Chapter Three

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MODEL, METHODOLOGY AND DATA

3.1. Introduction

In the second chapter we have reviewed the literature on the studies related to women's empowerment. In the course of the literature review, we have seen that many studies deal only with the concept of women's empowerment. Majority of the theoretical studies suggest that women's empowerment is multidimensional and context specific. A number of studies have tried to quantify the qualitative idea, empowerment, particularly women's empowerment. Some of the empirical studies have tried to find out the important determinants of women's empowerment. The impacts of women's empowerment on human well-being have been assessed in a few studies. Different studies have taken different indicators or measure of women's empowerment in accordance with their context and objectives. They have applied different methodologies for estimating the impact of women's empowerment on household and child welfare. In order to capture the concrete idea of women's empowerment in Bankura District of West Bengal we specify the suitable econometric models and methodologies in this chapter.

We have planned to divide our study in three parts. In the first part of this study we want to measure the level of empowerment for the rural women in the district of Bankura. Second, we are interested to find out impact of empowerment on the household welfare as well as on human wellbeing. In this part we have planned to emphasize on the three issues of household welfare, viz. issue of family planning, issue of domestic violence and issue of child education. In the third part of our dissertation the various influential factors of women's empowerment in the district of Bankura are dealt with. In order to carry out our study with the issues mentioned above we need to find out a suitable

approach to quantify empowerment and relevant methodology for estimating the different models related to the issues of our study. With this end in view, we have arranged the current chapter in the following manner.

In section 3.2 we have developed two systematic approaches for quantifying women's empowerment along with its different dimensions. Sub-section 3.2.1 deals with the selected dimensions and corresponding indicators of women's empowerment at the individual/household level as well as at the community level. We explain the details for measuring the degree of empowerment in sub-section 3.2.2. In sub-section 3.2.3 we have explained the framework for developing a composite index for women's empowerment. This section will help us show the empowerment status of women in the district of Bankura. Section 3.3 deals with the research design for studying the impact of women's empowerment on household welfare. This section has been decomposed into three sub-sections. In sub-section 3.3.1 we have explained the methodology for studying the impact of women's empowerment on family planning. We have addressed the issue of domestic violence which is expected to be connected with empowerment. Analytical framework for studying the nature of domestic violence against women in the district of Bankura has been presented in sub-section 3.3.2. Sub-section 3.3.3 has presented the analytical framework for the study of empowerment on child education. The analytical framework for finding out different influential factors of women's empowerment has been explained in section 3.4. Regression specifications for each of the selected issues of women's empowerment have been presented in section 3.5 along with its subsections. The definitions and measurements of the dependent and independent variables of the specified models specified have been explained in Section 3.6. In section 3.7 we have logically developed the hypotheses relating to the specific econometric models. The methodology of data collection and the diagnostic check for the sample size have been discussed in Section 3.8 and in its different sub-sections. Finally, we have come to the conclusion of this chapter in section 3.9. Now we are going to present the detailed analytical frameworks one by one.

3.2. Measures of Women's Empowerment

In this section we want to quantify the idea of women's empowerment. We have already discussed that women's empowerment is a buzzword now-a-days in developmental policies. It is qualitative and multidimensional in nature. However, there is not any

universally accepted definition of women's empowerment in the existing literature; its definition is very much context specific. One may consider women's empowerment in the individual/household context or in the community/locality context or in the national/international context. Consequently different studies have tried to measure it in different ways depending on different contexts. Our study area, the district of Bankura, is mainly a rural as well as poor district in the state of West Bengal. In this district the major development indices of women are standing below the expected level. Due to the geographical as well as social backwardness it is not surprising that women of this district have very little power and voice in the broader area of life. In other words, the empowerment of women in the national or international level in the area under study is almost zero and invariant in the broader area of life. However, owing to the different local and social customs of different communities, women of different regions and religions and communities have enjoyed different levels of empowerment at the household level as well as at the community level. Against this situation if one attempts to focus empowerment from a single window, it will give the wrong impression about the actual empowerment of a particular woman. In order to address the possibility of this wrong impression in the measure of empowerment we have sketched to study empowerment at the household level and at the community level separately. Therefore, we would like to measure empowerment of women in two levels.

Women's Empowerment at the Household Level
Women's Empowerment at the Community Level

In the course of literature review we have found two wings of studies of quantifying women's empowerment. One wing has considered the value of a specific indicator or simple average of the values of the selected indicators/dimensions of empowerment (Ghuman, et al. 2004, Srivedi, 2005**,** Adhikary and Dutta, 2011, Varghese, 2011). Other wing has tried to cover a wide range of the indicators and considered the weighted average of the values of the indicators of empowerment as a measure (Kishor, 1997, Jejeebhoy, 2000**,** Koenig, et al. 2003, Handy et al. 2004, Parveen et al. 2004, Chowdhury et al. 2009**)**. However, no one of the studies takes into account both the types simultaneously and compares the pros and cons of these two types of measures. With this end in view, we have planned to measure women's empowerment at household as well as at community levels by two different ways – simple average method and

weighted average method. In this study Principal Component Analysis has been used to derive the weights of the indicators of women's empowerment. Before going to the detailed specification of the methodology for measuring women's empowerment we discuss the dimensions and selected indicators of women's empowerment at the household level and at the community level.

3.2.1. Selected Dimensions and Indicators of Women's Empowerment

We have found several dimensions and indicators of women's empowerment in the existing literature. A section of existing literature only proposed the dimensions and indicators for measuring empowerment. Different studies reviewed in chapter two have tried to measure empowerment empirically considering different dimensions and indictors which are fitted in their context. In an exhaustive analytical study, Molhotra et al. (2002) has proposed several indicators for measuring empowerment at household level, at community level and at broader arenas. She has also proposed six dimensions of women's empowerment for each level. These are economic, socio-cultural, familial/interpersonal, legal, political, and psychological. However, she did not quantify women's empowerment in practice. Actually these dimensions are extremely broad in scope and not very much easy to capture at a time. In our dissertation we have planned to quantify women's empowerment at the household level as well as at the community level. We have tried to follow the dimensions as proposed by Molhotra, et al. (2002). In order to cover the dimensions we have selected some relevant criteria as indicators in the context of our study. The selected indicators for respective dimensions are as follows.

3.2.1A. Dimensions and Indicators of Women's Empowerment at Individual or Household level

Indicators of Economic Dimension
- Whether she has control over her personal income or asset.
- Whether she can have access to household resources.
- Proportion of household expenditure that she bears. (>50% | < 50% | None)
- Who decide the use of saving/ loan? (Own / with spouse/ with other family member/other members)
- Does she take part in the decision for selling or buying asset for household?
- Does she enjoy freedom in choosing her occupation? (Yes/No)

Indicators of Political Dimension

- Did she cast her vote in the last election?

- Does other influence her to cast her vote?

- Does she know the name of local leader? (panchayat pradhan / councilor/ MP/ MLA)

- Whether she know the candidate of opposition party in the last election.

- Does she get domestic support for her political engagement?

Indicators of Socio-Cultural Dimension

- Whether she is free to move outside her home.

- Does she regularly enjoy Radio, telephone, TV and Newspaper?

- Whether or not she participates in local cultural programs.

- Does she want to educate her girl or other girls in her household?

- Does she arrange the marriage of the girls before their eighteen years old or support it?

- Whether she want to send her child for earning.

Indicators of Personal / Familial Dimension

- Whether her marriage is arranged or self selection.

- Can she articulate her personal problem to other family members?

- Whether or not she can independently decide about her child education, health, food etc.

- Whether she has decision making power regarding her personal health, body.

- Whether anybody interfere when she talks to strangers.

Indicators of Legal Dimension

- Whether she knows the mechanisms of justice used in the locality.

- Does she think women/men get (better, equal or worse) treatment from this system?

- Whether she knows the laws and legislation available in favour of women.

- Whether she knows about the various kinds of public services available in the locality.

- Whether her marriage is registered or not.

3.2.1B.Dimensions and Indicators of Women's Empowerment at Community level

Indicators of Economic Dimension
- Whether she is employed/earner or not.
- Whether she has ownership of land or property or not.
- Whether she has access to formal savings, insurance or loan etc.
- Whether she has access education or training service when she needs it.
- Whether anybody threats her to evict from property.
- Whether her present occupation is secured or not.

Indicators of Political Dimension
- How much does she involve in political process? (Very involved / slightly involved / not at all)
- Whether she attends any political gathering or not.
- Whether she is a member of any political party.
- Did she ever contest vote as a representative?
- Is she leader of any organization?

Indicators of Socio-Cultural Dimension
- Does she participate in community activity?
- Whether she is a member of any social organization or group.
- Whether she can influence the election/ selection of the leader of organization or group.
- Whether or not she knows the location of the nearest post-office, school, hospital, club, vegetable market, other social/ cultural organization.
- Does she feel exclusion from participation in any community activity organized by local government, religious organization, school, the local development association etc.?
- Does she oppose the social curses like a) Dowry system, b) Inter-caste marriage, c) preference of male child?

Indicators of Personal / Familial Dimension
- Did she ever campaign against social curse like dowry, violence?
- Whether she has professional training or not.

- Has she voluntarily changed her occupation after marriage?
- Did she sacrifice employment or membership of any organization due to familial ground?
- Whether she has immunised her children in due time.

Indicators of Legal Dimension

- Whether she ever used the mechanism to seek redress or access justices.
- Whether she complains about the deficiency of public services in her locality.
- Is she active in complaining about any problem to the system of justice? (Very active, a little bit active, fairly active, and not active at all)
- Does she think that authorities are more, less or equal effective about other people's need/concern compared to her? - (More equal, less).

3.2.2. Degree of Women's Empowerment

Let us now quantify women's empowerment based on the above indicators. We intend to measure empowerment index by two methods. First, we would like to compute the degree of women's empowerment for each woman at household level and at community level using simple average method. Therefore, the simple indices adopted in the study for measuring the empowerment of women at the household level and at the community level are given as follows.

$$DOWEH = \frac{number\ of\ selected\ criteria\ at\ the\ household\ level\ fulfilled\ by\ the\ woman}{total\ number\ of\ selected\ criteria\ at\ the\ household\ level} \times 100$$

$$DOWEC = \frac{number\ of\ selected\ criteria\ at\ the\ community\ level\ fulfilled\ by\ the\ woman}{total\ number\ of\ selected\ criteria\ at\ the\ community\ level} \times 100$$

where, $DOWEH_i$ and $DOWEC_i$ are the degree of women's empowerment at the household level and at the community level for ith woman.

Using this formula we can easily measure the empowerment of women at the household level and at the community level, which are now quantitative in nature. In accordance with the specification of the quantification of the degree of empowerment we can say

that the values of women's empowerment vary from zero to hundred. The higher the value of empowerment index the higher is the empowerment of women i.e. the higher is the status of women in household and in society.

3.2.3. Analytical Framework for Computing Composite Index of Women's Empowerment

In order to study the empowerment level of the women at the household level and at the community level we have considered a large number of indicators which are usually correlated because they are measuring the same issue. So to make the analysis concrete we need to reduce the large number of indicators to lesser number of factors that are being measured by the indicators. Besides, we have put same weight for each dimension/indicator in our first measure; but in reality different dimension/indicator should have different weight in contributing to women's empowerment. The weights of the indicators may be derived in a number of ways. Factor analysis is the common statistical tool for the derivation of relative weights and is applied to deduce a set of latent factors that account for the patterns of collinearity among multiple metric variables. In literature we have found a variety of methods that extract factors from an inter-correlation matrix of the variables. Principal Component Analysis (PCA) is probably the most common method used in the extraction of factors. In order to study and understand the level of empowerment extracting a small number of orthogonal/uncorrelated variables called Principal Components from the set of indicators under consideration and to derive relative weights of the selected indicators we would like to use the technique of Principal Component Analysis. Each Principal Component is a linear combination of all the variables/indicators under studied having unit variance.

In PCA, the linear model accounts for large proportion of the variation of the data set. If the PCA becomes unrotated, the eigenvectors may not align close to the data clusters and thus may not represent the actual physical states as well. The rotated PCA methods rotate the PC eigenvectors so that they become closer to the cluster of data point. There are several strategies for rotation in the literature of Econometrics. Orthogonal rotation strategy is applied if no relationship is found between the principal components. In order to determine whether the extracted components are related or not, a simple correlation has been applied on the component scores. If the results show no correlation one can apply orthogonal rotation strategy on the indicators. In the present study Varimax

rotation strategy, which is the most popular form of orthogonal rotation schemes, has been applied. Varimax rotation maximizes the variance of the rotated squared PCs. It means that the squared loadings are made as large as possible or as close to zero as possible means that many of the loadings are essentially set to zero, yielding loading patterns which have more localized features than the unrotated patterns. In view of the above, PCA has been re-run/rotated (Varimax) specifying the fixed number of components (whose Eigen value is greater than one) to be retained. The respective rotated component scores have been obtained by regression method. In order to develop a composite index of women's empowerment we derive the component scores also (Antony et al. 2007). The weighted sum of the component scores may be considered as the composite index of women's empowerment.

Finally, in order to arrive at the composite index of women's empowerment (CIWE), the rotated component scores and the corresponding per cent of variances (rotation sums of squared loadings) accounted by the principal components are used. Principal Components are extracted in decreasing order of their variances. This indicates that variances explained different principal component are different, thus the weight of different principal components are different. To address this, we have constructed the CIWE as the weighted sum of the component scores – the weights being percentage of variations explained by the respective Principal Components after rotation. Thus, CIWE is to be calculated taking the sum of product of Component score (C_{ik}) and corresponding percent of variance (V_k) explained by the principal component (Antony et al, 2007)

$$CIWE_i = \sum V_k C_{ik} \qquad\qquad (3.2.1)$$

where, $CIWE_i$ stands for the composite index of empowerment for *ith* woman, V_k denotes the percentage of variation explained by *kth* principal component after rotation and C_{ik} is the component score of *ith* woman with respect to *kth* principal component after rotation.

Applying PCA tool for the indicators of women's empowerment at the household level we derive this formula and compute the CIWEH for the sample women at the household

level. Similarly for the indicators of women's empowerment at the community level we compute the CIWEC for the sample women at the community level. It should be noted that the values of these indices vary from $-\infty$ to $+\infty$ and follows standard normal distribution. So it has some good properties for inference analysis.

3.3. Research Design for Studying the Impact of Women's empowerment on Household Welfare

In the new millennium women's empowerment has been recognized as an instrument for improving household welfare. A large section of the literature regarding women's empowerment has put their attention on quantification and on measurement of women's empowerment from several view points. A group of studies has tried to identify the responsible factors for empowering women. A very few studied have examined the impact of women's empowerment on several dimension of household welfare. Again among these studies a section has theoretically analyzed the expected gain of women's empowerment on household welfare. Systematic empirical estimation of the impact of women's empowerment on household welfare is very much limited. Against this situation, we are interested to estimate the impact of women's empowerment on three specific issues of household welfare. These three issues are the family planning, domestic violence and child education expenditure. In the subsequent sub-sections we deal with the research design for studying the impact of women's empowerment along with some other selected variables on decision towards family planning, on incidence of domestic violence and on child education expenditure in the context to our sample women in Bankura district.

3.3.1. Analytical Framework for Studying Impact of Women's Empowerment on Family Planning Decision

We like to study how the decision regarding family planning is affected by women's empowerment. In order to estimate the impact of women's empowerment along with other explanatory variables on the family planning decision we formulate probit model. The decision regarding family planning is the dependent variable in this particular case. The decision towards family planning is specified by the information whether or not the woman is an ideal family planner. If the woman has only one or two children and there is no possibility of further child adaptation, or if the woman has strong decision that she will not have more than two children, the woman is identified as an ideal family planner.

The couples who have more than two children or have not taken any decision about family planning are considered as non-family planner. In this view, each woman has only two possible responses, 'yes' and 'no' regarding family planning decision. Therefore, the variable, decision regarding family planning can take only two values for two responses. We attach value '1' for the woman who has taken family planning decision and '0' otherwise. The decision regarding family planning (Y_i), which is the dependent variable, is a dichotomous variable taking values '1' and '0'.

The family planning decision definitely depends on some socio-economic and demographic traits of the woman and her household and on some community traits. It is expected that empowerment of the particular women have a crucial role for taking family planning decision. This means that women's empowerment along with several socio-economic and demographic traits of the woman/household determine the decision towards family planning. Let P_i stands for the conditional probability of taking decision regarding family planning. In the present framework, in terms of a typical binary response model we like to assess P_i conditional on certain information set, Ω, which consists of socio-economic and demographic traits of individual/household along with women's empowerment at the household level and at the community level. These traits are apparently exogenous and predetermined variables that have been considered as determinants of the conditional probability of taking family planning. Already we have expressed Y_i, as dichotomous variable and P_i is the probability that $Y_i = 1$ Therefore, by definition of mathematical expectation we can say $P_i = E(Y_i/X_i \in \Omega)$, where X_i stands for socio-economic and demographic traits of the ith individual/household along with women's empowerment belonging to the information set, Ω. Hence, the decision regarding family planning for the sample women is a function of the information set, Ω.

Factors affecting the Decision towards Family Planning

We have classified the socio-economic and demographic traits affecting the decision regarding family planning into two categories, namely, the individual and household characteristics and the community characteristics of the woman. Examination of the impact of women's empowerment at the household level and at the community level on the family planning decision is one of our prime objectives. So, women's empowerment

at the household level is the main explanatory variable under the individual/household characteristics. In addition to women's empowerment at the household level, we consider some other variables as determinants of the decision regarding family planning. In the category of individual and household characteristics we have incorporated male child bias, education level, age at marriage, spousal age gap, spousal education, family composition, household's land holding, household occupation, per capita family income, dependency ratio. We expect that women's empowerment at the household level should have a positive impact on the decision regarding family planning for the sample women. In order to check the empirical validity of the claim we include women's empowerment at the household level and at the community level as chief exogenous variables in the model for the decision regarding family planning. In the rural society we see that education level of the woman as well as other family members affect the outlook to family planning. Age at the time of marriage of the woman is crucial for taking any fruitful decision regarding family planning. Dependency ratio is another determinant of the family planning decision. Besides, we cannot ignore the variables like household's landholding, per capita family income and occupational status of the family as important determinants of the decision regarding family planning.

There are several community characteristics like caste, race, religion, region, social customs that affect the family planning decision of the couples. But in our dissertation we have planned to study the attitudes of rural couples regarding family planning in the district of Bankura. In the area under study the variation of region, race, religion, social custom are very much limited. With this end in view, women' empowerment at the community level, participation in SHG-centric microfinance program and caste, three community characteristics, have been considered as important exogenous variables affecting the decision regarding family planning in this study. In order to analyze the impact of caste we have categorized the persons in four groups like Scheduled Caste, Scheduled Tribe, Other Backward Classes and General Caste as per government regulation. Against this backdrop, we can write

Decision regarding Family Planning= ƒ (Women's Empowerment at the household level and at the community level, Individual/Household Characteristics, Community Characteristics, and Random Disturbances)

On the basis of such specification, we finally pay our attention in Probit Model. The cumulative distribution function for Probit model is given by

$$F(x) \equiv \int_{-\infty}^{\infty} \frac{1}{\sqrt{2\Pi}} exp\left(-\frac{1}{2x^2}\right) dx \qquad (3.3.1)$$

where x is a standard normal variable and $F(x)$ is a cumulative distribution function.

3.3.2 Analytical Framework for Impact of Empowerment on Domestic Violence against Women

In order to assess the impact of women's empowerment on household welfare, we would like to examine the impact of women's empowerment at the household level and at the community level along with other determinants on the probability of the incidence of domestic violence that she faces. The incidence of domestic violence is multidimensional in nature. So, to study the extent of domestic violence we need to specify the several indicators for measuring the intensity of domestic violence. But in the course of our field survey we have observed that most of the rural women are not willing to disclose the intensity of violence from that they suffer. That is why; we are reluctant to form a composite index for domestic violence for our sample women. We have collected information from the woman or from her neighbour whether or not the particular woman faces frequent physical violence from her husband or from other household members. If a woman suffered from physical assault by her husband or other family member at least in two episodes during the last six months, we have identified that the particular woman faces domestic violence. With reference to our criteria, therefore, domestic violence is a binary variable. Let us now discuss the several socio-economic-demographic and community traits that may affect domestic violence against women.

Factors Affecting Domestic Violence against Women

We can divide the determinants of domestic violence against women into two categories, namely, individual/household characteristics and community characteristics. In the course of our literature review we have noticed that individual/household's socio-economic-political factors such as nature of marriage, duration of marriage, dowry, women's education, age, occupation of woman, childlessness, economic pressure, and

intergenerational transmission of violence, financial condition of family, husband's education, average education level of the family, family type, household occupation are important determinants of the incidence of domestic violence against women. On the other hand, different studies have reported that caste, region, religion, environment of violent crime and community-level norms concerning wife beating, culture and customs of the society are the major community level factors that influence the incidence of domestic violence against women.

In addition to women's empowerment at the household level and at the community level in the spectrum of individual/household characteristics we have taken duration of married life, spousal age gap, family type, highest male education, husband education, household occupation, husband's drug addiction, annual per capita income, land holding, dependency ratio, dowry demand at and post marriage as determinants of the incidence of domestic violence against women in the category of individual/household characteristics. Among the community characteristics we have considered women's empowerment at the community level, duration of self-help group membership and caste. Note that caste of the sample member has been divided into four categories as we have mentioned in the last sub-section. Hence, we can write:

Domestic Violence against Women = f (Women's Empowerment at the household level and at the community level, Individual/Household Characteristics, Community Characteristics, Random Disturbances)

The incidence of domestic violence is a dichotomous variable (Y_i) that takes the value '1' for the woman who is victims of domestic violence and value '0' for others. So, in order to estimate the probability of facing domestic violence for a woman in the district of Bankura we formulate a Logit model. The logistic function for the logit model is as follows

$$\phi(X) \equiv \left[1 + \exp(-X)\right]^{-1} = \frac{\exp(X)}{1 + \exp(X)} \qquad (3.3.2)$$

where $\phi(X)$ expresses the cumulative distribution function of X which follows logistic distribution.

3.3.3. Analytical Framework for Impact of Women's Empowerment on Children's Educational Expenditure

The third issue that we have selected for studying the impact of women's empowerment on household welfare is the nature of educational expenditure for children. It is true that the women/households, who have no children in the age of studying in educational institutions, don't have this expenditure at all. On the other hand, the women/households, who have children in the age of studying in educational institutions, have two options: either send their children school/colleges for education or not. The women/households who send their children for education must have some expenditure towards children education. But expenditure for children education is also zero for the women/households who do not send the children in educational institutions. Actually, this part of our study is restricted among those sample women who have children in the age of attending school and colleges. A very large portion of our sample women have children in the age of attending school and colleges. So this part of our study does not lose generality. The educational expenditure for children in a family is one of the major indicators of a family wellbeing. It is expected that development of the family increases the expenditure for children's education. This study has planned to investigate the impact of women's empowerment at the household level and at the community level on education expenditure for her children. Education, particularly, primary education is most important for economic development. In India, as well as in our state of West Bengal, primary education is the four years of schooling from the age of six. The duration of education up to the class of eighth standard is termed as elementary education. Education up to tenth class is known as secondary education. Education after secondary level is viewed as higher education. Education up to elementary level has been made compulsory and free for all the children by the government of India. But we have the experience that a large section of the guardians of the students at any level cannot depend completely on the government and government aided schools for education of their children. Most of them arrange private tuition for their children. In urban area a section of guardians send their children in private school. However, in rural area, like our study area this opportunity is completely absent. A major part of the guardians, who like to educate their children, in rural area also send their children to private tutors. However, during the course of field survey we have observed that most of the people in our study area are living in a poor economic condition. A considerable number of children have to engage in job to collect their livelihood. In our study area many potential students could not

complete their primary education. Here dropout rate is high. As a result, educational expenditure varies widely across the sample households. Like any other part of India here primary and secondary education are provided by the government, forming a free education system. In spite of these, a major number of households have to spend money for education of the children.

The expenditure relating to education of the children is viewed as children's educational expenditure. Expenditure for purchasing educational kits like books, papers, pens, pencils school dresses etc., are the essential expenditure for children's education. The fact is that most of the students at primary level as well as secondary level even at the college level take the shelter of private tuition. The major part of expenditure for children's education is the fees for private tuition. Almost all villages in our country have at least one primary school. So traveling cost for attending primary school is zero for almost all households. However, women/households have to bear some travelling cost for their children who attend secondary or higher secondary school and college. This cost proportionally amplifies with the number of the tuition trips. Therefore, cost for commuting school/colleges and tuition is a significant part of children's educational expenditure. Another head of educational expenditure is for school (private school) and college tuition fees. The students, who study at residential institution or study in the institution far away from their residential addresses, need some accommodation cost. Besides, women/households give some money to their children for refreshment during travelling for education. In addition to these, actual costs for children's education there may have some opportunity costs. It is common that during the time of education parents or other family members have to spend some times every day for preparing and or escorting the children for school and for coaching. Sometimes guardians have to attend the school/colleges for admission and examination of the children, meetings or for functions. These factors give rise to some opportunity cost relating to children's education. Other part of the opportunity costs of children's education arise when the children have some opportunity to earn during the period of education. Sometimes, guardians want to send their child for earning. This fact also adds some opportunity cost for children's education to the guardians. In order to explain the analytical framework for modeling the child education expenditure first note down the probable heads of the educational expenditure for children.

Probable Heads of the Educational Expenditure for Children

- ❖ *Expenditure for purchasing educational kits including school uniform if any*
- ❖ *The cost for private tuition fees*
- ❖ *Commuting expenditure for attending tuition and school*
- ❖ *Fees for education (for higher education/private school)*
- ❖ *Accommodation costs if any*
- ❖ *Tiffin cost/ pocket money*
- ❖ *Opportunity cost (for the guardians themselves and for the guardians who wants to send their child for earnings)*

We did not consider the opportunity cost for children's education due to lack of reliable information and calculating hazards. In estimation we have considered annual child education expenditure as proportion to annual household income. To compute expenditure for children's education first we calculate the expenditure for each head for month or for year as we have been informed from the respondent and add them. Then we average the expenditure for the last year. We have finally divided the annual child education expenditure by annual household income to get the proportion of household income spend for child education. It is a quantitative variable and expressed as percentage.

Factors affecting Children's Educational Expenditure

No doubt the educational expenditure varies from household to households depending on the number children and their educational level. It is also directly related with income of the households. In addition to these two factors, children's educational expenditure depends on mother's/household characteristics and community characteristics. Educational expenditure depends on certain information set, which consists of socio-economic and demographic traits of women along with her empowerment status. These traits are exogenous and predetermined variables that have been considered as determinants of the educational expenditure for children.

We have classified the socio-economic and demographic traits affecting the child education expenditure into two categories, namely, the individual/household characteristics and the community characteristics of the woman. As per our specific

objective in the range of individual/household characteristics we have considered women's/mother's empowerment at the household level as the primary explanatory variable determining children's educational expenditure. Generally, empowered woman at the household level as well as the community level are more conscious about the effectiveness of education. Against this backdrop, we can write

Children's Education Expenditure as Proportion to Household Income = f (Mother's Empowerment at the household level and at the community level, Mother's/Household Characteristics, Community Characteristics, Random Disturbances).

In order to estimate the impact empowerment status along with other explanatory variables on the children educational expenditure as proportion to household income we formulate a multiple log linear regression model as

$$\ln Y_i = X_i' \beta + U_i \qquad\qquad (3.3.3)$$

where Y_i stands for the educational expenditure for children, X_i denotes the set of explanatory variables, which includes all the individual/household and community characteristics along with the empowerment variables, β_k captures the marginal impact of the particular explanatory variable on $(\ln Y_i)$ child educational expenditure as proportion to household income and U_i are the random disturbances.

The estimation of this model will help up capture the rate of change of the expenditure for children's education for change in empowerment at the household level and at the community level.

3.4. Analytical Framework for Studying Women's Empowerment

We expect that women's empowerment is an instrument for improving household and child welfare. Particularly we have already formulated the framework for assessing the impact of women's empowerment on family planning decision, on incidence of domestic violence against women and on child education expenditure. In this connection it is rational to quest the factors affecting household level and community level of empowerment. With this end in view, in the present section, an attempt has been taken to describe the strategy to estimate the women's empowerment at the household level and

at the community level so that we can find out the probable determinants of it in the context of our study objectives and study area.

Factors affecting Women's Empowerment

Several studies reviewed in chapter two have examined the impact of several socio-economic and demographic traits on women's empowerment. Similarly in the context of our study we have selected some factors affecting women's empowerment at the household level and at the community level. In the range of individual/household characteristics we have considered age, education, personal occupation and income, per capita household income, household occupation, landholding, family type, educational background of the household and access to formal credit. We have considered SHG membership and caste in the range of community characteristics.

Therefore, the general functions for studying empowerment at the household level and at the community level can be written as follows.

> *Women's Empowerment at the Household Level = f (Individual/Household Characteristics, Community Characteristics, Random Disturbances).*

> *Women's Empowerment at the Community Level = f (Individual/Household Characteristics, Community Characteristics, Random Disturbances).*

In order to estimate the empowerment status as a function of some individual/household characteristics and community characteristics we have planned to formulate multiple linear regression models. In this analytical framework the indices of women's empowerment are the dependent variables which are quantitative by construction. Now, we can write the function for each index of women's empowerment in terms of general linear regression model as

$$Y_i = X_i'\beta + U_i \qquad\qquad (3.4.1)$$

where Y_i stands for the index of women's empowerment of the ith woman, X_i denotes the set of explanatory variables, which includes all the individual/household and community characteristics affecting the empowerment status, β_k captures the marginal

impact of the particular explanatory variable on empowerment index and U_i are random disturbances.

3.5. Regression Specification of the Analytical Models relating to Women's Empowerment

Once we have the theoretical framework of the models corresponding to the issues of the women's empowerment, we need to specify the empirical models for estimation. Now we specify the econometric models serially in accordance with the analytical frameworks.

3.5.1. Probit Models for Decision regarding Family Planning

In order to specify the probit model for the decision regarding family planning we follow the framework analyzed in section 3.3.1. In this context we have considered two models, Model-1A and Model-1B. In Model-1A we have taken the degrees of women's empowerment as explanatory variables and in Model-1B the composite indices of women's empowerment have been considered as explanatory variable along with some other explanatory variables. The specific models are as follows.

Model-1A Probit Model when Empowerments Quantified by Simple Average

$$DRFP = \beta_0 + \beta_1 DOWEH + \beta_2 FMSF + \beta_3 FFSM + \beta_4 FFSF + \beta_5 AGAM + \beta_6 SAGEG$$

$$+ \beta_7 EDU + \beta_8 HEDU + \beta_9 TYFAMI + \beta_{10} CULTI + \beta_{11} NONFARM + \beta_{12} HLAND$$

$$+ \beta_{13} DRATIO + \beta_{14} APCHIN + \beta_{15} DOWEC + \beta_{16} DSHGM + \beta_{17} OBC + \beta_{18} SC + \beta_{19} ST + U$$

(3.5.1)

Model-1B Probit Model when Empowerments Indexed by PCA

$$DRFP = \beta_0 + \beta_{1C} DOWEH + \beta_2 FMSF + \beta_3 FFSM + \beta_4 FFSF + \beta_5 AGAM + \beta_6 SAGEG$$

$$+ \beta_7 EDU + \beta_8 HEDU + \beta_9 TYFAMI + \beta_{10} CULTI + \beta_{11} NONFARM + \beta_{12} HLAND$$

$$+ \beta_{13} DRATIO + \beta_{14} APCHIN + \beta_{15C} DOWEC + \beta_{16} DSHGM + \beta_{17} OBC + \beta_{18} SC + \beta_{19} ST + U$$

(3.5.2)

3.5.2. Logit Models for Incidence of Domestic Violence

As the incidence of domestic violence against women is a dummy variable in accordance with our specification, we formulate a Logit model. We have measured women's empowerment levels following two methodologies. Keeping this view in mind, here we also estimate two models. Degrees of women's empowerment have been considered as determinant of domestic violence against women in Model-2A whereas Model-2B includes composite indices of women's empowerment.

Model-2A Logit Model when Empowerments Quantified by Simple Average

$$DVIO = \gamma_0 + \gamma_1 DOWEH + \gamma_2 DURM + \gamma_3 SAGEG + \gamma_4 HEDU + \gamma_5 HIMEDU + \gamma_6 TYFAMI$$

$$+ \gamma_7 CULTI + \gamma_8 NONFARM + \gamma_9 HLAND + \gamma_{10} DRATIO + \gamma_{11} APCHIN + \gamma_{12} DOW$$

$$+ \gamma_{13} PMDOW + \gamma_{14} ADDIC + \gamma_{15} DOWEC + \gamma_{16} DSHGM + \gamma_{17} OBC + \gamma_{18} SC + \gamma_{19} ST + U$$

$$(3.5.3)$$

Model-2B Logit Model when Empowerments Indexed by PCA

$$DVIO = \gamma_0 + \gamma_{1C} CIWEH + \gamma_2 DURM + \gamma_3 SAGEG + \gamma_4 HEDU + \gamma_5 HIMEDU + \gamma_6 TYFAMI$$

$$+ \gamma_7 CULTI + \gamma_8 NONFARM + \gamma_9 HLAND + \gamma_{10} DRATIO + \gamma_{11} APCHIN + \gamma_{12} DOW$$

$$+ \gamma_{13} PMDOW + \gamma_{14} ADDIC + \gamma_{15C} CIWEC + \gamma_{16} DSHGM + \gamma_{17} OBC + \gamma_{18} SC + \gamma_{19} ST + U$$

$$(3.5.4)$$

3.5.3. Log-Lin Models for Children's Education Expenditure as Proportion to Household Income

In the section of analytical framework we have explained the justification of log-lin model for examining the impact of women's/mother's empowerment on household's expenditure for children's education. In this sub-section we express the explicit form of the regression models. Like another issues in this case we also set two models - one is based on the degrees of women's empowerment and other on the composite indices of women's empowerment.

Model-3A Log-Lin Model when Empowerments Indexed by Simple Average

$$LEDEX = \alpha_0 + \alpha_1 DOWEH + \alpha_2 HEDU + \alpha_3 HIMEDU + \alpha_4 HIFEDU + \alpha_5 TYFAMI$$

$$+ \alpha_6 CULTI + \alpha_7 NONFARM + \alpha_8 HLAND + \alpha_9 DRATIO + \alpha_{10} LOG(APCHIN)$$

$$+ \alpha_{11} DOWEC + \alpha_{12} DSHGM + \alpha_{13} OBC + \alpha_{14} SC + \alpha_{15} ST + U$$

$$(3.5.5)$$

Model-3B Log-Lin Model when Empowerments Indexed by PCA

$$LEDEX = \alpha_0 + \alpha_{1C} CIWEH + \alpha_2 HEDU + \alpha_3 HIMEDU + \alpha_4 HIFEDU + \alpha_5 TYFAMI$$

$$+ \alpha_6 CULTI + \alpha_7 NONFARM + \alpha_8 HLAND + \alpha_9 DRATIO + \alpha_{10} LOG(APCHIN)$$

$$+ \alpha_{11C} CIWEC + \alpha_{12} DSHGM + \alpha_{13} OBC + \alpha_{14} SC + \alpha_{15} ST + U$$

$$(3.5.6)$$

3.5.4. Linear Regression Models for Women's Empowerment at the Household Level and at the Community Level

By definition and conception the empowerment of women is a qualitative attribute of the women. So far we have quantified it at two levels, namely at individual/household level and at community level. Further, to measure the women's empowerment for each level we have considered two methodologies. Applying simple average method we have computed degrees of women's empowerment at the individual/household level and women's empowerment at the community level. We have also computed composite index of women's empowerment at the individual/household level and at the community level applying Principal Component Analysis. In the previous section we have explained the analytical framework for studying women's empowerment at household level and community level. Therefore, we have four measures for women's empowerment. To this end in view, we formulate four linear regression models to identify the major determinants of women's empowerment in the district of Bankura. First two are related with household level empowerment and last two with community level empowerment. These have been specified as follows.

Model-4A Linear Model for Household Level Empowerment Indexed by Simple Average

$$DOWEH = \delta_0 + \delta_1 AGE1 + \delta_2 AGE2 + \delta_3 AGE3 + \delta_4 EDU + \delta_5 LAB + \delta_6 SELF + \delta_7 PINC + \delta_8 AFCT$$

$$+ \delta_9 TYFAMI + \delta_{10} DRATIO + \delta_{11} APCHIN + \delta_{12} CULTI + \delta_{13} NONFARM + \delta_{14} HLAND$$

$$+ \delta_{15} HIMEDU + \delta_{16} HIFEDU + \delta_{17} DSHGM + \delta_{18} OBC + \delta_{19} SC + \delta_{20} ST + U$$

$$(3.5.7)$$

Model-4B Linear Model for Household Level Empowerment Indexed by Principal Component Analysis

$$CIWEH = \delta_0 + \delta_1 AGE1 + \delta_2 AGE2 + \delta_3 AGE3 + \delta_4 EDU + \delta_5 LAB + \delta_6 SELF + \delta_7 PINC + \delta_8 AFCT$$

$$+ \delta_9 TYFAMI + \delta_{10} DRATIO + \delta_{11} APCHIN + \delta_{12} CULTI + \delta_{13} NONFARM + \delta_{14} HLAND$$

$$+ \delta_{15} HIMEDU + \delta_{16} HIFEDU + \delta_{17} DSHGM + \delta_{18} OBC + \delta_{19} SC + \delta_{20} ST + U$$

$$(3.5.8)$$

Model-4C Linear Model for Community Level Empowerment Indexed by Simple Average

$$DOWEC = \sigma_0 + \sigma_1 AGE1 + \sigma_2 AGE2 + \sigma_3 AGE3 + \sigma_4 EDU + \sigma_5 LAB + \sigma_6 SELF + \sigma_7 PINC + \sigma_8 AFCT$$

$$+ \sigma_9 TYFAMI + \sigma_{10} DRATIO + \sigma_{11} APCHIN + \sigma_{12} CULTI + \sigma_{13} NONFARM + \sigma_{14} HLAND$$

$$+ \sigma_{15} HIMEDU + \sigma_{16} HIFEDU + \sigma_{17} DSHGM + \sigma_{18} OBC + \sigma_{19} SC + \sigma_{20} ST + U$$

$$(3.5.9)$$

Model-4D Linear Model for Community Level Empowerment Indexed by Principal Component Analysis

$$CIWEC = \sigma_0 + \sigma_1 AGE1 + \sigma_2 AGE2 + \sigma_3 AGE3 + \sigma_4 EDU + \sigma_5 LAB + \sigma_6 SELF + \sigma_7 PINC + \sigma_8 AFCT$$

$$+ \sigma_9 TYFAMI + \sigma_{10} DRATIO + \sigma_{11} APCHIN + \sigma_{12} CULTI + \sigma_{13} NONFARM + \sigma_{14} HLAND$$

$$+ \sigma_{15} HIMEDU + \sigma_{16} HIFEDU + \sigma_{17} DSHGM + \sigma_{18} OBC + \sigma_{19} SC + \sigma_{20} ST + U$$

$$(3.5.10)$$

In order to estimate Model-1A and Model-1B, we apply Binary Probit Maximum Likelihood method. Model-2A and Model-2B have been estimated by Binary Logit Maximum Likelihood method. The remaining models would be estimated using Ordinary Least Squares method.

3.6. Definition and Measurement of the Variables included in the Regression Models

We have specified the empirical models in the last section. In this section we define and specify the measurement of the variables that have been considered in these models. We would like to define and measure the variables considered in the whole study serially. Note that a few variables are common in more than one model. To avoid the repetition, we only refer the variables those have already been defined and explained.

Variables in Models for Family Planning Decision

In this model, we look into the determinants of the family planning decision for the rural women. The dependent variable in the model is the decision towards family planning, which we explain first and then explanatory variables of this model.

DRFP (*Decision regarding family planning by the woman under study):* It is the dependent variable in Model-1A and Model-1B. If the woman strongly inform that she has or will have utmost two children, we consider her as ideal family planner. Therefore, decision regarding family planning is a dichotomous variable such that

$$DRFP = 1, \text{ if the woman's family planning decision is positive}$$
$$0, \text{ otherwise}$$

Women's Empowerment Variables

In Model-1A and Model-1B the main explanatory variables are the women's empowerment variables. These are constructed variables. In this study we have measured women's empowerment at two levels- household level and community level. Detailed methods of construction of women's empowerment variables have been explained in sub-sections 3.2.2 and 3.2.3. Four measures of women's empowerment have been specified below.

A] **DOWEH** *(Degree of Women's Empowerment at Household Level):* It is simply a ratio of the number of criteria fulfilled by the woman to the total number of criteria set for women's empowerment at the household level. It has been expressed as percentage. So it ranges from zero to hundred.

B] **DOWEC** *(Degree of Women's Empowerment at Community Level):* Like DOWEH, it is a ratio of the number of criteria fulfilled by the woman to the total number of criteria for women's empowerment at the community level. It is also expressed as percentage form and thereby ranges from zero to hundred.

C] **CIWEH** *(Composite Index of Women's Empowerment at Household Level):* It is the weighted sum of the component scores – the weights being percentage of variations explained by the respective Principal Components after rotation. By principles of Principal Component Analysis these composite Index of women's empowerment are unit free but the values of this index varies from $-\infty \, to +\infty$.

D] **CIWEC** *(Composite Index of Women's Empowerment at Community Level):* It is the weighted sum of the component scores – the weights being percentage of variations explained by the respective Principal Components after rotation. It is also unit free but the values of this index varies from $-\infty \, to +\infty$.

The first two measures have been considered as primary explanatory variables in Model-1A and the last two are the main explanatory variables in Model-1B. In addition to the empowerment variables we have considered some other explanatory variables which are common in both the models for decision regarding family planning.

Male Child Bias: In order to measure the male child bias we have divided the women in accordance with the sequence of their children up to second issue into five groups, namely, a) women having one child only (ONEC), b) women having first and second children male, (FMSM), c) women having first child male and second child female, (FMSF), d) women having first child female and second child male, (FFSM) and e) women having first and second children female, (FFSF). Now if we find women having at least one female child are less likely to adopt family planning we say that they are male child biased.

Thus, male child bias is a categorical variable and the women, who have only one child or who have male child in first and second issue, have been considered as reference category for analyzing the impact of other groups. Therefore, the included dummy variables are as follows.

FMSF =1, for the woman having first child male and second child female

0, otherwise

FFSM = 1, for the woman having first child female and second children male

0, otherwise

FFSF = 1, for the woman having first and second children female

0, otherwise

AGAM *(Age of the Woman at the Time of Marriage):* It is the chronological age, measured in years, of the woman at the date of her marriage.

SAGEG (*Spousal Age Gap*): Spouse Age Gap, measured in years, is the difference between the physical age of husband and wife.

EDU (*Educational Qualification of the Woman*)**:** It is the number of years the woman attended the formal educational institutions.

HEDU (*Educational Qualification of the Husband*)**:** It is the number of years the husband attended the formal educational institutions.

TYFAMI (*Type of Family*): We consider two types of family – nuclear and joint. Nuclear family is a family where the woman (wife) lives with her husband and their children. On the other hand, joint family is one where husband, wife and their children live with other members of family like mother-in-law, uncle, aunt etc. It is a dummy variable as

TYFAMI = 1, if the woman belongs to nuclear family.

0, otherwise

Household Occupation: Household occupation means the economic activity in which the workers of the family are involved in to earn their livelihood over years. We have divided the households into three categories in terms of their main occupation as follows.

CULTI (Cultivation): Households mainly engaged in cultivation are considered in this category.

NONFARM (Non-Farm Self-employment): If major portion of the family income comes from the self-employed non-agricultural activities, the family is considered in this category.

Wage Labour: Households, in which earning members are wage labours or earning from the source other than cultivation or self-employment, are considered in this category.

In our study we have considered wage labour as the reference category for analyzing the impact of other categories i.e., Cultivation (CULTI) and Non-farm Self-Employment (NONFARM). Specifically,

CULTI =1, if the household is mainly engaged in cultivation.

    0, otherwise

NONFARM = 1, if the household is mainly engaged in nonfarm self-employment.

     0, otherwise

HLAND (*Household's Landholding):* Household's land is defined as the total size of land owned by the household for cultivation or residence. We have taken landholding as a quantitative variable, the unit of measurement of agricultural landholding being bigha (1 bigha = 0.4 acre).

DRATIO (*Dependency Ratio):* Dependency ratio is defined as the proportion of dependents or non-working members to the total members of the family. The dependency ratio in the family is expressed as percentage.

APCHIN (*Annual Per Capita Household Income):* Household income is the sum total of the incomes of all the earning members in the household. We have taken the total monthly expenditure as proxy for the household's monthly income and convert it into

annual income. Dividing it by household size we get per capita annual household income. The unit of measurement of this variable is rupee.

Explanatory Variables Reflecting the Community Characteristics

The main community level variable in our study is women's empowerment at the community level. We have taken DOWEC and CIWEC as main explanatory variables reflecting community characteristics in Model-1A and in Model-1B respectively. We have already specified DOWEC and CIWEC. Now we define the other community level variables affecting the decision regarding family planning, which are common in Model-1A and in Model-1B.

DSHGM (*Duration of SHG Membership*)**:** The duration of the SHG (self help group) membership is measured by the period for which the woman acts as a member of the SHG. We have taken month as measuring unit of the duration of SHG-membership.

Caste: Caste of a person is a categorical variable indicating the person belonging to a specific caste, namely, General Castes (GEN), Other Backward Classes (OBC), Scheduled Caste (SC) and Scheduled Tribe (ST) with GEN as reference category. Therefore, we have three dummy explanatory variables in connection with caste.

OBC = 1, if the person belongs to the Other Backward Classes.

0, otherwise

SC = 1, if the person belongs to the Scheduled Caste

0, otherwise

ST = 1, if the person belongs to the Scheduled Tribe

0, otherwise

Variables in Models for Incidence of Domestic Violence against Women

In order to study the incidence of domestic violence against women in the district of Bankura we have formulated two econometric models depending on the measures of women's empowerment. Except the empowerment variables, the variables in the models are same. In the models for domestic violence against women, the incidence of Domestic Violence is the dependent variable. It has been denoted by *DVIO.*

DVIO *(domestic violence against women)*: We have measured this variable by considering whether the woman experienced at least any two episodes of hit, kick, slap, beat etc. by her husband or other family member in the last six months or not. The incidence of domestic violence is a binary variable as specified below.

DVIO = 1, if the woman is victim of domestic violence during the last six months.

     0, otherwise

Explanatory Variables

First, we list those explanatory variables which have already been specified in the models for the decision regarding family planning. These are the DOWEH (Degree of Women's Empowerment at Household Level), CIWEH (Composite Index of Women's Empowerment at Household Level), SAGEG(Spousal Age Gap), HEDU (Educational Qualification of the Husband), TYFAMI (Type of Family), Household Occupation, CULTI (1= Cultivation), Household Occupation, NONFARM (1= Non-farm self-employment), HLAND (Household's Landholding), DRATIO (Dependency Ratio) and APCHIN (Annual Per Capita Household Income). The explanatory variables indicating the community traits are DOWEC (Degree of Women's Empowerment at Community Level), CIWEC (Composite Index of Women's Empowerment at Community Level), DSHGM (Duration of SHG Membership) and the dummies for Caste. In addition to these variables, we have included some other variables in the individual/household characteristics as specified below.

DURM *(Duration of the Married Life):* It is the chronological age of the woman after her marriage and is measured in years.

HIMEDU (*Highest Education among Male Household Members*): It is the education level of that male member of the family who attended the formal educational institution for maximum period. The number of years that male member attended the educational institution has been considered for measuring this variable.

DOW (*Dowry Given at Marriage*): It is captured the fact that whether the natal family of the woman has given any kind of dowry (financial or physical assets) to her in-laws at or before marriage It is a binary response variable as specified below.

DOW = 1, if the natal family of woman have given dowry.

0, otherwise

PMDOW (*Post Marriage Dowry Demand):* It is also a response variable stating whether or not the in-laws of the woman has claimed for assets after marriage from her natal house. Therefore,

PMDOW = 1, if the natal family of woman have given dowry after marriage.

0, otherwise

ADDIC (*Addiction of the Husband):* By addiction of the husband of the representative woman we mean whether or not the husband is addicted to any kind of tobacco or alcohol or both.

ADDIC = 1, if the husband is addicted to any kind of tobacco or alcohol or both.

0, otherwise

Variables in Models for Child Education Expenditure

Based on the different measures of empowerment we have formulated two separate econometric models. These have been specified as Model-3A and Model-3B. In both the models log of child education expenditure as proportion to household income in the last year has been considered as the dependent variable. Except the empowerment variables, the variables in Model-3A and in Model-3B are same.

LEDEX (*Ln of Child Education Expenditure as Proportion to Annual Household Income):* It is the logarithmic value of the percentage of child education expenditure to annual household income. We have already explained its measurement in section 3.3.3. This is the dependent variable in the models for child education expenditure for the women in Bankura district. No doubt it is a metric variable.

Explanatory Variables

First, we pass on the list of explanatory variables affecting child education expenditure, which have already been specified in the previous models. These are the DOWEH (Degree of Women's Empowerment at Household Level), CIWEH (Composite Index of

Women's Empowerment at Household Level), HEDU (Educational Qualification of the Husband), HIMEDU (Highest Education among Male Household Members), TYFAMI (Type of Family), Household Occupation, CULTI (1=Cultivation), Household Occupation, NONFARM (1=Non-farm self-employment), HLAND (Household's Landholding), DRATIO (Dependency Ratio) and APCHIN (Annual Per Capita Household Income). The explanatory variables indicating the community traits are DOWEC (Degree of Women's Empowerment at Community Level), CIWEC (Composite Index of Women's Empowerment at Community Level), DSHGM (Duration of SHG Membership) and the Caste dummies. In addition to these variables we have included one more variable in the individual/ household characteristics namely Highest Education among Female Household Members (HIFEDU)

HIFEDU (*Highest Education among Female Household Members*): The highest number of years in the educational institution, attended by any female member of the family, has been considered as the highest education among female household members. So, HIFEDU is a quantitative variable measured in year.

Variables in Models for Women's Empowerment

In accordance with the two alternative measures of empowerment we have specified two models for empowerment at the household level and two for empowerment at the community level. We have defined four empowerment variables. For each of these empowerment variables a regression model has been formulated. We have inserted the same independent variables in each model for studying women's empowerment at the households and at the community level. We now specify them as follows.

Explanatory variables reflecting Individual/household level Characteristics

First, we mention the explanatory variables which have already been specified in the previous models. These are EDU (education level of the woman), TYFAMI (Type of Family), Household Occupation, CULTI (1=Cultivation), Household Occupation, NONFARM (1=Non-farm self-employment), HLAND (Household's Landholding), DRATIO (Dependency Ratio), APCHIN (Annual Per Capita Household Income), HIMEDU (Highest Education among Male Household Members) and HIFEDU (Highest Education among Female Household Members). The explanatory variables indicating the community traits are DSHGM (Duration of SHG Membership) and the Caste

dummies. In addition to these variables we have included some more variables as follows.

Age (AGE): Age means simple the physical age of the person, counted by years. However, in different stages of life, women play different roles and duties in their households and in community. To gage the impact of age of women at different phases of life on her empowerment at the household level and at the community level we have divided them into four age groups: AGE1, AGE2, AGE3 and AGE4. Age of women in our study is a categorical variable with AGE4 as the reference category. Therefore,

AGE1 = 1, if age of the woman is below 25 years

0, otherwise

AGE2 = 1, if age of the woman is into the range 25-35 years

0, otherwise

AGE3 = 1, if age of the woman lies in the range 36-45 years

0, otherwise

Occupational Status of the Woman: Occupation of a woman means the work that the individual do on the most of the time of a day in general. We divide the occupation of the women into three categories such that Homemaker, (HM) Wage labour (LAB) and self-employed or service holder (SELF) with home maker category as reference category. The women, who basically are engaged in household job or in field agricultural activity without payment, belong to the category of home maker. The women who work for wages or crop share in the agricultural sector or do household job for wage belong to wage labour group. Women, who are mainly involved in business, manufacturing activity, provide services in organized sector, work for wages or commission in the non-agricultural unorganized sector belong to self-employed category. Thus we have

LAB = 1, if the woman belongs to wage labour group

0, otherwise

SELF = 1, if the woman earns from self-employment or from service

0, otherwise

PINC *(personal income of the woman):* It is amount of the money, measured in rupee which the woman earns from her personal activity per month in average.

AFCT *(Access to Formal Credit):* It is a qualitative dichotomous variable indicating whether or not the woman has access to formal credit. Therefore,

> **AFCT** = 1, if the woman has access to formal credit.
>   0, otherwise

3.7. Specification of Hypothesis

In order to study the empowerment and related issues of rural women in the district of Bankura we have already specified some models that to be estimated empirically. In this section, we propose the relevant hypotheses respective to those models.

3.7.1. Hypotheses relating to the Model for Decision regarding Family Planning

In the model for decision regarding family planning, our purpose is to explain how the household and community level empowerment of women along with other socio-economic factors affect the probability of taking family planning decision. The probit models that we have specified will enable us to test how the several explanatory variables affect the probability of taking family planning decision. The relevant models in this particular context are Model-1A and Model-1B and relevant hypotheses related to these models are set below.

Hypothesis-1

The empowerment of women has some positive effect on the decision regarding family planning. That is, $\beta_1 > 0$ and $\beta_{1C} > 0$ (refer to equation 3.5.1 and 3.5.2). As the women become more and more empowered they can realise the benefits of having small family. Empowered women do not take their children as their livelihood security of old age. Rather they become more conscious about their children health and education. So, we can say that the level of household empowerment is positively related with the probability of taking decision regarding family planning.

Hypothesis-2

Women having two children with at least one female child are less likely to adopt family planning. That means, $\beta_2 < 0, \beta_3 < 0 \, and \beta_4 < 0$ (refer to equation 3.5.1 and 3.5.2). It is expected that if the household prefers male child compared to female, then the couple under the household will not adopt family planning.

Hypothesis-3

Decisions regarding family planning are positively related with the age of the women at marriage. Age of the women at marriage positively affects the probability of taking family planning decision. That is, $\beta_5 > 0$ (refer to equation 3.5.1 and 3.5.2).

Hypothesis-4

It is convention in Indian culture that a husband should be older than his wife. The greater the difference of age between husband and wife the lower will be the women's say about family planning decision. The probability of taking family planning decision by women is expected to be lower for larger age gap of spouses. That is, $\beta_6 < 0$ (refer to equation 3.5.1 and 3.5.2).

Hypothesis-5

Education of the women has positive impact on the decision regarding family planning. That is, $\beta_7 > 0$ (refer to the Model-1A and Model-1B).

Hypothesis-6

Education of the husband has a positive impact on the decision towards family planning by woman. The probability of taking family planning decision by woman is directly related with the age of the person. That means, $\beta_8 > 0$ (refer to equation 3.5.1 and 3.5.2).

Hypothesis-7

Type of family, which the woman belongs to, affects the decision towards family planning by women. The probability of taking family planning decision by women is expected to be higher for the women of the nuclear family compared to those of the joint family. That means, we expect $\beta_9 > 0$ (refer to equation 3.5.1 and 3.5.2).

Hypothesis-8

The main occupation of the household is likely to influence the probability of taking family planning decision by woman. The probability of taking family planning decision is higher for the women of cultivator family and non-farm family than other. If the family shifts from the wage labour class to the cultivator class or to the non-farm self-employed family, the probability of taking family planning decision will increase. Specifically, we like to test $\beta_{10} > 0$ and $\beta_{11} > 0$ (refer to equation 3.5.1 and 3.5.2).

Hypothesis-9

We can expect that the larger the size of landholding the larger will be the probability of taking family planning decision. That is, $\beta_{12} > 0$ (refer to equation 3.5.1 and 3.5.2).

Hypothesis-10

Dependency ratio is expected to be negatively related with the probability of taking family planning decision by women. That is, $\beta_{13} < 0$ (refer to equation 3.5.1 and 3.5.2).

Hypothesis-11

Annual per capita family income has a positive impact on the family planning decision by women. That means that we like to test $\beta_{14} > 0$ for Model-1A and for Model-1B.

Hypothesis-12

Like the household level empowerment of women the community level empowerment of women has some positive effect on the decision towards family planning. That is, $\beta_{15} > 0$ and $\beta_{15C} > 0$ (refer to equation 3.5.1 and 3.5.2). Higher community empowerment means women have larger mobility in the society. They can easily identify the benefits of small family and troubles of having large family. So the women having higher community level empowerment want to have a small family.

Hypothesis-13

The duration of SHG-membership increases the probability of taking family planning decision. That is, $\beta_{16} > 0$ in equation 3.5.1 and 3.5.2. Being the member of SHG, a woman becomes more conscious and gets in touch with other people. They understand

the importance and advantages of family planning. So the probability of taking family planning decision increases with the increase of the duration of SHG-membership.

Hypothesis-14

The probability of taking family planning decision by woman is expected to be lower for the people of OBC, SC and ST compared to that for the people of general caste. That is, $\beta_{17} < 0, \beta_{18} < 0$ and $\beta_{19} < 0$ (refer to equation 3.5.1 and 3.5.2).

3.7.2. Hypotheses relating to the Model for Incidence of Domestic Violence

In the model for the incidence of domestic violence, our purpose is to explain how the empowerments of women along with other explanatory variables affect the probability of suffering from domestic violence. This section presents the hypotheses logically. The relevant models in the particular context are Model-2A (equation-3.5.3) and Model-2B (equation-3.5.4) and relevant hypotheses related to these models are stated below.

Hypothesis-1

The probability of sufferings of women from the incidence of domestic violence is negatively related with the household level empowerment and with the community level empowerment. It means that we like to test $\gamma_1 < 0$ and $\gamma_{15} < 0$ (refer to equation 3.5.3) and we test $\gamma_{1C} < 0$ and $\gamma_{15C} < 0$ (refer to equation 3.5.4).

Hypothesis-2

Duration of married life of the woman is negatively related with the incidence of domestic violence against her. That is, $\gamma_2 < 0$ (refer equations 3.5.3 and 3.5.4). Normally, with the increase in age women become more experienced and their influences in the family increase. Therefore, the duration of married life of the woman inversely affects the probability of sufferings from the incidence of domestic violence.

Hypothesis-3

Spousal age gap is directly related with the occurrence of domestic violence against women. The higher the age gap the higher will be the occurrence of domestic violence against women. That is, $\gamma_3 > 0$ (refer to equations 3.5.3 and 3.5.4).

Hypothesis-4

Husband education has a negative impact on the occurrence of domestic violence. With the increase in the level of education of husband, the probability of occurrence of domestic violence against his wife decreases. That is, $\gamma_4 < 0$ (refer to equation 3.5.3 and 3.5.4). This is self-explanatory.

Hypothesis-5

Higher education of the male family member is likely to reduce the occurrence of domestic violence. That is, higher education among the male person in family reduces the probability of occurrence of domestic violence against women. That is, $\gamma_5 < 0$ (refer to equation 3.5.3 and 3.5.4).

Hypothesis-6

The probability of occurring violence against women within family is expected to be lower for the women of the nuclear family compared to those of the joint family. That means, we expect $\gamma_6 < 0$ (refer to equation 3.5.3 and 3.5.4).

Hypothesis-7

It is very difficult to say whether the women of wage labour family suffer more from domestic violence in contrast to the women of cultivator family or the non-farm self-employed family. That is why, we want to test the hypothesis, $\gamma_7 \neq 0 \; and \; \gamma_8 \neq 0$ (refer to equations 3.5.3 and 3.5.4).

Hypothesis-8

There is no reason to expect any particular relation between the size of the household's landholding and the occurrence of violence against women. Therefore, we frame the alternative hypothesis $\gamma_9 \neq 0$ (refer to equations 3.5.3 and 3.5.4).

Hypothesis-9

There is no confirmed relation between the dependency ratio and the probability of occurrence of violence in the family against women. Therefore, we would like to test $\gamma_{10} \neq 0$ (refer to the Models-2A and Model-2B).

Hypothesis-10

Higher the annual per capita family income lower will be the probability of the occurrence of domestic violence against women. That means that we like to test $\gamma_{11} < 0$ for equations 3.5.3 and 3.5.4. Higher per capita family income ensures higher living and social standard of the family. So we expect that with the increase in the annual per capita income, the probability of the occurrence of domestic violence against women will decrease and vice-versa.

Hypothesis-11

We like to test whether the dowry system causes domestic violence in the area under study. With this end in view, we make hypothesis that the women who have given any kind of dowry suffer more from domestic violence from her in-laws. Not only that, we expect the sufferings of women to increase if the post marriage dowry demand arises. That is, we have set the hypotheses $\gamma_{12} > 0$ and $\gamma_{13} > 0$ (refer to the equations 3.5.3 and 3.5.4).

Hypothesis-12

The frequency of the sufferings of women from domestic violence and drug addition of their husbands are directly related. That is why, we are interested to test $\gamma_{14} > 0$ (refer to the equations 3.5.3 and 3.5.4).

Hypothesis-13

There is a negative relation between the occurrence of domestic violence against women and the duration of SHG-membership. That is, $\gamma_{16} < 0$ (refer to the equation 3.5.3 and 3.5.4). In fact being the member of self-help group a woman becomes more conscious about their rights and about their own wellbeing along with the wellbeing of the family and the society.

Hypothesis-14

The women who come from the OBC, SC and ST family are more likely to suffer from domestic violence compared to the women of the general caste. That is, $\gamma_{17} > 0, \gamma_{18} > 0$ and $\gamma_{19} > 0$ (refer to the equation 3.5.3 and 3.5.4).

3.7.3. Hypotheses in Connection with the Child Education Expenditure

In this sub-section we would formulate a set of hypotheses stating the relation between children's education expenditure and women's empowerment along with several other determinants.

Hypothesis-1

Household as well as community level empowerment of a woman has a positive impact on her children's education expenditure. Therefore, the higher the empowerment of women the higher will be the expenditure as proportion to household income for their children's education. So, we expect $\alpha_1 > 0$ and $\alpha_{11} > 0$ in equation 3.5.5 and $\alpha_{1C} > 0$ and $\alpha_{11C} > 0$ in equation 3.5.6.

Hypothesis-2

The higher the education level of the father, the higher will be the share of educational expenditure in household income for children in the family. That is, $\alpha_2 > 0$ (refer to Models-3A and Model-3B).

Hypothesis-3

The educational expenditure out of family income is directly related with the highest male education and highest female education in the family. That is, $\alpha_3 > 0$ and $\alpha_4 > 0$ (refer to Model-3A and Model-3B). Like many other decisions, the decision of how much to spend in children education depends on the education level of the other family members. An educated person better understand how much and for which stream of education they would spend. It is natural to expect that the highest male education and highest female education have favourable effect on the educational expenditure of the family.

Hypothesis-4

Women who belong to the nuclear family spend more on the education of their children than the women who belong to the joint or extended family. Thus we say that if a woman moves from the joint family to nuclear family, she will spend more. That is, $\alpha_5 > 0$ (refer to equations 3.5.5 and 3.5.6).

Hypothesis-5

A mother of cultivator family or non-farm self employed family spends more on their children education compared to a mother of wage labour family. That is, $\alpha_6 > 0$ *and* $\alpha_7 > 0$ (refer to equations 3.5.5 and 3.5.6). In wage labour family more heads means more income. Moreover, most of these families suffer from poverty. So they concentrate more on their bread rather the education of their children. That is why, in wage labour family children are also occupied as wage labour.

Hypothesis-6

Household's landholding has positive effect on the children's education expenditure. The income share in children's education expenditure increases as the size of the household agricultural land holding increases. That is, $\alpha_8 > 0$ (refer to equations 3.5.5 and 3.5.6). This is self-explanatory.

Hypothesis-7

Dependency ratio in the family affects negatively the educational expenditure. Therefore, the expenditure for education of children and dependency ratio in the family varies inversely. That is, $\alpha_9 < 0$ (refer to equations 3.5.5 and 3.5.6).

Hypothesis-8

As annual per capita family income increases share of child educational expenditure in income increases. That means that we like to test $\alpha_{10} > 0$ (refer to equations 3.5.5 and 3.5.6).

Hypothesis-9

The duration of membership of a woman in a SHG are expected to affect the expenditure for their children education positively. As the number of years engaged in SHG increases, the education expenditure for their children also increases. It implies that $\alpha_{12} > 0$ in equation 3.5.5 and 3.5.6.

Hypothesis-10

Women belonging to the general caste are more likely to spend on children's education compared to the women belonging to the Other Backward Classes, Scheduled Caste and

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Scheduled Tribe. Therefore, the spending for children education as proportion to family income will be higher in the general caste families contrasted with the non-general caste families. That is, $\alpha_{13} < 0, \alpha_{14} < 0$ and $\alpha_{15} < 0$ (refer to equations 3.5.5 and 3.5.6).

3.7.4. Hypotheses relating to the Models of Women's Empowerment

In order to assess the impact of several socio-economic-demographic factors on women's empowerment at the household level and at the community level we have specified four regression models in accordance with the measure of empowerment. In this sub-section we propose the hypotheses relating to the empirical models.

Hypothesis 1:

It is very difficult to assign any particular relation between the age of the woman and the empowerment level of women. We expect that the women's empowerment at the household level and at the community level of age group below 25 years is lower than that of the reference group. Again we can assume that age groups 25-35 years and age group 35-45 years enjoy more empower compared to reference group (above 45 years). It means that $\delta_1 < 0, \delta_2 > 0, and \delta_3 > 0$ (refer to equations 3.5.7 and 3.5.8) and $\sigma_1 < 0, \sigma_2 > 0, and \sigma_3 > 0$ (refer to equations 3.5.9 and 3.5.10).

Hypothesis 2:

Education of women directly affects women's empowerment at the household level and at the community level. Here our hypothesis is $\delta_4 > 0$ referring to equation 3.5.7, 3.5.8 and $\sigma_4 > 0$ in equations 3.5.9 and 3.5.10. Education makes a woman more conscious in all phases and all aspects of life. It increases her political and legal understanding. It improves the decision making power of woman at home and outside home. From all these observations we expect that education enhance both the household and societal empowerment of woman.

Hypothesis 3:

The occupation of a woman is likely to influence her empowerment. Therefore, the empowerment is higher for wage labour and self employed women compared to home

makers. Specifically, we like to test $\delta_5 > 0$ and $\delta_6 > 0$ (refer to equation 3.5.7 and 3.5.8). We also like to test $\sigma_5 > 0 \, and \, \sigma_6 > 0$ in equation 3.5.9 and 3.5.10.

Hypothesis-4

Average Monthly Personal Income of the woman affects her empowerment level positively. That is, $\delta_7 > 0$ refer to equation 3.5.7, 3.5.8 and $\sigma_7 > 0$ in 3.5.9 and 3.5.10.

Hypothesis-5

There is a positive relation between the access to formal credit and the empowerment of women. That is, we test $\delta_8 > 0$ referred to equation 3.5.7 and 3.5.8 and $\sigma_8 > 0$ in and 3.5.9 and 3.5.10.

Hypothesis-6

Women belonging to nuclear family enjoy more empowerment compared to the women belonging to joint family. This means $\delta_9 > 0$ and $\sigma_9 > 0$ (refer to equations 3.5.7, 3.5.8, 3.5.9 and 3.5.10).

Hypothesis-7

Dependency ratio in the family is negatively related with the empowerment of woman. We like to test $\delta_{10} < 0$ (refer to equations 3.5.7 and 3.5.8). We set alternative hypothesis $\sigma_{10} < 0$ in equations 3.5.9 and 3.5.10.

Hypothesis-8

We cannot confine to any definite relation between the annual per capita family income and the empowerment of a woman of that family. In this case we test the hypothesis $\delta_{11} \neq 0$ (refer to equations 3.5.7 and 3.5.8) and $\sigma_{11} \neq 0$ (refer to equations 3.5.9 and 3.5.10).

Hypothesis 9

Women who belong to the cultivator family or non-farm self-employed family has more empowerment in compare to the women of wage labour family. That is,

$\delta_{12} > 0 \; and \; \delta_{13} > 0$ in equations 3.5.7, 3.5.8 and $\sigma_{12} > 0 \; and \; \sigma_{13} > 0$ in equations 3.5.9 and 3.5.10.

Hypothesis-10

It is very difficult to identify the direction in which the empowerment of women move when the size of the household's landholding increase or decrease. In this case we test the hypothesis $\delta_{14} \neq 0$ and $\sigma_{14} \neq 0$ (refer to equations 3.5.7, 3.5.8, 3.5.9 and 3.5.10).

Hypothesis-11

Highest male education and highest female education in the household other than the respondent is likely to accelerate the empowerment level of the woman in the household as well as in the society. Therefore, the household and societal empowerment of women varies directly with the highest male education and highest female education in the household. Specifically, we like to test $\delta_{15} > 0$, $\delta_{16} > 0$ and $\sigma_{15} > 0, \sigma_{16} > 0$ (refer to equations 3.5.7, 3.5.8, 3.5.9 and 3.5.10).

Hypothesis-12

The duration of SHG membership has positive impact on the empowerment of woman. The higher the number of years of involvement of a woman in a SHG the higher will be her empowerment at the home and at the society. This means $\delta_{17} > 0$ and $\sigma_{17} > 0$ (refer to equations 3.5.7, 3.5.8, 3.5.9 and 3.5.10).

Hypothesis-13

The empowerment of general caste women is expected to be higher for the women of OBC, SC and ST, i.e. $\delta_{18} < 0, \delta_{19} < 0$ and $\delta_{20} < 0$ (refer to equation 3.5.7 and 3.5.8). We also examine $\sigma_{18} < 0, \sigma_{19} < 0$ and $\sigma_{20} < 0$ in equations 3.5.9 and 3.5.10.

3.8. Methodology of Data Collection

An adequate and reliable source of data is the primary ingredient of an empirical study. Without an adequate and reliable data set, any type of empirical analysis and its results would be falsified and will convey a wrong message to the future researchers and policy makers and thereby the purpose of the empirical study will be lost. That is why, before

going to the any type of empirical analysis we need to have a set of adequate and reliable data, which are collected following a scientific methodology. Keeping this point in mind, we have collected a set of primary data from the district of Bankura in West Bengal during 2012-2013. In this section we like to explain the methodology of data collection and present the nature and scope of the data and finally present the procedure of the diagnostic check for the sample size that would be used to factor analysis and estimate the econometric models as specified in the above sections.

3.8.1. Sampling Design

In order to carry out the study of women's empowerment we have considered the case study of the district of Bankura in West Bengal. This district belongs to the Jangalmahal (West Midnapore, Bankura and Purulia) in West Bengal. It has some distinct history and cultural norms as mentioned in the chapter one. We have selected Bankura district purposively as our study area. It is already known that the district has three sub-divisions and twenty-two blocks. For conducting the sample survey we have followed four stages stratified mixed sampling procedure. First of all, two blocks, namely Kotulpur and Chhatna have been selected purposively. Of which Kotulpur block is relatively developed and Chhatna block is relatively underdeveloped area in the district of Bankura. This constitutes the first stage of our sampling. In the second stage of the sampling we have randomly selected two Gram panchayets from Chhatna block and three from Kotulpur block. Later on, we have chosen two (four villages from Dhaban Gram panchayet) villages from each of the sample Gram panchayet. In total twelve villages have been selected for our empirical study. Finally, after making a pilot survey for each village, sample households are selected randomly from the sample villages. This completes the fourth stage of the sampling design. It should be noted that number of households chosen from each village are not equal. It depends on the total number of households and other socio economic characteristics of the villages. Therefore, we have designed a multi-stage sampling procedure which is also a combination of both purposive and random sampling to take the advantages of the both. It may be looked as a multi-stage stratified random sampling. Primarily, we have surveyed more or less six hundred households and interviewed at least 611 persons; of them we have recorded the relevant information of 580 households/persons in our data sheet. Data of some households are rejected due to incomplete, insufficient, or absurd information and for

maintaining standard sample size suitable for factor analysis and econometric estimations.

3.8.2. Profile of the Sample Areas

It has been already mentioned that our sample is constituted by 580 households residing at villages belonging to two blocks in the district of Bankura. In this sub-section we present an overview of the characteristics of the sample villages. Almost all the sample villages are remote in terms of the access to well transport facility, health facility, banking facility, job opportunity etc. In our sample we have selected three villages namely Gopalpur, Sidabari and Meghkata, where scheduled tribe community forms the major segment of population. In table-3.8.1 numbers and distribution of sample households corresponding to each village have been presented. A large number of Muslim households reside at Sarisadighi and Hati villages. Majority of the households at Ghatdighi, Dhaban and Tegharia belongs to scheduled castes community. There is no one village with any type of Bank branch.

Table 3.8.1. Area Specific Distribution of the Sample Households

Blocks	GramPanchayets	Villages	Total Households	Scheduled Caste Households	Scheduled Tribe Households	Sample Households
Kotulpur	Madan Mohan Pur	Hati	200	100	0	50
		Sundarchack	200	80	0	49
	Sihar	Masinapur	260	80	20	60
		Sihar	750	150	90	50
	Kotulpur	Ghatdighi	750	350	0	60
		Sarishadighi	110	60	0	40
Chhatna	Dhaban	Dhaban	550	265	0	70
		Tegharia	250	50	30	25
		Sidabari	175	25	30	27
		Gopalpur	265	55	130	44
	Jamtora	Meghkata	120	0	90	60
		Chitora	195	40	40	45
		Total				580

Source: Author's own field survey area during 2012-2013

There is a primary agricultural credit Samabay Samity at few sample villages. We have taken different size of villages in terms of the number of total households residing at the villages. In this sense, Sihar is the largest village and Sarisadighi is the smallest one among the sample villages. But sample households selected from Sihar is not highest among the number of households selected from other sample villages because a large section of the households in this village lies in a homogeneous group. In almost all the villages, the SHG based micro financing has been functioning but their tenure and outreach of activities differ from village to village. Most of the groups have been formed by women. This program includes the village women in the main stream development process making their financial inclusion and inculcates empowerment. In few villages women have participated in the NREGA program for supporting their families.

3.8.3. Nature and Scope of Data

We had prepared a structured questionnaire based on the objectives and necessity of our empirical study. For each village first we have conducted a pilot survey regarding the village level information. Then, the required data have been collected directly from the representative women from households. The purposive information has been collected through personal interview method. A woman from each sample household has been interviewed personally in a face-to-face contact to collect relevant information. The conversation was conducted in the local language. Therefore, we can claim that our data set is purely primary in nature.

In order to study the nature causes and consequences of women empowerment we have conducted exhaustive household survey and gathered the information regarding the different indicators of empowerment at the household level and at the community level as mentioned in section 3.2. Information regarding different household welfare has been collected to assess to impact of empowerment. Particularly data for several issues on domestic violence and on decision regarding family planning have also been collected. We have covered household income and expenditure pattern on food nutrition, on fuel and energy, on health care and on child education. We have also collected information regarding some selected socio economic and demographic characteristics of the respondent women, households and village like social status, age, educational background of the woman and other household members, occupation of the woman and occupational structure of the family, landholding, annual family income, dependency

ratio, SHG-membership status, caste, religion, distance of household from bank, school, hospital etc. We have divided categorically all the relevant information into individual, household and community characteristics. The respondents are not always smart enough to inform actual figure of the required data. So, we have logically tried to make a generalization. It is natural that in any type of data collection there may be some sort of discrepancy or personal bias. In our case we have tried to minimize this problem through cross checking.

3.8.4. Diagnostic Check for the Sample Size

In order to study women's empowerment at the household level and at the community level we have planned to apply factor analysis. So, we should check the factorability of our data set. The primary condition for applying the factor analysis is that the variables under consideration, indictors of women's empowerment in our case, are significantly correlated with each other. There are two popular tests for diagnostic check of the data set to be used in factor analysis. One is Bartlett's test of sphericity and other is the Kaiser-Meyer-Olkin measure of sampling adequacy.

In order to test the null hypothesis that the correlation matrix of the variable under consideration is an identity matrix we have used Bartlett's Test of Sphericity based on the test statistic

$$\chi^2 = -[(n-1) - \frac{1}{6}(2k+1+2/k)][\ln|D| + k\ln(1/k)\sum I_j] \sim \chi^2_{\frac{1}{2}k(k-1)}$$ where, k stands for

number of variables, I_j denotes jth eigenvalue of D.

Kaiser-Meyer-Olkin measure of sampling adequacy has been used to compare the magnitudes of the observed correlation coefficients in relation to the magnitudes of the partial correlation coefficients of the variables with the help of the formula

$$KMO = \frac{\sum\sum r_{ij}^2}{\sum\sum r_{ij}^2 + \sum\sum \rho_{ij}^2}$$ where, $\rho_{ij} = r_{ij.1,2,...k}$

The range 0.8 to 1.0 of KMO statistic indicates a commendable degree of common variance. If KMO statistic lies in the range 0.6 to 0.8 we can say that the degree of

common variance is mediocre. The value of KMO statistic below 0.6 reveals a miserable degree of common variance and the researchers should not use the factor analysis. This methodology suggests that before going to Principal Component Analysis for empowerment indicators we have to conduct the KMO test of the data set of the indicators of women's empowerment. If we find KMO value greater or equal to 0.6 we apply PCA and otherwise not. We should, therefore, obey this rule in our study of women's empowerment.

Once our data set of the indicators of women's empowerment passes this diagnostic test we can apply Principal Component Analysis for extracting the factors of women's empowerment and their respective weight. It will help us measure a composite index for women's empowerment at the household level and at the community level.

3.9. Conclusion

In this chapter we have explained the women's empowerment conceptually and quantitatively. We have proposed two alternative methodologies for quantifying the women's empowerment at household level and at the community level for the sample women. The frameworks for studying the impact of women's empowerment, on household welfare denoted by the attitudes regarding family planning, domestic violence against women and children education expenditure have been presented. We have presented the regression specification of our analytical framework of the issues of women's empowerment in the district of Bankura followed by the underlying hypotheses in the respective models. Given the model, methodology and data, we present and discuss the empirical findings of the issues relating to women's empowerment in the district of Bankura in chapter four and chapter five.