**Appendix 2**

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**households survey questionnaire**

**THESIS TITLE:** ECOLOGICAL AND SOCIO-ECONOMIC VULNERABILITY ASSESSMENT TO CLIMATE CHANGE: A STUDY ON SUNDARBAN BIOSPHERE RESERVE, WEST BENGAL

**Introduction**

In order to access the socio-economic vulnerability assessment to climate change in The Sundarban Biosphere Reserve, I’m conducting face-to-face interviews with head of the selected households located within the biosphere reserve.

District: Block: Village Name:

Block Name: Community Name:

Questionnaire ID: Date of Interview:

Religion……………………………………Social group…………………………………….

Name of respondent: ……………………………………Age: \_\_\_\_\_\_\_ Sex: \_\_\_\_\_

Marital Status: Married/ Unmarried/Widowed/separated/Remarried

1. **Attitude questions**
	1. Year since you are living lived in this area?
	2. Year since you have owned a property in this area?
	3. Sources of drinking water (types):
	4. Sources of drinking water: within premises/outside the house
	5. Electricity connection in your house? a. Yes b. No.
	6. If no specify the other sources:
2. **Households information:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Age | Sex | Education | Occupation |
|  |  |  |  |  |
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1. **Land tenure and land holding size:**

|  |  |  |
| --- | --- | --- |
| Sl. No | Land tenure system  | Tick where appropriate |
| 1 | Land less  |   |
| 2 | cultivator  |   |
| 3 | lease- in  |   |
| 4 | Cultivator and lease  |   |

1. **Source of family incomes:**

|  |  |  |  |
| --- | --- | --- | --- |
| Source  | Income (Rs) | Source  | Income (Rs)  |
| Agriculture |   | Labour |   |
| Fishing/ Shrimp Culture |   | Business |   |
| Honey collector |   | Tourism |   |
| Forest woods and others |   | migrated worker |   |
| Government job |   | Others |   |

1. **Households perceptions on variability**

|  |  |
| --- | --- |
| **Households perception on weather and climate variability** | **Code** |
| Delayed monsoon | 1 | 2 | 3 | 4 | 5 |
| Fewer rainy days | 1 | 2 | 3 | 4 | 5 |
| Shorter rainy season | 1 | 2 | 3 | 4 | 5 |
| Rainfall decreased | 1 | 2 | 3 | 4 | 5 |
| Summer longer | 1 | 2 | 3 | 4 | 5 |
| Temperature increased | 1 | 2 | 3 | 4 | 5 |
| Summer earlier | 1 | 2 | 3 | 4 | 5 |
| Warm winter | 1 | 2 | 3 | 4 | 5 |
| Late winter | 1 | 2 | 3 | 4 | 5 |
| Winter shorter | 1 | 2 | 3 | 4 | 5 |
| Frequency of flood increased | 1 | 2 | 3 | 4 | 5 |
| Frequency of cyclone increased | 1 | 2 | 3 | 4 | 5 |
| Soil salinity increased  | 1 | 2 | 3 | 4 | 5 |
| Availability of groundwater decreased | 1 | 2 | 3 | 4 | 5 |
| Availability of surface water decreased | 1 | 2 | 3 | 4 | 5 |
| Overall weather changed | 1 | 2 | 3 | 4 | 5 |

1= don’t know, 2= Disagree, 3= uncertain, 4= Agree, 5= strongly agree

1. **Households experience of suffering from natural disaster or climate change effects?**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Problems  | Severely suffered (3)  | Moderately suffered (2)  | Least suffered (1)  | Nosuffered (0)  |
| Decrease of mangrove | 3  | 2 | 1  | 0  |
| Bank erosion/soil erosion  | 3  | 2  | 1  | 0 |
| Inundation of low land | 3  | 2  | 1  | 0  |
| Change in river flow  | 3  | 2  | 1  | 0  |
| Land degradation  | 3  | 2  | 1  | 0  |
| salinity intrusion | 3 | 2 | 1 | 0 |
| Flood hazards | 3  | 2  | 1  | 0  |
| Cyclone | 3  | 2  | 1  | 0  |
| Stalinization of Agricultural land | 3 | 2 | 1 | 0 |
| Crop production decreased | 3  | 2  | 1  | 0  |
| Honey production decreased | 3 | 2 | 1 | 0 |
| livestock disease increased | 3  | 2  | 1  | 0  |
| fish production decreased | 3 | 2 | 1 | 0 |

1. **Did climate change effect the livelihood and economy?**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Livelihood effect | Flood | Salinity  | Cyclone | Sea level rise | Erosion  |
| Agriculture |  |  |  |  |  |
| Livestock |  |  |  |  |  |
| Fishing |  |  |  |  |  |
| Shrimp Culture |  |  |  |  |  |
| Honey production  |  |  |  |  |  |

1=yes, 0=No

1. **Types of House**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Types of House | Hut | Muddy | Semi cemented | Fully Cemented | Grass/Bamboo | Others |
| Click yes or no |   |   |   |   |   |   |

1= Yes, 0 = No

* 1. Do you have toiled in your houses?
	2. Do you have kitchen in your houses?
	3. Do you have bathroom in your houses?
	4. How many times your home affected by cyclone in last 10 years? (……..)
	5. How many times your home affected by flood in last 10 years? (……..)
	6. Have you, in the last 10 years, experienced any form of flood damage (including to your home, garden or vehicle)?

|  |  |  |  |
| --- | --- | --- | --- |
| Code | Damaged (10yr) | Cyclone | Flood |
| 0 | No damage |   |   |
| 1 | Less damage |   |   |
| 2 | Suffer damage |   |   |
| 3 | Severe damage |   |   |
| 4 | Irreversible damage |   |   |

1. **Wealth and Assets** (Please indicate the following assets and year was purchased )

|  |  |  |
| --- | --- | --- |
| Items  | Number  | Death/destroy due to flood, cyclone |
| Bicycle  |  |  |
| Motorcycle  |  |  |
| Radio  |  |  |
| boats |  |  |
| Goats  |  |  |
| Cows  |  |  |
| Land with tree plantation (bigha)  |  |  |
| Poultry  |  |  |
| Agricultural land (bigha) |  |  |
| Others |  |  |

1. **How many times your household members collect items from the forest recourses?**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Items** | **Trips / week**  | **Amount / trip**  | **Total / month**  | **Year**  |
| Fire wood  |  |  |  |  |
| Honey  |  |  |  |  |
| Grazing  |  |  |  |  |
| Fishing  |  |  |  |  |

1. **Health and treatment** (what are the major diseases affected by your family members?)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Members of family | Diseases 1 | Diseases 2 | Maternal Diseases | hospitalized | Local dr.  | RHCs | DHCs |
|  |  |  |  |  |  |  |  |
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1. **Heath problem due to climate change**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Heath problem due to climate change | Don’t know **(1)** | Decreased **(2)** | No change **(3)** | Uncertain **(4)** | Increased **(5)** |
| Vector borne diseases  |  |  |  |  |  |
| Water borne diseases |  |  |  |  |  |
| Arsenic poisoning  |  |  |  |  |  |
| Infectious diseases  |  |  |  |  |  |
| Child diseases  |  |  |  |  |  |
| Mortality  |  |  |  |  |  |

1. **Household coping mechanism for Heath issues**

|  |  |  |
| --- | --- | --- |
| **Coping mechanisms for health issue**  | **Yes = 1** | **No = 0** |
| Drink boiled water for drinking |  |  |
| Avoid using water from the river or pond |  |  |
| Use protection to avoid the diseases |  |  |
| Frequent checkup in near hospital  |  |  |
| Used Vaccine and take medicine  |  |  |
| Take advised of doctor  |  |  |
| Go to health awareness camp  |  |  |
| Take Ayurvedic medicine  |  |  |

1. **Education**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Education types | Members | Location | Mode of communication  | Reasons of dropout | Flood, cyclone, storm effect your education?  |
| Male | Female | yes/no | How |
| 4th |   |  |  |  |  |  |  |
| 8th |   |  |  |  |  |  |  |
| 10th |   |  |  |  |  |  |  |
| 12th |   |  |  |  |  |  |  |
| Graduate |   |  |  |  |  |  |  |
| Master |   |  |  |  |  |  |  |
| Higher |   |  |  |  |  |  |  |
| Others |   |  |  |  |  |  |  |

1. **Effective Adaptation strategies**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Effective Adaptive strategies  | Very highly effective **(4)** | Highly effective **(3)** | Moderately effective **(2)** | Somewhat effective **(1)** | Not effective **(0)** |
| Alternative crops |  |  |  |  |  |
| Cultivating HYV rice varieties |  |  |  |  |  |
| Alternative fish varieties |  |  |  |  |  |
| Prawn cultivation  |  |  |  |  |  |
| Poultry and duck rearing |  |  |  |  |  |
| Reclaim the degraded land |  |  |  |  |  |
| Cultivating vegetables |  |  |  |  |  |
| Non-agriculturalMigration |  |  |  |  |  |
| Off-farm work (van, rickshaw, driving) |  |  |  |  |  |
| Petty business |  |  |  |  |  |

1. **Early warning and Awareness**
	1. How do you obtain of information about the floods and cyclones?

No early warning (0), Radio (1), T.V (2), Newspaper (3), Panchayat (4), Neighborhood (5), relatives (6).

* 1. How before you obtained the early warning information?

|  |  |
| --- | --- |
| Early warning Period | Code |
| No early warring | 0 |
| Within 12 hours | 1 |
| Within 1 day | 2 |
| Before 2 days | 3 |
| Before 5 days | 4 |
| Before a week | 5 |

* 1. Are there safe places used to protect from hazards? **Yes/No**
	2. Decision after early warning?

|  |  |
| --- | --- |
| Decision after early warning | Code |
| Wanted to stay at own home | 1 |
| Evacuate home and shift to shelter with family | 2 |
| Go to cyclone center  | 3 |

1. **Households adaptation strategies for climate change effect**
	1. **Adaptation strategies for salinity inclusion**

|  |  |
| --- | --- |
| Adaptation strategies for salinity inclusion | Code |
| (0) Do nothing |  |
| (1) Rainwater harvesting |  |
| (2) Conservation of pond water |  |
| (3) Use of pond sand filter |  |
| (4) Digging of pond |  |

* 1. **Adaptation measures implemented by fish/shrimp farmers**

|  |  |
| --- | --- |
| Changes in Fish/shrimp farming practices | Code |
| 1. No response measures implemented
 |   |
| 1. Increased embankment height
 |   |
| 1. Digging pond inside fish farm
 |   |
| 1. Liming
 |   |
| 1. Use medicine
 |   |
| 1. Placing net around shrimp field
 |   |

* 1. **Adaptation measures for agriculture**

|  |  |
| --- | --- |
| Adaptation measures for agriculture | Code |
| 1. No adaption option
 |  |
| 1. Crop diversification
 |  |
| 1. Changing cropping calendar
 |  |
| 1. Change in cropping pattern
 |  |
| 1. Adopting modern faming technologies
 |  |
| 1. Transform agriculture land into fishery
 |  |

* 1. **Adaption measure for bank erosion**

|  |  |
| --- | --- |
| Adaption measure for bank/soil erosion | Code |
| 1. No Adaptation opted
 |  |
| 1. Sea wall/earthen embankment
 |  |
| 1. Soil bunds
 |  |
| 1. Waterways
 |  |
| 1. Stone bunds
 |  |
| 1. Grass strips
 |  |
| 1. Mangrove replanting
 |  |

* 1. **Adaption measure for floods**

|  |  |
| --- | --- |
| Adaption measure for flood | Code |
| 1. Storage food
 |  |
| 1. Migrated to safe place
 |  |
| 1. Migrated to other village
 |  |
| 1. Link with other communities
 |  |
| 1. Maintenance and improve the river bank
 |  |
| 1. Make community action team
 |  |
| 1. Make home with higher foundation
 |  |

* 1. **Adaption measure for cyclone**

|  |  |
| --- | --- |
| (1) Adaption measure for cyclone | Code |
| (2) Sifted to cyclone centre  |  |
| (3) Stay at home |  |
| (4) Migrated to other place |  |
| (5) Prepared cyclone protected home |  |
| (6) Make community action team  |  |

* 1. **Household coping mechanism**

|  |  |  |
| --- | --- | --- |
| **Code** | **Households Coping mechanisms**  | Tick the right Ans |
| 1 | By own savings  |   |
| 2 | By borrowing money from relatives  |   |
| 3 | By financial assistant from the Government  |   |
| 4 | By borrowing money from NGO  |   |
| 5 | By relief from the NGO  |   |
| 6 | By asking children to work  |   |
| 7 | By borrowing money from Bank  |   |
| 8 | By mortgage assets  |   |
| 9 | By stopping schooling of children  |   |
| 10 | By reducing expenses on food and other consumption |   |
| 11 | Sold assets |   |
| 12 | By temporarily migration to other area |   |

* 1. Distance of the cyclone centre from your home? (…………………meter)
	2. How much time you need to recover after cyclone Aila? (………………….days)
	3. How much time you need to come back in normal life after Aila? (……………months)
1. **Assistance from the Government and NGOs during and after the natural hazards**

|  |  |  |
| --- | --- | --- |
| Item received | Government/Ngo | Remark  |
| Foods |  |  |
| Shelter/tripal  |  |  |
| Clothes  |  |  |
| Financial assistance  |  |  |
| Loans  |  |  |
| Others |  |  |

1. **Access to government programmes and policies effect their life:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Adaptive strategies opted | highly effective | Moderately effective | Not effective | Negatively effective |
| MGNREGA |  |  |  |  |
| PDS |  |  |  |  |
| Formation of SGS |  |  |  |  |
| (SSDC) Programme |  |  |  |  |
| Mobile health service  |  |  |  |  |
| Ecological policies |  |  |  |  |
| Fishing, wood collection policies |  |  |  |  |
| Others (Specify)  |  |  |  |  |

1. **What the governments provided the land for bank erosion? Yes /No.**