever born,  $F= 81.07^{***}$ ,  $R^2 = 0.41$ ,  $^{***} =$  significant at 1% level

As expected, age at marriage of the females is found to have significant negative impact on fertility. The regression coefficient shows that as the age at marriage of the females increases by one year the number of live births decreases by 0.041. Early marriage exposes women to fertility for a longer period and hence, the chance of experiencing more child birth in their lifetime increases.

Use of contraceptive has significant negative influence on the fertility level of the tea garden labour community. The regression coefficient shows that the number of live births ever born is 0.624 lower among the couples who have ever used contraceptives than the couples who have never used. The socio-economic and cultural set up of a population influences the practice of family planning. It is found that the men in the tea gardens do not much prefer to use birth control measures. Some of them revealed that children were the gifts of God and it was not necessary to offend God by interfering in His actions while some others stated that they felt ashamed to buy the contraceptives. Oral pill is the most popular contraceptive used by the tea garden labourers.

The impact of breast feeding on fertility is found significant and negative implying that increase in the duration of breast feeding decreases fertility. It suggests that the tea garden women who suckle less experience more births. It has been observed that the tea garden females are not aware of the affect of breast feeding on the postpartum fertility return. It is important, therefore, to spread awareness which will allow mothers to maximize the birth-spacing effect of breast feeding.

The education of the wives is found to have negative impact on fertility. However, education of the husbands is found less important (significant at 10% only) than that of the wives. It is because the wives bear the risk of pregnancy entirely and the responsibility of child rearing mostly. Therefore, educated wives prefer to avoid the reproductive health risks and economic costs caused by high fertility and pursue husbands for fertility control.

The regression coefficient for monthly per capita income is found to be significant with negative sign that implies the retarding impact on fertility. Poor families may have more children as such families may treat children as potential sources of income and security. Low income may also affect the use of contraceptives as there is a direct relationship between income and users of family planning devices (Kaur, 2000).

The place of work of the husbands has emerged as a significant determinant of fertility of the tea garden labour community. The coefficient of the variable indicates that the average fertility of the wives with husbands working in tea garden is 0.266 units higher as compared to those wives whose husbands work outside the tea garden. It is observed that close to three-fourth of the husbands work within the garden in variety of garden related and factory works. Some of them are engaged in miscellaneous works in the tea garden like cooks, cleaners, watchman, etc. The tea industry being a labour intensive industry, the husbands working in tea garden may think that their children will get work in the garden and therefore, an additional child will not be an economic burden for long.

However, the place of work of the wives has not come out as a significant predictor of their fertility. The tea industry is not only labour intensive in nature, but also has the distinction of employing a large number of female workers as the plucking of tender tea leaves is more competently performed by the females. The wives engaged in garden related activities require going out of work without pay due to childbearing. Motherhood requires women to sacrifice work. The maternal role of a woman is not compatible to her role as worker (Mason and Palan, 1981).

As like other studies (Akin, 2005) a positive impact of infant mortality on fertility has been observed. The regression results reveal that the fertility level of the couples experiencing infant and child mortality is 0.368 units more as compared to the couples who have never experienced it. The mean duration of breast feeding among the women experiencing and not experiencing infant and child mortality is found to be 18.61 months and 19.22 months respectively, but the difference between the two means is not statistically significant. Thus, the argument that

child loss promotes fertility by shortening the period of post-partum amenorrhea through termination of breast feeding is not found valid. The positive impact of infant and child mortality experience on fertility may be because of the desire of the parents to replace the deceased or to insure against expected deaths through additional child birth. That the desired fertility level affects fertility positively has been proved by the regression model. It is found that increase in the desired family size by one unit raises the fertility level by 0.510 units.

### Conclusion

Identifying the factors affecting fertility of the tea garden labour community of Assam, this paper finds that three proximate determinants of fertility, such as, female age at marriage, ever use of contraceptives and duration of breast feeding have significant effect. On the other hand, education of wives, per capita family income, place of work of the husband, infant and child mortality experience and desired family size are found as the significant background determinants of fertility. It can, therefore, be stated that the socio-demographic and economic characteristics of the tea garden labour community do have an impact on their fertility level.

The education of the wives is found to have significant negative impact on fertility. However, education of the husbands is not significant at 5% level. On the other hand, the place of work of the husbands is a significant determinant but that of the wives is not a significant predictor of their fertility. Those husbands who work in tea garden may not treat an additional child as an economic burden as they expect a job for their children in the garden while motherhood requires women to sacrifice work. Infant and child mortality affects fertility significantly. But it has not promoted fertility by shortening the period of post-partum amenorrhea. It may rather be due to the desire of the parents to replace the deceased or to insure against expected deaths through additional child birth.

Since the age at marriage is found quite low, therefore, high birth with low interval may negatively affect health of the mother as well as the child in the community. Contraceptive prevalence is very less and lots of prejudices are associated with the use of contraceptives. It has been observed that the tea garden females are not

aware of the fertility inhibiting affect of breast feeding. Hence, reproductive health awareness and popularization of family planning services can be effective strategies to regulate fertility. Female education should receive priority in the development programmes.

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