

Participation of Women in Biodiversity Conservation: A Case Study of Sundarban Biosphere Reserve, West Bengal, India

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Abstract

In this decade of industrialization and urbanization, biodiversity conservation, protection and restoration of the remaining portion of the forest cover is a most prioritized and emerging issue. Besides natural protection, fulfilling the need of the ever-growing population is also a significant factor. In connection to this issue, some places are designated as Biosphere Reserves throughout the world to preserve existing resources of the localities and promote the relationship between natural, socio-economic & cultural environments. Among 701 Biosphere Reserve of the world, the largest and most unique mangrove forest, Sundarban Biosphere Reserve, is enlisted. There are two forest divisions of Sundarban Biosphere Reserve; 24 Pargana South Division has been considered for this study.

This paper is a combination of primary and secondary data. Secondary data have been collected from several forest department offices to detect women's participation in forest protection. The primary data collection is from an extensive field survey with the help of a scheduled questionnaire covering 302 women of 24 Pargana South Division. Five-point Likert scale has been used to understand the viewpoint of women respondents regarding Sundarban forest. As per women's statements, alternative income sources are the most effective way to save the mangrove forest. Expansion of small-scale industries by managing non-timber forest products sustainably, incorporation of views of women with the expert's knowledge and developing multi-dimensional approaches are the most significant incentives for the advancement of Sundarban Biosphere Reserve.

Keywords: Biodiversity conservation, Sundarban Biosphere Reserve, Women participation, Perception study, Inclusion of women

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1. Introduction

Biodiversity is the composition of varied life forms on the planet earth, including plants, animals, microorganisms, and the ecosystem they live in (Saini et al., 2019; Gupta et al., 2014; Kelboro et al., 2013). Presently, 8.7 million living species are enlisted in the list of global species (Mora et al., 2011). India plays a commendable role by contributing 7.8% of the total biodiversity percentage of the world, whereas India shares only 2.45 % of the geographical area out of the world's total geographical area (Saini et al., 2019). India is included in the list of twelve mega biodiversity countries (Myers et al., 2000; Singhal et al., 2020). Humans are continuously facing challenges in sustaining and nurturing the environment to control the massive population pressure and the ever-growing population demand (Gupta et al., 2013; Datta, 2012). Due to rapid biodiversity losses with several environmental issues, biodiversity conservation has become an emerging and most significant issue in present

decades (Bhattari). The government has taken several steps for insitu and exsitu conservation by designating biodiversity sites (Kelboro et al., 2013; watve et al., 2020).

For the conservation of biodiversity, United Nations Educational Scientific & Cultural Organization (UNESCO) introduced an "intergovernmental scientific programme" named MAB (Man and Biosphere Programme) in the year 1971 (Unesco.org). As per UNESCO, an area is designated as a Biosphere Reserve for the preservation of existing resources of the localities and to promote the sustainable relationship between natural, socio-economic & cultural environments. Among 701 Biosphere Reserves, Sundarban, the largest mangrove forest, is enlisted in the global network of Biosphere Reserves located in the deltaic complex of the Ganga –Brambhaputra river system. Intertidal dynamic ecosystem, the combination of fresh and saline water, has created a natural laboratory of biogeographical units containing almost all trophic levels .84 floral and 1692 faunal species are present in this world heritage site (Chandra et al., 2022).

Several environmental movements participated by women, and their sacrifices have proved that women strongly commune with nature. They handle natural resources more softly than men (Chandra et al., 2021). Agenda 21 of the United Nations Conference on Environment and Sustainable Development (UNCED) organized at Rio De Janeiro (1992) has given importance to women's participation in decision-making activities of sustainable development (Bhattari). Indian biological diversity act, 2002 is a step to empower local people and conserve biological diversity by involving local people, especially women (watve et al., 2020). That is why this paper tries to understand the role of women in biodiversity conservation and their perspective regarding the Sundarban forest.

2. Objectives

- To delineate the involvement of women in forest protection in the Sundarban Biosphere Reserve (SBR).
- To identify the perception of women regarding the Sundarban mangrove forest.

3. Study Area

Sundraban mangrove forest of West Bengal lies within 21°32' N to 22°40' N and 88°03' E to 89° E .Structurally SBR has three distinctive zones, i.e. core area and buffer area, which are included in the mangrove forest area and the transition zone, which is human-dominated (**Figure 1**). For the conservation and management of forest, the forest dept has divided the forest area into two divisions, 24 Paragana South Division and another one, Sundarban Tiger Reserve Division (Chandra et al., 2022). 24 Pargana South Division is taken into consideration for this present study (**Figure 2**).

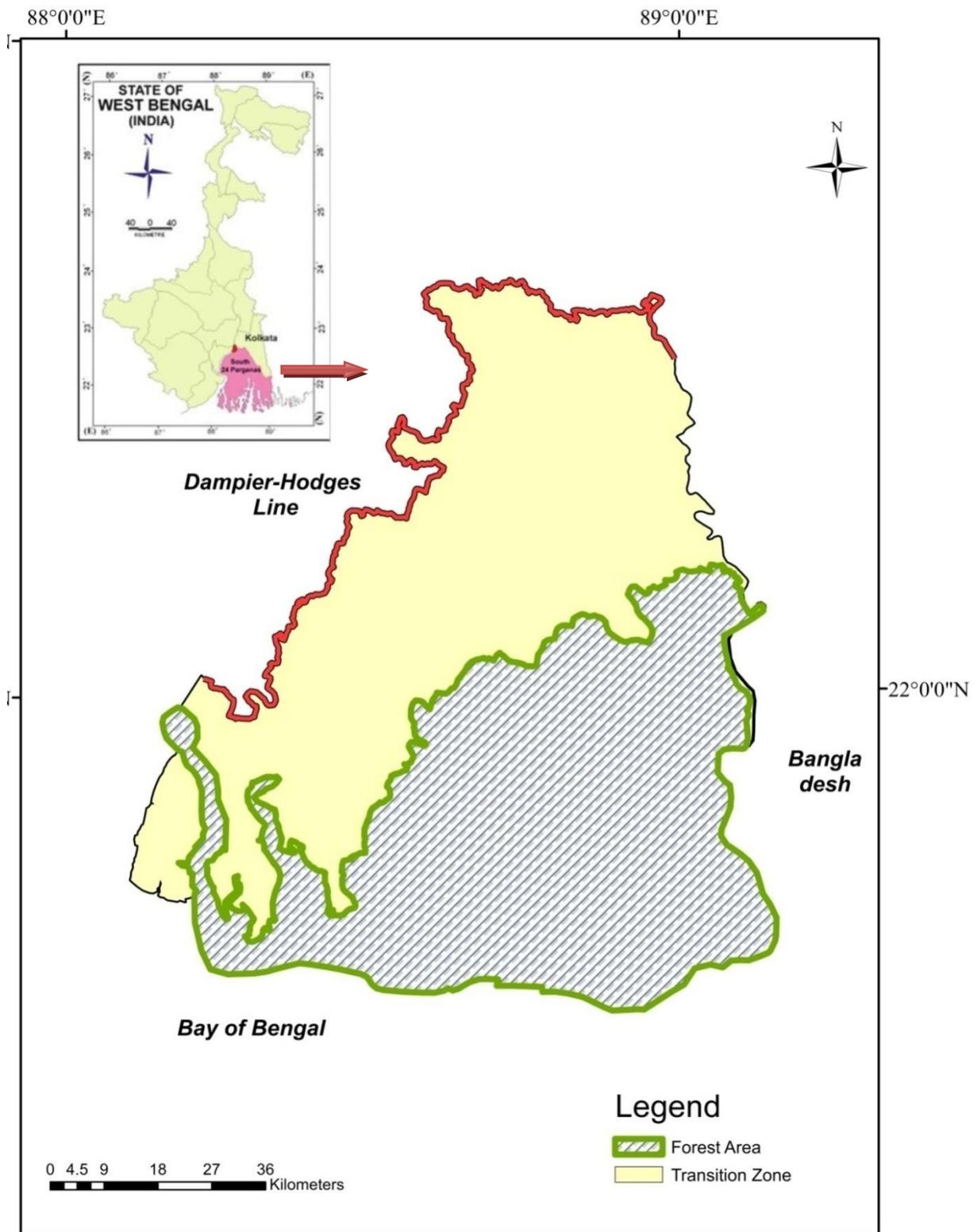


Figure 1: Location Map, Sundarban Biosphere Reserve (Source: WBFD, 2019)

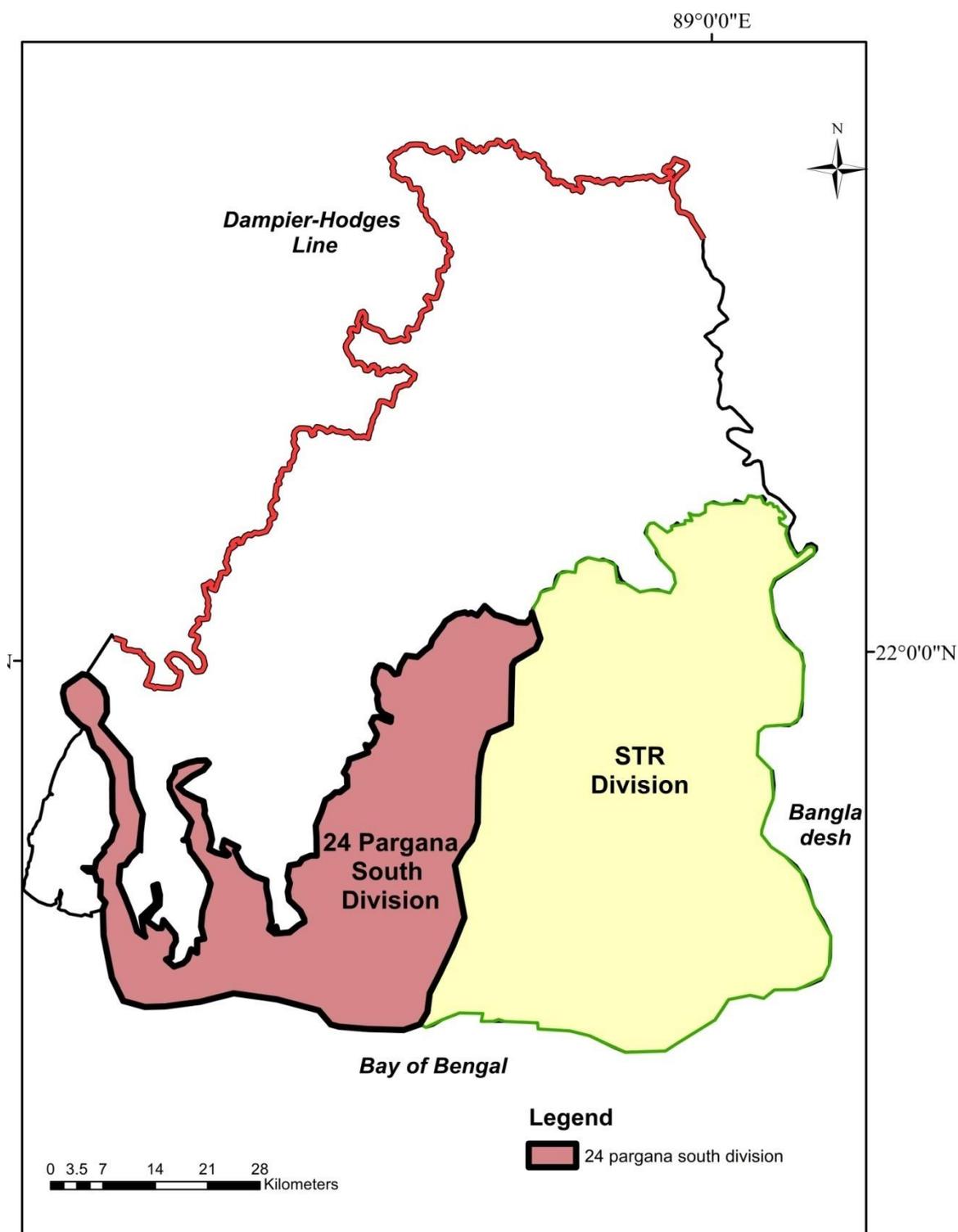


Figure 2: Study Area- 24 Pargana South Division (Source: WBFD, 2019)

The 24 Parganas South Division stretches over an area of 1653 km². It is located between 22°30'45" to 20°29'00" North Latitude and between 89°04'56" and 88°03'45" East Longitude, bounded by the river Muriganga on the west and the river Matla on the east (Directorate of Forest, Govt. of W.B. 2015).

4. Materials and Methods

This paper is based on both primary and secondary data. An extensive field has been completed with the help of a scheduled questionnaire. A total of 302 women have been surveyed from 24 Pargana South Division fringe villages. Open and close-ended questions have been used to understand the viewpoint of women about

Sundarban. The responses to each statement for the close-ended questionnaire are rated on a five-point Likert scale (Sanjay, 2011). The time period for the field survey was from January to March 2020.

Sources of secondary data are various offices of the Forest Department, i.e. Aranya Bhavana, Bikash Bhavana, DFO office, and 24 Pargana Forest Department. Calculations have been done using Excel 07, where maps have been prepared in the ArcGIS environment.

5. Results and Discussion

Joint Forest Management Programme is presently running in Sundarban, which is playing a significant role in conserving forest and advancing local dwellers by providing alternative income sources. This programme's main objective is to collaborate between forest officials and fringe villagers for forest conservation. For establishing several Joint Forest Management Committees (JFMCs), 24 Pargana South Division is divided into six forest ranges: Ramganga, Matla, Bhagabatpur, Bakkhali, Namkhana and Raidighi. A total of 40 JFMCs are presently working in 24 Pargana South Division under these six ranges.

5.1 The scenario of women participation in JFMCs in 24 Pargana South Division

Table 1: Details of JFMCs and Women Participation in 24 Pargana South Division (Source: WBFD, 2019)

Division	Range	No.of JFMC	Total Members in JFMC	Female members in JFMC	Protected area (Ha.)
24 Pargana South	Ramganga	4	1336	658	11401
	Matla	4	4890	2444	3948
	Bhagabatpur	6	2181	1087	5056
	Bakkhali	5	8826	4401	3169
	Namkhana	7	3471	1728	3048
	Raidighi	14	3956	1914	16112

Ramganga range:

Ramganga range shares 10% of JFMCs out of total JFMCs in 24 Pargana South, containing 5.37% of women members from the total members of this division (*Table 1*). This range is running towards sustainable mangrove management compared to other ranges of this division (Datta, 2012). Dispersion is low in the case of protected areas and members among the JFMCs.

Matla range:

Four JFMCs are located under this range. Among these, Jharkhali 4 is more organized regarding mangrove management (Datta, 2012). A total of 4890 fringe villagers are involved in these four JFMCs, out of which 2444 (50%) are women. The total protected area under this range is 3948, which is 9.23% of the total area of 24 Pargana South (*Table 1*).

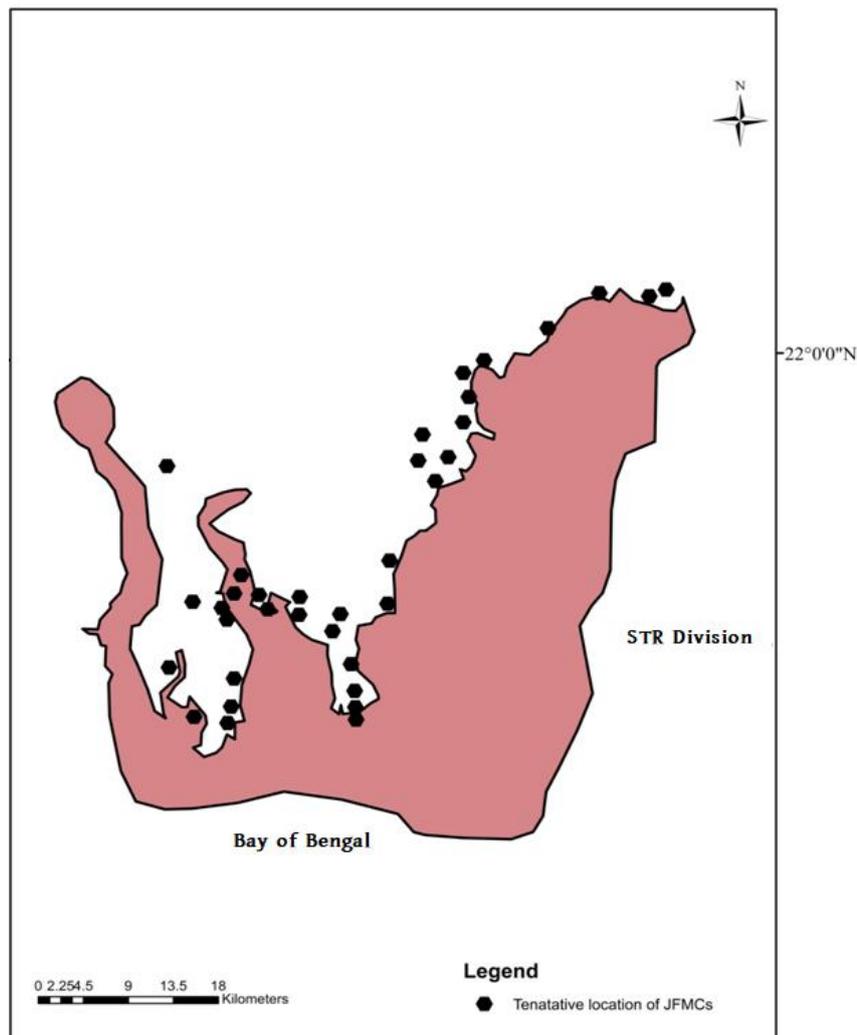


Figure 3: Tentative Location of JFMCs in 24 Pargana South Division (Source: WBFD, 2019)

Bhagabatpur range:

The Bhagabatpur range is composed of 7 JFMCs, where 2341 members are involved (**Table 1**). Very high dispersion is present in this range in the case of the protected area and members. In Brajaballavpur JFMC, only 315 members are involved in protecting the 3839 hectares area, whereas, in the case of Dakshin Chandanpiri, 58 hectares areas are conserved by 413 members. This range covers 8.88% of women members out of the total members in this division (**Table 1**). Sustainable mangrove management is comparatively not in a better position with respect to others (Datta, 2012).

Bakkhali range:

In the Bakkhali range, south Bakkhali shares the maximum number of members among this range. Mousani range has the most diminutive members in this range. Very high dispersion is present in the case of protected areas and members among JFMCs in this range.

Namkhana range:

7 JFMC are included in this range. A total of 3048 hectares areas are covered under this range. This range shares 16.04% members and 37.70% protected area in this division (**Table 1**).

Raidighi range:

In the Raidighi range, there are 14 JFMCs with 3956 members (**Table 1**). Very high dispersion is present in this range. In Kishorimohanpur JFMC, only 49 members are covering the 2500 hectares area, and for Ambikanagar JFMC, 864 members are protecting 500 hectares forest area. The percentage of women members out of the total

members in this range is 48.38. In Bhubanswari char JFMC, the percentage of women members is 24.1, which is lowest concerning others.

24 Pargana South Division presents a satisfactory rate of women members out of total members in each JFMC, but the scenario is different considering the total number of women in the fringe villages. The total number of female members of JFMCs in this division is 12,232, and the estimated women population of the fringe villages are 1 27,010 (Census, 2011), which shows that only 9.63% of women from fringe villages are involved in JFMCs. In this division total of 234 self-help groups are located for developing the economic condition of women. In such groups, total of 2808 women are involved under this division.

5.2 View point of Women regarding Sundarban Forest

5.2.1 Level of importance of Sundarban Forest

Sundarban is an inevitable part of the lives of rural women. When asked about the importance of mangrove forest, 83% of women respondents among total respondents replied that the Sundarban forest is crucial for their survival. 17% of women gave their opinion that Sundarban is essential. No one disagreed about the importance of the Sundarban forest (Sanjay, 2011).

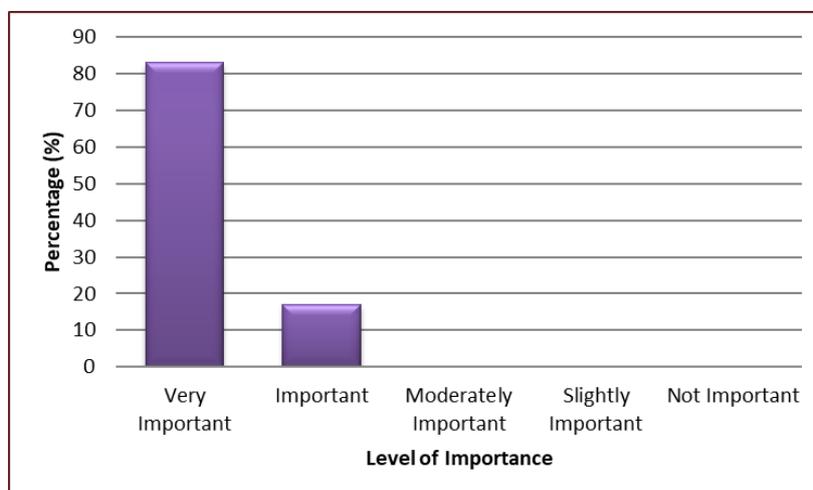


Figure 2: Level of Importance of Sundarban Forest to Women (Source: Field survey, 2020)

Anjali Das (50) of Amrabati village of Namkhana Block, involved in collecting fish and crab for survival, has stated that 'For the people of Sundarban, mangrove forest is an indispensable life support system. We are highly dependent on the forest for our survival. If there is no forest, our primary needs will not be fulfilled'.

Table 2: Respondent's View regarding Development of Sundarban (Source: Field Survey, 2020)

Variables	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
Plantation	87.18%	12.53%	0.29%		
More Involvement of forest department	40.67%	43.43%	3.02%	11.3%	1.58%
Development of eco-tourism	22.63%	32.83%	8.29%	30.5%	5.75%
Alternative sources of income	90.15%	9.85%			
Awareness generation	38.56%	47.58%	2.25%	9.03%	2.58%
Educational development	25.36%	23.49%	1.57%	30.3%	19.28%

Most of the respondents are a supporter of Alternative sources of income. 90.15% of women respondents strongly agreed with the generation of alternative sources of income for the development of Sundarban, followed by Plantation, more involvement of forest officials and others (Chandra et al., 2022).

Arati Shaw (36) of Gangadharpur village has no sources of income. In her opinion, 'the number of people in Sundarban is increasing daily. However, the sources of income are limited. To handle such a situation, the development of alternative sources of income is necessary. Small-scale industries can develop using non-timber forest products' (Chandra et al., 2022).

Expression of Namita Maity (47) of Radhakrishnanagar village of Patharptatima block, 'Plantation is required for the protection of Sundarban. The number of cyclones has increased, and its effect is becoming very harmful. We lost everything after each cyclone. We have to start from the beginning. It is only the mangrove forest that can protect us from devastating cyclones. Not only for natural reasons but for fulfilling our economic demand, mangrove forest is necessary. So Plantation and maintenance of planted trees by the patrolling system and other ways are necessary for the development of Sundarban' (Chandra et al., 2021, 2022).

From the above study, it can be stated that the forest department is actively working in Sundarban. Still, more attention should be given to several committees that the forest department develops to protect Sundarban forest. In many cases, women are interested in joining such committees and doing work under them, but they do not get such scopes. These negative issues should be eliminated (Chandra et al., 2021, 2022).

Regularly women of Sundarban are facing a huge struggle for survival. Still, they maintain a special relationship with the mangrove forest. Many women of fringe villages celebrate the occasion of 'Mangrove Bandhan' on the date of 'Raksha Bandhan' to create a bonding between man and nature.

6. Findings and Conclusion

Plantation and coverage of mangrove forest present a favourable scenario after establishing JFMCs. As per forest department records, although the percentage of women members out of total members in JFMCs is sufficient, this percentage is inadequate concerning the total women population of the fringe villages. The actual number of beneficiaries from JFMCs is significantly less, as per the viewpoint of the respondents. Women's involvement is also less in decision-making processes (Chandra et al., 2022).

Women of Sundarban have given maximum importance to the generation of alternative sources of income based on non-timber forest products (Chandra 2020. Chandra et al., 2022). They believe that actual conservation will not be possible without the development of local people's socio-economic conditions. They have also suggested that women should involve in several forest-related issues. Observation of the works of JFMCs by the forest department from the grassroots level is necessary to eradicate several negative issues. Lastly, it can be stated that a true collaboration between governmental and non-governmental organizations by involving local people, especially women, is a prior fact for the preservation of Sundarban.

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