

**STUDY OF WOMEN'S PARTICIPATION IN AGRICULTURE AND
ALLIED SECTORS IN KOCH BIHAR DISTRICT OF WEST BENGAL**

A THESIS SUBMITTED FOR THE AWARD OF DOCTOR OF
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SUBMITTED BY
ANWESHA SAHA

UNDER THE SUPERVISION OF
DR. INDIRA LEPCHA NEE LAMA
ASSOCIATE PROFESSOR

DEPARTMENT OF GEOGRAPHY & APPLIED GEOGRAPHY
UNIVERSITY OF NORTH BENGAL

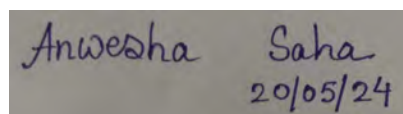
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DEDICATION

I dedicate this thesis to my parents and my family members who has supported and co-operated each step in my life and to this work.

DECLARATION OF THE CANDIDATE

I do hereby declare that the thesis entitled “Study of Women’s Participation in Agriculture and Allied Sectors in Koch Bihar District of West Bengal” has been prepared by me under the supervision of Dr. Indira Lepcha Nee Lama, Associate Professor, Department of Geography and Applied Geography, University of North Bengal. This thesis is submitted for the fulfilment of the award of Doctor of Philosophy. The research work is an outcome of my own efforts and is an original one. I have designed the research work, collected the data, analysed the result, interpreted the findings. I further declare that this research work has not been published or awarded elsewhere, nor has been submitted in full or part for any other degree.



(Anwesha Saha, Researcher)

Department of Geography & Applied Geography
University of North Bengal



DEPARTMENT OF GEOGRAPHY & APPLIED GEOGRAPHY
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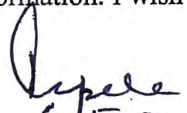
+91-0353-2776342
+91-0353-2699001
www.nbu.ac.in

RAJA RAMMOHUNPUR, P.O. NORTH BENGAL UNIVERSITY, DIST. DARJEELING, WEST BENGAL, PIN - 734013
Ph. No. +91-0353-2776342, FAX +91-0353-2699001, URL: www.nbu.ac.in

CERTIFICATE

This is to certify Smt. Anwesha Saha has prepared the thesis entitled "*Study of Women's Participation in Agriculture and Allied Sectors in Koch Bihar District of West Bengal*" for the award of Ph. D. degree in the Department of Geography & Applied Geography, Faculty of Sciences, University of North Bengal.

She has carried out the research work in the Department of Geography & Applied Geography, University of North Bengal based on primary data and secondary sources of information. I wish her all success in life.


6.15.2024
Indira Lepcha Nee Lama

Associate Professor
Department of Geography & Applied Geography
University of North Bengal



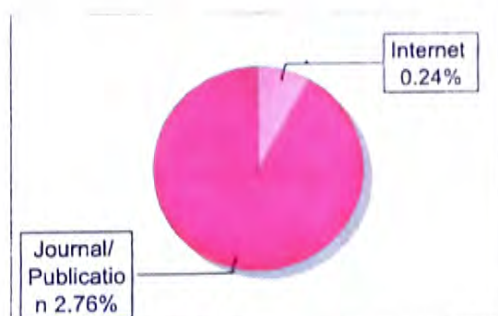
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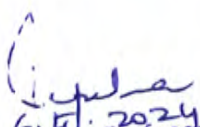


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6.5.2024
Associate Professor
Department of Geography &
Applied Geography
University of North Bengal

Anwesha Saha
20/05/24



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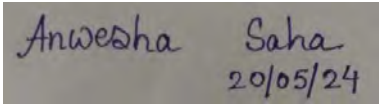
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(Anwesha Saha, Researcher)

Department of Geography & Applied Geography
University of North Bengal

PREFACE

This thesis entitled “Study of Women’s Participation in Agriculture and Allied Sectors in Koch Bihar District of West Bengal”, deals with farm women’s role in the growth and development of agriculture and allied sectors with their domestic duties. As a means of achieving the objectives of the study and to draw some meaningful conclusions, the study had been organized in eight chapters. In first chapter, Introduction, deals with objectives, review of literature, hypothesis, Methodology, origin and dimension of woman’s involvement in agriculture from pre historic to modern age etc. Second chapter explain the location and geo-environmental setting of the study area, that is, location, geology, relief, climate, drainage, soil, natural vegetation, groundwater, demographic characteristics, land use, agricultural technologies etc. Third chapter describe the overall socio-economic condition of Koch Bihar district and socio-economic status of women of this area. This chapter interpret the level of demographic condition, infrastructural condition, economic condition and overall socio-economic condition of Koch Bihar district. This chapter further delineate the total female worker in different blocks of Koch Bihar, occupation structure of female workers in different blocks of Koch Bihar, women involved in agriculture and allied activities out of total working population of Koch Bihar, Socio economic status of women respondents of Koch Bihar district such as status of farm women, age group, caste status, religion status, educational status, occupational status, annual income, annual expenditure, land holding of the family, farm power, irrigation sources, house types etc. Fourth chapter explicate the relationship between women’s participation in agriculture and allied sectors and their development. This chapter through light on female work participation rate in different blocks of Koch Bihar districts, distribution of female Main and Marginal workers, relationship between female literacy and work participation, participation of farm women in farm and livestock activities along with their domestic duties, agricultural knowledge & awareness of farm women etc. Chapter five spell out the involvement of farm women in decision making process in agriculture and allied sectors along with household activities. This chapter again clarify the point score scale analysis (Risk Preference, Scientific Orientation, Economic Motivation, Independence Scale, Management Orientation, Attitude towards Agriculture, Attitude towards Animal Rearing & Poultry) and index analysis (AII & DII), involvement in decision making of farm women in agricultural activities, family matters

and economic aspects. Chapter five again explain the descriptive distribution of the socio-economic attributes associated with women involved in agriculture, association of farm women's involvement in agricultural activity with their socio-economic attributes, association of farm women's involvement in decision making related to agricultural and allied activities with their socio-economic attributes. Chapter six account for the problems faced by farm women in the study area. This chapter again explain the farm women drudgery in agriculture. Chapter seven focus in findings, summary, recommendations and conclusion.

This thesis has wide future scope to improve the efficacy of farm women in all aspect of their life. The outcome of the study will be useful for the associated government departments and other agencies as farm women have the potentialities for improvement of socio-economic status through their participation in agriculture and allied fields. This work will very helpful for further research project also. This thesis conducted location-specific research which generates more concrete and detailed data which would be more effective and practical for developing new strategies for farm women.

ABSTRACT

Koch Bihar is located on the northern part of West Bengal along the foothills of Himalayas. This district is the gateway to Assam from West Bengal and also Bangladesh. Koch Bihar district is geologically composed by new alluvial soil. The climate of this district is hot and humid summer, moisture in air during rainy season and cold winter. The major rivers flow from north-west to south-east. Six river systems (Tista, Jaldhaka, Torsa, Kaljani, Raidak and Gadadhar) cut through the district flowing in a south-easterly direction. In Koch Bihar district male population is 51.49% and female population is 48.51% (Census 2011). Koch Bihar is an agricultural district. The female main workers in Koch Bihar district the majority of women are involved as agricultural labourers forming 48.83%. 23.3% of women are engaged as cultivators. Among the female marginal workers in the district 23.64% women work as cultivators, 52.77% women are involved as agricultural labourers (Census 2011). Women population share abundant responsibilities and perform wide spectrum of duties in running family, maintaining households, agriculture and allied fields in this district. Although rural farm women contribute monetary and non-monetary inputs toward family income, however, they occupy low position in the socio-economic index. To meet the family's daily requirements of food, firewood, water and fodder, the women in the villages work in agricultural fields, pastures etc., apart from the jobs they work in household, the unpaid activities in the domestic-sphere. Farm women are extensively involved in agricultural activities. However, the nature and extent of their involvement differs with the variations in agro-production systems. The present study was conducted among 1200 respondents in Koch Bihar district to study the level, extent and nature of participation of rural farm women in home, farm and livestock production activities as well as decision making process. Random sampling technique was adopted for collecting the data and the study based on primary data and documentary sources. The result revealed that in the Koch Bihar district female work participation rate was highest in Sitai block (31.77%) and lowest in Cooch Behar-II (14.84%) as per Census 2011. Most of the farm women were largely engaged with some farm activities such as threshing (84%), winnowing (84%), weeding (82%), sowing (78%), thinning (70%) etc. Almost all the farm women (88.33%) had doing allied activities such as poultry and animal rearing. 74.17% farm women did not try an entirely new method in farming which involves risk. 66.5% farm women willing to grow

large number of crops to avoid greater risks. The study revealed a negative attitude to taking risk of the farm women. After doing 8 hours. agricultural work farm women worked for her own family and also did livestock activities. Farm women's participation in terms of doing was more than of supervision in case of all agricultural and animal husbandry activities. Although rural farm women played a vital role in agricultural, domestic & livestock activities but for decision making their view was very negligible. There is a tendency to see men as farmers and women as farmer's wife or helper and highlight their supportive roles rather than productive roles. Farm women experienced also drudgery effect of agricultural activities mostly through the processes of weeding, transplanting, harvesting, threshing, cutting, carrying and storing grains. Eleven problems were identified in the study area which reflects the barriers in case of involving the women in any agricultural system. The field survey revealed 96.97% of farm women faced the problem of gender disparity in wages. 77.80% of the respondents were faced negligence in decision making. 74.17% of the farm women had more involvement in house hold work for this they had problems to do agricultural work with household activities. 71.74% of farm women had limited land ownership. 68.86% of farm women were faced the problem of lack of gender-neutral agricultural tools, 60.45% farm women had limited access to capital, resource and credit. There is an immediate need to improve extension facilities to train the farm women regarding the best risk management practices for deciding the choice of a particular crop such as growing short-duration crops as well as climate-resistant crop varieties. Storage facilities and weather-based crop insurance are necessary that can effectively address farmer's challenge and improve risk taking capabilities of a farmer. Farm women need to more interact with scientific oriented persons or agricultural extensions to update themselves about the crop science and agricultural technologies. There is a need to work on transforming the less socio-economic condition to high socio-economic condition which will motivate farm women to fully devote their effort to increase their income to lead a satisfied life. Farm women needs to come out on the dependency form their male counterpart in decision. It is high time for planners, policy makers and extension personnel to realize the immense potential of farm women resources in agriculture and develop appropriate policy measures. Beside this, it is necessary to provide need based educational programmes and market linkages to farm women so as to get additional income and employment opportunity in the days to come.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Since the advent of human civilization, women have played a pivotal role in case of characterizing and giving impetus to the growth and development of agriculture as a vocation. Women have their inclination towards doing the household activities from the primitive era. Women have their efficiency in case of dealing the complex things in a multidimensional social situation. Till date, women are the critical workforce for the development of our economy and society. As per Census, 2011, 48.46% women of this country are generally associated with the sustainable domestic activities and considerable sectors of women are involved to the wellbeing of farm households. Women are involved in all aspects of agriculture and allied activities from land preparation to making agricultural produces. Nowadays 44% world's food is produced by women which shows the importance of women in agricultural sector (Chowdhury, 2008). Rural Indian women are widely involved in agricultural activities. However, the nature and level of their participation differs with the variations in agro-production systems. The form of female participation in agricultural production varies with the land-owning status of farm households. Their role ranges from managers to landless labourers. In overall farm production, women's average contribution in India is estimated at 55% to 66% of the total labour with percentages much higher in certain regions (Venkateswan, 1992). Indian women in contemporary India do not enjoy an equal status with men, as Indian society has strong overtones of patriarchy. The social status of farm women reveals that most of them belong to socially backward and economically disadvantaged groups like Scheduled Castes, Scheduled Tribes and backward classes. So, women are the backbone of the village economy in general and of the economy of agriculturally dependent districts. Thus, farm women's role is biological and social combined to create four distinct functions of mother, wife, homemaker and worker. The role of homemaker and worker is equally important as the two roles. But her role as an active worker and producer is rarely acknowledged though it is significant for the family's survival (Reddy, 2003). Status and role of Indian women and their problems are linked to the history and social system of the country. They are not treated at par with men in many aspects of life. Though six decades have passed since independence, women are yet in the grip of the traditional role resulting into the economic dependence, social neglect and political ignorance, eventually preventing them to attain their due place in society. Female children as unpaid contributors have considerable role in household production. They contribute substantially as helpers in subsistence farming, livestock management, gathering fuel wood,

collecting water and acting as surrogate mother when the mother is busy in farm and other livelihood activities. By virtue of these various activities, they qualify as essential components of rural labour force. But their contribution is ignored by standard estimates of labour force. Recently many households in rural areas are headed by a single parent usually a mother because male migrate with their limited literacy and skill to urban area for secondary jobs leaving the illiterate women behind with the land and children leading to *feminization of agriculture*. These women despite the fact that they are performing several farm activities, their roles have been overlooked by agriculturalist and policy makers. Although the decision to be taken by farm women is influenced by the opinion of others with whom they interact (Chaudhary *et al.* 1998). Women's decision-making freedom is linked to whether she is engaged in gainful economic activities or not. Her economic activity and economic contribution help women to gain more power in making decision. Farm women are not much acquainted in new agricultural technologies and other innovations. Today, farm women do not seem to have meaningful access to the new farm technologies as they have little access to non-formal education, rural institutions and extension services.

Despite significant contributions of women in the crop production, animal husbandry, fisheries, forestry and post-harvest operations, those engaged in the formulation of policies have often tended to neglect the productive role of women. But still the role of women is marginalized, undervalued and unrecognized. Women's status in society is measured in terms of educational level, income, employment as well as the role played by them in the family, society and the community. Education affects employment opportunities and the decision-making role. Economic viability and education contribute either singly or jointly to women's empowerment. In fact, education and employment of women are the first prerequisite not only for improving the status of women but also for moving towards gender equality. In production relations gender relation takes the form of the appropriation of women's household work. In labour market it takes the form of discrimination in wages, sexual segregation of jobs, restricted entry to jobs, inadequate access, ownership and control of productive resources like technology, skills, education, productive assets like land and credit, information and mobility. State agencies are usually dominated by men and are, therefore, biased towards patriarchy either because of their male interests or simply ignorance or poor understanding. Women are poorly represented in these structures to make a difference. There is a tendency among the administrators and policy makers to see men as farmers and women as farmer's wife and highlight their supportive roles rather than productive roles (Samanta, 1994). As a consequence,

the biasness of the development planners in agricultural planning process is enumerated as follows.

- Women are consumers of social services, rather than producers and hence, it is enough to reach them with schemes like applied nutrition, home making, tailoring, weaving, pre and postnatal care etc. Agriculture is not their forte.
- Within the family structure, there is 'inside-outside' dichotomy in respect of division of labour. Agriculture is perceived as an activity, with its local outside the house and hence, women are left out.
- Whatever women do in agriculture, are usually auxiliary in nature and hence they need not be brought into the purview of agricultural development.

In such a resilient research climate there is a need to reemphasize the role of farm women in household activities, livestock rearing and farm activities and in decision making process. Thus, there is need for a conceptual and theoretical framework that can fully explicate the relationship of women's involvement in agricultural decision-making process. Keeping all this in view, the present study is conducted to explore the areas of women's involvement and decision making in agriculture and allied activities.

1.2 Review of Literature

A comprehensive and systemic review of the past literature is a prerequisite for carrying out any research in a scientific manner. A reference to the past studies provides guidelines not only to frame future areas of research to be covered and methodology to be adopted but also to confirm or repudiate research outcome with possible reasons.

Chaudhary et al., (1998) revealed that age, education, cosmopolitans, mass media exposure and extension contact were positively related with decision making ability of farm women in relation to farm and aspects, while income and socio-economic status were found to be non-significant in relation with decision-making. It has clearly indicated that educated women, having contacts outside their social system, having more mass media exposure and better extensive contacts influenced the decision-making. It also indicated that farmwomen who had higher income and higher socio-economic status took independent decisions.

Punam Kumari (1998) opined that 50% of the societies population who contributed significantly in making their homes were not given due share in decision making, pertaining the economic affairs of the home. The study rather showed that men were taking all the major

decisions in the households. The study further revealed that the joint decision-making was also adopted in less than 25% of the cases showing male dominance in decision making in various areas.

The extent on involvement of women in farm operations like the selection of seeds including hulling and inter-cultivation, sowing activities, harvest and post-harvest activities respondents showed medium levels of involvement. (Saikia and Das, 1998).

Doss R. (1999), stated that based on an extensive review of the literature on women farmers in Africa, this paper explored the potential reasons why women farmers had not adopted improved maize technologies and discusses the implications for agricultural research. Women farmers were often constrained by their lack of access to labour, land, and inputs. In addition, women may prefer different outputs than men. Finally, the dynamics of household decision-making affects technology adoption; roles and responsibilities within the household were often renegotiated when new technologies were adopted, and women may be reluctant to provide labour if they did not receive some of the benefits. Each section of this paper includes a number of questions that may provide insights into the gender roles and dynamics in a particular community. Three general conclusions could be drawn from the available literature. First, there was enormous complexity and heterogeneity among African households. Second, there was no simple way to summarize gender roles within African households and communities. Third, gender roles and responsibilities were dynamic; in particular, they change with new economic circumstances. An extensive annotated bibliography on gender issues and the adoption of maize technologies in Africa follows the review of studies.

A study by Antoniadou et al., (2000), analyses the position of rural women in the mountain region of Cyprus. It examined their personal and family characteristics and their attitudes towards on-farm employment. It also investigates their role in the farm household, their perception of public participation and their stance to new roles that were emerging for rural females as a result of social change. Women in the zone were aged, with 44% being over 63 years old. The vast majority (82.9%) was at the same time housewives and farmers and only 13% were fully or partially employed in 'off-farm' jobs. Younger women had a higher incidence of 'off-farm' jobs mainly due to higher level of education and improved opportunities to choose their own employment status. With regard to vocational agricultural education, 3 out of 10 attended training courses. In addition to domestic work and childcare, women were involved in farm operations. Involvement in farm administration was extremely low. Participation in decision making for farm and household day-to-day operations was high but

decisions relating to household improvements or on-farm investment continue to be the domain for men. Some 40% shared responsibility with men in the management of the farm budget. Public participation was relatively high, with 60% being members of local organizations from mainly local cooperatives.

Fuah, (2000) showed that the major factors influencing participation was family income, level of formal education, age, family size, the numbers of animal kept and average land available for cropping activities. In general, despite of the significant roles of women in agricultural production and regional development, their participation was hardly recognized. The need to support rural women's role in agricultural development was stressed.

Alesina et. al, (2001), said that the historic origins of current differences in norms and beliefs about the appropriate role of women in society. They tested the hypothesis that traditional agricultural practices influenced the historic gender division of labour and the evolution and persistence of gender norms. They found that, consistent with existing hypotheses, the descendants of pre-industrial societies that practiced plough agriculture, today have lower rates of female participation in the work place, in politics, and in entrepreneurial activities, as well as attitudes reflecting gender inequality. The causal impact of traditional plough use on gender norms today by exploiting variation in the historic geo-climatic suitability of the environment for growing crops that differentially benefited from the adoption of the plough. To isolate the importance of cultural transmission as a mechanism, they examined female labour force participation of second-generation immigrants living within the society.

The study conducted by Suradkar and Nirban (2001) reported that personal characteristics of farm women like education, marital status, family type, farming experiences and mass media exposure were affecting the extent of participation of farm women in decision making.

Devi et al., (2002) opined that a larger percentage of the rural women took decision jointly and hence a medium level of involvement in decision-making was found. There was no relationship between involvement in decision-making and selected independent variables but educational facilities to female should provide to broaden their mental horizon, which will ultimately enhance their participation in decision-making.

Joint decisions were predominant (26%) in the medium category, which showed that there was mutual understanding between husband and wife. There was close association between wife, husband and both regarding decisions making in family activities. Husband

decision in farming activity was in higher proportion (3 to 45%) in all the categories. Joint decisions were more in farm aspect as compared to home activities (17 to 44%). The extent of decisions taken jointly by husband and wife were found to reduce (8.50%) in case of Artisan category along with corresponding increase in the decisions taken by husband alone. (Kamble et. al., 2002).

Sarkar et al., (2002), opined that education, information use, level of aspiration, management orientation in enterprise and decisiveness in financial affairs had significant bearings on the level of participation in fish farming enterprise.

A case study by Swarnalata et al., (2002), revealed that the contribution of female labour in crop and livestock activities was higher than that of male labour before as well as after project implementation. Despite such a high labour contribution, females were dependent on their male counterparts for technical advice. There were certain farm decisions, like choice of crops to be grown, quantity of grain to be marketed, and soil and water conservation methods, in which more than 60% of the women were consulted.

Chhaya Badiger et al., (2004) reported that the nature and extent of women in agriculture and animal husbandry activities vary greatly from region to region and even within a region. It varies widely among different farming system and socio-economic status of families. In agriculture, operations in respect to the amount of work, maximum numbers of women were participating in cleaning of the grains, fertilizer application, gap filling, transplanting, sowing, grazing, nursery, seedling, picking, drying etc. In animal husbandry operations, major amount of work done by farm women were cutting, collection and making bundles of fodder, feeding of animals, cleaning of cattle shed, collection and disposal of dung, feeding of colostrum to the calves, boiling of milk and churning of milk.

On the basis of the study in Uttar Pradesh, Das (2004) observed that rural women participated in all kinds of agricultural activities. Same way 96% women were involved in animal husbandry activities. As far as participation of rural women in decision making in matters related to agricultural operation and family affairs was concerned, 98% women were consulted in marriage of their children, but only 32% women were consulted in money matters, though a higher percentage of women were consulted in selection of seed, storage and selling of farm products.

The extent of farm women's contribution can be guessed from the finding in a study in the Himalayan region, where a pair of bullocks works 1064 hours, a man 1212 hours and a woman 3485 hours a year on a one-hectare farm (Grover & Grover, 2004).

Sarkar and Pradhan (2004) identified three very important variables viz. age, education and family size of the respondents which had effects on women participation, planning and decision-making process.

Singh et al., (2004) observed that the average employment for female workers, per hectare basis was higher (190.60 days) than male workers (168.40) in crop production as whole. The rate of participation of female workers was higher than male workers in certain crop operations like sowing, inter-culture, harvesting and threshing. In production of all crops in the study, the participation of male workers shared for 261 days and female workers 238 days.

Bhagowalia P., et al., (2007), contained most developing countries strive to improve agricultural productivity by relaxing credit constraints, supplying better inputs, and improving marketing and distribution. However, the efficacy of these reforms needs to be examined in the context of the behavioural responses of farming households. They examine gender biases within households that affect short term decisions with immediate and long-term implications. They utilize data from ICRISAT's village level studied in India (1975-85) to highlight the effects of child gender on the use of agricultural inputs. The main finding was that households with boys tend to use purchased inputs such as fertilizers and insecticides more intensively compared with households with girls. In general, household with boys also tend to have larger land holdings, and use animal and human labour to a greater extent than household with girls.

Kaur et al., (2007), said that empowerment was an active process, which enables women to realize their identity and power in all aspects of life. It enables women to have more access to knowledge and resources, greater autonomy in decision making, greater ability to plan their times, free them from the clutches of irrelevant customs built and practices. The study was conducted in one of the development blocks of Faizabad district i.e. Masodha block on 100 women respondents (the wives of household heads) selected from 4 villages of Masodha block on the basis of proportionate random sampling technique. A semi-structured schedule was used to collect the data from rural women. Various constraints, which were observed in empowerment of rural women, were social constraints, political constraints, economic constraints and psychological constraints. The main reason for poor empowerment of rural women was noted as 'lack of knowledge about new technology'.

Kelsey K.D. (2007), contained women had been traditionally underrepresented in secondary agricultural education as teachers and students. Using critical theory as the lens for interpreting findings, the study sought to explore female teachers' and pre-service students' experiences in secondary agricultural education to better understand their perceptions of barriers to entry into the profession. Two-thirds of the women reported that they experienced gender bias from school administrators, community members, and peers; however, they exhibited a high degree of self-efficacy for teaching agricultural education that allowed them to persist in spite of any barriers. However, all discriminatory experiences were more likely to discourage women in pre-service education from entering the profession. It was recommended that agricultural teacher educators prepare female pre-service students with the knowledge and skills necessary to face and overcome gender bias in a variety of formal and informal educational contexts, especially job seeking interviews, to increase their chances of career entry into secondary agricultural education in this state.

Liepins R. (2007) stated that, agricultural geography had long been a predominantly economic field of inquiry. Recently, however, wider rural studies had incorporated more cultural approaches, and had considered the notion of discourse as a way of understanding the social construction of spaces and the social relations that were found in rural settings. Discourse was a useful medium for studying how gender was socially constructed within agriculture. Thus, this paper documents how agriculture was gendered through media and organizational discourses. It draws on literature addressing discourse and gender in agriculture, and then documents how different understandings of gender were developed through contrasting narratives of masculinity and femininity. The narratives were shown to be circulating through agriculture at both farm and industry levels. Finally, this set of location-specific readings was outlined to indicate how discourses enable the maintenance or modification of gendered power relations that operate on farms and in agricultural politics.

Srivastava and Srivastava (2009), state that the paper analysed the trends and pattern of women's employment in rural India using unit data from two types of large-scale surveys. It showed that while rural women's employment had grown over the decades, there had not been much improvement in outcomes. Women were still largely concentrated in agriculture as self-employed or casual labour. Women workers face various forms of discrimination, including job-typing that pushes them in low paying jobs. The significant predictor variables were social group, age, marital status, landholding, wealth status, and women's autonomy. Results showed that higher work participation per se did not indicate higher welfare; only when accompanied

by higher education, and/or assets did it lead to better employment outcomes. Further, education may not positively influence a woman's participation in work, but for women who were in the workforce, education was the most important determinant of better-quality non-agricultural work. Along with education, women's autonomy measured in terms of access to land, control over its operation, mobility, and willingness to join self-help groups enables her to move into non-agricultural jobs. The paper argued for policy interventions to provide work opportunities and better wages to rural women workers and builds the case for improving the education, information and skill level of women workers. It emphasises strategies to promote women's control over assets and increase her autonomy. Finally, the paper recommends policy initiatives and research to tackle the inequitous functioning of the labour market in India, particularly with respect to valuing women's work, fixing minimum wages for home-based work and looking at the needs of women workers from the most disadvantaged social groups.

Doss et al., (2011), stated that, agriculture is an important engine of growth and poverty reduction. But the sector was underperforming in many countries in part because women, who were often a crucial resource in agriculture and the rural economy, faced constraints that reduce their productivity. The paper draws on the available empirical evidence to study in which areas and to what degree women participate in agriculture. Aggregated data showed that women comprise about 43 percent of the agricultural labour force globally and in developing countries. But this figure masks considerable variation across regions and within countries according to age and social class. Time use surveys, which were more comprehensive but typically not nationally representative, add further insight into the substantial heterogeneity among countries and within countries in women's contribution to agriculture. They showed that female time-use in agriculture varies also by crop, production cycle, age and ethnic group. A few time-use surveys had data by activity and these showed that in general weeding and harvesting were predominantly female activities. Overall, the labour burden of rural women exceeds that of men, and includes a higher proportion of unpaid household responsibilities related to preparing food and collecting fuel and water. The contribution of women to agricultural and food production was significant but it was impossible to verify empirically the share produced by women. Women's participation in rural labour markets varies considerably across regions, but invariably women were over represented in unpaid, seasonal and part-time work, and the available evidence suggests that women were often paid less than men, for the same work. Available data on rural and agricultural feminization showed that this was not a general trend but mainly a sub-Saharan Africa phenomenon, as well as observed in some sectors such as

unskilled labour in the fruit, vegetable and cut-flower export sector. This paper re-affirms that women make essential contributions to agriculture and rural enterprises across the developing world. But there was much diversity in women's roles and over-generalization undermines policy relevance and planning.

Lal and Khurana (2011) stated that, India is developing country. The main occupation is agriculture, because 70 per cent of the population is involved in this occupation. Many women in developing countries were occupied in agriculture. Women occupation in agriculture in low-income countries in Asia was between 60-80 per cent. In almost, Asian countries, the number of women employed in agriculture as a percentage of the economically active population was higher. Long standing obstacles faced by rural women in terms of limited access to productive resources (Land, Credit, Inputs, Transport, Extension Services, Storage and Technical Assistance) prevent them from adopting new technologies or encoring them economies of scale. This paper examined the ways in which greater integration through agriculture impact women and men differently and ensured implications for growth. This paper found that agriculture creates many jobs for women in agriculture sector. Jobs that bring many household resources under women control leads to greater earnings in the family. Although, women were more than ever finally employed, differences in wages earned by women and men persist in all countries. Women also had less access to productive resources specially in developing countries. Due to these reasons and women's lower education level compel the women had a greater tendency to remain in subsistence agriculture. Professional women continue to discrimination in hiring and promotion. The impact of liberalization and globalization on women was important not only because they represent almost half of the total population, but also because they face constraints, which make them less beneficial from the liberalization. Once different impacts were ascertained well designed policy responses may aid women in taking advantage of greater openness to agriculture.

Mondal, M. (2013), stated that, agriculture is an important engine for growth and poverty reduction. But the sector was underperforming in many countries in part because women, who were often a crucial resource in agriculture and the rural economy, face constrain that reduce their productivity. His study analyzed women participation in agricultural production of Sagar Island, West Bengal, India. In that paper he had tried to discuss the actual role of rural women in agricultural sector. He had shown how number of rural agricultural labor changed from 1971 to 2011. Therefore he had discussed the major role of rural women in another fields, their real problems, barriers and actual position of the society. From the

contribution of women to agricultural and food production was significant, but it was impossible to verify empirically the share produced by women. It investigated the women access to economic resources and examined the influence of selected socio-economic characteristics of women and access to economic resources on their participation in agricultural production. In this study area maximum no. of women laborers were illiterate with no formal educational status which directly informed their participation in agricultural production. Women participation in rural labor markets varies considerably across regions, but invariably women were over represented in unpaid, seasonal and part-time work, and the available evidence suggests that women were often paid less than men for the same work. This paper re-affirms that women make essential contributions to agriculture and rural enterprises across the study area as well as developing world.

National Rural Network Report (2013): The role of women in Irish agriculture had traditionally been understated due to the predominance of male farm owners and the preference to transfer farmland to a son or other male relative. A previous EU study into aspects of gender and agriculture across six European countries strongly indicates that the traditional gender role ideology was still very much alive. There was a perception that the situation regarding women may have been improving, however recent statistics highlighted that any changes that occurred have been small and that the participation of women in the sector, at ownership level in particular was low. Previous research had identified the many ways in which women's farm work is essential to the farm business and attempts had been made to bring women out of the shadows of the family farm to illustrate unequal gender relations within farm families. It was argued by researchers and practitioners alike that ideological and cultural barriers to women's real participation still exist and continue to impact negatively on gender equality. This study aimed to provide a greater understanding of the issues associated with the participation of women in agriculture and how these issues might be addressed in future Rural Development Programme measures. In addition to reporting on the outcomes, the study documents the specific circumstances of a sample of farm women. These circumstances include social, economic, environmental and organisational issues as well as other factors that impact on the participation of women in agriculture. A series of recommendations were proposed to address the issues highlighted.

Njuki et al., (2013), reported the result of baseline studies carried out in 2012 to establish the status of women in agriculture in six countries; Malawi, Tanzania, Ghana, Mali, Bangladesh, and India as part of CARE USA's Women in Agriculture Project, Pathways.

Agriculture could be an important engine of growth and poverty reduction. However, the sector was underperforming in many countries in part because women, who were often a crucial resource in agriculture and the rural economy, face constraints that reduce their productivity despite women playing a critical and potentially transformative role in agricultural growth in developing countries, they often faced persistent obstacles and economic constraints limiting further inclusion in agriculture. In some countries, women were often not recognized as farmers and face widespread restrictions on decision making about the basic resources for production i.e., land; access to productivity-enhancing inputs such as credit, fertilizer, improved seeds and extension; and control over the producing resulting from their labour and other investments. Women's ability to produce enough food was further hampered by the physically exhausting labour and drudgery associated with farming practices that had remained unchanged for generations. Women were clearly an important part of the agricultural labour force, but agriculture and agricultural value chains were equally important for women as a source of employment. Given that gender inequalities run through agricultural systems, action was required at all levels from household and community up to national, regional, and international scales. This action will require making research, extension, and market systems inclusive and accessible to both men and women farmers; implementing policy actions that reduce barriers to women's access to resources including land; engaging men to change gender relations, community structures and cultural norms that perpetuate gender inequalities; and programmatic interventions that integrate the multiple functions of agriculture (food, nutrition, incomes).

Sangar S. (2013) stated that inclusive development must involve women since poverty was particularly acute for women living in rural households. There was a need to empower these poor women through science and technology (S&T). Discussions on the recently announced Science, Technology and Innovation Policy, 2013, however, had not deliberated what the policy entails not only for women involved in S&T but also what S&T had to offer to the poor rural women and improve their lives. This was not a new phenomenon in India as S&T policies had not been particularly favourable to women in S&T since the inception of the Five-Year Plans. The foundation set up during the Nehruvian era continued during later years as well. To understand this the present article attempts to explore how the concerns of women were addressed during the initial Five-Year Plans to the current phase with particular focus on bringing socio-economic empowerment of women through S&T.

Tologbonse, E.B. et al., (2013), stated that the study was conducted to determine women farmers' participation in Women in Agriculture (WIA) programmes. The output and income of women who participated and those who did not participated in the WIA programme were also compared. A multi-stage sampling method was employed to select 272 respondents. Primary data were collected through the use of questionnaires and interview schedule and were subjected to both descriptive and inferential statistics. The mean farming experience was 11.4 years for WIA participants and 9.8 years for non-WIA participants while mean farm size for participants was 1.4ha. and 0.9ha for non-WIA participants. The main source of agricultural information was radio. Regression analysis showed that level of education, age and marital status were significantly related with level of participation. The mean output of WIA participants (688.06kg) was significantly higher than non-WIA participants (139.91kg). The difference in the mean output levels was largely attributed to participation in WIA programme. Calculated Z-statistic value (274.04) for income was significant at 5%. The findings concluded that the difference (₦118,783.69) in the mean income could be attributed to their participation in WIA programmes. Therefore, it was recommended that WIA programmes be sustained and encouraged by Kaduna State Government.

Ghosh and Ghosh (2014), said that agriculture sector as a whole had developed and emerged immensely with the infusion of science and technology. But this latest emergence was not capable of plummeting the ignorance of women labour as an integral part of this industry. In developing countries like India, agriculture continues to absorb and employ female work force but fails to give them recognition of employed/hired labour. Women constituted 38% of the agricultural labour force in developing countries. It was also estimated that 45.3% of the agricultural labour force consists of women. But a large number of women had remained as "invisible workers". Since there had been concern expressed regarding the gap between women's actual economic participation and public perception of it several researchers had attempted to overcome this invisibility through gendered empirical research studies for using on gender analysis and gender roles. This piece of research was highlighted the trend of female participation in agriculture across various Indian states. The secondary data collated for the research was used to study the growth trend of the agricultural worker from 1961-2001. Analysis was done to categorize the states on their identical behaviour of participation in agriculture by hierarchical clustering of economically active female in agriculture based on measurements like coefficient of variation, compound growth rate and work participation rate.

Zakaria et al., (2014), stated that female farmers in East Lombok were doing important works in household food security. Therefore, female farmers should have sufficient ability to be able to participate optimally to gain household food security and all family members could live healthy and active. The aims of this study were to analyze the ability level of female farmers, the participation level of female farmers and the status of household food security; and to analyze relationship between the ability level of female farmers and the participation level of female farmers, and the status of household food security. The number of respondents was 300 female farmers who had been selected randomly. The results of this study showed that female farmers did not have sufficient ability in household food security yet, the participation of female farmers had not been optimized in each stage and the household food security status was generally insecure; there was a positive and very significant relationship between the ability level and the participation level of female farmers, and the status of household food security; there was a positive and significant relationship between the participation level of female farmers and the status of household food security. Partially, there was a positive and significant relationship between the stages of obtaining benefits and the household food and energy status.

1.3 Women's Involvement in Agriculture

The dimensions of women involvement in agriculture and allied activities have been taken into consideration since settled agriculture started. The agricultural and decision-making involvement pattern of women are involving, participation of women in agriculture and allied sectors though are mutually exclusive to each other. To explore the areas of women involvement in agriculture and allied sector, the study depicts its journey from origin of agriculture to participation of women in agriculture during different historical time periods.

- The English word 'agriculture' is derived from latin *agricultura* from *ager* means 'a field' and *cultura* means 'cultivation' or "tillage of the soil". Thus, a literal meaning of the word 'agriculture' is "tillage of a field". Agriculture refers to the production of food and fibre and other goods through farming and forestry.
- The advent of settled life started with the beginning of agriculture when people started cultivating food for their livelihood. In the history of human development, women have contributed as much as men. In fact, the status of employment and work performance by women in society is an indicator of human's overall progress. The scenario of agriculture has completely changed over the historical periods but from ancient time. One aspect that has not changed, is the visualization of women as key labourer in this

sector. From archaeological records some references can be drawn about women's participation in agriculture during ancient period. During ancient period the hunting was done by males but it was not sufficient, came irregular and used to gather the food stuffs. In Palaeolithic era women used bones, stones and wood to dig up and women were the earliest inventors of tools. In Mesolithic era the major role of women was domestication of animals, taking care of families and gathering of foods. The chief characteristics of Palaeolithic period was domestication of plants. Women recognized the best soil and chose the land to be cleared for regular growing of crops. During this period farming became more labour intensive and women would need to have more children to meet this labour demand. Women used to spend more time to being pregnant and looking after their children. So, women no longer contributed much to the economy. The discovery of agriculture at the beginning of the Neolithic period appeared to be a positive step for women but by the end opposite effect was demonstrated (Owen, 2005). In the early Vedic age agriculture was the principal occupation of the people. Agriculture was their main source of income and apart from Agriculture, Animal husbandry was considered as occupation. Women played an important role in agriculture. Upper class women took leadership power in agricultural operations and socially lower-class women engaged themselves as labour with their husband in agricultural fields (Sharma & et. al., 2010). In Medieval period women were share duties of their husband's labour on the farm and also became servants in another farms. Women were introduced as an agricultural labourer in this period (Adams et. al., 1983).

- In modern period 70% of agricultural workers, 80% of food producers and 10% of food processor are women throughout the world sector (Doss 2011). The national time use in agriculture by the women is 32% of the whole day but in West Bengal it is more than 40%. Younger women contributed a higher share of this. Age between (19-35) years contributed up to 60% of the total time spend on agriculture and if food processing and preparation included with agricultural work it is exceed 60% (Jain, 1996). Food production includes crop production, food processing and preparation. It is mostly produced by men and women in a collaborative process. Mostly men provided the labour to clean the field and women used to plant and weed crops etc. women produced 60%-80% of food in developing countries like India and half of the worlds sector (Doss 2011). In India more than half of the female workforce are engaged with agriculture and allied sectors. According to female work participation rate of census 2011

Himachal Pradesh (44.8%) occupied the state wise highest position followed by Nagaland (44.7%), Chhattisgarh (39.7%) second and third respectively. West Bengal ranked 26 (18.1%).

▪ **Women's Participation in Agricultural Sectors in India**

In India, women are largely engaged with agriculture. Women's involvement varied widely with different regions, ecological sub zones, farming system, caste, class, and stages in the family cycle. Generally, the poorer families' women have greater involvement in agricultural activities. Despite women's significant and crucial role in agricultural sector and allied fields, still they have virtually no access to agricultural information, services or production assets and have very limited control over their income. The significant role of women as producer, in the agriculture and allied sectors, intense efforts will be made to ensure the benefits of training, extension and various programmes which will reach to the women in proportion to their numbers. The programmes of training for women in soil conservation, social forestry, dairy development, and other occupations allied to agriculture like horticulture, livestock including animal husbandry, poultry, fisheries etc. are expanded to benefit women workers. Majority of the female workforce (84%) are workings in rural India. A very large share (73%) of this female workforce toils in the agricultural sector, mostly (96%) in rural areas. In most farming systems, females participated in all phases of agricultural production, although their roles (including decision-making) and control over resources and incomes varied greatly from place to place (Bala, 2010). The table no. 1.1 deviates that a significant feature about women main worker in India. It shows clearly an increasing trend of women worker participation in agriculture from last forty Census years.

TABLE NO. 1.1 PERCENTAGE OF FEMALE MAIN WORKERS TO TOTAL FEMALE POPULATION (1981 TO 2011)

Census Year	Percentage to Total Female Population				
	Female Main Workers	Cultivators	Agricultural Labourers	Household Industry	Other Workers
1981	13.99	4.65	6.46	0.64	2.24
1991	15.93	5.51	7.05	0.55	2.82
2001	14.68	5.11	4.51	0.95	4.11
2011	25.5	24.0	41.1	5.7	29.2

Source: Indian Labour Year Book, 2011

Table no. 1.2 explain the total worker in rural and urban areas in Census 2011. Though the female works both outside and inside of the home but they are not recognised as an independent rather than a supportive worker. That's why the decadal work participation of male is higher than women. On the other hand, most of the female are engaged in rural areas agriculture.

TABLE NO. 1.2 TOTAL WORKERS IN INDIA - 2011 CENSUS

Population/ Workers		Persons	Male	Female
Population	Total	1,21,05,69,573	62,31,21,843	58,74,47,730
Workers		48,17,43,311	33,18,65,930	14,98,77,381
Percentage of Workers		39.79	53.26	25.51
Population	Rural	83,34,63,448	42,76,32,643	40,58,30,805
Workers		34,85,97,535	22,67,63,068	12,18,34,467
Percentage of Workers		41.83	53.03	30.02
Population	Urban	37,71,06,125	19,54,89,200	18,16,16,925
Workers		13,31,45,776	10,51,02,862	2,80,42,914
Percentage of Workers		35.31	53.76	15.44

Source: Indian Labour Year Book, 2011

Note: Workers include both main workers and marginal workers

▪ **Women's Role in Agricultural and Allied Sectors in West Bengal and Study Area**

The economy of West Bengal as well as Koch Bihar district is based on agricultural and allied activities. In West Bengal during 1951 Census 14.9% persons are directly associated with agriculture whereas Koch Bihar has 22.4% population who are engaged with agricultural activities.

TABLE NO. 1.3 CULTIVATORS AND AGRICULTURAL LABOURERS OF DIFFERENT CENSUS YEARS OF WEST BENGAL AND KOCH BIHAR

Population	Census Years									
	1971		1981		1991		2001		2011	
	West Bengal	Koch Bihar	West Bengal	Koch Bihar	West Bengal	Koch Bihar	West Bengal	Koch Bihar	West Bengal	Koch Bihar
Cultivators (%)										
Persons	31.97	67.95	29.76	52.02	28.40	48.18	19.8	38.5	14.72	32.34
Male	33.58	69.10	31.40	54.29	30.15	51.32	21.5	40.6	16.84	35.81
Female	12.12	29.87	14.67	13.72	16.23	19.59	10.6	26.8	7.67	21.95
Agricultural labourers (%)										
Persons	26.46	15.59	25.23	27.24	24.56	26.04	19.6	25.0	29.32	34.74
Male	25.00	15.28	23.69	26.58	22.65	23.91	19.2	22.9	27.9	30.45
Female	44.50	26.07	39.43	38.37	37.88	45.47	22.1	36.4	34.03	47.56

Source: Indian Labour Year Book, 2011

In 1961 Census, West Bengal had 123 male and 23 female cultivators per thousand persons who are working as cultivators and agricultural labours. Koch Bihar also had 51 male and 8 female cultivators per thousand persons who are working as cultivators and agricultural labours (Census 1961). According to Census 1971, to 2011 percentages of cultivators and agricultural labourers of West Bengal and Koch Bihar district are stated table no. 1.3.

Women played an important role and perform numerous labour-intensive jobs in agricultural operations such as weeding, hoeing, grass cutting, picking, collection of jute fibre etc. in the Koch Bihar district of West Bengal. Women are also expected to collect wood from fields. This wood is used as a major fuel source for cooking. Because of the increasing population, over grazing and desertification in West Bengal, women faced difficulties to searching of firewood. Rural women are also responsible for farm activities, such as caring of livestock and its other associated activities like milking, milk processing etc. The majority of farmers have their own livestock. Livestock is the primary subsistent activity which used to meet household food needs as well as supplement of farm incomes. The strength of livestock is mainly influenced by various factors such as farm size, cropping pattern, availability of range-lands including fodder and pasture. Evidently, rural women are involved in almost all livestock related activities. Mostly women are engaged in maintenance of animals, animal-sheds, putting fodder and water and milking the animals. Rural women are also responsible for collection of dung, preparing dung cakes which is an activity that also brings additional income for poor families. Most of the livestock management activities are predominantly performed by females. Majority of women are involved in shed cleaning and collection of dung which is used to produce farm yard manure. Males, however, shared the responsibility of taking care of sick animals. It is evident that the women are playing a dominant role in the livestock production and management activities in Koch Bihar district of West Bengal. Poultry farming is one of the major sources of rural economy along with agricultural activities. Even though rural women are not using modern management techniques, such as vaccination and improved feed, but their management capacity of poultry enterprise is impressive. Every year, income from poultry farming has been rising in this state. Rural women also help to produce the staple crops like rice, wheat, jute, potato but her contribution is considered secondary in crop production. Women farmers are generally ignored in development strategies

and policies. In most of the cases, both men and women farmers do not have access to adequate resources, but women are even more constrained due to cultural, traditional and sociological factors in Koch Bihar district of this state.

1.4 Objectives

Keeping all above things in view the present study is conducted in the light of the following objectives.

1. To identify the socio-economic background of the farm women associated with the agriculture and allied activities in the study area.
2. To evaluate the involvement of farm women in agriculture and allied activities.
3. To assess the involvement of farm women in decision making process in agriculture and allied sectors and household activities.
4. To analyze the relationship between the socio-economic status of farm women and involvement of the farm women in agriculture and allied activities.
5. To identify the problems of farm women regarding their involvement in agriculture and to find out the way to solve these problems.

1.5 Hypothesis

Based on the available literature and objectives the present study is designed to test the following hypothesis.

1. Farm women actively participate in agriculture and allied fields along with household activities.
2. Farm women actively participate in decision-making process of agriculture and allied sector.
3. Farm women's involvement is significantly associated with their socio-economic attributes.

1.6 Methodology

To conduct particular research in any direction there is a need of appropriate methodology. The methodology incorporates different ideas for conducting the research in a smooth way and it helps in understanding the techniques and methods which are utilized to design to study, collect the information, analyze the data and interpret the data for relocation of truth and formulation of theories. The research methodology includes the following steps:

1.6.1 Locale of Research

The present study is conducted in 12 CD blocks of Koch Bihar district. The district is selected purposively due to the following reasons;

- The researcher's close familiarity with respect to the area, people, official and local dialects.
- As per 2011 Census of India, Koch Bihar has a population of 28,19,086 out of which 14,51,542 are males and 13,67,544 are females. Total 3,64,797 cultivators depend on agriculture farming out of 3,02,745 are men and 62,052 are women. 3,91,875 people works as agricultural land as labourer, out of which 2,57,425 are men and 1,34,450 are women. Koch Bihar is an agricultural district with very large number of people dependent on agriculture.
- The highly cooperative and responsive farm women trying to improve their socio-economic condition.
- Ample scope to get relevant information regarding women's involvement in different activities in agriculture and allied sector.
- Easy accessibility of the area.

1.6.2 Sampling Design

Random sampling technique is followed for selecting the area and the respondents of the present study. The district is selected systematically; the blocks from sub-division are selected with the help of simple random sampling. Figure no. 1.1 and map no. 1.1 shows the selection of the respondents of the study area. In Koch Bihar district, there are five sub division names as Mekhliganj, Mathabhanga, Cooch-Bihar Sadar, Tufanganj and Dinhata. The sub divisions are further divided into 12 CD blocks. Mekhliganj sub division is divided into two CD blocks namely Mekhliganj and Haldibari. Mathabhanga sub division is divided into three CD blocks namely Mathabhanga I, Mathabhanga II and Sitalkuchi. Cooch-Bihar Sadar sub division is divided into two CD blocks name as Cooch-Bihar I and Cooch-Bihar II. Tufanganj sub division is divided into two CD blocks name as Tufanganj I and Tufanganj II. Dinhata sub division is divided into two CD blocks namely Dinhata I, Dinhata II and Sitai. An exhaustive list of farm women within the CD blocks is prepared. From this total list, twelve hundred farm women are selected randomly as respondents from each CD block of the district for the present study.

RESEARCH FRAME OF THE RESEARCH WORK

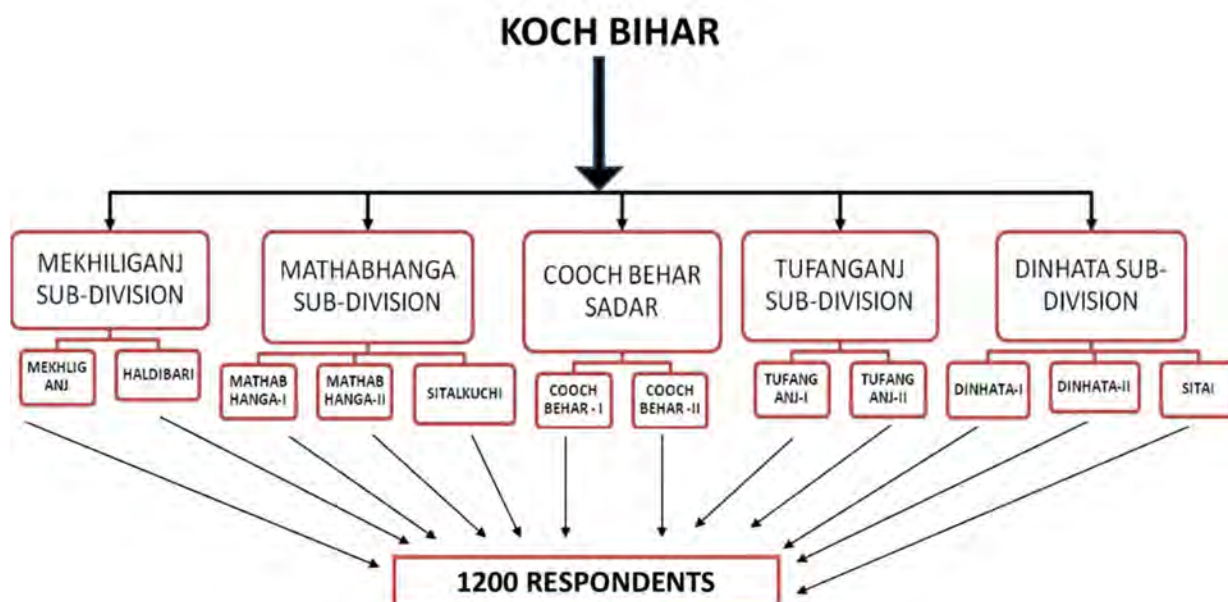
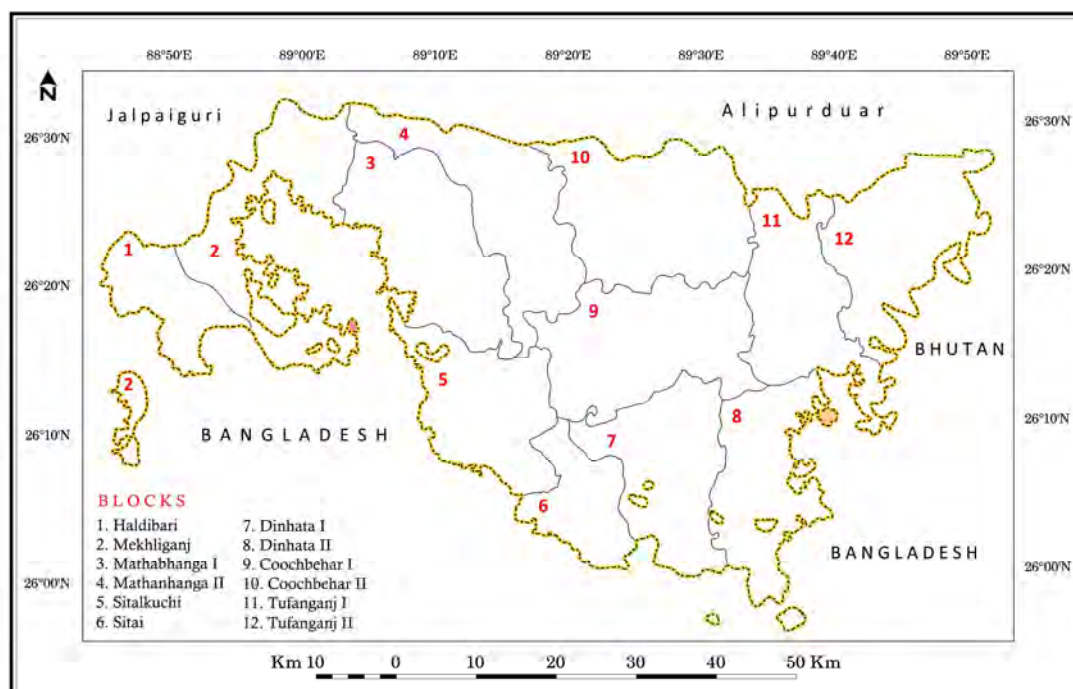


FIGURE NO 1.1

Source: Census, 2011

SAMPLE LOCATION IN CD BLOCKS OF KOCH BIHAR DISTRICT



MAP NO 1.1

Source: Census, 2011

1.6.3 Pilot Study

A pilot study was conducted in the selected study areas before conducting the actual study. In course of this survey informal discussion was carried out with farm women, local leader and agricultural functionaries of the locality. An outline of background information, their opinion, settlement pattern, decision making process was obtained for the construction of reformative working tools.

1.6.4 Variable and their Measurements

On the basis of the delineated objectives the involvement indices are considered as dependent variables and the different socio-personal, economic variables are considered as independent variables. The following variables are considered for the study.

Status of the Family It refers to the position that occupy by the farm women in the family. The farm woman whose husband has migrated and who is widow has to act as family head. In nucleus family farm woman act as a family co-head. If the farm woman occupies the status of daughter or daughter in law is dominated by the elder members of the family. Thus, farm women are classified into four categories - daughter, daughter-in-law, family-co-head, family head. While collecting the data the present study has given prime importance upon family head category.

Age Age is the one's orientation towards development and growth. An individual behaves according to her orientation and her orientation gives to determines her character. The chronological ages developed through experiences and introspection, exert influence in orienting the participation process. As a result, the present study has considered the age of women as a predictor variable and directly registered the chronological age of the responded women.

Religion & Caste Caste is an aggregate of individual whose share of obligations and privileges are fixed by birth, as well as sanctioned and supported by religion which comprises of Hindu, Muslim, Christian and others. This variable will be with the help of four distinguished caste prevailing in the present social system namely Scheduled Tribe, Scheduled Caste, Other Backward Caste, General caste. The variable is measured with the help of Bhairamkar's scale on caste (2010).

Education According to the International Encyclopedia of the Social Science, education is an institutionalized form of socialization to adult roles. Education helps an individual to know and give shape and direction to the thinking processes. The variable education is operationalized as

the formal education successfully completed by the respondents and it is measured with the help of the scale derived by Hadole and Tawade (2005).

Family Education Status It refers to the education status of all the members of the family in the eligible age group for formal education i. e. excluding the children below six years of the age. This variable is measured with the help of procedure followed by Bhairamkar (2010). The total score is obtained by adding the respective standard completed by each member and the Family Education Status score is obtained by dividing the total score with eligible number of family members. Family Education Status is calculated with the help of following formula;

$$\text{Family Education Status} = \frac{E_1 + E_2 + \dots \dots E_n}{N}$$

Family Occupation Occupation is considered as one of the factors which influence the decision making by farm women. Accordingly, five prominent professions like wage earning (working on others farm), agriculture, allied fields, business, services are considered.

Family Annual Income Annual income can give inputs in case of developing the attitude towards participation in any activities. The annual income is measured as the earnings of the family from primary and secondary sources of income per year in rupees.

Family Annual Expenditure It shows the attitude of the respondent's family towards the consciousness on health, education, savings etc.

Land Holding Land holding is the representation of economic status within a rural system. The land holding is measures as total land of respondent family in Bigha. This variable is measured with the scale produced by Markad (1996).

Farm Power The possession of farm power indicates the efficiency of an individual in case of managing the agriculture and livestock enterprise. It is categorized as, no farm power, indigenous farm implement, one pair of drought animal, power tiller, tractor.

Irrigation Irrigation is one of the important aspects of cultivation practices like selection of crops, selection of variety, time of sowing of the crops etc. This variable is measured as no irrigation, tank, shallow tube well, river lift pump, deep tube well. This variable is measured with the scale developed by Nirban (2004).

Possession of Assets The information related to possession of assets of the respondent's family is obtained and is considered. The variable is measured as cart, bicycle, radio, improved plough, sprayer (heavy weight/light weight), paddle thresher, seed drill, tractor, power tiller, television, telephone/mobile, refrigerator, motor cycle. Bawajir and Nandapurkar (1985) developed the scale for possession of assets.

Livestock Possession The information pertaining to the growing population available to the respondents is obtained and measured by Hadole's scale (2005), considering piggery, cow (local/cross bred), goat/sheep, fishery, buffalo, poultry.

House Type The type of house owned by the respondents is taken into consideration. The variable house types as it has some impact on the participation process. It is measured by the Supe's scale (2007) by assigning the score as no house, hut, kutchra, mixed, pucca and mansion.

Risk Preference It is the degree to which a farmer is oriented towards risk and uncertainty and has courage to face the problems in farming. This variable is measured with the help of scale developed by Supe (2007). This scale consists of six items, in which first four statements are positive and two statements are negative. The responses are recorded on five-point continuum ranging from strongly agree to strongly disagree.

Scientific Orientation It is the degree to which a farmer is oriented to the use of scientific methods in decision making and farming. This variable is measured with the help of scale developed by Supe (2007). This scale consisted of six items, in which five statements are positive and one statement is negative. The responses are recorded on five-point continuum ranging from strongly agree to strongly disagree.

Economic Motivation It is defined as the occupational success in terms of profit maximization and the relative value placed by a farmer on economic basis. This variable is measured with the help of scale developed by Supe (2007). This scale consisted of six items, in which five statements are positive and one statement is negative. The responses are recorded on five-point continuum ranging from strongly agree to strongly disagree.

Independence Scale It is the degree to which a farmer places positive value independence or autonomy in decision-making. This variable is measured with the help of scale developed by Supe (2007). This scale consisted of six items, in which five statements are positive and one statement is negative. The responses are recorded on five-point continuum ranging from strongly agree to strongly disagree.

Management Orientation It is operationally defined as the degree to which a farmer is oriented towards scientific farm management comprising of planning, production and marketing function of the farm. This variable is measured with the help of scale developed by Samanta (1977). The scale consists of eighteen statements, six statements each for planning, production and marketing orientation. In each group positive and negative statements are mixed, retaining at the same time a more or less same order of statements. Each item will be provided with four-point response continuum. The positive statements are given a score of four for strongly agree, three for agree, two for disagree and one for strongly disagree response and vice-versa in case of negative statements. The score for each individual on the management orientation scale is obtained by summation of the score awarded for each one of the items included.

Attitude towards Agriculture It is measured by scale developed by Mathew and Reddy (1989). This scale consists 12 statements and responses are rated on five-point continuums ranging from strongly agree to strongly disagree.

Attitude towards Animal Rearing and Poultry It is measured by the scale developed by Rajkamal & Kunzru (1993). This scale consists 10 statements and response will be rated on three-point continuum ranging from agree to disagree.

Problem Associated with Agriculture & Allied Sector The study will help to gain knowledge and develop future plan of work for that locality. The major problems of farm women are identified with the help of Ranking Based Question (RBQ).

Activity-Involvement Index (AII) Activity-Involvement Index is the physical involvement in the agriculture, livestock and poultry rearing activities. The women bear the responsibility of performing of every activity of agriculture, livestock and poultry rearing activities. The variable is operationalized as the performance of activities on the bases of their physical involvement. It is measured with the help of three-point scale as no involvement, 0; occasional involvement, 1; independent involvement, 2. It is measured by scale developed by Pareek-Trivedy (1964). The Activity-Involvement Index (AII) is calculated as;

$$AII = \frac{\sum O_{Aj}}{\sum M_{Aj}} \times 100$$

where, O_{Aj} = obtained activity score (weighted) in j^{th} enterprise /crop/area

M_{Aj} = maximum activity score (weighted) achievable in j^{th} enterprise/crop/area

Decision-Involvement Index (DII) Women have engaged themselves in decision making process of every sphere of agriculture, livestock and poultry enterprise. The variable is operationalized as the involvement in decision making practice with respect to the selective activities in agriculture and livestock enterprise. It is measured with the help of three-point scale and score is assigned ‘0’ as not considered; ‘1’ as considered after consultation with others; and ‘2’ as considered independently. It is measured by scale developed by Pareek-Trivedy (1964). The Decision-Involvement Index (DII) is calculated with the help of following formula;

$$DII = \frac{\sum O_{Dj}}{\sum M_{Dj}} \times 100$$

where, O_{Dj} = obtained decision score (weighted) in j^{th} enterprise/ crop/area

M_{Dj} = maximum decision score (weighted) achievable in j^{th} enterprise/crop/area

Overall-Involvement Index (OII) The Overall Involvement Index is operationalized as the composite from of Activity-Involvement Index and Decision-Involvement Index. It is measured by scale developed by Pareek-Trivedy (1964). It is measured as the composite score of Activity-Involvement Index and Decision-Involvement Index and calculated with the following equation;

$$DII = \frac{AII + DII}{2} \%$$

Activity Involvement Score (AI Score) It refers to all the agricultural and allied activities like livestock rearing with domestic duties of a farm woman done by herself. The frequency is measured as no involvement, occasional involvement and independent involvement with score 0,1 and 2 respectively. This scale is developed by Pareek-Trivedy (1964). Based on the total score obtained by the respondents, at first obtained score is calculated by (average farm activity score plus average livestock activity score plus average household activity score) divided by $n=3$. n refers to total types of activities done by farm woman. Then AI score is measured by

$$\text{Activity Involvement Score (AI Score)} = \frac{\text{Obtained Score} - \text{Maximum Score}}{\text{Maximum Score} - \text{Minimum Score}}$$

Decision Making Involvement Score (DI Score) It is the degree to which a farm woman is positively oriented and evaluated and take prompt decisions for the farm as well as for her home. It consists of 3-point response namely, not considered, considered after consultation with other and considered independently with scores of 0, 1 and 2 respectively. This scale is developed by Pareek-Trivedy (1964). Based on the total score obtained by the respondents at first obtained decision-making score is calculated by (average decision making in farm activity score plus average decision making in family matters score plus average decision making in economic aspects score) divided by $n=3$. n refers to total types of decision making done by farm woman. Then DI score is measured by

$$\text{Decision Making Involvement (DI Score)} = \frac{\text{Obtained Score} - \text{Minimum Score}}{\text{Maximum Score} - \text{Minimum Score}}$$

1.6.5 Method of Data Collection

Primary Data Data is collected with the help of structured interview scheduled which is framed after conceptualizing and operationalizing their measurements. The pretesting is conducted for evaluating the validity and reliability of the structured interviewed. The personal interview method is followed to collect the information from sample farm woman in the study area.

Secondary Data Secondary data are collected from Census report of India; District Statistical Handbooks; Statistical Abstracts of West Bengal; various publications like books, journals, articles, topographical maps.

1.6.6 Statistical Tools Used The following statistical tools have been used.

Mean Measure of central tendency (or statistical averages) tells us the point about which items have a tendency to cluster. Such a measure is considered as the most representative value for the entire mass of data. Mean is the simplest measurement of central tendency and is a widely used measure. It is mainly used to consist in summarizing the essential features of a series and in enabling data to be compared. It is amenable to algebraic treatment and is used in further statistical calculations. It is a relatively stable measure of central tendency. But it suffers from some limitations viz., it is unduly affected by extreme; it may not coincide with the actual value of an item in a series, and it may lead to strong impressions, particularly when the item values are not given with the average. However, mean is better than other averages, especially in economic and social studies where direct quantitative measurements are possible.

Coefficient of Variation Divide the standard deviation by the arithmetic average of the series, the resulting value is known as coefficient of standard deviation. It happens to be a relative measure, and is often used for comparing with similar measure of other series. When this coefficient of standard deviation is multiplied by 100, the resulting figure is known as coefficient of variation. Sometimes, the square of standard deviation, known as variance, is frequently used in the context of analysis of variation.

The standard deviation (along with several related measures like variance, coefficient of variation, Z score, etc.) is used mostly in research studies and is considered as a very satisfactory measure of dispersion in a series. It is amenable to mathematical manipulation, because the algebraic signs are not ignored in its calculation. It is less affected by fluctuations of sampling. These advantages of standard deviation and its coefficient make a very popular method for the scatteredness of a series.

Karl Pearson's Coefficient of Correlation is the most widely used method to measuring the degree of relationship between two variables. This coefficient assumes the following:

- That, there is linear relationship between the two variables;
- That, the two variables are causally related which means that one of the variables is independent and the other one is dependent;
- A large number of independent causes are operating both in variables, to produce a normal distribution.

Karl Pearson's coefficient of correlation

$$r = \frac{\sum(X_i - \bar{X})(Y_i - \bar{Y})}{n \cdot \sigma_x \sigma_y}$$

Where $X_i = i^{\text{th}}$ value of X variable

$\bar{X}$ = mean of X

$Y_i = i^{\text{th}}$ value of Y variable

$\bar{Y}$ = mean of Y

n = number of pairs of observations of X and Y

σ_x = Standard deviation of X

σ_y = standard deviation of Y

Karl Pearson's coefficient of correlation is also known as the Product Moment Correlation Coefficient. The value of 'r' lies between ± 1 . Positive values of r indicate positive correlation between the two variables (i.e., changes in both variables take place in the same direction), whereas negative values of 'r' indicate negative correlation i.e., changes in the two variables taking place in the opposite directions. A zero value of 'r' indicates that there is no association between the two variables. When r (+) 1, it indicates perfect positive correlation and when it is (-) 1, it indicates perfect negative correlation, meaning thereby that variations in independent variable (X) explain 100% of the variations in the dependent variable (Y). It can also say that for a unit change in independent variable, if there happens to be a constant change in the dependent variable in the same direction, then correlation will be termed as perfect positive. But if such change occurs in the opposite direction, the correlation will be termed as perfect negative. The value of 'r' nearer to + 1 or – 1 indicates high degree of correlation between the two variables.

Co-efficient of Variation (CV) The Co-efficient of Variation (CV) is a statistical measure of the dispersion of data points in a data series around the mean. The Co-efficient of Variation represents the ratio of the standard deviation to the mean, and it is a useful statistic for comparing the degree of variation from one data series to another, even if the means are different from one another.

$$\text{Co-efficient of Variation (CV)} = \frac{\text{Standard deviation}}{\text{Mean}} \times 100$$

1.7 Scope and Impact of the Study

The economy of the study area mainly depends on agriculture. There is no noticeable industry except one tea factory in this area causing low income of the people. Infrastructural facilities like transport network, industry, education and medical facilities are very poor particularly in rural areas. The rate of increase of population has increased the pressure on land and reduced the man-land ratio. Although, improved technology in relation to crop production has been introduced in this area but farm women are not aware of this phenomenon. Besides, numbers of male, living their homelands have migrated to other places within and outside the state to earn money, causing shortage of male labour and more involvement of female labour. Moreover, rural women actively participate in number of agricultural operations, maintenances of livestock, fisheries etc. There is scope to increase productivity of this area through training of farm women on modern technology – following sustainable agriculture. To improve the efficacy of farm women it is essential to have a detail study on this aspect so that policy makers

take more care in making the policies for the farm women. The outcome of the study will be useful for the associated Government departments and other agencies as farm women have the potentialities for improvement of socio-economic status through their participation in agriculture and allied fields.

1.8 Conclusion

From the ancient period to modern society, women have an important role in agriculture. Many agriculture-based countries like India, agriculture no doubt is sustained upon the rural women who have been poorly rewarded in terms of income and access to resources. It is important now to recognize that area and provide equal opportunities to the female labour and resources such as land, assets and credit and suitable share in agricultural income to the unpaid women workers in the family farms. They need to be recognized as farmers and should give their due share. In developing countries like India, agriculture continues to absorb and employed two third of the female work force but fails to give them recognition of employed labour. The female labour force in developing nations still faces the oppressive status and majorly responsible for family and household maintenance. In addition to that, their contribution as an agriculture labour is suppressed in the family labour who works in farm in addition to her regular household chores. These problems of the rural women are further accentuated by the tribulations of illiteracy, underdevelopment, unemployment and poverty. Despite, the major part of farm labour force in agriculture their needs and problems are somewhat ignored by the rural development initiatives. The multi-tasking potentiality of female labour brought significant propositions for agricultural productivity, rural production, economic vitality, household food security, family health, family economic security and welfare.

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CHAPTER 2

GEO-ENVIRONMENTAL SETTING OF THE KOCH BIHAR DISTRICT

2.1 Introduction

Every research work starts with the knowledge, background and historical insights about the study area. The present research work is based on women's participation in agriculture and allied sector and the relevant parameters associated with it, in the district of Koch Bihar district. As such role of various geographic factors like geology, climate, topography, soil, water resources etc. along with socio-economic indicators like demographic distribution, occupation, caste, religion, transport, credit facilities etc. is studied and assessed.

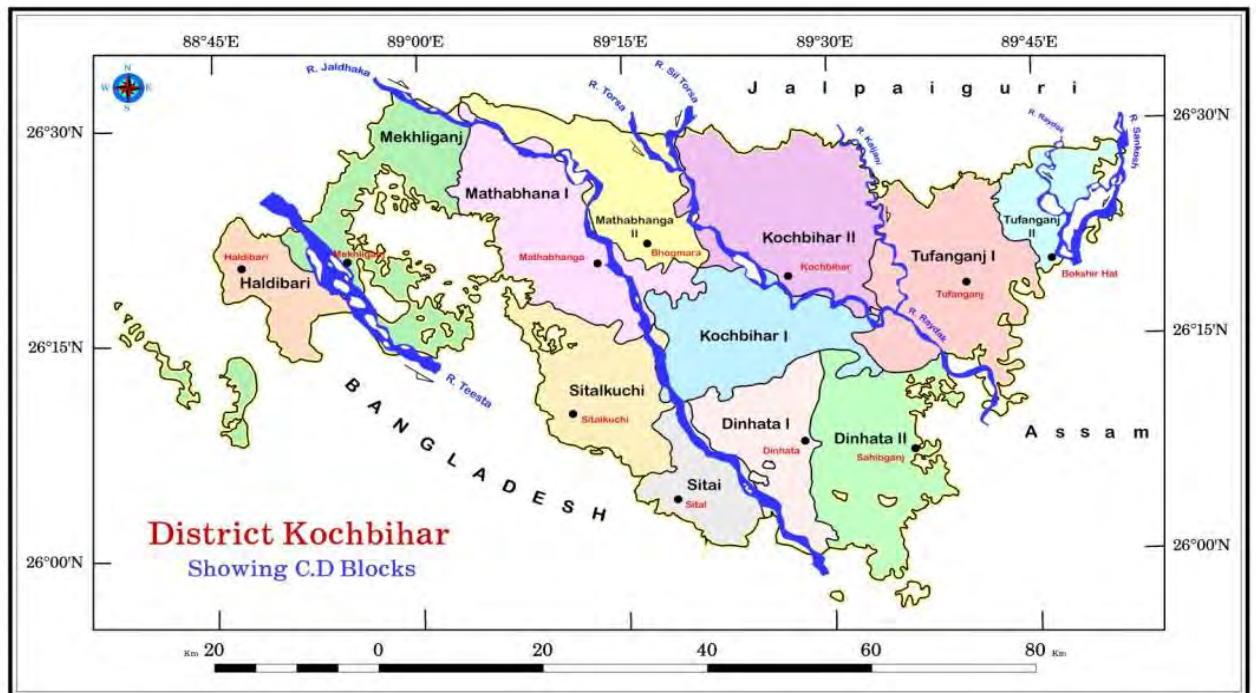
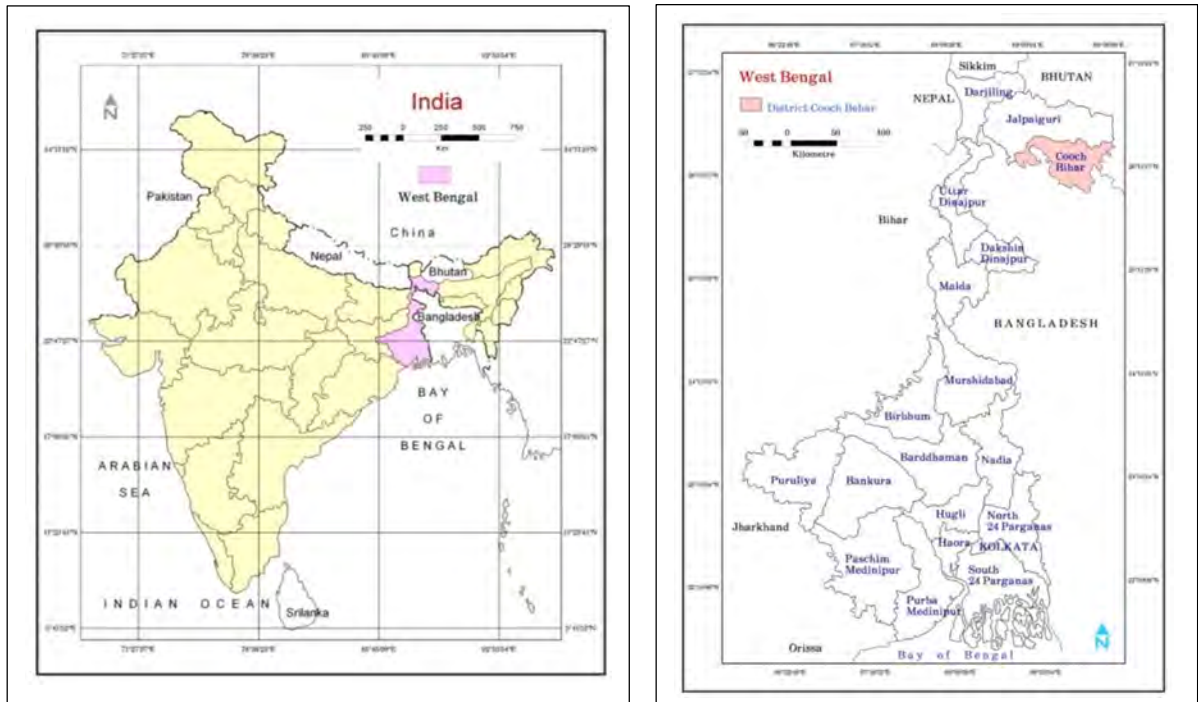
2.2 Location and Regional Setting

The name Cooch Behar is derived from two-word Koch, the name of the Koch tribes, and the word Behar is derived from vihara meaning land, Koch Behar means land of the Koches.

Koch Bihar formed part of the Kamarupa Kingdom of Assam from the 4th to the 12th. In the 13th century, the area became a part of the Kamata Kingdom. Under an agreement between the king of Koch Bihar and the Indian Government at the end of British rule Maharaja Jagaddipendra Narayan transferred full authority, jurisdiction, and power of the state to the Dominion Government of India, effective 12 September 1949. Eventually, Koch Bihar became part of the state of West Bengal on 19 January 1950, with Cooch Behar town as its headquarters.

Koch Bihar district is located in the north-eastern part of the state and bounded by the district of Alipurduar in the north and north-west, state of Assam in the east (bounded by the districts of Kokrajhar & Dhubri of Assam) and the international border in the form of Indo-Bangladesh boundary in the south and south-west (map no. 2.1). Koch Bihar district comprises of 5 sub divisions names as Mekhiliganj, Mathabhanga, Cooch-Bihar Sadar, Tufanganj and Dinhata; 12 CD blocks namely Haldibari, Mekhliganj, Mathabhanga I, Mathabhanga II, Cooch Behar I, Cooch Behar II, Tufanganj I, Tufanganj II, Dinhata I, Dinhata II, Sitai and Sitalkuchi; 11 police stations; 12 panchayatsamities; 128-gram panchayats; 1714-gram sansads; 1202 mouzas; 6 municipalities and 80 wards (map no. 2.2). The district lies between 26°32'20" N to 25°57'40" N latitude and 89°54'35" E to 88°47'40" E. (District Census Handbook, 2011), forming a trapezoidal land area of 3.387 km² which accounts for 3.82% of the land mass of the state of West Bengal.

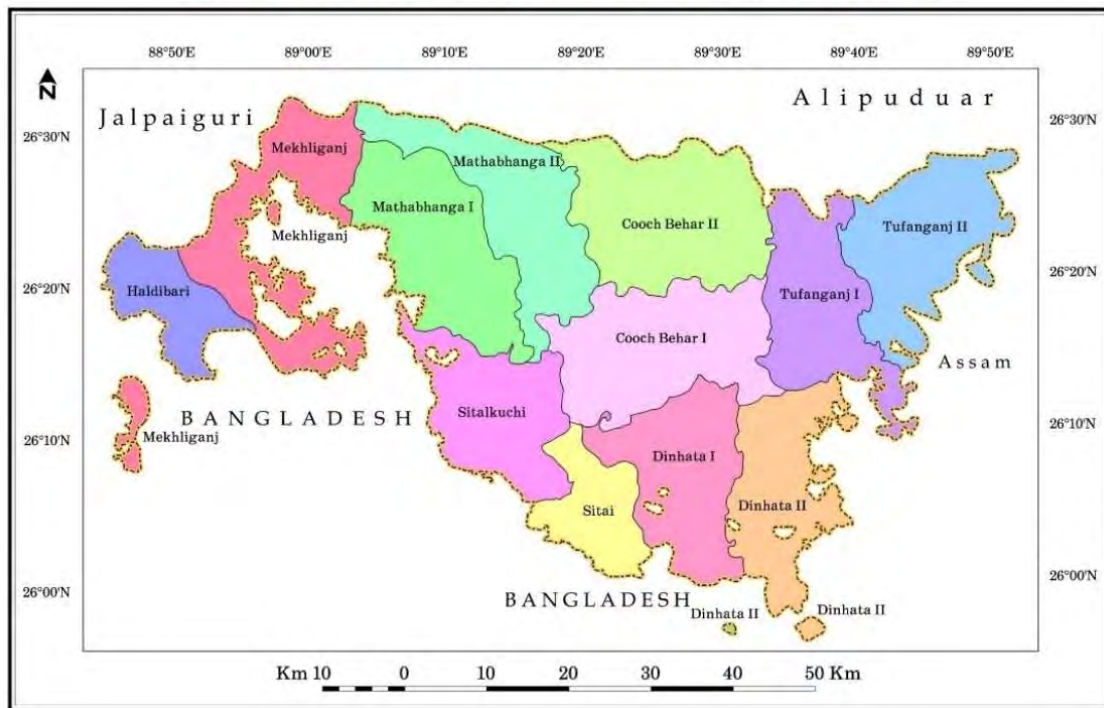
LOCATION MAP



MAP NO. 2.1

Source: Census, 2011

ADMINISTRATIVE MAP OF KOCH BIHAR DISTRICT



MAP NO. 2.2

Source: Census, 2011

2.3 Physical Setup

2.3.1 Geology

Koch Bihar district is composed by new alluvial soil. These alluvial soils are mostly brought down by the Himalayan rivers like Tista, Torsa, Jaldhaka, Raidak and Sankosh. In Quaternary period during the uplift of the Himalayas caused to the creation of parallel faults and transverse faults of the Himalayas in West Bengal. Koch Bihar district is formed due to the upliftment of these faulting in time to time. Sometimes these faults are causing shifting of river channels in that area. The northern part of this district is made up of fluvio- catastrophic deposition and southern part is formed by Pleistocene to recent flood plain deposition (Roy R., 2009).

2.3.2 Relief

The entire district forms a part of the great alluvial plain of the Ganges-Brahmaputra system. The topography in the district gradually slopes southwards, the maximum elevation in the district being 55m above msl (mean sea level). The minimum elevation is 32 m above msl. The northern part of district, which in general has a higher elevation and forms the transitional zone between the northern *Terai* zone of the Himalayas and the southern alluvial soil. Apart from

the flat, monotonous or gently sloping topography in the district, no other important physiographic features are noticed in any part of district. Maximum high lands are found in Sitalkuchi area and maximum low lands lie in Dinhata area. The relative height of this district is 47 m (Roy R., 2009).

2.3.3 Climate

The climate of the Koch Bihar district of West Bengal, in general, is sub-tropical per humid to tropical humid in nature with distinctive characteristics of high rainfall, high relative humidity and moderate to low temperature (Roy R., 2009). 70% of the annual rainfall is received during the southwest monsoon season. On an average there are about 102 rainy days with records of more than 400 mm rainfall in 24 hours. During monsoons, starting from June, Koch Bihar experiences heavy rainfall. The average annual rainfall is about 3201mm in Koch Bihar district of West Bengal. The numbers of rainy days in Koch Bihar district are recorded to be the highest in the months of June and July. In Koch Bihar district, the number of rainy days often cross 20 days in a month during the months of June and July followed by 15-20 days in August and September. During April, May and October it varies between 10-12 days. An early onset of pre monsoon shower and occurrence of a low quantum of precipitation during the month of March and April with occasional short dry spells are the other distinctive characteristics for Koch Bihar district. Temperature and rainfall are the most important natural key factors for the agricultural production.

2.3.3.1 Temperature

This area experiences a prolonged mild winter which extends from November to March and moderate summer from May to September. According to the Meteorological unit, office of the Deputy Director of Agriculture, Koch Bihar, last 10 years (2011 to 2020) January is the coldest month and July is the hottest month. The mean maximum and mean minimum temperatures of last 10 years (2011 to 2020) for January is 23.4⁰C and 9⁰C and July is 32.6⁰C and 25.4⁰C respectively. (In winter season damp weather hampers production of various Rabi crops in this area). Table no. 2.1 and table no. 2.2 shows the maximum and minimum temperature of last 10 years for Koch Bihar district. Over the last ten years, mean and maximum temperature does not gradually increase or decreased rather it is always up and down trend observed in 10 years. Highest mean maximum which is 35.4 ⁰C temperature observed in the month of April in 2014. Lowest mean maximum which is 7.1⁰C temperature observed in the month of January in 2016.

TABLE NO. 2.1 MEAN MAXIMUM TEMPERATURE (°C) OF KOCH BIHAR DISTRICT (2011-2020)

Months	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
January	22.1	23.2	24.4	24.2	24.1	23.8	22.9	24.2	23.7	24.6
February	28.3	26.1	26.7	25.3	26.3	26.3	25.9	26.4	26.2	25.7
March	31.1	30.4	32.1	30.7	30.8	30.7	31.2	30.3	31.3	30.8
April	31.1	31.2	32.2	35.4	30.4	31.2	32.2	30.1	32.1	31.1
May	32.4	33.5	31.5	32.2	32.6	32.7	33.2	32.5	32.6	32.1
June	33.5	31.2	33.6	32.4	31.1	32.1	33.1	33.4	32.2	32.7
July	31.1	32.3	33.1	33.1	34.2	32.5	32.9	33.4	33.2	32.1
August	33.6	33.6	33.2	31.7	32.5	34.5	34.1	33.9	34.1	33.8
September	33.2	33.2	33.2	31.2	32.4	33.8	33.7	32.6	34.1	33.8
October	33.5	31.2	31.2	32.8	33.1	33.4	32.7	32.8	32.7	32.2
November	29.3	29.3	30.7	30.7	29.4	29.1	29.5	29.7	30.1	29.8
December	26.7	24.1	26.8	26.3	25.4	25.1	24.8	25.9	25.4	25.7

Source: Meteorological Unit, Office of the Deputy Director of Agriculture, Koch Bihar

TABLE NO. 2.2 MEAN MINIMUM TEMPERATURE (°C) OF KOCH BIHAR DISTRICT (2011-2020)

Months	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
January	9.2	9.2	7.2	10.5	10.2	7.1	8.3	7.9	8.4	8.4
February	12.1	11.2	12.4	11.2	12.1	12.1	11.7	11.3	11.9	11.1
March	16.4	15.6	17.8	15.3	16.7	16.2	16.9	17.1	17.2	17.2
April	20.1	20.4	20.5	19.6	20.2	20.4	20.7	20.1	19.7	19.8
May	23.1	23.4	23.4	23.1	22.1	24.1	23.7	24.1	23.9	23.5
June	25.1	24.2	26.5	25.4	24.4	25.2	24.9	24.8	26.2	25.1
July	26.2	26.7	26.7	26.2	25.3	25.4	26.2	26.3	25.9	26.8
August	26.2	26.7	25.2	25.4	25.4	26.9	26.8	26.1	25.2	25.2
September	25.3	26.5	25.6	24.3	25.3	25.1	25.4	25.9	25.7	26.2
October	22.1	20.1	22.1	21.3	21.4	22.1	22.3	22.5	21.9	22.1
November	15.3	13.2	13.2	16.3	15.3	14.9	14.4	15.2	14.4	14.1
December	12.1	11.4	11.4	11.2	11.2	11.2	11.2	11.7	11.3	11.4

Source: Meteorological Unit, Office of the Deputy Director of Agriculture, Koch Bihar

2.3.3.2 Rainfall

The rainfall pattern of the district varies in different months in a year. Highest rainfall occurs in the months of June, July and August. On the other hand, lowest rainfall is recorded in the months of November and December. Medium showers are received in the months of April, May, September and October. Very light showers occur in rest of the months i.e. January, February and March. The irrigation facilities in this district are inadequate so that most of the farmers are still dependent upon natural rainfall. Due to irregular rainfall different crops are grown in different months. Paddy and jute are cultivated during heavy rainfall months i.e. June and July. In winter due to scarcity of rainfall potato is the major crop in this district. During monsoons, starting from June, Koch Bihar practices heavy rainfall. The average annual precipitation is about 3,201 mm, gradually increasing from the south-west to the north-east. The monsoon season lasts till September. The details of the monthly rainfalls of last 10 years are presented in the table no. 2.3.

TABLE NO. 2.3 MONTHLY RAINFALL (MM) OF KOCH BIHAR DISTRICT (2011-2020)

Months	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
January	3	3	-	-	27	-	-	4	7	4
February	11	11	14	24	12	-	-	10	11	11
March	56	3	10	20	55	33	12	8	44	42
April	138	173	115	46	151	178	152	117	174	178
May	294	242	244	437	335	357	248	315	285	412
June	431	947	404	605	723	607	756	762	789	918
July	775	779	661	285	250	720	778	721	689	803
August	476	337	348	558	828	478	404	567	456	504
September	465	614	398	558	445	432	412	456	612	448
October	20	245	237	19	36	121	56	189	89	234
November	-	-	-	-	3	-	-	8	-	2
December	-	-	-	-	2	-	-	-	-	3
Total	2669	3354	2431	2552	2866	2926	2818	3157	3156	3559

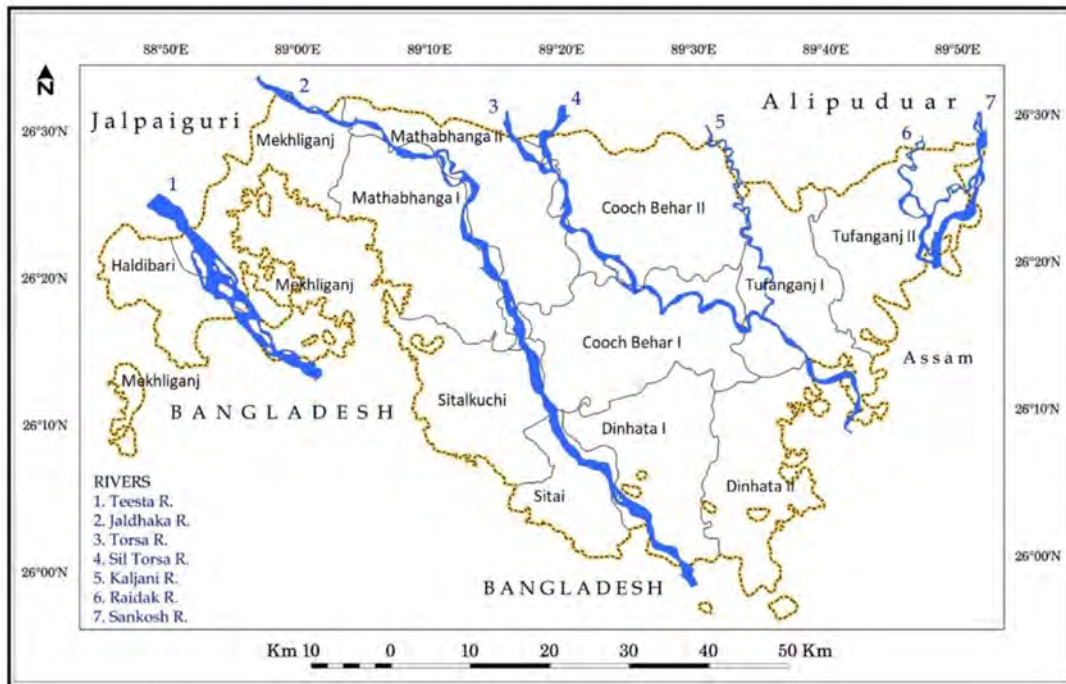
Source: Meteorological Unit, Office of the Deputy Director of Agriculture, Koch Bihar

2.3.4 Drainage

Koch Bihar district is endowed with a numerous river system due to its close proximity to the Himalayas. The rivers along with network of tributaries and sub-tributaries are over flooded during monsoons and maintain a normal water flow until middle of November. Moreover, this region is favourably exposed to high rainfall in terms of its duration as well as amount. Perennial and non-perennial streams are found in this district. Most of the rivers are originate from Himalayas. Formations of flood plains are very common because of flooding in rainy months. Silt and clay are deposited near to the river channel area.

The major rivers flow from north-west to south-east. Six river systems cut the district flowing in a south-easterly direction. From the west to east, there are the Tista system, Jaldhaka system, Torsa system, Kaljani system, Raidak system and Gadadhar system. Most of the rivers originate from Sikkim, Bhutan and Darjeeling hills except Torsa river which originate from Tibet. All the rivers are flooded during the rainy season. The river Tista enters the district from the south-western part and forms the border of Mekliganj and Haldibari block. The river Jaldhaka enters the district at the north-eastern part of Mekhliganj and then runs along the border of Mathabhanga block I and II with Cooch Behar block II at north western direction, finally flows in Cooch Behar block I from south-east direction. The river Torsa enters from the Koch Bihar district from the north between Latabari in Mathabhanga and Putimari in the Cooch Behar Sadar. Other rivers like Kaljani, Gadadhar, Raidak and Sankosh flow in Tufanganj blocks I and II (Roy R., 2009) The river Kaljani is the combined waters of the Alaikuri and Dima rivers. A river Raidak enters the district from the western duars between Dorko and Changtimari. Map no. 2.3 and Map no. 2.4 shows the drainage patterns of the district.

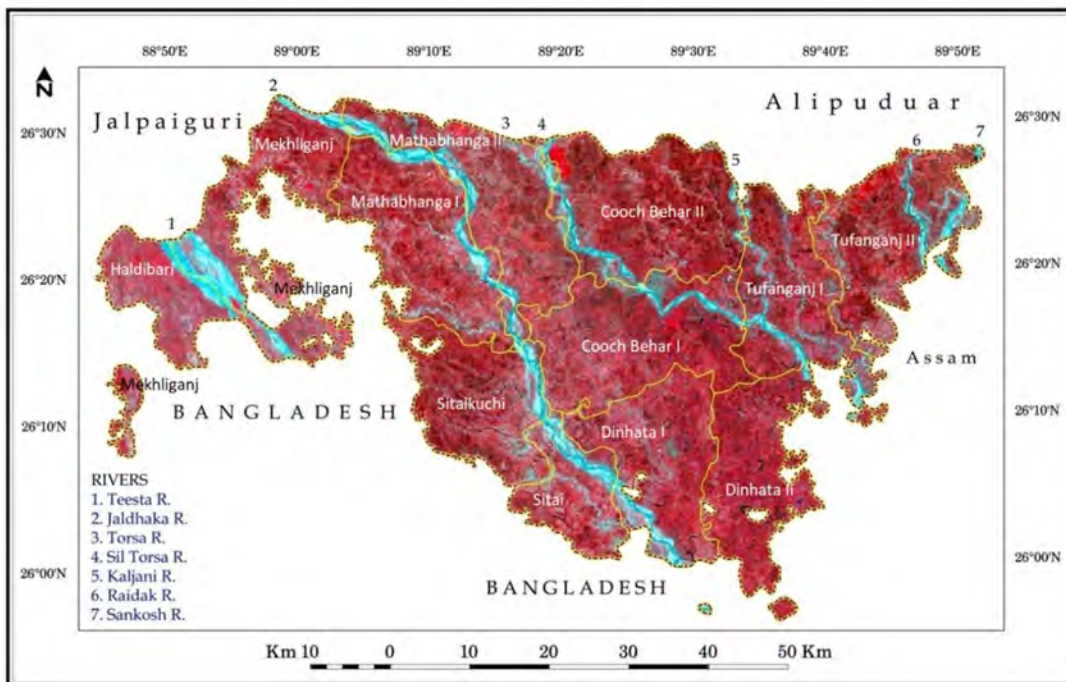
DRAINAGE MAP OF KOCH BIHAR DISTRICT



MAP NO. 2.3

Source: LANDSAT Image, November 2019

DRAINAGE MAP OF KOCH BIHAR DISTRICT



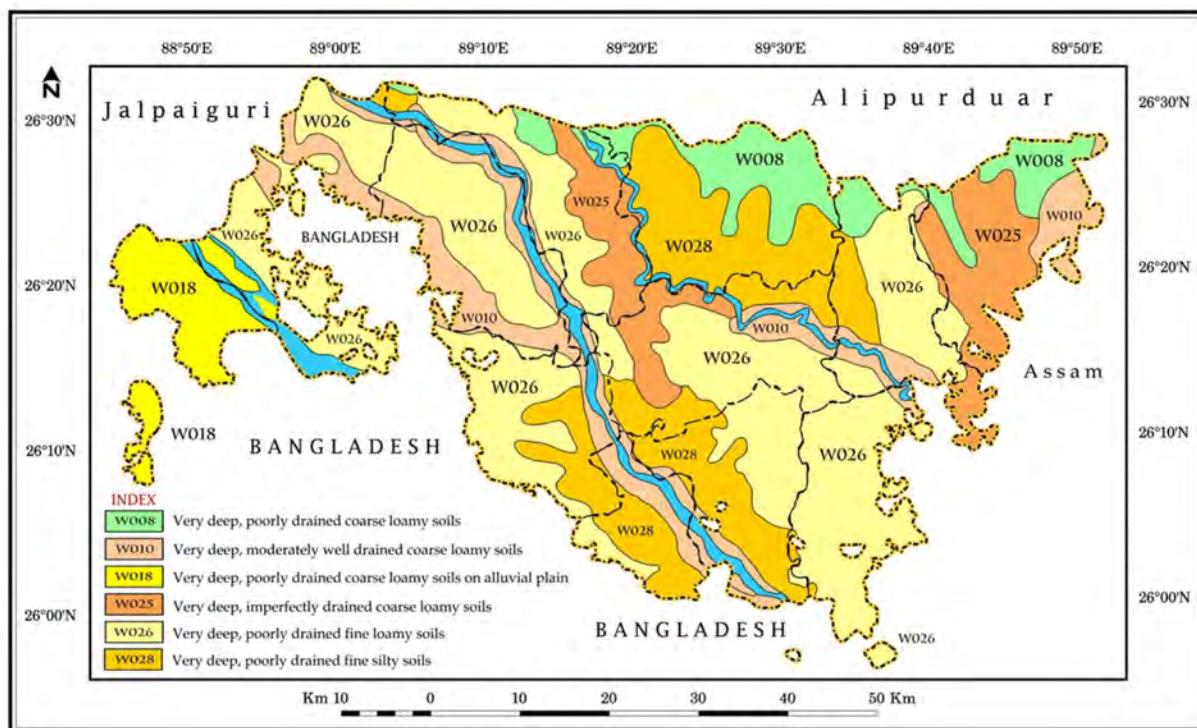
MAP NO. 2.4

Source: LANDSAT Image, November 2019

2.3.5 Soil

With its riverine topography and lack of high elevations, Koch Bihar presents a more homogeneous soil profile than is usual for an area of its magnitude. Soils in the district are mostly alluvial soils ranging from sandy soil to a clayey loam. Sandy loam is more prevalent in the district. The soil materials being brought down by various rivers from the Himalayan mountain and forms the soils of the region (Roy Choudhuri *et. al.*, 1963). In the north eastern corner of the district i.e., in Tufanganj block, brown forest soils are found in the higher altitudes. The alluvial soils in the district are ash in colour, relatively shallow in depth (1 m), light texture and highly porous. With leaching of the bases brought about by heavy rainfall, these soils are acidic (pH 4.2-6.2) and organic matter is not properly decomposed. The acidity in the soil is removed by the addition of measured quantities of dolomite/limestone, which is locally called soil-conditioner. Symptoms of deficiency of some micro-nutrient elements specially boron, molybdenum and zinc are also the characteristic features of these soils. Evidences of toxicity of some metallic cations are common (Biswas and Mukherjee, 2009).

SOIL MAP OF KOCH BIHAR DISTRICT



MAP NO. 2.5

Source: National Bureau
of Soil Survey and Land Use Planning

The brown forest soils have high fertility, but crop yield is poor due to low soil depth and high acidity. Soil depths are normally low ranging from 15-100 cm, super-imposed on deep beds of sand. The base is igneous and/or metamorphic rocks lying at depth of 1000-1500 meters. The moisture retentive capacity of land in higher altitudes is low with much lower fertility. The lower plains are more fertile while in the middle-order lands, multiple cropping has gained popularity. With assured irrigation facility these lands can be better utilised for crop production. Out of the total cultivated land 5.7% is low land 15% high land and the rest medium land (Map no.2.5).

2.3.6 Natural Vegetation

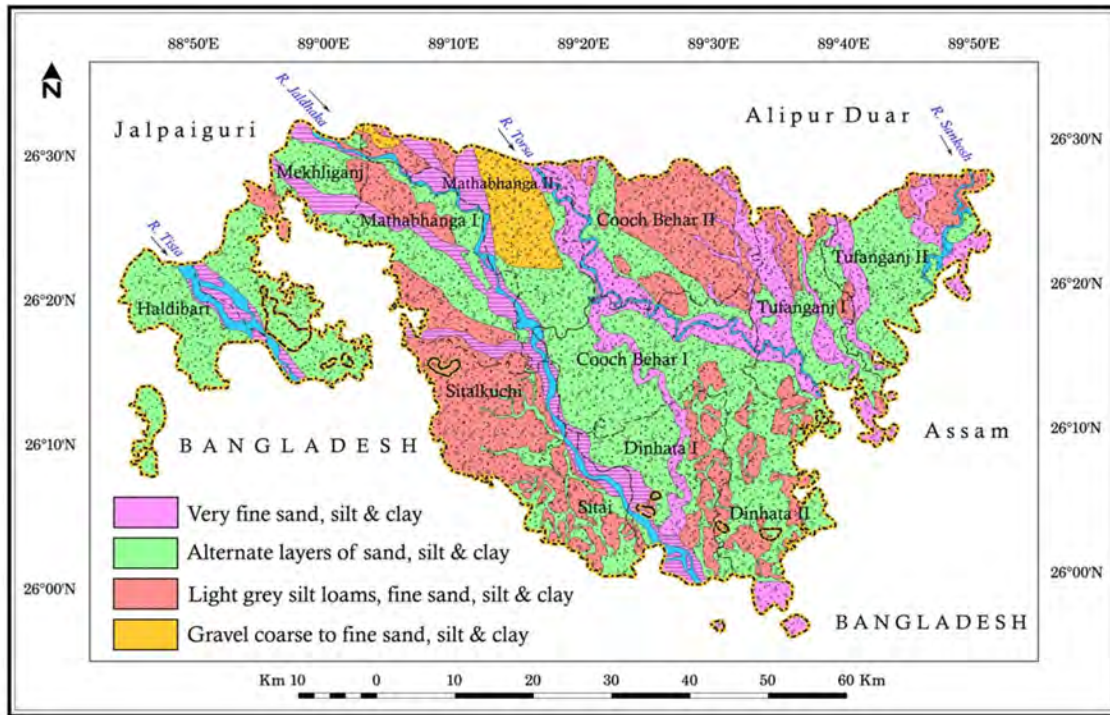
This district has 349 sq. km area under forest cover which constitutes 10.3% of total geographical area. It is mostly open degraded forest cover i.e. 92.26%. Tufanganj I block has the maximum area under forests while Haldibari, Sitai and Dinhata II blocks have no forests cover. The Jaldapara National Park shared a small portion with in Koch Bihar district, have dry and moist deciduous forest patches. The dominant tree species found in the district are *Shorea robusta* (Sal), *Chukrasia velutina* (Indian Mahogany), interspersed with riverine forest of *Acacia Catechu* (Khair), *Dalbergiasisoo* (Indian Rosewood) and *Bombaxceiba* (Red Cotton Tree). The town of Koch Bihar and its surrounding regions is facing rapid deforestation due to urbanisation and increased demand of fuel and timber. Sporadic patches of mixed Sal forest along with plantation areas are observed in peri-urban area.

2.3.7 Groundwater

Groundwater occurs under both water table and confined conditions in aquifers in depth ranging from 2.5-3.4 mbgl., the shallow aquifer being tapped by dug wells while the deeper aquifers being tapped by medium to heavy duty tube wells. Groundwater is utilized through open wells i.e., dug wells, in the district. The available discharges can only meet the domestic needs but is not sufficient enough for any large-scale work of ground water. However, groundwater in the zone of semi confined to confined aquifers could yield 80 – 170 lpm; which at places goes to as high as 350 lpm. The water table varies with the topography and becomes steeper towards the northern side with the onset of monsoon. The water levels gradually tend to rise and ultimately reach a level beyond which there is no further rise. Depth of water level in pre-monsoon period (2018) varies from 2 to 5.00 mbgl., whereas during post-monsoon it ranges from less than 2.00 to 5.00 mbgl. Groundwater in Koch Bihar is a renewable resource

subject to periodic replenishment from direct infiltration from precipitation and infiltration from streams and rivers flowing across the district (map no.2.6).

HYDROGEOMORPHOLOGY OF KOCH BIHAR DISTRICT



MAP NO. 2.6

Source: LANDSAT Image, November 2019

2.4 Social, Cultural and Economic Setup

2.4.1 Demographic Characteristics

In Koch Bihar district the total population is 2819086 and the density of population is 832 persons per sq.km. Sex ratio of the district is 942 females per 1000 male. This district has 1451542 males (51.49%), 1367544 females (48.51%); 289434 persons urban reside in (10.27%) and 2529652 persons in rural (89.73%) areas (Census 2011).

2.4.1.1 Literacy

Education is an important factor in determining the level of living of the people and also the level of productivity in all sectors of an economy. It is the first step for development of any society. It is an important factor in economic development. Education widens the mental horizon of the people and it promotes a rational and scientific outlook. Education helps in bringing about improvement in health, hygiene, productivity and other components of quality

of life. Moreover, it is essential for the people to adjust with the changes of the modernization. The literacy rate of Koch Bihar district is 74.78% which is higher in comparison to India (74.04%). The male literacy rate is higher (80.71%) than female literacy (68.49%) in Koch Bihar district as per Census 2011. The literacy rate of the Koch Bihar district is presented in the table no.2.4.

TABLE NO. 2.4 SEX WISE LITERACY RATE IN KOCH BIHAR DISTRICT, 2011

Sub-Divisions	Rural literacy (%)			Urban literacy (%)			Total literacy (%)		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Mekhliganj	76.20	61.65	69.11	84.78	75.75	80.32	77.07	63.11	70.25
Mathabhanga	78.52	64.29	71.59	93.40	86.70	90.09	79.08	65.16	72.30
Sadar	83.64	71.78	77.96	92.26	85.90	89.12	85.51	75.10	80.48
Tufanganj	80.69	67.80	74.46	92.71	85.73	89.28	81.44	68.93	75.38
Dinhata	76.83	64.84	71.02	93.94	87.67	90.85	77.89	66.29	72.27
Total	79.43	66.47	73.16	91.64	85.00	88.36	80.71	68.49	74.78

Source: Census of India, 2011

2.4.1.2 Religion wise Distribution of Population

Religion of population is an important social indicator in describing the socio-economic characteristic of the population. In Koch Bihar district Hindus, Muslims Christians and other people professing living together with a brotherhood mentality. As per Census 2011 Hindus are the majority followed by Muslims. The details of the religious composition over Koch Bihar district are presented table no. 2.5.

TABLE NO. 2.5 RELIGIOUS COMPOSITION OF KOCH BIHAR DISTRICT, 2011

Religion	Total Population (Persons)	Percentages of population (%)	Male Population (Persons)	Female Population (Persons)
Hindu	2087766	74.06	1076413	1011353
Muslim	720033	25.54	369383	350650
Christian	4122	0.15	2077	2045
Sikh	449	0.02	267	182
Buddhist	445	0.02	213	232
Jain	1869	0.07	952	917
Other religions	158	0.01	92	66
No religion specified	4244	0.15	2145	2099

Source: Census of India, 2011

2.4.1.3 Caste wise Distribution of Population

The caste wise distribution of the population is a social factor in analysing the socio-economic characteristics of an economy. It reveals that the proportion of population of different castes in the total population and their customs, economic status has a great impact of any area. In past the Koch Bihar was dominated by Scheduled Caste population and Scheduled Tribe and general caste people are the minorities in this district (Census, 2011). Rajbanshi, Namasudra

and Jali Kaibartta are the major forms of Scheduled Caste population in the district. The number of general caste population in this district has increase largely after independence. There has been considerable migration of general caste population in the district from different parts of Bangladesh and Assam. According to 2011 census among the total population in the district 50.17% are Scheduled Caste population and only 0.64% are the Scheduled Tribe population. At present the district is a miniature of all caste of people. The detailed of the major caste composition over Koch Bihar district are presented is table no.2.6.

TABLE NO.2.6 CASTE COMPOSITION OF KOCH BIHAR DISTRICT, 2011

Category	Male (Persons)	Female (Persons)	Total (Persons)
Scheduled Caste			
Rural	696254	654403	1350657
Urban	32252	31427	63679
Total	728506	685830	1414336
Scheduled Tribe			
Rural	8735	8137	16872
Urban	653	600	1253
Total	9388	8737	18125

Source: Census of India, 2011

2.4.1.4 Occupation Structure

Occupation of the people is an important economic factor to analyse the standard of living of the people of any area. Occupational structure helps to understand the economic development of that particular area. Koch Bihar district is mainly an agricultural district as 85% of the population are dependent on agriculture and agriculture allied activities for their livelihood. The only industrial centre is the Ckakhaka Industrial Growth Centre' which comprises 131 acres of land. This growth centre is located at a distance of 4 kilometre from Koch Bihar town. As it is a growing centre and most of the small industries are in to formative stage, it does not have capacity to employ more people. Thus, due to industrial backwardness most of the people of Koch Bihar district have chosen agriculture and allied activities as the main source of their employment.

As per 2011 Census of India, Koch Bihar has a population of 2,819,086 out of which 1,451,542 are males and 1,367,544 are females. Total working population is 1127977 persons which accounts to 40.01%. While the total non-working population of the district is 1691109 persons which is about 59.99% (Census, 2011). Total 3,64,797 cultivators depend on agriculture farming out of 3,02,745 are men and 62,052 are women. 3,91,875 people works as agricultural land as labourer, out of which 2,57,425 are men and 1,34,450 are women. Koch Bihar is an agricultural district with very large number of people dependent on agriculture.

OCCUPATIONAL STRUCTURE OF KOCH BIHAR DISTRICT, 2011

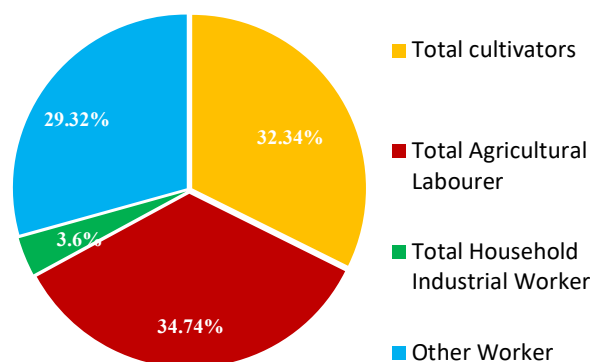


FIGURE NO. 2.1

Source: Census, 2011

Occupational structure helps in the analysis of distribution of the population in various economic sectors. In the 12 CD blocks of Koch Bihar district the occupational structure is classified into four sectors – i) Cultivators, ii) Agricultural Labourers, iii) Household Industrial Workers and iv) Other workers (figure no. 2.1). Agricultural labourers account for 34.74% (391875 persons) of the population followed by cultivators with 32.34% (364797 persons). Population involved in household industry is low accounting for 3.6% (364797 persons).

Out of the total working population i.e, 1127977 persons the female working population from the rural area are 262416 persons accounting for 23.26% while only 1.8% (20253 persons) of female working population come from the urban area. The female working population forms 25.61% (262416 persons) out of the total working population (rural area) which indicates that about 74.39% women are non-workers.

According to the Census 2011 workers are broadly divided into two classes – a) Main workers and b) Marginal workers. Main workers are those workers who have worked for the major part of the reference period i.e., six months or more. While marginal workers are those who have not worked for the major part of the reference period i.e., less than six months. The total female main worker is 121330 persons which is 46.24% and the total female marginal worker is 141086 persons i.e, 53.76%.

The main workers and marginal workers are further classified into four types – i) Cultivators, ii) Agricultural labourers, iii) Household industrial workers and iv) Other workers. Among the female main workers in Koch Bihar district the majority of women are involved as agricultural

labourers (figure no. 2.3) forming 48.83%. 23.3% of women are engaged as cultivators, 7.15% women are involved as household industrial workers and the remaining 20.72% women are involved in other sectors. Among the female marginal workers in the district 23.64% women work as cultivators, 52.77% women are involved as agricultural labourers, 7.63% are involved as household industrial worker and 15.97% (figure no. 2.2) women are involved in other activities.

OCCUPATIONAL STRUCTURE OF FEMALE MARGINAL WORKERS OF KOCH BIHAR DISTRICT, 2011

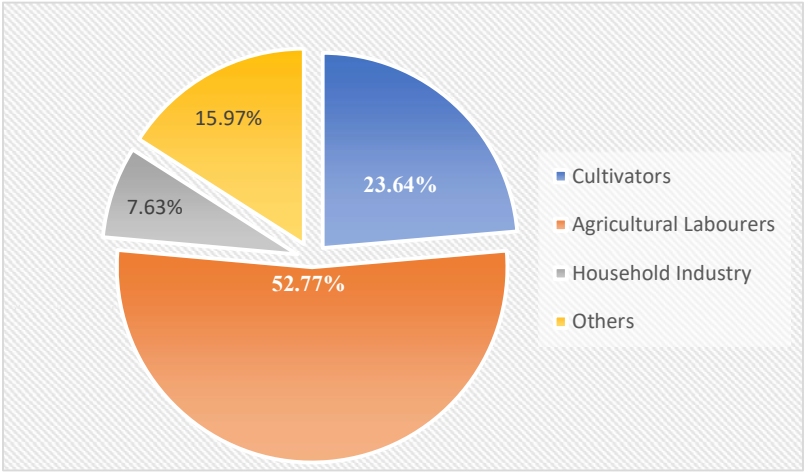


FIGURE NO. 2.2 *Source: Census, 2011*

OCCUPATIONAL STRUCTURE OF FEMALE MAIN WORKERS OF KOCH BIHAR DISTRICT, 2011

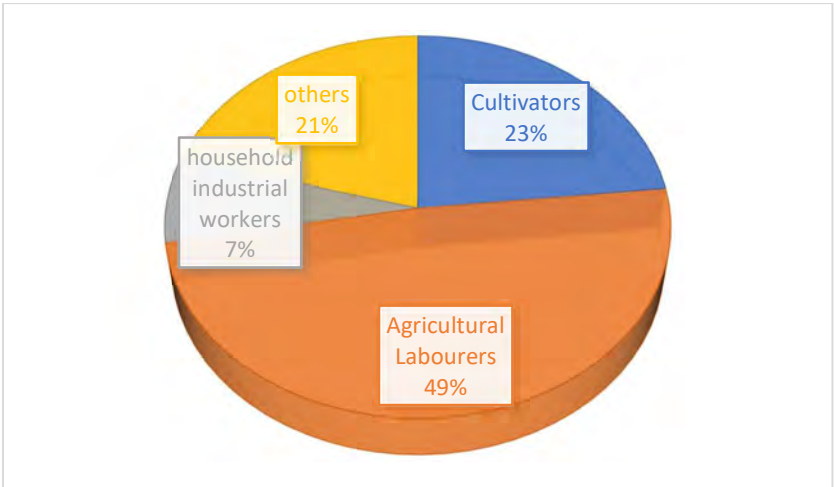


FIGURE NO. 2.3 *Source: Census, 2011*

Out of the total female working population of Koch Bihar district i.e., 262416 persons, most of the female working population are involved in agriculture and allied activities forming 74.88% while 25.57% (67108 persons) women are involved in non-agricultural activities. Therefore an overall view of the occupation structure of women in Koch Bihar district indicates an involvement of women mostly in primary activities. The details of the population over different agricultural sectors in the Koch Bihar district is presented in the following table no.2.7.

TABLE NO.2.7 AGRICULTURAL WORKERS BY GENDER IN KOCH BIHAR DISTRICT, 2011

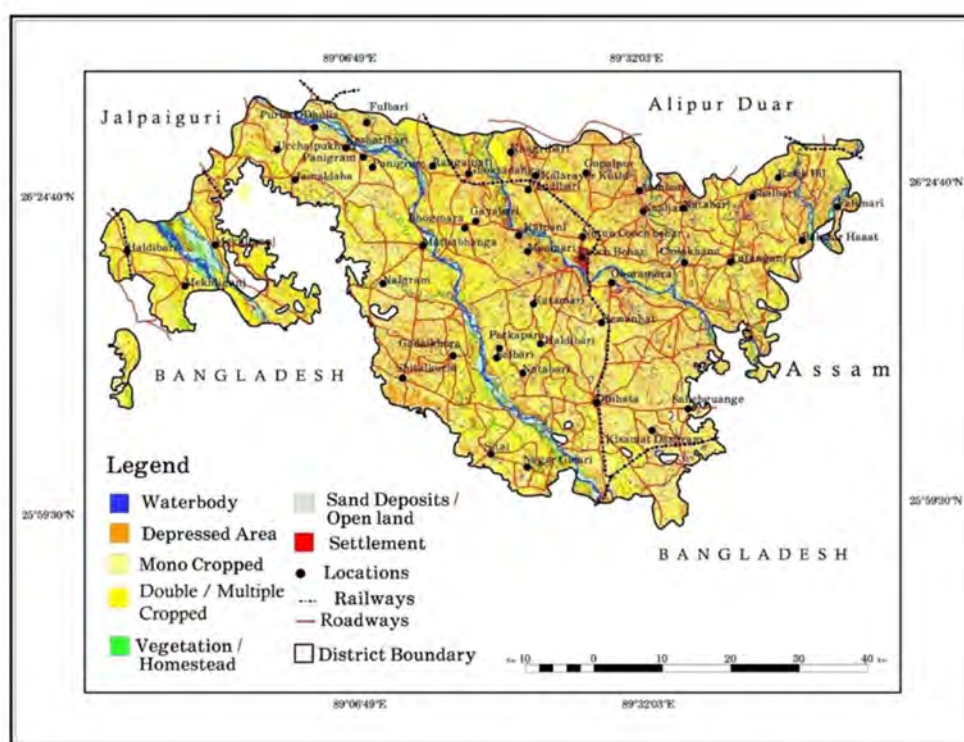
Category	Male (Persons)	Female (Persons)	Total (Persons)
Cultivators			
Rural	301021	61620	362641
Urban	1724	432	2156
Total	302745	62052	364797
Agricultural labourers			
Rural	254599	133688	388287
Urban	2826	762	3588
Total	257425	134450	391875

Source: Census of India, 2011

2.4.2 Land Use

Land use involves the management and modification of natural environment or wilderness into built environment such as settlements and semi natural habitats such as arable fields, pastures and woods. The land use pattern of Koch Bihar district is diversified as forest area, fallow land, net sown area, pasture and grazing land etc. Total area of Koch Bihar district is 3387 square kilometres (map no.2.7). The land is one of the main factors of agricultural production. The land resource constitutes the fundamental basis for agricultural activities. The land use pattern has endured many changes over the years in Koch Bihar district. Of the total geographic area of 331.57 thousand hectares of the district the net sown area was 250.61, 250.61, 252.56, 253.26 and 254.54 thousand hectares during 2010-11, 2011-12, 2012-13, 2013-14, 2014-15. During the year from 2010 to 2015, forest area gradually decreased in Koch Bihar district (5.26 to 3.76 thousand hectares). On the same period current fallow land gradually increased from 0.86 thousand hectares to 0.81 thousand hectares. Culturable Waste Land remains same in 2010-11 and 2011-12 (0.29 thousand hectares), sharply increased to 1.33 thousand hectares in 2012-13 but subsequently decreased to 1.22 thousand hectares in 2013-14 and further to 0.72 thousand hectares in 2014-15. The overall loss of dense forest class in the period of 2010 to 2015 was found to be decreased. The major reason for this change was identified as the conversion of dense forest areas settlement and agricultural land due to the population pressure (District Statistical Handbook, Koch Bihar, 2018).

LANDUSE LANDCOVER MAP OF KOCH BIHAR DISTRICT



MAP NO. 2.7

Source: LANDSAT Image, November 2019

2.4.2.1 Agriculture

Agriculture is the backbone of the economy of this area. The total area of vested agricultural land of Koch Bihar district is 28103 hectares in the year 2018. Agricultural sector is mainly dominated by marginal and small farmers having less than 1 hectare and less than 2 hectares of land respectively (District Statistical Handbook, Cooch Behar, 2018). The principal crops of this region are rice (autumn rice and winter rice), wheat, pulses (lentil, gram, moong, arhar and khasari), oilseeds (mustard, niger, groundnut, linseed and til or sesamum), potato, jute etc. Besides some minor crops like tobacco, chillies, turmeric, vegetables, coconut, areca nut, cashew nut etc. are also cultivated in this district. A relatively small area is under tea (1655.63 hectare and 869 tea gardens, 2018).

2.4.2.2 Agricultural Allied Sectors (Cattle Rearing)

From the stand point of nutritional requirement of growing population, developments of animal resources are very relevance. Besides nutritional point of view, it has been noted that without livestock resources the crop production is not sufficient for the economic development process

of rural community. It is relevant that the cattle–man ratio for this district production of milk (146 thousand tones, 2018) is low than the state level (4961 thousand tones, 2018). Farming with crossbreed has emerge out a profitable proposition in this district. In this district per capita availability of goat is relatively high. But the demand of goat is high in this region because it is slaughtered for meat purposes. The method of improving the goat population has not yet been adopted. The availability of eggs in this district is slightly lower than that of the state level. Broiler production in the districts satisfactory and it has replaced the demand of meat in a large extent. According to the livestock Census 2019, total number of the livestock and poultry of Koch Bihar district are 3333260. According to the livestock Census 2019, the details of the livestock and poultry of Koch Bihar district is presented in table no.2.8.

TABLE NO.2.8 DISTRIBUTION OF LIVESTOCK AND POULTRY OF KOCH BIHAR DISTRICT, 2019

Sl. No.	Blocks	Number of Livestock and Poultry						Total No.
		Cattle	Buffaloes	Goats	Sheep	Others	Poultry Birds	
1	Haldibari	40260	235	25931	74	29	85862	152391
2	Mekliganj	69249	708	45523	2395	1060	91511	210446
3	Mathabhanga I	96122	160	44268	17382	2306	133641	293879
4	Mathabhanga II	83422	141	41516	16662	5057	253252	400050
5	Cooch Behar I	93211	189	55652	7633	1677	187815	346177
6	Cooch Behar II	138810	127	57338	11868	1567	149177	358887
7	Tufanganj I	99011	347	26845	12158	538	98772	237671
8	Tufanganj II	107625	871	45748	23924	3673	146403	328244
9	Dinhata I	71449	274	37427	1234	2720	164343	277447
10	Dinhata II	99400	103	49638	8360	1648	144897	304046
11	Sitai	56348	943	35107	4547	492	37999	135436
12	Sitalkuchi	80290	268	51151	13658	399	142820	288586

Source Livestock Census, 2019

2.4.3 Agricultural Technologies

2.4.3.1 Irrigation

Water plays a dominant role in increasing the agricultural productivity in any region. Irrigation facilities an essential pre requisite for agricultural progress is very limited in the district. The main source of irrigated water available for agricultural fields is natural rainfall which is not sufficient in terms of quantity, time and continuity. The present sources of irrigation in this district are canals, river lift irrigation, tank, deep tube wells, shallow tube wells and open dug

wells etc. The irrigation facilities are negligible in comparison to the gross cropped area. It is due to the inadequate supply of irrigation facilities the farmers of the district are not able to introduce multiple cropping. More over main agricultural production is seriously handicapped due to the shortage of irrigation facilities.

The major irrigation sources in 2018 are tank (5.89 thousand hectares), high-capacity deep tube well (16.17 thousand hectares), middle capacity deep tube well (3.40 thousand hectares), shallow tube well (51.36 thousand hectares), river lift pump (11.28 thousand hectares), open dug well (6.63 thousand hectares) etc. (District Statistical Handbook, Cooch Behar, 2018). Uninterrupted rainy days prevail during a part of monsoons in the district and generally has a positive bearing on irrigation system. In spite of such abundance of water resources their exploitations for the purpose of developing agriculture are unsatisfactory till date. Although this region is richly placed in terms of ground water availability, as well as availability of surface water, the concept of water harvesting has remained only at conceptual levels for the region under study. Thus, sufficient care is being taken to evolve new technologies, models of irrigation benefiting the soils, water harvesting, cropping and economy of the district. Irrigation schemes and deep-boring technology using turbine/submersible pumps under DTW (deep tube well) schemes, while IRDP and SFPP schemes provide credit-linked support for installation of single-user medium-duty irrigation tube wells by private cultivators.

2.4.3.2 Fertilizer

Koch Bihar is an agriculture-based district and most of the people depend on agriculture for their livelihood. The nature of agriculture of the district shows signs of low productivity. Among many factors, the reluctance as well as the inability of the poor farmers to use more chemical fertilizers is responsible for low agricultural productivity in the district (Biswas and Mukherjee, 2009). Fertilizer is one of the vital inputs required for enhancing agricultural production and the farmers' income in the district. Farmers of the district are also dependent on animal dung as manure. For the introduction of HYV programme on a wide scale, use of chemical fertilizers acts as an essential ingredient in any agriculture based rural economy. The consumption of chemical fertilizers is insufficient and irregular in the district. So, it has an impact on raising the agricultural productivity in the district. The farmers are habituated to use more fertilizers during potato cultivation. The most important point here is that the farmers cannot use fertilizers in proper proportions due to lack of proper knowledge and training, which ultimately destroy the productive capacity of soil in many cases. So, to maintain the productive

capacity of soil in the rural economy the government must arrange proper training for the farmers.

2.4.3.3 Power

Power or energy is the most important developmental infrastructure for development in a region. It makes the life of the people more comfortable. Electricity also helps in agricultural and industrial activities. So, electricity stands as an important economic indicator. In Koch Bihar district electricity is consumed mainly for domestic and commercial purposes, 2% to 6% (Ghosh, R.K., 2014) electricity is consumed for agricultural activities. The main sources of power in this area are electricity supplied by West Bengal State Electricity Board.

2.4.3.4 Transport & Communication

Roads and railways serve an economy like the arteries in human body. Before independence North Bengal was badly neglected in respect of transport and communication. The situation changed after 1962. But per capita road mileage and rail lines are still very meagre in this area. Due to inadequate transport facilities the area of North Bengal is still backward in all respects. The NH31 passes through the district connecting Assam and Bengal. There are also state highways, district roads and village roads. The roads are maintained by PWD, zilla parishad, gram panchayet, panchayet samity and Prime Minister's gram in sarak yojana. In the district are 1065.66 kilometers (both surface and unsurface) out of which surface roads are 1041.86 kilometres (District Statistical Handbook, 2018). Total registered motor vehicles and post offices of Koch Bihar district are 89437 and 362 respectively (District Statistical Handbook, 2018). The railway station New Koch Bihar is situated within the district which connects Koch Bihar with every region in India. There is an airport (non-operative) in the adjacent area of Koch Bihar town. The roads of different sub divisions are metalled but the village roads are unmetalled. The village people thus face problems mainly during the rainy seasons, in case of communication. Some village areas are not well connected with the main roads which cause great difficulties to transfer perishable agricultural products.

2.4.3.5 Credit Facilities

Financial supports much necessary for any kind of economic activity. Banking service occupies the most important place in rapid economic development of an economy. It opens the scope to the people to deposit their savings safely and lend money at cheaper rates of interest when needed. Banking service in the rural economy helps the farmers to lend money at lower rates during the period of sowing seeds. Various co-operatives including credit and non-credit

societies and banking are available in Koch Bihar district which help the citizens for the Koch Bihar district to act freely for their livelihood. Farmers of Koch Bihar district included investment credit for various crops mainly for potato, winter vegetable, paddy and agricultural allied activities. They also take loans for purchasing of fixed assets for agricultural machineries like tractors, power tillers etc. Table no. 2.9 shows block wise number of bank offices and co-operatives in Koch Bihar district (Census 2011).

TABLE NO.2.9 NUMBER OF BANK OFFICES AND CO-OPERATIVES OF KOCH BIHAR DISTRICT, 2011

Name of CD Blocks	Number of Bank offices	No. of Co-operative Societies
Haldibari	8	15
Mekliganj	8	31
Mathabhanga I	10	43
Mathabhanga II	11	28
Cooch Behar I	40	70
Cooch Behar II	17	68
Tufanganj I	13	55
Tufanganj II	7	27
Dinhata I	16	74
Dinhata II	12	31
Sitai	4	19
Sitalkuchi	5	41

Source: District Census Handbook, 2011

2.5 Conclusion

Koch Bihar is located on the northern part of West Bengal along the foothills of Himalayas. This district is the gateway to Assam from West Bengal and also to Bangladesh. The Tista, Jaldhaka, Torsa etc. rivers demarcate the flood plains area of this district. The principal rivers in this region are Tista, Jaldhaka, Torsa, Kaljani, Raidak and Gadadhar. The climate of the district is hot and humid. Young alluvial soils are deposited by Himalayan rivers which is very helpful for agriculture. Socio-economic condition includes population distribution, population density, literacy, occupation, religion, caste etc. It also includes the inter-relationships between social-economic condition and cultural indicators of the area and their effects on standard of living as well as life style of an area. The male literacy rate is higher than female literacy. Hindu is the major religion. Koch Bihar is dominated by Scheduled Caste population. Koch Bihar

district is mainly an agricultural district and a large percentage of population are dependent on agriculture and agriculture allied activities for their livelihood due to lack of industrial activities.

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CHAPTER 3

SOCIO-ECONOMIC CONDITION OF WOMEN IN THE STUDY AREA

3.1 Introduction

The study of socio-economic status of women is a great way towards women empowerment which leads to their better access to resources and therefore improved socio-economic status. In recent years, women empowerment has been recognized as crucial to the health and socio-economic development of not only individual families but of entire country. The study of socio-economic status of women is relevant not only as it leads to a fuller understanding of the needs of the local community but also as it is focused on socially and economically relevant planning and policy making. Socio economic status affects overall human functioning, including our physical and mental health. Low socio-economic status and its correlates, such as lower educational achievement, poverty and poor health, ultimately affect our society. Society benefits from an increased focus on the foundations of socioeconomic inequities and efforts to reduce the deep gaps in socioeconomic status. Research indicates that socio economic status is a key factor in determining the quality of life of women as extension, it strongly influences the lives of children and families. Inequities in wealth and quality of life for women are long-standing and exist both locally and globally. Behavioral and social science professionals possess the tools necessary to study and identify strategies that could alleviate these disparities at both the individual and societal level.

3.2 Socio economic characteristics based on Composite Score Method

The present study is conducted on secondary data from various sources particularly from District census Hand book (2011) which are directly or indirectly related to agriculture. Composite score method is use to analyses the spatial variation in socio-economic condition of the district. Keeping in view the existing socio-economic condition of the district, 26 indicators are selected and grouped into three categories i.e., demographic, infrastructural and economic.

By using the data and indicators an attempt has been made to examine the existing condition of different blocks of Koch Bihar district. Z score has been used to analyses the spatial variation of socio- economic condition of this district.

$$Z_i = \frac{x_i - \bar{x}}{s}$$

Where, Z_i is the computed Z-score, $\bar{x}$ is the mean and S is the standard deviation (SD)

Sturges rules are used for categorizing the CD blocks. The blocks have been classified into three groups (high, Moderate and low) based on the computed values.

3.2.1 Demographic Indicators

Density of population per sq. km. (X_1), sex ratio (X_2), percentage of scheduled caste population (X_3), percentage of scheduled tribe population (X_4), percentage of total literate population (X_5), percentage of Hindu population (X_6), percentage of Muslim population (X_7).

- **Level of Demographic Condition**

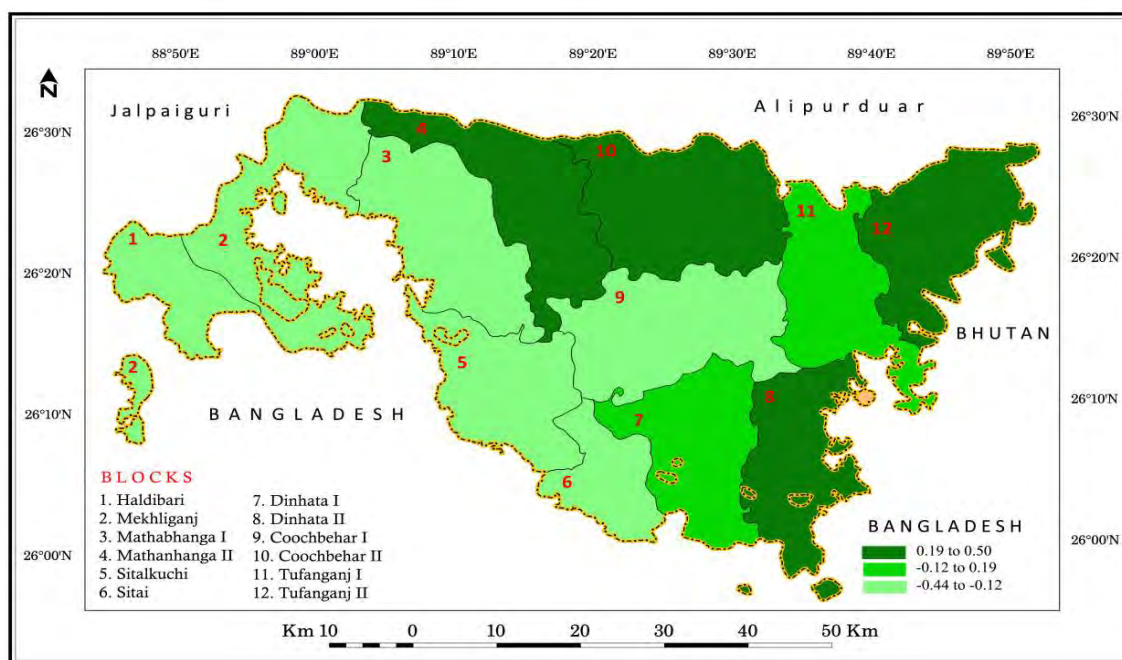
TABLE NO. 3.1 Z SCORE VALUES OF DEMOGRAPHIC INDICATORS

Blocks	X_1	X_2	X_3	X_4	X_5	X_6	X_7	Composite score	Levels
Haldibari	-0.44	-0.88	0.60	-0.44	-0.54	-0.93	0.93	-0.24	Low
Mekliganj	-1.88	-1.48	1.48	1.16	-0.47	0.84	-0.87	-0.17	Low
Mathabhanga I	-0.70	-0.28	1.21	-0.92	-0.54	1.28	-1.29	-0.18	Low
Mathabhanga II	-0.30	-0.19	0.92	1.00	0.82	1.44	-1.43	0.32	High
Cooch Behar I	0.53	-0.45	-1.15	-0.28	0.42	0.11	-0.12	-0.13	Low
Cooch Behar II	0.53	-1.05	-0.75	0.68	1.90	0.31	-0.31	0.19	High
Tufanganj I	0.29	1.10	-0.90	-0.76	0.40	0.43	-0.42	0.02	Moderate
Tufanganj II	-0.32	1.53	-0.45	2.12	0.57	0.64	-0.63	0.50	High
Dinhata I	1.91	0.06	-1.04	-0.44	-0.05	-1.30	1.28	0.06	Moderate
Dinhata II	1.34	1.53	-0.97	-0.28	0.54	-1.21	1.21	0.31	High
Sitai	-0.58	0.67	1.10	-0.92	-1.89	-0.31	0.32	-0.23	Low
Sitalkuchi	-0.37	-0.54	-0.06	-0.92	-1.17	-1.32	1.33	-0.44	Low

Source: Compiled by Researcher

- **Low Developed Region** This region consisted of 6 blocks namely Haldibari, Mekliganj, Mathabhanga I, Cooch Behar I, Sitai, Sitalkuchi has low composite score (-0.44 to -0.12) in terms of demographic indicators. These blocks are suffering from backwardness and having high population density, unfavorable sex ratio, low literacy rate.
- **Moderate Developed Region** The blocks have the composite value between -0.12 to 0.19 are considers as moderate developed regions consisting 2 blocks namely Cooch Behar I, Dinhata I.
- **High Developed Region** The high developed region (0.19 to 0.50) consists of 4 blocks namely Mathabhanga II, Cooch Behar II, Dinhata II and Tufanganj II. Cooch Behar II is the head quarter of the district. These four blocks are having favorable male female ratio, population density and SC & ST population, high literacy rate etc. (map no.3.1).

BLOCK WISE DISPARITIES IN DEMOGRAPHIC CONDITION OF KOCH BIHAR DISTRICT, 2011



MAP NO. 3.1

Source: Census, 2011

3.2.2 Infrastructural Indicators

Infrastructure is the set of facilities and systems that serve a country, city or other area and encompasses the services and facilities necessary for its economy, households and firms to function.

Infrastructure is composed of public and private physical structures such as roads, railways, bridges, water supply, schools, health centres, electrical grids and telecommunications. In general, infrastructure has been defined as, the physical components of interrelated systems providing commodities and services to maintain the surrounding environment.

There are total 8 infrastructural indicators to analysis the z score value of Koch Bihar district. These are percentage of villages having primary school (X_8), percentage of villages having primary health sub-centre (X_9), percentage of villages having well (X_{10}), percentage of villages having post office (X_{11}), percentage of villages having bus facility (X_{12}), percentage of villages having approach by pucca road (X_{13}), percentage of villages having electricity for domestic use (X_{14}), percentage of villages having irrigated area (X_{15}).

- **Level of Infrastructural Condition**

TABLE NO. 3.2 Z SCORE VALUES FOR INFRASTRUCTURAL INDICATORS

Block	X ₈	X ₉	X ₁₀	X ₁₁	X ₁₂	X ₁₃	X ₁₄	X ₁₅	Composite Score	Levels
Haldibari	-1.40	-0.79	1.85	-0.99	-1.27	-0.09	-1.40	0.89	-0.40	Low
Mekliganj	-2.49	-0.06	1.84	-1.07	-0.09	0.81	-0.63	-0.96	-0.33	Moderate
Mathabhanga I	0.22	1.27	0.95	-0.15	-1.11	-1.50	-1.81	0.52	-0.20	Moderate
Mathabhanga II	-0.23	-1.08	-0.56	-0.04	0.66	0.24	0.55	-0.05	-0.06	Moderate
Cooch Behar I	-0.14	0.00	-0.84	-0.94	0.03	0.38	1.34	0.72	0.07	Moderate
Cooch Behar II	0.84	1.69	-0.90	1.09	0.78	0.87	1.04	0.82	0.78	High
Tufanganj I	0.53	0.43	-0.01	1.41	0.53	1.18	0.24	0.83	0.65	High
Tufanganj II	0.95	-0.70	-0.14	1.94	2.21	0.21	0.75	0.04	0.66	High
Dinhata I	0.16	0.96	-0.73	-0.80	-0.58	0.63	0.84	-0.84	-0.04	Moderate
Dinhata II	0.59	0.32	-0.73	0.22	0.22	0.16	-0.20	0.29	0.11	Moderate
Sitai	0.51	-1.70	-0.18	-0.15	-0.14	-2.18	-0.89	-2.50	-0.90	Low
Sitalkuchi	0.46	-0.35	-0.57	-0.53	-1.24	-0.71	0.15	0.24	-0.32	Moderate

Source: Compiled by Researcher

- **Low Developed Region**

Haldibari and Sitai fall under this group with the low value i.e. -0.90 to -0.34. These blocks are low developed due to a less number of educational institutions, inadequate power supply, low number of medical institutions etc. Another major problem of these blocks has very low-level transport and communication systems. Road network is much better but rail way facilities and water way connection are negligible in these blocks.

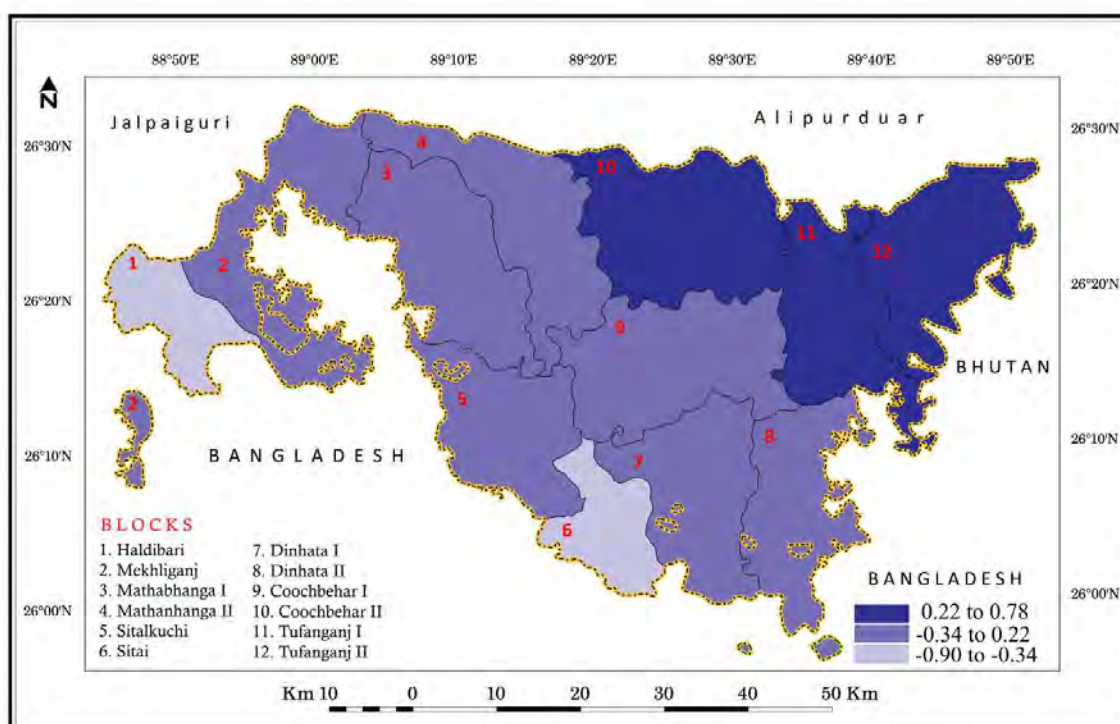
- **Moderate Developed Region**

The category is the score of -0.34 to 0.22 which includes 7 blocks namely Mekhliganj (-0.33), Mathabhanga I (-0.20), Mathabhanga II (-0.06), Cooch Behar I (0.07), Sitalkuchi (-0.32), Dinhata I (-0.04) and Dinhata II (0.11). The blocks have moderate number of amenities like good transport and communication system, better health facilities, better power supply, better educational support which has results in order moderate state of development.

- **High Developed Region**

Three blocks namely Tufanganj I (0.65), Tufanganj II (0.66) and Cooch Behar II (0.78) come under this category (0.22 to 0.78) due to adequate number of schools, health centers, power supply. Map no.3.2 explain the infrastructural condition of different blocks of Koch Bihar district.

BLOCK WISE DISPARITIES IN INFRASTRUCTURAL CONDITION OF KOCH BIHAR DISTRICT, 2011



MAP NO. 3.2

Source: Census, 2011

3.2.3 Economic Indicators

An economic indicator is a statistic about an economic activity. Economic indicators allow analysis of economic performance and predictions of future performance. An economic indicator is a metric used to assess, measure and evaluate the overall macro economy of a region.

There are so many economic indicators to evaluate the economic status of a region. But to analysis the economic development of different CD blocks of Koch Bihar district eleven economic indicators is selected. The economic indicators are selected based on the present study and related to agriculture. The economic indicators are ranging from X_{16} to X_{26} . These are total bargadars (X_{16}), total patta holders(X_{17}), total small farmers (X_{18}), total marginal farmers(X_{19}), total agricultural labourers (X_{20}), total work participation rate (X_{21}), total female worker (X_{22}), women involved in agriculture and allied sector (X_{23}), total number of bank

offices (X_{24}), total number of fair price shops (X_{25}), total number of co-operative societies (X_{26}).

- **Level of Economic Condition**

TABLE NO. 3.3 Z-SCORE VALUES FOR ECONOMIC INDICATORS

Blocks	X_{16}	X_{17}	X_{18}	X_{19}	X_{20}	X_{21}	X_{22}	X_{23}	X_{24}	X_{25}	X_{26}	Composite Score	Levels
Haldibari	0.55	-0.82	-1.45	-1.48	-1.40	-1.77	-1.94	-1.79	-0.48	-1.65	-1.32	-1.23	Low
Mekliganj	0.54	0.42	-0.58	-0.20	-1.00	-0.38	-0.65	-0.21	-0.48	-0.76	-0.53	-0.35	Moderate
Mathabhanga I	0.01	1.54	2.43	1.96	-0.18	1.23	1.48	2.04	-0.27	0.38	0.06	0.97	High
Mathabhanga II	1.53	1.90	-0.58	-0.19	0.25	0.06	0.08	0.36	-0.17	-0.09	-0.68	0.23	Moderate
Cooch Behar I	-1.19	-0.53	0.53	0.01	1.01	-0.85	1.73	1.06	2.88	1.16	1.38	0.65	High
Cooch Behar II	-0.18	0.29	0.10	-0.08	0.99	0.20	-0.13	-0.33	0.46	1.73	1.28	0.40	High
Tufanganj I	-0.26	0.19	0.76	-0.18	0.24	-1.05	0.29	-0.94	0.04	-0.03	0.65	-0.03	Moderate
Tufanganj II	-0.45	0.45	-0.65	-1.12	-0.69	-0.48	-0.63	-0.95	-0.59	-0.50	-0.73	-0.58	Low
Dinhata I	-0.71	-0.83	-0.05	0.55	1.09	-0.04	0.77	0.43	0.36	1.06	1.58	0.38	High
Dinhata II	-1.02	-1.18	0.60	-0.07	1.56	1.82	-0.15	0.24	-0.06	0.43	-0.53	0.15	Moderate
Sitai	-0.86	-1.19	-0.75	-0.81	-0.91	0.69	-0.71	-0.25	-0.90	-1.13	-1.12	-0.72	Low
Sitalkuchi	2.02	-0.23	-0.36	1.62	-0.98	0.57	-0.16	0.33	-0.80	-0.61	-0.04	0.12	Moderate

Source: Compiled by Researcher

- **Low Developed Region**

The low developed region is under score between -1.23 to -0.49. Blocks namely Haldibari (-1.23), Tufanganj I (-0.03) and Sitai (-0.72) are under less developed region. The low development is due to in adequacy of worker, low work participation rate, having no bank facilities etc.

- **Moderate Developed Region**

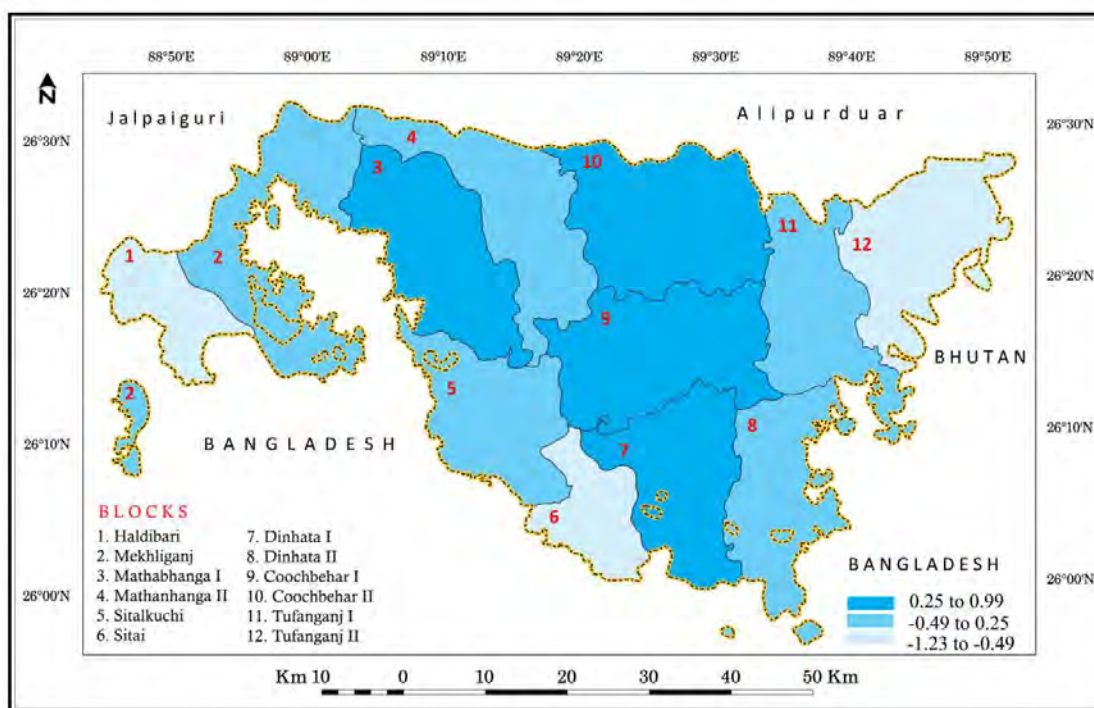
The zone is between the score -0.49 to 0.25. Moderate developed region comprises 5 blocks namely Sitalkuchi (0.12), Dinhata II (0.15), Tufanganj I (-0.03), Mathabhanga II (0.23) and Mekliganj (-0.35). These blocks have moderate level of bank facilities, communication sources and adequate worker. All these indicators help these blocks to figure in moderate developed region in terms of economy.

- **High Developed Region**

High developed region is under the score between 0.25 to 0.99. Mathabhanga I (0.97), Cooch Behar I (0.65), Cooch Behar II (0.40), Dinhata I (0.38) blocks are under high developed region in terms of economy. These blocks have adequate worker, more

involvement of women in agriculture and allied sector, developed bank facilities, high number of co-operative societies, a greater number of fair price shops etc. Map no.3.3 highlights the economic disparities of different blocks of Koch Bihar district.

BLOCK WISE DISPARITIES IN ECONOMIC CONDITION OF KOCH BIHAR DISTRICT, 2011



MAP NO. 3.3

Source: Census, 2011

3.2.4 Overall Socio-Economic Condition

Socio-economic development is the process of improving the economic and social well-being of individuals, communities, societies or region. It involves creating the conditions that enhance people's quality of life, increase access to basic needs, necessities and resources. Socio-economic development is also refers the sustainable economic growth and reduces inequalities of a region.

The Z score analysis of sectoral development brought out the fact that by itself each CD block does not have the same level of infrastructural, economic and demographic condition of Koch Bihar district. Some blocks have high level of infrastructural development whereas the others are well placed in demographic condition or economic terms, while overall socio-economic

condition shows different result. These indicators have to be further analysed whether there is any connection among them and results in a different pattern of overall socio-economic condition.

TABLE NO. 3.4 COMPOSITE SCORE FOR VARIOUS SECTORS

Blocks	Demographic Sector	Infrastructural Sector	Economic Sector	Overall Socio-Economic Development
Haldibari	-0.24	-0.40	-1.23	-0.62
Mekhliganj	-0.17	-0.33	-0.35	-0.28
Mathabhanga I	-0.18	-0.20	0.97	0.20
Mathabhanga II	0.32	-0.06	0.23	0.16
Cooch Behar I	-0.13	0.07	0.65	0.20
Cooch Behar II	0.19	0.78	0.40	0.46
Tufanganj I	0.02	0.65	-0.03	0.21
Tufanganj II	0.50	0.66	-0.58	0.19
Dinhata I	0.06	-0.04	0.38	0.13
Dinhata II	0.31	0.11	0.15	0.19
Sitai	-0.23	-0.90	-0.72	-0.62
Sitalkuchi	-0.44	-0.32	0.12	-0.21

Source: Compiled by Researcher

- Low Developed Region** The blocks have the value of -0.62 to -0.26 are considered as less developed regions. There are 4 blocks namely Sitai, Sitalkuchi, Haldibari and Mekhliganj. These 4 blocks are most backward blocks due to low development categories mainly due to lack of irrigation, unfavorable sex ratio, high population density, low level of literacy, lack of educational institution etc. These are the least developed blocks of district in terms of overall socio-economic development.
- Moderate Developed Region** 2 blocks fall under this group has a score between -0.26 to 0.10 blocks and comprises of Mathabhanga II and Dinhata I. The moderate presence of all infrastructural, economic and demographic indicators has placed these blocks in moderate developed region.
- High Developed Region:** On the basis of aggregate score, the highly developed region consists of 6 blocks namely Cooch Behar I, Cooch Behar II, Tufanganj I, Tufanganj II, Dinhata II and Mathabhanga I. These blocks have better sex-ratio, population density, literacy rate, good number of educational intuitions, health centers, irrigation, power supply etc. All these have made the blocks highly developed region in terms of overall socio-economic development. The blocks that are highly developed in terms of economic and demographic factors also show significant growth and development in

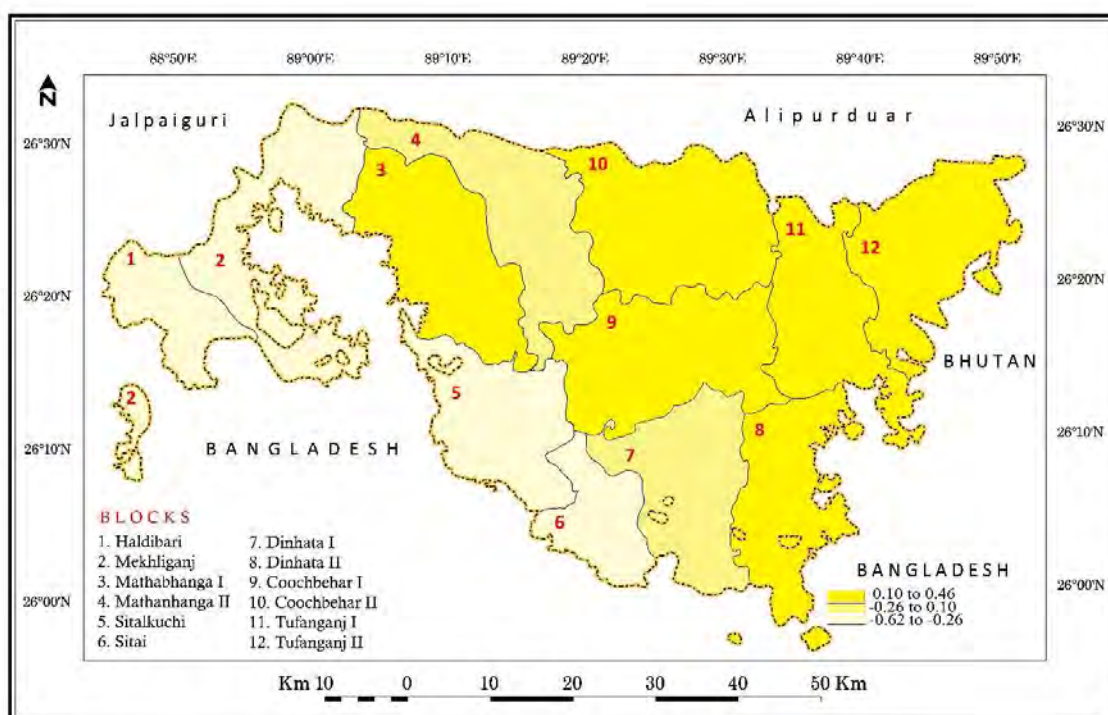
terms of land use and agricultural efficiency showed the block wise disparity in terms of demographic, infrastructural, economical and socio-economic condition (map no.3.4).

TABLE NO. 3.5 LEVEL OF OVERALL SOCIO-ECONOMIC CONDITION

Level of Development	Name of the Blocks
High (0.10 to 0.46)	Cooch Behar I, Cooch Behar II, Tufanganj I, Tufanganj II, Dinhata II, Mathabhanga I
Moderate -0.26 to 0.10)	Mathabhanga II, Dinhata I
Low (-0.62 to -0.26)	Sitai, Sitalkuchi, Haldibari, Mekhliganj

Source: Compiled by Researcher

BLOCK WISE DISPARITIES IN OVERALL SOCIO-ECONOMIC CONDITION OF KOCH BIHAR DISTRICT, 2011



MAP NO. 3.4

Source: Census, 2011

3.2.5 Correlation among Major Developmental Variables

Correlation matrix is showing the correlation between demographic condition, infrastructural condition, economic condition and socio-economic condition of different CD blocks of Koch Bihar district. Table no. 3.6 explain the correlation between above these variables. The Correlation matrix indicates that the demographic condition, infrastructural condition,

economic condition and overall socio-economic condition are significantly correlated with each other.

TABLE NO. 3.6 CORRELATION MATRIX

Category	Demographic	Infrastructural	Economic	Overall development
Demographic	1			-
Infrastructural	0.270	1.000		-
Economic	-0.505*	-0.383	1.000	-
Overall development	0.463	0.665**	0.188	1

Source: Compiled by Researcher

Demographic condition and economic condition are positively and significantly associated with overall development (0.463) and (0.188) of the district. But economic condition is negatively and significantly correlated with both demographic condition (-0.505) and infrastructural (-0.383) development. This is mainly due to the infrastructural facilities like good education systems, better transport and communication systems, good health care facilities etc. are concentrated in certain blocks where working population sex ratio, literacy rate etc. are not equally concentrated in Koch Bihar district. Infrastructural condition is also positively associated with overall development (0.665) at 0.01 significant levels.

3.3 Socio Economic Status of Women Workers in Koch Bihar District

‘Status’ may be defined as: “the position of an individual in relation to another or others, especially in regard to social or professional standing” or “state or condition of affairs” or “the standing of a person before the law”. Menon explained the term, ‘status’ explicitly in her work “Women Empowerment and Challenge of Change” where she said that “status” is initially a legal term referring to the legal standing of an individual enjoying certain rights or subject to certain limitations. Later, the meaning of the word is extended to cover an individual or groups position in society in a more general sense. Most references to the status of women imply a comparison with the status of men but it is also possible to compare one group of women with another, or to examine changes in the status of women over time. While legal and political rights are one aspect of women’s status, other aspects concern their actual experience in practice (Menon, 2008: 214). She also opines that demographic indicators like mortality by age and sex are the important indicators of women’s status. Other important indices can be related to literacy, level of formal education received by women, occupational structure clearly defining the job categories of high, moderate or low job status etc. In rural communities, the status of women is not effectually recognized. Sometimes, they experience discriminatory treatment as compared to their male counterparts. They are deprived of certain rights and opportunities and are required to wholeheartedly dedicate themselves towards the

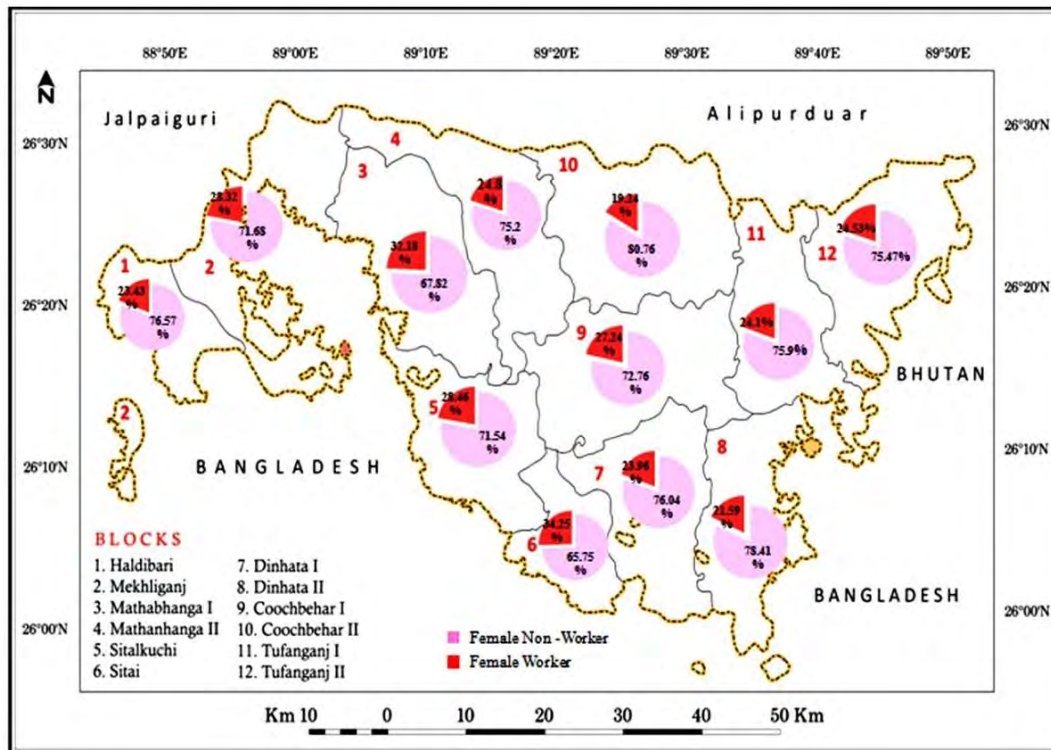
implementation of household responsibilities. Based on these parameters analysis has been done considering Census data and CD block wise socio-economic status of women population has been studies.

TABLE NO. 3.7 TOTAL FEMALE WORKER IN DIFFERENT BLOCKS OF KOCH BIHAR, 2011

Blocks	Total Worker	Total Female Worker	% of Female Worker
Haldibari	39419	9234	23.3%
Mekliganj	62327	17653	28.32%
Mathabhanga I	98,056	31,550	32.18%
MathabhangaII	90417	22,421	24.80%
Cooch Behar I	121,700	33,150	27.2%
Cooch Behar II	109,328	21,034	19.30%
Tufanganj I	98,472	23,735	24.10%
Tufanganj II	72337	17,746	24.53%
Dinhata I	112120	26,862	23.95%
Dinhata II	96877	20,917	21.59%
Sitai	50387	17,259	34.25%
Sitalkuchi	73277	20,855	28.6%

Source: Census 2011

PERCENTAGE OF FEMALE WORKING AND NON-WORKING POPULATION IN CD BLOCKS OF KOCH BIHAR DISTRICT



MAP NO. 3.5

Source: Census 2011

The CD blocks in which the female working population is more than 30% are Mathabhanga I (32.18%) and Sitai (34.25%). The CD blocks where percentage of worker is between 25 to 30% are Mekliganj, Cooch Bihar I, Tufanganj II and Sitalkuchi. The lowest female work participation is observed in Cooch Behar II block which is 19.30% which in total accounts to 21034 persons out of total 109328 persons. On an average the female working population varies from 23% to 32% in different CD blocks (table no. 3.7 and map no. 3.5).

TABLE NO. 3.8 OCCUPATION STRUCTURE OF FEMALE WORKERS IN DIFFERENT BLOCKS OF KOCH BIHAR, 2011

Name of CD Blocks	Total Female Worker	Main Worker	Percentage of Main Worker	Marginal Worker	Percentage of Marginal Worker
Haldibari	9234	5,478	59.32%	3756	40.68%
Mekliganj	17653	7,996	45.29%	9657	54.71%
Mathabhanga I	31,550	14110	44.72%	17440	55.28%
Mathabhanga II	22,421	10358	46.19%	12063	53.81%
Cooch Behar I	33,150	12819	38.66%	20331	61.34%
Cooch Behar II	21,034	10692	50.83%	10342	49.17%
Tufanganj I	23,735	11106	46.79%	12629	53.21%
Tufanganj II	17,746	7003	39. 46%	10743	60.54%
Dinhata I	26,862	13059	48.61%	13803	51.39%
Dinhata II	20,917	10963	52. 41%	9954	47.59%
Sitai	17,259	7765	44.99%	9494	55.01%
Sitalkuchi	20,855	9981	47.85%	10874	52.15%

Source: Census 2011

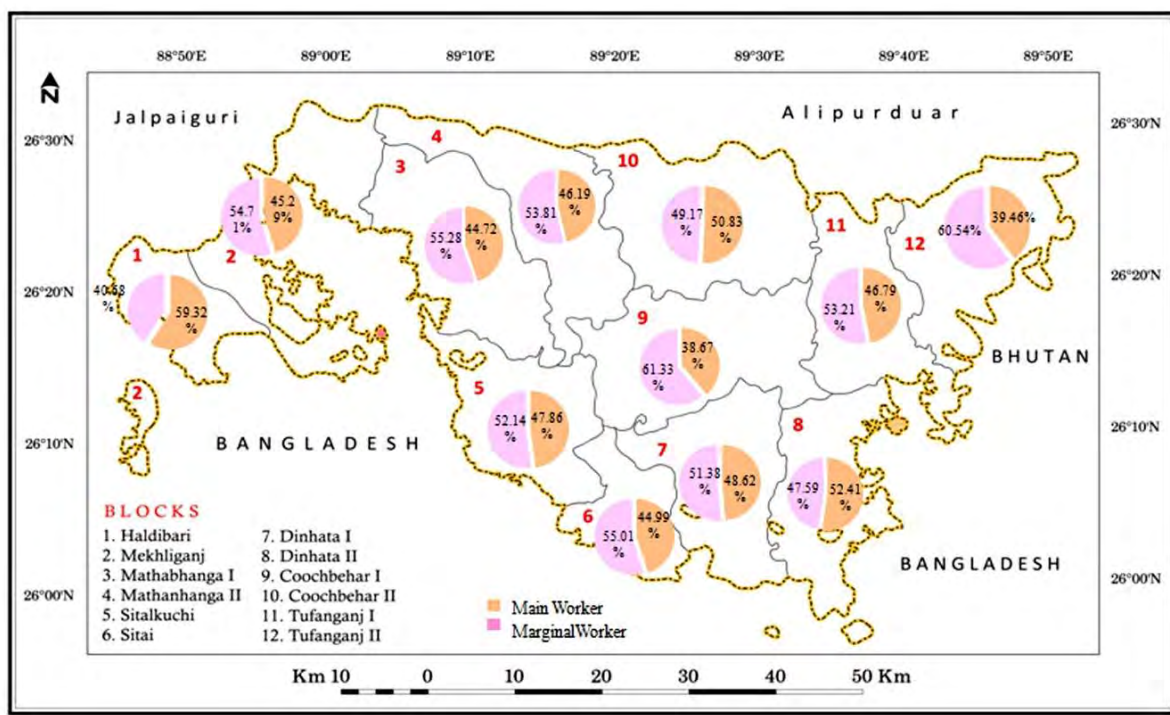
The female working population of 12 CD blocks of Koch Bihar district has been divided into main workers and marginal workers which are further subdivided into i) Cultivators, ii) Agricultural Labourers, iii) Household Industrial Workers and iv) Other workers.

The CD blocks in which female main worker is more than 50% are Haldibari (59.32%), Cooch Behar II (50.83%) and Dinhata I (52.41%). While, Cooch Behar I (38.67%) and Tufanganj II (39.46%) have less than 40% female main workers. Approximately the percentage of female main workers is varying between 40% to 49%.

The blocks in which female marginal workers account for more than 60% are Tufanganj II (60.54%) and Cooch Behar I (61.33%). The lowest female marginal working population is seen in Haldibari which is 40.68% accounting to 3756 persons out of total female working population in Haldibari i.e., 9234 persons. Thus, from the data it can be infer that in most of the blocks (9 blocks) except Haldibari, Cooch Behar II and Dinhata I the percentage of women engaged as marginal worker is higher than percentage of women employed main workers.

Table no. 3.8 and map no. 3.6 explain the occupational structure of female workers in different CD blocks of Koch Bihar district.

PERCENTAGE OF FEMALE MAIN WORKER AND MARGINAL WORKER IN CD BLOCKS OF KOCH BIHAR DISTRICT



MAP NO. 3.6

Source: Census 2011

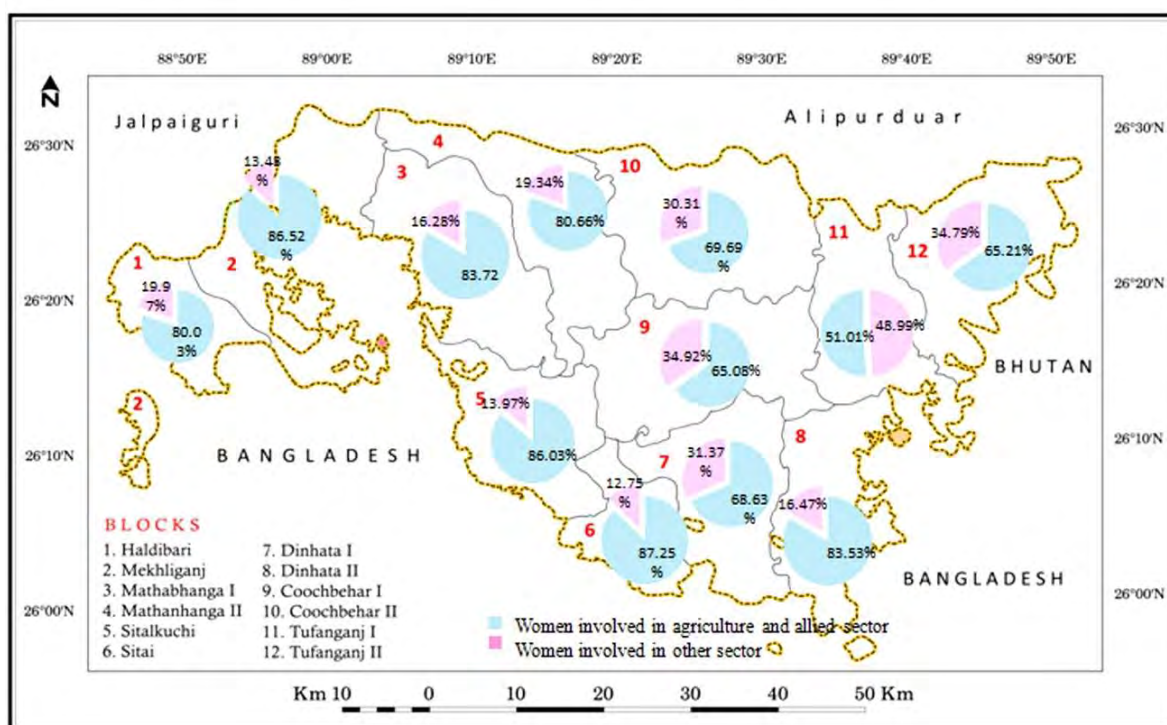
TABLE NO. 3.9 WOMEN INVOLVED IN AGRICULTURE AND ALLIED ACTIVITIES

Name of CD Blocks	Total Female Worker	Women Involved in Agriculture and Allied Sector	Percentage of Women Involved in Agriculture and Allied Sector	Women Involved in Other Sector
Haldibari	9234	7390	80.03%	1844
Mekhliganj	17653	15274	86.52%	2379
Mathabhanga I	31,550	26414	83.72%	5136
Mathabhanga II	22,421	18085	80.66%	4336
Cooch Behar I	33,150	21575	65.08%	11575
Cooch Behar II	21,034	14659	69.69%	6375
Tufanganj I	23,735	11628	51.01%	12107
Tufanganj II	17,746	11573	65.21%	6173
Dinhata I	26,862	18435	68.63%	8427
Dinhata II	20,917	17473	83.53%	3444
Sitai	17,259	15059	87.25%	2200
Sitalkuchi	20,855	17943	86.03%	2912

Source: Census 2011

The female workers are involved in various occupations. However, 23.48% of total female working population are employed as cultivators which accounts to 61620 persons out of the 262416 persons female working population. Maximum percentage of female working population i.e., 50.95% is engaged as agricultural labourers (accounting to 133688 persons female workers). In Tufanganj I block 51.01% (11628 persons) of female working population is involved in agriculture and allied activities. On the other hand, in Haldibari (80.03%), Mekliganj (86.52%), Mathabhanga I (83.72%), Mathabhanga II (80.66%), Dinhata II (83.53%), Sitai (87.25%) and Sitalkuchi (86.03%) of female working population is involved in agriculture and allied sector (map no. 3.7).

WOMEN INVOLVED IN AGRICULTURAL AND ALLIED SECTOR IN CD BLOCKS OF KOCH BIHAR DISTRICT



MAP NO. 3.7

Source: Census 2011

3.4 Socio Economic Status of Women Respondents of Koch Bihar District

A primary survey is conducted among 1200 farm women in different blocks of the district. The study revealed interesting facts about the socio-economic characteristics of farm woman in the district. Inadequate employment opportunity due to industrial backwardness, inherited fragmented landholdings, minimum returns from agricultural activities, growing price of necessary commodities and increasing consumerist ideology have compelled rural male of the

district to migrate in search of work elsewhere. In rural society of Koch Bihar district; women generally participate in food processing, child care, nursing, and intensive agricultural task as helper. But in many villages where men folk have moved out for jobs in other states women have come forward in leading the family as well as taking decisions in agricultural sector. Table no. 3.10.1 and 3.10.2 shows the socio-economic status of the study area.

TABLE NO. 3.10.1 DISTRIBUTION OF THE RESPONDENTS ACCORDING TO THE SELECTED VARIABLES

Category	Score	Frequency	Percentage
Status of Farm Women			
Daughter		21	1.75
Daughter in Law		182	15.17
Family Co-Head		668	55.67
Family Head		329	27.42
Age Group			
1 st Age Group	18-39	648	54
2 nd Age Group	40-61	543	45.25
3 rd Age Group	62-83	9	0.75
Religion			
Hindu		686	57.17
Muslim		514	42.83
Caste			
Scheduled Tribe		320	26.67
Scheduled Caste		485	40.42
Other Backward Caste		290	24.17
General		105	8.75
Education			
Illiterate		27	2.25
Can Write Only		368	30.67
Can Read and Write		440	36.67
Primary		127	10.58
Middle School		150	12.5
High School		79	6.58
Graduate		9	0.75
Family Education Status			
Low	0-2.2	486	40.5
Medium	2.3-4.5	654	54.5
High	4.6-6.8	60	5
Family Type			
Nuclear		399	33.25
Joint		801	66.75
Occupation			
Wage Earning (Working on Others Farm)		202	16.83
Agriculture		380	31.67
Allied Fields		0	0
Allied Fields with Wage Earning		160	13.33
Agriculture and Allied Fields		372	31
Agriculture with Business		14	1.17
Allied Fields with Business		0	0
Agriculture, Allied Fields with Business		72	6

Source: Field Survey, 2017

TABLE NO. 3.10.2 DISTRIBUTION OF THE RESPONDENTS ACCORDING TO THE SELECTED VARIABLES

Category	Score	Frequency	Percentage
Annual Income			
Low	6000-86000	840	70
Medium	86000-166000	350	29.17
High	166000-246000	10	0.83
Annual Expenditure			
Low	6000-36000	789	65.75
Medium	37000-67000	403	33.58
High	68000-98000	8	0.67
Land Holding of the Family			
Small	1 Hec. & above but < 2 hec.	809	67.42
Semi-Medium	2 Hec. & above but < 4 hec	193	16.08
Medium	4 Hec. & above but < 10 hec.	198	16.5
Farm Power			
No Farm Power		39	3.25
Indigenous Farm Implement		361	30.08
One Pair of Drought Animal		687	57.25
Power Tiller		91	7.58
Tractor		22	1.83
Source of Irrigation			
No Irrigation		579	48.25
Tank		2	0.17
Shallow Tube Well		483	40.25
River Lift Pump		21	1.75
Deep Tube Well		15	1.25
House Type			
No house		0	0
Hut		0	0
Kutchra		272	22.67
Mixed		816	68
Pucca		112	9.33
Mansion		0	0

Source: Field Survey, 2017

- The majority of the respondents are enjoying the status of family-co-head (55.67%) followed by status of family head (27.42%) and daughter-in-law (15.17%). The status of women in the family always controls the involvement pattern in any activities associated in farm and home. The family head and family-co-head majorly control the financial decisions involved in agricultural activities, crop rotation, labour distributions. Where the daughter and daughter-in-law contributes directly or indirectly involve themselves in field activities, storing and household activities but they don't have any input on decision-making. Figure no. 3.1 describe the status of farm women of the study area.

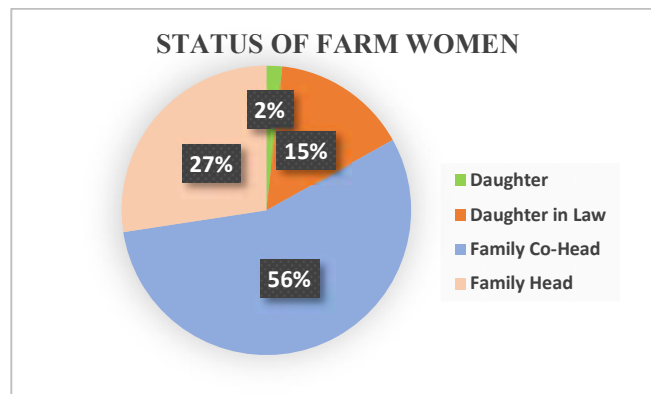


FIGURE NO. 3.1

Source: Field Survey, 2017

- The farm women in Koch Bihar district are classified into three groups according to their age. The results show that majority of the respondents are under the age group of 18-39 years (54%) followed by 40-61 years age group (45.25%) and 62-83 years age group (0.75%) respectively. The data indicates that the young aged women are much prone to decision making as well as actively participate for conducting the agricultural and allied activities (figure no. 3.2). The old age group of the families is not much physically active, having said that they are the most experienced in agricultural activities but ignored by their family members due to their age and sluggishness.



FIGURE NO. 3.2

Source: Field Survey, 2017

- In the present research work 2 types of religions are dominating. The majority of the women respondents are under Hindu (57.17%). In the study area there is a mix of Hindu and Muslim religion in case of delimiting their differential participation in agriculture and allied sectors (figure no. 3.3). Hindu farm women are more involved in farm

activities because they are in majority in population. Family's food consumption is mostly served by the own production of rice, vegetables and other gains.

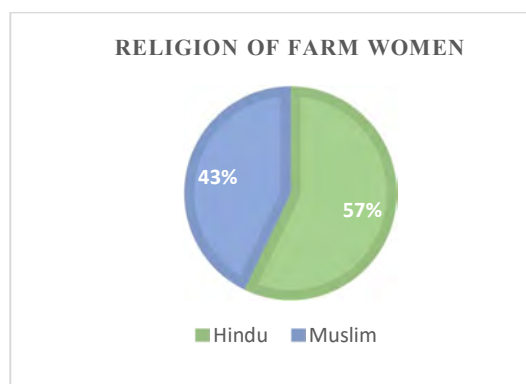


FIGURE NO. 3.3

Source: Field Survey, 2017

- The study shows that majority of the respondents are Scheduled Caste (40.42%) followed by Scheduled Tribe (26.67%) and General Caste (24.17%). According to the study the scheduled Caste and General Caste women are more involved in agricultural activities (figure no. 3.4). Scheduled Caste families are dominated the farm activities where the farm women own their responsibilities as agricultural labourers, farmers on others land or own land. Experience wise they are rich and brought up in the culture of farming so the level of interest is high.

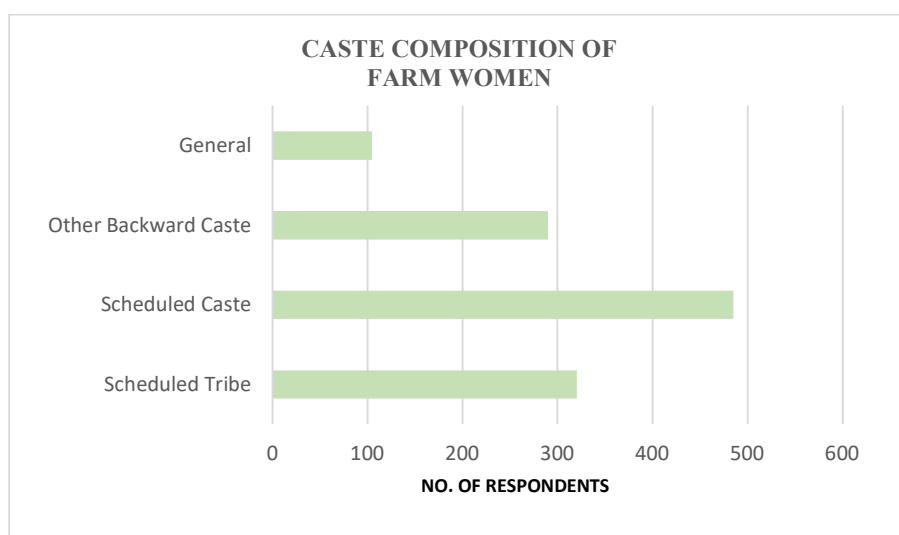


FIGURE NO. 3.4

Source: Field Survey, 2017

- Education is an important indicator for a society. The study shows that majority of the respondents is under can read and write educated group (36.67%), followed by can write educated group (30.67%). The field study shows the distribution of the respondents of Koch Bihar districts of West Bengal according to their family education status. The results shows that majority of the respondents' family education status are under the medium group of 2.3-4.5 (54.5%) followed by low education status group of 0-2.2 (40.5%) and high education status group 4.6-6.8 (5%) respectively (figure no. 3.5). Education has an impact on involvement in agriculture by the respondents, the less educated farm women are more dedicated and oriented in farming where the elevated level of educated farm women are more intended to grab external opportunities like service or business other than farming.

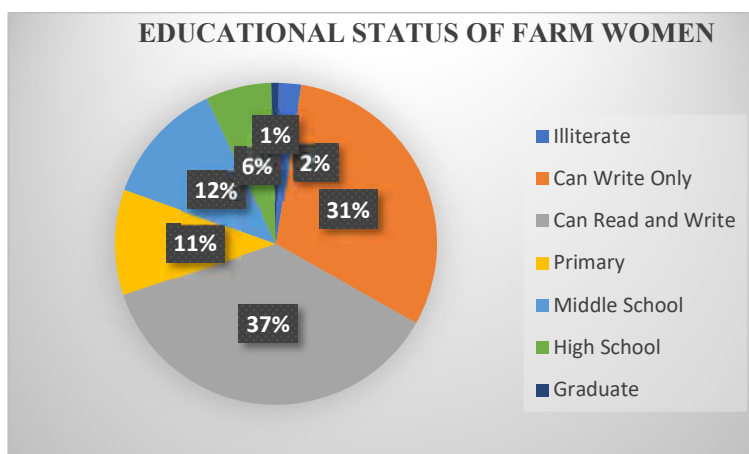


FIGURE NO. 3.5

Source: Field Survey, 2017

- The study shows that majority of the respondents are under joint family types group (66.75%) followed by nuclear family type group (33.25%) respectively. Figure no. 3.6 describe the family types of farm women of Koch Bihar district. In nuclear family, the women family head are mostly unanimous as majorly the male members are out migrated so it is easy for the women family head to take farm and home decisions by individual stand point or consulting with her male counterpart over telephone and occasional face to face interaction. Sometimes widow farm women also takeover the family responsibilities as family head. Where as in joint family group farm women has less opportunity in decision making as this is more of multidimensional by the male counterpart and involvement by the other family members.

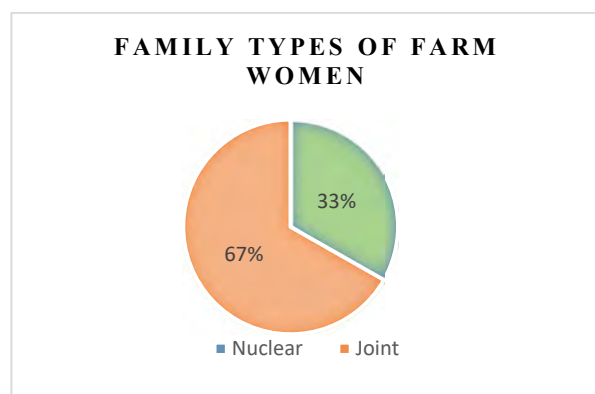


FIGURE NO. 3.6

Source: Field Survey, 2017

- The study shows that majority of the respondents' primary occupation are agriculture (31.67%) followed by agriculture & allied (31%). It is clearly shows that in the present study area most of the women are associated with agricultural and allied field activities and their primary vocation is agriculture and allied. They are mostly dependent on agriculture to maintain their livelihood (figure no. 3.7). The female wage labour has a great proportion in the figure no 3.7 as they involve agricultural occupation as daily labourers. In agriculture and allied field goat farming, poultry, milking are major contributors as occupation for women. Wage earning is very common profession in the district, though this is majorly seasonal earning but farm women have flexibility of work and earning.

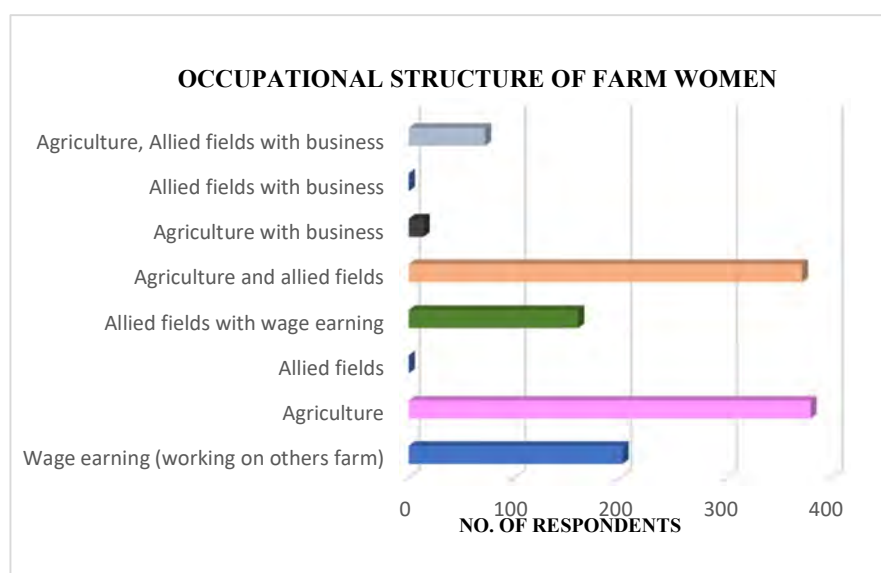


FIGURE NO. 3.7

Source: Field Survey, 2017

- The study shows that majority of the respondents are under low annual income group of 6000/- to 86000/- (70%) followed by medium annual income group 86000/- to 166000/- (29.17%). The women of the study area are mostly poor in nature. Majority of the respondents are doing agriculture and their economic condition is not so good. Figure no. 3.8 describe the annual income of farm women. The above income groups are categorized by Sturges Rules method. Factors affecting the low income of farm women are disparity in wages, low return on agricultural goods in local market, low land holding ownership.

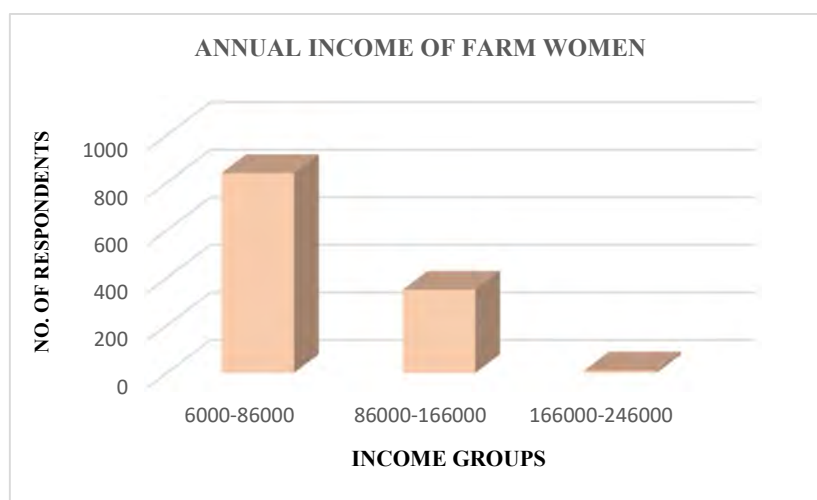


FIGURE NO. 3.8

Source: Field Survey, 2017

- The study shows that majority of the respondents are under low annual expenditure income group 6000/- to 36000/- (65.75%) followed by medium annual expenditure group 37000/- to 67000/- (33.58%). Very few only 0.67% farm women are under high annual expenditure group 68000/- to 98000/-. This group are categorized by Sturges Rules method. Though their annual income is not so high but still they incur a moderate amount of money for maintaining their livelihood status. Mostly farm women spend their money for health care, food, family education small travels like blocks to headquarters, shopping and also for her farm or agriculture etc. Consequently, the gap between their income and expenditure are too large. During survey it is observed that though farm women also earn money with their male counterpart but most of the family budgeting is done by male counterpart. Figure no. 3.9 explain the annual expenditure of farm women.

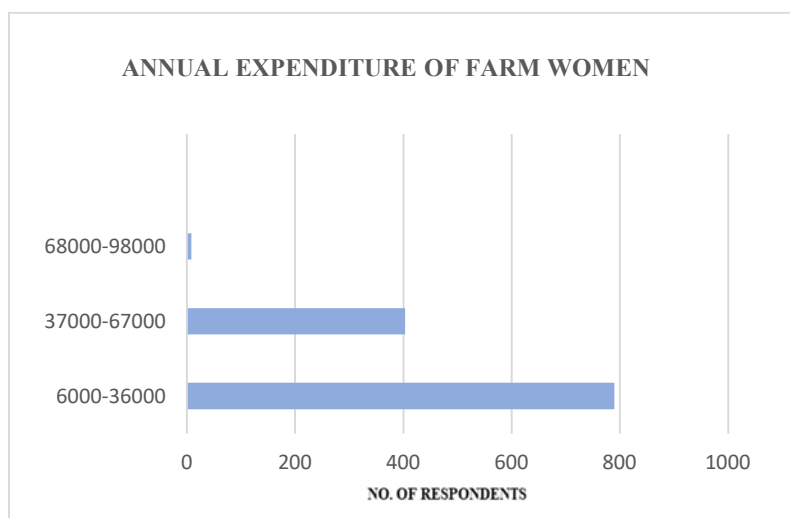


FIGURE NO. 3.9

Source: Field Survey, 2017

- The present study represented the distribution of the farm women according to their land holding per family of the study area. The results shows that majority of the respondent's family are under the small land holding group 67.42% and this is an important factor that farm women has to work as labourer to other's land and the reason behind the increasing number of farm labourer rather than farm owner. Due to the land fragmentation and land reformation of the study area the possession of the land of the family of the women respondents are very low. So, it is reflected of the economic condition as well as her family status (figure no. 3.10).

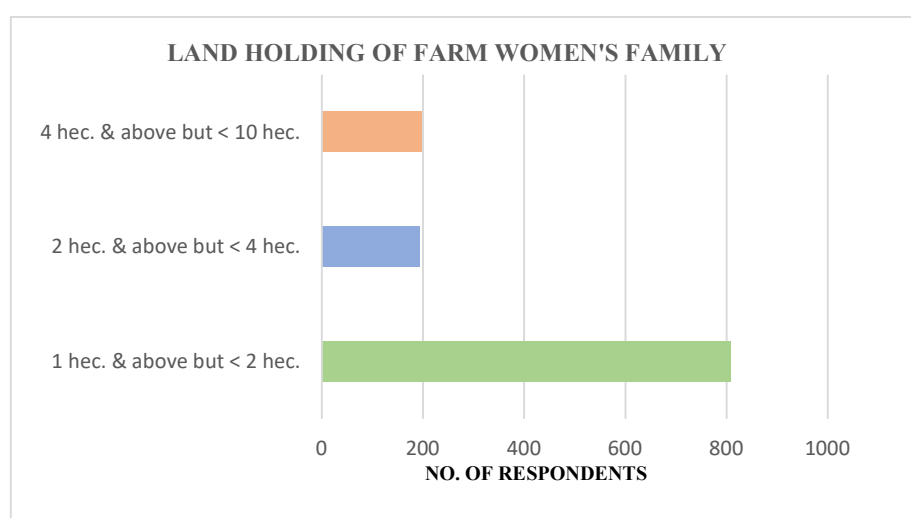


FIGURE NO. 3.10

Source: Field Survey, 2017

- In the present research indicates 3 types of farm power are dominating. The maximum of the women respondents has one pair of drought animal (57.25%) followed by indigenous farm implement (30.08%). Farm power is also an indicator of the economic condition and application of new agricultural technology. It is clear that drought animals are very common in women respondent's household for conducting agriculture but power tiller, tractor and other indigenous farm implements are not so much common in the study area but still these implements are available (figure no. 3.11).

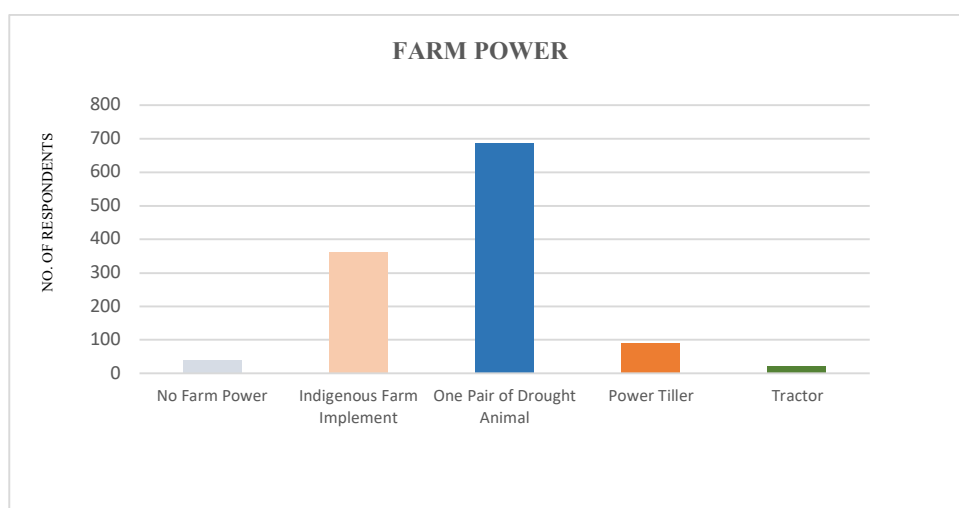


FIGURE NO. 3.11

Source: Field Survey, 2017

- The artificial application of water to land in agriculture is known as irrigation. Some land requires irrigation before it is ready to use for any agricultural production. Irrigation helps to increase agricultural production. Koch Bihar district is mainly depended upon monsoon rain. Maximum rainfall occurs from June to September. During winter season agricultural work is depended upon irrigation. In the present research showing the majority of the women respondents has shallow tube well irrigation facilities (40.25%). The women farmers are mostly depending upon shallow tube well in case of irrigating their own land as the rent for irrigation water (pump) is quite high (figure no. 3.12). The per hour charge of irrigation pump under 100-130 rupees. Almost 48.25% farm women have not any irrigation for their farm. As the land holding are less for the respondents, so they do not want to invest that money for irrigation and dependent on natural water resources (seasonal rain).

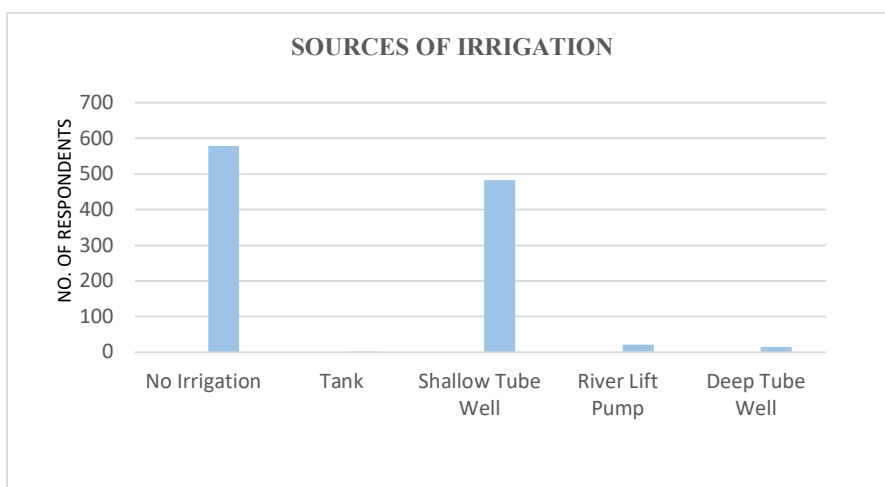


FIGURE NO. 3.12

Source: Field Survey, 2017

- The respondents mostly have mixed type (semi pucca) of house (54%) respectively. As the kutchha house also very predominant in the study area which reflects the scarcity of resources among the women respondents of the study area. Pucca houses are very uncommon in the area (figure no. 3.13). This depicts the economic variabilities and disparities of income among the farm women.

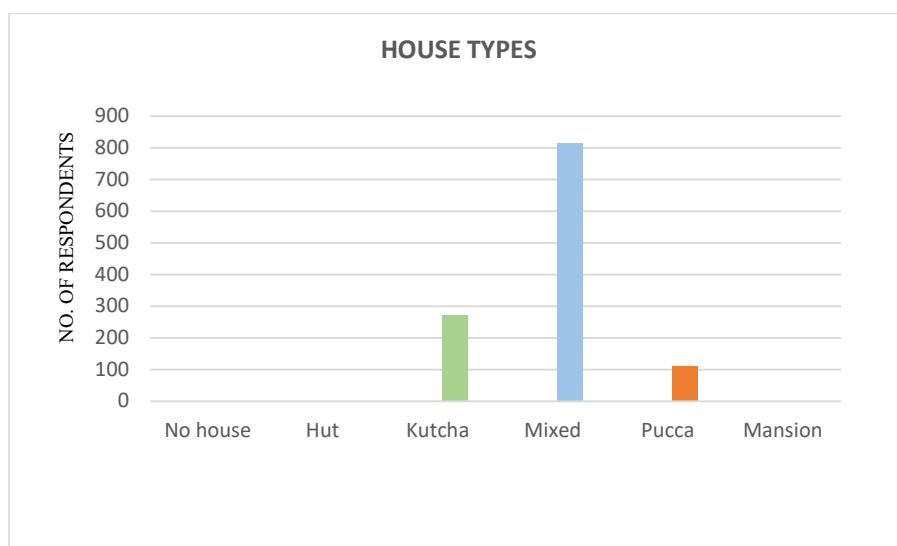


FIGURE NO. 3.13

Source: Field Survey, 2017

3.5 Conclusion

- There exists a wide regional disparity in sectoral and spatial development in the district. This region consists of 6 blocks namely Haldibari, Mekliganj, MathabhangaI,

Cooch Behar I, Sitai, Sitalkuchi has low in terms of demographic condition. These blocks are suffering from backwardness and having high population density, unfavorable sex ratio, low literacy rate. The 2 blocks namely Cooch Behar I, Dinhata I are considering as moderate developed regions consisting and the high developed region consists of 4 blocks namely Mathabhanga II, Cooch Behar II, Dinhata II and Tufanganj II in terms of demographic condition. These blocks are having favorable male female ratio, population density and SC & ST population, moderate to high literacy rate etc.

- Haldibari and Sitai fall under the low developed region in terms of infrastructural condition. These blocks are low developed due to a less number of educational institutions, inadequate power supply, low number of medical institutions etc. Moderate developed region includes 7 blocks namely Mekhliganj, Mathabhanga I, Mathabhanga II, Cooch Behar I, Mathabhanga II, Dinhata I and Dinhata II. The blocks have moderate number of amenities which has results in order moderate state of development. High developed region are Tufanganj I, Tufanganj II and Cooch Behar II blocks in terms of infrastructural condition due to adequate number of schools, health centers, power supply.
- 3 blocks namely Haldibari, Tufanganj I and Sitai are less developed, 5 blocks namely Sitalkuchi, Dinhata II, Tufanganj I, Mathabhanga II and Mekhliganj have moderate level of development and remaining 4 blocks namely Mathabhanga I, Cooch Behar I, Cooch Behar II, Dinhata I are highly developed terms of economy. Therefore, it is imperative, Government to look into the proper development of each sector at grass root level especially for the moderately and least developed blocks.
- Correlation matrix is used to understand the interrelationship between demographic condition, infrastructural condition, economic condition and overall socio- economic condition of the Koch Bihar district. The analysis indicated that all the parameters of developments are positively and significantly correlated with each other. Demographic and economic condition is positively associated with overall development (0.463) and (0.188). But economic condition is negatively correlated with both demographic (-0.505) and infrastructural (-0.383) development. This is mainly due to the infrastructural facilities are concentrated in certain areas where working population sex ratio, literacy rate etc. are not equally concentrated. Infrastructural condition is also positively associated with overall development

(0.665) at 0.01 significant levels.

- The lowest female work participation (Census 2011) is observed in Cooch Behar II (19.30%) and highest in Sitai (34.25%). Female main workers (census 2011) are highest in Haldibari (59.32%) and lowest in Cooch Behar I (38.67%). Female marginal workers (Census 2011) are highest in Cooch Behar I (61.33%) and lowest in Haldibari (40.68%). The Census data 2011 depicts just opposite facts in terms of main and marginal female workers. Maximum percentage of female working population are involved in agriculture and allied activities (Census 2011) in the block of Sitai (87.25%) and minimum in Tufanganj I block (51.01%).
- This chapter also explain the objective of research - “To identify the socio-economic background of the farm women associated with the agriculture and allied activities in the study area”. Primary survey of 1200 respondents in Koch Bihar district shows that the 55.67% respondents enjoyed the status as family-co-head. 54% respondents are in the age group of 18-39 years followed by 40-61 years age group (45.25%). 57.17% women respondents are Hindus. 40.42% respondents are Scheduled Caste. Similar observation is seen for the Koch Bihar district as a whole as per 2011 Census. The study shows maximum of the respondents can read and write educated (36.67%). 66.75% respondents are under joint family types group. 62.67% farm women respondents’ primary occupation is agriculture and allied fields. The scenario matches with Census data 2011 of Koch Bihar district where 21.95% females are cultivators and 47.56% females are agricultural labourers. The study shows that 70% respondents belong to under low-income group having an annual income of 6000/- to 86000/-. 65.75% respondents’ expenditure ranges from Rs. 6000/- to Rs. 36000/-. 67.42% respondents have under the small land holdings. 57.25% women respondents have one pair of drought animal. 54% of the respondents have mixed (semi-pucca) type of house. The findings show farm women respondents socio-economic status is low.

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CHAPTER 4

WOMEN'S PARTICIPATION IN AGRICULTURE AND ALLIED SECTORS

4.1 Introduction

Population is dynamic as the entire concept related with population such as size, composition, distribution of population and demographic workforce are variable in nature. The workforce is defined as the number of people engaged in or available for work, and conceptually includes all persons who contribute to the Gross Domestic Product (GDP) of the country's economy (Rai, 2015). The study of labour force occupied an important position in the field of population studies (Chandna, 2014). Work force influences the socio-economic development of a nation and also provides the information about the productive capacity of that country (Sinha, 2005). Work Force Participation Rates are useful for an understanding of the extent to which men, women, children and the aged participate in economic activity (Bhagat & Das, 2008). The work force participation varies from region to region, across culture, different age group, stages of economic development and between genders. India is one of the traditional countries with diversity in culture, religion, custom (Singh & Mishra, 2013). In the history of human development women have been vital makers of well-developed family as well as human society. In the Indian economy there are many reasons which forced women to work out in the field of agriculture, industry and any other sector (Bhalla, 1997). In India, female work participation rate has been changing over time in general and the rural female work participation rate has increased in nature. As per National Sample Survey (68th round, 2011,12), in rural India the female work participation rate is 24.8% in 2011-12, while that for males it is 54.3%; and in urban sector, it is 14.7% for females and 54.6% for males. In the rural area, total female workers are increased (Census 2011) compared to the total male workers, indicating an increase in women work force participation rate in agricultural activities (Kispotta, Kumar & Vadyak, 2016; Khan *et al*, 2012).

4.2 Women - as a Human Resource

Women who comprise half of the world's population are not fully recognized as a human resource. A society cannot develop if half of the population does not participate in its developmental activities (Sundaram, 2001). Mrs. Indira Gandhi, the former Prime Minister of India examined that dishonor of women will be criminal since humanity has been deprived of half of the energy and creative talents. Right through history, in all religions and cultures women have been assigned a secondary status (Balaraman, S., 1986). The world wars proved to be a turning point in the history of mankind. The participation of women in the work force

started increasing since then. This trend is observed in developing nations (Sharma, K.,1988). In tune with the world-wide trend, Indian women are marching towards self-development. In India, women played a secondary role for centuries together. During the colonial rule, women lived a miserable life in diverse situations (Krishnamurthy,1990). The socio-economic development is set in pace in India after independence provided women with better educational and employment opportunities (Mohapatra, 2015). Besides, a series of judiciary laws namely the Special Marriage Act 1954, the Hindu Marriage Act 1955, Equal Remuneration Act, 1976 passed by the Government of India helps to improve the status of women (Andippan, 1980). Today, educated women have made a landmark also in the non-conventional fields (Chakravarthy & Tiwari,1979). Women have started coming forward in grass root level to top level management work. Today women have significant role in agriculture, marketing, agricultural business, agricultural goods exports and imports (Banerjee, N.,1989).

4.3 Role of Women

Women are regarded as the heart of overall development. They control most of the non-money economy (Khan *et al*, 2015) (subsistence agriculture, bearing and rearing children, household works) and also play an important role in the money economy (trading, the 'informal sector', employment). Everywhere in the world women are doing two jobs i.e. around the home and outside the home (Gupta & Gupta,1989). Women are containing half of the world's population, receive one-tenth of the world's income and count for two-thirds of the world's working hours. The process of industrialization, urbanization and the increased educational and employment opportunities for women have changed the traditional attitudes and values towards women in India (Kathleen,1986). The role of women in our society is not only as a householder, but also play a significant role in the socio-economic and political development of the country (Roy, K.,1999). The status of women has changed not only in the sphere of marriage and family but also in the field of personal, education, service and political life. Women's education and employment play an important role in women's empowerment. Women employment in the organized sector confirms the better living conditions for herself and her family as well as society (Monahar, K.,1989). To study the work participation rate following formula have been used-

Crude Female Work Participation Rate (CFWPR) The Crude Female Work Participation Rate indicated the size of female work force to the total size of female population (Bhende & Kanitkar, 2010). In this formula total female population has been taken to depict the result.

$$CFWPR = \frac{TFW}{TFP} \times 100$$

Where, CFWPR= Crude Female Work Participation Rate, TFW= Total Female Workers,
TFP= Total Female Population

4.4 Trend and Pattern of Crude Female Work Participation of Koch Bihar District

Female crude work participation in Koch Bihar district is high than the state level in both 2001 and 2011 census year which is showed in table no. 4.1.

TABLE NO. 4.1 CRUDE FEMALE WORK PARTICIPATION RATE

Country/State/District/Block	2001 (%)	2011 (%)
India	25.6	30.02
West Bengal	17.08	18.10
Koch Bihar	20.04	21.43

Source: Computed from Census of India, Primary Census Abstract, Koch Bihar 2001&2011

4.5 Block Wise Crude Female Work Participation Rate in Rural Koch Bihar District (2001 and 2011)

TABLE NO. 4.2 CRUDE FEMALE WORK PARTICIPATION RATE IN 2001 & 2011

Blocks/ District	2001		2011	
	Male (%)	Female (%)	Male (%)	Female (%)
Haldibari	52.2	7.83	57.11	18.06
Mekhliganj	54.82	10.94	57.42	24.19
Mathabhanga-I	58.44	32.00	59.12	29.85
Mathabhanga-II	55.47	23.22	58.07	20.33
Cooch Behar-I	53.48	16.06	58.51	23.36
Cooch Behar-II	55.18	24.78	58.11	15.25
Tufanganj-I	53.54	14.17	59.47	20.19
Tufanganj-II	52.78	20.79	58.43	20.21
Dinhata-I	54.47	23.2	58.67	19.67
Dinhata-II	58.65	37.91	59.97	17.82
Sitai	56.5	28.69	59.14	31.77
Sitalkuchi	55.52	28.31	55.6	22.9
Koch Bihar	55.14	23.28	58.42	21.43

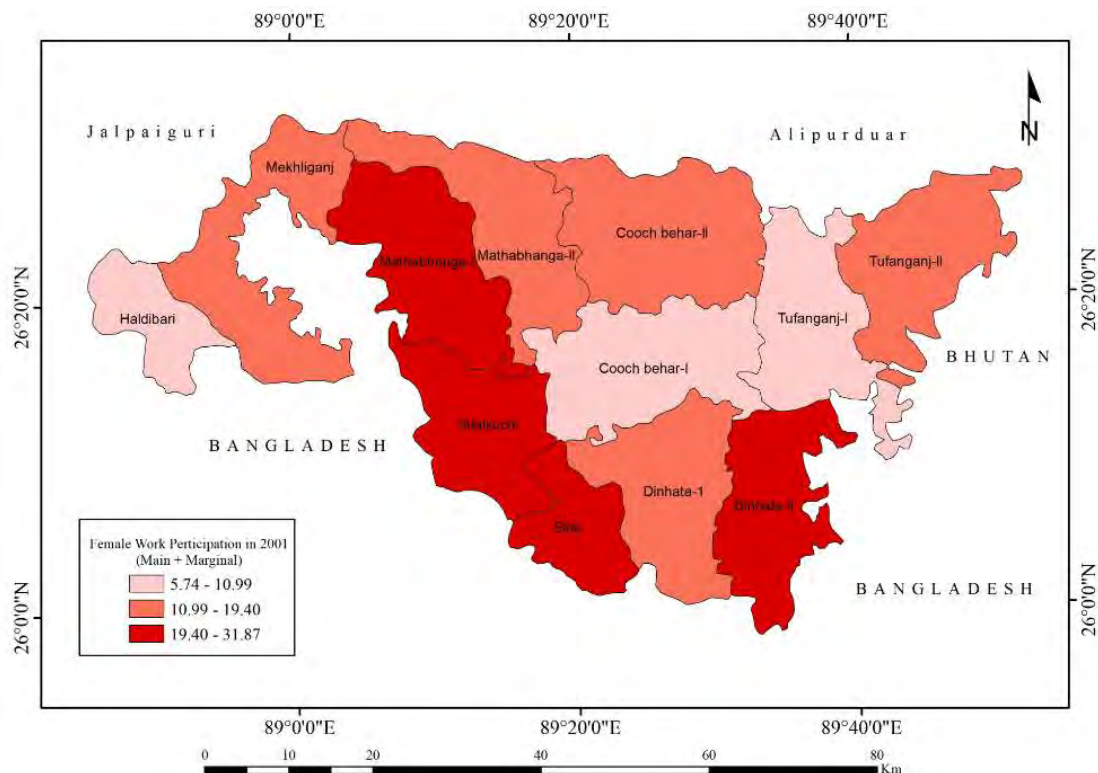
Source: Computed from DCHB Primary census Abstract, Koch Bihar 2001& 2011

Female Work Participation Rate (FWPR), a useful measure of economic activity is generally computed as the ratio of the female worker (engaged in different productive activity) to the female Population of any country or nation. This rate indicated the probability of women's works (Mazumdar & Guruswamy, 2006). The number of females employed means all the women who are in paid employment and those who are unpaid family laborers. Women working on the family farm, service and business as well as outside of the home are considered economically active female population (Tansel, 1994). In rural areas of the district women

contribute less role in total workforce. With the help of high level of development and increase in education in Koch Bihar the crude female work participation shows a rising trend.

Table no. 4.2 provided the Census wise crude female work participation in rural areas Koch Bihar district during 2001 and 2011. It has been found that in 5 blocks (Mathabhanga-I, Mathabhanga-II, Cooch Behar-II, Tufanganj- II and Dinhata- I crude female work force has decreased among the decade 2001 to 2011 because of high birth rate and involvement of women in domestic works within the extensive agrarian economy. Highest female crude work participation is found in Dinhata-II (37.91%) and Sitai (31.77%) during the year 2001 and 2011 respectively. On the other hand, lowest is in Haldibari (7.83%) and Cooch Behar-II (15.25%) in 2001 and 2011 census. Map no 4.1 and 4.2 shows the female work participation rate in Census 2001 and 2011 of Koch Bihar district. Figure no.4.1 shows the graphical presentation of female work participation in Koch Bihar district.

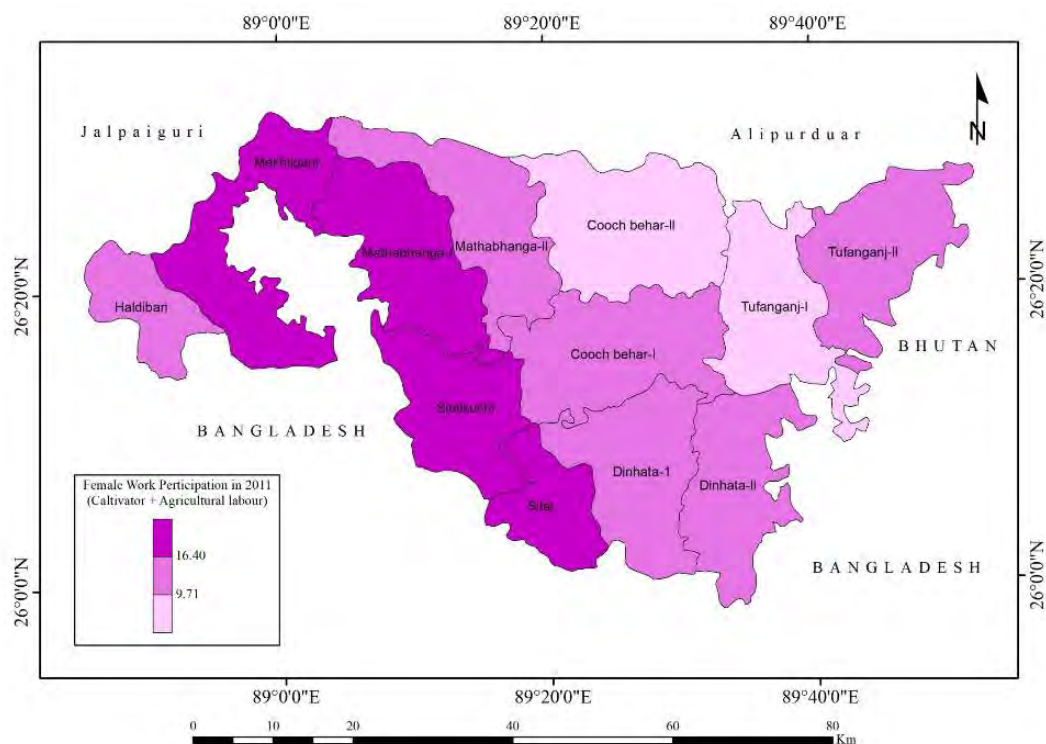
FEMALE WORK PARTICIPATION IN CD BLOCKS OF KOCH BIHAR DISTRICT, 2001



MAP NO. 4.1

Source: Census, 2001

FEMALE WORK PARTICIPATION IN CD BLOCKS OF KOCH BIHAR DISTRICT, 2011



MAP NO. 4.2

Source: Census, 2011

FEMALE WORKERS IN AGRICULTURAL SECTOR (2001 & 2011) OF KOCH BIHAR DISTRICT

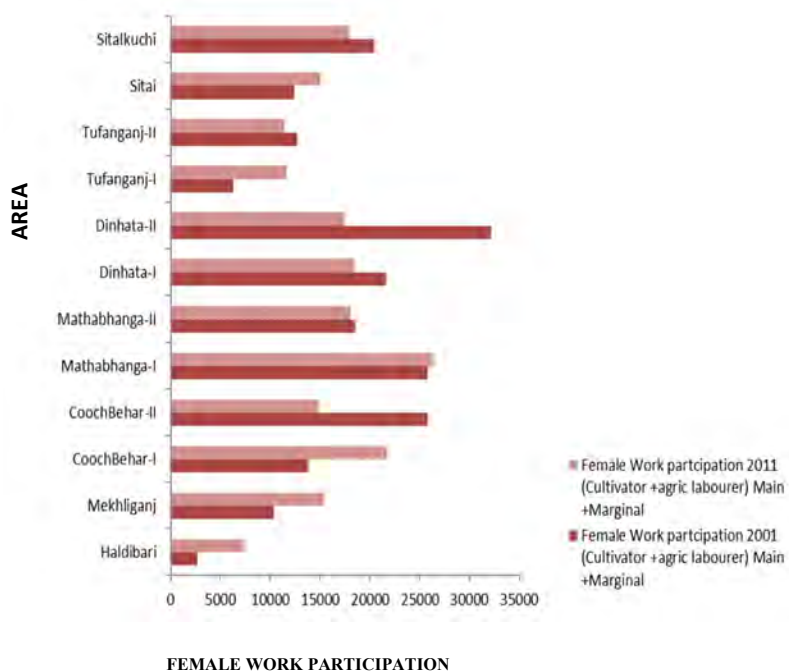


FIGURE NO.4.1

Source: Census, 2001 & 2011

4.6 Gender Gap

A gender gap is a relative disparity between male and female in different sectors in our society. This section depicts the gender difference in total work force during 2001 and 2011 among the different blocks in rural Koch Bihar district. The average percentage of female WPR in during 2011 is recorded to be 40.51%, in comparison with male having 77.5% in the total work force. This reveals gap of 36.99% difference among male and female participation in the total work force (table no. 4.3).

TABLE NO. 4.3 GENDER GAP IN WORK PARTICIPATION, 2001-2011

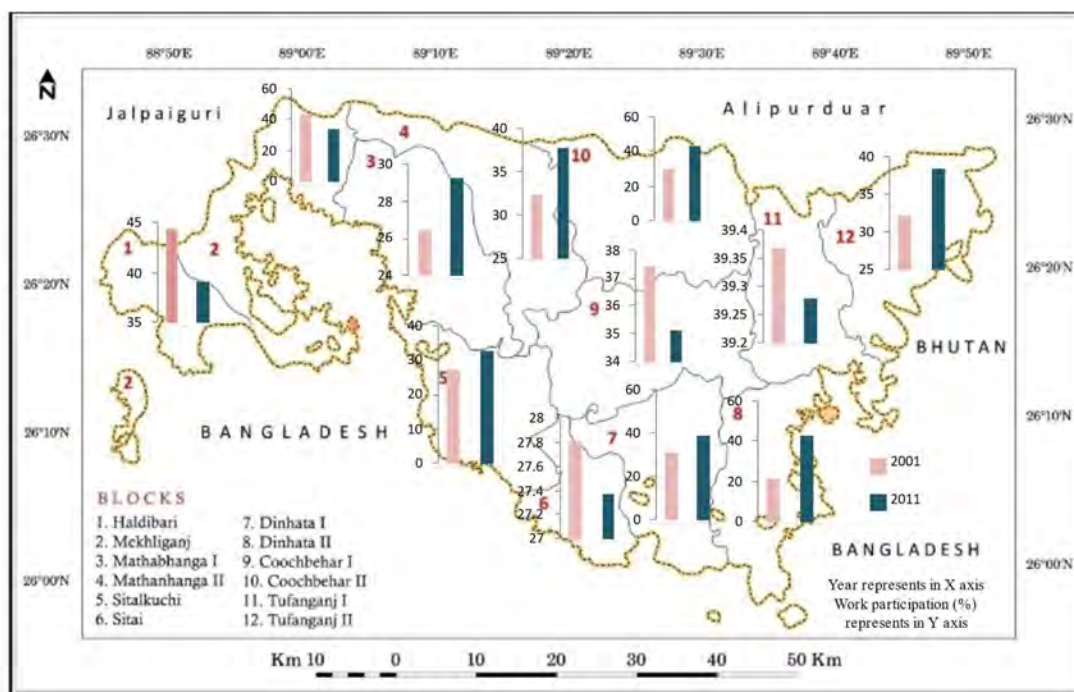
Blocks/ District	Gender Gap (%)	
	2001	2011
Haldibari	44.37	39.05
Mekhliganj	43.88	33.23
Mathabhanga-I	26.44	29.27
Mathabhanga-II	32.25	37.74
Cooch Behar-I	37.42	35.15
Cooch Behar-II	30.4	42.86
Tufanganj-I	39.37	39.28
Tufanganj-II	31.99	38.22
Dinhata-I	31.27	39.00
Dinhata-II	20.74	42.15
Sitai	27.81	27.37
Sitalkuchi	27.21	32.7
Koch Bihar	32.76	36.99

*Source: Computed from DCHB Primary census Abstract,
Koch Bihar 2001& 2011*

In the rural blocks of Koch Bihar higher gender gap is found in work participation rate in the blocks of Cooch Behar II (42.86%) followed by Dinhata II (42.15%) and Tufanganj I (39.28%) blocks in 2011 Census.

Most of the blocks have shown hike in gender gap from 2001 to 2011 like Mathabhanga I (2.83%), Mathabhanga II (5.49%), Cooch Behar II (12.46%), Tufanganj II (6.23%), Dinhata I (7.73%), Dinhata II (21.41%), Sitalkuchi (5.49%). Only 4 blocks shown progress or improvement on work participation rate over the years from 2001 to 2011, Haldibari (5.32%), Mekhliganj (10.65%), Tufanganj-I (0.09%), Sitai (0.44%). The result indicates male dominance in the area for economic activity and lower economic significance of women in the society. Map no. 4.3 shows the gender gap in work participation in different CD blocks of Koch Bihar district.

GENDER GAP IN WORK PARTICIPATION IN CD BLOCKS OF KOCH BIHAR DISTRICT, 2001-2011



MAP NO. 4.3

Source: Census, 2001 & 2011

4.7 Work Participation of Women by Caste

The study find that the women's work force participation follows a clear caste pattern with the upper castes having the lowest work participation rates and it increases on caste hierarchy.

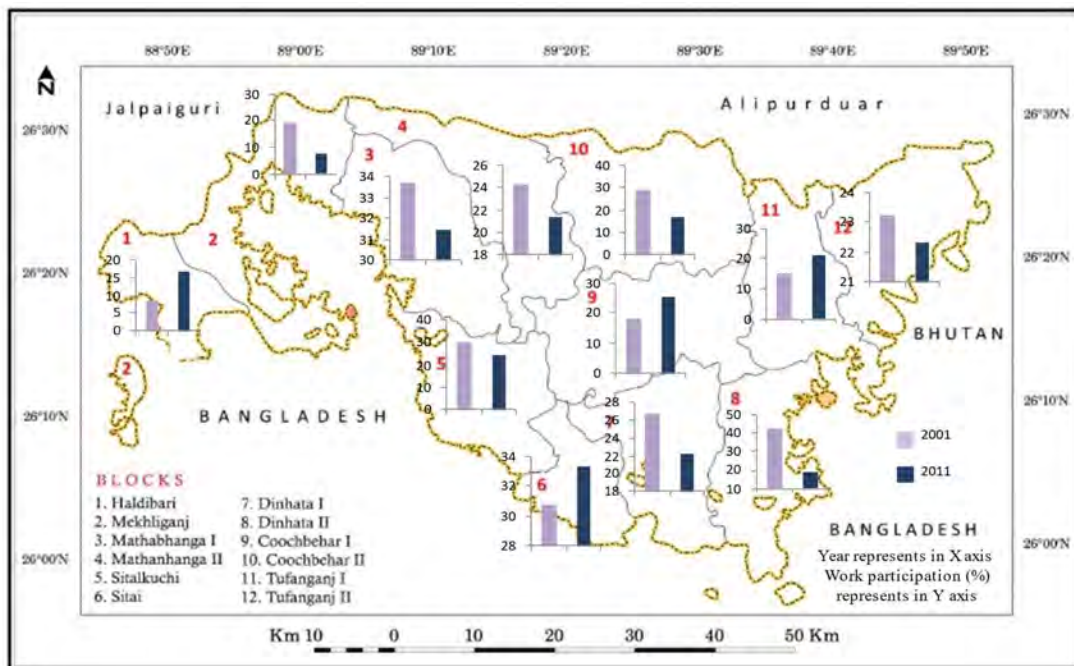
**TABLE NO. 4.4 WOMEN WORK PARTICIPATION OF RURAL WOMEN BY CASTE
IN KOCH BIHAR DISTRICT, 2011**

Blocks/ District	2001		2011	
	SC (%)	ST (%)	SC (%)	ST (%)
Haldibari	8.72	9.76	16.68	16.78
Mekhliganj	19.51	18.86	7.42	20.18
Mathabhanga-I	33.74	42.31	31.42	40.79
Mathabhanga-II	24.34	36.21	21.32	40.12
Cooch Behar-I	18.27	19.49	25.02	20.45
Cooch Behar-II	29.23	33.52	16.95	21.7
Tufanganj-I	14.86	14.75	20.87	20.24
Tufanganj-II	23.21	36.53	22.35	21.66
Dinhata-I	26.56	37.13	22.14	27.38
Dinhata-II	41.93	41.13	19.13	18.62
Sitai	30.72	5.21	33.36	25.86
Sitalkuchi	29.99	12.5	24.28	21.17
Koch Bihar	25.62	31.74	23.24	25.12

Source: Computed from DCHB Primary census Abstract, Koch Bihar 2001& 2011

Work participation varies from region to region and among different castes also. In the rural areas of Koch Bihar district, the crude work participation rate of Scheduled Caste female is 23.24% (Census 2011). Most of them are basically engaged in agriculture but some of them are also engaged as household industry workers and as other workers. In the CD block of Cooch Behar-I, Cooch Behar-II, Tufanganj-I and Tufanganj-II, the women are working in brick field, pati making, biri making and tant making. Among the blocks of Koch Bihar, the highest SC female work participation is found in Sitai (33.36%) as per 2011 Census followed by Mathabhanga-I (31.42%) and Cooch Behar-I (25.02%). The lowest is in Mekhliganj (7.42%) block. On the other hand, Scheduled Tribe, another back ward group of Koch Bihar district accounting for 0.66% to total rural female population has a work participation rate of 25.12% as per 2011 Census. Among the blocks of Koch Bihar, the highest ST female work participation is found in Mathabhanga-I (40.79%) followed by Mathabhanga-II (40.12%) and Dinhata-I (27.38%) where lowest is in Haldibari (16.78%) block (table no. 4.4, map no. 4.4 and 4.5).

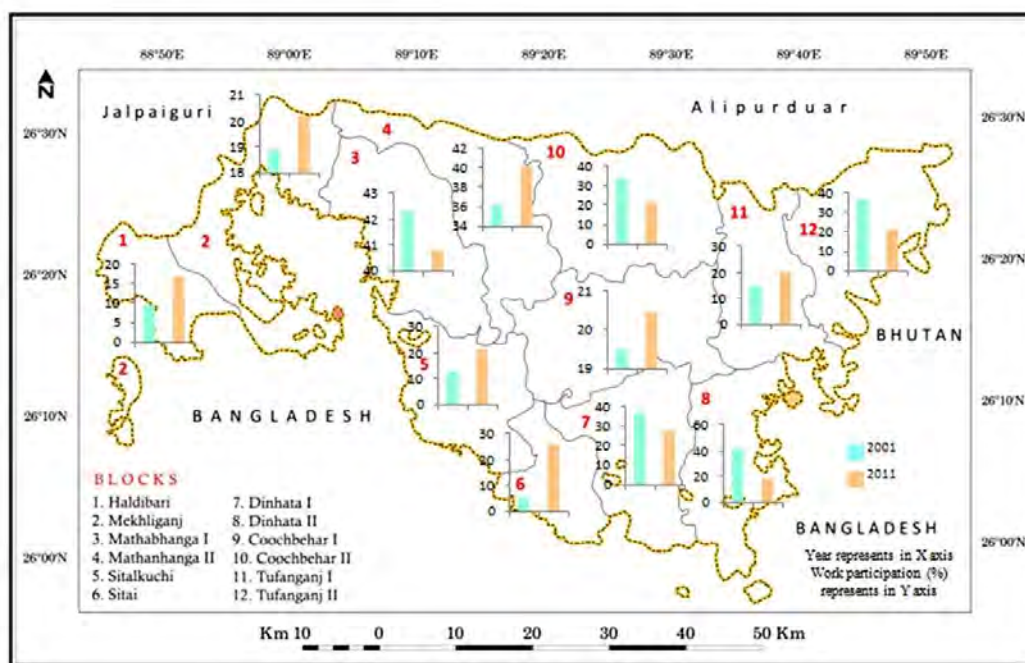
CRUDE WORK PARTICIPATION AMONG RURAL SC WOMEN IN CD BLOCKS OF KOCH BIHAR DISTRICT (2001 & 2011)



MAP NO. 4.4

Source: Census, 2001 & 2011

CRUDE WORK PARTICIPATION AMONG RURAL ST WOMEN IN CD BLOCKS OF KOCH BIHAR DISTRICT (2001 & 2011)



MAP NO. 4.5

Source: Census, 2001 & 2011

4.8 Distribution of Female Workers (Main & Marginal) by Work Status

On the basis of the work status female workers have been categorized in two types –Main and Marginal worker. Main worker is those who are engaged in economically active production for 183 days or more than six months (Census of India, 2011). Marginal are those engaged in productive activities for less than 183 days or six months (Census of India, 2011). Table no. 4.5 shows the percentage distribution of female main and marginal workers to total population in rural areas of Koch Bihar district. It is found that highest percentage of main and marginal workers are in Cooch Behar I (13.7%) and Tufanganj II (26.4%) block respectively in 2001. In case of 2011 Tufanganj II (14.30%) has the highest percentage of main workers but among marginal workers Sitai (17.48%) block has the highest number. In most of the block, the percentage of main workers has increased from 2001 to 2011 except in Mathabhanga-II, Tufanganj I and Tufanganj II. Maximum rate of increase in marginal workers are found in Haldibari (2.7% in 2001, 7.37% in 2011) block whereas rate of decrease in is highest Sitalkuchi (19.1% in 2001, 11.94% in 2011) block.

TABLE NO. 4.5 PERCENTAGE OF FEMALE WORKERS (MAIN AND MARGINAL) TO TOTAL POPULATION, IN CD BLOCKS OF KOCH BIHAR DISTRICT

Blocks/District	2001		2011	
	Main	Marginal	Main	Marginal
Haldibari	5.1	2.7	10.72	7.37
Mekhliganj	7.3	11.4	10.80	13.03
Cooch Behar-I	13.7	18.3	13.35	16.50
Cooch Behar-II	8.7	14.5	9.39	10.94
Mathabhanga-I	8.4	7.4	9.62	13.21
Mathabhanga-II	9.3	14.6	8.10	6.74
Dinhata-I	8.9	5.3	9.48	10.72
Dinhata-II	7.0	13.8	7.87	12.05
Tufanganj-I	11.0	12.0	9.53	10.01
Tufanganj-II	11.5	26.4	9.34	8.48
Sitai	11.4	17.3	14.30	17.48
Sitalkuchi	9.2	19.1	10.96	11.94
Koch Bihar	9.5	12.7	9.98	10.69

Source: Computed from DCHB Primary Census Abstract, Koch Bihar 2001& 2011

4.9 Distribution of Female Workers (Main & Marginal) by Different Categories

Table no. 4.6 shows block wise percentage distribution of female workers to total workers by broad categories i.e. cultivators, agricultural labour, household industry labour and other workers in the year of 2001 and 2011. The female worker participation rate during the decade has declined in Koch Bihar. In Koch Bihar 23.48% (2011) of the female work-force are engaged as cultivators; about 17.21% higher than state average (6.2%) and throughout the districts female work participation rate as cultivators is highest in Mathabhanga-I (39.68%) followed by Sitalkuchi (37.2%), Mekhliganj (34.58%), Sitai (31.23%) and the lowest is in Tufanganj- I (11.67%). Women took part in wide series of activities and played important function in agricultural growth (Ram, 1969; Suneeta, 2014). In Koch Bihar 50.95% of the total work force are engaged as agricultural labourers according to 2011 Census (table no. 4.6). This indicates most of the women are engaged as cultivators as Koch Bihar district is an agrarian district of the West Bengal having plain fertile soil. In 2001 the height percentage of agricultural labourers is found in Haldibari block (58.8%) followed by Sitai (58.5%), Mathabhanga II (56.8%) and lowest percentage of agricultural labourers is in Tufanganj I block (28.24%). The highest concentration of female workers as agricultural labourers in Koch Bihar (2011) is found in Dinhata-II (66.36%) block followed by Mathabhanga- II (62.24%), Haldibari (60.14%) and Cooch Behar- II (56.55%); and lowest percentage is in Tufanganj-I (37.32%).

TABLE NO. 4.6 CATEGORY OF FEMALE WORKERS IN KOCH BIHAR DISTRICT, 2001-2011

Blocks/ District	Cultivators (%)		Agricultural Labourers (%)		Household Industry Workers (%)		Other Workers (%)	
	2001	2011	2001	2011	2001	2011	2001	2011
Haldibari	16.0	19.89	58.8	60.14	9.15	3.41	16.05	16.56
Mekhliganj	43.5	34.58	43.1	51.95	1.33	3.35	12.07	10.12
Mathabhanga-I	52.2	39.68	36.7	44.04	1.6	11.2	9.5	5.08
Mathabhanga-II	26.7	18.42	56.8	62.24	7.83	5.71	8.67	13.63
Cooch Behar-I	22.3	20.07	40.8	45.01	1.56	2.49	35.34	32.43
Cooch Behar-II	32.4	13.14	42.8	56.55	3.92	2.81	20.88	27.5
Tufanganj-I	12.3	11.67	28.2	37.32	7.16	9.46	52.34	41.55
Tufanganj-II	29.8	18.89	44.6	45.2	8.7	3.3	16.9	32.61
Dinhata-I	26.9	17.67	48.9	50.96	7.4	9.46	16.8	21.91
Dinhata-II	29.3	17.18	46.9	66.36	8.47	11.18	15.33	5.28
Sitai	33.5	31.23	58.5	56.02	1.16	3.28	6.84	9.47
Sitalkuchi	49.8	37.2	41.2	48.83	1.14	4.23	7.86	9.74
Koch Bihar	31.5	23.48	43	50.95	7.75	7.54	17.75	18.03

Source: Computed from DCHB Primary census Abstract, Koch Bihar 2001& 2011

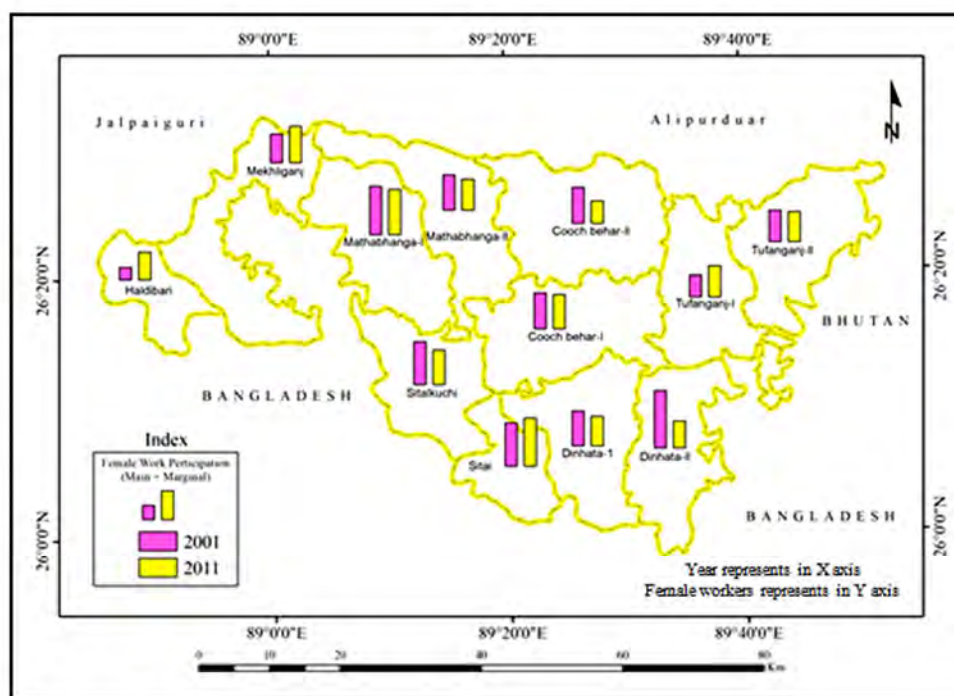
Table no 4.7 represents the percentages of female main and marginal workers along with cultivator and agricultural labours. The table shows declining trends in percentage of female work force in the district during census year 2001 to 2011. In Koch Bihar district percentage of main and marginal workers is decreases 1.53% and cultivators and agricultural labourers is decreases 0.03% from 2001 to 2011.

TABLE NO. 4.7 PERCENTAGE OF FEMALE WORKERS (MAIN AND MARGINAL) TO TOTAL POPULATION, IN CD BLOCKS OF KOCH BIHAR DISTRICT (2001 & 2011)

Blocks	Female Workers 2001 (Main + Marginal) (%)	Female Workers 2011 (Main + Marginal) (%)	Female Cultivators +Agricultural Labourers (%), 2001	Female Cultivators +Agricultural Labourers (%), 2011
Haldibari	7.8	18.06	37.4	40.02
Mekhliganj	18.7	23.83	43.3	43.27
Cooch Behar I	32.0	29.85	44.45	41.86
Cooch Behar II	23.2	20.33	41.75	40.33
Mathabhanga I	15.8	22.83	31.55	32.54
Mathabhanga II	23.8	14.84	37.6	34.85
Tufanganj I	14.2	20.20	20.25	24.50
Tufanganj II	20.8	19.92	37.2	32.05
Dinhata I	23.0	19.54	37.9	34.32
Dinhata II	37.9	17.82	38.1	41.77
Sitai	28.7	31.77	46	43.63
Sitalkuchi	28.3	22.90	45.5	43.02
Koch Bihar	22.2	20.67	37.25	37.22

Source: Computed from DCHB Primary census Abstract, Koch Bihar 2001& 2011

FEMALE WORKERS IN AGRICULTURAL SECTOR IN CD BLOCKS OF KOCH BIHAR DISTRICT (2001 & 2011)



MAP NO. 4.6

Source: Census, 2001 & 2011

4.10 Female Literacy and Female Work Participation in Koch Bihar

Literacy is a fundamental human right. It is not only a means of liberation but also an instrument of social change. It is not the mere acquiring of the skill to write a few words or performing some rudimentary legal or economic function. Literacy is kindling a thirst for knowledge and acquiring some basic skills to pursue the search for knowledge. Literacy in fact opens up greater potential of the masses for self-development. It helps inculcate dignity and self-respect among the people and literacy programme is about people developing competences that enable them to live and work in fulfilling ways. Women literacy is very important and plays an essential role for the progress of the society. Through literacy, women can improve and enhance their personalities and contribute towards the progress of the society. Literacy is the basic need and condition for improving the capabilities and empowering an individual to be efficient in her fields. Literacy plays important role and it is indeed very much necessary in empowerment of women and can help in better participation in agriculture and farm business. It is a potential instrument of individual well-being as well as social development. The following table no. 4.8

shows block wise decadal (2001 to 2011) female literacy and female agricultural workers. An attempt to ascertain the analyse of the relationship between the spatial patterns of female literacy and female workers.

TABLE NO. 4.8 FEMALE LITERACY & FEMALE AGRICULTURAL WORKERS IN CD BLOCKS OF KOCH BIHAR DISTRICT, (2001 & 2011)

Blocks/ District	2001				2011			
	Literacy (%)	Cultivators (%)	Agricultural Labourers (%)	Cultivators + Agricultural labourers (%)	Literacy (%)	Cultivators (%)	Agricultural Labourers (%)	Cultivators + Agricultural labourers (%)
Haldibari	38.87	16.0	58.8	37.4	54.63	19.89	60.14	40.02
Mekhliganj	39.66	43.5	43.1	43.3	66.29	34.58	51.95	43.27
Mathabhanga-I	39.55	52.2	36.7	44.45	54.89	39.68	44.04	41.86
Mathabhanga-II	46.49	26.7	56.8	41.75	57.15	18.42	62.24	40.33
CoochBehar-I	52.82	22.3	40.8	31.55	61.73	20.07	45.01	32.54
CoochBehar-II	58.99	32.4	42.8	37.6	67.08	13.14	56.55	34.85
Tufanganj-I	46.91	12.3	28.2	20.25	59.30	11.67	37.32	24.50
Tufanganj-II	47.09	29.8	44.6	37.2	60.95	18.89	45.20	32.05
Dinhata-I	45.79	26.9	48.9	37.9	58.96	17.67	50.96	34.32
Dinhata-II	47.12	29.3	46.9	38.1	58.03	17.18	66.36	41.77
Sitai	34.81	33.5	58.5	46	46.53	31.23	56.02	43.63
Sitalkuchi	37.28	49.8	41.2	45.5	54.77	37.20	48.83	43.02
Koch Bihar	52.06	31.5	43.0	37.25	60.09	23.48	50.95	37.22

Source: Computed from DCHB Primary Census Abstract, Koch Bihar, 2001& 2011

Table no. 4.8 shows the relationship between female literacy rate and female agricultural workers in CD blocks in Koch Bihar districts between Census 2001 and Census 2011, where literacy rate influenced cultivators and agricultural labourers. Historically literacy plays an important parameter on influencing skills and development of people. The above table no. 4.8 and 4.9 also explain that increasing literacy rate impacted in percentage of female cultivators and female agricultural labourers over the years from 2001 to 2011. Change of literacy percentage is highest in Mekhliganj (26.63%) followed by Sitalkuchi (17.49%), Haldibari (15.76%), Mathabhanga-I (15.34%) and with increased percentage of literacy, cultivators' percentage decreased all CD blocks except Haldibari. Cooch behar-II witness highest percentage of decreased cultivators (19.26%) followed by Mathabhanga-I (12.52%), Dinhata-II (12.12%), Sitalkuchi (12.6%). Agricultural labourers decrease in Sitai (2.48%) with increase

literacy (11.72%). Tufanganj-II (5.15%) has highest decremental percentage for both cultivators and agricultural labourers followed by Dinhata-I (3.58%), Cooch Behar-II (2.75%). Overall, from 2001 to 2011 literacy changes has increased by 8.03%, cultivators and agricultural labourers change has decreased by 0.03% throughout the Koch Bihar district.

TABLE NO. 4.9 PERCENTAGE OF CHANGE OF FEMALE LITERACY AND FEMALE AGRICULTURAL WORKERS DURING 2001 TO 2011 IN CD BLOCKS OF KOCH BIHAR DISTRICT

Blocks/District	% of Literacy Change	% of Cultivators Change	% of Agricultural Labourers Change	% of Cultivators + Agricultural Labourers Change
Haldibari	Increases 15.76	Increases 3.89	Increases 1.34	Increases 2.62
Mekhliganj	Increases 26.63	Decreases 8.92	Increases 8.85	Decreases 0.03
Mathabhanga-I	Increases 15.34	Decreases 12.52	Increases 7.34	Decreases 2.59
Mathabhanga-II	Increases 10.66	Decreases 8.28	Increases 5.44	Decreases 1.42
CoochBehar-I	Increases 8.91	Decreases 2.23	Increases 4.21	Increases 0.99
CoochBehar-II	Increases 8.09	Decreases 19.26	Increases 13.75	Decreases 2.75
Tufanganj-I	Increases 12.39	Decreases 0.63	Increases 9.12	Increases 4.25
Tufanganj-II	Increases 13.86	Decreases 10.91	Increases 0.6	Decreases 5.15
Dinhata-I	Increases 13.17	Decreases 9.23	Increases 2.06	Decreases 3.58
Dinhata-II	Increases 10.91	Decreases 12.12	Increases 19.46	Increases 3.67
Sitai	Increases 11.72	Decreases 2.27	Decreases 2.48	Decreases 2.37
Sitalkuchi	Increases 17.49	Decreases 12.6	Increases 7.63	Decreases 2.48
Koch Bihar	Increases 8.03	Decreases 8.02	Increases 7.95	Decreases 0.03

Source: Compiled by Researcher

Over the Census year 2001 to 2011 female cultivators' percentage decreases with increased percentage of female literacy. Women are seeking jobs and other profession then agriculture with elevated level of literacy, these are small business, contractual jobs, office jobs and pursuing studies as well. Sometimes cultivators sell their land or lease the land for farming to help pursuing their children's higher study. Another reason of decreased female cultivators' percentage is migration with family members to other city or state where their son or daughter is settled for better life.

Over the Census year 2001 to 2011 agricultural labourers' percentage elevated with increased

percentage of literacy. Women are involved more on agriculture & allied sector as labourer, with increasing literacy rate women are involved in multiple jobs, business, local trading but most of them are engaged themselves in the harvesting time due to shortage of agricultural labourer to obtain additional income yearly. Sometimes cultivators sell their land to help pursuing their children's higher study or mitigate family crisis and those women are working as agricultural labourer as they don't have any land to own.

FEMALE LITERACY AND FEMALE WORKERS (CULTIVATORS AND AGRICULTURAL LABOURERS) IN CD BLOCKS OF KOCH BIHAR DISTRICT (2001 & 2011)

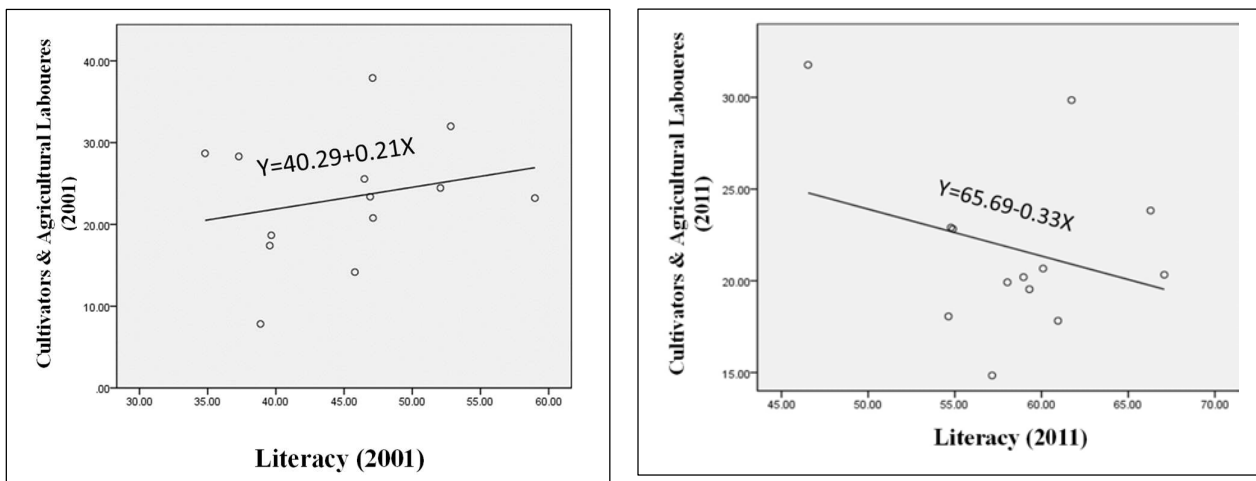


FIGURE NO.4.2

Source: Census, 2001 & 2011

Figure no. 4.2 shows the relationship between female literacy rate and female workers (cultivators and agricultural labourers) in CD blocks of Koch Bihar district between the Census year 2001 to 2011. In 2001 Census female cultivators and female agricultural labourers shows positive relationship ($Y=40.29+0.21X$) with female literacy. In 2011 census female cultivators and female agricultural labourers shows negative relationship ($Y=65.69-0.33X$) with female literacy. Reason of such trend over the Census years (2001 to 2011) are indicate that female cultivators and female agricultural labourers losing interest in agricultural activities with increasing literacy rate, they are more interested on jobs and engagements in other sectors. The dilemma of being into agriculture does not bring them the social respect that they look into the other sectors of professions like office work, small business, hand craft industry etc.

**TABLE NO. 4.10 PERCENTAGE OF FEMALE LITERACY & FEMALE WORKERS
(MAIN AND MARGINAL) TO TOTAL POPULATION, IN CD BLOCKS OF KOCH BIHAR
DISTRICT**

Blocks/ District	2001				2011			
	Literacy (%)	Main Workers (%)	Marginal Workers (%)	Female Workers (Main + Marginal) (%)	Literacy (%)	Main Workers (%)	Marginal Workers (%)	Female Workers (Main + Marginal) (%)
Haldibari	38.87	5.1	2.7	7.8	54.63	10.72	7.37	18.06
Mekhliganj	39.66	7.3	11.4	18.7	66.29	10.80	13.03	23.83
Mathabhanga-I	39.55	13.7	18.3	32.0	54.89	13.35	16.50	29.85
Mathabhanga-II	46.49	8.7	14.5	23.2	57.15	9.39	10.94	20.33
CoochBehar-I	52.82	8.4	7.4	15.8	61.73	9.62	13.21	22.83
CoochBehar-II	58.99	9.3	14.6	23.8	67.08	8.10	6.74	14.84
Tufanganj-I	46.91	8.9	5.3	14.2	59.30	9.48	10.72	20.20
Tufanganj-II	47.09	7.0	13.8	20.8	60.95	7.87	12.05	19.92
Dinhata-I	45.79	11.0	12.0	23.0	58.96	9.53	10.01	19.54
Dinhata-II	47.12	11.5	26.4	37.9	58.03	9.34	8.48	17.82
Sitai	34.81	11.4	17.3	28.7	46.53	14.30	17.48	31.77
Sitalkuchi	37.28	9.2	19.1	28.3	54.77	10.96	11.94	22.90
Koch Bihar	52.06	9.5	12.7	22.2	60.09	9.98	10.69	20.67

Source: Computed from DCHB Primary Census Abstract, Koch Bihar 2001 & 2011

**FEMALE LITERACY AND FEMALE WORKERS (MAIN AND MARGINAL) IN CD
BLOCKS OF KOCH BIHAR DISTRICT (2001 & 2011)**

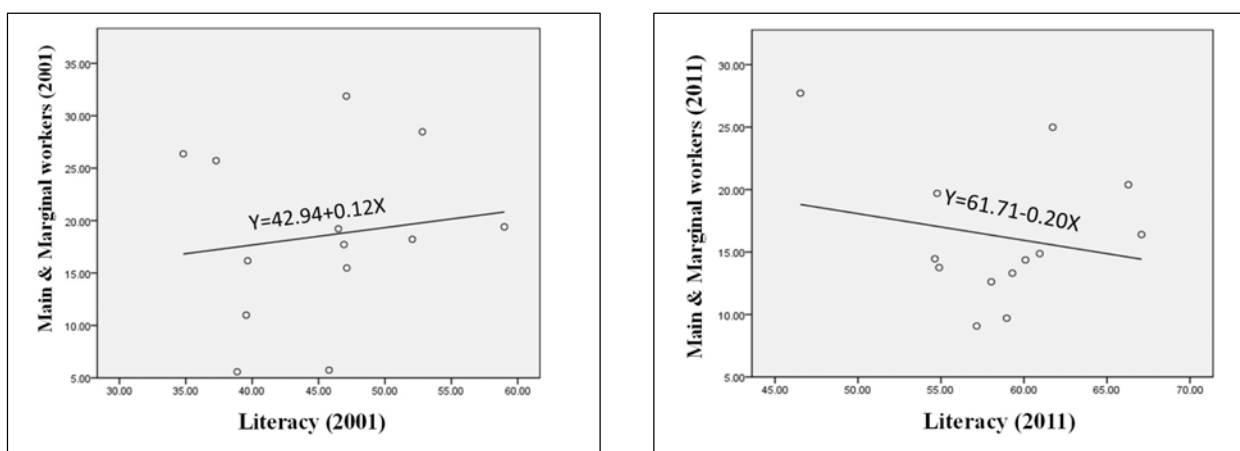


FIGURE NO.4.3

Source: Census, 2001 & 2011

Figure no. 4.3 shows relationship between female workers (main and marginal) with female literacy in 2001 to 2011. Year 2001 witness positive relationship ($Y=42.94+0.12X$) between female main and marginal workers with female literacy and in 2011 shows negative

relationship ($Y=61.71-0.20X$) between female main and marginal workers with female literacy.

Table no. 4.10 depicts the relationship between female literacy and female main and marginal workers over the years from 2001 to 2011. Highest female main workers decrease (2.16%) with the increase (10.91%) of literacy is in Dinhata-II block (11.5% in 2001 and 9.34% in 2011). In Dinhata-I female main workers decrease (1.47%) with the increase of female literacy (13.17%). In Cooch Behar II female main workers decrease (1.2%) with the increase of female literacy (8.09%). Highest female marginal workers decrease (17.92%) with the increase (10.91%) of literacy is in Dinhata-II block (26.4% in 2001 and 8.48% in 2011). In Cooch Behar-II take second position in case of female marginal workers decrease (7.86%) with the increases of female literacy (8.09%). Next block where female marginal workers decrease is Sitalkuchi (7.16%) with the increase of literacy (17.49%). Other blocks where female marginal workers decrease with the increase of literacy are Mathabhanga-II (3.56%), Dinhata-I (1.99%), Mathabhanga-I (1.8%), Tufanganj-II (1.75%). Overall, both female main and marginal workers decrease is highest in Dinhata-II (20.08%) with increase of literacy (10.91%). Second highest position take place into cooch Behar-II (8.96%) in case of decrease female main and marginal workers both with the increase of literacy (8.09%). Next highest position is captured by Sitalkuchi (5.4%) for decrease of female main and marginal workers both with the increase of literacy (17.49%). Other blocks where both female main and marginal workers decrease with increase of literacy are Mathabhanga-II (2.87%), Dinhata-I (3.46%), Mathabhanga-I (2.15%), Tufanganj-II (0.88%). In total Koch Bihar district both female main and marginal workers decrease 1.53% from 2001 to 2011 with the increase of literacy 8.03%.

4.11 Relationship between Female Literacy and Occupational Structure in KochBihar District

**TABLE NO. 4.11 CORRELATION ANALYSIS BETWEEN
FEMALE LITERACY & FEMALE OCCUPATIONAL STRUCTURE, 2011**

Category	Female Literate
Female Literate	1
Main + Marginal	-0.74 **
Agricultural labour + Cultivator	-0.85 **
Other workers	0.54 **

Source: Compiled by Researcher

An attempt has been made to analyze the inter-relationship between the female literacy and occupational structure of female in the total work participation applying Karl Pearson's correlation technique determining the significance.

Table 4.11 shows the correlation analysis between female literacy with female occupational structure in 2011. From the result it is seen that main and marginal category (-0.74) and cultivators and agricultural labours category (-0.85) are negatively and significantly associated with the female literacy. The literacy rate of female always influences to uplift the social status of female. So, if a female gets higher education, she feels lack of interest in doing agriculture and move to the other segment of occupation. That is why these variables are negatively and significantly associated and other workers category is positively and significantly associated with the female literacy.

4.12 Participation of Farm Women in Agricultural and Allied Activities

As per 2011 Census of India, Koch Bihar has a population of 2,819,086 out of which 1,451,542 are males and 1,367,544 are females. Total 3,64,797 cultivators depend on agriculture farming out of 3,02,745 are men and 62,052 are women. 3,91,875 people works as agricultural land as labourer, out of which 2,57,425 are men and 1,34,450 are women. Koch Bihar is an agricultural district with very large number of people dependent on agriculture. The district has moist humid climate. More than 77% rainfall is received in the months of June to September. Koch Bihar district comprises of new alluvial soils. On the basis of agro climatic condition like soil, rainfall, temperature the important crops grown in this district are rice, jute, wheat, potato etc.

TABLE NO. 4.12 AREA UNDER PRINCIPAL CROPS IN THE KOCH BIHAR DISTRICT

Crops	2014-15	Crops	2014-15
Foodgrains		Oil Seeds	
1.Rice	<u>293.5</u>	1.Rapeseed &Mustard	16.1
Aus	12.3	2.Linseeds	1.0
Aman	230.8	3.Other Oil Seeds	3.7
Boro	50.4	Total Oil Seeds	20.8
2.Wheat	13.4	Fibres:	
3.Barley	-	1.Jute	<u>87.7</u>
4.Maize	9.7	2.Mesta	0.3
5.Other Cereals	0.7	2.Potato	18.6
Total Cereals	317.3	3.Tobaco	11.0

Source: District Statistical Handbook, 2018

It is evident from the above table no. 4.12 as well as personal observation rice and jute are grown extensively in Koch Bihar district and a huge number of people both men and women make their living through the cultivation of these two major crops. To analyse the nature of

farm women involvement in agricultural activities these two crop's farm activities are considers for the present study.

4.12.1 Participation of Farm Women in Farm Activities

TABLE NO. 4.13 PARTICIPATION OF FARM WOMEN IN FARM ACTIVITIES

Sl. No.	Activities	No Participation (0)		Occasional Participation (1)		Independent Participation (2)	
		No.	%	No.	%	No.	%
Farm Activities (For Rice)							
1	Nursery Bed Preparation	362	30.16	648	54	190	15.83
2	Transplanting	126	10.5	110	9.16	964	80.33
3	Gap Filling	126	10.5	110	9.16	964	80.33
4	Bird Scaring	218	18.17	342	28.5	640	53.33
5	Rodent Control	218	18.17	342	28.5	640	53.33
6	Threshing	48	04	144	12	1008	84
7	Winnowing	48	04	144	12	1008	84
8	Grading	192	16	648	54	360	30
9	Storage of Grains	240	20	168	14	792	66
Farm Activities (For Jute)							
1	Thinning	120	10	240	20	840	70
2	Retting	168	14	240	20	792	66
3	Bundle Making	288	24	480	40	432	36
4	Caring	840	70	264	22	96	8
5	Placing in Retting Water	840	70	264	22	96	8
6	Placing Wet (Wooding Logs, Concrete Blocks etc.) to Submerge	840	70	264	22	96	8
7	Extraction of Fibres from the Jute Stem and Washing	216	18	744	62	240	20
8	Drying	216	18	696	58	288	24
9	Bundling of Fibres	240	20	768	64	192	16
10	Bundling of Jute Stick	240	20	600	50	360	30
Farm Activities (For Both Rice & Jute)							
1	Preparatory Tillage	984	82	120	10	96	08
2	Ploughing	1104	92	0	0	96	08
3	Land Preparation	1104	92	0	0	96	08
4	Manure & Fertilizer Application	504	42	552	46	144	12
5	Cleaning Seeds for Sowing	144	12	432	36	624	52
6	Seed Treatment	984	82	120	10	96	08
7	Sowing	144	12	120	10	936	78
8	Weeding	144	12	72	06	984	82
9	Irrigation	984	82	120	10	96	08
10	Plant Protection Measures	984	82	120	10	96	08
11	Harvesting	504	42	216	18	480	40
12	Account Keeping	1104	92	22	1.83	74	6.16
13	Marketing & Transportation	744	62	312	26	144	12
14	Preparation of Manures & Compost	782	65.17	274	22.83	144	12

Source: Field Survey, 2017

Table no.4.13 provides the information on the degree of participation of farm women in rice and jute cultivation in Koch Bihar district. It is observed that farm operations like transplanting

(80.33%), gap filling (80.33%), bird scaring (53.33%), rodent control (53.33%), threshing (84%), winnowing (84%), storage of grains (66%) specially for rice cultivation (figure no.4.4); thinning (70%), retting (66%) specially for jute cultivation (figure no.4.5), cleaning seeds for sowing (52%), sowing (78%), weeding (82%), harvesting (40%) for both rice and jute cultivation are mostly done by farm women. These activities need much tolerance and persistence which is exhibits by farm women rather than men farmers.

PARTICIPATION OF FARM WOMEN IN RICE PRODUCTION

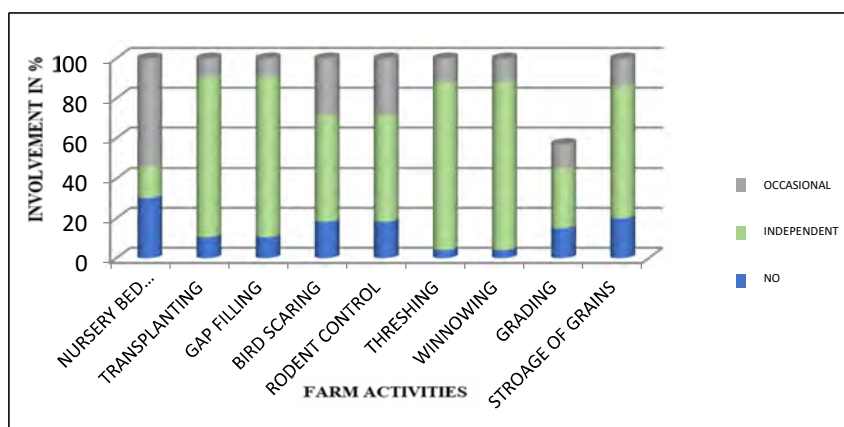


FIGURE NO.4.4

Source: Field Survey, 2017

PARTICIPATION OF FARM WOMEN IN JUTE PRODUCTION

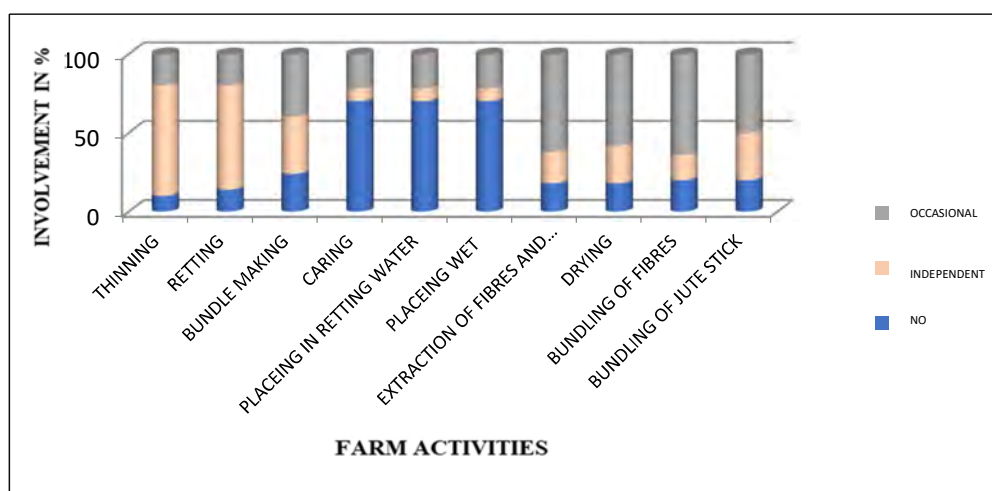


FIGURE NO.4.5

Source: Field Survey, 2017

On the other hand female farmer's involvement is very in some of crucial operations like caring (70%), placing in retting water (70%), placing wet (Wooding Logs, Concrete Blocks etc.) to Submerge (70%) specially for jute cultivation; preparatory tillage (82%), ploughing (92%), land preparation (92%), manure and fertilizer application (42%), seed treatment (82%), irrigation (82%), plant protection measures (82%), harvesting (42%), account keeping (92%), marketing and transportation (62%), preparation of manures and compost (65%) for both rice and jute cultivation. This kind of farm activities are mostly labour intensive and acute so is generally performed by male farmers and female farmers kept themselves out of such activities due to the nature of farm work (figure no.4.5 and figure no. 4.6).

However, female farmers a substantial percentage of do major farm activities like nursery bed preparation (54%), grading (54%), specially for rice cultivation; bundle making (40%), extraction of fibres from the jute stem and washing (62%), drying (58%), bundling of fibres (58%), bundling of fibres (64%) bundling of jute stick (50%) specially for jute cultivation; manure and fertilizer application (46%), cleaning seeds for sowing (36%), for both rice and jute cultivation. Granular details on all aspects of agricultural activities justified that farm women have crossed the male counterpart on all aggregated inputs.

PARTICIPATION OF FARM WOMEN IN RICE AND JUTE PRODUCTION

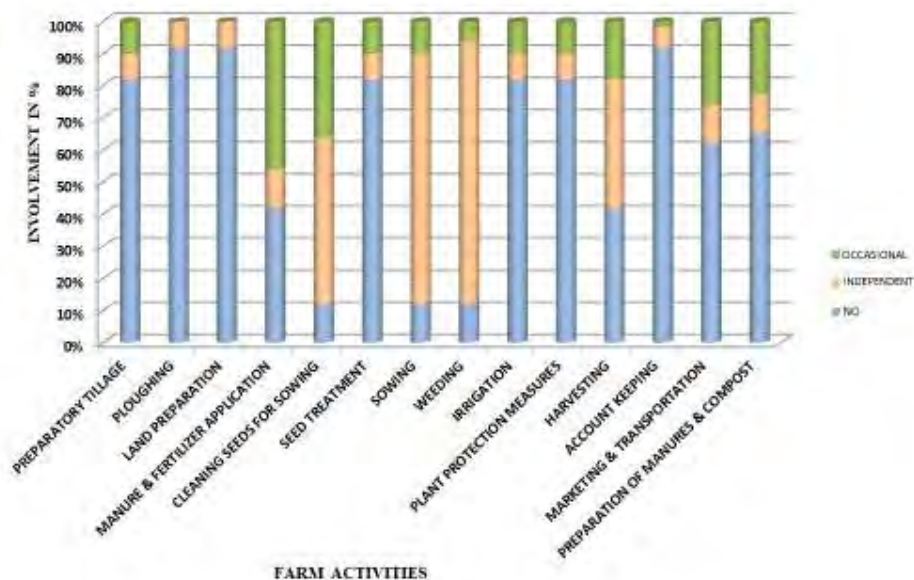


FIGURE NO.4.6

Source: Field Survey, 2017

4.12.2 Participation of Farm Women in Livestock Activities

TABLE NO. 4.14 PARTICIPATION OF FARM WOMEN IN LIVESTOCK ACTIVITIES

Sl. No.	Activities	No Participation (0)		Occasional Participation (1)		Independent Participation (2)	
		No.	%	No.	%	No.	%
1	Milking of Cattle and Goat	152	14.34	422	39.81	486	45.85
2	Cow Dung Making	16	1.5	112	10.57	932	87.92
3	Feeding Animals	326	30.75	302	28.49	432	40.75
4	Collection of Fodder	509	48.02	209	19.72	342	32.26
5	Cleaning and Maintenance of Cattle Shed	126	11.89	412	38.87	522	49.25
6	Cleaning of Cattle /Goat/Pig	423	39.91	203	19.15	434	40.94
7	Health Care of Poultry Birds and Poultry Farm	404	38.11	244	23.02	412	38.87
8	Health Care of Cattle /Goat/Pig	404	38.11	244	23.02	412	38.87
9	Marketing of Milk, Eggs, Meat of Goat and Pig, Chicken (N=270)	228	84.44	27	10.00	15	5.56
10	Maintenance of Accounts	967	91.23	15	1.42	78	7.36
11.	Purchase of Cattle Feed & Other Items	854	80.57	114	10.75	92	8.68

Source: Field Survey, 2017

Livestock farming is also known as animal husbandry, involves care, breeding and management of animals for economic benefits. Livestock rearing plays a crucial role in overall wellbeing for farm women. Livestock products contribute to the economic development of the respondents. Livestock provide meat, milk and egg. Major livestock like cow, goat, pig, hen are found in the study area. Among 1200 respondents 1060 respondents have livestock. 88.33% farm women have been doing allied livestock activities. Only 140 respondents (11.67%) do not have any kind of livestock in the study area. It is also observed that 790 respondents out of 1060 respondents have livestock but most of them do not sell milk and other dairy products. Rather they used these products to fulfil their daily nutritional requirements of the family (74.52%). Only 25.47% respondents sell their livestock output. In this sector male are dominate (84.44%). Farm women are largely engaged with some specific livestock activities like milking (45.85%), feeding animals (40.75%), cleaning and maintenance of cattle shed (49.25%), fodder collection (32.26%), cleaning of cattle, goats, pigs (40.94%), health care of animals or poultry birds (38.87%). Farm women highly participate with much patience in cow dung making activity (87.92%). On the other hand, farm women are rarely engaged with allied activities like fodder collection (48.02%), cleaning of cattle, goats, pigs (39.91%), health care of animals or poultry birds (38.11%), maintenance of accounts (91.23%), purchase of cattle feed & other items (80.57%). Female are occasionally involved in milking (39.81%) and cleaning and maintenance of cattle shed (38.87%) the table no. 4.14 and figure no. 4.7 explain the scenario about the livestock rearing in the study area.

PARTICIPATION OF FARM WOMEN IN LIVESTOCK ACTIVITIES

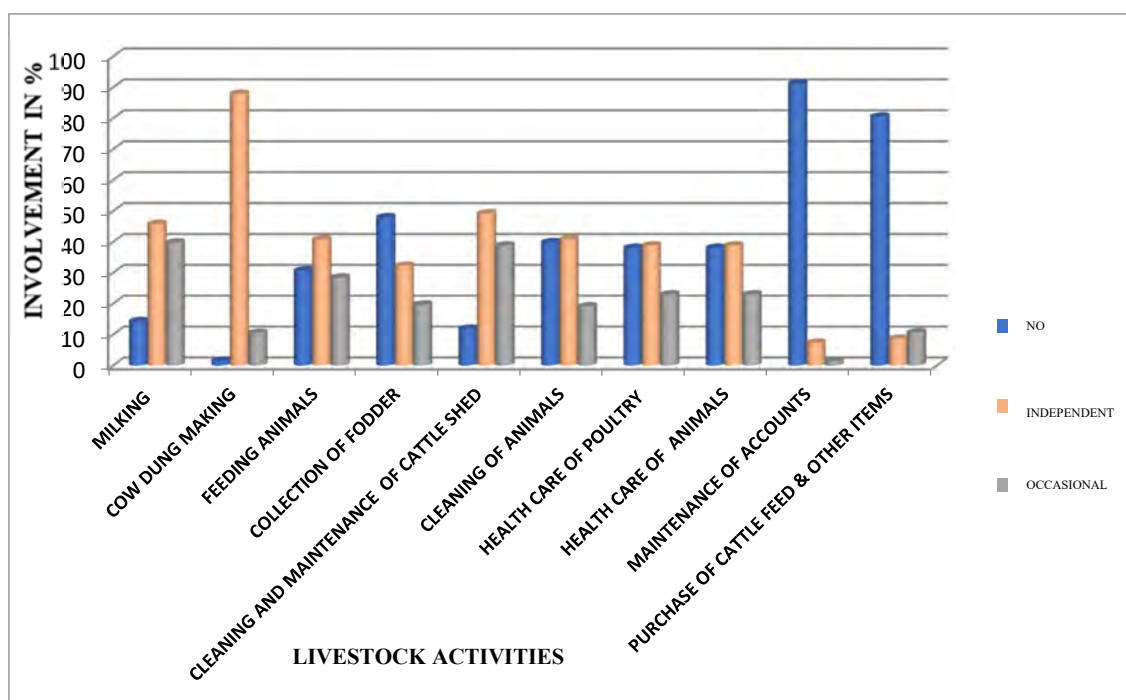


FIGURE NO.4.7

Source: Field Survey, 2017

4.12.3 Participation of Farm Women in Domestic Activities

TABLE NO. 4.15 PARTICIPATION OF FARM WOMEN IN DOMESTIC ACTIVITIES

Sl. No.	Activities	No Participation (0)		Occasional Participation (1)		Independent Participation (2)	
		No.	%	No.	%	No.	%
1	Cooking & Serving	0	0	0	0	1200	100
2	Bringing Water	84	7	84	7	1032	86
3	Grinding Flour	0	0	0	0	1200	100
4	Cleaning of Utensils	0	0	0	0	1200	100
5	Cleaning Home	0	0	0	0	1200	100
6	Washing Clothes	0	0	0	0	1200	100
7	Child Care	0	0	144	12	1056	88
8	Feeding of Child	0	0	0	0	1200	100
9	Education of Child	554	46.17	421	35.08	225	18.75
10	Fuel Collection	48	4	264	22	888	74
11	Shopping	947	78.92	151	12.58	102	8.5
12	Family Budgeting	1056	88	48	4	96	8

Source: Field Survey, 2017

Table no. 4.15 and figure no 4.8 further indicates that all the farm women do top to bottom domestic work along with field activities other than shopping and family budgeting. Ironically these domestic activities seem negligible in terms of overall output in society but as a woman it's also some significant role to play along with farm activities. Other members of the family especially male counterpart never indulge themselves in such household activities apart from putting labour in the field, even if the woman counterpart is ill and has poor health condition to carry out the above jobs. But when it came to financial aspect male are always dominant and took over it from their female counterparts.

PARTICIPATION OF FARM WOMEN IN DOMESTIC ACTIVITIES

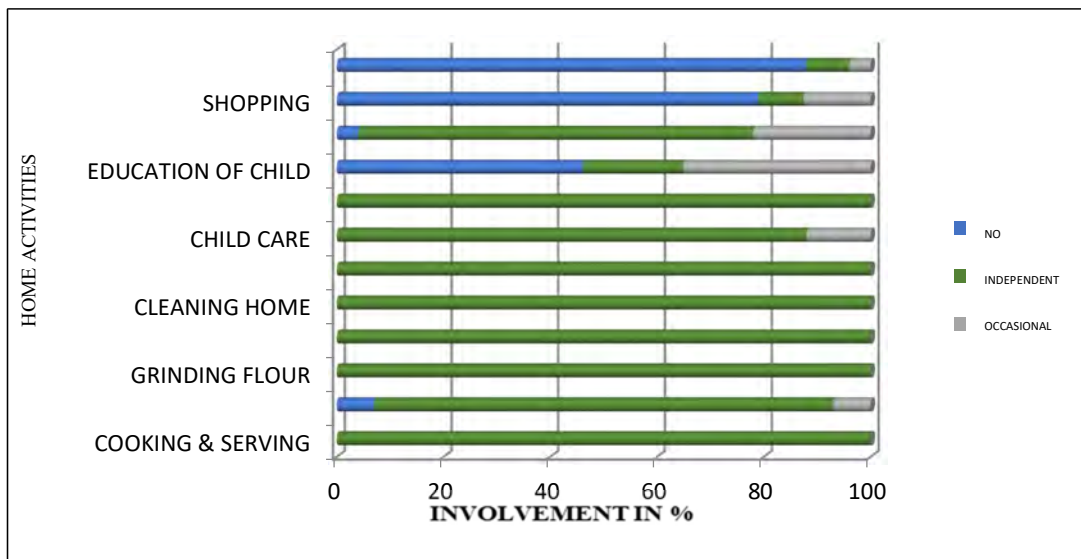


FIGURE NO.4.8

Source: Field Survey, 2017

4.12.4 Calculation of Activity-Involvement Index (AII) and Activity Involvement Score (AI Score) of Farm Women Respondents

- **Activity-Involvement Index (AII)**

Activity-Involvement Index is the direct involvement of farm women in the agriculture, livestock and poultry rearing activities as well as domestic activities. The variable is measured with the help of three-point scale on the basis of extent of direct involvement and the extent is categorized and score as no involvement, 0; occasional involvement, 1; independent involvement, 2. It is measured by scale developed by Pareek-Trivedy (1964). The Activity-Involvement Index (AII) is calculated as;

$$AII = \frac{\sum O_{Aj}}{\sum M_{Aj}} \times 100$$

where, O_{Aj} = obtained activity score (weighted) in j^{th} enterprise /crop/area

M_{Aj} = maximum activity score (weighted) achievable in j^{th} enterprise/crop/area

TABLE NO. 4.16 SCORE OBTAINED BY FARM WOMEN IN FARM, LIVESTOCK AND HOUSEHOLD ACTIVITIES IN KOCH BIHAR DISTRICT

Sl. No.	Activities	Obtained Activity Score		Maximum Activity Score
		Independent Involvement (2)	Occasional Involvement (1)	
1	Farm Activities	Score Obtained by Farm Women in Independent Involvement (in Farm Activities) 7566+4432+5106=17104x2=34208	Score Obtained by Farm Women in Occasional Involvement (in Farm Activities) 2656+4560+2480=9696	Total Farm Activities 39 Maximum Activity Score in Farm 39x2=68 (in Individual)
		Score Obtained by Farm Women in Farm Activities 34208+9696=43904		
2	Livestock Activities	Score Obtained by Farm Women in Independent Involvement (in Livestock Activities) 5157x2=10314	Score Obtained by Farm Women in Occasional Involvement (in Livestock Activities) 4304	Total Livestock Activities 10 Maximum Activity Score in Livestock 10x2=20 (in Individual)
		Score Obtained by Farm Women in Livestock Activities 10314+4304=14618		
3	Domestic Activities	Score Obtained by Farm Women in Independent Involvement (in Domestic Activities) 11599x2=23198	Score Obtained by Farm Women in Occasional Involvement (in Domestic Activities) 2112	Total Domestic Activities 10 Maximum Activity Score in Domestic 20x2=40 (in Individual)
		Score Obtained by Farm Women in Domestic Activities 23198+2112=25310		
Score Obtained by Farm Women in Farm, Livestock and Household Activities in 1200 Farm Women 43904+14618+25310=83832				Maximum Activity Score for 1200 Farm Women 78+20+40=138x1200=165600

Source: Compiled by Researcher

Activity-Involvement Index (AII) of Farm Women in Koch Bihar District

$$AII = \frac{83832}{165600} \times 100$$

$$AII = 50.62\%$$

• Activity Involvement Score (AI Score)

It refers to all the agricultural and allied activities like livestock rearing with domestic duties of a farm woman done on her own. The frequency is measured as no involvement,

occasional involvement and independent involvement with score 0, 1 and 2 respectively (explained in table no. 4.13, 4.14 and 4.15). Based on the total score obtained by the respondents, at first obtained score is calculated by (average farm activity score + average livestock activity score + average household activity score) and dividing by n=3. Where, n refers to total types of activities done by farm woman. Then AI score is measured by

$$\text{Activity Involvement Score (AI Score)} = \frac{\text{Obtained Score} - \text{Maximum Score}}{\text{Maximum Score} - \text{Minimum Score}}$$

The Activity Involvement Score is distributed with minimum value of 0.10 to the maximum value 1.00. The mean value of the distribution is 0.36 along with the standard deviation is 0.08. The co-efficient of variation of the variables is 24.23%.

Table no.4.16 explain the farm women's AII value is 50.62%. The research objective "To evaluate the involvement of farm women in agriculture and allied activities" and hypothesis – "Farm women actively participate in agriculture and allied fields along with household activities." are explain in this part. 50.62% AII value indicates that the farm women are actively participate in agriculture and allied fields along with household activities so the research hypothesis is accepted.

4.12.5 Agricultural Knowledge & Awareness Test of Farm Women

Table No. 4.17 and figure no. 4.9 shows the agricultural knowledge & awareness of farm women. During field survey it is observed that farm women have enough knowledge on various crops and livestock's diseases. They have good knowledge about the cropping seasons. Farm women are moderately aware about the uses of pesticides, manures and fertilizers. They are not familiar with soil or water testing. They do not use fertilizers on the basis of soil test. They are not aware about proper soil health management. From time to time, they apply pesticides, manures and fertilizers but they absolutely have no idea about proper methodology to apply these products. Due to less milk production, most of the farm women use for family rather than sell it, as they have a perception that selling milk is not a profitable business. Very few farm women are maintaining the livestock and poultry enterprise scientifically. During field visit it is observed that female and male farmers are less interested to gain additional knowledge and expertise about farm activities other then what they already know. They have complacence on knowledge about farm or livestock activities as they are running farm techniques by hereditary. As a result, the farmers of this area are lagging behind in increasing

the production and quality of crops as well as livestock. For example, most farmers knew the Swarna is a variety of rice but they do not know it is also HYV seed. Due to lack of agricultural training and self-interest on learning, farmers in this area lag behind the expected production volume and incurred low economic profit.

**TABLE NO. 4.17 AGRICULTURAL KNOWLEDGE & AWARENESS TEST OF
FARM WOMEN**

Sl.No.	Statements	Correct Response		Incorrect Response	
		NO.	%	NO.	%
1	Jute is a Pre-Kharif Crop	1040	86.67	160	13.33
2	Boro Rice is a Rabi Crop	1125	93.75	75	6.25
3	Swarna is the HYV of Rice	540	45	660	55
4	Amaranthus can be Grown in Homestead Garden	1200	100	0	0
5	Majra is an Insect Pest of Paddy	1175	97.92	25	2.08
6	Jute Semilooper is a Pest of Jute	1140	95	60	5
7	Sheath Blight is a Disease of Rice	1120	93.33	80	6.67
8	Rogar is a Pesticide	790	65.83	410	34.17
9	Late Blight (Dhasa) is a Disease of Potato	1140	95	60	5
10	Urea is Applied in Split Doses	340	28.33	860	71.67
11	Are you Applying Manures along with Fertilizers?	370	30.83	830	69.17
12	Phosphorus & Potash is Applied During Land Preparation	390	32.5	820	68.33
13	Borax is Applied in This Zone to Supply Micronutrient	180	15	1020	85
14	Jute is a Three-Month Crop	1080	90	120	10
15	FMD is a Disease of Cattle	1020	85	180	15
16	Ranikhet is a Disease of Poultry	1156	96.33	44	3.67
17	Soil & Water Testing is Needed for Proper Soil Health Management	340	28.33	860	71.67
18	Do You Test the Soil?	180	15	1020	85
19	Do You Test the Irrigation Water?	0	0	1020	100
20	Are You Applying Fertilizers on the Basis of Soil Test?	0	0	1020	100
21	Bank is The Credit Provider for Livestock & Poultry Enterprise	110	9.17	1090	90.83
22	Cooperative is Helpful to Increase the Productivity of Livestock & Poultry Enterprise	430	35.83	770	64.17
23	Milk Selling is a Profitable Business	340	28.33	860	71.67
24	Egg & Meat is the Product of Poultry Enterprise	970	80.83	230	19.17
25	Are You Maintaining the Livestock and Poultry Enterprise Scientifically?	140	11.67	1060	88.33

Source: Field Survey, 2017

AGRICULTURAL KNOWLEDGE & AWARENESS TEST OF FARM WOMEN

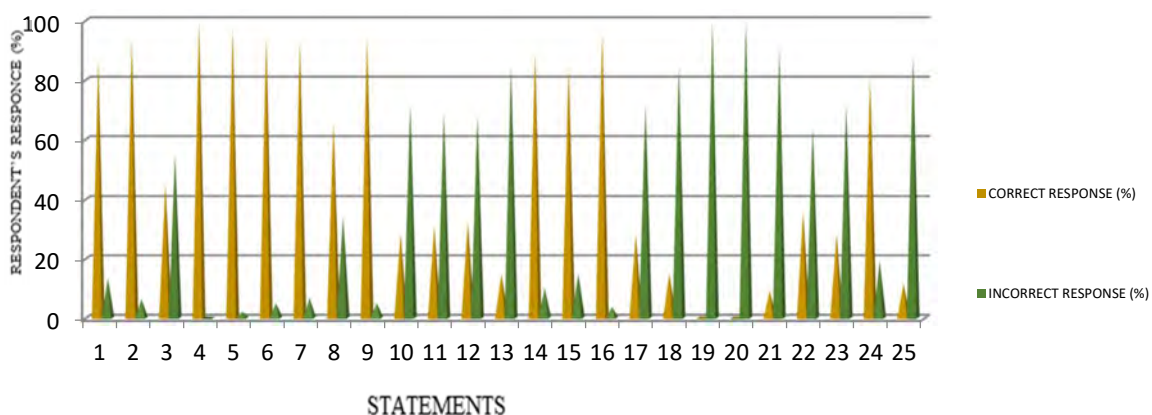


FIGURE NO.4.9

Source: Field Survey, 2017

4.12.6 Time Utilization Pattern of Farm Women

Table no. 4.18 and figure no. 4.10 shows that farm women and men spend equal time (i.e. about 8 hours) in agricultural works but after that women spend their remaining time for unpaid domestic duties for which, they get very little time to carry out then their personal care and leisure activities. On the other hand, males of the family have sufficient time to spend for their personal work as, after doing agricultural and allied field activities their involvement in domestic activities is relatively very less.

TABLE NO. 4.18 TIME UTILIZATION PATTERN OF FARM WOMEN

Sl. No.	Activities	Time Utilisation (Hrs) / Day	
		Male	Female
1	Food Preparation	0	2
2	Dish Washing	0	0.5
3	Cleaning Home	0	1
4	Washing Clothes	0	1
5	Marketing	2	0.2
6	Family Care	1	2
7	Personal Care	1	0.3
8	Sleeping & Resting	7.5	6
9	Leisure Time	2.5	0.5
10	Agriculture	8	8
11	Allied Agricultural Field	2	2.5
Total		24	24

Source: Field Survey, 2017

TIME UTILIZATION PATTERN OF RESPONDENTS ACCORDING TO HOURS / DAY

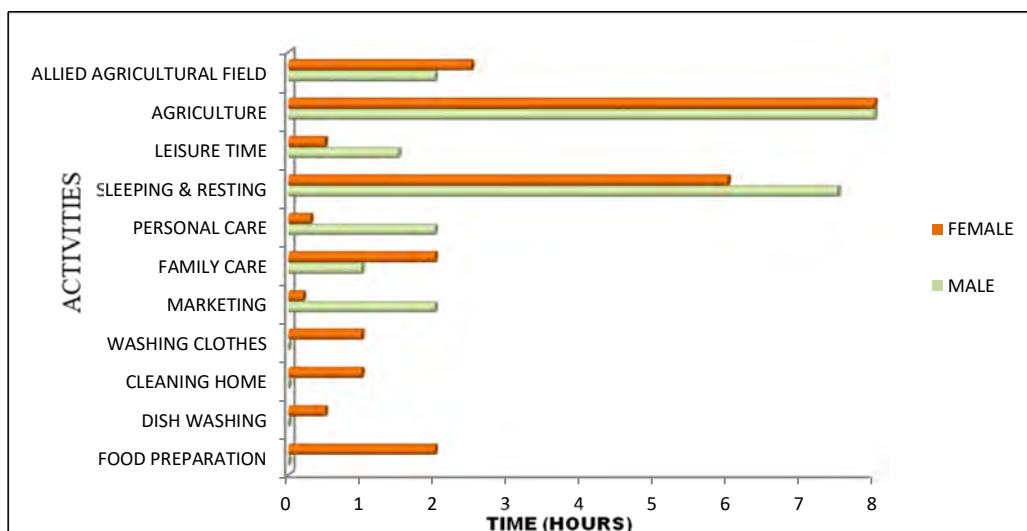


FIGURE NO.4.10

Source: Field Survey, 2017

TABLE NO. 4.19 GENDER INEQUITY IN WAGES / DAY / HEAD

Person	Male	Female
Wage / Day /Head	170-190	130-170

Source: Field Survey, 2017

4.12.7 Gender Inequity in Wages

The table no. 4.19 shows that there is a disparity between the wages of male and female although male and female give equal effort and time in agricultural activities but males are paid Rs 170-190/- per day and female get only Rs 130-170/- per day. The reason in the difference in wages as stated by the payee is because the male worker can-do labour-intensive work like preparatory tillage, ploughing, land preparation, bundle making, caring, placing in retting water, placing wet etc. while female, are unable to do it effectively. It is observed that women are involved in relatively light works which are time consuming and require patience, fineness and neatness for this quality they do not get any extra benefit.

FARM WOMEN'S PARTICIPATION IN DIFFERENT TYPES OF FARM ACTIVITIES OF KOCH BIHAR DISTRICT



Plate 4.1 Woman Preparing nursery bed for rice cultivation in their agricultural land at village Soulhari in Dinhata II block



Plate 4.2 Woman performing transplanting activities in wet field during rice cultivation at Putimari village in Coochbehar-I block



Plate 4.3 Woman moving with traditional plow to hand over to her male counterpart for ploughing at Shikarpur village in Mathabhanga I block



Plate 4.4 Farm woman performing winnowing activities before storing the rice for selling or own consumption at Kuchlibari in Mekhliganj block



Plate 4.5 Village woman during drying session of rice cultivation after threshing process at Patchhara village in Coochbehar-I block



Plate 4.6 Field survey during agricultural activities Putimari village in Coochbehar-I block

FARM WOMEN'S PARTICIPATION IN LIVESTOCK AND DOMESTIC ACTIVITIES OF KOCH BIHAR DISTRICT



Plate 4.7 Villagers at Salmara in Coochbehar-II making cow dung to mitigate fuel need on kitchen. Though Pradhan Mantri Ujjwala Yojana' has ensured availability of clean fuel to the rural and deprived household but this village still using the traditional way of fuel



Plate 4.8 Milking is major part of allied field of agriculture which ensure milk consumption of family members and bring additional income to family. Picture taken at Natabari in Tufanganj-I



Plate 4.9 Woman collecting fodder to feed domestic animals at Falimari village in Tufanganj-II. This fodder generally collected from agricultural field then stored



Plate 4.10 A woman feeding her children during break time, this emphasis the commitment of farm woman in household activities along with farming. Picture taken at Petla in Dinhata-I block



Plate 4.11 Woman cleaning home after cooking and ensures cleanliness and arrangements of household at Sahebganj village in Dinhata-II block



Plate 4.12 Solid fuel biomass is the largest fuel resources in rural village despite of clean fuel availability. A woman trying to gather wood pieces to serve household needs after returning from field at Sajerpar Ghoramara village in Coochbehar-II block

4.13 Conclusion

Female workforce has been considered as an important segment of the total work force in India. Women constitutes 48 percent of total population (Census 2011) and majority live in rural areas. With the passage of time and changing socio-economic scenario, beside men, women's productive roles have taken a new dimension. It is obvious that women's participation in different sector is one of the key indicators of socio-economic development. Their activeness helps their family as well as human society. Their participation in rural development as well as society development has increased and taken a significant place in development programmes. The study found that women are working in different sector in rural areas. In Koch Bihar district women comprises nearly half (48.51% as census, 2011) of the total population with a literacy rate of 68.49%. Women's Work Participation rate is 20.08% in 2001 in the district which increased to 21.43% in 2011. The whole study is based on both primary and secondary data. Primary data is collected from 1200 respondents with the help of structured questionnaire and secondary data collected from District Census Handbook 2001 and 2011, Census of India 2001 and 2011. Some important findings are,

1. In the Koch Bihar district female work participation rate is highest in Sitai block (31.77%) and lowest in Cooch Behar-II (14.84%) as per Census 2011.
2. The increasing rate of Crude Female Labour Force Participation Rate is the highest in Haldibari block i.e. 7.83% (2001) to 18.06% (2011).
3. Gender gap in Crude Female Work Participation is highest in case of Cooch Behar-II (42.86%), followed by Dinhata II (42.86%) and lowest in Sitai block (27.37%).
4. Sitai (33.36%) and Mekhliganj (7.42%) comprise the top and bottom position in terms of female work participation among Scheduled Castes respectively. On the other hand, among the Scheduled Tribes high rate is found in Mathabhanga-I (40.79%) and low is in Haldibari (16.78%) block.
5. There is a negative relationship between female literacy and female work participation in all the blocks of Koch Bihar.
6. Most of the farm women are largely engaged with farm activities such as threshing (84%), winnowing (84%), weeding (82%), sowing (78%), thinning (70%) etc.
7. 88.33% of farm women are involved in allied activities such as poultry and animal rearing.
8. Farm women participate in livestock activities such as cow dung making activity (87.92%) milking (45.85%), feeding animals (40.75%) etc.

9. Though the female farmers have agricultural knowledge which they have acquired through extensive field work, but they do not have a zeal to upgrade on their knowledge front because they are demoralised in wages and work recognition.
10. After 8 hours. of agricultural work farm women do domestic work and also are involved in livestock activities.
11. Farm women face negligence in wages also. Male farmers are paid Rs 170-190/- per day and female farmers get only Rs 130-170/- per day.

The study reveals various complexities of farm women and vulnerable character as a group of rural labourers in Koch Bihar district of West Bengal. Every year, a large number of rural labourers from Koch Bihar district migrate to different states of India like Rajasthan, Haryana, Delhi, Maharashtra, Tamil Nadu, Bihar and Arunachal Pradesh as well as other districts of West Bengal in search of work (Sarkar, 2012). The impact of male migration has both positive and negative impact on the female work force which have been highlighted in different chapters. Monopolistic power exercised by the land lords, minimum and uncertain wages, seasonal nature of agriculture and lack of employment opportunity, growing price of commodity and growing demands have collectively bent down the back-bone of these vulnerable people in existing agro-ecological set-up of the district. An inconsistent crisis in this agro-ecological set up of the study area have been broken out due to the huge out-flux of rural labours. But it is the most unfortunate story for the vulnerable people that, database regarding this most serious economic exclusion related to them, are not properly recorded by any Governmental or Non-Governmental Organization for their future development.

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CHAPTER 5

INVOLVEMENT OF FARM WOMEN IN DECISION MAKING PROCESS IN AGRICULTURE AND ALLIED SECTORS

5.1 Introduction

In earlier period, when Koch Bihar had been ruled by the Koch Kings, the rural women enjoyed more liberty in every aspect of life. During that period, society claimed massive hard work from the inhabitants for living as they were uneducated and agriculturally dependent. Consequently, people had no time; thus, they had to take assistance of women in every sphere of their activities. Later, continuous invasion of southern people and changing culture transformed the gender ideology of Koch Bihar. Male labour migration from the district resulted women are left behind, and an opportunity to escape from patriarchal domination. But this opportunity is fruitful only for the younger women belonging to the age group of 30-44 years (Sarkar, 2012). Youngest women belonging to the age group of 15-29 years never are left at home by their husband. They survive under the guidance of aged women or men (Sarkar, 2012). So, the migration of male labour gave them pain of separation and less responsibility at their home. The aged women get all the opportunity to establish herself as de facto head of the family but lack of education, lack of confidence and obviously age prevented them from their capabilities. Although the decision of the said women is executed with much respect but in reality, they are directed by her husband through telephone. In spite of these, rural women of Koch Bihar who are left behind home built their self-confidence, bringing a sense of independence and have generated capability to defend themselves against discrimination imposed by the male dominated society. Thus, ability to make strategic life choices in a context where this ability is previously denied to them have been obtained due to absence of male working members in the family which, partially enabling women to take right decision at right time in every sphere of their social, economic, political, life ranging from daily household activities to outside activities. At present, the decision which is taken by the women gets respects and is valuable equally by the male counterpart.

5.2 Factors Affecting in Decision Making process in Agriculture

The decision-making process in agriculture is complex, as many factors and a multifaceted environment influences farmers in their decision-making approach, as the farming environment is complex and uncertain due to various aspects of weather, soil, socio economic condition of the farmer, political frameworks etc. Furthermore, farmers can be influenced by their surrounding and the information given by the community. Another essential influence in the

decision-making of a farmer is lessons learned from the past. The decision-making process of small-scale farmers in developing countries is impacted by various complicated scenarios because of gender discrimination. Decision-making in this context implies aspects like choice of crop at the right time, in the most suitable soil and the proper treatment for its growth. The following factors acquired through field survey are considered as major factors for decision making processes in agriculture for women.

- **Agricultural Factors** Major agricultural factors are crops to be grown, season of growing, use of variety, time of sowing, time of manuring, type of fertilizer & manures, use of pesticides, harvesting, marketing.
- **Socio-Economic Factors** Major socio-economic factors are education of children, taking care of children, buying of foods, buying of clothes, marriage of children, selling, buying of domestic animals, selling of agricultural products, selling of dairy products, savings.

5.3 Methodology of Study

Many mathematical models of decision-making processes in farming have been developed. The present study is measured by scale developed by Pareek-Trivedy (1964). This scale is divided into three categories which are Activity-Involvement Index (AII), Decision-Involvement Index (DII) and Overall-Involvement Index (OII). Pareek-Trivedy's Decision-Making Score (DI Score) is applied to 1200 respondents to analysis farm women's involvement decision-making process. The other approach taken for the study of decision-making power is point score scale. Implementing point-score scale has provided the opportunity to get an insight into farmer's opinion, goals, values and experience. The point score scale analysis is done to dealing with farmers' perceptions as well as decision taking capacity. Major point score scale taken for this study are Risk Preference by Supe (2007), Scientific Orientation by Supe (2007), Economic Motivation by Supe (2007), Independence Scale by Supe (2007), Attitude towards Agriculture by Mathew and Reddy (1989), Attitude towards Animal Rearing & Poultry by Rajkamal &Kunzru (1993), Management Orientation by Samanta (1977). These point score scales are applied to the 1200 farm women in Koch Bihar district.

5.4 Observations of Decision Making by Farm Women in Koch Bihar District

Various studies on decision making power of the women, left behind shows that decisions taken by women are not considered by the senior family members in India (Chaudhuri, 1903). In the study area, generally the women are more intelligent and better informed in all matters

than the men. Male labour migration from a family creates an opportunity to exercise the decisions which are taken by women in different family matter. To judge reality, the decision-making index has been calculated on the basis of some relevant parameters.

5.4.1 Point Score Scale Analysis

Point score scale analysis is very much useful technique to understand the condition of small-scale farmers in a developing country like India. Point-score scale analysis has been proven to be applicable in developing countries with the purpose of encouraging a cross-cultural communication between planners and farmers (Ryder, 1993; Greig, 2009; Beckford, 2002). According to Ryder (1993) the advantages of this behavioural study take into account a wide range of decision-making factors, including socio-personal aspects. To analysis this scale respondents have provided valuable insights into the farmers' decision-making process. The advantage of point-score scale in particular is that the farmers don't need to provide detailed information about the farm size, yields and other sensitive issues. On the other side this scale stresses on the advantage of the possibility of coding the answers in groups which allows further statistical analysis. Some major relevant point score scale has been taken to analysis the decision-making power of farm women in the study area.

5.4.1.1 Risk Preference of Farm Women

It is the degree to which a farmer is oriented towards risk and uncertainty and has courage to face the problems in farming. This variable is measured with the help of scale developed by Supe (2007). This scale consists of six items, in which first four statements are positive and two statements are negative. The responses are recorded on five-point ranging from strongly agree to strongly disagree. The positive statements are scored 5, 4, 3, 2 and 1 for strongly agree, agree, undecided, disagree and strongly disagree, whereas, the scoring system are reversed in case of negative statement.

The farming sector in the district is often characterized by high exposure to risk from extreme climatic events. The decision on environment in the agricultural sector is completely uncertain and very much dependent on the mercy of the weather. Thus, farm production decision always contains a certain element of risk due to uncertain weather but somehow the producer must make risky choices to gain more return from farm production. Risk and uncertainty impacts farm households' production and consumption decisions. Major work force of the study area directly depends on agriculture for their livelihood. Agricultural uncertainty has impact on the farm income and food security. Moreover, distortions in agricultural production and supply

affect agricultural exports and a rise in prices causing an inflationary situation in the economy. Climatic shocks, therefore, affect crop production directly without proper adaptation and mitigation strategies. To understand individual risk preferences is a pre-requisite to measures agricultural economics. From a policy-makers' perspective, it is imperative to understand farmers' risk preferences to gain insight into the dynamics of how risk affects their decision-making process and to predict for future. The socio-demographic and socio-economic variables influence the farmers' risk-taking attitude. The study also reveals a negative relationship between farm income source and risk-taking attitude table no. (5.1 and figure no. 5.1). 74.17% farm women do not try an entirely new method in farming which are involves risk. 66.5% farm women believe trying new methodology is risky but worth to do it on other hand 34.5% of farm women believe to stick on the regular farming methods to avoid risk though it might not financially profitable. 89.17% farm women are agreeing on not trying new methodology of farming which is not tested, 10.83% farm women tend to disagreeing on this. The study reveals a negative attitude to taking risk of the farm women. The study also found that there is an immediate need to improve extension facilities in the study area to train these farmers regarding the best risk management practices for deciding the choice of a particular crop such as growing short-duration crops as well as climate-resistant crop variety. Storage facilities, weather-based crop insurance and other safety nets are necessary that can effectively address farmer's challenge and improve risk taking capabilities of a farmer. 30.00% farm women think that who take high risk on farming tend to income better out of this, 68.17% farm women does not agreeing on the same.

TABLE NO. 5.1 RISK PREFERENCE OF FARM WOMEN

Sl. No.	Statements	SA	A	UD	DA	SDA
	Score (+)	5	4	3	2	1
	Score (-)	1	2	3	4	5
1	A Farmer Should Rather take More of a Chance in Making a Big Profit than to be Contented with a Smaller, But Less Risky Profit (+)	-	270	-	827	103
2	A Farmer Who is Willing to Take Greater Risks than the Average Farmer, usually Do Better Financially (+)	32	328	22	720	98
3	It is Good for a Farmer, to Take Risks When She knows Her Chance to Success is Fairly High (+)	202	398	15	370	215
4	Try an Entirely New Method in Farming by a Farmer Involves Risk, but It is Worth Doing It (+)	-	55	-	890	255
5	A Farmer Should Grow Large Number of Crops to Avoid Greater Risks Involved in Growing One or Two Crops (-)	246	798	-	156	-
6	It is Better for a Farmer Not to Try New Farming Method Unless Most Other Farmers Have Used them with Success (-)	434	636	-	130	-

Source: Field Survey, 2017

RISK PREFERENCE OF FARM WOMEN IN KOCH BIHAR DISTRICT

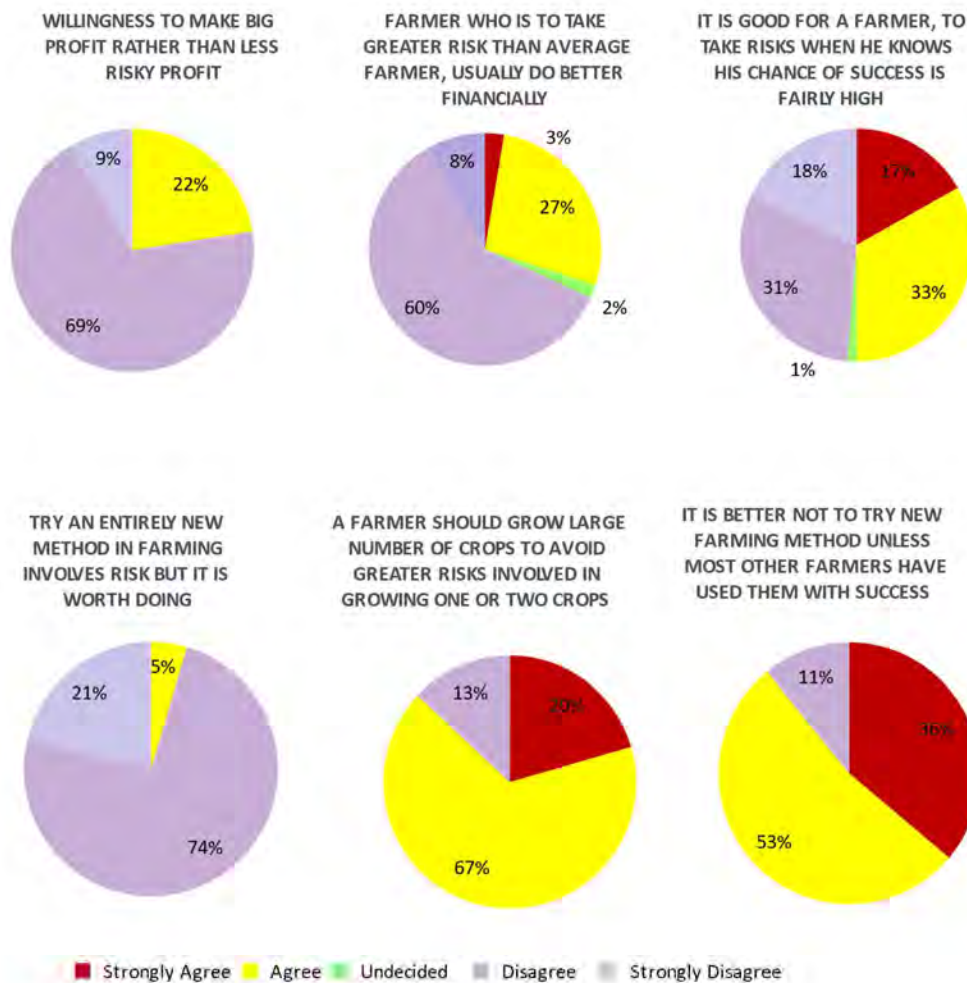


FIGURE NO. 5.1

Source: Field Survey, 2017

5.4.1.2 Scientific Orientation of Farm Women

It is characterized by a belief in science and scientific approach to solve the problems in farming. The scale developed by Supe (1969) is adopted for this study to measure the degree to which the respondents are oriented to use scientific methods in farming and decision making. The scale consists of six statements out of which five statements are positive and one is negative. The responses of the respondents are obtained against each statement in terms of their agreement or disagreement on a five-point scale ranging from strongly agree, agree, undecided, disagree and strongly disagree. The positive statements are scored 5, 4, 3, 2 and 1 for strongly agree, agree, undecided, disagree and strongly disagree, whereas, the scoring system are reversed in case of negative statement. Scientific orientation is characterised by a belief in science and scientific approaches to solve problems of families and it leads the farmers to adopt improved/local agricultural technologies. The data (table no. 5.2 and figure no. 5.2) regarding scientific orientation of the respondents are presented in table no.5.2. 51.58% farm women are not willing to try new ideas in farming and 60.16% farm women think that the way of her forefathers farmed is still the best way to farm today. 55.01% farm women think to learn new methods of farming is time consuming which indicates that very few respondents have good scientific orientation. 55% farm women believe that to learn new method of farming is time consuming but worth it once done, 45% farm women do not agree on this. The reason for above situation is due to the fact that they have less exposure to scientific oriented persons of other community. Since some of the family members are working as migrating labourers and are found to be engaged in agriculture-labour work and non-agriculture labour work they have not understood the importance of science and technology.

TABLE NO. 5.2 SCIENTIFIC ORIENTATION OF FARM WOMEN

Sl. No.	Statements	SA	A	UD	DA	SDA
	Score (+)	5	4	3	2	1
	Score (-)	1	2	3	4	5
1	New Methods of Farming Give Better Results to a Farmer than the Old Methods (+)	62	482	-	584	72
2	Even a Farmer with Lots of Experience Should Use New Methods of Farming (+)	72	530	-	521	77
3	Though it takes Time for a Farmer to Learn New Methods in Farming it is Worth the Efforts (+)	80	580	-	470	70
4	A Good Farmer Experiments with New Ideas in Farming (+)	53	528	-	545	74
5	Traditional Methods of Farming Have to be Changed in Order to Raise the Level of Living of a Farmer (+)	74	590	-	464	72
6	The Way of Farmer's Forefathers Farmed is Still the Best Way to Farm Today (-)	202	520	-	416	62

Source: Field Survey, 2017

SCIENTIFIC ORIENTATION OF FARM WOMEN IN KOCH BIHAR DISTRICT

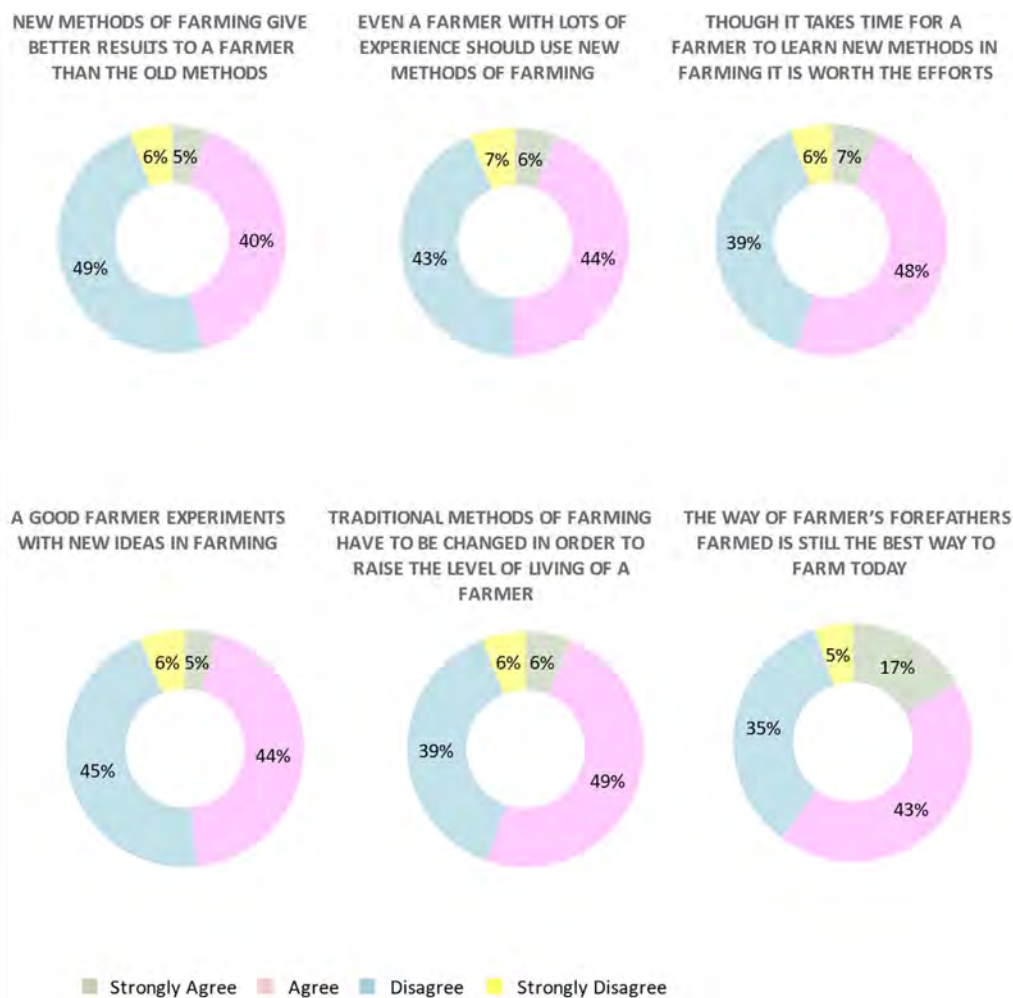


FIGURE NO. 5.2

Source: Field Survey, 2017

5.4.1.3 Economic Motivation of Farm Women

It is defined as the occupational success in terms of profit maximization and the relative value placed by a farmer on economic ends. This variable is measured with the help of scale developed by Supe (2007). This scale consists of six elements, in which the first five statements are positive and statement no. six is negative. The responses are recorded on five-points ranging from strongly agree to strongly disagree. The positive statements are scored 5, 4, 3, 2 and 1 for strongly agree, agree, undecided, disagree and strongly disagree, whereas, the scoring system are reversed in case of negative statement.

93.02% farm women agree that most successful farmer is the one who makes the most profit and 84.05% farm women admit that a farmer should work towards larger yields and economic profits. But when she asked to try new farming idea which may give her more profit, 66.83% farm women do not agree to do it because their risk-taking ability is less. 73.5% farm women think that to get a good start by their children they must need economic assistance, 26.5% farm women disagree in this thought. 49% farm women believe that it is important of earn money but life is not all about financial terms and condition, 51% farm women disagree on that thought. Though farm women have an interest to earn economic profit from her farm but due to low risk-taking ability and low scientific orientation they move backward in terms of economic motivation. There is a need to formulate different strategies by the policy makers and implement those at the grass root level. Different factors affecting the economic motivation of the farmers also require further study. Table no.5.3 and figure no. 5.3 shows the field scenario about economic motivation.

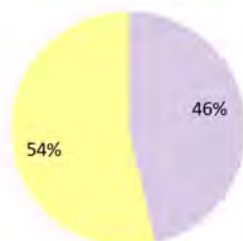
TABLE NO. 5.3 ECONOMIC MOTIVATION OF FARM WOMEN

Sl. No.	Statements	SA	A	UD	DA	SDA
	Score (+)	5	4	3	2	1
	Score (-)	1	2	3	4	5
1	A Farmer Should Work towards Larger Yields and Economic Profits (+)	556	644	-	-	-
2	A Most Successful Farmer is the One Who Makes the Most Profit (+)	428	688	-	84	-
3	A Farmer Should Try Any New Farming Idea Which May Earn Him More Money (+)	70	328	-	700	102
4	A Farmer Should Grow Cash Crops to Increase Monetary Profits in Comparison to Growing of Food Crops for Home Consumption (+)	382	682	-	136	-
5	It is Difficult for the Farmer's Children to Make Good Start Unless He or She Provides Them with Economic Assistance (+)	202	680	-	318	-
6	A Farmer Must Earn for Her Living but the Most Important Thing in Life cannot be Defined in Economic Terms (-)	170	418	-	542	70

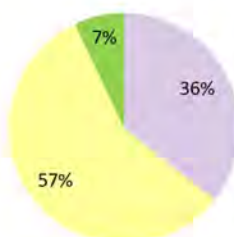
Source: Field Survey, 2017

ECONOMIC MOTIVATION OF FARM WOMEN IN KOCH BIHAR DISTRICT

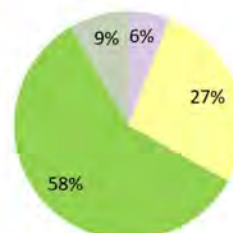
A FARMER SHOULD WORK
TOWARDS LARGER YIELDS AND
ECONOMIC PROFITS



MOST SUCCESSFUL FARMER IS THE
ONE WHO MAKES THE MOST
PROFIT



A FARMER SHOULD TRY ANY NEW
FARMING IDEA WHICH MAY EARN
HIM MORE MONEY



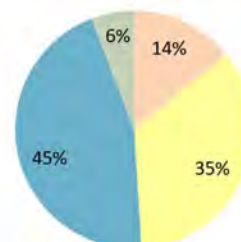
A FARMER SHOULD GROW CASH
CROPS TO INCREASE MONETARY
PROFITS RATHER THAN GROWING
FOOD CROPS FOR HOME
CONSUMPTION



IT IS DIFFICULT FOR THE FARMER'S
CHILDREN TO MAKE GOOD START
UNLESS THEY PROVIDE THEM WITH
ECONOMIC ASSISTANCE



A FARMER MUST EARN FOR HIS
LIVING BUT THE MOST
IMPORTANT THING IN LIFE
CANNOT BE DEFINED IN
ECONOMIC TERMS



■ Strongly Agree
 ■ Agree
 ■ Disagree
 ■ Strongly Disagree

FIGURE NO. 5.3

Source: Field Survey, 2017

5.4.1.4 Independence Scale of Farm Women

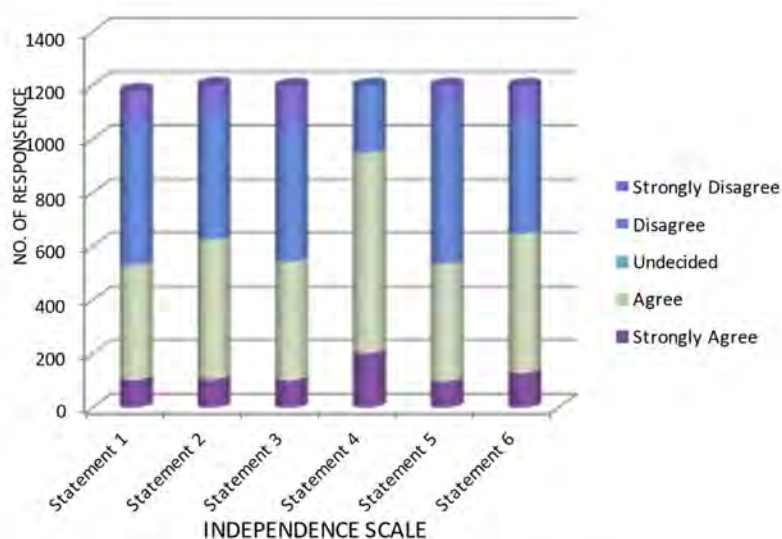
It is the degree to which a farmer places positive value on independence or autonomy in decision-making. This variable is measured with the help of scale developed by Supe (2007). This scale helps to understand if she takes independent decision or not, in agriculture. This scale consists of six items, in which the first five statements are positive and statement six is negative. The responses are recorded on five-points ranging from strongly agree to strongly disagree. The positive statements are scored 5, 4, 3, 2 and 1 for strongly agree, agree, undecided, disagree and strongly disagree, whereas, the scoring system are reversed in case of negative statement. 44.17% farm women agree that right thing must be done by themselves, 55.83% farm women disagree on the same. 52.08% farm women agree as decision making should be independent to be successful, 42.08% farm women do not agree on the same. 45.25% farm women think that job satisfaction is best when there is full ownership, 54.75% farm women do not agree in it. 44.58% farm women believe that they should teach their children to foster decision making, 54.42% farm women do not think so. 54% farm women think that farmer cannot be independent decision maker rather they should consult with other family members, 46% farm women believe anyone can be independent decision maker in cultivation. During field survey the data indicates (table no 5.4 and figure no. 5.4) that majority of farm women are willing to take decision independently for economic benefits but when they took independent decision for minimum risk-oriented farm work they are hesitant to take independent decisions. Then dependency upon male counterpart also another factor for low level of independence score.

TABLE NO. 5.4 INDEPENDENCE SCALE OF FARM WOMEN

Sl. No.	Statements	SA	A	UD	DA	SDA
	Score (+)	5	4	3	2	1
	Score (-)	1	2	3	4	5
1	If a Farmer Wants a Thing Done Right, She Must Do It Himself (+)	102	428	-	530	120
2	Independence in Decision-Making is the Most Important Quality of a Successful Farmer (+)	105	520	-	485	93
3	A Farmer is at Her Best When She is Free, Self-Reliant and Avoids All Outside Help (+)	101	442	-	495	161
4	A Financially Successful Farmer is One Who Stands on Her Own Feet (+)	202	748	-	250	-
5	A Farmer Should Teach Her Children to Make their Decisions Independently (+)	97	438	-	585	80
6	Now-A-Days a Farmer Can No Longer Afford to be Independent (-)	128	520	-	432	120

Source: Field Survey, 2017

INDEPENDENCE SCALE OF FARM WOMEN IN KOCH BIHAR DISTRICT



Statement 1: If a farmer wants a thing done right, he must do it himself

Statement 2: Independence in decision-making is the most important quality of a successful farmer

Statement 3: A farmer is at his best when he is free, self-reliant and avoids all outside help

Statement 4: A financially successful farmer is one who stands on his own feet

Statement 5: A farmer should teach his children to make their decisions independently

Statement 6: Now-a-days a farmer can no longer afford to be independent

FIGURE NO. 5.4

Source: Field Survey, 2017

5.4.1.5 Management Orientation of Farm Women

Management orientation plays a key role in the creation of farm output. It is operationally defined as the degree to which a woman is oriented towards scientific farm management comprising planning, production and marketing function of the farm. Farm management skills of a farmer are related with farm resource that enhances market orientation. Successful farming requires the availability of managerial skills of farmers. Market-oriented farming requires farmers' knowledge about farm management. Farm management is viewed as a process of decision-making that involves setting goals and objectives, farm planning, implementing the plan and monitoring its outcome. Unfortunately, the agriculture sector is perceived to have low management skills and will need to strengthen it to cope up with the ever-changing farming environment. Very few studies have focused on management skills of farmers. Most of the farmers are comfortable to participate and assist in farm work other than management work. A distinct skills gap exists in the district where not only farmers but also the extension workers on whom they rely have inadequate managerial skills. Unfortunately, extension workers in focus on agricultural production and technology transfer, thus leaving a gap in farm business management. To show actual management skill of farm women in the study area, this scale is applied. This variable is measured with the help of scale developed by Samanta (1977). The scale consists of eighteen statements, six statements each for planning, production and marketing orientation. In each group positive and negative statements are mixed, retaining at the same time a more or less same order of statements. Each item will be provided with four-point response continuum. The positive statements are given a score of four for strongly agree, three for agree, two for disagree and one for strongly disagree response and vice-versa in case of negative statements. The score for each individual on the management orientation scale is obtained by summation of the score awarded to each of the items. This scale explains the management orientation skill of farm women in three categories; planning orientation, production orientation and marketing orientation. 61.33% farm women think that farmer should cultivate new crops every year based upon the type of land they have. 91.33% farm women think that, it is not necessary to make prior decision about the varieties of crop to be cultivated in land. 74.83% farm women agree to consult agricultural experts for crop plan. 59.5% farm women think that, it is not necessary to have training for crop production which indicates farm women are not aware about pre cultivation planning. They thought as they do same cultivation each and every year, they do not need any prior decision for cultivation. 74.83% farm women believe that suitable herbicides should use to control weed.

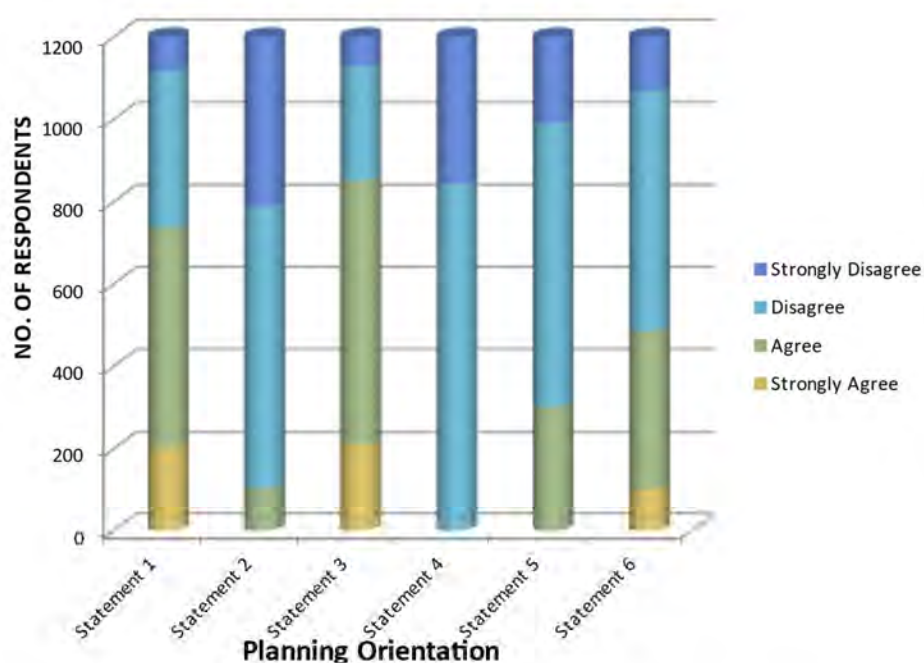
83.8% farm women are not aware about the use of fertilizers, 83.5% farm women are not interested to attend agricultural production training. As they do not use proper planning orientation their production orientation part is also very low. So, they faced very low rate of production in field crops. 74.3% farm women are not aware about the crop market new. 64.33% farm women sell her crop to the nearest market irrespective of price. 64.33 % farm women do not agree on the thought that co-operative can help to get better price for farmers. The result shows their market orientation skill low so they do not get proper price of their cultivated crops. Table no. 5.5 and figure no. 5.5, 5.6, 5.7 explain the management capacity of farm women in the study area.

TABLE NO. 5.5 MANAGEMENT ORIENTATION OF FARM WOMEN

Sl. No.	Statement	SA	A	DA	SDA
	Score (+)	4	3	2	1
	Score (-)	1	2	3	4
1	Planning Orientation				
A	Each Year, One Should Think a Fresh about the Crop to be Cultivated in Each Type of Land (+)	202	534	380	84
B	It is Not Necessary to Make Prior Decision about the Varieties of Crop to be Cultivated in Land (-)	-	104	684	412
C	It is Possible to Increase the Yield through Farm Production Plan (+)	208	642	278	72
D	It is Not Necessary to Think Ahead the Cost Involved in Raising a Crop (-)	-	-	844	356
E	One Need Not Consult Agricultural Experts for Crop Plan (-)	-	302	688	210
F	It is Not Necessary to Have Training for Crop Production (-)	102	384	582	132
2	Production Orientation				
A	Timely Planting of a Crop can Ensure Good Yield (+)	492	685	23	-
B	One Should Use as Much Fertilizers as He Likes (-)	92	102	766	240
C	Determining Fertilizer Quantities by Soil Testing Saves Money (+)	42	156	840	162
D	Seed Rate Should be Used as Recommended by the Specialists (+)	78	240	732	150
E	For Timely Weed Control One Should Use Suitable Herbicides (+)	220	678	302	-
F	With Low Water Rates One Should Use as Much Irrigation Water as Available (-)	472	768	40	-
3	Marketing Orientation				
A	Market News is Not Useful to a Farmer (-)	-	102	756	342
B	A Farmer Can Get Good Price by Grading Her Produce (+)	165	620	415	-
C	Co-Operatives Can Help the Farmers to Get Better Price for their Produce (+)	72	356	622	150
D	One Should Sell Her Produce to the Nearest Market Irrespective of Price (-)	90	382	662	66
E	One Should Purchase the Inputs from the Shop Where Her Other Relatives Purchase (-)	172	622	406	-
F	One Should Grow Those Varieties, Which Have More Market Demand (+)	422	688	90	-

Source: Field Survey, 2017

PLANNING ORIENTATION OF FARM WOMEN IN KOCH BIHAR DISTRICT



Statement 1: Each year, one should think a fresh about the crop to be cultivated in each type of land (+)

Statement 2: It is not necessary to make prior decision about the varieties of crop to be cultivated in land (-)

Statement 3: It is possible to increase the yield through farm production plan (+)

Statement 4: It is not necessary to think ahead the cost involved in raising a crop (-)

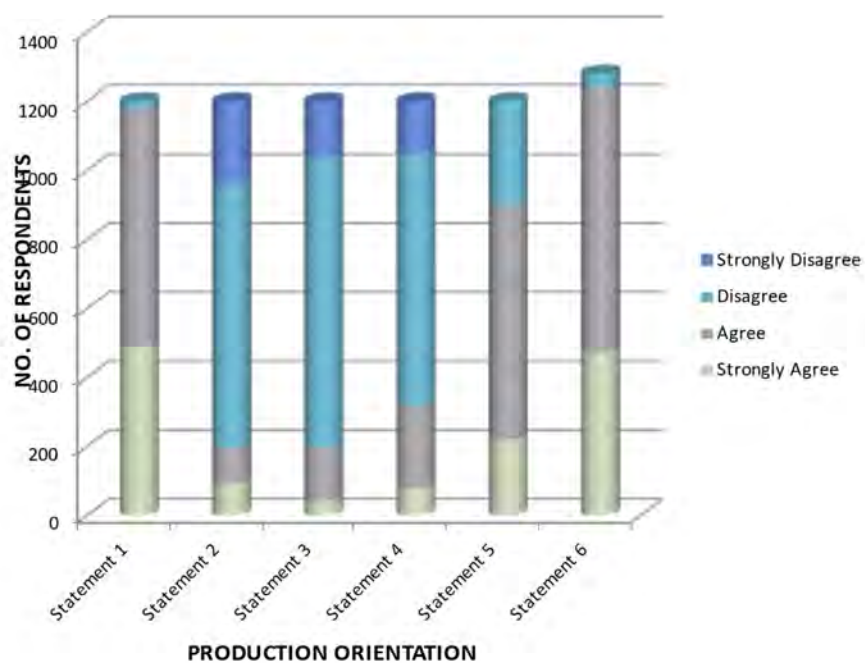
Statement 5: One need not consult agricultural experts for crop plan (-)

Statement 6: It is not necessary to have training for crop production (-)

FIGURE NO. 5.5

Source: Field Survey, 2017

PRODUCTION ORIENTATION OF FARM WOMEN IN KOCH BIHAR DISTRICT



Statement 1: Timely planting of a crop can ensure good yield (+)

Statement 2: One should use as much fertilizers as he likes (-)

Statement 3: Determining fertilizer quantities by soil testing saves money (+)

Statement 4: Seed rate should be used as recommended by the specialists (+)

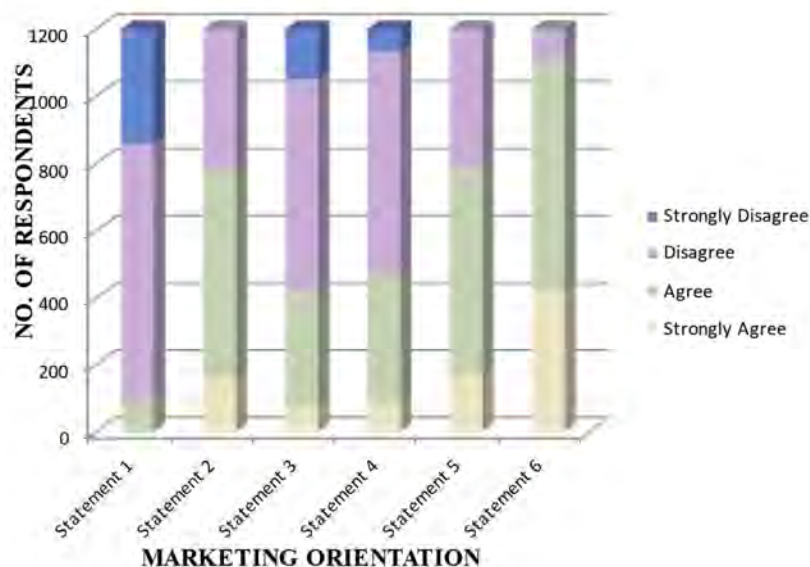
Statement 5: For timely weed control one should use suitable herbicides (+)

Statement 6: With low water rates one should use as much irrigation water as available (-)

FIGURE NO. 5.6

Source: Field Survey, 2017

MARKETING ORIENTATION OF FARM WOMEN IN KOCH BIHAR DISTRICT



Statement 1: Market news is not useful to a farmer (-)

Statement 2: A farmer can get good price by grading his produce (+)

Statement 3: Co-operatives can help the farmers to get better price for their produce (+)

Statement 4: One should sell his produce to the nearest market irrespective of price (-)

Statement 5: One should purchase the inputs from the shop where his other relatives purchase (-)

Statement 6: One should grow those varieties, which have more market demand (+)

FIGURE NO. 5.7

Source: Field Survey, 2017

5.4.1.6 Attitude of Farm Women towards Agriculture

Agriculture is an important sector for the economic development of any country and agricultural sector is undoubtedly the prime area for economic progress. Recently the agricultural sector of India has been losing its young labour force specially males due to migration from rural to urban areas in search of better jobs. The young farm family members have developed a negative attitude towards agriculture as a career. According to the National Sample Survey (2010), it is found that over 45 per cent of farmers in India wanted to quit farming. Hence, the present-day challenge is to bring back young farm family members in villages and take up agriculture as a profession. Due to lack of male farm family members positive trends emerge for female farm members to taking up agricultural activities. The study has focused on assessing the attitude of farm women towards agriculture as a profession. Attitude towards agriculture is measured by scale developed by Mathew and Reddy (1989). This scale consists of 12 statements and responses are rated on five-points ranging from strongly agree to strongly disagree. The positive statements are scored 5, 4, 3, 2 and 1 for strongly agree, agree, undecided, disagree and strongly disagree, whereas, the scoring system is reversed in case of negative statement.

In the study area, attitude towards agriculture of farm women as a profession is measured and results reveal that majority i.e. 52% of the farm women have negative attitude towards agriculture as a profession. Because they think those who are unable to take up other services have to take agriculture as a profession. Also 51% farm women are promoting industry than agriculture, 49% farm women promoting agriculture than industry. 49.17% farm women wish to change profession other than agriculture even if agriculture secure good income and return on investment. 52% farm women think agriculture is for uneducated and poor people, on the other hand, 44% farm women agree to take agriculture as a profession if a handsome return is guaranteed from agriculture so they have positive attitude towards agriculture. 64% female farmers thought that government should give top priority to agriculture. 55% farm women believe that agriculture has a potency as one of the major resources for growing population, 45% farm women do not agree on the same. 30.5% farm women take a pride for being involved into agriculture as profession, 69.5% farm women do not like such pride and neglect agriculture as profession. 57.5% farm women think that agriculture is inherited into their culture and heritage, 42.5% farm women don't believe that. 34% farm women don't think agriculture is worth of time giving and do not wish to be in agricultural activities. On the other side, 66% farm women agree to be in agricultural activities and significantly involve in agriculture thus

believe invest in agriculture is really worthy for them. 30.8% farm women undertake agriculture to prosper both economically and socially, 69.2% farm women do not believe in such way but involve in agriculture though. 57.5% farm women believe that if India need to prosper then promoting scientific agriculture is the key, 42.5% farm women not relate themselves with such thought. During field survey it is observed that some factors like low cost of cultivated crops, higher education status, lack of agricultural knowledge has led to negative attitude towards agriculture specially for young generation. There is a need to grow positive attitude towards agriculture among farm women especially among the young generation. Government should focus on agricultural training programmes so that awareness level will increase of young generation to take agriculture as a means of livelihood. The study will help to the extension agencies and policy makers to plan and design agricultural training programmes and developmental activities for female farmers as well as young farm family members to encourage them to take agriculture as a profession. The following table no. 5.6 and figure no. 5.8 and 5.9 explain the scenario of farm women's attitude towards agriculture.

TABLE NO. 5.6 ATTITUDE OF FARM WOMEN TOWARDS AGRICULTURE

Sl. No.	Statements	SA	A	UD	DA	SDA
	Score (+)	5	4	3	2	1
	Score (-)	1	2	3	4	5
1	Agriculture is the Hope for the Growing Population in India (+)	82	578	32	406	102
2	Top Priority Should Be Given by the Govt. for the Development of Agriculture (+)	388	778	-	34	-
3	To Me, Agriculture Will Be the Last Resort as Profession (+)	32	522	-	540	106
4	Only Those Who are Unable to Go for Any Other Work Will Take Agriculture (-)	394	628	-	178	-
5	One Should Be Proud of Being Member of a Farm Family (+)	44	322	-	732	102
6	If We Want to Safe Guard Our Cultural Heritage, We Should Foster an Agrarian Society (+)	102	588	-	428	82
7	I Will Rather While Away My Time Than Doing Agriculture (-)	82	326	-	692	100
8	Agriculture is Meant for Uneducated and Poor People (-)	304	632	-	264	-
9	I Will Take Agriculture to Prosper (+)	22	348	-	798	10
10	Promoting Scientific Agriculture is the Way for India's Prosperity (+)	156	534	-	510	-
11	Even If a Handsome Return is Guaranteed from Agriculture, I Will Not Take It as A Profession (-)	198	392	-	532	78
12	Today's Need is to Promote Industry than Agriculture (-)	172	402	-	612	14

Source: Field Survey, 2017

ATTITUDE OF FARM WOMEN TOWARDS AGRICULTURE IN KOCH BIHAR DISTRICT

AGRICULTURE IS THE HOPE FOR
THE GROWING POPULATION IN
INDIA



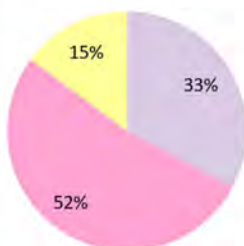
TOP PRIORITY SHOULD BE GIVEN
BY GOVT. FOR THE DEVELOPMENT
OF AGRICULTURE



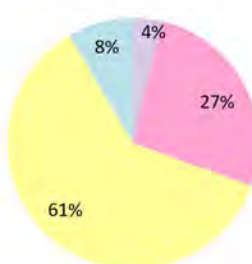
AGRICULTURE WOULD BE
LAST RESORT AS
PROFESSION



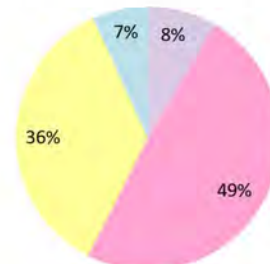
ONLY THOSE WHO ARE UNABLE TO
GO FOR ANY OTHER WORK WILL
TAKE AGRICULTURE



ONE SHOULD BE PROUD OF BEING
MEMBER OF FARM FAMILY



IF WE WANT TO SAFEGUARD OUR
CULTURAL HERITAGE, WE SHOULD
FOSTER AN AGRARIAN SOCIETY



Strongly Agree Agree Undecided Disagree Strongly Disagree

FIGURE NO. 5.8

Source: Field Survey, 2017

ATTITUDE OF FARM WOMEN TOWARDS AGRICULTURE IN KOCH BIHAR DISTRICT

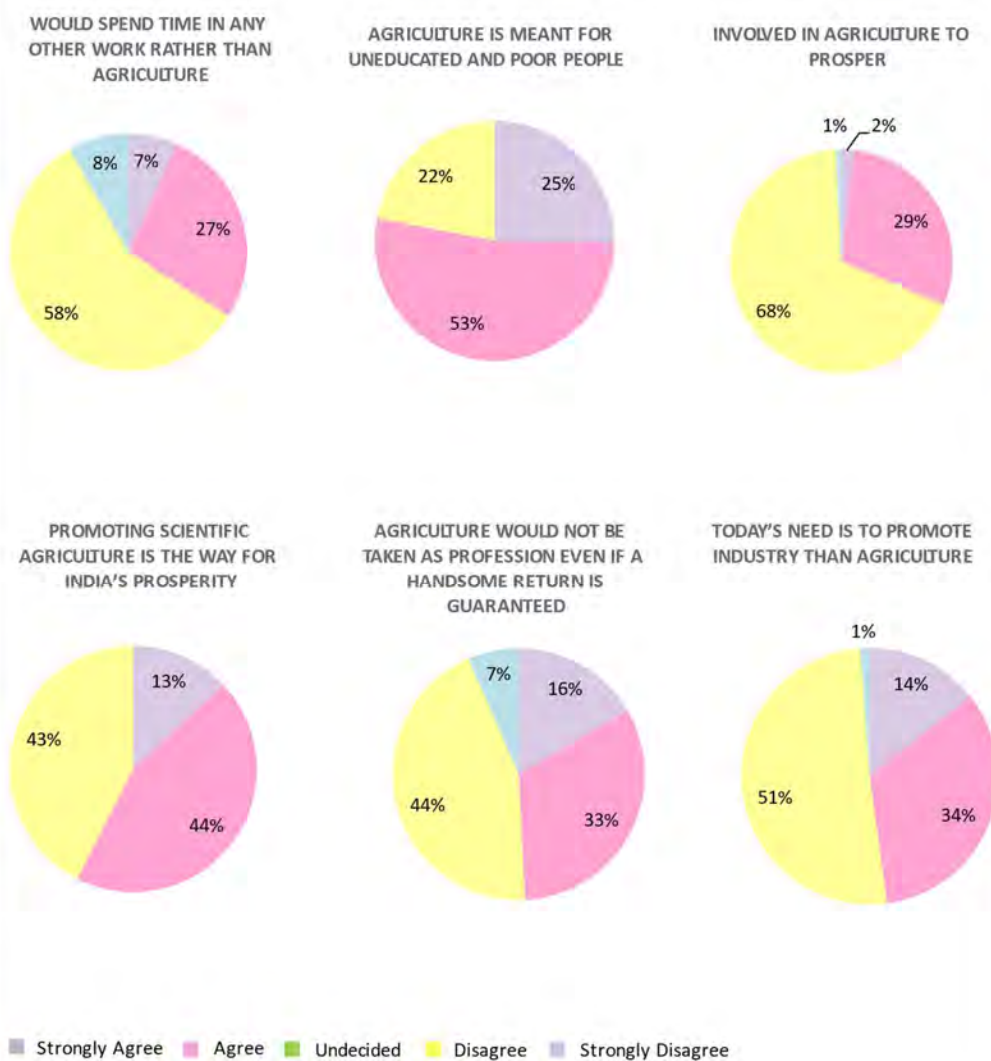


FIGURE NO. 5.9

Source: Field Survey, 2017

5.4.1.7 Attitude of Farm Women towards Animal Rearing & Poultry

Animal rearing and poultry is considered associate activities with agriculture. It is also termed as agricultural allied activities. It includes rearing of cattle, buffalo, sheep, goats and pigs. In the study area cattle, goats, pigs and poultry are the integral part of agricultural allied activities and supporting livelihood system for farm families. The objective of animal rearing is to make additional income along with agriculture and support them economically and they also use livestock for their own consumption specially milk, meat, egg in daily diet. It provides self-employment to the households and contributes significantly to the empowerment of women and has increased their income and role in society. It is a risk mitigation approach for small and marginal farmers particularly across the rain-fed area like Koch Bihar district. Animal rearing is a part of mixed crop livestock farming system. It also generates income faster than many other sectors of agriculture. Attitude towards animal rearing and poultry of farm women indicates whether farm women are willing to take it as a secondary activity with agriculture. It is measured by scale developed by Rajkamal & Kunzru (1993). This scale consists 10 statements and response rated on three-point ranging from agree to disagree. The positive statements are scored 3, 2 and 1 for agree, undecided and disagree, whereas, the scoring system is reversed in case of negative statement.

The study focuses on the perception and attitudes of farm women towards animal rearing and poultry. The study also explains the management decisions and behaviour towards animals, which affects animal behaviour, welfare and productivity. The analysis of attitude towards animal rearing and poultry of farm women helps to understand her perceptions, attitudes and choices about the rearing practices. During field survey it is found that 60% female farmers are interested to take up animal rearing & poultry as self-employment project because use it is readily available for consumption as well as economically profitable. 49% female farmers agreed with the statement that animal rearing & poultry are very useful to prosperity for poor farmers. 64% farm women accepted that rearing practices is a risky enterprise because of costly and shortage fodder, animals easily contract many diseases. 57.1% farm women agree with the statement that animal rearing and poultry is a costly affair and everyone cannot afford it, 42.9% farm women do not believe so and think poultry and animal rearing can be taken as a good income sources. 27.25% farm women do not believe in implanting scientific methods towards animal rearing and poultry as this will not turn out to be profitable, 72.75% farm women believe scientific methods towards animal rearing and poultry definitely help to generate profit. 68.08% farm women feel that they should keep continuing animal rearing and poultry activity

to meet emergency need, 31.9% farm women do not think so. In the field survey, it is also found that farm women are to some extent interested to take training for improving the productivity and animal welfare. Few female farmers are interested in increasing the animals' and poultry by products and not on keen animals' welfare. During field survey it is observed that most of the farm women have low understanding of the consequences of management strategies for the animal rearing and poultry. The findings suggest to the government and planners to take strategy for increasing commercialization of livestock products by improving technologies, increasing market connectivity, processing and storage centre, training, focused on availability of quality fodder etc. Government also focuses on preparing disaster management fund for livestock. In case of natural calamities like flood, drought in this area of Koch Bihar district and scheme should be known by these farm women. Government should encourage to the farm women to take self-responsibility for increasing animals by products, take care on animal welfare, motivated to take animal rearing as a profession with agriculture. The table no. 5.7 and figure no. 5.10 and 5.11 explain the complete picture of the field about attitude towards animal rearing and poultry of farm women in the study area.

TABLE NO. 5.7 ATTITUDE OF FARM WOMEN TOWARDS ANIMAL REARING & POULTRY

Sl. No.	Statement	A	UD	DA
	Score (+)	3	2	1
	Score (-)	1	2	3
1	I Feel that Young Farmers Should Take Up Animal Rearing & Poultry as a Self-Employment Project (+)	720	-	480
2	Animal Rearing & Poultry are Labour and Capital Intensive (-)	685	-	515
3	Animal Rearing & Poultry Make their Meat and Milk Readily Available for Consumption (+)	1020	-	180
4	Using Scientific Methods in Animal Rearing & Poultry Con Not Generate Higher Profit (-)	327	-	873
5	Farmers Should Keep Animal Rearing & Poultry to Meet Emergency Financial Need by Selling Them (+)	817	57	326
6	Animal Rearing & Poultry is Risky Enterprise for Any One as Animals Easily Contract Many Diseases (-)	772	-	428
7	Animal Rearing & Poultry are Very Useful to Prosperity for Poor Farmers (+)	582	153	465
8	As Efficiency to Convert Otherwise Unless Crop By-Products into Milk and Meat is a Plus Point for Animal Rearing & Poultry (+)	523	127	550
9	Animal Rearing & Poultry Should Be Banned as Animals and Poultry Cause Deforestation (-)	-	40	1160
10	One Should Abstain from Animal Rearing & Poultry as Feed are Costly and Fodder are Scare These Days (-)	714	-	486

Source: Field Survey, 2017

ATTITUDE OF FARM WOMEN TOWARDS ANIMAL REARING AND POULTRY IN KOCH BIHAR DISTRICT

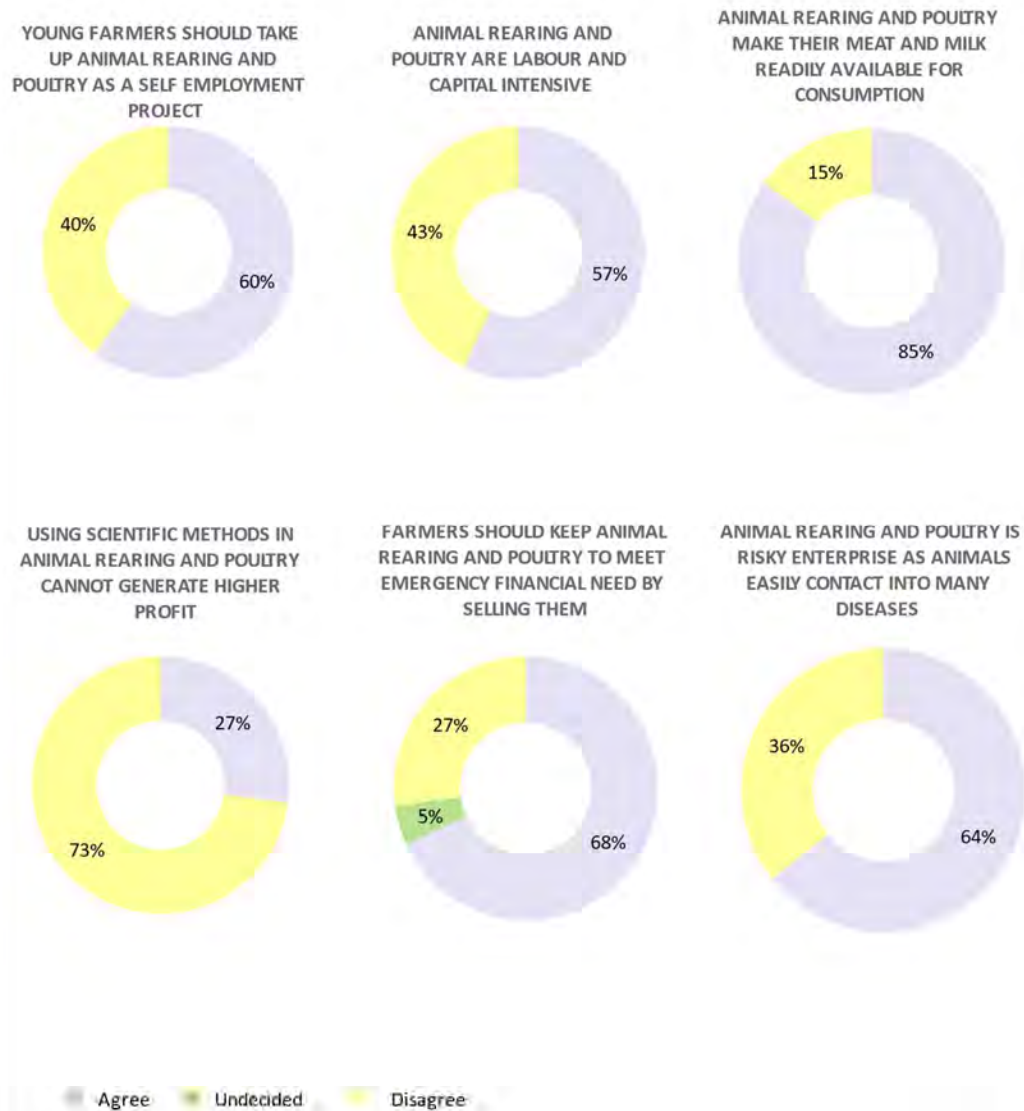
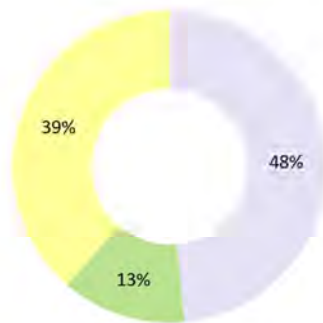


FIGURE NO. 5.10

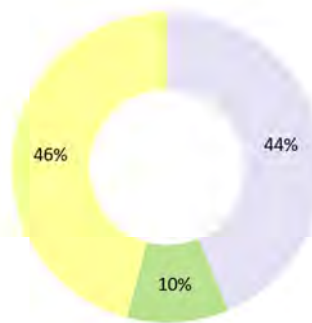
Source: Field Survey, 2017

ATTITUDE OF FARM WOMEN TOWARDS ANIMAL REARING AND POULTRY IN KOCH BIHAR DISTRICT

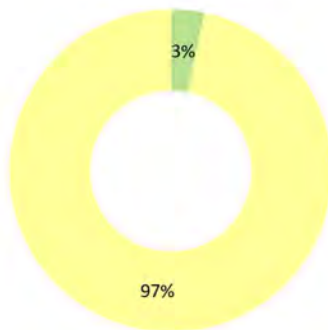
ANIMAL REARING AND POULTRY
PROVIDES PROSPERITY TO POOR
FARMERS



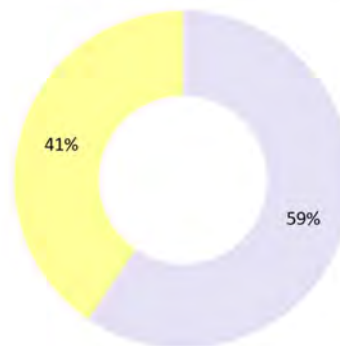
CONVERSION OF BY PRODUCTS OF
ANIMAL REARING AND POULTRY IS
BENEFICIAL



ANIMAL REARING AND POULTRY
SHOULD BE BANNED AS IT CAUSES
DEFORESTATION



REDUCTION OF ANIMAL REARING
AND POULTRY AS FEED ARE
COSTLY AND FODDER ARE SCARCE



Agree Undecided Disagree

FIGURE NO. 5.11

Source: Field Survey, 2017

5.4.2. Case Study

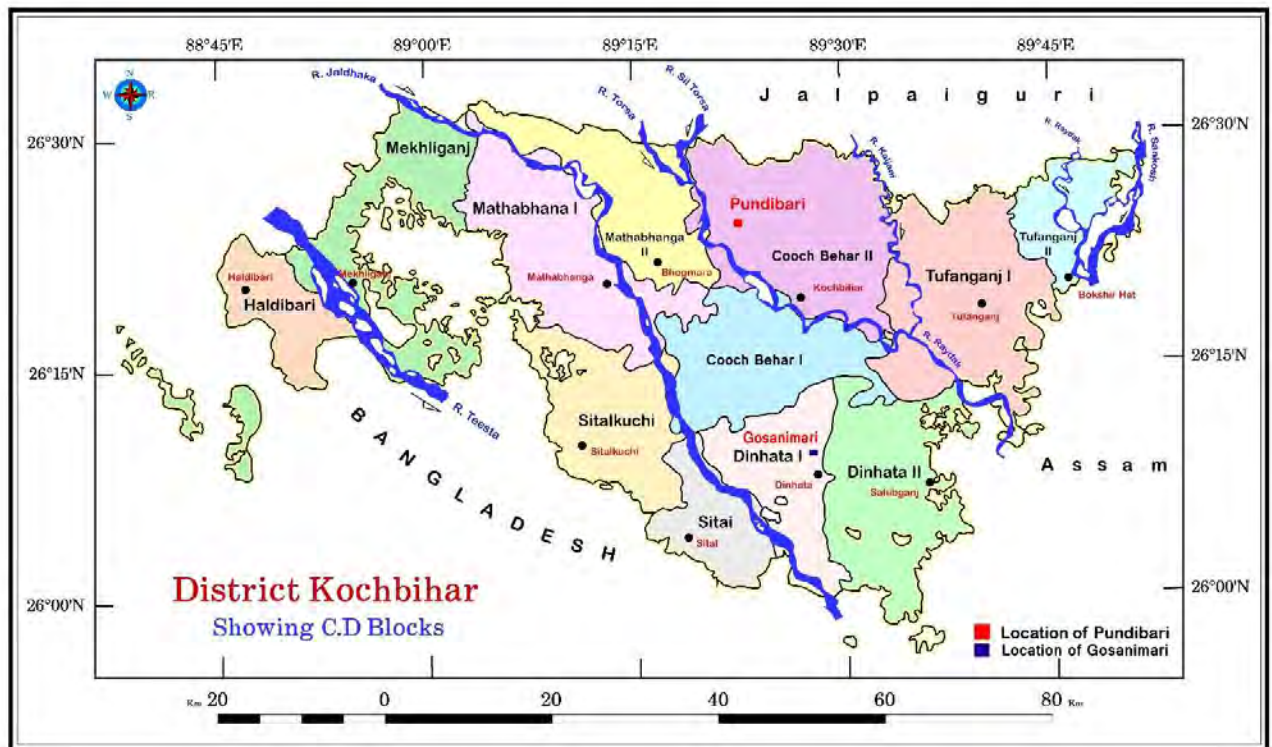
Koch Bihar is an agricultural district. The soil condition of Koch Bihar district is mainly acidic in nature and silty clay loam in texture. This district is represented by moist humid climate which are favourable for cultivation of jute and rice in this region. A huge number of people both men and women make their living through the cultivation of these two crops. Women are the integral part of agricultural production systems of Koch Bihar. Farm women share abundant responsibilities and perform a wide spectrum of duties in crop production, animal rearing as well as domestic activities. Although women bear the burden of work in the field of agriculture and allied sectors they remain as helpers of men without due recognition of their work. Based on the Index Analysis, women's contribution in field and domestic activities is evaluated. For this analysis two major crops (rice and jute) field activities are selected. The present study is conducted among 50 farm households of each village of Pundibari and Gosanimari of Koch Bihar district to evaluate the inequity towards the farm women in agricultural activities, household works and decision-making process in comparison to men. The Index Analysis scale is divided into three categories which are Activity-Involvement Index (AII), Decision-Involvement Index (DII) and Overall-Involvement Index (OII). Pundibari and Gosanimari villages have been selected on the presence of male counterpart. Pundibari village of Cooch Behar block II most of the males and females both are directly engaged in agriculture. In Gosanimari village of Dinhata I block most of the males migrate to earn money, so that females of this village are more engaged with agriculture and allied activities. For this reason, these two villages are selected to analyse these indexes. Random sampling technique is adopted for collecting the data and the study based on primary data and documentary sources.

Pundibari village is situated in the Cooch Behar II CD block. It is very near to Koch Bihar Sadar subdivision. Latitude and longitude of Pundibari village is 26°40'28" N and 89°38'23" E. Total population of Pundibari village is 1,491 persons out of which 753 are males and 738 are females. Total 343 families are residing in Pundibari village. Average Sex Ratio of Pundibari village is 980 which is higher than West Bengal state average of 950. Literacy rate of Pundibari village is 75.54 %. Whereas male literacy rate is 83.02% while female literacy rate is 67.97%. In Pundibari village out of total population, 681 persons are engaged in working activities whereas 440 are males and 241 are females. 452 persons (66.37%) of workers are Main Workers while 33.63 % are involved in marginal work. Total 229 persons are marginal workers where 95 are males and 134 are females. Out of 681 persons workers engaged in Main

Work, 199 persons are cultivators (owner or co-owner) while 110 persons are Agricultural labourer.

Gosanimari village is situated in Dinhata I CD block, in the Dinhata subdivision of the Koch Bihar district. Latitudinal and longitudinal extension of Gosanimari village is 26°0'32" N and 89°48'04" E. Total population of Gosanimari village is 6,410 persons out of which 3295 are males and 3115 are females. Total 1508 families are residing in Gosanimari village. Average Sex Ratio of Gosanimari village is 945 which is lower than West Bengal state average of 950. Literacy rate of Gosanimari village is 71.02 %, whereas male literacy rate is 77.72% while female literacy rate is 63.87%. In Gosanimari village out of total population, 2842 persons are engaged in working activities whereas 1995 are males and 847 are females. 2322 persons (81.70%) of workers are Main Workers while 18.30 % are involved in marginal work. Out of 2842 persons workers engaged in Main Work, 694 persons are cultivators (owner or co-owner) while 795 persons are Agricultural labourer.

LOCATION OF PUNDIBARI AND GOSANIMARI VILLAGE OF KOCH BIHAR DISTRICT



MAP NO. 5.1

Source: Census, 2011

5.4.2.1 Activity-Involvement Index (AII)

Activity-Involvement Index is the direct involvement of farm women in the agriculture, livestock and poultry rearing activities as well as domestic activities. The variable is measured with the help of three-point scale on the basis of extent of direct involvement and the extent is categorized and score as no involvement, 0; joint involvement, 1; independent involvement, 2. It is measured by scale developed by Pareek-Trivedy (1964). The Activity-Involvement Index (AII) is calculated as;

$$AII = \frac{\sum O_{Aj}}{\sum M_{Aj}} \times 100$$

where, O_{Aj} = obtained activity score (weighted) in j^{th} enterprise /crop/area

M_{Aj} = maximum activity score (weighted) achievable in j^{th} enterprise/crop/area

No involvement refers male counterpart hold farming or agricultural work as this is more of handling machines like tractors, sprayers and other heavy farming intensive works. Joint involvement refers farm women share responsibilities and farm activities with their male counterparts. Independent involvement refers complete owing of farm activities by farm women and no sharing of workloads with male counterparts. Below table no. 5.8 shows participation of farm women in farm and household activities in Pundibari and Gosanimari villages in above three-point scale and different crop farming (rice, jute) and domestic activities. Table no. 5.9 participation of farm women in livestock activities in Pundibari and Gosanimari villages three-points scale of different activities. During field survey at both the villages it has been found that out of total farm activities involved in rice cultivation, farm women are widely participating in activities like transplanting, gap filling, bird scaring, threshing, winnowing. In jute cultivation activities like thinning, retting, bundle making, placing in retting water, extraction of fibres from the jute stem and washing, drying, bundling of fibres, bundling of jute stick are mostly done by farm women. In both case of rice and jute cultivation, cleaning seeds for sowing, sowing, weeding, harvesting are predominantly executed by farm women. In allied activities farm women largely involve in activities like milking, feeding animals, maintenance of cattle shed, fodder collection, cleaning of cattle, cow dung making. Other activities like preparatory tillage, ploughing, irrigation, account maintenances, marketing & transportation, preparation of manures & compost, family budgeting, purchase of cattle are rarely performed by farm women.

**TABLE NO. 5.8 PARTICIPATION OF FARM WOMEN IN FARM AND HOUSEHOLD ACTIVITIES
IN PUNDIBARI AND GOSANIMARI VILLAGES**

Sl. No.	Activities	No Involvement (0)				Independent Involvement (2)				Joint Involvement (1)			
		Pundibari		Gosanimari		Pundibari		Gosanimari		Pundibari		Gosanimari	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Farm Activities (Specially for Rice)													
`1	Nursery Bed Preparation	27	54	15	30	9	18	25	50	14	28	10	20
2	Transplanting	6	12	2	4	39	78	41	82	5	10	6	12
3	Gap Filling	6	12	2	4	39	78	41	82	5	10	6	12
4	Bird Scaring	9	18	3	6	27	54	39	78	14	28	8	16
5	Rodent Control	9	18	6	12	27	54	37	74	14	28	7	14
6	Threshing	3	6	2	4	41	82	44	88	6	12	4	8
7	Winnowing	3	6	2	4	41	82	44	88	6	12	4	8
8	Grading	27	54	12	24	15	30	24	48	8	16	14	28
9	Storage of Grains	10	20	10	20	33	66	34	68	7	14	6	12
Farm Activities (Specially for Jute)													
`1	Thinning	7	14	3	6	33	66	35	70	10	20	12	24
2	Retting	10	20	8	16	29	58	31	62	11	22	11	22
3	Bundle Making	20	40	7	14	12	24	23	46	18	36	20	40
4	Caring	38	76	14	28	4	8	22	44	8	16	14	28
5	Placing in Retting Water	38	76	14	28	4	8	22	44	8	16	14	28
6	Placing Wet (Wooding Logs, Concrete Blocks etc. to Submerge)	38	76	14	28	4	8	22	44	8	16	14	28
7	Extraction of Fibres from the Jute Stem and Washing	9	18	9	18	10	20	22	44	31	62	19	38
8	Drying	9	18	8	16	12	24	23	46	29	58	19	38
9	Bundling of Fibres	10	20	10	20	8	16	22	44	32	64	18	36
10	Bundling of Jute Stick	10	20	10	20	15	30	24	48	25	50	16	32
Farm Activities (For Both Rice & Jute)													
`1	Preparatory Tillage	41	82	28	56	4	8	6	12	5	10	16	32
2	Ploughing	46	92	26	52	4	8	6	12	0	0	18	36
3	Land Preparation	46	92	26	52	4	8	6	12	0	0	18	36
4	Manure & Fertilizer Application	21	42	21	42	23	46	23	46	6	12	6	12
5	Cleaning Seeds for Sowing	6	12	2	4	26	52	28	56	18	36	20	40
6	Seed Treatment	41	82	22	44	4	8	16	32	5	10	12	24
7	Sowing	6	12	2	4	39	78	39	78	5	10	9	18
8	Weeding	6	12	2	4	41	82	41	82	3	6	7	14
9	Irrigation	41	82	23	46	4	8	6	12	5	10	21	42
10	Plant Protection Measures	41	82	23	46	4	8	6	12	5	10	21	42
11	Harvesting	21	42	12	24	20	40	27	54	9	18	11	22
12	Labour Supervision	50	100	38	76	0	0	6	12	0	0	6	12
13	Account Keeping	46	92	24	48	4	8	23	46	0	0	3	6
14	Marketing & Transportation	31	62	25	50	2	4	22	44	17	34	3	6
15	Preparation of Manures & Compost	41	82	23	46	4	8	6	12	6	12	21	42
Domestic Activities													
`1	Cooking & Serving	0	0	0	0	50	100	50	100	0	0	0	0
2	Bringing Water	0	0	0	0	43	86	45	90	7	14	5	10
3	Grinding Flour	0	0	0	0	50	100	50	100	0	0	0	0
4	Cleaning of Utensils	0	0	0	0	50	100	50	100	0	0	0	0
5	Cleaning Home	0	0	0	0	50	100	50	100	0	0	0	0
6	Washing Clothes	0	0	0	0	50	100	50	100	0	0	0	0
7	Child Care	0	0	0	0	44	88	45	90	6	12	5	10
8	Fuel Collection	2	4	2	4	37	74	39	78	11	22	9	18
9	Shopping	42	84	17	34	4	8	28	56	4	8	5	10
10	Family Budeeting	43	86	22	44	4	8	6	12	3	6	22	44

Source: Field Survey, 2017

TABLE NO. 5.9 PARTICIPATION OF FARM WOMEN IN LIVESTOCK ACTIVITIES IN PUNDIBARI AND GOSANIMARI VILLAGES

Sl. No.	Activities	Supervision				Doing						No Involvement (0)	
		No Involvement (0)		Independent Involvement (2)		No Involvement (0)		Independent Involvement (2)		Joint Involvement (1)		P	G
		P	G	P	G	P	G	P	G	P	G		
1	Milking	0	0	0	0	7	2	23	28	14	12	6	8
2	Marketing of Milk & Other Dairy Products	2	0	0	0	15	0	0	10	3	8	30	32
3	Feeding Animals	0	0	0	0	9	0	21	31	14	11	6	8
4	Maintenance of Cattle Shed	0	0	0	0	8	0	20	32	16	10	6	8
5	Fodder Collection	0	0	0	0	21	0	14	31	9	11	6	8
6	Cleaning of Cattle	0	0	0	0	5	0	29	32	10	10	6	8
7	Cow Dung Making	0	0	0	0	4	0	33	40	7	2	6	8
8	Health Care of Cattle	0	0	0	0	20	22	7	5	17	15	6	8
9	Maintenance of Accounts	0	0	0	0	41	22	3	5	0	15	6	8
10	Purchase of Cattle Feed & Other Items	0	0	0	0	41	22	3	5	0	15	6	8

Note: P is for Pundibari Village & G is for Gosanimari Village

Source: Field Survey, 2017

TABLE NO. 5.10 SCORE OBTAINED BY FARM WOMEN IN FARM, LIVESTOCK AND HOUSEHOLD ACTIVITIES IN PUNDIBARI VILLAGE

Sl. No.	Activities	Obtained Activity Score		Maximum Activity Score
		Independent Involvement (2)	Joint Involvement (1)	
1	Farm Activities	Score Obtained by Farm Women in Independent Involvement (in Farm Activities) 271+131+183=585x2=1170	Score Obtained by Farm Women in Joint Involvement (in Farm Activities) 79+180+67=326	Total Farm Activities 34 Maximum Activity Score in Farm 34x2=68 (in Individual)
		Score Obtained by Farm Women in Farm Activities 1170+326=1496		
2	Livestock Activities	Score Obtained by Farm Women in Independent Involvement (in Livestock Activities) 153x2=306	Score Obtained by Farm Women in Joint Involvement (in Livestock Activities) 90	Total Livestock Activities 10 Maximum Activity Score in Livestock 10x2=20 (in Individual)
		Score Obtained by Farm Women in Livestock Activities 306+90=396		
3	Domestic Activities	Score Obtained by Farm Women in Independent Involvement (in Domestic Activities) 382x2=764	Score Obtained by Farm Women in Joint Involvement (in Domestic Activities) 31	Total Domestic Activities 10 Maximum Activity Score in Domestic 10x2=20 (in Individual)
		Score Obtained by Farm Women in Domestic Activities 764+31=795		
Score Obtained by Farm Women in Farm, Livestock and Household Activities in 50 Families 1496+396+795=2687				Maximum Activity Score for 50 Families 68+20+20=108x50=5400

Source: Compiled by Researcher

TABLE NO. 5.11 SCORE OBTAINED BY FARM WOMEN IN FARM, LIVESTOCK AND HOUSEHOLD ACTIVITIES IN GOSANIMARI VILLAGE

Sl. No.	Activities	Obtained Activity Score		Maximum Activity Score
		Independent Involvement (2)	Joint Involvement (1)	
1	Farm Activities	Score Obtained by Farm Women in Independent Involvement (in Farm Activities) 329+246+261=836x2=1672	Score Obtained by Farm Women in Joint Involvement (in Farm Activities) 65+157+192=414	Total Farm Activities 34 Maximum Activity Score in Farm 34x2=68 (in Individual)
		Score Obtained by Farm Women in Farm Activities 1672+414=2086		
2	Livestock Activities	Score Obtained by Farm Women in Independent Involvement (in Livestock Activities) 219x2=438	Score Obtained by Farm Women in Joint Involvement (in Livestock Activities) 199	Total Livestock Activities 10 Maximum Activity Score in Livestock 10x2=20 (in Individual)
		Score Obtained by Farm Women in Livestock Activities 438+199=637		
3	Domestic Activities	Score Obtained by Farm Women in Independent Involvement (in Domestic Activities) 413x2=826	Score Obtained by Farm Women in Joint Involvement (in Domestic Activities) 46	Total Domestic Activities 10 Maximum Activity Score in Domestic 10x2=20 (in Individual)
		Score Obtained by Farm Women in Domestic Activities 826+46=872		
Score Obtained by Farm Women in Farm, Livestock and Household Activities in 50 Families 2086+637+872=3595				Maximum Activity Score for 50 Families 68+20+20=108x50=5400

Source: Compiled by Researcher

Activity-Involvement Index (AII) of Farm Women at Pundibari Village:

$$AII = \frac{2687}{5400} \times 100$$

$$AII = 49.76\%$$

Activity-Involvement Index (AII) of Farm Women at Gosanimari Village:

$$AII = \frac{3595}{5400} \times 100$$

$$AII = 66.57\%$$

Table no. 5.8 provides information on the degree of participation of respondents in rice and jute cultivation at Pundibari and Gosanimari villages of Koch Bihar district. The respondents are distributed against independent participation and joint participation. It is observed that farm women participated to a very large extent in some of the crucial operations such as transplanting, gap filling, bird scaring, rodent control, threshing, winnowing, storage of grains specially for rice cultivation; thinning, retting for jute cultivation; manure and fertilizer application, cleaning seeds for sowing, sowing, weeding, harvesting for both rice and jute cultivation. On the other hand they are less involved in some activities like nursery bed preparation, grading specially for rice cultivation; bundle making, caring, placing in retting

water, placing wet specially for jute cultivation; preparatory tillage, ploughing, land preparation, manure and fertilizer application, seed treatment, irrigation, plant protection measures, harvesting, labour supervision, account keeping, marketing and transportation, preparation of manures and compost for both rice and jute cultivation. However, both male and female farmers are jointly doing some major farm activities like nursery bed preparation, bird scaring, rodent control, for rice cultivation; extraction of fibres from the jute stem and washing, drying, bundling of fibres, bundling of jute stick specially for jute cultivation.

The table further indicates that almost all the farm women participated in all the domestic activities other than shopping and family budgeting while the contribution of male members in domestic activities are mainly confined in shopping and family budgeting.

Respondents' participation in the area of livestock keeping is studied with reference to ten specific items as given in table no. 5.9. It is found that most of the respondents have livestock but most of them do not sell milk and other dairy products, rather they used these products to fulfil their daily nutritional requirements. Farm women are largely engaged with some specific livestock activities like milking, feeding animals, maintenance of cattle shed, fodder collection, cleaning of cattle, cow dung making. On the other hand, male respondents are largely engaged with fodder collection, health care of cattle, maintenance of accounts, purchase of cattle feed and other items. When the nature of participation is analysed, it is found that in general, respondents' participation in terms of doing work is more than in terms of supervision.

The AII in Pundibari village is 49.76% and in Gosanimari village the value is 66.57%. 50% women in Pundibari village and 67% female in Gosanimari village are doing farm activities, livestock rearing as well as domestic activities. During field survey it is observed that 37 families out of 50 families of males of Gosanimari village migrant to the other city to earn money this is the reason the AII value is 17% higher than Pundibari village. Some women have lost their husband and some male persons leave their wife too and they are actively involved the farm and allied activities independently. These women of Gosanimari village are more engaged with economic activities like marketing, maintenance of accounts purchase of cattle feed, shopping, family budgeting etc.

5.4.2.2 Decision-Involvement Index (DII)

Women have engaged themselves in decision making process in every sphere of agriculture, livestock and poultry enterprise. The variable is measured with the help of three-point scale and score is assigned as not considered, 0; considered after consultation with others 1 and

considered independently, 2. It is measured by scale developed by Pareek-Trivedy (1964). The Decision-Involvement Index is calculated with the help of following formula;

$$DII = \frac{\sum O_{Dj}}{\sum M_{Dj}} \times 100$$

where, O_{Dj} = obtained decision score (weighted) in j^{th} enterprise/ crop/area

M_{Dj} = maximum decision score (weighted) achievable in j^{th} enterprise/crop/area

TABLE NO. 5.12 PARTICIPATION OF FARM WOMEN IN DECISION-MAKING PROCESSES IN PUNDIBARI AND GOSANIMARI VILLAGES

Sl. No.	Activities	Decision-Making Power											
		Not Considered (0)				Considered Independently (2)				Considered after Consultation with Others (1)			
		Pundibari		Gosanimari		Pundibari		Gosanimari		Pundibari		Gosanimari	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Farm Activities													
1	Crops to be Grown	46	92	28	56	4	8	14	28	0	0	8	16
2	Season of Growing	46	92	28	56	4	8	14	28	0	0	8	16
3	Use of Variety	46	92	28	56	4	8	14	28	0	0	8	16
4	Time of Sowing	46	92	28	56	4	8	14	28	0	0	8	16
5	Time of Manuring	46	92	28	56	4	8	14	28	0	0	8	16
6	Type of Fertilizer & Manures	46	92	28	56	4	8	14	28	0	0	8	16
7	Use of Pesticides	46	92	28	56	4	8	14	28	0	0	8	16
8	Harvesting	46	92	28	56	4	8	14	28	0	0	8	16
9	Marketing	46	92	32	64	4	8	10	20	0	0	8	16
Family Matters													
1	Education of Children	38	76	20	40	4	8	12	24	8	16	18	36
2	Taking Care of Children	6	12	4	8	33	66	36	72	11	22	10	20
3	Buying of Foods	37	74	18	36	4	8	22	44	9	18	10	20
4	Buying of Clothes	37	74	28	56	4	8	12	24	9	18	10	20
5	Marriage of Children	50	100	38	76	0	0	8	16	0	0	4	8
Economic Aspects													
1	About Savings	46	92	40	80	4	8	8	16	0	0	2	4
2	Selling, Buying of Domestic Animals	46	92	32	64	4	8	8	16	0	0	10	20
3	Selling of Agricultural Products	46	92	32	64	4	8	8	16	0	0	10	20
4	Selling of Dairy Products	43	86	32	64	4	8	8	16	3	6	10	20

Source: Field Survey, 2017

TABLE NO. 5.13 SCORE OBTAINED BY FARM WOMEN IN DECISION-MAKING PROCESSES IN PUNDIBARI VILLAGE

Sl. No.	Activities	Obtained Decision Score		Maximum Decision Score
		Considered Independently (2)	Considered after Consultation with Others (1)	
1	Farm Activities	36x2=72	0	Total Farm Activities 9 Maximum Decision Score in Farm 9x2=18 (in Individual)
		Score Obtained by Farm Women in Farm Activities 72		
2	Family Matters	45x2=90	37	Total Family Matters 5 Maximum Decision Score in Family Matters 5x2=10 (in Individual)
		Score Obtained by Farm Women in Family Matters 90+37=127		
3	Economic Aspects	16x2=32	3	Total Economic Aspects 4 Maximum Decision Score in Economic Aspects 4x2=8 (in Individual)
		Score Obtained by Farm Women in Economic Aspects 32+3=35		
Score Obtained by Farm Women in Decision-Making Processes in 50 Families 72+127+35=234				Maximum Decision Score for 50 Families 18+10+8=36x50=1800

Source: Compiled by Researcher

TABLE NO. 5.14 SCORE OBTAINED BY FARM WOMEN IN DECISION-MAKING PROCESSES IN GOSANIMARI VILLAGE

Sl. No.	Activities	Obtained Decision Score		Maximum Decision Score
		Considered Independently (2)	Considered after Consultation with Others (1)	
1	Farm Activities	122x2=244	72	Total Farm Activities 9 Maximum Decision Score in Farm 9x2=18 (in Individual)
		Score Obtained by Farm Women in Farm Activities 244+72=316		
2	Family Matters	90x2=180	52	Total Family Matters 5 Maximum Decision Score in Family Matters 5x2=10 (in Individual)
		Score Obtained by Farm Women in Family Matters 180+52=232		
3	Economic Aspects	32x2=64	32	Total Economic Aspects 4 Maximum Decision Score in Economic Aspects 4x2=8 (in Individual)
		Score Obtained by Farm Women in Economic Aspects 64+32=96		
Score Obtained by Farm Women in Decision-Making Processes in 50 Families 316+232+96=644				Maximum Decision Score for 50 Families 18+10+8=36x50=1800

Source: Compiled by Researcher

Decision-Involvement Index (DII) of Farm Women at Pundibari Village:

$$DII = \frac{234}{1800} \times 100$$

$$DII = 13\%$$

Decision-Involvement Index (DII) of Farm Women at Gosanimari Village:

$$DII = \frac{644}{1800} \times 100$$

$$DII = 35.78\%$$

The nature of participation of respondents in decision-making processes is represented in table no. 5.13. Although farm women play a vital role in agricultural, domestic & livestock activities but for decision making their view is not considered. Most of the farm women do their work like as a labour or helper but they do not have much right to make decisions on any major issues. The decision-taking processes are mainly done by the male member of the family. During collection of data, it is also been observed the women take decision only when the male members are absent due to migration of other places for earning money or any other reasons and women are working as head of the family.

During field survey a huge change is noticed in Decision-Involvement Index (DII). At Pundibari village only 4 families out of 50 families are found where male members are absent due to migration so those women took decisions independently. But Pundibari village male persons take all major decisions. So, the DII value is very low. Though 50% women are actively doing their farm work, livestock rearing, domestic duties, only 13% women take decision on those matters in this village. At Gosanimari village 37 families out of 50 families are taking decision or indirectly by women because the male counterpart have migrated. In these 37 families 12 families have women taking major decisions because their husbands have leave them or they are widows. In the remaining 25 families' decisions are taken after consultation with their husband or children or father-in-law. So, the DII value is slightly high at 35%. Though, in absence of male counterparts' huge responsibility come upon women so their AII value is also high at 67%.

5.4.2.3 Overall-Involvement Index (OII)

The Overall Involvement Index is calculated as the composite from of Activity-Involvement Index and Decision-Involvement Index. It is measured by modified scale developed by Pareek-Trivedy (1964). It is calculated with the following equation;

$$OII = \frac{AII + DII}{2} \%$$

Overall-Involvement Index (OII) of Farm Women at Pundibari Village

$$OII = \frac{49.76 + 13}{2} \%$$

$$OII = 31.38\%$$

Overall-Involvement Index (OII) of Farm Women at Gosanimari Village

$$OII = \frac{66.57 + 35.78}{2} \%$$

$$OII = 51.18\%$$

To calculate Overall Involvement Index of farm women it is necessary to analysis the Activity Involvement Index and Decision Involvement Index. The OII of farm women is only 31% due to low value of DII (13%), though the AII value is 49.76% in Pundibari village. But at a glance (Figure no. 5.12) it is perceived that farm women contribute less activity due to mere participation in decision making process at Pundibari village. The scenario is slightly different at Gosanimari village. The OII value is 51.18% though farm women contributed 67% (AII) in activities in farm, animal rearing and domestic work, but their DII value is only 35.78% at Gosanimari Village.

There are some reasons mentioned below in the different Index shown in the Figure no. 5.12.

- **For Pundibari Village** Activity Involvement Index (AII) is 49.76% and Decision-Involvement Index (DII) is 13%. Farm women of this village involved in the agricultural activities of crops like rice and jute and share responsibilities as labourer in the field. In allied sectors they use to take care of poultry, milking, animal husbandry but not much involved in marketing and selling the products derived from that. Their decision-making capabilities are poor as male counterparts overtake the major decisions in agriculture, household and allied sectors. So, the Overall Involvement Index (OII) is 31.38%.
- **For Gosanimari Village** Activity Involvement Index (AII) is 66.57% and Decision-Involvement Index (DII) is 35.78%. Quite more activity involvement seen for farm women in Gosanimari village as respondents are mostly oriented through the entire process of cultivation, allied fields and household activities. The DII is comparatively high for farm women, as a large number of their male counterpart are out migrated for jobs or left them or died. So, they are capable of decision making on each of the responsibilities for both agriculture and households. Thus, the Overall Involvement Index (OII) is 51.18%.

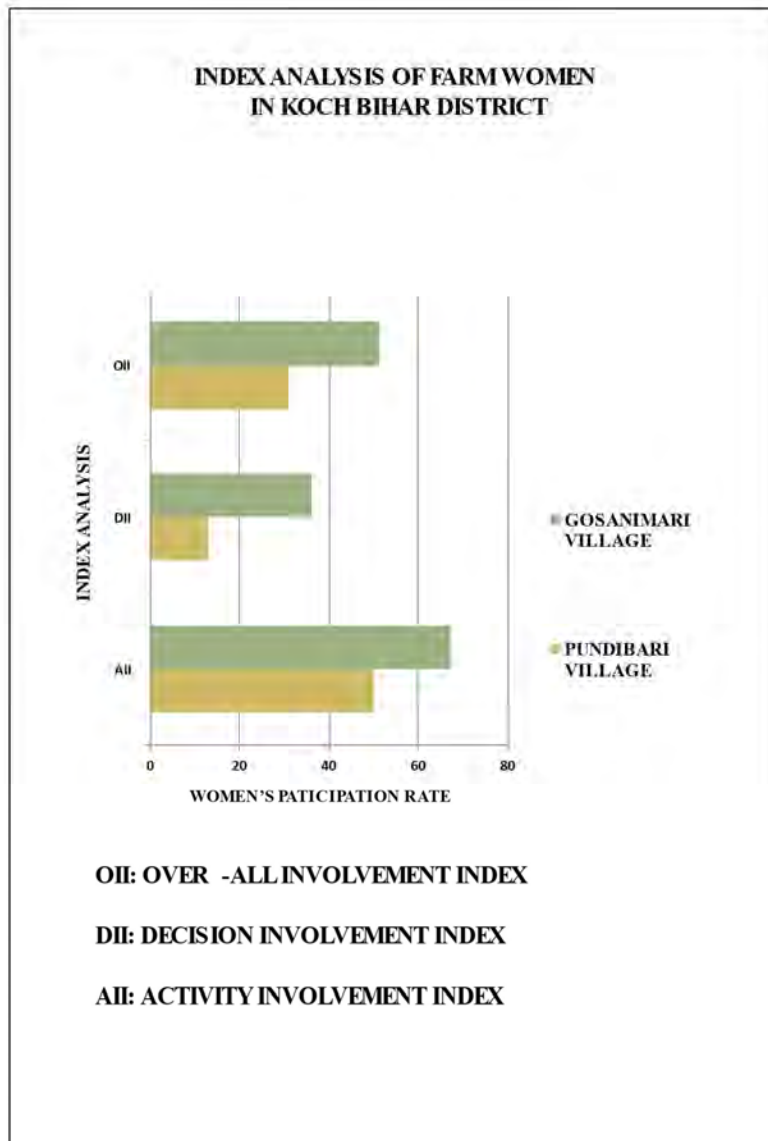


FIGURE NO. 5.12

Source: Field Survey, 2017

5.5 Involvement of Farm Women in Decision Making Process

Decision-making ability is the degree to which a person justifies his or her selection most efficiently. In farming, whether its household work or economic aspects a farm women have to take decision at every stage. Farm women have to basic leadership and decision-making ability to control her farm especially cultivation of land, sowing of crops, weeding, collection of crops, selling and marketing of crops etc. Farm women have polymorphic work in nature which extends form child care to crop cultivation. These works need taking multiple decision

at every step. The farm women participate actively in agricultural and household activities which has been discussed in chapter no 4. But their involvement in decision making in agricultural and household activities is very negligible. To measure the decision-making ability of the respondents another scale developed by Nandapurkar (1981) has been taken. This scale considers 3-point response namely, not considered, considered after consultation with other and considered independently with scores of 0, 1, 2 respectively.

5.5.1 Involvement in Decision Making of Farm Women in Agricultural Activities

TABLE NO. 5.15 INVOLVEMENT IN DECISION-MAKING OF FARM WOMEN IN AGRICULTURAL ACTIVITIES

Sl. No.	Activities	Not Considered (0)		Considered after Consultation with Others (1)		Considered Independently (2)	
		No.	%	No.	%	No.	%
Agriculture							
1	Crops to be Grown	524	43.67	580	48.33	96	8.00
2	Season of Growing	704	58.67	400	33.33	96	8.00
3	Use of Variety	700	58.33	404	33.67	96	8.00
4	Time of Sowing	700	58.33	400	33.33	100	8.30
5	Type of Manures & Fertilizers	1000	83.33	104	8.67	96	8.00
6	Irrigation	700	58.33	401	33.41	99	8.25
7	Use of Pesticides	800	66.67	304	25.33	96	8.00
8	Harvesting	350	29.17	700	58.33	150	12.50
9	Marketing	1000	83.33	104	8.67	96	8.00

Source: Field Survey, 2017

It is evident from the table no 5.15 that majority of the respondent's decision varies in different decision-making process of agricultural activities. 43.67% farm women are not considered to be part of which crops to be grown in a season, 58.37 % farm women are not considered for growing season, 58.33% farm women not considered for crops variety, 58.33% farm women are not considered for sowing time, fertilizers and manure decision making majorly not done by farm women as 83.33% are not part of it, 58.33% farm women are not involved in irrigational activities, marketing activities of a farm is the another area where very less contribution is made by women s 83.33% farm women are not considered as a part of the process, 66.67% farm women are not considered in pesticide's use. Harvesting activates are majorly influenced and contributed by farm women where 12.50% farm women make independent contribution, 58.33% considered after consultation with others and 29.17% are not considered. It is observed that though farm women are largely associated with agricultural as a workforce but during the time of decision making, they are dependent on their male counterparts or other family members.

5.5.2 Involvement in Decision Making of Farm Women in Family Matters

**TABLE NO. 5.16 INVOLVEMENT IN DECISION-MAKING OF FARM WOMEN
IN FAMILY MATTERS**

Sl. No.	Activities	Not Considered (0)		Considered after Consultation with Others (1)		Considered Independently (2)	
		No.	%	No.	%	No.	%
Family Matters							
1	Education of Children	970	80.83	210	17.50	20	1.70
2	Taking Care of Children	100	8.33	200	16.67	900	75.00
3	Buying of Foods	800	66.67	300	25.00	100	8.33
4	Buying of Clothes	900	75.00	200	16.67	100	8.33
5	Marriage of Children	1000	83.33	170	14.16	30	2.50
6	Ceremonial Aspects at Home	890	74.17	230	19.16	80	6.70
7	Invitation Outside Home	1000	83.33	170	14.16	30	2.50
8	Interaction with Neighbours	100	8.33	900	75.00	200	16.67

Source: Field Survey, 2017

Farm women perform a greater part of domestic work and take care of children. They are fully involved with the maintenance of household. The fact remains that female workers contribute significantly to household income across all farm sizes and their earnings are found crucial for landless and small farm households. Yet, the status of female agricultural workers in decision making remains very poor. Female agricultural workers contribute significantly to household economy, but they lack behind in decision making. The major decision makers in agricultural activities are male counterpart even though women perform more agricultural related activities than men. Even they are not consulted at the time of purchase of clothes, foods or any outside invitation of home. The traditional role of women as a home maker remains unaltered. Decision making pattern regarding farm affairs along with domestic matters reveals it to be more or less under male domain. Farm women shows low level of participation in household decision making. Table no. 5.16 revealed that farm women's decision-making power in family matters. 75% farm women stated that they have taken final decision in taking care of children because children are mostly under the care of their mothers. But in matters related to children marriage (83.33%), education of children (80.83%), ceremonial aspects at home (74.17%), outside invitation from home (83.33%) etc. farm women's decision is not considered.

5.5.3 Involvement in Decision Making of Farm Women in Economic Aspects

Table no 5.18 shows the involvement of farm women in decision making in economic aspects. Participation of farm women is much less in money related matters. More than 60% farm women's decisions are not considered in case of buying and selling any agricultural materials, domestic animals, dairy products etc. Only 5% to 8% farm women take decision independently

on these matters. These women belong to families in which women are head of the family or the male members are working outside the village.

TABLE NO. 5.17 INVOLVEMENT IN DECISION-MAKING OF WOMEN RESPONDENTS IN ECONOMIC ASPECTS

Sl. No.	Activities	Not Considered (0)		Considered after Consultation with Others (1)		Considered Independently (2)	
		No.	%	No.	%	No.	%
Economic Aspects							
1	About Savings	700	58.83	400	33.33	100	8.33
2	Selling, Buying of Holdings	1100	91.67	50	4.17	50	4.17
3	Selling, Buying of Domestic Animals	1100	91.67	50	4.17	50	4.17
4	Buying Of Raw Materials of Agriculture	1000	83.33	104	8.67	96	8.00
5	Buying Farm Machineries	1000	83.33	104	8.67	96	8.00
6	Selling or Buying Household Materials	900	75.00	200	16.67	100	8.33
7	Selling or Buying Luxurious Materials	1100	91.67	80	6.7	20	1.70
8	Selling of Food Grains and Vegetables	800	66.67	300	25.00	100	8.33
9	Selling of Other Agricultural Products	900	75.00	204	17.00	96	8.00
10	Selling of Poultry & Dairy Products	900	75.00	200	16.67	100	8.33
11	Selling of Domestic Animals	900	75.00	200	16.67	100	8.33
12	Regarding Borrowing Money	500	41.67	500	41.67	200	16.67
13	Regarding Return of Borrowed Money	500	41.67	500	41.67	200	16.67
14	Buying or Selling of Jewelleries	1100	91.67	100	8.33	0	0

Source: Field Survey, 2017

5.5.4 Calculation of Decision-Involvement Index (DII) and Overall-Involvement Index (OII) of Farm Women Respondents

- Decision-Involvement Index (DII)**

This variable is measured with the help of three-point scale and score is assigned as not considered, 0; considered after consultation with others 1 and considered independently, 2. It is measured by scale developed by Pareek-Trivedy (1964). The Decision-Involvement Index is calculated with the help of following formula;

$$DII = \frac{\sum O_{Dj}}{\sum M_{Dj}} \times 100$$

where, O_{Dj} = obtained decision score (weighted) in j^{th} enterprise/ crop/area

M_{Dj} = maximum decision score (weighted) achievable in j^{th} enterprise/crop/area

TABLE NO. 5.18 SCORE OBTAINED BY FARM WOMEN IN DECISION-MAKING PROCESSES IN KOCH BIHAR DISTRICT

Sl. No.	Activities	Obtained Decision Score		Maximum Decision Score
		Considered Independently (2)	Considered after Consultation with Others (1)	
1	Farm Activities	3397x2=6794	925	Total Farm Activities 9 Maximum Decision Score in Farm 9x2=18 (in Individual)
		Score Obtained by Farm Women in Farm Activities 6794+925=7719		
2	Family Matters	2380x2=4760	1460	Total Family Matters 8 Maximum Decision Score in Family Matters 8x2=16 (in Individual)
		Score Obtained by Farm Women in Family Matters 4760+1460=6220		
3	Economic Aspects	2992x2=5984	6258	Total Economic Aspects 14 Maximum Decision Score in Economic Aspects 14x2=28 (in Individual)
		Score Obtained by Farm Women in Economic Aspects 5984+6258=12242		
Score Obtained by Farm Women in Decision-Making Processes in 1200 farm women 7719+6220+12242=26181				Maximum Decision Score for 1200 farm women 18+16+28=62x1200=74400

Source: Compiled by Researcher

Decision-Involvement Index (DII) of Farm Women of Koch Bihar District

$$DII = \frac{26181}{74400} \times 100$$

$$DII = 35.19\%$$

• Overall-Involvement Index (OII)

The Overall Involvement Index is calculated as the composite from of Activity-Involvement Index and Decision-Involvement Index. It is measured by modified scale developed by Pareek-Trivedy (1964). It is calculated with the following equation;

$$OII = \frac{AII + DII}{2} \%$$

Overall-Involvement Index (OII) of Farm Women of Koch Bihar District

$$OII = \frac{50.62 + 35.19}{2} \%$$

$$OII = 42.91\%$$

Table no. 5.18 explain the farm women's DII value which is 35.19% and the OII value of farm women is 42.91%. The research objective "To assess the involvement of farm women in decision making process in agriculture and allied sectors and household activities" and the research hypothesis "Farm women actively participate in decision-making process of agriculture and allied sector" are explain in this part. Low DII value (35.19%) indicates that the farm women are not actively participate in decision making process so the research

hypothesis is rejected and an alternative research hypothesis is taken that is “Farm women rarely participate in decision-making process of agriculture and allied sector”.

5.6 Attributes Associated with Women’s Involvement in Agriculture and Decision-Making Processes

TABLE NO. 5.19 ATTRIBUTES OF WOMEN INVOLVED IN AGRICULTURE
IN KOCH BIHAR DISTRICT

Variables	Range	Mean	Standard Deviation	Co-efficient of Variation (C.V.) %
Age (X ₁)	18.00-82.00	36.47	9.41	25.81%
Family Education Status (X ₂)	0.00-6.50	3.39	0.98	28.79%
Annual Income (X ₃)	0.63-24.00	6.43	2.35	36.51%
Annual Expenditure (X ₄)	0.60-9.65	3.69	1.27	31.71%
Land Holding (X ₅)	0.00-16.00	3.88	2.85	73.48%
Possession of Assets (X ₆)	0.00-40.00	16.09	6.31	39.21%
Livestock Possession (X ₇)	0.00-11.00	4.55	2.64	57.92%
Communication Sources (X ₈)	1.00-23.00	9.68	2.51	25.88%
Risk Preference (X ₉)	6.00-25.00	16.74	3.37	20.15%
Scientific Orientation (X ₁₀)	10.00-28.00	18.36	2.56	13.92%
Economic Motivation (X ₁₁)	12.00-28.00	21.83	1.55	7.12%
Independence Scale (X ₁₂)	14.00-27.00	17.88	2.76	15.44%
Attitude towards Agriculture (X ₁₃)	31.00-49.00	38.94	3.19	8.18%
Management Orientation (X ₁₄)	41.00-70.00	53.69	4.66	8.64%
Agricultural Knowledge Test (X ₁₅)	8.00-26.00	16.13	2.62	16.23%
Decision Making Involvement Score (DI Score)	0.00-1.00	0.38	0.19	49.20%

Source: Compiled by Researcher

The table no. 5.19 represented the descriptive statistics of the variables related to the selected farm women’s personal and family characters. The table explains the maximum and minimum value, mean, standard deviation, co-efficient of variation (c.v.) and consistency level of the variables. Consistency level is measured into three groups, high consistency level (1%-33%), medium consistency level (34%-66%) and low consistency level (67-100%).

The variable **Age (X₁)** is distributed with minimum value of 18 years to a maximum age of 82 years. The mean value of the distribution is 36.47 along with the standard deviation is 9.41. The co-efficient of variation of the variables is 25.81% which reflects the high consistency level of the distribution.

Family Education Status (X₂) all the members of the family in the eligible age group for formal education, excluding the children below six years of the age. The total score is obtained by adding the respective standard completed by each member of the family. Education status score is obtained by dividing the total score with eligible number of the family members. The

field study presents the distribution of the respondents of the Koch Bihar districts of West Bengal according to their family education status. The range of this variable is maximum value of 6.50 to minimum of 0.00. The mean value of the distribution is 3.39 along with the standard deviation is 0.98. The co-efficient of variation of the variables is 28.79% which reflects the high consistency level of the distribution. Family education status of the respondent's family is not so much high consequently they are involved in agriculture and allied activities.

The annual income measures as the earnings of the family from primary and secondary sources per year in rupees. The annual expenditure is also measures as the expenditure of respondent's family towards the consciousness on health, education, lifestyle etc. to calculate the annual income and annual expenditure, both the variables of individual farm woman's income and expenditure is divided by 1000 and then calculated. The variable **Annual Income (X₃)** is distributed with minimum value of 0.63 to a maximum value of 24. The mean value of the distribution is 6.43 along with the standard deviation is 2.35. The co-efficient of variation of the variables is 36.51% which reflects the medium consistency level of the distribution. The variable **Annual Expenditure (X₄)** is distributed with minimum value of 0.60 to a maximum value of 9.65. The mean value of the distribution is 3.69 along with the standard deviation is 1.27. The coefficient of variation value within the distribution is 31.71% showing high consistency level of the distribution for the variable annual expenditure.

Land Holding (X₅) is the representation of economic status within a rural system. The land holding is measured as total land owned by respondent family (in bigha). This variable is measures with modified scale produced by Markad (1996). The range of the variable land holding varies from a maximum of 16.00 to minimum of 0.00. The mean score of total distribution is 3.88 and standard deviation of the distribution is 2.85. The coefficient of variation value within the distribution is 73.48% signifying a low consistency level in the distribution for the variable land holding.

Possession of Assets (X₆) is measured based on respondent's household goods and material possessed namely furniture, vehicle, communication materials, farm materials etc. Bawajir and Nandapurkar (1985) developed this scale possession of assets. The variable possession of assets is distributed with minimum value of 0.00 to the maximum value of 40.00. The mean value of the distribution is 16.09 and the standard deviation is 6.31. The co-efficient of variation of the variables is 39.21% which reflects a medium consistency level of the distribution.

The variable **Livestock Possession (X₇)** is measured by Hadole's scale (2005), as follows; piggery, cow (local/cross bred), goat/sheep, fishery, buffalo, poultry. The variable livestock possession is distributed with minimum value of 0.00 to the maximum value of 11.00. The mean value of the distribution is 4.55 along with the standard deviation is 2.64. The co-efficient of variation of the variables is 57.92% which reflects the medium consistency level of the distribution.

Communication Sources (X₈) is operationalised as the frequency of contacts of the respondents with extension persons or development departments during one year or a quarterly basis. This variable is measured by the scale developed by Patil (1994). The range of this variable is maximum 23.00 to minimum of 1.00. The mean score of total distribution was 9.68 and standard deviation of the distribution was 2.51. The coefficient of variation value within the distribution is 25.88% signifying the very high consistency level of the distribution for the variable communication sources.

Risk Preference (X₉) is the psychological orientation of the individual to take risk and bear the risk for development of any new enterprise and management of such enterprise for the sustainability. For a farm women risk taking ability is one of the characters in case of developing and managing the farm. The variable risk orientation is distributed with minimum value of 6.00 up to the maximum value of 25.00. The mean value of the distribution is 16.74 along with the standard deviation of 3.37. The co-efficient of variation of the variables is 20.15% which reflects the high consistency level of the distribution.

Scientific Orientation (X₁₀) makes a farm woman perfect through scientific knowledge and helps to use this scientific knowledge in their own situation to solve their problems. The perfection of agricultural activities needs risk assimilation and creativity. The scientific orientation always tries to help the farm woman being to become innovative and creative. The variable scientific orientation is distributed with minimum value of 10.00 up to the maximum value of 28.00. The mean value of the distribution is 18.36 along with the standard deviation of 2.56. The co-efficient of variation of the variables is 13.92% which reflects a high consistency level of the distribution.

Economic Motivation (X₁₁) indicates the maximum profit gains by a farmer from their fields. The variable economic motivation is distributed with minimum value of 18.00 up to a maximum value of 28.00. The mean value of the distribution is 21.83 along with the standard

deviation is 1.55. The co-efficient of variation of the variables is 7.12% reflects a high consistency level of the distribution.

Independence Scale (X₁₂) refers to the positive value of independence or autonomy in decision-making process by a person. Independency is a goal directed at psychological trait of an individual. The goal of the independency is to maximize the profit for its future sustainability. With the help of independent scale of the farm woman develops her decision-making ability through skill, knowledge and reasoning ability. The variable economic motivation is distributed with minimum value of 14.00 to the maximum value of 27.00. The mean value of the distribution is 17.88 along with the standard deviation is 2.76. The co-efficient of variation of the variables is 15.44% which reflects the high consistency level of the distribution.

Attitude towards Agriculture (X₁₃) is measured by the scale developed by Mathew and Reddy (1989). This variable helps to understand the involvement pattern of the farm women towards agriculture. The variable attitude towards agriculture is distributed with minimum value of 31.00 up to the maximum value of 49.00. The mean value of the distribution is 38.94 along with the standard deviation is 3.19. The co-efficient of variation of the variables is 8.18% which reflects a high consistency level of the distribution.

Management Orientation (X₁₄) is the psychological activity of an individual to become conversant for managing his/her enterprise in effective manner. The farm woman with positive attitude, proper planning and management contributes her agricultural farm reach to the peak profit level. The variable management orientation is distributed with minimum value of 41.00 up to the maximum value of 70.00. The mean value of the distribution is 53.69 along with the standard deviation is 4.66. The co-efficient of variation of the variables is 8.64% which reflects the high consistency level of the distribution.

Agricultural Knowledge & Awareness Test (X₁₅) is use to describe to promote mutual learning, to generate, share and use of agriculture related knowledge and information. Agricultural knowledge and awareness are becoming increasingly important to develop new production, faster production, new skills, innovative ideas to develop and manage smarter and more sustainable production systems. The variable agricultural knowledge and awareness test is distributed with minimum value of 8.00 up to the maximum value of 26.00. The mean value of the distribution is 16.13 along with the standard deviation of 2.62. The co-efficient of variation of the variables is 16.23% reflects the high consistency level of the distribution.

Decision Making Involvement Score (DI Score) is the degree to which a farm woman is positively oriented and evaluated and take prompt decisions for the farm and domestic sphere. It consists of 3-point response namely, not considered, considered after consultation with other and considered independently with scores of 0, 1, 2 respectively (table no 5.15, 5.16, 5.17). Based on the total score obtained from the respondent's, decision-making score is calculated by (average decision making in farm activity score + average decision making in family matters score + average decision making in economic aspects score) and dividing by $n=3$. n refers to number of decisions making done by farm woman. Then DI score is measured by

$$\text{Decision Making Involvement (DI Score)} = \frac{\text{Obtained Score} - \text{Minimum Score}}{\text{Maximum Score} - \text{Minimum Score}}$$

The variable Decision Involvement Score is distributed with minimum value of 0.00 to the maximum value of 1.00. The mean value of the distribution is 0.38 along with the standard deviation of 0.19. The co-efficient of variation of the variables is 49.20% which reflects the medium consistency level of the distribution.

5.7 Association of Farm Women's Involvement in Agricultural Activity with their Socio-Economic Attributes

TABLE NO. 5. 20 ASSOCIATION OF FARM WOMEN'S INVOLVEMENT IN AGRICULTURAL ACTIVITY WITH SOCIO-ECONOMIC ATTRIBUTES

Variables	Co-Relation
Age (X_1)	-0.50**
Family Education Status (X_2)	-0.21
Annual Income (X_3)	0.47*
Annual Expenditure (X_4)	0.69**
Land Holding (X_5)	-0.59**
Possession of Assets (X_6)	-0.15
Livestock Possession (X_7)	0.54**
Communication Sources (X_8)	0.58**
Risk Preference (X_9)	-0.12
Scientific Orientation (X_{10})	-0.60**
Economic Motivation (X_{11})	-0.88**
Independence Scale (X_{12})	0.88**
Attitude towards Agriculture (X_{13})	0.64**
Management Orientation (X_{14})	-0.20
Agricultural Knowledge & Awareness Test (X_{15})	0.35

Source: Compiled by Researcher

Table no. 5.20 represents the association of farm women's involvement in agricultural activities. The results shows that the variables annual income, annual expenditure, livestock possession, communication sources, independence scale, attitude towards agriculture are positively and significantly associated with the variable farm women's involvement in agricultural activities. On the other hand, the variables age, land holding, scientific orientation,

economic motivations are negatively and significantly associated with the variable farm women's involvement in agricultural activities.

- **Annual Income and Annual Expenditure**

Annual income and annual expenditure are the two different economic variables which indicate the economic status of an individual. This annual income and annual expenditure also create an environment to establish the individual in such a position where he or she can enjoy the social prestige and esteem. Annual income and expenditure reflex the financial situation of an individual in a social system. Annual expenditure of the family indicates the purchasing power of that family in a year. The higher annual income and expenditure is gives impetus to live in a financially affluent manner. It gives exposure on different innovative technologies as well as helps in case of involvement in different activities like agriculture. Therefore, high level of income and expenditure influence the farm women to carry forward the agricultural activities. It helps in making a farm women take bigger risks to enhance agricultural production. For increasing the profit of a farmer there is a need to make a farmer risk bearer, innovative and efficient decision maker. The earning or the annual income and annual expenditure of the farm women contributes directly to the development of her farm and increases the optimum working capital investment in her agricultural field. The primary vocation of the respondents from where the data are collected is agriculture and the livelihood of that family depends on agriculture and allied activities. The expenditure increases with the increase of income. The farm women with high annual expenditure motivated to actively involve within the agriculture and allied activities. So that the profit increases from the agricultural enterprises and women can maintain the high level on income as well as expenditure throughout the year. Thus, is why the variable annual income and annual expenditure are positively and significantly associated with the women's involvement in agriculture.

- **Livestock Possession**

Livestock possession is a very important indicator in case of delineating of involvement of women in agriculture and allied activities. Livestock possession is measured by the number of livestock possessed by the women in a family. It is very important to maintain that the women in a family are providing their physical effort to nurture and care to the livestock and ultimately gets the profit from this allied agricultural sector. So, their involvement in livestock rearing contributes to the annual earning of the

family. This earning leads to more involvement in agriculture and allied sectors. This is the reason for positive and significant relationship of livestock possession with farm's women involvement in agriculture.

- **Communication Sources**

Sources of communication are very important in case of gathering information and utilizing the information in needed situation to develop income generating activities. The information received through the communication sources have motivated the individual to involve in different income generating activities which gives him/her satisfaction of using the information. Agriculture is also an income generating activity. Farm women who have been exposed to any communication sources, gather information related to new agricultural information and utilize the information by involving themselves in agricultural activities. This is the reason for positive and significant relationship of communication sources with farm's women involvement in agriculture.

- **Independence Scale**

Independence scale is the psychological pursuit of human being which reflects the dependency of individual's self-efficiency and decision-making ability. It increases the self-confidence and self-proficiency in doing a job. The farm women want to become independent in various outside activities too mainly agricultural and allied activities. They involve themselves in agricultural activities to generate income and make herself more self-dependent. This is the reason for positive and significant relationship of independence scale with farm's women involvement in agriculture.

- **Attitude Towards Agriculture**

Attitude towards agriculture is pre disposition of individuals' behaviour. The perception of individuals is expressed with the help of their attitudes. The positive attitudes towards agriculture of women indicate the higher level of involvement in agriculture and allied sectors which ultimately lead to the greater prosperity and dignity in the society. This is the reason for positive and significant relationship of attitude towards agriculture with farm's women involvement in agriculture.

- **Age**

Social and personal maturity comes with chronological age and experiences that are derived from insight. In the present study the agricultural activities are considered as the outside activities and these activities consisted of hard work mainly conducted by

male counterpart. The young aged farm women could involve themselves in the hard work in agricultural activities like the farmer but as their age increased, they mostly lose their physical efficiency and involved themselves in agricultural activities to a very limited extent. That is why the variable age is negatively and significantly associated with the variable women's involvement in agriculture.

- **Land Holding**

Land holding is the indicator of prestige of a society. The women who hold good amount of land does not show any interest to do the work physically in the field and they always try to enjoy the status of land owner and supervise the agricultural labourers for getting good profit. Consequently, women with low land holding, status work in the agricultural field as agricultural laborers. Thus, is why the variable land holding is negatively and significantly associated with the variable women's involvement in agriculture.

- **Scientific Orientation**

Scientific orientation is a psychological belongingness of an individual. The farm women of high level of scientific orientation always searches for the reasons behind her farm activity. If she fiends the cause behind conducting any new farm activity then only she goes alone with this activity in future. The farm women who have high level of scientific orientations try to take decisions and involve herself in any agricultural activity. The farm women with high level of scientific orientation always take parts in decision making and give instructions to others for conducting the agricultural activities. Thus, the variable scientific orientation is negatively and significantly associated with the variable women's involvement in agriculture.

- **Economic Motivation**

Economic motivation is the psychological pursuit of a farmer to orient him or her for managing his or her farm in economic manner. The economic motivation of the farm women contributes to the net profit and sustainability of the farm through appropriate planning, efficient organizing the activities, market linkage, taking risk etc. But today farm women do not get much more profit from agriculture. Farm women perceive agricultural related activities are less remunerative because of cultivating, growing and selling agricultural goods are time and risk taking task and also the market and price of that is volatile in nature. As a result, the variable economic motivation is negatively and significantly associated with the variable women's involvement in agriculture.

ASSOCIATION OF FARM WOMEN'S INVOLVEMENT IN AGRICULTURAL ACTIVITY WITH SOCIO-ECONOMIC ATTRIBUTES

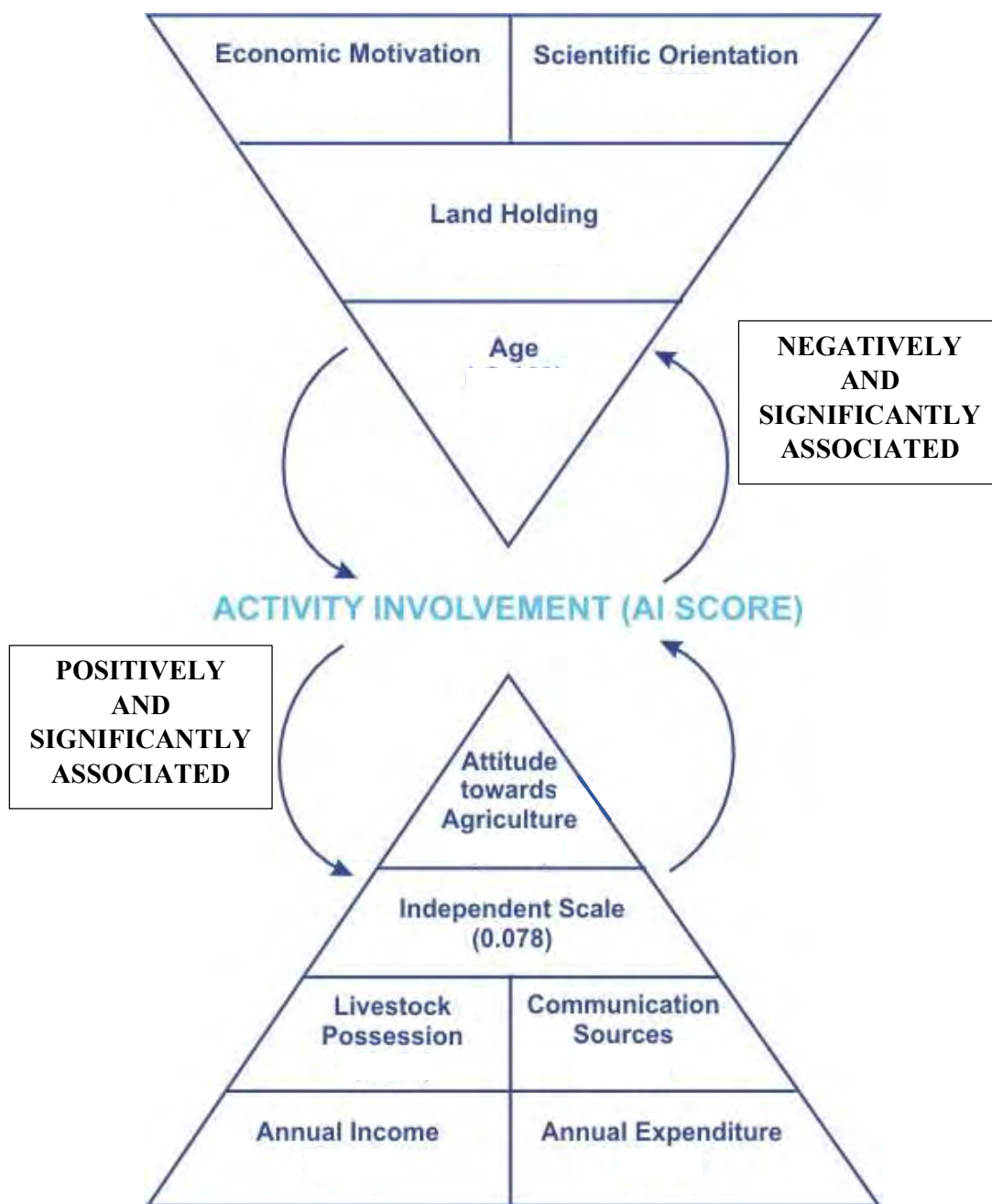


FIGURE NO. 5.13

Source: Compiled by Researcher

5.8 Association of Farm Women's Involvement in Decision Making Related to Agricultural and Allied Activities with their Socio-Economic Attributes

TABLE NO. 5.21 ASSOCIATION OF FARM WOMEN'S INVOLVEMENT IN DECISION MAKING RELATED TO SOCIO-ECONOMIC ATTRIBUTES

Variables	Co-relation
Age (X ₁)	-0.55*
Family education status (X ₂)	0.67**
Annual income (X ₃)	0.77**
Annual expenditure (X ₄)	0.13
Land holding (X ₅)	0.12
Possession of assets (X ₆)	-0.13
Livestock possession (X ₇)	-0.16
Communication sources (X ₈)	0.56*
Risk preference (X ₉)	-0.12
Scientific orientation (X ₁₀)	0.72**
Economic motivation (X ₁₁)	0.12
Independence scale (X ₁₂)	-0.35
Attitude towards agriculture (X ₁₃)	0.23
Management orientation (X ₁₄)	0.147
Agricultural knowledge & awareness test (X ₁₅)	-0.121

Source: Compiled by Researcher

Table no. 5.21 represents the association of farm women's involvement in decision making processes. The results show that the variables family education status, annual income, communication sources are positively and significantly associated with the variable farm women's involvement in decision making processes. On the other hand, the variables age, and scientific orientation are negatively and significantly associated with the variable farm women's involvement in decision making processes.

- **Age**

In all societies age is one of the most important determinants of social status and social role of an individual. In the present study it is found that the young farm women are more acquainted with agricultural techniques than the elderly farm women. Young farm women also comprehend an idea better than the old aged, which ultimately helps the young farm women take more sound decision than the elderly women. This is the reason behind the negative and significant association between the variables age and decision-making ability of the farm women.

- **Family Education Status**

Education is the process through which one individual can gather knowledge and use this knowledge in their own situation to solve their problems. Education makes an individual aware through the manifestation of different positive traits. Family education status is the average formal education exposure of the family. The preliminary learning

occurs from the family to develop decision taking ability of farm women from her childhood. If she has a higher educational background of a farm woman can take decision easily. That is why the variable family educational status is positively and significantly associated with the variable decision-making ability of the farm women.

- **Annual Income**

Annual income is the economic indicator of an individual. Annual income is the expression of economic dimension in rural settings. The variable annual income reflects the resource richness of an individual. The resources endowment always makes an individual more perfect in case of risk-taking ability for appropriate management of farm women through positive attitude development. It also helps to acquire respect and values in the society. The farm women who has economically sound and has the capability to take risk for farm and home could take decision and got results in a successful manner. In the present study it is found that the high annual income group farm women gained profit from their farm ultimately. The high-income group farm women could take decision to invest more to make profit in the extreme limit. That is why the variable annual income is positively and significantly associated with the variable decision-making ability of the farm women.

- **Communication Sources**

The appropriate decision taking ability of a farm woman depends on the information seeking, passing and sharing process etc. Communication sources exposure the degree of capacity building. This exposes to helps to build the capacity of the farm women for trying new ideas and taking decision within her own farm as well as home in case of managing the farm or home efficiently. The various communication sources are always giving a direction towards development of the farm women and building the capacity of to make appropriate decisions. Thus, is why the variable communication sources positively and significantly associated with the variable decision-making ability of the farm women.

- **Scientific Orientation**

Scientific orientation is the back bone of cognitive enlargement. Persons acquire their knowledge from the formal education system and that makes an individual more confident, more scientific and self-reliant in any decision-making process. Persons with high level of scientific orientation build up their confidence to take decision for effective management in field as well as home. The farm women with high level of

scientific orientation have higher decision-making ability due to the scientific knowledge and exposure to the farm, home and society. The farm women with low level of scientific orientation have less confidence level in decision making process due to lack of scientific knowledge. Thus, is why, the variable scientific orientation is positively and significantly correlated with the decision-making ability of the farm women.

ASSOCIATION OF FARM WOMEN'S INVOLVEMENT IN DECISION MAKING WITH SOCIO-ECONOMIC ATTRIBUTES

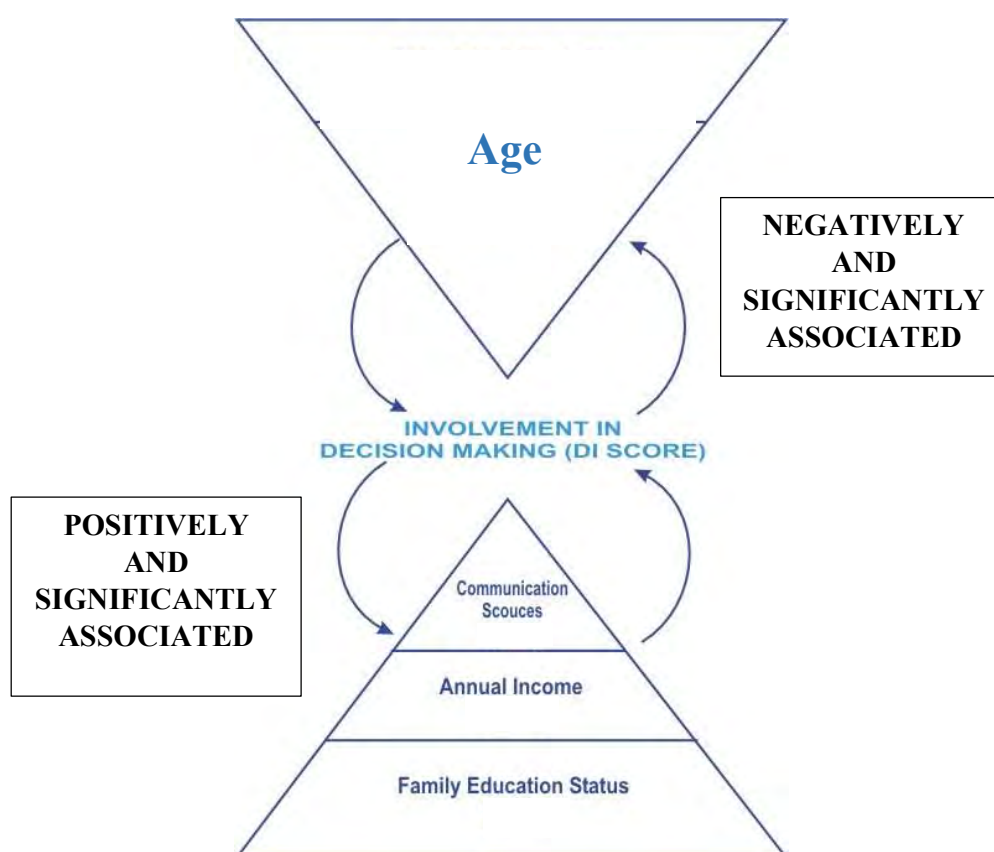


FIGURE NO. 5.14

Source: Compiled by Researcher

The research work in this part deals the research objective “To analyze the relationship between the socio-economic status of farm women and involvement of the farm women in agriculture and allied activities” and research hypotheses “Farm women’s involvement is significantly associated with their socio-economic attributes”. In this part research objective is explain in details. Decision Involvement Score (DI Score), Coefficient of Variation (CV) and Correlation

helps to prove the research hypothesis which is accepted - “Farm women’s involvement is significantly associated with their socio-economic attributes.”

5.9 Conclusion

The study also has brought out several realities about gender disparity in agriculture, allied activities, domestic duties and decision making.

Although farm women give equal and same time in cultivation of agricultural crops especially rice and jute as that of men but their work is not properly recognised by other family members and society. They are practically ignored in decision making and economic activities which are mainly done by male members of the family.

Farm women are involved in unpaid domestic activities along with the agricultural activities, for which instead of getting appreciation, other family members think that it is their duty to do the domestic work.

In agricultural activities women have assisted men but in domestic work women do not get assistance from men. Farm women also cannot ask help from their male counterpart on the same.

The present study shows that a farm woman does agricultural activities on her own farm, after that she do unpaid domestic work, nourish children but when the farm woman gives her opinion for agricultural activities for her own farm or for the marriage of her children, her views are not considered. Even decision for purchasing clothes to selling dairy product she is not allowed to participate in taking decisions. When male counterpart is going out, women of the family have to consult with him even over phone and take decisions. Sometimes women even have to wait for their husbands to return back home and then she has to share her opinion on farm activities or family matters with him, based on which her husband gives final decisions related to family or economic aspects. There is a tendency to see men as farmers and women as farmer’s wife or helper and this shows their supportive roles rather than productive roles.

Agriculture of Koch Bihar district is no doubt dependent on the activities of farm women who have been poorly rewarded in terms of income, access to resources and decision-making. It is high time now to recognize the activities of farm women and provide equal opportunities to the female farmers and ensure suitable share in the agricultural income to the unpaid farm women in the family. They should be recognized as farmers (not as farmer’s wife or helper) and provide their due share in agricultural income.

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CHAPTER 6

PROBLEMS FACED BY FARM WOMEN IN THE STUDY AREA

6.1 Introduction

The economy of Koch Bihar mainly depends on agriculture. Increased population have increased the pressure on land and reduced the man-land ratio, for which it is essential to follow improved technology in crop production. Farm women are not aware of these phenomena. The major problems faced by the farm women in the study area are different due to difference in economic status. An attempt is made to understand the problems in availing the benefits of the research and make suggestions for farm women to improve their efficiency. Accordingly, the data obtained in this regard are analysed and presented in relation to;

1. General problems of the farm women.
2. Suggestions made for farm women on improving their participation in agriculture and allied sectors.

The data is collected in order to investigate the problems faced by the farm women while working on their farm. Due to difference in economic status, the farm women of the district have different problems because of social, economic, organizational and technological constraints. Thus, problems are categorized into mainly two broad groups namely health problems with occupational health hazards, socio-economic and technological problems.

6.2 Health Problems and Occupational Health Hazards of Farm Women

6.2.1 Drudgery in Agriculture

Agricultural operations require persistent labour, which demands physical energy and proper posture. Women plays an important role in agriculture. Women are doing major farm work along with household activities. The farm women play a significant role in agriculture and other agro based activities. The daily work schedule for rural farm women is very demanding and arduous. It is observed during field survey that during peak period, women work every day for about 8-9 hours in agriculture and 4-6 hours in household activities. Drudgery is defined as dull, repetitive, time-consuming and fatigue-causing work. Major cause of drudgery in agriculture is in the form of excess labour, improper working posture, and time consumption in work. However, drudgery also occur with the use of machines and due to improper workplace and human-machine interface. Women experience drudgery of agricultural activities mostly through the processes of weeding, transplanting, harvesting, threshing, cutting, carrying and storing grains which has explained below.

TABLE NO. 6.1 WOMEN DRUDGERY IN AGRICULTURE

Activities	No. of Farm Women in Drudgery	% of Farm Women in Drudgery	Overall Drudgery Status	Reasons
Transplanting or Planting	1078	89.83%	Heavy	a. Bending posture. b. Long hour of standing in deep puddle soil. c. Discomfort on moving forward and backward in wet field. Care and skill required for uniformity in transplanting/planting.
Threshing	1134	94.50%	Heavy	a. Bending posture. b. High energy required for threshing.
Weeding	872	72.67%	Moderately Heavy	a. Long hours of sitting in wet fields. b. Requiring difficult posture in handling traditional implements. c. Selection of weed plants from cultivated rice variety. Use of blunt and old implements.
Cutting	790	65.83%	Moderately Heavy	a. Long hours of bending and sitting on toe in wet fields. b. High energy required for cutting by traditional sickle and setting the lodge plants and injury can occur.
Carrying	865	72.13%	Moderately Heavy	a. Difficulties in preparing bundles easy for carrying. b. Carrying head load of bundles causing stress and strain on eyes and neck.

Source: Compiled by Researcher

6.2.1.1 Transplanting or Planting

Planting requires substantial physical strength, perseverance and manual labour. Transplanting process is a complex activity. Chronologically, it is closely associated with harrowing, ploughing, and gathering of saplings on the field. The transplanting process involves standing in a waterlogged field and bending to put seedlings into the soil by hand, frequently and over a long period of time. During the manual transplanting women labourers are exposed to several work-related physical risks like standing for long hour on the puddle soil, sometimes amidst heavy rain. Environmental factors that cause drudgery during transplanting process are heat, humidity and dust. After working for several hours, they go back to home, feeling discomfort on shoulders, hip and joints. In long term this develops into musculoskeletal disorders. Due to this, efficiency of female workers decreases leading to poor goal-achievement, frustration and drudgery. Better skill and techniques are needed to work on the ground to help them avoid or recover, rejuvenate and take self-care during and post transplantation. Drudgery status is high in transplanting or planting process.

6.2.1.2 Threshing

During threshing process women labour as have to perform heavy work by keeping same posture for long hours. This job demands strength, techniques and agility along with time management, which leads to high prevalence of work-related musculoskeletal disease. Low back pain (LBP) is a common health problem arising from manual threshing. Contemporary literature has simply suggested that occupational factors, especially working postures, are the main causes of LBP. Consequently, LBP prevalence has been found highest in the transplanting and threshing process of farming because manual transplanting or threshing is a labour-intensive and tiresome job. Occupational health hazards during threshing causes health problems mainly due to heat and dust. Most of the farm women suffered irritation in eyes, throat, nose and ears affecting their respiratory tract due to exposure into heat and dust, considering the high temperature in summer, causing more discomfort on continuous thrashing process in the field. Women agriculture labourers who are involved in lifting and fetching crops bundle have experienced various musculoskeletal discomforts on their neck, shoulder and upper back. Threshing process also demand very high energy and physical strength quite similar with weight lifting, which in long run pose pressure in joints and skeleton structure to women labourers. This is significant as the nutrition deficiency is so high for women population with inadequate sleep and rest, as after giving full time in field they are also required to cook for their family, raise children, do all domestic works. Overall drudgery status heavy in threshing process.

6.2.1.3 Weeding

Weeding is an important agricultural task that is performed to ensure a profitable yield. A typical weeding day ranges from eight to ten hours for women labourers with few breaks in between. Often, this type of works is considered extraneous on the back if carried out by hand or with a short-handled tool due to the prolonged periods of time that are spent in awkward postures. Weeding with hands requires workers to bend forward well over 75° and sustain static loading to soft tissues of the back. This type of activity leads to over stressing the viscoelastic tissue of the back (ligaments, disks, facet capsules, etc). Agricultural workers performing manual weeding are exposed to high risks of musculoskeletal disorders to the lower back. Hand weeding is the cause to sustain static loading to spinal soft tissues of workers, which can lead to the initiation of a cycle of inflammatory response. Overall drudgery status is moderate in weeding process.

6.2.1.4 Cutting

Like transplanting, cutting requires long hours of bending and sitting on toe in the field with continuous hand movement. For certain crops women labourers have to get into wetland for long duration causes skin infections, itching and patchy skin. Cutting poses a significant pressure on hands and shoulder and led to several injuries in musculoskeletal tissues. Overall drudgery status is moderate in cutting process.

6.2.1.5 Carrying

Carrying involves lot of strength on knees and shoulder. Women labours needs to carry bundles for long distance from field to home or to load up in tractor or in a carriage van. This exercise over the time develops shoulder and back pain. Sometimes due to time management or on the urge of finishing up carrying work early, labourers lift overload beyond their capacity. This habit results in bone and joint health deterioration for women. Rising temperature in Koch Bihar region during summer pose a great challenge for carrying thus ask by making them fatigued, sweat and dehydrated. In a way to compensate the workforce capital, most of the times agricultural farms allot limited women agricultural labourers for carrying crops instead of the required numbers of labourers which pose a challenge for them to carry extra weight. During monsoon carrying is associated with micro bacterial infections, fungi infections and skin rashes. Overall drudgery status is moderate in carrying process.

6.2.2 Identify the Problems of Farm Women in Agriculture with the Help of RBQ Method

TABLE NO. 6.2 PRIORITISATION OF PROBLEMS EMBEDDED WITH
WOMEN IN AGRICULTURE

Sl. No.	Problems Associated with Women in Agriculture	RBQ Value	Rank
1	Gender Disparity in Wage	96.97	I
2	Poor Gender-Neutral Infrastructural Facility	68.86	V
3	Less Importance in Decision Making	77.80	II
4	Limited Land Ownership	71.74	IV
5	Limited Access to Capital, Resource, Credit	60.45	VI
6	Lack of Agricultural Knowledge Training Discussion	30.45	IX
7	More Involvement in Household Activity	74.17	III
8	Limited Education and Mobility	15.15	XI
9	Drudgery in Agriculture Due to Lack of Resources and Machines	45.15	VII
10	The Lack of Strong Networks and Mentors	34.55	VIII
11	Unaware About the Legal Rights	24.70	X

Source: Compiled by Researcher

Ranking Based Question (RBQ) are those which finding out the rank for the given questions. Rank Based Question can be vertical or horizontal depending on the question series. RBQ is a

type of survey question asked to respondents to compare a list of items or problems with each other and arrange them in order of preference. Individual make a choice that are influenced by many factors. Each of these factors have different priorities in the decision-making process. To determine how they are prioritized, RBQ method is used. The formula to calculate the Rank Based Question is.....

$$\frac{\sum_{i=1}^n f_i(n+1-i)}{N \times n} \times 100$$

Where, f_i = Frequency,

N = No of respondents,

n = No. of problems,

i =Rank

Table no. 6.2 depicts the problems faced by the farm women regarding their involvement in agriculture. Eleven problems are identified in the research area which reflects the barriers in case of involving the women in any agricultural system. On the basis of the Rank Based Question (RBQ) value, the problems are prioritized through the perception of the farm women in local agricultural system.

During field survey it is find that majority stated that gender disparity on wage is the major problem and is ranked the first problem. Women are discriminated in agriculture by engaging them in low wage agricultural works and paying less than men for similar work. There is a variation between the wages of male and female, although male and female give equal effort and time in agricultural activities but males are paid Rs 170-190/- per day and female receive only Rs 130-170/- per day in the district. Wages disparities are due to gender specific agricultural operations. Agricultural activities like transplanting, weeding, harvesting etc. which carry lower wages are largely performed by female workers. On the other hand, sowing, fertilizer application, spraying pesticides and post-harvest operations with relatively higher wages are performed by male works. Sometimes female workers are also forced to accept the wages in their own area because they cannot migrate as easily as male due to domestic responsibilities.

Thus, second rank and third rank take less importance on decision making and more involvement in household activity of the farm women respectively. Women have always been an important and integral part in sustainable agricultural systems. Agriculture is very heavily

dependent on manual labour and women constitute the maximum of it. Other than crops they are involved in allied sectors like animal husbandry, dairying, piggery, poultry etc. The extent of women's contribution is aptly highlighted in a study conducted in West Bengal where it has been revealed that a typical work day for women agricultural labour during season lasts for 15 hours and her male counterpart works for 7 to 8 hours (Mies, 1986). Even within a region their involvement varies widely among different agro ecological sub zones, farming systems, socio-economic status of families. The scenario is same for Koch Bihar district. Farm women are fully occupied and overburdened with three-fold responsibility of home, agriculture and livestock management. Farm women spend their maximum time for agricultural activities and unpaid domestic duties for which they get very little time for their personal care. Women responsibilities are far more than for men because of their involvement in multifarious activities in agriculture as well as at home. Despite extended involvement in agriculture and at home, their contribution is still unrecognised. Women's participation in decision making is bent toward lower side in the family as this is considered as men's domain. Decision-making power of farm women is ineffective and applicable only within the four walls of her home.

The fourth important problem identified by the respondents are limited land ownership of farm women. Most common problem in our society is daughters and son can jointly inherit property acquired directly from their fathers, but ancestral property can only be inherited by sons. Women have an equal share in ancestral property but due to gender biasness in joint family systems, women always lose her rights. As a result, farm women have less ownership of land. Most of the farm women who owns land works as a farm labourer because they do not have any legal rights to occupy it.

The fifth problem of farm women in the study area is poor gender-neutral infrastructural facility. Today agriculture is fully dominated by modern machineries. Male agricultural labourers usually operate machines like tracker, power tillers, spray machines etc. which sometimes displace female labourers. On the other hand, female workers face problems in handling heavy agricultural machines because of which farm women are discriminated by wages as well as farm work loads.

The sixth problem of the farm women are limited access to capital, resource and credit. Limited access to resources like availability of high yield seeds, modern machines, proper irrigation facilities, suitable pesticides are also the constraints faced by the women stakeholders to become integral part of an agricultural system. Limited access to financing is one of the major problems identified by the women respondents. Due to lack of timely available credit facilities

women cannot make investments for production or processing purpose and also unable to undertake any business venture. As an aftermath, limited capital leads to lower participation of women as stakeholders in agricultural value chain system. Proper banking facilities can promote more involvement of women in agriculture.

The seventh problem rank take drudgery in agriculture due to lack of resources and machines of the farm women. Transplanting or planting, weeding, threshing, cutting, carrying operations are the major drudgery problems for farm women. Majority of the farm women do weed control using hands tools like sickle and khurpi. This leads to muscular stress, musculo-skeletal injuries and posture problems. During field work on different parts of the district, the farm women reported that they felt pain (shoulder pain, back pain, wrist pain, hand pain, leg pain, thigh pain, knee pain) in their body due to repetitive motions and awkward postures adopted while doing agricultural activity. The use of the 'wheel hoe weeder' and replacing the traditional gadgets may lower the physiological and cardiovascular stress.

The eighth problem of the farm women are lack of strong network, mentors. The limited market knowledge and low networking are other major problem of the women. In the study area the males are shouldering the responsibilities of selling the agri-products in the market with women but marketing knowledge is not shared by their counterpart. As a result, the women do not have any market intelligence and interest to know about the value chain. In the ninth rank of problem faced by the farm women in the study area is lack of modern agricultural knowledge and training. Due to limited knowledge and access of agricultural techniques, farm women are less interested to attended any kind of agricultural training programme.

Unaware about the legal rights of farm women takes tenth rank problem because of limited education, lack of confidence, poor communication, inadequate information of the society etc. Eleventh ranked problem of the farm women are limited education and mobility. Most of the farm women of the rural area have low level of education, low access of mass media, awareness and skills.

6.2.3 Contact with Chemicals

Pesticides are widely used in agriculture and the human exposure to these substances caused adverse health hazards. Non-occupational exposure to this can come from many sources, such as food or water. For occupational exposure, many studies have been conducted on men but very few information is available concerning the exposure of women. It is important to understand how women's susceptibility to the effects of pesticides from men. Women generally

have a higher proportion of body fat and more likely to store pollutants that bio-accumulate in fat tissue. Women also absorb pesticides through their skin more readily, and pesticides reside in the body longer. Women have a higher level of hormonal sensitive tissues that makes them more vulnerable to the impacts of pesticides, known as endocrine disruptors. Carcinogens linked with breast and ovarian cancers are of special concern for women. Pesticides adversely affect women's fertility and reproductive health, with both known and unknown impacts on future generations. Exposure to the pesticides can have different effects on health from early life stages, resulting in different outcomes ranging from neuro- developmental effects in newborns to different types of cancers. Pesticide risk is higher to people suffering from asthma, diabetes and cardiovascular diseases. Women farmers are mostly using moderate or highly hazardous pesticides like organochlorine, organophosphorus, and carbamates, while it is found that they never use any protective equipment like masks, gloves, etc. while handling pesticides. Sometimes women farmers use highly hazardous pesticides under deplorable conditions, such as lack of Personal Protective Equipment (PPE) or using leaky spraying equipment. Women's exposure to pesticides increases as their poverty and marginalisation deepens. This is especially true in rural communities in Koch Behar district where small-scale farmers adopted chemical-intensive farming incentivised by governments. Poverty also further increases women's vulnerability to pesticides, as toxic effects are aggravated by poor diet and malnutrition. In this context, it is clear that "gender equality today for a sustainable tomorrow" includes more decisive action to reduce women's exposure to pesticides, while enhancing women's participation in healthy, equitable and sustainable food production. Unfortunately, not much emphasis has been given to enabling women's proper access to pesticides as a means of achieving Sustainable Development Goals (SDGs). There is an earnest requirement for giving more protection to farm women in using pesticides. More researches need to focus on relationship between the extent of pesticide use and signs and symptoms of illnesses due to pesticide exposure among women farmers.

6.2.4 Climatic Vagaries

The farm women of the district faced some physical challenges due to significant climate factors. Excessive heat, heavy rain, shivering cold posed big challenges for farm women in Koch Bihar. During summer, temperature raised up to 45°C, excessive humidity (90-98%) pull down the energy of farm women in the agriculture field. During December and January temperature falls below 10°C, chilly breeze and fog makes the work difficult for them. Koch Bihar is a place of heavy rainfall during monsoon in each year and most of the time, water

logging, poor drainage system not only hamper the regular work but also ruined production frequently. Seasonal extremities play a very big impact on women's farm worker duties and responsibilities.

6.2.5 Poor Healthcare Facilities

Rural healthcare structure does not meet the women's overall wellbeing in terms of treatment, medication, nutrition and recovery. Most of the farm women in Koch Bihar have died due to tuberculosis, post-delivery complications, dengue, malnutrition. The subdivisional hospitals experience huge patients flow and most of the times are unable to provide beds to everyone. The primary healthcare centres in the villages don't have the required infrastructure, diagnostic laboratory and therapeutic area for treatment. So, they mostly depend on quack- practitioner or occultist which many times yield fatal result for patients. Maternal mortality rates in rural areas of Koch Bihar district is very high (98 per 100000 live birth, in 2018), factor that contributes to high maternal mortality rate is the reluctance to seek medical care for pregnancy. Farm women receive very low antenatal care during pregnancy due to heavy work load in field as well as home.

As an adult, women receive poor health care than man. They are apprehensive to admit that they are sick and they will wait until their sickness has aggravated before they seek help. Studies on attendance at rural primary health centers reveals that more number of males are treated in hospitals than women, pointing to regional differences in the wellbeing priorities on women health. Additionally, women in Koch Bihar are uncomfortable to consult male doctors and hesitate to check up due to the less number of lady doctors' available at centers.

6.2.6 Malnutrition

Malnutrition is the reason for poor health and wellbeing of farm women. Women are served last after male members and children for which most of the time a larger portion of food is consumed by them. Besides, nutritional food like milk, egg, fish, vitamin enriched vegetables are not a part of their daily diet. Gender disparities in nutrition are evident from infancy to adulthood. In fact, gender has been the most statistically significant determinant of malnutrition among young children and malnutrition is the direct or underlying cause of death among women. Malnutrition has led to chronic energy deficiency, low BMI, underweight, stunted growth etc. At the individual level, immediate effects of inadequate food and dietary intake increase the susceptibility to disease and illness. These are also influenced by underlying factors at the household level, such as access to food and health services, maternal and child-

care practices and household amenities relating to sanitation and safe drinking water. Moreover, there is high risk of chronic malnutrition even among children. Poor access to sanitation facilities and women's literacy in particular is found to be strong factors affecting malnutrition. Field survey data shows 27% farm women in the age 15 to 49 years, have completed primary education. Literacy and basic sanitation have directly impacted the ability of women, men, and children to maintain personal hygiene. Women's health is further harmed by air and water pollution and lack of sanitation. The high incidence of malnutrition present amongst women and their low metabolism and other health problems have affected their capacity to deal with chemical stress. According to Cardiological society of India, 2017, smoke from household biomass (made up of wood, dung and crop residues) stoves within a three-hour period is equivalent to smoking 20 packs of cigarettes every day. For women who spend an average of three hours cooking every day, often in a poorly ventilated area, has led to eye problems, respiratory problems, chronic bronchitis and has further developed into lung cancer in some cases.

6.3 Socio-Economic and Technological Problems Faced by Farm Women

There are different socio- economic factors which plays major roles in broader life of farm women. Gender disparity, disparity in wages, occupational stress, low satisfaction in family life and lack of family support, powerlessness, lack of social security, inadequate education, operational holdings are some of the parameters that deeply impact women's roles in agriculture. Women have traditionally been integral to on-farm operations and are often responsible for tending to crops and managing household food supply and consequently bear the brunt of these disruptions.

6.3.1 Gender Disparity and Mental Harassment

It is an age-old convention that women are less capable and inefficient as workers as compared to men. The attitude which considers women unfit for certain jobs holds back women. In addition to this, the same attitude governs injustice of unequal salaries for the same job. The true equality has not been achieved even after 76 years of independence. Working on such conditions inevitably puts strain on women to a greater extent as compared to men, thus making them demotivated in their inputs in agriculture. The female agricultural labourers have suffered from wage disparity and women are earning much less compared to their male counterparts for doing the same work. Many women are also engaged in unpaid subsistence labour within farms owned by the male members of the family. The male members mostly husband take the daily

income from their wives. There are common pictures in Koch Bihar. Instances like these have not only demotivated women labourers to attend daily work but at some times they remain absent in field. In the study area 70% people think that women are unfit for some agricultural operations such as preparatory tillage, forming ridges and furrows, ploughing, land preparation, manure and fertilizer application, irrigation, labour supervision, account keeping, marketing and transportation etc. That is why they get less wages than male agricultural labourers. A majority of farm women (79%) continued to be denied their right to equal pay, under the Equal Remuneration Act, 1976 and are underpaid in comparison to their male counterpart.

6.3.2 Gender Gap in Wages of Farm Women

There is wage inequality among the male and female agricultural labourers in the study area. Female workers are replacing male workers in the rural sectors because of out migration of male family members in the district. The condition of female agricultural labourers is even worse. They not only receive low wages but they faced discrimination too. According to West Bengal Government, June 2018, the wages of agricultural labour are categorised into three category which are 210.00/- per day with food and 226.00/- per day without food for unskilled agricultural worker, 232.00/- per day with food and 248.00/- per day without food for semi-skilled agricultural worker, 257.00/- per day with food and 273.00/- per day without food for skilled agricultural worker. But in actual situation no one have followed it. Mostly women agricultural labourers get 130/- to 170/- and male agricultural labourers get 170/- to 190/- per day without food (Source: field survey, 2017). Wages are likely to be high in peak work seasons during the rice growing period for both male and female agricultural labourers. Most of the people including female agricultural labourers believe that male agricultural labourers are superior than females for various agricultural activities like preparatory tillage, forming ridges and furrows, ploughing, land preparation, manure and fertilizer application, irrigation, plant protection measures etc. So, this belief is natural to offer low wages to female agricultural labourers.

6.3.3 Occupational Stress and Overwork

According to World Health Organization (WHO), 2016 occupational or work-related stress “is the response people may have when presented with work demands and pressures that are not matched to their knowledge and abilities and which challenge their ability to cope”. Work and family are the two most important aspects in women’s lives. Balancing work and family roles have become a key personal and family issue for many societies. There are many priorities in

working mother's lives that are subjected to stress. They have to deal with family and are working under stress every day. The main reason behind occupational stress is imbalance between work and family. Women have extensive workloads with dual responsibility for farm production and household affairs. Women work roughly twice as many hours than men. Women's contribution to agriculture - whether it is subsistence farming or commercial agriculture - when measured in terms of the number of tasks performed and time spend, is greater than men. The extent of their contribution can be gauged from the finding in a study in the Himalayan region, where a pair of bullocks works 1064 hours, a man 1212 hours and a woman 3485 hours a year on a one-hectare farm (Grover & Grover, 2004). In Koch Bihar district, farm women work 8 -10 hours per day in field, 6-7 hours in home activities (Source: field Survey, 2017). Therefore, they get very little time to do their personal care (30 mints) or leisure activities. Women's work is getting harder and more time-consuming. Women contribute considerably to household income through farm and nonfarm activities as well as through work as landless agricultural laborers. Women's work as family members is underestimated.

6.3.4 Low Satisfaction in Family Life and Lack of Family Support

Family life of farm women in Koch Bihar revolves almost in same direction in the district. They have poor support from family due to the negligence and dominant approach by their husbands or male counterparts. In decision making they hardly get involved in agriculture planning, land, finance or even a small family call. If she needs something for herself or for her children, she has to ask the money from husband and justify the reason. They hardly have any savings for themselves to utilise own the money on herself. During field survey among the farm women, 78% of them are unhappy and not satisfied in their family life due to non-having cash or money in hand. Rest of them (22%) are more or less satisfied due to having money in hand as their male counterparts out migrated for job.

6.3.5 Decision Making Power of Farm Women

Various studies on women autonomy and empowerment shows that the decisions taken by women are not considered by the family members. In the study area, male labour circulation / migration in some blocks have led to women taking major decision. Women are traditionally home makers and care givers. Apart from household management, child care and social responsibilities, rural women have worked on the farm as unpaid labourers or helping men folk, harvesting and storing crops leaving little time for effective participation in local organization.

Their opinions or their decision-making power are also neglected in their family. Though male labour migration from the district offered women to escape from patriarchal domination, but this opportunity is fruitful only for the young women belonging to the age group of 30-44 years. Young women belonging to the age group of 15-29 years never left home without their husband. They remained under the headship of aged women or men. So, the migration of male gave them pain of separation as well as more responsibility of their home. The aged women get all the opportunity to establish her as they facto head of the family but, lack of education, lack of confidence and obviously age prevent them from their capabilities. Although the decision of the said women is executed in much respect but actually, they are directed by her husband through telephone.

6.3.6 Powerlessness

Legal protection of farm women's rights has little effect in the face of prevailing patriarchal traditions. Farm women are subordinate in their in laws home in Koch Bihar districts. Child marriage has also kept women subjugated. Women are kept subordinate and are even murdered due the practice of dowry in some homes. Women's rights to inheritance are limited and frequently violated. Farm women are not entitled to claim to their father's land or her husband property after their demise in most households which force them to work as agricultural labourer. Losing the rights of inheritance have make them conquer with low income, landlessness, decision making rights in agriculture and food security for themselves and their children. Transforming the prevailing social discrimination against women must become the top priority and can happen concurrently with intervention by the society and government who can improve the social and economic status of women. This way, a synergy of progress will be achieved. When farm women receive greater education and training, they will earn more money through agriculture. If women earn more money, she can spend it in the further education and health of her children, as opposed to men who often spend it on drink, tobacco or other women (Dogra, 2002). When women hold the power in decision making, they will gain greater social status in the household and will have greater importance. As women gain influence and consciousness, they will make stronger claims to their entitlements - gaining further training, better access to agriculture credit and higher incomes. As women's economic power grows, it will be easier to overcome the tradition of 'son preference' and thus put an end to the evils of dowry. As son preference declines and acceptance of violence declines, families will be more likely to educate their daughters, and age of marriage will rise. As women are better nourished and marry later, they will be healthier, more productive and will give birth to healthier babies.

Only through action to remedy of discrimination against women have the chance to live healthy and productive lives.

6.3.7 Lack of Social Security

Social security of farm women in Koch Bihar is male-concentrated (Chaudhuri, 2003). A male family member can ensure food, family income, and protect them from uneven circumstances. So, when husbands migrate to another place in search of work women who are left behind, they are not able to confident to continue farm activities, secure family incomes and are concerned about domestic violence from other male relatives or neighbour. Although, in several reports it has been revealed that West Bengal is a more secure place for women in India but domestic violence is significant against women, which has been reflected in Human Development Report of West Bengal (2004). Violence against women is the most pervasive human rights violation today. Male violence against women is a worldwide phenomenon. Fear of violence have caused barrier for women's participation in activities in home and agriculture. Such domestic insecurities in the study area comes in form of abuse, sexual harassment and other forms of gender-based violence. The heightened risks are due to factors such as gender power imbalances, a lack of oversight, and working alone in relative isolation or in remote locations. Within the home, women are subjected to physical and sexual abuse as punishment or as culturally justified assaults. These acts shape their attitude to life and their expectations of themselves.

6.3.8 Lack of or Inadequate Education

Inadequate education is a key contributing factor to gender bias in accessing resources. Women's education is vital for their empowerment, to develop basic skills needed to participate in knowledge intense agriculture and economic activities. Information and Communication Technology (ITC) is a great platform to inform and educate rural women about agriculture, health and nutrition provided which are users friendly, have gender responsive content and applications. However, there are barriers on mass reach of ITCs initiatives due to low education, inadequate infrastructure, high cost, limited capacity etc.

6.3.9 Lack of Leisure Time and Recreation

Women labourers in Koch Bihar are mostly engaged in home making and agricultural work. They hardly find time for recreational activities and leisure which have made their life monotonous and dull. The extensive pressure of child raising, family issues, cooking other than labour work in field consumes their entire time. Finally, after a period of time they get

exhausted and demoralized on their scheduled work. During field survey it is observed that farm women get only 15 to 30 mints per day for their leisure.

6.3.10 Operational Holdings

A lack of ownership of land does not allow women farmers to approach banks for institutional loans, as banks usually consider land as collateral; women farmers hardly have any representation in society and are nowhere discernible in farmers' organizations or in occasional protests. A declining size of land holdings acts as a deterrent due to lower net returns earned and technology adoption etc.

6.3.11 Lack of Agricultural Extension System

The agricultural extension system is conceived and operating to train the capacity building of farmers. It is exclusively composed of men and the attempts to reach out to women farmers were highly inadequate. Further, most of the transfers of technology are targeted to male farmers. The time and location of training hardly takes into consideration the time and work pattern of farm women (Lal, 2011).

6.3.12 Modernization and Technological Development in Agriculture

Technological developments have not been responsive to household drudgery associated with routine activities of rural women at home and on farm. In most technologies women's actual needs are ignored. Modernization in agriculture have led to increased agricultural productivity and decreased drudgery but have adversely affected the women of lower castes, lower income groups and landless families or with small holding by reducing demand for labour. Introduction of weedicides and pesticides have deprived a large number of women labourers of their meagre source of income.

6.4 Remedial Measures

The problems of farm women in Koch Bihar prevalent in the context of different socio-economic factors are listed above. The remedial measures given are based on the basis of study made in the field.

- Better skill and techniques need to be implemented in terms of advancement of their skills and confidence on the ground to help them recover, rejuvenate and self-care during and post transplantation, threshing, planting.

- Yoga and stretching process needs to be introduced by District Agricultural Office and organize training session for them. It will help them keep the posture right, avoid musculoskeletal injuries and help them recover from injuries as well.
- Stress management tools and techniques needs to be incorporated in daily life of farm women to inculcate a work- life balance.
- Spread awareness on keeping mask, personal protective equipment (PPE) and take every precaution and preventive during spraying fertiliser spray to avoid health hazards due to contact with chemicals and fertilizers.
- Easy access to technology for training of farm women need to be ensured by government. It can be digital medium or in person or through a skilled partner who can come and interact with them on a regular basis and train them on latest technologies, techniques of agriculture.
- More training and skill should be offered to farm women on accessing tools and equipment by themselves and not be dependent on men. For example, if a farm women can drive tractors and run in the field, she is more confident in asking the same wage as men and set examples to others to take control.
- Health Camps should be held out by government especially for farm women to diagnose, prevent and provide medication for long illness like TB, COPD, skin disease which they incur through daily agriculture work. They should also be ensured health safety, medication and wellness.
- More responsibilities and benefits need to be distributed to women in the form of land ownership, distribution of property, bank or financial institute accounts access to empower them to conquer the societal stigma. Panchayat can start weekly or monthly meetings of agricultural farm women to lead, discuss and distribute their work and ask the support required from government. No men should interfere in such meetings or gathering so they feel morally boosted and confident on decision making in the field as well as in home.
- Educate them and encourage them to continue study along with domestic and farm work. This can be in the form of evening school or camp conducted with the help of NGOs. They can further identify one of them as role model for such initiatives from whom others can be encouraged.
- Strictly follow up on wages policy for women and men so no discrimination take place. This includes following the policy laid by the government. The wage needs to be often

regulated. This will make a huge change in the decision-making process and social security for farm women.

6.5 Conclusion

Women have been shouldering responsibilities in the major activities associated with the agriculture and allied sectors from the ancient times. The district of Koch Bihar comprises of 48.51% (Census 2001) women of its total population where 21.95% female are cultivators and 47.56% female are agricultural labourers. Women are deprived in every stage of the society in the study area. This present chapter deals with the research objective - “To identify the problems of farm women regarding their involvement in agriculture and to find out the way to solve these problems.” RBQ method is followed to identify the problems of the farm women in the study area and accordingly some suitable measures have been given to solve their problems.

The involvement of women in agriculture from land preparation to post harvest management of agricultural crops and livestock rearing is observed to be higher than her male counterparts. One of the reasons for the increasing trend of participation in agriculture and allied sectors as obtained from the research survey, due to the fact that male persons in this district are migrating to other areas to earn more money and uplift their socio-economic status. Consequently the crises of male labours in agricultural activities are increasing day by day and the workloads upon the female workers in agriculture are increasing. The astounding fact is that the work load of women within the study area has increase at a faster rate due to their involvement in agricultural activities and household work. The trend shows a clear scenario towards the increased drudgery on women in the district. At the same time this phenomenon empowers the women to take independent decision in case of agriculture and household activities due to the absence of male counterpart in the family. With all of the social changes and reformations, there is an emerging trend of increasing **feminization in agriculture** experienced in the district.

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CHAPTER 7

SUMMARY AND CONCLUSION

7.1 Introduction

Since the advent of civilisation, women have played a pivotal role in case of increasing the family income through agricultural development. Woman, have played a vital role in developing agriculture and thereby initiated the art of domestic farming. While, men went out for hunting to search food, women started gathering seeds from the native flora and began cultivation those for food, feed, fodder, fibre and fuel purpose. Women have played and continue to play a key role in the conservation of agriculture support systems namely cultivation, animal rearing etc. Women have always been key players in agriculture and allied fields. The nature and extent of women's involvement in agriculture, no doubt, varies greatly from region to region. Even within a region, their involvement varies widely among different ecological sub-zones, farming systems, castes, classes and stages in the family cycle. Women heavily contribute to several responsibilities and perform wide spectrum of duties in most of the family and farming activities etc. The issues of women's involvement along with their participation in economic, social and cultural are considered to integrate the development of the society as a whole. But the women's efforts are not yet acknowledged fully by society. In rural society, there has been a long speculation regarding the decision-making power of women. The entire study of the research work depicts in briefly farm women's role in agriculture, household activities and decision-making process.

7.2 Farm Women and Agriculture with Allied Agricultural Activities

Agriculture is the back bone of rural economy. Rural development in any society cannot be comprehended without the active participation of women. Women account for more than half of the work force by participating in different farm activities, either directly or indirectly. Women in India are major producers of food in terms of value, volume and number of hours worked. 63% of all economically active men are engaged in agriculture as compared to 78% of women (Choudhary H, Singh S, 2003). In India, 50% of rural female workers are classified as agricultural labourers and 37% as cultivators, 70% of farm work are performed by women (Ahuja and Narayan, 2016). Women represent a significant and crucial role in agricultural development and allied fields including in the main crop production, livestock production,

horticulture, post-harvest operations, agro or social forestry, fisheries, etc. Right from the soil preparation to post-harvest activities, rural women are engaged in production of crops (Ahmed and Hussain 2004). It is estimated that women are responsible for 70% of actual farm work and constitute up to 60% of the farming population (Choudhary and Singh 2003). Farm women perform numerous labour-intensive jobs such as weeding, hoeing, grass cutting, picking, cotton stick collections, separation of seeds from fibre.

Farm women are responsible for farm activities, keeping of livestock and other associated activities like milking, milk processing, and preparation of ghee etc. Livestock is the primary subsistence activity used to meet household needs as well as supplement farm incomes. The majority of farms have their own some livestock. The strength of livestock is mainly influenced by various factors such as farm size, cropping pattern, availability of range-lands including fodder and pasture. Farm women earn extra income from the sale of milk and animals. Farm women are engaged in cleaning of animal, animal sheds, watering and milking the animals. Farm women are mostly also responsible for collection of animal dung. Due to preparing dung cakes also brings additional income to poor families. Evidently, farm women are involved in almost all livestock related activities. Except grazing, all other livestock management activities are predominantly performed by females. Majority of women are involved in shed cleaning and collection of farm yard manure. Males, however, share the responsibility to taking care of sick animals. It is evident that the women are playing a dominant role in the livestock production and poultry farming which are one of the major sources of rural economy. The involvement of women in poultry farming at household level is poultry industry. Even though rural women are not using modern management techniques, such as vaccination and improved feed, still their poultry enterprise is commendable. Every year, income from poultry farming has been contributing to the family income by the farm women. In order to generate more income, rural women often sell eggs and poultry meat too.

Farm women contribute more in agricultural and allied activities than has not generally been acknowledged. Despite women's major contribution to the family income through productive activities, no recognition is given to them as an important contributor and their contribution is not recorded. They still remain invisible workers. Over the years women cultivators are typically characterized as economically inactive and women cultivator play only a supportive role in agriculture as farmers' wives (Samanta 1994). Agricultural development programmes

are usually planned by men and aimed for men. Farm women needed to more and more agricultural training and agricultural extension programmes for agricultural development.

7.3 Farm Women and Domestic Duties

Farm women are, of course form an integral part of farming household. They are involved in over half of the farm activities, bear most of responsibilities for household food security and contribute to household wellbeing through their income generating activities (Sharma *et al.*, 2013). Women are also expected to collect wood from fields. This wood is being used as a major fuel source for cooking. Because of the increasing population pressure, over grazing and desertification, women face difficulties collecting fire wood. Clean drinking water is another major problem in rural areas. Like collection of wood, fetching water from remote areas is also the duty of women. Their activities typically include producing agricultural crops, tending animals, processing and preparing food in agricultural or other rural enterprises, collecting fuel and water, caring for family members and maintaining their homes (SOFA Team and Cheryl Doss 2011). Farm women play numerous roles inside as well as outside the home. She spends about 304 days of her life span only in the kitchen annually, which remains unaccounted in the national income estimates (Chauhan N. M., 2011). Recognition of their crucial role in agriculture should not obscure the fact that farm women continue to be concerned with their primary functions as wives, mothers and homemakers. Farm women play their dual responsibilities within and outside the home. Farm women have always worked along with men in fields. Despite their importance to agricultural production and household duties, women face severe handicaps. One must therefore not overlook the major role played by women as in an agricultural setting the distinction between farm and house work gets blurred. Even the household work by women which accounts for 40% of our gross national product and involves much drudgery is totally left out of economic account (Goudappa, 2012). Farm women need recognition, appreciation and family support for her laborious work.

7.4 Decision-Making Processes

Decision-making as a mental process requires conscious reasoning. Rational decision involves deliberation, planning and best available sources of information and advice in arriving at a decision as a means of achieving maximum economic and other allied yields. The decision-making ability of an individual might be influenced by the possession of farm related technical

knowledge, skills and socio-economic characteristics. Decision-making power is the ability to influence decisions that affect one's life – both private and public. In fact, decision-making ability is a component of access, capabilities and actions that shape whether women have influence over society or decisions about their private life.

7.5 Farm Women and Decision-Making Processes in Agriculture and Allied Fields

Rural women are directly or indirectly engaged with agricultural activity along with working in the family, dairying and animal husbandry etc. As majority of the agricultural work force in our society comprises of the women, their role in the decision making in different agricultural activities need to be properly looked into. Women play an important role in initiation, control and supervision of farm production, horticulture, livestock and in productive work. Despite women's critical contribution to the family income through productive activities, no recognition is given to them as an important contributor and their contribution is not recorded. Though women have been playing major part in agriculture, her role in the decision-making process related agricultural activities is seen to be minimal. Farm women have little knowledge about their farm business as they use to run family living needs, debt payment and capital investment through daily farming rather than decision making into agricultural business growth and progressive farming activities.

7.6 Farm Women and Decision-Making Processes in Family Matters and Economic Aspects

The role of women has always been multi-dimensional and significant as women have performed well in case of agricultural activities, domestic activities, marketing activities as far as labour requirement is considered. The decision-making process is an important segment of every household because the functioning of family resource management depends on the efficiency of decision-making progress. So, women's involvement in decision-making process has been of great importance because women play an important role in every household activity and gives her best most of the time. In spite of discharging farm activities and domestic duties women's involvement in decision making process specially related to money matters is low. It is a common knowledge, that the roles of women in decision making at household level and economical contribution to household income both are insignificant in our society. In rural society in general, male dominate in household decision making as well as in economic aspects.

It is a traditional belief that generally males make all major household decisions and at the same time they contribute to household income more than females, and thus, our society is highly male dominated, which shows gender bias against female (Alam, 1998). In rural families, type and size of the family, caste, size of land holding, socio-economic status of the families, education level of rural women, their employment status and rational position affects her involvement in decision-making. The issue of women's involvement in decision making process depends upon how they participate economically, socially and culturally is considered to be important for the development of the society as a whole. Women's participation in the decision-making process has a significant impact on their improvement in status and greater importance in society.

So, women are the key players making enormous contribution in agriculture and rural development. Women shoulder many of the responsibilities and perform wide spectrum of duties in most of the family related activities, farming related activities as well, beside their exclusive involvement in domestic chores. Despite significant contribution of women in agriculture and allied sectors they are still neglected and the productive role of women is marginalised, undervalued and not recognized. In such a backdrop there is an extreme requirement to explore the involvement pattern in various activities and decision-making process of women in household activities, livestock rearing and farm activities. The entire research work is based on the involvement of farm women in planning implementation and defining future course of action related to agriculture and allied sectors. The activities of agriculture and allied sectors are always complex in nature and require hard skill to operate the entire activities from preparation of land to the marketing of the agriculture and allied sector produce in the market in remunerative prizes. During post globalization era the agriculture is primarily concerned about the enhancement of productivity on a huge scale. But after globalization the market of agricultural produce has paid a pivotal role in case of controlling the entire agricultural sector and allied sector. Mostly the activities related to agriculture and allied activities are delineated as outside activities and the primary responsibilities of these activities would be shouldered by male counterpart of the family in the male dominated society. Though the agricultural practices have more labourious work but women do also contribute to outside agricultural activities in a very systematic manner. Contribution of women in agriculture in earlier days was always neglected and not properly acknowledged. In recent times women are paying a crucial role in carrying out the agricultural activities in their own field and also take part in decision making for better agricultural practices as well as home

activities. In the concept of holistic agriculture there is a need to understand the stockholder's role in each and every sphere of agricultural production and marketing. Furthermore, there is a need to enable that the environment is conducive to promote the factors contributing in building the agricultural system. The decision-making ability of all the family members in the farming community is important to develop a productive agricultural system towards food security. They accept the important role of women in decision making and farm activities for all-around agricultural development. In the present study the entire content has been prepared after going through every dimension of agriculture and allied sectors.

7.7 Major Findings

- Koch Bihar is located on the northern part of West Bengal along the foothills of Himalayas. This district is the gateway to Assam from West Bengal and Bangladesh. The Tista, Jaldhaka, Torsa etc. rivers demarcate the flood plains area of this district. The principal rivers in this region are Tista, Jaldhaka, Torsa, Kaljani, Raidak and Gadadhar. The climate of this district is hot and humid summer, moisture in air during rainy season and cold winter. Young alluvial soils are deposited by Himalayan rivers which is very helpful for agriculture.
- Socio-economic condition includes population distribution, population density, literacy, occupation, religion, caste etc. It includes the inter-relationships between social-economic condition and cultural indicators of the area and their effects on standard of living as well as life style of an area. The population density (Census 2011) of this district is 832 persons per sq.km. Sex ratio of this district is 942 females per 1000 male (Census 2011). The male literacy (Census 2011) rate (80.71%) is higher than female literacy (68.49%). Hindu (Census 2011) is the major religion (74.06%). Koch Bihar is dominated by Scheduled Caste (Census 2011) population (50.17%). Koch Bihar district is mainly an agricultural district and major population is dependent on agriculture and agriculture allied activities for their livelihood due to lack of industrial activities and suitable climatic condition and availability of water resources. Total cultivators and agricultural labourers (Census 2011) are 32.34% and 34.74% in this district, where female main worker is 121330 persons which accounts for 46.24% and the total female marginal worker is 141086 persons accounting for 53.76%. Transport systems as well as credit facilities also supports the development of agricultural activities in the district.
- There exists a wide regional disparity in sectoral and spatial development in the district. This region consists of 6 blocks namely Haldibari, Mekliganj, Mathabhanga I, Cooch

Behar I, Sitai, Sitalkuchi has low in terms of demographic condition. These blocks are suffering from backwardness and having high population density, unfavorable sex ratio, low literacy rate. The 2 blocks namely Cooch Behar I, Dinhata I are considering as moderate developed regions consisting and the high developed region consists of 4 blocks namely Mathabhanga II, Cooch Behar II, Dinhata II and Tufanganj II in terms of demographic condition. These blocks are having favorable male female ratio, population density and SC & ST population, moderate to high literacy rate etc.

- Haldibari and Sitai fall under the low developed region in terms of infrastructural condition. These blocks are low developed due to a less number of educational institutions, inadequate power supply, low number of medical institutions etc. Moderate developed region includes 7 blocks namely Mekhliganj, Mathabhanga I, Mathabhanga II, Cooch Behar I Mathabhanga II, Dinhata I and Dinhata II. The blocks have moderate number of amenities which has results in order moderate state of development. High developed region are Tufanganj I, Tufanganj II and Cooch Behar II blocks in terms of infrastructural condition due to adequate number of schools, health centers, power supply.
- 3 blocks namely Haldibari, Tufanganj I and Sitai are less developed, 5 blocks namely Sitalkuchi, Dinhata II, Tufanganj I, Mathabhanga II and Mekhliganj have moderate level of development and remaining 4 blocks namely Mathabhanga I, Cooch Behar I, Cooch Behar II, Dinhata I are highly developed terms of economy. Therefore, it is imperative, Government to look into the proper development of each sector at grass root level especially for the moderately and least developed blocks.
- Correlation matrix is used to understand the interrelationship between demographic condition, infrastructural condition, economic condition and overall socio- economic condition of the Koch Bihar district. The analysis indicated that all the parameters of developments are positively and significantly correlated with each other. Demographic and economic condition is positively associated with overall development (0.463) and (0.188). But economic condition is negatively correlated with both demographic (-0.505) and infrastructural (-0.383) development. This is mainly due to the infrastructural facilities are concentrated in certain areas where working population sex ratio, literacy rate etc. are not equally concentrated. Infrastructural condition is also positively associated with overall development (0.665) at 0.01 significant levels.
- The lowest female work participation (Census 2011) is observed in Cooch Behar II (19.30%) and highest in Sitai (34.25%). Female main workers (census 2011) are highest in Haldibari (59.32%) and lowest in Cooch Behar I (38.67%). Female marginal workers

(Census 2011) are highest in Cooch Behar I (61.33%) and lowest in Haldibari (40.68%). The Census data 2011 depicts just opposite facts in terms of main and marginal female workers. Maximum percentage of female working population are involved in agriculture and allied activities (Census 2011) in the block of Sitai (87.25%) and minimum in Tufanganj I block (51.01%).

- Primary survey of 1200 respondents in Koch Bihar district show that the majority of the respondents enjoyed the status as family-co-head (55.67%). Majority of the respondents are in the age group of 18-39 years (54%) followed by 40-61 years age group (45.25%). Majority of the women respondents are Hindus (57.17%). The study shows that majority of the respondents are Scheduled Caste (40.42%). Similar observation is seen for the Koch Bihar district as a whole as per 2011 Census. The study shows maximum of the respondents can read and write educated (36.67%). 66.75% of the respondents are under joint family types group. 62.67% of the farm women respondents' primary occupation is agriculture and allied fields. The scenario matches with Census data 2011 of Koch Bihar district where 21.95% females are cultivators and 47.56% females are agricultural labourers. The study shows that 70% of the respondents belong to under low-income group having an annual income of 6000/- to 86000/-. 65.75% of the respondents' expenditure ranges from Rs. 6000/- to Rs. 36000/-. 67.42% of the respondents has under the small land holdings. 57.25% of the women respondents have one pair of drought animal. 54% of the respondents have mixed (semi-pucca) type of house. The findings show farm women respondents socio-economic status is low.
- In the Koch Bihar district Crude female work participation rate is highest in Sitai block (31.77%) and lowest in Cooch Behar-II (15.25%) as per Census 2011. The Crude female labour force participation growth rate is the highest in Haldibari block show in increase from 7.83% in 2001 to 18.06% in 2011. Gender gap (Census 2011) in Crude female work participation is highest in Cooch Behar-II (42.86%), followed by Dinhata II (42.86%) and lowest in Sitai block (27.37%). Sitai (33.36%) and Mekhliganj (7.42%) comprise the top and bottom position in terms of Female work participation among Scheduled Castes (Census 2011). Among the Scheduled Tribes the high rate is found in Mathabhanga-I (40.79%) and low in Haldibari (16.78%) block (Census 2011).
- The study depicts the correlation analysis between female literacy with female occupational structure in 2011. From the result it is notice that main and marginal category (-0.74) and cultivators and agricultural labours category (-0.85) are negatively and significantly associated with the female literacy. The literacy rate of female always

influences to uplift the social status of female. So, if a female gets higher education, she feels lack of interest in doing agriculture and move to the other segment of occupation. That is why these variables are negatively and significantly associated and other workers category (0.54) is positively and significantly associated with the female literacy.

- Among 1200 respondents farm women are largely engaged in farm activities such as threshing (84%), winnowing (84%), weeding (82%), sowing (78%), thinning (70%). 88.33% of the farm women are engaged in allied activities such as poultry and animal rearing. Among 1200 respondents 88.33% of farm women have livestock. 87.92% of farm women are involved in cow dung making, 45.85% are involved in milking and 40.75% are involved in feeding animals. Though the female farmers have agricultural knowledge which they have acquired through extensive field work, they do not have a zeal to upgrade on their knowledge. After working 8 hours. in agricultural work farm women worked for her family and is involved in livestock activities. Farm women and men spend equal time in agricultural works but women spend their most time for unpaid domestic duties due to which they get little time for their personal care or leisure activities. Their sleeping time is shorter than their male counterpart. Males get 7.5 hours/day for sleeping whereas female get only 6 hours/day on an average.
- The Activity Involvement Score is distributed with minimum value of 0.10 to the maximum value 1.00. The mean value of the distribution is 0.36 along with the standard deviation is 0.08. The co-efficient of variation of the variables is 24.23%.
- Farm women's AII value is 50.62% which indicates that the farm women are actively participate in agriculture and allied fields along with household activities. Activity Involvement Score (AI Score) refers to all the agricultural and allied activities like livestock rearing with domestic duties a farm woman done by her own. The variable Activity Involvement Score is distributed with minimum value of 0.10 to the maximum value 1.00. The mean value of the distribution is 0.36 along with the standard deviation is 0.08. The co-efficient of variation of the variables is 24.23%.
- 74.17% farm women do not try an entirely new method in farming which are involves risk. 66.5% farm women willing to grow large number of crops to avoid greater risks. The study reveals a negative attitude to taking risk of the farm women.
- 51.58% farm women are not willing to try new ideas in farming and 60.16% farm women think that the way of her forefathers farmed is still the best way to farm today. 55.01% farm women think to learn new methods of farming is time consuming which indicates that very few respondents have good scientific orientation.

- 93.02% farm women agree that most successful farmer is the one who makes the most profit and 84.05% farm women admit that a farmer should work towards larger yields and economic profits. But when she asked to try new farming idea which may earn her more money. 66.83% farm women do not agree to do it because their risk taking ability is less. Though farm women have an interest to earn economic profit from her farm but due to low risk taking ability and low scientific orientation they move backward in terms of economic motivation.
- 91.33% farm women think that, it is not necessary to make prior decision about the varieties of crop to be cultivated in land. 74.83% farm women agree to consult agricultural experts for crop plan. 59.5% farm women think that, it is not necessary to have training for crop production which indicates farm women are not aware about pre cultivation planning. They thought as they do same cultivation each and every year, they do not need any prior decision for cultivation. 83.8% farm women not aware about the use of fertilizers, 83.5% farm women are not interested to attend agricultural production training. As they do not use proper planning orientation their production orientation part is also very low. So, they faced very low rate of production in field crops. 74.3% farm women are not aware about the crop market new. 64.33% farm women sell her crop o to the nearest market irrespective of price. The result shows their market orientation skill low so they do not get proper price of their cultivated crops.
- Attitude towards agriculture of farm women as a profession is measured in this section. The results show that 52% of the farm women have negative attitude towards agriculture as a profession because they are of the opinion those who are unable to go for any other work will take agriculture as a profession. 51% farm women promoted industry than agriculture. 52% farm women supports the statement “agriculture is for uneducated and poor people”. 44% farm women agree to take agriculture as a profession if a handsome return is guaranteed from agriculture so they have positive attitude towards agriculture. 64% female farmers are of the opinion that government should give top priority to agriculture. During field survey it is observed that some factors like low cost of cultivated crops, higher education status, lack of agricultural knowledge leads to increase the negative attitude towards agriculture specially among younger generation.
- 60% female farmers are interested to take up animal rearing & poultry as a self-employment project as meat and milk are readily available for consumption as well as it economically profitable when they sell it. 49% female farmers are agreeing animal rearing and poultry are very useful for prosperity of poor farmers. 64% farm women accepted that

rearing practices is a risky enterprise because of cost and shortage of fodder, animals easily contact many diseases. 32.32% farm women interested to take training for improving the productivity and animal welfare. 44.8% female farmers are interested in increasing the animals' and poultry by products. Most of the farm women have low understanding of the consequences of management strategies for the animal rearing and poultry.

- A case study among 50 farm households of Pundibari and Gosanimari villages of Koch Bihar district is done to evaluate the inequity towards the farm women in agricultural activities, household works and decision-making process in comparison to men. Males of 37 families out of 50 families of Gosanimari village have migrated to the other city to earn money where in Pundibari village only 4 families out of 50 families found where male members have migrated. At Pundibari village AII value is 49.76% and DII value is only 13%. DII value of Gosanimari village is slightly high 35%. As due to of male counterpart a huge responsibility has to be taken by the women so the AII value is high at 67%.
- Farm women are largely involved in agricultural but during the time of decision making, they are dependent on her male counterpart or other family members. It is evident from the study that 58.67% respondent's decision are not considered in case of season of growing. 58.33% respondents' decision are not considered for determining the variety. Similarly, to time of sowing (58.33%), type of manures & fertilizers use (83.33%), irrigation (58.33%), use of pesticides (66.67%), marketing (83.33%) harvesting (58.33%) and crops to be grown (48.33%). The study further revealed that farm women's decision-making power in family matters. 75% farm women stated that they have taken final decision in taking care of children because children are more attached to their mothers. But in matters related children marriage (83.33%), education of children (80.83%), ceremonial aspects at home (74.17%), outside invitation from home (83.33%) etc. 60% farm women's decision are not considered in case of buying and selling any agricultural materials, domestic animals, dairy products etc. Only 5%-8% farm women take decision independently in these matters. These women belong to families where the women are the head of the family or the male member are working outside the village.
- Farm women's DII value is 35.19% and the OII value of farm women is 42.91%. The Decision Involvement Score is distributed with minimum value of 0.00 to the maximum value of 1.00. The mean value of the distribution is 0.38 along with the standard deviation of 0.19. The co-efficient of variation of the variables is 49.20%. Low DII value (35.19%) indicates that the farm women rarely participate in decision-making process of agriculture and allied sector.

- Farm women's involvement in agricultural activities, shows that the variables annual income, annual expenditure, livestock possession, communication sources, independence scale, attitude towards agriculture are positively and significantly associated with the variable farm women's involvement in agricultural activities. On the other hand, the variables age, land holding, scientific orientation, economic motivation are negatively and significantly associated with the variable farm women's involvement in agricultural activities.
- Farm women's involvement in decision making related to agricultural and allied activities with their socio-economic attributes. The results shows that the variables family education status, annual income, communication sources are positively and significantly associated with the variable farm women's involvement in decision making processes. On the other hand, the variables age, and scientific orientation are negatively and significantly associated with the variable farm women's involvement in decision making processes.
- Numerous problems are faced by the farm women regarding their involvement in agriculture. Eleven problems are identified in the study area which reflects the barriers in case of involving the women in any agricultural system. The field survey reveals 96.97% of farm women face the problem of gender disparity in wages. 77.80% of the respondents are face negligence in decision making. 74.17% of the farm women have more involvement in house hold work for this they have problems to do agricultural work with household activities. 71.74% of farm women have limited land ownership. 68.86% of farm women are face the problem of lack of gender-neutral agricultural tools, 60.45% farm women have limited access to capital, resource and credit.
- The major problems are observed by women experienced drudgery due to involvement in agricultural activities during weeding, transplanting, harvesting, threshing, cutting, carrying and storing grains. 89.83% of farm women feeling back pain after transplanting or Planting. 94.50% of farm women are face less energetic or tired after threshing. 72.67% of farm women are face discomfort after weeding. 65.83% farm women feeling stressful for cutting and 72.13% farm women face exhausted after carrying.
- Othe problems faced by farm women are contact with chemicals, climatic vagaries, poor healthcare facilities, malnutrition, gender disparity and mental harassment, gender gap in the wages, occupational stress, overworked, low satisfaction in family life, lack of family support, less decision making power, powerless, lack of social security, lack of or inadequate education, lack of leisure time and recreation, lack of operational holdings,

limitations of agricultural extension system, unskilled, lack of modernization in agriculture and technological development.

7.8 Recommendations

On basis of findings of the study the recommendations are given. The government or policy makers take up measures for improvement of women's participation in agriculture and allied sectors.

- There is an immediate need to improve extension facilities to train the farm women regarding the best risk management practices for deciding the choice of a particular crop such as growing short-duration crops as well as climate-resistant crop varieties. Storage facilities and weather-based crop insurance are necessary that can effectively address farmer's challenge and improve risk taking capabilities of a farmer.
- Farm women need to more interact with scientific oriented persons or agricultural extensions to update themselves about the crop science and agricultural technologies.
- There is a need to work on transforming the less socio-economic condition to high socio-economic condition which will motivate farm women to fully devote their effort to increase their income to lead a satisfied life.
- Farm women needs to come out on the dependency form their male counterpart in decision.
- Farm women should work on three parameters of farm management as planning orientation, production orientation and marketing orientation to channelised crop rotation, production planning and outcome and better market scope of their agricultural goods. Proper planning of these three elements will help them earn better income, flexibility in decision-making and better livelihood.
- There is a need to spread positive attitude towards agriculture among farm women as well as among young generation. Government should focus on agricultural training programme so the awareness will increase among young generation to take agriculture as a career. It will help the extension agencies and policy makers to plan and design agricultural training programmes and developmental activities for female farmers as well as young farm family members to encourage them to take agriculture as a profession.
- Government and planners must make strategies for increasing commercialization of livestock products by improving technologies, increasing market connectivity,

processing and storage centre, training, focuses on availability of quality fodder etc. Government should also focus on preparing disaster management fund for livestock in case of natural calamities like flood, drought in this Koch Bihar district and scheme should be informed to the farm women. Government should encourage the farm women to take responsibility for increasing animals by products, take care at animal welfare, and be motivated to take animal rearing as a profession along with agriculture.

- Sessional trainings need to implemented block wise at regular intervals to emphasize on seasonal crops, fodder and grains to rotate farm production and cultivate various crops. This will help them utilise farm resources wisely and maximize profit.
- Easy credit facility or loans must be offered to farm women to invest in agriculture activities. This will help them enhance their farm business, take active part in decision making, once they become economically empowered.
- Government should regulate strong land inheritance law for women which will ensure farm women will have their own agricultural land and no one will forcefully occupy or claim their land. Once a farm women have own land, they have free to access their farm and farm business.
- Strict wage policy regulation must be implemented by Government and follow up on the same to be ensured, thus a farm woman who work as agricultural labourer can have equal pay as men. According to West Bengal Government, June 2018, the wages of agricultural labour are categorised into three category which are 210.00/- per day with food and 226.00/- per day without food for unskilled agricultural worker, 232.00/- per day with food and 248.00/- per day without food for semi-skilled agricultural worker, 257.00/- per day with food and 273.00/- per day without food for skilled agricultural worker. This will motivate, uplift and encourage them to take farm activities seriously and readily. Wage policy regulation will help them to enhance their quality of life and overall- wellbeing.
- Farm women must be made aware about their existing rights, access to judicial relief and readdress. This will accelerate farm women empowerment, decision making and rights to claim.
- The Government needs to establish a flexible educational institute or body which will work continuously on farm women literacy rate increment by ensuring proper course structure, teaching and exams. This is ideally not like regular schools. Most of the farm women do not want to avail education in regular schools due to the hesitation of being with the children in the same room.

- A counselling centres must be set up in the panchayat office can be a very strategic movement that Government or policy makers can think to improve farm women's social wellbeing and productivity. These centres can work on the core areas of mental health counselling, tips on how to engage in family decision making, self-awareness and rights to access their claims.
- Koch Bihar districts has soil testing laboratory where farm women can enjoy free test of soil and water, but they hardly avail the benefit. Testing up soils can ensure right seeds, legitimate use to fertilizers and pesticides which can help them plan, optimize resources and avoid health and environment hazards. Local agriculture officers or authorities should emphasis and sensitize the farm women to visit and avail the benefit of soil testing laboratory and understand the science involved in it.
- Government should ensure that the high yield seeds and agricultural goods to be regulated and women led agricultural farm can earn maximum profit. This can be through set up women kisan mandi or Government regulated market where only women farmers can sell the products. This will ensure the price, empowerment and ownership of them.
- Domestic Violence cases against farm women should strictly handle and swiftly charged against accused. Farm women fears or hesitant due to the harassment they undergo in local police station and withdraw complaint due to the pressure of family members and neighbours. Strict action should be imposed on such incidents to ensure a safe and harmonical work and family environment.
- Financial institutions like banks, co-operatives credit society, agricultural banks (like NABARD) periodically conduct financial awareness programme and economic literacy sessions for farm women to take the on confidence about loans, rate of interest, documentation process, latest savings schemes, educational loans and other financial instruments which can help them to grow as an individual and to do effective financial planning.
- Government should think of setting up creches to help farm women keeping their children for the time being to actively involve in farm activities and engage themselves for longer time. Many of them have no family members to keep eye on their children during work, which make the farm women worried about their children. Keeping them in creches will ensure their safety, education and well engagement.

7.9 Conclusion

The economy of the study area mainly depends on agriculture. There is no noticeable industry except one tea factory in this area causing low income of the people. Infrastructural facilities like transport network, industry, education and medical facilities are very poor particularly in rural areas. The rate of increasing population has elevated the pressure on land and reduced the man-land ratio. Women playing a pivotal role in case of developing the agriculture and allied sector through their active participation in terms of farming, production, labours as a whole. The major problem facing women farmers in the study area is poor access to farm machinery as majority depend on commercial equipment thereby making them to employ labour intensive technique of farming. Women engaged in agriculture face gender-specific constraints that limit their access to productive inputs, assets, and services. This is observed for land, livestock, purchased and modern inputs, financial services, extension services and labour. Access to assets is often bundled land ownership helps with securing credit while credit is necessary for investment and covering short-term expenses for inputs, in particular for cash crops. At the same time labour constraints in the family and the labour market make it more difficult for women to adopt more labour-intensive technology, access land and take advantage of cash cropping possibilities. The women also identified non access to efficient market as well as poor prices for their farm produce. Numbers of male, living their homelands have migrated to other places within and outside the state to earn money, causing shortage of male labour and more involvement of female labour. Moreover, farm women actively participate in number of agricultural operations, maintenances of livestock and household activities. With all the significant roles played and effort made by women farmers in agricultural development, their output still falls below the desired outcome. This can be due to their inability to acquire some of the farm resources that can ease their labour and increase their output. Moving male counterpart of farm women, drive themselves to involve more on agricultural activities and also the widow women are joining hands into agriculture operations more than previous time. Blending of all this is been seen as emerging trend of **Feminization in Agriculture** in Koch Bihar district, which also emphasis the fact that all necessary resources, support, guidance to be provided to the farm women for a sustainable growth and development of women led agriculture. Therefore, it is essential to take comprehensive programs to enhance women's educational status. Women having sufficient agricultural knowledge can better contribute in family decision making. So, special agricultural program is necessary to provide women modern agricultural knowledge. Thus, the entire work can be concluded with the facts that

women participation in agriculture is increasing with time and women are now acknowledged with the status of 'agricultural worker'.

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ANNEXURE-I

TABLE NO. I.1 PERCENTAGE OF CULTIVATORS AND AGRICULTURAL LABOURERS, 2011

Sl. No.	State	Category	Total Workers	% of Workers	
				Cultivators	Agricultural Labourers
1	India	Male	331865930	24.92	18.56
		Female	149877381	24.01	55.21
		Total	481743311	24.64	29.96
2	West Bengal	Male	26716047	16.84	27.90
		Female	8040308	7.67	34.03
		Total	34756355	14.72	29.32

Source: Office of the Registrar General, India

Note: Workers include both main and marginal workers

TABLE NO. I.2 UTILIZATION OF LAND STATISTICS IN THE IN KOCH BIHAR DISTRICT ('000 HECTARES)

Year	Reporting Area	Forest Area	Area under Non-Agricultural Use	Barren and Uncultivable Land	Permanent Pastures & Other Grazing Land	Land under Misc. Tree Groves not Included in Net Area sown	Culturable Waste Land	Fallow Land other than Current Fallow	Current Fallow	Net Area Shown
2010-11	331.57	5.26	69.43	0.26	0.01	5.80	0.29	0.05	0.81	250.61
2011-12	331.57	4.74	69.43	0.26	0.01	5.80	0.29	0.05	0.81	250.61
2012-13	331.57	4.26	64.80	0.12	-	7.60	1.33	0.05	0.85	252.56
2013-14	331.57	4.21	65.23	0.10	0.01	6.63	1.22	0.04	0.83	253.26
2014-15	331.57	3.76	64.72	-	0.01	6.51	0.72	-	0.86	254.54

Source: District Statistical Handbook, Koch Bihar, 2018

TABLE NO. I.3 OPERATIONAL HOLDING OVER SIZE-CLASSES IN KOCH BIHAR DISTRICT

Year	Size-Classes (Area in hectare)												Average Size of Holdings (hect.)
	Marginal		Small		Semi-Medium		Medium		Large		Total		
	No. of holdings	Area of holdings	No. of holdings	Area of holdings	No. of holdings	Area of holdings	No. of holdings	Area of holdings	No. of holdings	Area of holdings	No. of holdings	Area of holdings	
2005-2006	249437	132758	50748	79525	20789	57528	432	2094	40	2042	321446	273947	0.85
2010-2011	254309	138164	49158	78424	19540	52680	231	1192	40	2042	323278	272502	0.84

Source: District Statistical Handbook, Koch Bihar, 2018

Notes:

Marginal = Below 1.0 hectare, Small = 1.0 hectare and above but less than 2.0 hectare, Semi-medium = 2.0 hectares and but less than 4.0 hectares, Medium = 4.0 hectares and above but less than 10.0 hectares, Large = 10.0 hectares and above.

TABLE NO. I.4 AREA UNDER IRRIGATION IN KOCH BIHAR DISTRICT

Year	Area (Thousand hectares) Irrigated by									
	Govt. Canals	Tank	HDTW	MDTW	LDTW	STW	RLI	ODW	Others	Total
2010-11	-	5.88	3.64	0.22	-	68.06	14.97	2.84	9.12	104.73
2011-12	-	5.89	3.71	0.26	-	69.46	15.29	3.11	9.29	107.01
2012-13	-	5.89	1.86	0.26	-	30.92	7.45*	3.41	9.41	59.20
2013-14	-	-	1.70	0.64	-	30.23	9.23*	-	-	41.80
2014-15	-	-	0.91	0.64	=	30.23	9.26	-	-	41.04

Source: District Statistical Handbook, Koch Bihar, 2018

TABLE NO. I.5 FERTILISER UTILIZED IN KOCH BIHAR DISTRICT

Year	Nitrogen (N) (Thousand Tonnes)	Phosphate (P) (Thousand Tonnes)	Potash (K) (Thousand Tonnes)	Total (Thousand Tonnes)
2010-11	21.2	14.7	10.8	46.7
2011-12	37.1	22.6	12.7	72.4
2012-13	29.1	11.3	7.8	48.2
2013-14	22.4	8.9	7.5	38.8
2014-15	18.5	11.9	7.7	38.1

Source: District Statistical Handbook, Koch Bihar, 2018

TABLE NO. I.6 CONSUMPTION OF ELECTRICITY IN DIFFERENT SECTORS IN KOCH BIHAR DISTRICT

Year	Domestic	Commercial	Industrial	Public lighting	Agricultural irrigation & dewatering	Public Water works & Sewerage pump	Miscellaneous	Total (Thousand K.W.H.)
2010-11	139298	53550	24772	3192	4723	4805	371	230711
2011-12	96557	34731	17515	2004	2831	3583	17128	174349
2012-13	110247	39326	17329	2433	8454	3597	13793	195179
2013-14	131446	36730	17777	2249	11767	3359	20328	223656
2014-15	177398	43044	17175	2510	23703	567	3085	267602

Source: District Statistical Handbook, Koch Bihar, 2018

TABLE NO. I.7 ROADS MAINTAINED BY P.W.D., ZILLAPARISHAD AND PANCHAYAT IN KOCH BIHAR DISTRICT

Year	P.W.D.			Zilla Parishad			Gram Panchayat & PanchayatSamity			Pradhan Mantri Gram Sadak Yojana		
	S	US	T	S	US	T	S	US	T	S	US	T
2010-11	808	15	823	207.47	97.54	305.01	536.13	6687.00	7223.13	795.03	-	795.03
2011-12	985	-	985	229.72	75.29	305.01	569.31	6631.89	7201.20	816.96	-	816.96
2012-13	-	-	-	250.90	54.11	305.01	606.04	6595.16	7201.20	819.23	-	819.23
2013-14	1002	-	1002	-	-	-	-	-	-	-	-	-
2014-15	971.40	22.60	994	37.65	1.20	38.85	-	-	-	32.81	-	32.81

Source: District Statistical Handbook, Koch Bihar, 2018

Note: S= Surfaced Road, US= Unsurfaced Road, T= Total

TABLE NO. I.8 CO-OPERATIVES IN KOCH BIHAR DISTRICT

Sl. No.	Types of Societies	No. of Societies	Total Members
1	Central Bank	1	280
2	Primary Land Mortgage Bank	1	16530
3	Agricultural Credit Societies	176	115103
4	Non Agricultural credit Societies	273	26079
5	All Credit Societies (1+2+3+4)	451	157992
6	Non Credit Societies	184	6891
7	Total of all Credit and Non-Credit (5+6)	635	164883

Source: District Statistical Handbook, Koch Bihar, 2018

TABLE NO. I.9 BANKING IN KOCH BIHAR DISTRICT

Centres	No. of Offices
Rural (Population of 10000 or less)	98
Semi-Urban (Population over 10000 and upto 1 lakh)	70
Urban/ Metropolitan (Population over 1 lakh and upto 10 lakhs)	-
Total	168

Source: District Statistical Handbook, Koch Bihar, 2018

TABLE NO. I.10 FEMALE LITERACY RATE IN CD BLOCKS OF KOCH BIHAR DISTRICT, 2001

Station	Total Female 2001	2001	% of Literate 2001
Haldibari	45,399	17648	38.87
Mekhliganj	64212	25464	39.66
CoochBehar-I	125387	66225	52.82
CoochBehar-II	134436	79299	58.99
Mathabhanga-I	90653	35855	39.55
Mathabhanga-II	95398	44348	46.49
Dinhata-I	121936	55829	45.79
Dinhata-II	100919	47551	47.12
Tufanganj-I	109292	51264	46.91
Tufanganj-II	82242	38724	47.09
Sitai	47059	16381	34.81
Sitalkuchi	79363	29586	37.28
KochBihar	1096296	570769	52.06

Source: Census, 2001

TABLE NO. I.11 FEMALE LITERACY RATE IN CD BLOCKS OF KOCH BIHAR DISTRICT, 2011

Station	Total Female 2011	Total Literate 2011	% of Literate 2011
Haldibari	51118	27925	54.63
Mekhliganj	75198	49847	66.29
CoochBehar-I	158373	97760	61.73
CoochBehar-II	164310	110214	67.08
Mathabhanga-I	105694	58017	54.89
Mathabhanga-II	110297	63036	57.15
Dinhata-I	138667	81754	58.96
Dinhata-II	117403	68124	58.03
Tufanganj-I	120180	71268	59.30
Tufanganj-II	90504	55166	60.95
Sitai	54317	25272	46.53
Sitalkuchi	91076	49879	54.77
KochBihar	1367544	8,21,771	60.09

Source: Census, 2011

TABLE NO. I.12 PROBLEMS FACED BY FARM WOMEN

Problems	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5	Rank 6	Rank 7	Rank 8	Rank 9	Rank 10	Rank 11
Gender disparity in wage	900	200	100	0	0	0	0	0	0	0	0
Poor scale neutral infrastructural facility	0	200	130	100	600	70	100	0	0	0	0
Less importance in decision making	0	600	150	100	110	150	90	0	0	0	0
Limited land ownership	100	100	300	250	120	230	50	50	0	0	0
Limited access to capital, resource, credit	0	0	0	500	140	330	100	130	0	0	0
Lack of agricultural knowledge training discussion	0	0	0	0	0	80	100	200	600	220	0
More involvement in household activity	200	100	400	70	100	130	150	50	0	0	0
Limited education and mobility	0	0	0	0	0	0	0	100	100	300	700
Drudgery in agriculture due to a lack of resources and machines	0	0	70	130	0	210	350	150	100	190	0
The lack of strong networks and mentors	0	0	50	50	130	0	160	100	300	290	120
Unaware about the legal rights	0	0	0	0	0	0	100	420	100	200	380

Source: Field Survey, 2017

ANNEXURE-II

INTERVIEW SCHEDULE FOR PERSONAL INTERVIEW

Respondent No.:

Date of Investigation:

Name of the Village:

Gram Panchayat:

Block:

FAMILY STATUS

Name of the respondent:

Address:

Status in the family: Daughter (1) / Daughter-in-law (2) / Family-co-head (3) / Family Head (4)

Age:

Religion: Hindu (1) / Muslim (2) / Christian (3) / Others (4)

Caste: Scheduled Tribe (1) / Scheduled Caste (2) / Other Backward Caste (3) / General (4)

LITERACY LEVEL

Education: Illiterate (0) / Can write only (1) / Can read & write (2) / Primary (3) / Middle school (4) / High school (5) / Graduate (6) / Above (7)

Family education status:

Members

Education

F. E. S. (Total educational score/member)

Type of the family: Nuclear (1) / Joint (2)

ECONOMIC CONDITION

Occupation: Wage Earning (working on others farm) (1): Agriculture (2):
Allied fields (3): Business (4): Service (5):

Annual Income (Rs.):

Annual Expenditure (Rs.):

Occupation	
Agriculture	
Agricultural Labour	
Animal Husbandry	
Poultry	
Fisheries	
Private Firm	
Business	
NGO – Worker	
Govt. Employee	
Others (Specify)	

Land holding: Cultivated land (in Bigha):

Farm power: No farm power (0) / Indigenous farm implement (1) / One pair of drought animal (2) / Power tiller (3) / Tractor (4)

Source of irrigation: No irrigation (0) / Tank (1) / Shallow tube well (2) / River lift pump (3) / Deep tube well (4)

Possession of assets: Cart (1) / Bicycle (2) / Radio (3) / Improved plough (4) / Sprayer (heavy weight/light weight) (5) / Paddle thresher (6) / Seed drill (7) / Television (8) / Telephone/Mobile (9) / Refrigerator (10) / Motor cycle (11)

Livestock possession: Piggery (1) / Cow (local/cross bred) (2) / Goat/sheep (3) / Fishery (4) / Buffalo (5) / Poultry (6)

House Type: No house (0) / Hut (1) / Kutcha (2) / Mixed (3) / Pucca (4) / Mansion (5)

Utilization Pattern of Communication Sources

1. Communication with Extension Worker/Organization:

Extension Worker/Organisation	Most Often (4)	Often (3)	Sometimes (2)	Rarely (1)	Never (0)
Pranibandhu					
Private Organization (Input Dealers Etc.)					
Animal Scientists					
Ngo					
KPS					
Farmers' Club					
KVK University					

2. Mobility / Outside Contact:

Outer World/Destination	Most Often (4)	Often (3)	Sometimes (2)	Rarely (1)	Never (0)
City					
District Town					
Subdivision					
Others					

POINT SCORE FOR RESPONDENTS

Sl. No.	Particulars	Response				
		SA	A	UD	DA	SDA
1.	Score for positive statement	5	4	3	2	1
2.	Score for negative statement	1	2	3	4	5

SA= Strongly Agree; A=Agree; UD=Undecided; DA=Disagree; SDA=Strongly Disagree

RISK PREFERENCE

SL. NO.	STATEMENTS	SA	A	UD	DA	SDA
1	A farmer should rather take more of a chance in making a big profit than to be contented with a smaller, but less risky profit (+)					
2	A farmer who is willing to take greater risks than the average farmer, usually do better financially (+)					
3	It is good for a farmer, to take risks when he knows his chance to success is fairly high (+)					
4	Try an entirely new method in farming by a farmer involves risk, but it is worth doing it (+)					
5	A farmer should grow large number of crops to avoid greater risks involved in growing one or two crops (-)					
6	It is better for a farmer not to try new farming method unless most other farmers have used them with success (-)					

SCIENTIFIC ORIENTATION

SL. NO.	STATEMENTS	SA	A	UD	DA	SDA
1	New methods of farming give better results to a farmer than the old methods (+)					
2	Even a farmer with lots of experience should use new methods of farming (+)					
3	Though it takes time for a farmer to learn new methods in farming it is worth the efforts (+)					
4	A good farmer experiments with new ideas in farming (+)					
5	Traditional methods of farming have to be changed in order to raise the level of living of a farmer (+)					
6	The way of farmer's forefathers farmed is still the best way to farm today (-)					

ECONOMIC MOTIVATION

SL. NO.	STATEMENTS	SA	A	UD	DA	SDA
1	A farmer should work towards larger yields and economic profits (+)					
2	A most successful farmer is the one who makes the most profit (+)					
3	A farmer should try any new farming idea which may earn him more money (+)					
4	A farmer should grow cash crops to increase monetary profits in comparison to growing of food crops for home consumption (+)					
5	It is difficult for the farmer's children to make good start unless he provides them with economic assistance (+)					
6	A farmer must earn for his living but the most important thing in life cannot be defined in economic terms (-)					

INDEPENDENCE SCALE

SL. NO.	STATEMENTS	SA	A	UD	DA	SDA
1	If a farmer wants a thing done right, he must do it himself (+)					
2	Independence in decision-making is the most important quality of a successful farmer (+)					
3	A farmer is at his best when he is free, self-reliant and avoids all outside help (+)					
4	A financially successful farmer is one who stands on his own feet (+)					
5	A farmer should teach his children to make their decisions independently (+)					
6	Now-a-days a farmer can no longer afford to be independent (-)					

ATTITUDE TOWARDS AGRICULTURE

SL. NO.	STATEMENTS	SA	A	UD	DA	SDA
1	Agriculture is the hope for the growing population in India (+)					
2	Top priority should be given by the govt. For the development of agriculture (+)					
3	To me, agriculture will be the last resort as profession (+)					
4	Only those who are unable to go for any other work will take agriculture (-)					
5	One should be proud of being member of a farm family (+)					
6	If we want to safe guard our cultural heritage, we should foster an agrarian society (+)					
7	I will rather while away my time than doing agriculture (-)					
8	Agriculture is meant for uneducated and poor people (-)					
9	I will take agriculture to prosper (+)					
10	Promoting scientific agriculture is the way for India's prosperity (+)					
11	Even if a handsome return is guaranteed from agriculture, I will not take it as a profession (-)					
12	Today's need is to promote industry than agriculture (-)					

ATTITUDE TOWARDS ANIMAL REARING & POULTRY

SL. NO.	STATEMENT	A	UD	DA
	SCORE (+)	3	2	1
	SCORE (-)	1	2	3
1	I feel that young farmers should take up animal rearing & poultry as a self employment project (+)			
2	Animal rearing & poultry are labour and capital intensive (-)			
3	Animal rearing & poultry make their meat and milk readily available for consumption (+)			
4	Using scientific methods in animal rearing & poultry can not generate higher profit (-)			
5	Farmers should keep animal rearing & poultry to meet emergency financial need by selling them (+)			
6	Animal rearing & poultry is risky enterprise for any one as animals easily contract many diseases (-)			
7	Animal rearing & poultry are very useful to prosperity for poor farmers (+)			
8	As efficiency to convert otherwise useless crop by-products into milk and meat is a plus point for animal rearing & poultry (+)			
9	Animal rearing & poultry should be banned as animals and poultry cause deforestation (-)			
10	One should abstain from animal rearing & poultry as feed are costly and fodder are scarce these days (-)			

MANAGEMENT ORIENTATION

SL. NO.	STATEMENT	SA	A	DA	SDA
1	PLANNING ORIENTATION				
A	Each year, one should think a fresh about the crop to be cultivated in each type of land (+)				
B	It is not necessary to make prior decision about the varieties of crop to be cultivated in land (-)				
C	It is possible to increase the yield the yield through farm production plan (+)				
D	It is not necessary to think ahead the cost involved in raising a crop (-)				
E	One need not consult agricultural experts for crop plan (-)				
F	It is not necessary to have training for crop production (-)				
2	Production orientation				
A	Timely planting of a crop can ensure good yield (+)				
B	One should use as much fertilizers as he likes (-)				
C	Determining fertilizer quantities by soil testing saves money (+)				
D	Seed rate should be used as recommended by the specialists (+)				
E	For timely weed control one should use suitable herbicides (+)				
F	With low water rates one should use as much irrigation water as available (-)				
3	Marketing orientation				
A	Market news is not useful to a farmer (-)				
B	A farmer can get good price by grading his produce (+)				
C	Co-operatives can help the farmers to get better price for their produce (+)				
D	One should sell his produce to the nearest market irrespective of price (-)				
E	One should purchase the inputs from the shop where his other relatives purchase (-)				
F	One should grow those varieties, which have more market demand (+)				

PROBLEMS ASSOCIATED WITH AGRICULTURE & ALLIED SECTORS

Sl. No.	Problems	Detailing of the Problems
	Technical	
	Economic	
	Institutional	
	Socio-cultural	

AGRICULTURAL KNOWLEDGE & AWARENESS TEST

PLEASE COMMENT ON THE FOLLOWING

1. Jute is a pre-Kharif crop: YES (1) / NO (0)
2. Boro rice is a Rabi crop:
3. Swarna is the HYV of rice:
4. Amaranthus can be grown in homestead garden:
5. Majra is an insect pest of paddy:
6. Jute semilooper is a pest of jute:
7. Sheath blight is a disease of rice:
8. Rogar is a pesticide:
9. Late blight (Dhasa) is a disease of potato:
10. Urea is applied in split doses:
11. Are you applying manures along with fertilizers?:
12. Phosphorus & Potash is applied during land preparation:
13. Borax is applied in this zone to supply micronutrient:
14. Jute is a three-month crop:
15. FMD is a disease of cattle:
16. Ranikhet is a disease of poultry:
17. Soil & water testing is needed for proper soil health management:
18. Do you test the soil?:
19. Do you test the irrigation water?:
20. Are you apply fertilizers on the basis of soil test?:
21. Bank is the credit provider for livestock & poultry enterprise:
22. Cooperative is helpful to increase the productivity of livestock & poultry enterprise:
23. Milk selling is a profitable business:
24. Egg & meat is the product of poultry enterprise:
25. Are you maintaining the livestock and poultry enterprise scientifically?

INVOLVEMENT IN FARMING ACTIVITIES: CROP PRODUCTION

ACTIVITIES	NO PARTICIPATION (0)	OCCASIONAL PARTICIPATION (1)	INDEPENDENT PARTICIPATION (2)
Selection of land			
Selection of variety			
Collection of seeds			
Collection of fertilizers			
Collection of pesticides			
Nursery bed preparation			
Preparatory tillage			
Forming ridges & furrows			
Ploughing			
Land preparation			
Manure & fertilizer application			
Cleaning seeds for sowing			
Seed treatment			
Sowing			
Transplanting			
Gap filling			
Weeding			
Irrigation			
Plant protection measures			
Bird scaring			
Rodent control			
Harvesting			
Threshing			
Winnowing			
Grading			
Storage of grains			
Labour supervision			
Account keeping			
Marketing & transportation			
Preparation of manures & compost			
Production of TPS			
Intercultural operations			
Jacking			
Retting			
Collection of fibres			
Fiber cleaning			
Drying of fibres			
Making bundles			

INVOLVEMENT IN DAIRY/GOATERY/PIGGERY/POULTRY ACTIVITIES

ACTIVITIES	NO PARTICIPATION (0)	OCCASIONAL PARTICIPATION (1)	INDEPENDENT PARTICIPATION (2)
Cleaning of cattle shed			
Feeding			
Collection of fodder / food			
Animal rearing			
Milking of cattle and goat			
Care of cattle / goat / pig			
Care of calves			
Care of poultry birds and poultry farm			
Collection of feed			
Marketing of milk, eggs, meat of goat and pig, chicken			

INVOLVEMENT IN HOUSEHOLD ACTIVITIES

ACTIVITIES	NO PARTICIPATION (0)	OCCASIONAL PARTICIPATION (1)	INDEPENDENT PARTICIPATION (2)
CLEANING			
House			
Utensils			
Clothes			
Farm house			
FOOD PREPARATION			
Cooking			
Collection of fuels			
Marketing			
REPAIRING			
House			
Others			
CHILD CARE			
Taking care of children			
Feeding			
Caring			
Education			
PURCHASING NECESSARY ITEMS			
Food			
Clothes			
Jewelleries			
Luxurious materials			
Assets			
Medicine			
Others			
OTHER INVOLVEMENT			

DECISION MAKING IN AGRICULTURE AND DOMESTIC MATTERS

ACTIVITIES	NOT CONSIDERED (0)	CONSIDERED AFTER CONSULTATION WITH OTHERS (1)	CONSIDERED INDEPENDENTLY (2)
AGRICULTURE			
Crops to be grown			
Season of growing			
Use of variety			
Time of sowing			
Type of manures & fertilizers			
Irrigation			
Use of pesticides			
Harvesting			
Marketing			
FAMILY MATTERS			
Education of children			
Taking care of children			
Buying of foods			
Buying of clothes			
Marriage of Children			
Ceremonial aspects at home			
Invitation outside home			
Interaction with neighbours			
Others			

DECISION MAKING IN ECONOMIC ASPECTS

ACTIVITIES	NOT CONSIDERED (0)	CONSIDERED AFTER CONSULTATION WITH OTHERS (1)	CONSIDERED INDEPENDENTLY (2)
About savings			
Selling, buying of holdings			
Selling, buying of domestic animals			
Buying of raw materials of agriculture			
Buying farm machineries			
Food and household materials			
Luxurious materials			
Other necessary materials			
Selling of food grains			
Selling of vegetables			
Selling of other agricultural products			
Selling of poultry & dairy products			
Selling of domestic animals			
Regarding borrowing money			
Regarding return of borrowed money			
Buying and selling of jewelleryes			

Signature of the surveyor:

Signature of the respondent:

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Women in Agriculture: A Case Study of Koch-Bihar District, West Bengal

Anwesha Saha* and Indira Lepcha**

**Research Scholar, Department of Geography & Applied Geography, University of North Bengal **
Associate Professor, Department of Geography & Applied Geography, University of North Bengal
E-mail: anweshageorbu@gmail.com*

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Abstract

Women contribute substantially to agricultural income of our country. The economy of the Koch Bihar district mainly depends on agriculture. A very large number of people are dependent on agriculture. In this district 285426 numbers are agricultural workers of which 59.63% are male and 40.37% are female (Census 2011). Female farm women contribute significantly to household and their earnings are found crucial for their family but the status and role of farm women is very poor in this area. Although rural farm women played a vital role in agricultural, domestic their view was very negligible. It is high time for planners, policy makers and extension personnel to realize the immense potential of rural farm women resources in agriculture and develop appropriate policy measures. Beside this, it is necessary to provide need based educational programmes and market linkages to rural farm women so as to get additional income and employment opportunity in the days to come.

Keywords : agriculture, socio-economic status, wages, women's participation

Introduction

Agriculture is the single largest production in India and it has been widely accepted that women are an integral part of the agricultural production systems. Women of India, numbering 495.7 million constitute 48.27% of total population of which 72.72% live in rural areas. Female labour force in rural areas is 31.56% with most of them (87%) being employed as agricultural labourers and cultivators (Sridhara, 2009). Women contribute substantially to agricultural income of the country. Agriculture including crop production, animal husbandry, and storage of food grains is highly dependent on the time devoted by women. In India men and women participate in agriculture as a family unit on the farms. Female farm labourers contribute significantly to household and their earnings are found crucial for their family. But the status and role of farm women is very poor. Female agricultural workers belonging to big farm households have a better say as compared female farm labourers. Female agricultural labourers contribute significantly to

households but they lack education, modern agricultural techniques and often do not have access to economic resources. Moreover, they are not integrated into mainstream of the development process. Scarcity of resources, economic deprivation, gender bias in wages, lack of freedom in decision making for agricultural activities as well as domestic matters has made life miserable and unjustifiably hard for farm women. The present study examines the issues of women's contribution to agriculture, valuation of women work in field and household, lower wages for women compared to men and major problems of farm women.

Objectives

The following objectives were set up for this study:

1. To analyze the relationship between the socio economic status of farm women and involvement of the farm women in agriculture and allied activities.

2. To study the factors that influencing differentials in wages between men and women agricultural labours.

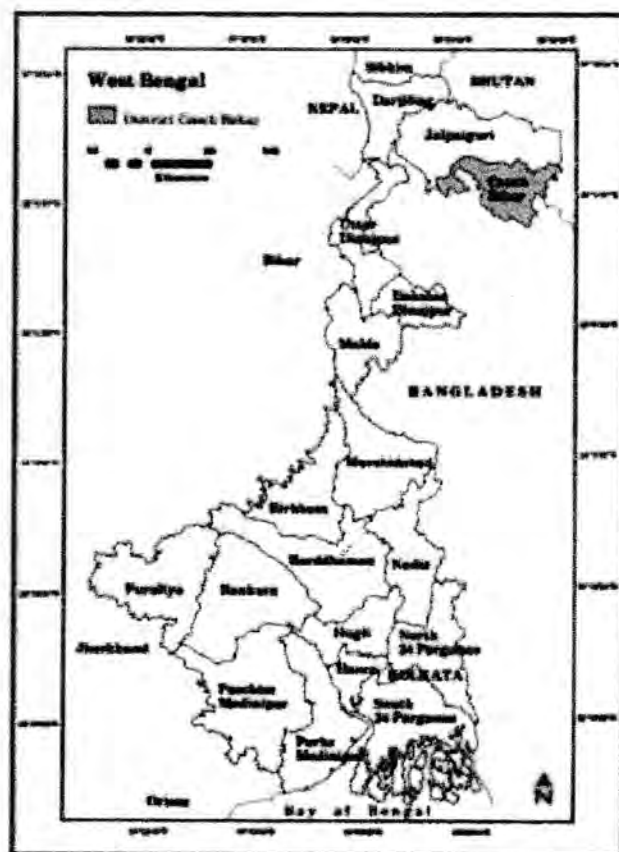
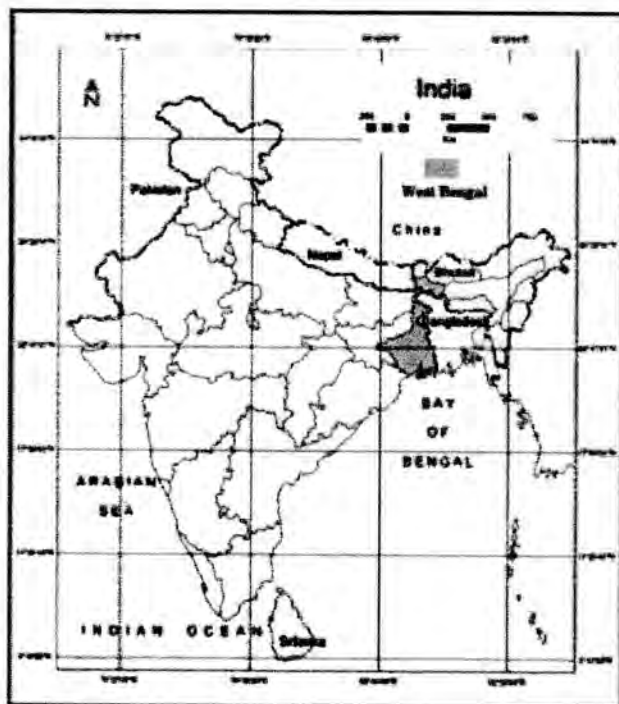
3. To identify the problems of farm women regarding their involvement in agriculture and to find out the way to solve these problems.

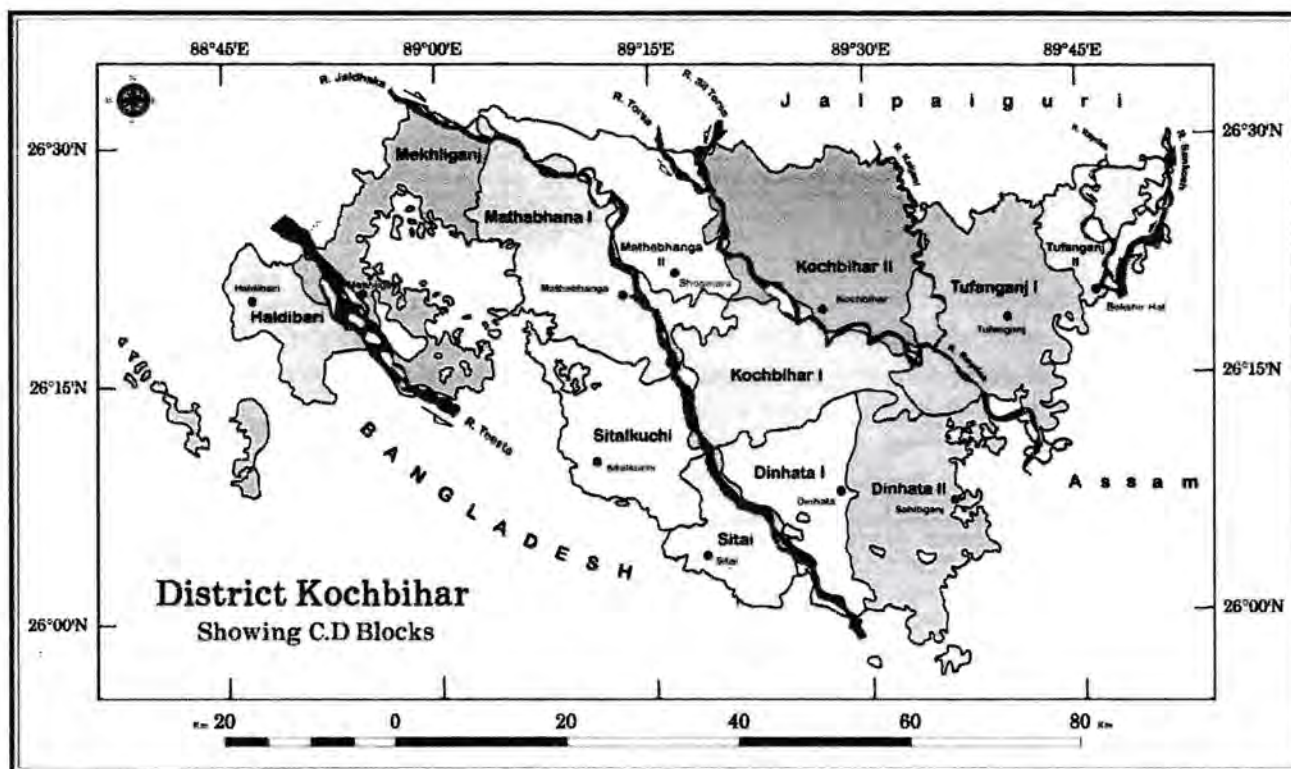
Study area:

The economy of the Koch Bihar district mainly depends on agriculture. There is no noticeable industry except one tea factory in this area causing low income of the people. Infrastructural facilities like transport network, degree of urbanization, industry, education and medical facilities are very poor particularly in rural areas. The rate of increase of population has increased the pressure on land and reduced the man-land ratio. A very large number of people are dependent on agriculture. The number of women in Koch Bihar district is 1369190 contributing about 48.51% of total population of the district (census 2011). In this district 285426 numbers are agricultural workers of which 59.63% are male and 40.37% are female. Thus women are integral part of agricultural production systems of

Koch Bihar. Farm women share abundant responsibilities and perform a wide spectrum of duties in crop production activities such as seed sowing, transplanting, weeding, fertilizer application, plant protection measures processing, storage etc. as well as in allied field activities such as dairy, goatery, piggery, poultry, fisheries etc. in addition to their household activities. Although, improved technology in relation to crop production has been introduced in this area but farm women are not aware of this phenomenon. Besides, numbers of male, living their homelands have migrated to other places within and outside the state to earn money, causing shortage of male labour and more involvement of female labour. Although women bear the burden of work in the field of agriculture and allied sectors they remain as helpers of men without any proper recognition in this district. For this the present study was conducted in Koch Bihar district to focus on farm women status in our society.

Location map of the study area





Methodology :

Sampling design (Selection of the area and the respondents): The random sampling technique was followed in case of selecting the area and the respondents of the present study. The district, the sub-divisions was selected systematically; the blocks from the chosen sub-division were selected with the help of simple random sampling. An exhaustive list of farm women within the selected blocks was prepared. From this total list, five hundred farm women were selected randomly as respondent for the present study.

Variables and their measurements: On the basis of the delineated objectives the involvement indices were considered as dependent variables and the different socio-personal, economic, other variables were considered as independent variables. The variables to be considered for this study were operationalised and measured in following way.

Status of the farm women: It refers to the position that farm women occupy in the family. The farm woman whose husband has migrated or widow

women has to act as family head. In nucleus family farm woman act as a family co-head. If the farm woman occupy the status of daughter or daughter in low is dominated by the elder members of the family. Thus farm women are classified into four categories and accordingly the score was given as under Daughter, 1; Daughter-in-low, 2; Family-co-head, 3; Family Head, 4.

Age: Age is the one's orientation towards development and growth. Individual behaves according to her orientation and her orientation gives to determine his/her character. The chronological ages developed through experiences and introspection, excise influence in orienting the participation process. As a result the present study was consider the age of women as a predictor variable and measured by directly registering the chronological age of the responded women.

Religion & Caste: Caste is an aggregate of individual whose share of obligations and privileges are fixed by birth, as well as sanctioned and supported by religion which comprises of Hindu, Muslim, Christian, Others. This variable was divided into four distinguished

caste prevailing in the present social system namely Scheduled Tribe, Scheduled Caste, Other Backward Caste, General caste. The variable was measured with the help of slightly modified scale devised by Bhairamkar scale on caste (2010). The score would be assigned as Scheduled Tribe, 1; Scheduled Caste, 2; Other Backward Caste, 3; General, 4.

Education: According to the International Encyclopedia of the Social Science, education is an institutionalized form of socialization to adult roles. Education helps an individual to know and give shape and direction to the thinking processes. The variable education was operationalised as the formal education successfully completed by the respondents and it would be measured with the help of slightly modified scale derived by Supe (2007). The score was assigned as Illiterate, 0; Can read only, 1; Can read & write, 2; Primary, 3; Middle school, 4; High school, 5; Graduate, 6; Above, 7.

Family education status: It refers to the education status of all the members of the family in the eligible age group for formal education i. e. excluding the children below six years of the age. This variable was measured with the help of procedure followed by Bhairamkar (2010). The total score was obtained by adding the respective standard completed by each member and the Family Education Status score was obtained by dividing the total score with eligible number of family members. Family Education Status would be calculated with the help of following formula;

$$\text{Family Education Status} = \frac{E_1 + E_2 + \dots + E_N}{N}$$

Family occupation: Occupation is considered as one of the factors which influence the decision making by farm women. Accordingly five prominent professions like wage earning, agriculture, allied fields, business, service were considered and scored as under Wage Earning (working on others farm), 1; Agriculture, 2; Allied fields, 3; Business, 4; Service, 5.

Family annual income: Annual income can give inputs in case of developing the attitude towards participation in any activities. The annual income was

operationalised and measured as the earnings of the family from primary and secondary sources of income per year in rupees. This variable was measured by assigning the score as Below Poverty Level or BPL (family annual income below 18-20 thousand), 1; Above Poverty Level or APL (family annual income above 18-20 thousand), 2.

Family annual expenditure: It shows the attitude of the respondent's family towards the consciousness on health, education, savings etc.

Land holding: Land holding is the representation of economic status within a rural system. The land holding was operationalised and measured as total land caused by respondent family in hectares. It was measured by assigning the score as No Land, 0; Marginal (below 1 hec.), 1; Small (1 hec. & above but < 2 hec.), 2; Semi-medium (2 hec. & above but < 4 hec.), 3; Medium (4 hec. & above but < 10 hec.), 4; Large (10 hec. & above), 5.

Land utilization pattern: It shows the use of land of the respondent's family. It was measured by assigning the score as House, 1; Cultivated land, 2; Pond, 3; Pasture land, 4; Orchards, 5; Others, 6.

Farm power: The possession of farm power indicates the efficiency of an individual in case of managing the agriculture and livestock enterprise. It was operationalised by the number of drought animal and improve tillage implements. It was measured by assigning the score as, No drought animal, 0; One pair of drought animal, 1; Two pair of drought animal, 2; Three pair of drought animal, 3; Power tiller, 4; Tractor, 5.

Irrigation: Irrigation is one of the important aspects of cultivation practices like selection of crops, selection of variety, time of sowing of the crops etc. This variable was measured by assigning the score as No irrigation, 0; Tank, 1; Shallow tube well, 2; River lift pump, 3; Deep tube well, 4.

Possession of assets: The information related to possession of assets of the respondent's family would be obtained and was considered for scoring. The variable would be measured with the scale as Cart, 1; Bicycle, 2; Radio, 3; Improved plough, 4; Sprayer

(heavy weight/light weight), 5; Paddle thresher, 6; Seed drill, 7; Television, 8; Telephone/Mobile, 9; Refrigerator, 10; Motor cycle, 11;

Livestock Possession: The information pertaining to the growing population available to the respondents would be obtained and their type was considered for scoring livestock possession. This variable was measured with the scale developed by Hadole (2005), as follows; Piggery, 1; Cow (local/cross bred), 2; Goat/Sheep, 3; Fishery, 4; Buffalo, 5; Poultry, 6.

House type: The type of house owned by the respondents was taken into consideration for operationalising the variable house type as it some impact on the participation process. It was measured by the Supe's scale (2007) by assigning the score as No house, 0; Hut, 1; Kutcha, 2; Mixed, 3; Pucca, 4; Mansion, 6.

Utilization pattern of communication sources: It was operationalised as the frequency of respondent's exposure to the extension personal of lime dependents, information, mass media and cosmopolite source of during last one year with a view to seek guidance on the issues related to agriculture, livestock and poultry. The variable was measured with the help of the slightly modified scale of Haidikar (1998). The variable was measured by assigning the score to the frequency of exposure as most often, 4; often, 3; sometimes, 2; rarely, 1; never, 0 and the identified communication sources are Pranibandhu, V. S. & B. L. D. O., Private Organisation, Animal scientists, NGOs.

a. Communication with extension worker/organisation: The scores composed based on the frequency of communication with extension worker or any other organisation and scale prepared having score of '0' to '4'. The corresponding responses are 'never'; 'rarely'; 'sometime'; 'often' and 'most often' and also having score of '0' to '4' for the corresponding responses of 'never'; 'occasionally'; 'regularly'; 'supervision' and 'doing'.

b. Use mass media: The scores composed based on the extent of use of mass media channels and

scale prepared having score of '0' to '4'. The corresponding responses are 'never'; 'rarely'; 'sometime'; 'often' and 'most often'.

c. Mobility: As per the review of available literature mobility/outside contact also be regarded as important socio-economic character regarding decision-making. The responses regarding the visit of the respondent of the nearest town, district town and cities are coded against a 5-point scale, which is composed of five responses like 'never'; 'rarely'; 'sometime'; 'often' and 'most often' with corresponding scores of '0', '1', '2', '3' and '4' respectively.

Risk preference: It is the degree to which a farmer is oriented towards risk and uncertainty and has courage to face the problems in farming. This variable was measured with the help of scale developed by Supe (2007). This scale consisted of six items, in which first four statements are positive and two statements are negative.

Scientific orientation: It is the degree to which a farmer is oriented to the use of scientific methods in decision making and farming. This variable was measured with the help of scale developed by Supe (2007). This scale consisted of six items, in which first five statements are positive and statement no. six is negative.

Economic motivation: It is defined as the occupational success in terms of profit maximization and the relative value placed by a farmer on economic ends. This variable was measured with the help of scale developed by Supe (2007). This scale consisted of six items, in which first five statements are positive and statement no. six is negative.

Independence scale: It is the degree to which a farmer places positive value independence or autonomy in decision-making. This variable was measured with the help of scale developed by Supe (2007). This scale consisted of six items, in which first five statements are positive and statement no. six is negative.

Attitude towards agriculture: It was measured by scale developed by Mathew and Reddy

(1989). This scale consists 12 statements and response would be rated on five point continuum ranging from strongly agree to strongly disagree.

The responses were recorded on five point continuum ranging from strongly agree to strongly disagree for risk preference, scientific orientation, economic motivation, independence scale and attitude towards agriculture. The scoring procedure used is as follows;

for strongly disagree response and vice-versa in case of negative statements. The score for each individual on the management orientation scale was obtained by Summation of the score awarded for each one of the items included.

Agricultural knowledge & awareness test:

Knowledge is the pursuit of wisdom and information application. The knowledge of the selected enterprise was operationalised twenty five dichotomous (yes/no)

SL. NO.	PARTICULARS	RESPONSE				
		SA	A	UD	DA	SDA
1.	SCORE FOR POSITIVE STATEMENT	5	4	3	2	1
2.	SCORE FOR NEGATIVE STATEMENT	1	2	3	4	5

SA= Strongly Agree; A=Agree; UD=Undecided; DA=Disagree; SDA=Strongly Disagree

Attitude towards animal rearing & poultry:

It was measured by slightly modified scale developed by Rajkamal&Kunzru (1993). This scale consists 10 statements and response was rated on three point continuum ranging from agree to disagree. The scoring procedure used is as follows;

type statements which refers the knowledge of the respondents on agriculture, livestock and poultry enterprise. The knowledge score was obtained with the help of the total positive answers of the statements. The score would be assigned to the response as yes, 1 and no, 0.

SL. NO.	PARTICULARS	RESPONSE		
		A	UD	DA
1.	SCORE FOR POSITIVE STATEMENT	3	2	1
2.	SCORE FOR NEGATIVE STATEMENT	1	2	3

A=Agree; UD=Undecided; DA=Disagree

Management orientation: It is operationally defined as the degree to which a farmer is oriented towards scientific farm management comprising planning, production and marketing function of the farm. This variable was measured with the help of scale developed by Samanta (1977). The scale consisted eighteen statements, six statements each for planning, production and marketing orientation. In each group positive and negative statements would be mixed, retaining at the same time a more or less same order of statements. Each item would be provided with four point response continuum. The positive statements was given a score of four for strongly agree, three for agree, two for disagree and one

Activity-Involvement Index (AII): Activity-Involvement Index is the physical involvement in the agriculture, livestock and poultry rearing activities. The women bear the responsibility of performing of every activity of agriculture, livestock and poultry rearing activities. The variable was operationalised as the performance of activities on the bases of their physical involvement. It was measured with the help of three point scale on the basis of extent of physical involvement and the extent was categorized and score as no involvement, 0; joint involvement, 1; independent involvement, 2. It was measured by slightly modified scale developed by Pareek-Trivedy (1964). The Activity-Involvement Index was calculated as;

$$AII = \frac{O_{Aj}}{\sum M_{Aj}} \times 100 \quad \text{where, } O_{Aj} = \text{obtained activity score (weighted) in } j^{\text{th}} \text{ enterprise /crop/area}$$

M_{Aj} = maximum activity score (weighted)

achievable in j^{th} enterprise/crop/area

Result and Discussion:

Actual socio-economic conditions of women farmers of Koch Bihar district are stated below in a broad manner. It explored the areas of relational analysis between the involvement of different socio-personal, socio-economic and communication related attributes of women in agriculture and allied sectors within the district of Koch Bihar.

The majority of the respondents are enjoying the status of family head (65.8%) followed by status of family co-head (31.4%) and daughter-in-law (2.4%). The status of women in the family always controls the involvement pattern in any activities associated in farm and home.

The farm women in Koch Bihar district of West Bengal are classified into three groups according to their age. The results show that majority of the respondents is under the age group of 18-39 years (69.60%) followed by 40-61 years age group (28.60%) and 62-83 years age group (1.80%) respectively. The data indicate that the young aged women are much prone to decision making as well as actively participate for conducting the agricultural and allied activities.

In the present research setting 2 types of religions are dominating. The majority of the women respondents are under Hindu (80%) and Muslims are the minority (20%). In the study area there is a mix of Hindu and Muslim religion in case of delimiting their differential participation in agriculture and allied sectors.

The study shows that majority of the respondents is Scheduled caste (57%) followed by General caste (37%). According to the study the scheduled caste and general caste women are getting

the information and utilizing that information in case of delimiting their involvement status with caste.

Education is an important indicator for a society. The study shows that majority of the respondents is under middle school educated group (30%) followed by can read and write educated group (20.6%), primary school educated group (17.6%) and high school educated group (15.8%) respectively. Middle school educated women are much more responsive for involving themselves in any activity.

The field study presents the distribution of the respondents of Koch Bihar districts of West Bengal according to their family education status. The results show that majority of the respondents' family education status are under the medium group of 2.3-4.5 (75.8%) followed by low education status group of 0-2.2 (61%) and high education status group 4.6-6.8 (60%) respectively. Family education status is also medium means the respondents and their family members are not so much highly educated consequently they involve in agriculture and allied activities.

The study shows that majority of the respondents is under joint family types group (60.2%) followed by nuclear family type group (39.8%) respectively. Though nuclear family is much more prominent in the present context but in present study the joint families women are contribute much more in making the entire sample.

The study shows that majority of the respondents' primary occupation is agriculture & allied (74.4%) followed by agriculture (20.2%) and wage earning group (3.2%) respectively. It is clearly showed that in the present study area most of the women are associated with agricultural and allied field activities and their primary vocation is agriculture and allied. They are mostly dependent on agriculture to maintain their livelihood.

The study shows that majority of the respondents are under low annual income group of 6000/- to 86000/- (88%) followed by medium annual income group 86000/- to 166000/- (11.6%). The women of the study area are mostly pro-poor in nature. Most of the women are doing well with their

TABLE 1. Distribution of the respondents according to the selected variables(N=500)

Category	Score	Frequency	Percentage
Status of farm women (X_1), N=500			
Daughter	1	2	0.4
Daughter in law	2	12	2.4
Family co-head	3	157	31.4
Family Head	4	329	65.8
Age Group (X_2), N=500			
1 st aged group	18-39	348	69.60
2 nd aged group	40-61	143	28.60
3 rd aged group	62-83	9	1.80
Religion (X_3), N=500			
Hindu	1	400	80
Muslim	2	100	20
Caste (X_4), N=500			
Scheduled tribe	1	11	2.2
Scheduled caste	2	285	57
Other backward caste	3	19	3.8
General	4	185	37
Education (X_5), N=500			
Illiterate	0	3	0.6
Can write only	1	76	15.2
Can read and write	2	103	20.6
Primary	3	88	17.6
Middle school	4	150	30
High school	5	79	15.8
Graduate	6	1	0.2
Family education status (X_6), N=500			
Low	0-2.2	61	12.2
Medium	2.3-4.5	379	75.8
High	4.6-6.8	60	12
Family type (X_7), N=500			
Nuclear	1	199	39.8
Joint	2	301	60.2
Occupation (X_8), N=500			

Wage earning (working on others farm)	1	16	3.2
Agriculture	2	101	20.2
Allied fields	3	5	1
Allied fields with wage earning	4	1	0.2
Agriculture and allied fields	5	372	74.4
Agriculture with business	6	2	0.4
Allied fields with business	7	1	0.2
Agriculture, Allied fields with business	9	2	0.4

Annual income (X_9), N=500

Low	6000-86000	440	88
Medium	86000-166000	58	11.6
High	166000-246000	2	0.4

Expenditure (X_{10}), N=500

Low	6000-36000	221	44.2
Medium	37000-67000	274	54.8
High	68000-98000	5	1

Land holding of the family (X_{11}), N=500

Small	1 hec. & above but < 2 hec.	401	80.2
Semi-medium	2 hec. & above but < 4 hec	93	18.6
Medium	4 hec. & above but < 10 hec.	6	1.2

Farm power (X_{12}), N=500

No farm power	0	12	2.4
Indigenous farm implement	1	88	17.6
One pair of drought animal	2	287	57.4
Power tiller	3	91	18.2
Tractor	4	22	4.4

Source of irrigation (X_{13}), N=500

No irrigation	0	4	0.8
Tank	1	2	0.4
Shallow tube well	2	483	96.6
River lift pump	3	11	2.2
Deep tube well	4	0	0

Possession of assets (X_{14}), N=500

Low	0-13	180	36
Medium	14-27	283	56.6
High	28-41	37	7.4

Livestock possession (X_{15}), N=500

Low	0-3	213	42.6
Medium	4-7	180	36
High	8-11	107	21.4
House type (X_{16}), N=500			
No house	0	0	0
Hut	1	0	0
Kutch	2	272	54.4
Mixed	3	216	43.2
Pucca	4	12	2.4
Mansion	5	0	0
Utilization pattern of communication sources (X_{17}), N=500			
Low	1-7	78	15.6
Medium	8-15	414	82.8
High	16-23	8	1.6

Source: Field survey, 2017-18

agricultural vocation and their economic condition is not so high and they are willing to apply agricultural innovation for augmenting their annual income.

The study shows that majority of the respondents are under medium annual expenditure group of 37000/- to 67000/- (54.8%) followed by low expenditure income group 6000/- to 36000/- (44.2%). Though their annual income is not so high but still they incurred a medium amount of money for maintaining their livelihood status. Consequently the gap between their income and expenditure is too large.

The present study presents the distribution of the farm women according to their land holding per family of the study area. The results show that majority of the respondents are under the Semi-medium land holding group 60.6% followed by medium land holding 27.2% and small land holding group 9% respectively. Due to the land fragmentation and land reformation of the study area the possession of the land of the family of the women respondents is very low. So it will reflect of the economic condition as well as her family.

In the present research setting 3 types of farm power are dominating. The majority of the women respondents have one pair of draught animal (57.4%)

followed by power tiller (18.2%) and indigenous farm implement (17.6%). Farm power is also an indicator of the economic condition and application of new agricultural technology. It is clear that draught animals is very common in women respondents household for conducting agriculture but power tiller, tractor and other indigenous farm implements are not so much common in the study area but still these implements are available.

In the present research setting the majority of the women respondents have shallow tube well irrigation facilities (96.6%) followed by river lift pump (2.2%). Among the various sources of irrigation the shallow tube well is very common in the study area. The women farmers are mostly depending upon shallow tube well in case of irrigating their own land as the rent for irrigation water is not very high and within the reach of the pro-poor women farmers.

Most of the respondents are under the medium material possession group, 14-27 (56.6%) followed by low material possession group 0-13 (36%) and high material possession group, 28-41 (7.4%) respectively. As the respondents are not very rich in their economic condition, the women respondents are showing very clear penchant towards a medium to low assets possession.

The study shows that majority of the respondents are under low livestock Possession group, 0-3 (42.6%) followed by medium livestock Possession group 4-7 (36%) and high livestock Possession group, 8-11 (21.4%) respectively. Almost every family posses very minimum level of animals in their homestead area. Most of the respondents are not following the scientific practices of rearing of animals. High value livestock are not very common in the study area as the women are very resource poor in nature and they are following subsistence livelihood status.

The respondents mostly have Kutcha house (54.4%) followed by mixed type of house (43.2%) and pucca house (2.4%) respectively. As the kutcha house is predominant in the study area which reflects the scarcity of resources among the women respondents of the study area. Pucca houses are very uncommon in the area as the farm women are dependent on agriculture.

Majority of the respondents are under the medium pattern of communication sources, 8-15 (82.8%) followed by low pattern of communication sources group 1-7 (15.6%) and high pattern of

TABLE 2. Distribution of the respondents according to the selected variables(N=500)

Variables	Category	Score	Frequency	Percentage
Risk preference (X_{18})	Low	6-12	94	18.8
	Medium	13-19	266	53.2
	High	20-26	140	28
Scientific orientation (X_{19})	Low	10-16	134	26.8
	Medium	17-23	354	70.8
	High	24-30	12	2.4
Economic motivation(X_{20})	Low	12-17	8	1.6
	Medium	18-23	438	87.6
	High	24-29	54	10.8
Independence Scale (X_{21})	Low	14-17	236	47.2
	Medium	18-22	235	47
	High	23-27	29	5.8
Attitude towards agriculture (X_{22})	Low	31-37	129	25.8
	Medium	38-44	360	72
	High	45-51	11	2.2
Attitude towards animal rearing and poultry (X_{23})	Low	18-22	24	4.8
	Medium	23-27	459	91.8
	High	28-31	17	3.4
Management orientation (X_{24})	Low	41-50	122	24.4
	Medium	51-60	356	89
	High	61-70	22	4.4
Agricultural knowledge and awareness (X_{25})	Low	8-14	136	27.2
	Medium	15-21	362	72.4
	High	22-28	2	0.4

Source: Field survey, 2017-18

communication sources group, 16-23 (8%) respectively. Information sources are very much important for getting new information related to the agriculture and allied sectors. Women respondents are still in the rural areas and are lacking in case of accessing the information from various communication sources. They know about the different communication sources but they don't know how to utilize this information in their own situation.

Table no. presents the distribution of respondents according to their risk preference, economic motivation, independence, attitude towards agriculture, attitude towards animal rearing and poultry, management orientation and agricultural knowledge and awareness.

The majority of the respondents are under the medium risk preferred group of 13-19 (53.2%) followed by high risk preferred group of 20-26 (28%) and low risk preferred group of 6-12 (18.8%) respectively. Taking risk is the mother of invention and profit maximization for administering any innovation in agriculture. Practices in local situation requires high amount of risk preference among the users. In the study area the women prefer to take risk in medium level in case of pursuing any agricultural activities.

The results show that majority of the respondents are under the medium scientific oriented group of 17-23 (70.8%) followed by low scientific oriented group of 10-66 (26.8%) and high scientific oriented group of 24-30 (2.4%) respectively. The data clearly indicate that the scientific orientation of the women respondents is medium to low level and the women folk of the family do not practices the new agricultural techniques due to lack of scientific orientation.

Most of the respondents are under the medium economic motivated group of 18-23 (87.6%) followed by high economic motivated group of 24-29 (10.8%) and low economic motivated group of 12-17 (1.6%) respectively. Motivation is drive to achieve something. Women are very much accounted with household activities but still they are resource poor in nature. Consequently motivation level is

medium for getting much more economic profit from their enterprises.

The results show that majority of the respondents are under the low independent group of 14-17 (47.2%) followed by medium independent group of 18-22 (47%) and high independent group of 23-27 (5.8%) respectively. In the male dominated society the women members of the family are mostly dependent on the male counterpart. Hardly they are taking independent decision in case of involving themselves as a results, their independent score is low to medium.

The majority of the respondents are under the medium attitude towards agriculture group of 38-44 (72%) followed by low attitude towards agriculture group of 31-37 (25.8%) and high attitude towards agriculture of 45-51 (2.2%) respectively. The women are mostly conducting the household activities and very rarely associated with outside activities like agriculture that signifies in medium level of attitude towards agriculture.

Most of the respondents are under the medium attitude towards animal rearing and poultry group of 23-27 (91.8%) followed by low attitude towards animal rearing and poultry group of 18-22 (4.8%) and high attitude towards animal rearing and poultry of 28-31 (3.4%) respectively. Women are mostly conducting the household activities and very rarely associated with outside activities like animal rearing and poultry that signifies to medium level of attitude towards agriculture animal rearing and poultry.

The results show that majority of the respondents are under medium management orientation group of 51-60 (89%), followed by the low management orientation group 41-50 (24.4%) and high management orientation group 61-70 (4.4%). The management orientation is medium to low as women are not always directly managing the agricultural enterprises outside.

Most of the respondents are under medium agricultural knowledge and awareness group of 15-21 (72.4%), followed by the low agricultural knowledge and awareness group 8-14 (27.2%) and high management agricultural knowledge and awareness 22-

28 (4.4%). The medium to low level of awareness and knowledge regarding agricultural practices indicates the lower degree of participation in agricultural activities.

Involvement Index:

It is the ratio between weighted sum of obtained score and weighted sum of maximum score obtainable in any field/enterprise/crop, multiplied by 100. The present study is directly deals with women's involvements in every dimension of agriculture and allied sectors. The different indicators were developed to explore the efficacy of women in terms of their Activity involvement in agriculture and allied sectors. The involvement of farm women in agriculture and allied sectors was

categories into two sections namely Activity involvement, involvement in decision making with the help of correlation co-efficient analysis.

Above table depicts the correlation coefficient of activity involvement index with twenty five casual variables. The result of the correlation analysis reveals that the variables status in the family, annual expenditure of the family, source of irrigation, livestock possession and attitudes towards agriculture are significantly and positively associated with the activity involvement index of women in agriculture and allied activities. The variables land holding status and scientific orientation are significantly and negatively associated with the activity involvement index of women in agriculture and allied activities.

TABLE 3. Correlation co-efficient of AII (Y2) with twenty five causal variables

Variables (X)	Coefficient of correlation (r)
Status in the family (x_1)	0.124**
Age (x_2)	-0.087
Religion (x_3)	0.006
Caste (x_4)	0.038
Education (X_5)	-0.001
Family education status (X_6)	0.010
Type of family (x_7)	-0.060
Occupation (X_8)	-0.022
Annual income (x_9)	0.068
Annual expenditure (x_{10})	0.096*
Land holding in bigha (x_{11})	-0.096*
Farm power (X_{12})	-0.066
Source of irrigation (X_{13})	0.116**
Possession of assets (X_{14})	-0.045
Livestock possession (X_{15})	0.130**
House type (x_{16})	0.060
Communication sources (X_{17})	0.050
Risk preference (x_{18})	-0.020
Scientific orientation (x_{19})	-0.131**
Economic motivation (x_{20})	-0.075
Independence scale (x_{21})	0.058
Attitude towards agriculture (x_{22})	0.144**
Attitude towards animal rearing & poultry (x_{23})	0.123**
Management orientation (x_{24})	-0.004
Agricultural knowledge & awareness (x_{25})	0.052

**significant at 1% level

*significant at 5% level

Status of women in the family and Activity Involvement Index of women in agriculture and allied sector:

The status of women in the family is considered in the present study in four categories namely family head with height score, family co head, daughter-in-law and daughter in lowest score. In rural areas the family head by women means that women family head has the liberty to take independent decision and that decision can be implemented with the other family members in case of agricultural practices. The women family head is also playing a discriminatory role to involve the family members in favour of her decision and other women who are in others status within the family are only getting the little opportunity to directly involve themselves in outside activities like agriculture and allied sectors. Due to this particular cause the women family head involve in actively in case of increasing the productivity in agriculture and allied sectors. That is why the variable status in the family of women is positively and significantly associated with activity involvement index of women in agriculture and allied activities.

Family annual expenditure and Activity Involvement Index of women in agriculture and allied sector:

The annual expenditure of the family indicates the purchasing power of that family in a particular year. The primary vocation of the family from where the data were collected is agriculture and the livelihood of that family depends on agriculture and allied activities. The expenditure increases with the increase of income. The families with high annual expenditure motivate to actively involve within the agriculture and allied activities. So that the profit increases from the agricultural enterprises and women can maintain the high level on expenditure throughout the year. For this reason family annual expenditure is positive and significant association of the variable annual expenditure with activity involvement index of women in agriculture and allied activities.

Sources of irrigation and Activity Involvement Index of women in agriculture and allied sector:

Sources of irrigation is also a determine factor in case of judging the activity involvement index of women in agriculture and allied activities. The availability and accessibility of water for irrigation are always contributing towards the productivity enhancement and income generation from agriculture and allied sectors. The easily available and ready accessible irrigation for field crop always motivate and create an environment to involve physically for productivity and income enhancement. In the study area the sources of irrigation is mostly shallow tube well and this is the easy way to irrigate the farm within the very short period of time and this type of irrigation structure also help in case of attaching the women in case of agriculture and allied practices. That is why the variable sources of irrigation is positively and significantly associated with activity involvement index of women in agriculture and allied activities.

Livestock possession and Activity Involvement Index of women in agriculture and allied sector:

Livestock Possession is a very important indicator in case of delineating of activity involvement index of women in agriculture and allied activities. Livestock possession is measured by the number of livestock possess by the women in a family. It is very important to maintain that mostly the women in a family are providing their physical effort to nurture and care of livestock and ultimately gets the profit from this allied agricultural sector. So their activity involvement for livestock maintain by ultimately contributes the annual earning of the family. This earning leads to the more activity involvement in agriculture and allied sectors. This is the reason for positive and significant relationship of livestock-possession with activity involvement index of women in agriculture and allied activities.

Attitudes towards agriculture and Activity Involvement Index of women in agriculture and allied sector:

Attitudes are the pre disposition of individuals' behaviour. The perception of individuals is expressed

with the help of their attitudes. The positive attitudes towards agriculture of women indicate the higher level of involvement (physically and mentally) in agriculture and allied sectors which ultimately lead to the greater prosperity and dignity in the society. That is the basic reason behind positive and significant relationship between Activity involvement index and attitudes towards agriculture of women in agriculture and allied activities.

Attitudes towards animal rearing & poultry and Activity Involvement Index of women in agriculture and allied sector:

It has been already shown that farm women have positive and significant relationship between Activity involvement index and attitudes towards agriculture. Agriculture and animal rearing are almost associate activities. Those who are engaged in agricultural activities mostly they are doing animal rearing also, because it helps to upgrade individual's economic status. That is why a positive and significant relationship found between activity involvement index and attitudes towards animal rearing and poultry.

Land holding and Activity Involvement Index of women in agriculture and allied sector:

Land holding is the indicator of prestige of a society. The women who holds good amount of land does not show any intension to do the work physically in the field and the always try to enjoy the status of land owner and employ several agricultural labourer for getting good profit. Consequently women with low land holding status works in the agricultural field as agricultural labour with a high level of physically labour. That is why the variable land holding significantly and negatively is associated with Activity involvement index of women in agriculture and allied activities.

Scientific orientation and Activity Involvement Index of women in agriculture and allied sector:

Scientific orientation is a psychological belongingness of individual with the analytical raising of a phenomenon and object. The individual of high level of scientific orientation always searches the rationale behind any activity. If he or she finds the reason

behind conducting an activity then only he or she goes alone with this activity in future. The people with high level of scientific orientation is only tries to take decisions and involves themselves in any activity mentally which preferably lacks the actively involvement in any activity in case of agriculture and allied activities. The women with high level of scientific orientation always take parts in decision making and give instructions to others for physically conducting the agriculture and allied activities. That is why variable scientific orientation significantly and negatively correlated with Activity involvement index of women in agriculture and allied activities.

Gender gap in the wages of agricultural labourers:

There is a wage inequality among the male and female agricultural labourers in the study area. Female main workers are replacing male main workers in the rural sectors because of out migration of male family members in this district. The condition of female agricultural labourers is even worse. They not only face low wages but also they face discrimination. Though west Bengal govt. fixed equal wages for both male and female agricultural labourers (210 .00/- per day without food) but in practical situation on one can follow this. Mostly women agricultural labourers get 130/- to 170/- and male agricultural labourers get 170/- to 190/- per day without food (source:field survey,2018). Wages are likely to be high in peak seasons in the rice growing for both male and female agricultural labourers. Most of the people including female agricultural labourersbelieved that male agricultural labourers are superiors than female agricultural labourers in terms of various agricultural activities like preparatory tillage, forming ridges and furrows, ploughing, land preparation, manure and fertilizer application, irrigation, plant protection measures etc. so that they thought it is quite natural to get low wages than male agricultural labourers.

Constrains identified in the life of women in agriculture:

Traditional role: Women are traditionally home makers and care givers. Apart from household

management, child care and social responsibilities, rural women unpaid workers on the farm either as labourers or helping their men folk in rising, harvesting and storing crops leaving little time for effective participation in local organization. Their views or their decision making power also neglected in their family.

Lack of or inadequate education: Inadequate education is a key contributing factor to gender bias in accessing resources. Women's education is vital for their empowerment, to develop basic skills needed to participate in knowledge intense agriculture and economic activities. Information and communication technology (ITC) has great to inform and educate rural women about agriculture, health and nutrition provided they are user friendly, have gender responsive content and applications. However, there are barriers to increased use of ITCs such as inadequate infrastructure, high cost, limited capacity and content relevancy.

Modernization in agriculture and technological development: Technological developments have not been responsive to household drudgery associated with routine activities of rural women at home and on farm. In most technologies women's actual needs are ignored. Modernization in agriculture have led to increased agricultural productivity and decreased drudgery but have adversely affected the women from lower castes, lower income groups and landless families or with small holding by reducing demand for labour. Introduction of weedicides and pesticides has deprived a large number of women labourers of their meager source of income.

Limitations of agricultural extension system: The agricultural extension system conceived and operating to train and capacity building of farmers is almost exclusively composed of men and the attempts to reach out to women farmers is highly inadequate. Further, most of the transfer of technology is conceived with male farmers as the target. The time and location of training hardly takes into consideration the time and work pattern of farm women.

Occupational health hazards of farm women: General implication of pesticides have very adverse effects on women health like leukemia,

lymphoma, aplastic anemia, soft tissue sarcoma and cancers of various kinds, a variety of reproductive health problems of women. Very low levels of pesticides have been found to induce DNA damage, mental retardation and delayed milestones in children born to mothers exposed to pesticides. Pesticide risk is higher to people suffering from asthma, diabetes and cardiovascular diseases.

To analyze the relationship between the socio economic status of farm women and involvement of the farm women in agriculture and allied activities

Summary and conclusion:

Socio-economic status has the largest impact on women and it has wider detrimental impact on development. Within the household, women have less entitlement to household goods are poorer command over a range of other productive resources including education, land, information and financial resources and the labour to help them to undertake economically gainful activities. Women play a crucial role in all societies. However, socio-economic status of the farm women in the study area is very much associated with their involvement in agricultural activities such as their status in their family, risk preference, management orientation etc. Rural women contribute much towards agricultural activities on farm and in post harvest storages, much more than men. Still they are never conscious of gender discrimination. They do not complain against bias. Women agricultural labourers slog much more in the field and get paid less for the strenuous jobs they discharge. They actually balance the triple burden of field work, home and social prejudice. But there are no complaints, no protests. Instead they manage a well adjusted life of domestic and on farm responsibility. It is a philosophical acceptance that life is a responsibility, home and contributing to family income together. Indian agriculture no doubt is sustained on the backs of rural women who have been poorly rewarded in terms of income, access to resources and socio economic status. It is important now to recognize this and provide equal wages to the female labour and resources such as land, assets and suitable share in the agricultural

income to the unpaid women workers in the family farms. Rural women need to be educated as to utilize the modern agricultural training and techniques. They need to be recognized as farmers and given their due share.

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Problems faced by farm women in the field of agriculture in Koch Bihar district, West Bengal

¹Anwesha Saha and ²Dr. Indira Lepcha Nee Lama

¹Research Scholar, Department of Geography & Applied Geography, North Bengal University, Raja Rammohanpur, Darjeeling, West Bengal, India

²Associate Professor, Department of Geography & Applied Geography, North Bengal University, Raja Rammohanpur, Darjeeling, West Bengal, India

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Corresponding Author: Anwesha Saha

Abstract

Nearly half of the available human resources in Koch Bihar are women and share huge responsibilities and perform wide spectrum of works in running family, maintaining households, agriculture and allied fields in the rural areas. Rural women are extensively involved in agricultural and livestock activities however, the nature and extent of their involvement differs with the variations in agro-production systems and socio-economic status. Taking the above situation in consideration, a study was conducted to identify the major problems of farm women in Koch Bihar district of West Bengal. The investigation indicated that majority of rural farm women experienced drudgery of agricultural activities mostly through the processes of weeding, transplanting, harvesting, threshing, cutting, carrying and storing grains. During field survey it was found that majority farm women stated that gender disparity on wage was the major problem and was ranked the first problem. Thus, second rank and third rank took less importance on decision making and more involvement in household activity of the farm women respectively. Although rural farm women played a vital role in agricultural operations, livestock production and household activities but for decision making their involvement was negligible. This study will help the planners, policy makers and extension personnel to realize the immense potential of rural farm women resources in agriculture and develop appropriate policy measures to solve their real and practical problems. Beside this, it is necessary to provide agricultural training and market linkages to rural farm women so that they get additional income and employment opportunity in future.

Keywords: Rural farm women, drudgery in agricultural activities, major problems of farm women

Introduction

Agriculture is the single largest livelihood system in Asia, employing nearly 60% of the workforce. It is not only the main source of employment, income and food for over 70% of the population, but it is also the main 'culture' for rural families (Das *et al.* 2006) [8]. Women are an important segment of the total workforce particularly in rural areas. So, women are a crucial development force in the economy and the society. Women represent 48.27% of population and

share abundant responsibilities and perform wide spectrum of duties in running family, maintaining households, agriculture and allied fields such as dairy, goatery, piggery, poultry, fisheries etc. in the rural areas. The extent of their contribution can be gauged from the finding in a study in the Himalayan region, where a pair of bullocks works 1064 hours, a man 1212 hours and a woman 3485 hours a year on a one-hectare farm (Grover & Grover, 2004) [15]. Different roles of rural women are described in following table 1.

Table 1: Different role of rural women

Domestic role ↓	Agricultural role ↓	Role in cottage industries ↓
1. Cooking food	1. Sowing	1. Toy making
2. Collecting water	2. Transplanting	2. Carpet making
3. Collecting vegetables	3. Irrigation	3. Basket making
4. Collecting fuel wood	4. Manure / fertilizer & Chemical application	4. Cloth weaving
5. Cleaning house, utensils, cattle shed	5. Weeding	5. Rope making
6. Child rearing	6. Plant protection	6. Agricultural processing
7. Maintaining poultry & Cattle / dairy farm	7. Harvesting	
8. Care for aged and handicapped	8. Threshing	
9. Maintaining kitchen garden	9. Winnowing	
	10. Storing and marketing	

(Source: Anandraj Kumar, 1995) [1]

Thus, a rural woman works along with man in performing several farm operations as well as the roles related to home, family care and management. Rural women play a significant role in agricultural activities such as seed sowing, transplanting, weeding, fertilizer application, plant protection, harvesting, processing, storage etc., several of these operations are exclusively carried out by women only. Their involvement in agriculture varies from region to region and also among different ecological zones, farming systems, caste, class and socio-economic status of families. Thus, by participating in agricultural activities, they directly or indirectly influence the course of agriculture.

The economy of Koch Bihar mainly depends on agriculture. Increased population have increased the pressure on land and reduced the man-land ratio, for which it is essential to follow improved technology in crop production. Farm women are not aware of these phenomena. The major problems faced by the farm women in the study area are different due to difference in economic status. An attempt is made to understand the problems in availing the benefits of the research and make suggestions for farm women to improve their efficiency. Accordingly, the data obtained in this regard are analysed and presented in relation to.

1. General problems of the farm women.
2. Suggestions made for farm women on improving their participation in agriculture and allied sectors.

Although, a large number of studies have been conducted to identify the roles, needs and problems of women in

agriculture, it seems that they have not been sufficient. It is believed that lack of accurate information on women's role in agricultural production has resulted in the failure of developmental programmes and projects, because they did not address the needs of rural women. The data is collected in order to investigate the problems faced by the farm women while working on their farm. Due to difference in economic status, the farm women of the district have different problems because of social, economic, organizational and technological constraints. Thus, problems are categorized into mainly two broad groups namely health problems with occupational health hazards, socio-economic and technological problems.

Health Problems and Occupational Health Hazards of Farm Women

Drudgery in Agriculture

Women plays an important role in agriculture. Women are doing major farm work along with household activities. The farm women play a significant role in agriculture and other agro based activities. The daily work schedule for rural farm women is very demanding and arduous. It is observed during field survey that during peak period, women work every day for about 8-9 hours in agriculture and 4-6 hours in household activities. Women experience drudgery of agricultural activities mostly through the processes of weeding, transplanting, harvesting, threshing, cutting, carrying and storing grains which had explained below.

Table 2: Women drudgery in agriculture

Activities	No. of Farm Women in Drudgery	% of Farm Women in Drudgery	Overall Drudgery Status	Reasons
Transplanting or Planting	1078	89.83%	Heavy	a) Bending posture. b) Long hour of standing in deep puddle soil. c) Discomfort on moving forward and backward in wet field. Care and skill required for uniformity in transplanting/planting.
Threshing	1134	94.50%	Heavy	a) Bending posture. b) High energy required for threshing.
Weeding	872	72.67%	Moderately Heavy	a) Long hours of sitting in wet fields. b) Requiring difficult posture in handling traditional implements. c) Selection of weed plants from cultivated rice variety. Use of blunt and old implements.
Cutting	790	65.83%	Moderately Heavy	a) Long hours of bending and sitting on toe in wet fields. b) High energy required for cutting by traditional sickle and setting the lodge plants and injury can occur.
Carrying	865	72.13%	Moderately Heavy	a) Difficulties in preparing bundles easy for carrying. b) Carrying head load of bundles causing stress and strain on eyes and neck.

Source: Compiled by Researcher

Transplanting or Planting

Planting requires substantial physical strength, perseverance and manual labour. Transplanting process is a complex activity. Chronologically, it is closely associated with harrowing, ploughing, and gathering of saplings on the field. The transplanting process involves standing in a waterlogged field and bending to put seedlings into the soil by hand, frequently and over a long period of time. During the manual transplanting women labourers are exposed to

several work-related physical risks like standing for long hour on the puddle soil, sometimes amidst heavy rain. After working for several hours, they go back to home, feeling discomfort on shoulders, hip and joints. In long term this develops into musculoskeletal disorders. Better skill and techniques are needed to work on the ground to help them avoid or recover, rejuvenate and take self-care during and post transplantation. Drudgery status is high in transplanting or planting process.

Threshing

During threshing process women labour as have to perform heavy work by keeping same posture for long hours. This job demands strength, techniques and agility along with time management, which leads to high prevalence of work-related musculoskeletal disease. Low back pain (LBP) is a common health problem arising from manual threshing. Contemporary literature has simply suggested that occupational factors, especially working postures, are the main causes of LBP. Consequently, LBP prevalence has been found highest in the transplanting and threshing process of farming because manual transplanting or threshing is a labour-intensive and tiresome job. Occupational health hazards during threshing causes health problems mainly due to heat and dust. Most of the farm women suffered irritation in eyes, throat, nose and ears affecting their respiratory tract due to exposure into heat and dust, considering the high temperature in summer, causing more discomfort on continuous thrashing process in the field. Women agriculture labourers who are involved in lifting and fetching crops bundle have experienced various musculoskeletal discomforts on their neck, shoulder and upper back. Threshing process also demand very high energy and physical strength quite similar with weight lifting, which in long run pose pressure in joints and skeleton structure to women labourers. This is significant as the nutrition deficiency is so high for women population with inadequate sleep and rest, as after giving full time in field they are also required to cook for their family, raise children, do all domestic works. Overall drudgery status heavy in threshing process.

Weeding

Weeding is an important agricultural task that is performed to ensure a profitable yield. A typical weeding day ranges from eight to ten hours for women labourers with few breaks in between. Often, this type of works is considered extraneous on the back if carried out by hand or with a short-handled tool due to the prolonged periods of time that are spent in awkward postures. Weeding with hands requires workers to bend forward well over 75° and sustain static loading to soft tissues of the back. This type of activity leads

to over stressing the viscoelastic tissue of the back (ligaments, disks, facet capsules, etc). Agricultural workers performing manual weeding are exposed to high risks of musculoskeletal disorders to the lower back. Hand weeding has exposed workers to sustain static loading to spinal soft tissues, which can lead to the initiation of a cycle of inflammatory response. Overall drudgery status is moderate in weeding process.

Cutting

Like transplanting, cutting requires long hours of bending and sitting on toe in the field with continuous hand movement. For certain crops women labourers have to get into wetland for long duration causes skin infections, itching and patchy skin. Cutting poses a significant pressure on hands and shoulder and led to several injuries in musculoskeletal tissues. Overall drudgery status is moderate in cutting process.

Carrying

Carrying involves lot of strength on knees and shoulder. Women labours needs to carry bundles for long distance from field to home or to load up in tractor or in a carriage van. This exercise over the time develops shoulder and back pain. Sometimes due to time management or on the urge of finishing up carrying work early, labourers lift overload beyond their capacity. This habit results in bone and joint heath deterioration for women. Rising temperature in Koch Bihar region during summer pose a great challenge for carrying tout thus ask by making them fatigued, sweat and dehydrated. In a way to compensate the workforce capital, most of the times agricultural farms allot limited women agricultural labourers for carrying crops instead of the required numbers of labourers which pose a challenge for them to carry extra weight. During monsoon carrying is associated with micro bacterial infections, fungi infections and skin rashes. Overall drudgery status is moderate in carrying process.

Identify the Problems of Farm Women in Agriculture with the Help of RBQ Method

Table 3: Prioritisation of problems embedded with women in agriculture

Sl. No.	Problems Associated with Women in Agriculture	RBQ Value	Rank
1.	Gender Disparity in Wage	96.97	I
2.	Poor Gender-Neutral Infrastructural Facility	68.86	V
3.	Less Importance in Decision Making	77.80	II
4.	Limited Land Ownership	71.74	IV
5.	Limited Access to Capital, Resource, Credit	60.45	VI
6.	Lack of Agricultural Knowledge Training Discussion	30.45	IX
7.	More Involvement in Household Activity	74.17	III
8.	Limited Education and Mobility	15.15	XI
9.	Drudgery in Agriculture Due to Lack of Resources and Machines	45.15	VII
10.	The Lack of Strong Networks and Mentors	34.55	VIII
11.	Unaware About the Legal Rights	24.70	X

Source: Compiled by Researcher

Ranking Based Question (RBQ) are those which finding out the rank for the given questions. Rank Based Question can be vertical or horizontal depending on the question series. RBQ is a type of survey question asked to respondents to

compare a list of items or problems with each other and arrange them in order of preference. Individual make a choice that are influenced by many factors. Each of these factors have different priorities in the decision-making

process. To determine how they are prioritized, RBQ method is used. The formula to calculate the Rank Based Question is.

$$\frac{\sum_{i=1}^n f_i(n+1-i)}{N \times n} \times 100$$

Where, f_i = Frequency.

N = No of respondents.

n = No. of problems.

I = Rank.

Table no. 3 depicts the problems faced by the farm women regarding their involvement in agriculture. Eleven problems are identified in the research area which reflects the barriers in case of involving the women in any agricultural system. On the basis of the Rank Based Question (RBQ) value, the problems are prioritized through the perception of the farm women in local agricultural system.

During field survey it is found that majority farm women stated that gender disparity on wage is the major problem and is ranked the first problem. Women are discriminated in agriculture by engaging them in low wage agricultural works and paying less than men for similar work. There is a variation between the wages of male and female, although male and female give equal effort and time in agricultural activities but males are paid Rs 170-190/- per day and female receive only Rs 130-170/- per day in the district. Wages disparities are due to gender specific agricultural operations. Agricultural activities like transplanting, weeding, harvesting etc. which carry lower wages are largely performed by female workers. On the other hand, sowing, fertilizer application, spraying pesticides and post-harvest operations with relatively higher wages are performed by male workers. Sometimes female workers are also forced to accept the wages in their own area because they cannot migrate as easily as male due to domestic responsibilities.

Thus, second rank and third rank take less importance on decision making and more involvement in household activity of the farm women respectively. Women have always been an important and integral part in sustainable agricultural systems. Agriculture is very heavily dependent on manual labour and women constitute the maximum of it. Other than crops they are involved in allied sectors like animal husbandry, dairying, piggyery, poultry etc. The extent of women's contribution is aptly highlighted in a study conducted in West Bengal where it has been revealed that a typical work day for women agricultural labour during season lasts for 15 hours and her male counterpart works for 7 to 8 hours. Even within a region their involvement varies widely among different agro ecological sub zones, farming systems, socio-economic status of families. The scenario is same for Koch Bihar district. Farm women are fully occupied and overburdened with three-fold responsibility of home, agriculture and livestock management. Farm women spend their maximum time for agricultural activities and unpaid domestic duties for which they get very little time for their personal care. Women responsibilities are far more than for men because of their involvement in multifarious

activities in agriculture as well as at home. Despite extended involvement in agriculture and at home, their contribution is still unrecognised. Women's participation in decision making is bent toward lower side in the family as this is considered as men's domain. Decision-making power of farm women is ineffective and applicable only within the four walls of her home.

The fourth important problem identified by the respondents are limited land ownership of farm women. Most common problem in our society is daughters and son can jointly inherit property acquired directly from their fathers, but ancestral property can only be inherited by sons. Women have an equal share in ancestral property but due to gender biasness in joint family systems, women always lose her rights. As a result, farm women have less ownership of land. Most of the farm women who owns land works as a farm labourer because they do not have any legal rights to occupy it.

The fifth problem of farm women in the study area is poor gender-neutral infrastructural facility. Today agriculture is fully dominated by modern machineries. Male agricultural labourers usually operate machines like tracker, power tillers, spray machines etc. which sometimes displace female labourers. On the other hand, female workers face problems in handling heavy agricultural machines because of which farm women are discriminated by wages as well as farm work loads.

The sixth problem of the farm women are limited access to capital, resource and credit. Limited access to resources like availability of high yield seeds, modern machines, proper irrigation facilities, suitable pesticides are also the constraints faced by the women stakeholders to become integral part of an agricultural system. Limited access to financing is one of the major problems identified by the women respondents. Due to lack of timely available credit facilities women cannot make investments for production or processing purpose and also unable to undertake any business venture. As an aftermath, limited capital leads to lower participation of women as stakeholders in agricultural value chain system. Proper banking facilities can promote more involvement of women in agriculture.

The seventh problem rank take drudgery in agriculture due to lack of resources and machines of the farm women. Transplanting or planting, weeding, threshing, cutting, carrying operations are the major drudgery problems for farm women. Majority of the farm women do weed control using hands tools like sickle and khurpi. This leads to muscular stress, musculo-skeletal injuries and posture problems. During field work on different parts of the district, the farm women reported that they felt pain (shoulder pain, back pain, wrist pain, hand pain, leg pain, thigh pain, knee pain) in their body due to repetitive motions and awkward postures adopted while doing agricultural activity. The use of the 'wheel hoe weeder' and replacing the traditional gadgets may lower the physiological and cardiovascular stress.

The eighth problem of the farm women are lack of strong network, mentors. The limited market knowledge and low networking are other major problem of the women. In the study area the males are shouldering the responsibilities of selling the agri-products in the market with women but marketing knowledge is not shared by their counterpart. As

a result, the women do not have any market intelligence and interest to know about the value chain. In the ninth rank problem faced by the farm women in the study area is lack of modern agricultural knowledge and training. Due to limited knowledge and access of agricultural techniques, farm women are less interested to attend any kind of agricultural training programme.

Unaware about the legal rights of farm women takes tenth rank problem because of limited education, lack of confidence, poor communication, inadequate information of the society etc. Eleventh ranked problem of the farm women are limited education and mobility. Most of the farm women of the rural area have low level of education, low access of mass media, awareness and skills.

Contact with Chemicals

Pesticides are widely used in agriculture and the human exposure to these substances caused adverse health hazards. Non-occupational exposure to this can come from many sources, such as food or water. For occupational exposure, many studies have been conducted on men but very few information is available concerning the exposure of women. It is important to understand how women's susceptibility to the effects of pesticides differ from men. Women generally have a higher proportion of body fat and more likely to store pollutants that bio-accumulate in fat tissue. Women also absorb pesticides through their skin more readily, and pesticides reside in the body longer. Women have a higher level of hormonal sensitive tissues that makes them more vulnerable to the impacts of pesticides, known as endocrine disruptors. Carcinogens linked with breast and ovarian cancer are of special concern for women. Pesticides adversely affect women's fertility and reproductive health, with both known and unknown impacts on future generations. Exposure to the pesticides can have different effects on health from early life stages, resulting in different outcomes ranging from neurodevelopmental effects in newborns to different types of cancers. Pesticide risk is higher to people suffering from asthma, diabetes and cardiovascular diseases. Women farmers are mostly using moderate or highly hazardous pesticides like organochlorine, organophosphorus, and carbamates, while it is found that they never use any protective equipment like masks, gloves, etc. while handling pesticides. Sometimes women farmers use highly hazardous pesticides under deplorable conditions, such as lack of Personal Protective Equipment (PPE) or using leaky spraying equipment. Women's exposure to pesticides increases as their poverty and marginalisation deepens. This is especially true in rural communities in Koch Behar district where small-scale farmers adopted chemical-intensive farming incentivised by governments. Poverty also further increases women's vulnerability to pesticides, as toxic effects are aggravated by poor diet and malnutrition. In this context, it is clear that "gender equality today for a sustainable tomorrow" includes more decisive action to reduce women's exposure to pesticides, while enhancing women's participation in healthy, equitable and sustainable food production. Unfortunately, not much emphasis has been given to enabling women's proper access to pesticides as a means of achieving Sustainable Development Goals (SDGs). There is an earnest requirement for giving more protection to farm

women in using pesticides. More researches need to focus on relationship between the extent of pesticide use and signs and symptoms of illnesses due to pesticide exposure among women farmers.

Climatic Vagaries

The farm women of the district faced some physical challenges due to significant climate factors. Excessive heat, heavy rain, shivering cold posed big challenges for farm women in Koch Bihar. During summer, temperature raised up to 45°C, excessive humidity (90-98%) pull down the energy of farm women in the agriculture field. During December and January temperature falls below 10°C, chilly breeze and fog makes the work difficult for them. Koch Bihar is a place of heavy rainfall in every year and most of the times water logging, poor drainage system not only hamper the regular work but also ruined production frequently. Seasonal extremities play a very big impact on women's farm worker duties and responsibilities.

Poor Healthcare Facilities

Rural healthcare structure does not meet the women's overall wellbeing in terms of treatment, medication, nutrition and recovery. Most of the farm women in Koch Bihar have died due to tuberculosis, post-delivery complications, dengue, malnutrition. The subdivisional hospitals experience huge patients flow and most of the times are unable to provide beds to everyone. The primary healthcare centres in the villages don't have the required infrastructure, diagnostic laboratory and therapeutic area for treatment. So, they mostly depend on quack- practitioner or occultist which many times yield fatal result for patients. Maternal mortality rates in rural areas of Koch Bihar district is very high (98 per 100000 live birth, in 2018), factor that contributes to high maternal mortality rate is the reluctance to seek medical care for pregnancy. Farm women receive very low antenatal care during pregnancy due to heavy work load in field as well as home.

As an adult, women receive poor health care than man. They are apprehensive to admit that they are sick and they will wait until their sickness has aggravated before they seek help. Studies on attendance at rural primary health centers reveals that more number of males are treated in hospitals than women, pointing to regional differences in the wellbeing priorities on women health. Additionally, women in Koch Bihar are uncomfortable to consult male doctors and hesitate to check up due to the less number of lady doctors' available at centers.

Malnutrition

Malnutrition is the reason for poor health and wellbeing of farm women. Women are served last after male members and children for which most of the time a larger portion of food is consumed by them. Besides, nutritional food like milk, egg, fish, vitamin enriched vegetables are not a part of their daily diet. Gender disparities in nutrition are evident from infancy to adulthood. In fact, gender has been the most statistically significant determinant of malnutrition among young children and malnutrition is the direct or underlying cause of death among women. Malnutrition has led to chronic energy deficiency, low BMI, underweight, stunted growth etc. At the individual level, immediate effects of

inadequate food and dietary intake increases the susceptibility to disease and illness. These are also influenced by underlying factors at the household level, such as access to food and health services, maternal and child-care practices and household amenities relating to sanitation and safe drinking water. Moreover, there is high risk of chronic malnutrition even among children. Poor access to sanitation facilities and women's literacy in particular is found to be strong factors affecting malnutrition. Field survey data shows 27% farm women in the age 15 to 49 years, have completed primary education. Literacy and basic sanitation have directly impacted the ability of women, men, and children to maintain personal hygiene. Women's health is further harmed by air and water pollution and lack of sanitation. The high incidence of malnutrition present amongst women and their low metabolism and other health problems have affected their capacity to deal with chemical stress. According to Cardiological society of India, 2017, smoke from household biomass (made up of wood, dung and crop residues) stoves within a three-hour period is equivalent to smoking 20 packs of cigarettes every day. For women who spend an average of three hours cooking every day, often in a poorly ventilated area, has led to eye problems, respiratory problems, chronic bronchitis and has further developed into lung cancer in some cases.

Socio-Economic and Technological Problems Faced by Farm Women

There are different socio- economic factors which plays major roles in broader life of farm women. Gender disparity, disparity in wages, occupational stress, low satisfaction in family life and lack of family support, powerlessness, lack of social security, inadequate education, operational holdings are some of the parameters that deeply impact women's roles in agriculture. Women have traditionally been integral to on-farm operations and are often responsible for tending to crops and managing household food supply and consequently bear the brunt of these disruptions.

Gender Disparity and Mental Harassment

It is an age-old convention that women are less capable and inefficient as workers as compared to men. The attitude which considers women unfit for certain jobs holds back women. In addition to this, the same attitude governs injustice of unequal salaries for the same job. The true equality has not been achieved even after 76 years of independence. Working on such conditions inevitably puts strain on women to a greater extent as compared to men, thus making them demotivated in their inputs in agriculture. The female agricultural labourers have suffered from wage disparity and women are earning much less compared to their male counterparts for doing the same work. Many women are also engaged in unpaid subsistence labour within farms owned by the male members of the family. The male members mostly husband take the daily income from their wives. There are common pictures in Koch Bihar. Instances like these have not only demotivated women labourers to attend daily work but at some times they remain absent in field. In the study area 70% people think that women are unfit for some agricultural operations such as preparatory tillage, forming ridges and furrows, ploughing, land

preparation, manure and fertilizer application, irrigation, labour supervision, account keeping, marketing and transportation etc. That is why they get less wages than male agricultural labourers. A majority of farm women (79%) continued to be denied their right to equal pay, under the Equal Remuneration Act, 1976 and are underpaid in comparison to their male counterpart.

Gender Gap in Wages of Farm Women

There is wage inequality among the male and female agricultural labourers in the study area. Female workers are replacing male workers in the rural sectors because of out migration of male family members in the district. The condition of female agricultural labourers is even worse. They not only receive low wages but they faced discrimination too. According to West Bengal Government, June 2018, the wages of agricultural labour are categorised into three category which are 210.00/- per day with food and 226.00/- per day without food for unskilled agricultural worker, 232.00/- per day with food and 248.00/- per day without food for semi-skilled agricultural worker, 257.00/- per day with food and 273.00/- per day without food for skilled agricultural worker. But in actual situation no one have followed it. Mostly women agricultural labourers get 130/- to 170/- and male agricultural labourers get 170/- to 190/- per day without food (Source: field survey, 2017). Wages are likely to be high in peak work seasons during the rice growing period for both male and female agricultural labourers. Most of the people including female agricultural labourers believe that male agricultural labourers are superior than females for various agricultural activities like preparatory tillage, forming ridges and furrows, ploughing, land preparation, manure and fertilizer application, irrigation, plant protection measures etc. So, this belief is natural to offer low wages to female agricultural labourers.

Occupational Stress and Overwork

According to World Health Organization (WHO), 2016 occupational or work-related stress "is the response people may have when presented with work demands and pressures that are not matched to their knowledge and abilities and which challenge their ability to cope". Work and family are the two most important aspects in women's lives. Balancing work and family roles have become a key personal and family issue for many societies. There are many priorities in working mother's lives that are subjected to stress. They have to deal with family and are working under stress every day. The main reason behind occupational stress is imbalance between work and family. Women have extensive workloads with dual responsibility for farm production and household affairs. Women work roughly twice as many hours than men. Women's contribution to agriculture - whether it is subsistence farming or commercial agriculture - when measured in terms of the number of tasks performed and time spend, is greater than men. The extent of their contribution can be gauged from the finding in a study in the Himalayan region, where a pair of bullocks works 1064 hours, a man 1212 hours and a woman 3485 hours a year on a one-hectare farm (Grover & Grover, 2004) [15]. In Koch Bihar district farm women work per day 8 -10 hours in field, 6-7 hours in home activities (Source: field Survey, 2017) so that they get very little time

to do their personal care (30 mins) or leisure activities. Women's work is getting harder and more time-consuming. Women contribute considerably to household income through farm and nonfarm activities as well as through work as landless agricultural laborers. Women's work as family members is underestimated.

Low Satisfaction in Family Life and Lack of Family Support

Family life of farm women in Koch Bihar revolves almost in same direction in the district. They have poor support from family due to the negligence and dominant approach by their husbands or male counterparts. In decision making they hardly get involved in agriculture planning, land, finance or even a small family call. If she needs something for herself or for her children, she has to ask the money from husband and justify the reason. They hardly have any savings for themselves to utilise own the money on herself. During field survey among the farm women, 78% of them are unhappy and not satisfied in their family life due to non-having cash or money in hand. Rest of them (22%) are more or less satisfied due to having money in hand as their male counterparts out migrated for job.

Decision Making Power of Farm Women

Various studies on women autonomy and empowerment shows that the decisions taken by women are not considered by the family members. In the study area, male labour circulation / migration in some blocks have led to women taking major decision. Women are traditionally home makers and care givers. Apart from household management, child care and social responsibilities, rural women have worked on the farm as unpaid labourers or helping men folk, harvesting and storing crops leaving little time for effective participation in local organization. Their opinions or their decision-making power are also neglected in their family. Though male labour migration from the district offered women to escape from patriarchal domination, but this opportunity is fruitful only for the young women belonging to the age group of 30-44 years. Young women belonging to the age group of 15-29 years never left home without their husband. They remained under the headship of aged women or men. So, the migration of male gave them pain of separation as well as more responsibility of their home. The aged women get all the opportunity to establish her as they facto head of the family but, lack of education, lack of confidence and obviously age prevent them from their capabilities. Although the decision of the said women is executed in much respect but actually, they are directed by her husband through telephone.

Powerlessness

Legal protection of farm women's rights has little effect in the face of prevailing patriarchal traditions. Farm women are subordinate in their in laws home in Koch Bihar districts. Child marriage have also kept women subjugated. Women are kept subordinate and are even murdered due the practice of dowry in some homes. Women's rights to inheritance are limited and frequently violated. Farm women are not entitled to claim to their father's land or her husband property after their demise in most households which force them to work as agricultural labourer. Loosing

the rights of inheritance have make them conquer with low income, landlessness, decision making rights in agriculture and food security for themselves and their children. Transforming the prevailing social discrimination against women must become the top priority and can happen concurrently with intervention by the society and government improve the social and economic status of women. This way, a synergy of progress will be achieved. As farm women receive greater education and training, they will earn more money through agriculture. If women earn more money, she can spend it in the further education and health of her children, as opposed to men who often spend it on drink, tobacco or other women (Dogra, 2002) ^[11]. When women hold the power in decision making, they will gain greater social standing in the household and will have greater voice. As women gain influence and consciousness, they will make stronger claims to their entitlements - gaining further training, better access to agriculture credit and higher incomes. As women's economic power grows, it will be easier to overcome the tradition of 'son preference' and thus put an end to the evils of dowry. As son preference declines and acceptance of violence declines, families will be more likely to educate their daughters, and age of marriage will rise. As women are better nourished and marry later, they will be healthier, more productive and will give birth to healthier babies. Only through action to remedy of discrimination against women have the chance to live healthy and productive lives.

Lack of Social Security

Social security of farm women in Koch Bihar is male-concentrated (Chaudhuri, 2003) ^[7]. A male family member ensures food, family income, and protect them from uneven circumstances. So, when husbands migrate to another place in search of work women who are left behind they are not confident to continue farm activities, secure family incomes and are concerned about domestic violence from other male relatives or neighbour. Although, in several reports it has been revealed that West Bengal is a more secure place for women in India but domestic violence is significant against women, which has been reflected in Human Development Report of West Bengal (2004). Violence against women is the most pervasive human rights violation today. Male violence against women is a worldwide phenomenon. Fear of violence have caused barrier for women's participation in activities in home and agriculture. Such domestic insecurities in the study area comes in form of abuse, sexual harassment and other forms of gender-based violence. The heightened risks are due to factors such as gender power imbalances, a lack of oversight, and working alone in relative isolation or in remote locations. Within the home, women are subjected to physical and sexual abuse as punishment or as culturally justified assaults. These acts shape their attitude to life and their expectations of themselves.

Lack of or Inadequate Education

Inadequate education was a key contributing factor to gender bias in accessing resources. Women's education is vital for their empowerment, to develop basic skills needed to participate in knowledge intense agriculture and economic activities. Information and Communication Technology (ITC) is a great platform to inform and educate

rural women about agriculture, health and nutrition provided which are user friendly, have gender responsive content and applications. However, there are barriers on mass reach of ITCs initiatives due to low education, inadequate infrastructure, high cost, limited capacity etc.

Lack of Leisure Time and Recreation

Women labourers in Koch Bihar are mostly engaged in home making and agricultural work. They hardly find time for recreational activities and leisure which have made their life monotonous and dull. The extensive pressure of child raising, family issues, cooking other than labour work in field consumes their entire time. Finally, after a period of time they get exhausted and demoralized on their scheduled work. During field survey it is observed that farm women get only 15 to 30 mins per day for their leisure.

Operational Holdings

A lack of ownership of land does not allow women farmers to approach banks for institutional loans, as banks usually consider land as collateral; women farmers hardly have any representation in society and are nowhere discernible in farmers' organizations or in occasional protests. A declining size of land holdings acts as a deterrent due to lower net returns earned and technology adoption etc.

Lack of Agricultural Extension System

The agricultural extension system is conceived and operating to train the capacity building of farmers. It is exclusively composed of men and the attempts to reach out to women farmers was highly inadequate. Further, most of the transfer of technology are conceived with male farmers as the target. The time and location of training hardly takes into consideration the time and work pattern of farm women (Lal, 2011) ^[12].

Modernization and Technological Development in Agriculture

Technological developments have not been responsive to household drudgery associated with routine activities of rural women at home and on farm. In most technologies women's actual needs are ignored. Modernization in agriculture have led to increased agricultural productivity and decreased drudgery but have adversely affected the women of lower castes, lower income groups and landless families or with small holding by reducing demand for labour. Introduction of weedicides and pesticides have deprived a large number of women labourers of their meagre source of income.

Remedial Measures

The problems of farm women in Koch Bihar prevalent in the context of different socio- economic factors are listed above. The remedial measures given are based on the basis of study made in the field.

- Better skill and techniques need to be implemented in terms of advancement of their skills and confidence on the ground to help them recover, rejuvenate and self-care during and post transplantation, threshing, planting.
- Yoga and stretching process needs to be introduced by District Agricultural Office and organize training session for them. It will help them keep the posture

right, avoid musculoskeletal injuries and help them recover from injuries as well.

- Stress management tools and techniques needs to incorporated in daily life of farm women to inculcate a work- life balance.
- Spread awareness on keeping mask, personal protective equipment (PPE) and take every precaution and preventive during spraying fertiliser spray to avoid health hazards due to contact with chemicals and fertilizers.
- Easy access to technology for training of farm women need to ensure by government. It can be digital medium or in person or through a skilled partner who can come and interact with them on a regular basis and train them on latest technologies, techniques of agriculture.
- More training and skill should be offered to farm women on accessing tools and equipment by themselves and not be dependent on men. For example, if a farm women can drive tractors and run in the field, she is more confident in asking the same wage as men and set examples to others to take control.
- Health Camps should be held out by government especially for farm women to diagnose, prevent and provide medication for long illness like TB, COPD, skin disease which they incur through daily agriculture work. They should also be ensured health safety, medication and wellness.
- More responsibilities and benefits need to distributed to women in the form of land ownership, distribution of property, bank or financial institute accounts access to empower them to conquer the societal stigma. Panchyat can start weekly or monthly meetings of agricultural farm women to lead, discuss and distribute their work and ask the support required from government. No men should interfere in such meetings or gathering so they feel morally boosted and confident on decision making in the field as well as in home.
- Educate them and encourage them to continue study along with domestic and farm work. This can be in the form of evening school or camp conducted with the help of NGOs. They can further identify one of them as role model for such initiatives from whom others can be encouraged.
- Strictly follow up on wages policy for women and men so no discrimination take place. This includes following the policy laid by the government. The wage needs to be often regulated. This will make a huge change in the decision-making process and social security for farm women.

Conclusion

Women have been shouldering responsibilities in the major activities associated with the agriculture and allied sectors from the ancient times. The district of Koch Bihar comprises of 48.51% (Census 20011) women of its total population where 21.95% female are cultivators and 47.56% female are agricultural labourers. Women were deprived in every stage of the society in the study area. This present chapter deals with the research objective - "To identify the problems of farm women regarding their involvement in agriculture and to find out the way to solve these problems." RBQ method is followed to identify the problems of the farm women in the study area and accordingly some suitable

measures have been given to solve their problems.

The involvement of women in agriculture from land preparation to post harvest management of agricultural crops and livestock rearing is observed to be higher than her male counterparts. One of the reasons for the increasing trend of participation in agriculture and allied sectors as obtained from the research survey, due to the fact that male persons in this district are migrating to other areas to earn more money and uplift their socio-economic status. Consequently the crises of male labours in agricultural activities are increasing day by day and the workloads upon the female workers in agriculture are increasing. The astounding fact is that the work load of women within the study area has increased at a faster rate due to their involvement in agricultural activities and household work. The trend showed a clear scenario towards the increased drudgery on women in the district. At the same time this phenomenon empowered the women to take independent decision in case of agriculture and household activities due to the absence of male counterpart in the family. With all of the social changes and reformations, there is an emerging trend of increasing feminization in agriculture experienced in the district.

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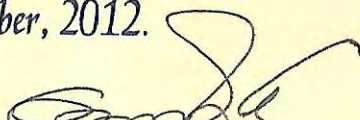
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This is to certify that Sri/ Smt./ Dr./ Prof. *Anwesha Saha*.....
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Department of Geography
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Raja Rammohunpur
Dated : 30th March, 2013

Sushma Chakraborty
Director
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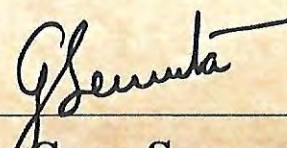
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Title of the Paper Presented/Technical Session Chaired Gender disparity in the field of agriculture in Koch Bihar district, West Bengal.


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