

# Health care in the Sundarbans (India): Challenges and plan for a better future

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## Abbreviations

ACMOH	Assistant Chief Medical Officer, Health
BPHC	Block Primary Health Centre
BPL	Below Poverty Line
CMOH	Chief Medical Officer, Health
DFID	Department for International Development
DH	District Hospital
DHFWS	District Health and Family Welfare Society (Samity)
DoHFW	Department of Health and Family Welfare
EDL	Essential Drug List
EMOC	Emergency Obstetric Care
FHS	Future Health System
FW	Family Welfare
GoI	Government of India
GoWB	Government of West Bengal
GP	Gram Panchayet
HSDI	Health System Development Initiative
HMIS	Health Management Information System
IEC	Information, Education, and Communication
IIHMR	Institute of Health Management Research
IPD	In-patient Department
JSY	Janani Suraksha Yojana (Mother's Protection Scheme)
MCH	Maternal and Child Health
NFHS-3	National Family Health Survey (3 <sup>rd</sup> round)
NGO	Non-government Organization
NSSO	National Sample Survey Organization
OPD	Out-patient Department
OOPE	Out of Pocket Expenditure
PHC	Primary Health Centre
PPP	Public Private Partnership
RCH	Reproductive and Child Health
RH	Rural Hospital
RMP	Rural Medical Practitioners
SDH	Sub-divisional Hospital
SHG	Self Help Group
SGH	State General Hospital
SHSDP-II	State Health System Development Project: Phase –li

## Preface

This document presents the key results of a recent research on the health care system of the Indian Sundarbans conducted by Institute of Health Management Research (IIHMR) in West Bengal, India based on a research grant awarded by the Department for International Development (DFID), United Kingdom to an International Research Programme Consortium (RPC) in which IIHMR is a partner. The consortium, titled as *Future Health Systems: Innovations for Equity (FHS)*, will carry out innovative research programmes in six countries. The three basic themes of FHS can be summarized as follows:

- How can the poor be protected from the impoverishing impact of health-related shocks?
- What innovations with public and private health sector can work for the poor?
- How can policy and research processes be used to meet the needs of the poor?

IIHMR has identified *West Bengal* as the major focus state for implementing the research programme in India. More specifically, it proposes to explore the potential of the strategy of decentralization of health care services, as manifested in a series of initiatives recently being spearheaded by the Department of Health and Family Welfare (DoHFW) in the state to improve the effectiveness of the health system, in protecting interests of poor people.

The present document is based on a series of studies carried out during the earlier part of the year 2009 in the Indian part of the Sundarbans – a cluster of islands with extreme geo-climatic challenges and spread over 19 blocks in West Bengal. The principal driving force behind the initiative was the keen interest of the government as well as of a few local non-government agencies to curve out a special plan to improve the health care delivery system of the area. All stakeholders concur alike that the area, due to its extreme geographical barriers and abject poverty, requires a long-term innovative plan to provide basic health care services to its people. Evidently, the routine services provided by the existing health care structures are not adequate to reach every corner of the islands with an affordable solution to people's health problems. The unique location of the Sundarbans in the geographical and human development map of the state makes it imperative that there is a separate health plan that would be aligned to the overall master development plan of the area.

This document is expected to serve two purposes: (1) based on recent evidences it attempts to highlight the need for a special attention to the Sundarbans' health service delivery system, and (2) it presents a broad framework of a health plan especially targeted to improve the system and make it work more for the poor and vulnerable groups of population in the islands. Given that fact that the Sundarbans represent a typical fragile and hard-to-reach pocket within a state, the initiative may also be considered as a learning platform for other similar fragile states in India and in other developing countries.

We hope that the findings and the planning framework presented in this document will be discussed and used by the Department of Health & FW, Government of West Bengal and other key stakeholders to finally draw a detailed master health plan for the Sundarbans.

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## Executive Summary

### ***Background***

The Sundarbans, a unique biosphere reserve of mangrove forests and one of the global heritage sites, are located in the extreme south of West Bengal (an eastern Indian state) and Bangladesh, the neighboring country. The entire area is intersected by tidal rivers or estuaries from north and south and by innumerable narrow tidal creeks from east to west painting an assortment of beautiful but largely formidable and inhospitable terrains. The area outside the reserve forest (54 islands), home of about 4 million people spread over 19 administrative blocks, is the human face of the Sundarbans which epitomizes abject poverty, deprivation, and acute struggle against geographical challenges. It is however important to note that the geographical challenges vary across blocks. People, who live in the 'remote' Sundarbans - the blocks adjacent to the forest area or the Bay of Bengal – face much harder problems compared to those who live in the 'peripheries' (and closer to Kolkata).

### ***People and their health***

The major findings related to people's health in the Sundarbans are classified into two groups according to their links to the following areas: (1) health status, and (2) health care utilization..

#### ***Health status***

**General morbidity rate is higher than the state average.** Children are three times more vulnerable to respiratory ailments which also top the prevalence list. In general, almost all types of communicable diseases are highly prevalent. Environmental problems, such as skin related ailments are also very common. The impact of arsenic poisoning was quite visible in the blocks where groundwater is heavily contaminated with arsenic. People, who collect forest and river products, are under constant threat of animal attacks. The incidences of snake bites recorded in the local hospitals were high.

**The dual burden of communicable and non-communicable diseases is quite evident** like urban West Bengal. Coronary heart diseases (CHD) are estimated to affect 6 percent of population aged 40 years or more. Similarly, about 2.4 percent of adult population (>40 years) indicated high risk of arthritis while 42.4 percent were already diagnosed which was higher than the corresponding state average (35.3%). Bronchial Asthma chronically affects the elderly population at 8 percent prevalence rate. The inequalities in the spread of these ailments are also worth noting. Women and poor are more vulnerable to chronic ailments such as Arthritis and Asthma. There are other chronic problems, such as vision problems (farsightedness) which, despite their disproportionately high burden, remain largely unaddressed due to low perceived severity.

**Remarkably high prevalence of mental health problems** due to strong presence of various psycho-social stressors. Reported cases of Deliberate Self Harm cases have increased in the last few years.

**About half of the children (below 5 years) are chronically malnourished** leading to their vulnerability to respiratory and gastro-intestinal ailments. Prevalence of respiratory ailments

among children is higher than the state average. One in three children in the Sundarbans were found to have suffered at least one episode of cough with difficulty in breathing (faster than usual, short and rapid breaths) in the last two weeks compared to only 13 percent in West Bengal.

**Women share disproportionately higher burden of ailments than men do** especially in the 15-59 age group. Data on the body mass index (BMI) of selected mothers indicate that a little less than one-third of women (31.5%) were underweight (i.e., BMI<18.5).

### *Health care utilization*

**Very high utilization of inpatient care reflected by high hospitalization rate (4.2%) which is almost equal to the state average.** About two-thirds of total hospitalized persons in the Sundarbans sought admission in public hospital, which by Indian standard was quite high but by West Bengal's standard was low (40% in India and about 82% in West Bengal). However, the utilization of local facilities for inpatient care is relatively low as little more than one-fifth (21%) of all inpatients had sought admission from Kolkata and 43 percent of them were self-referred.

**Absolute dominance of Rural Medical Practitioners (RMP) in outpatient care market.** 62% of outpatients were treated by RMPs who rampantly practice modern medicines without formal training. This is a much higher rate than what was found in rural West Bengal (53%). According to the study results, the most obvious reasons for such dominance are physical proximity and affordable market prices of RMP services. Reduced transaction cost and trust were found to be two other important factors explaining high acceptability of these providers.

**Utilization of maternal health care at institutions is low.** Out of sample 569 mothers, who delivered at least one child in the last five years, only 29 percent delivered their last child at public or private institutions – a rate comparable to the rural areas of the most backward districts in West Bengal such as Uttar Dinajpur (23.6%) or Malda (26.4%). However, most of these institutional deliveries (about 71% of all institutional deliveries) were conducted at government hospitals. It is also interesting to note that utilization of ante-natal care is considerably high, yet institutional natal care is mostly unutilized. Difficult terrain and broken chain of transportation – especially in the least accessible islands - seem to force the mothers deliver births at home.

**Sick children at the Sundarbans are more probable to receive treatment (compared to the children in other parts of the state).** However, in most cases RMPs are the only or first source of treatment. The rate of child immunization is slightly lower than the state average.

### *Who provide health care and how much?*

#### *Public health care system*

**Low Bed Occupancy Rate at local facilities (45% in North Sundarbans, 73% in South Sundarbans compared to 91% in West Bengal at the BPHC level)** implying that large number of patients bypass local facilities to seek treatment in Kolkata or upper tier hospitals. The rates of hospitalization at local facilities are significantly low at the remote blocks (e.g., Gosaba, Basanti, Canning-2, and Sandeshkhali-2) indicating higher prevalence of self-referral in these blocks.

**Utilization of outpatient care at public facilities is also at sub-optimum level.** The number of outpatients per bed day at the BPHCs of the Sundarbans worked out to be 25 to 30 percent less than the state average, primarily because of easy availability of unqualified providers. The number of PHCs is conspicuously low (total 47, one per 90,000 population) and few of them are non-functional (without any doctor).

**Physical infrastructure of the BPHCs is not a serious problem, but shortage of frontline workers and complementary equipment keep them partially ineffective.** Availability of manpower is especially a matter of concern at the sub-centre level where about 16 percent of ANM's positions remained vacant in 2008 (15% in North and 17% in South Sundarbans). It is also important to note that two-thirds of all ANM vacant positions could be attributed to only five 'remote' blocks – Hingalganj, Sandeshkhali-2, Gosaba, Basanti, and Patharpratima – implying a negative correlation between the need and supply of health workers. The shortage of medical staff is less acute at the upper level facilities (BPHC, RH, and SDH). However, there are inequalities in allocation as demonstrated by the fact that three BPHCs were running with only 2 medical officers (Gosaba, Haroa, and Sandeshkhali-1) while six other reported more than 5 medical officers (in 2008). In addition, there had been an acute shortage of technical persons at this level making the service delivery package less effective in several facilities.

**Without proper linked referral transportation, the service delivery system often fails to produce desired results.** The geographical landscape of the Sundarbans makes it imperative to link the river and road transportation from a village to the nearest public hospital by a single chain.

**The existing governance structure at the district level is not very favorable to make and implement separate plan for the Sundarbans.** The region spreads over two districts making it difficult to see the Sundarbans as a separate entity. Even within a district, the data and problems of the non-Sundarbans blocks often confound the unique constraints of the service delivery system in the Sundarbans blocks.

### *Public private partnership*

**Mobile health clinics on waterways, being operated by several voluntary agencies for a decade, offer a highly potential model for delivering services to water-locked islands.** However, these clinics still could meet only a small part of the huge need for health care. Further, the probability of meeting the need of care for acute ailments is low especially for those diseases that require continuum care for a short period. The model is weakly integrated with the public health care system implying that the outcome generated from this initiative has remained largely unknown and unexamined. The services provided by the agencies have almost established a channel parallel to the government system without a strong linkage effect.

**Institutional birth delivery point, another PPP initiative, wherever established, have effectively addressed the barriers to access institutional care for birth deliveries to a large extent.** However, apart from the fact that the numbers of such points are conspicuously small compared to people's need, the initiative is also constrained by the same set of factors as experienced in the cases of mobile clinics. In addition, treatment of common diseases should be included in the package – which is limited to birth delivery services at present – to buy in people's demand.

**Several commendable independent NGO projects, but added together they are still inadequate to meet the need of under-served population.** There is huge scope for



these agencies to play roles that are more prominent. The independent 'project' initiatives need to be integrated with public health care system and an operational link need to be established between these initiatives.

### *Parallel providers: Rural Medical Practitioners*

**Gaps in public health care have helped RMPs – the army of less qualified providers - establish a strong network of parallel health care.** On average, a RMP treats 15-20 patients every day, about one-third of them being children below 5 years. Most common diseases treated by them are related to gastro-enteric (e.g., diarrhea) and respiratory ailments (common cough, cold, fever, and Asthma). However, people seek care also for relatively less common ailments; for example, about 22 percent of RMPs reported to have treated patients with mental health problems in the last one year.

**Their treatment behavior often reflect lack of judgment regarding rational use of drugs** although most of them were found to have basic knowledge about the diagnosis and primary purpose of modern medicines related to common diseases.

**Poor are usually benefitted by RMP services but also bear huge risks associated with utilization of this unregulated practice.** Besides irrational drug use, the risks manifest in (1) RMPs' increasing engagement in surgical intervention, (2) their gradual penetration in the inpatient market (i.e., clinics with beds), and (3) their poor referral practices.

### *The gaps in service delivery system*

**The Service Delivery Space**, i.e., the *availability of room that would allow the government and its development partners to provide additional resources or to undertake new initiatives for improving service delivery*, has been identified by the study in relation to (1) service categories, and (2) geographical areas within the Sundarbans.

**The space is wide open for all categories of health care** except routine preventive public health programs such as child immunization. For example, there is huge scope to increase institutional birth delivery by strengthening the PHCs and through scaling up partnership with the local NGOs. Similarly, high level of chronic child malnutrition creates an opportunity for community level intervention for (such as, positive deviance model) addressing the problem. By introducing a guided and linked referral transportation an increased rate of utilization of inpatient care at local facilities may be achieved. Similarly, by proper integration with and regulation of the RMP market one can achieve better quality outpatient care.

**Geographically, six blocks are identified as 'priority' blocks in terms of available service delivery space and physical inaccessibility.** These blocks are: Gosaba, Hingalganj, Patharpratima, Sandeshkhali-2, Namkhana, and Kultali.

### *A plan for better future*

A plan for a set of initiatives are proposed for consideration by all key stakeholders. There are five major components of the plan: (1) Strengthening public health facilities, (2) Providing basic health services at the village level, (3) Establishing a referral transport

network, (4) Reorganizing existing and introducing new PPP initiatives at the least accessible areas, and (5) Innovations in use of information and communication technology.

For **strengthening public health facilities**, the proposed initiatives are: (1) renovating all 47 PHCs in the Sundarbans, (2) at least one PHC is designated 24 × 7 in each remote block (9 blocks), (3) upgrading the BPHCs of 6 priority blocks to provide basic EMoC services, and (4) river ambulance for BPHCs in the 9 remote blocks.

For **providing basic health services at the village level**, 100 Basic Health Guard Units (BHGUs) will be made operational at the GP level of 6 priority blocks. The unit will provide basic curative services, referral services, safe delivery services, basic mental health services, and post-calamity basic health care. A trained diploma holding medical practitioner will be at the core assisted by two community health workers from existing pool (e.g., ASHA and second ANM). This unit will provide services on a daily basis under the technical supervision of local PHC doctor and with written guidelines on basic treatment and referral. A local agency will be contracted to operate this unit.

For **establishing referral network**, an exclusive referral transport chain (rickshaw van – boat – ambulance) will be provided to each BHGU on contractual basis. Local transporters will be contracted for this purpose. It will be managed on a PPP basis and will ensure quick linking of the broken chain of transportation to the nearest BPHC for those patients who are referred by a BHGU.

For **reorganizing existing PPP initiatives and introducing new PPP initiatives at the least accessible areas**, all existing initiatives will be aligned to BGHUs. For upscaling, a detailed assessment of existing initiatives will be done. New initiatives, such as Mothers' waiting home, will be planned and implemented under NRHM program.

For **innovations in use of information and communication technology**, a GIS based surveillance technology will be introduced at the block level. In addition, the use of low cost diagnostic technology in public health programs will be encouraged.

**The proposed plan will require a drive for decentralization of health governance in the Sundarbans.** This would require establishing separate cells for the Sundarbans at the state and the district level. Three zones will be set up (2 in the South and 1 in the North) which will be led by an ACMOH and have maximum autonomy in planning and management. At the block level, the Block Society will be reformed to assume more responsibilities in supervising all PPP initiatives within the block. In addition, it will procure, stock, and supply essential drugs required in a post-calamity situation according to the advanced indent of the BGHUs within the block. One of the Medical Officers will provide technical support to the BGHUs and act as a nodal person for all PPP initiatives within the block. At the community level, a health watch group will be formed to oversee the process and results of BHGU and other PPP initiatives.

The plan will follow a low-cost strategy; hence, the additional requirement of resources will be within feasible limit. A ballpark estimate of additional investment works out to Rs. 830 million. A more rigorous costing procedure is however required in the next stage (during action plan process) to reach a more accurate estimate.

# **1. Background**

## 1.1. Introduction

The present document encapsulates the findings of a research study on issues related to the health system of the Indian part of the Sundarbans<sup>1</sup>, a cluster of islands with mangrove forests and about 4 million people. The study was recently carried out by the Future Health System (FHS) project, a research initiative currently being implemented by Institute of Health Management Research (IHMR) with support from DFID, UK. The study is expected to provide the Government of West Bengal and other key stakeholders with much-required inputs to design a master health plan for the Sundarbans. The need for a special focus on the Sundarbans is longstanding since the extreme geographical barriers and abject poverty among most of the islanders have made the routine public health services inadequate and largely ineffective. The need has turned more pressing in recent times due to the catastrophic impact of the cyclone *Aila* which rampaged through the whole region on May 25, 2009 and, in addition to the huge human and environmental damages, exposed the inadequacy and vulnerability of the existing health care system.

The study attempts not only to show why the Sundarbans are different in terms of health indicators and utilization of health care services but also to measure the extent of unmet need for people's health security. Since health of the islanders is inseparably linked to their social, environmental, and economic security, it also aims to explore the links and to posit health security on a broader spectrum of issues related to the protection of the Sundarbans from long run extinction. .

The document is organized in the following way: Chapter 1 (this chapter) presents an overview of the Sundarbans and the objectives, data, and methods of the study. Chapter 2 highlights the key findings and issues related to the demand side that emerged from the surveys. Chapter 3 focuses on the supply side capacity and identifies the system gaps for different health care needs. Finally, based on the findings, Chapter 4 provides a broad framework of a future health plan.

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<sup>1</sup> Sundarbans is the English transliteration of the Bengali name of the place called “Sun-dor-bon”. The literature offers several variants of English names, such as “Sundarban”, “Sunderban”, “Sundarbans”, “the Sundarbans”, and so on. We follow the last version, i.e., “the Sundarbans” throughout this document to reflect the pluralities within the region and clustering of islands.

## 1.2. The Sundarbans with two faces<sup>2</sup>

### The natural face

The Sundarbans, a unique biosphere reserve and one of the global heritage sites, are located in the extreme south of West Bengal, an eastern Indian state, and Bangladesh, the neighboring country (Figure 1.1). Representing a cluster of islands and surrounded by one of the most beautiful arrangements of mangrove forests with rich variety of flora



and fauna, the Sundarbans, considered as the world's largest river delta, represent a unique ecosystem with magnificent biodiversity. The region is also the home of exotic wild lives including the Royal Bengal Tiger. Extending between 21°32" North and 22°40" North Latitude and between 88°05 East and 89°00 East Longitude, it is demarcated by the river

Hooghly on the west, rivers Ichamati-Herobhanga-Raimangal on the east, Dampier-Hodges line on the north, and the Bay of Bengal on the south. While the larger part of the region falls under the administrative boundary of Bangladesh, India possesses 40 percent of this unique mangrove forest area. The Indian part of the Sundarbans covers around 9630 square kilometers in West Bengal, spreading across 106 islands in 19 administrative blocks of its two districts – 6 from the North 24 Pargonas district (out of 22 blocks) and 13 from the South 24 Pargonas district (out of 29 blocks).

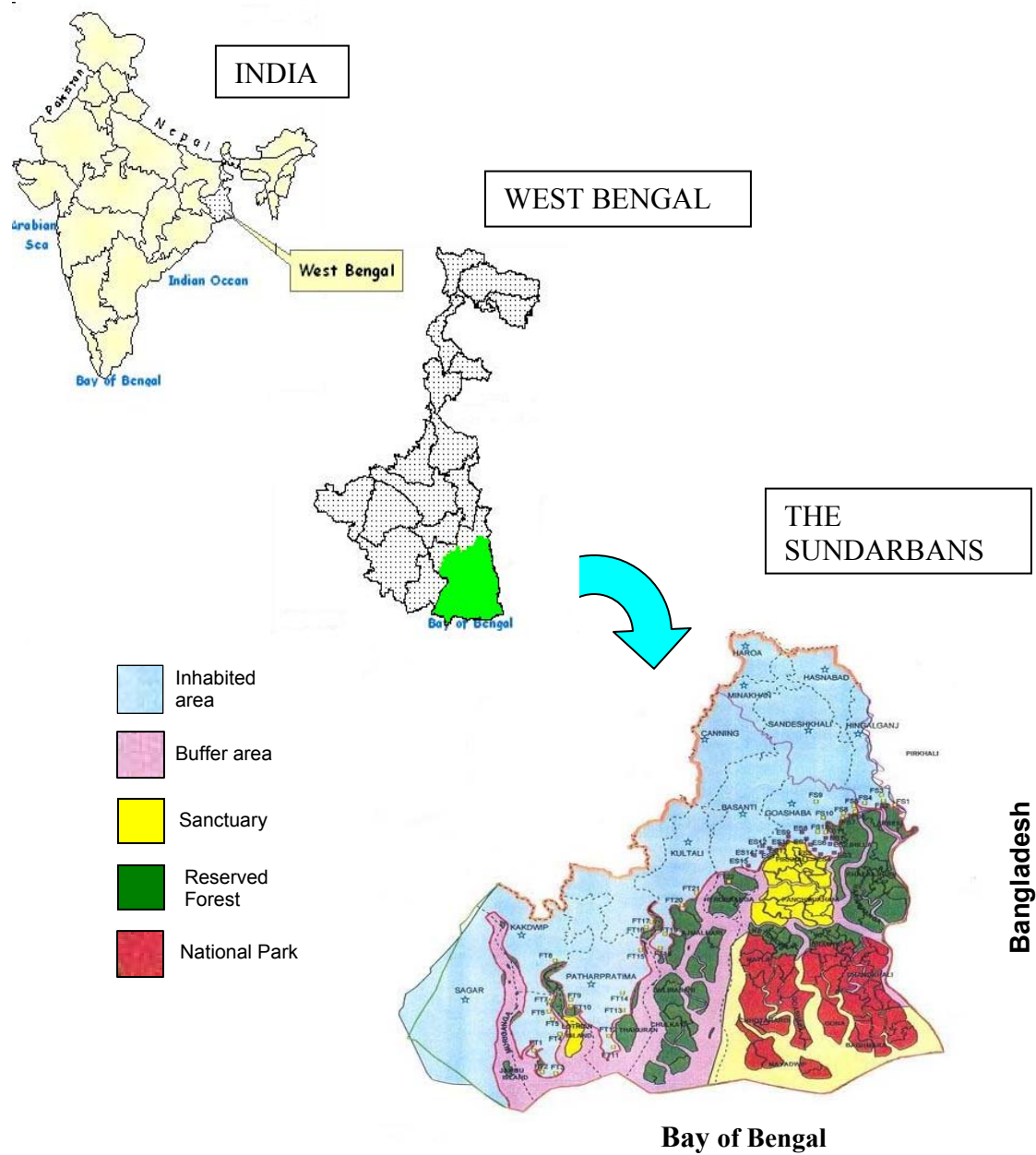
The Sundarbans, literally meaning 'beautiful forests' in Bengali derive the name from a family of mangrove tree 'Sundari' (*Heritiera fomes*) which represents one of the major vegetation in the locality. The entire area is intersected by tidal rivers or estuaries from north and south and by innumerable narrow tidal creeks from east to



west painting an assortment of beautiful but largely formidable and inhospitable terrains.

<sup>2</sup> This section and the other sections in this chapter draw heavily upon several published and unpublished sources. A list of selected sources is given at the end of this chapter.

Figure 1.1. Map of the Sundarbans





The eco-geography of this area is totally dependent on the tidal effect. There are two flow tides (inflow) and two ebb tides (outflow) within 24 hours and tidal range varies from 3m to 5m, rising up to 8m, in normal spring tide. Due to the tidal action, the silts carried down to the sea are pushed back to the channels and get deposited there. The

bed of the channel thus gets steadily raised ultimately blocking the flow of water and gradually evolving a small island. This is the basic geographical history about the origin of innumerable islands of the region. The hydrodynamics of this process is shrouded with great deal of uncertainty, which may lead to mysterious change of course of a river causing gradual disappearance of one island (and appearance of a new one).

As shown in the map (Figure 1.1), a large part of the whole area of the Sundarbans (about 2600 sq. km) is protected as reserve forest, also known as the Sundarbans tiger reserve. Within the Reserve Forests, 1330 sq km has been notified as Sundarban National Park which also forms the Core area of the Reserve and where “Project Tiger” was launched in 1973 with support from World Wildlife Fund. The balance area forms the Buffer Zone and a Wildlife Sanctuary. The whole area, including human settlements, is now earmarked as the “Protected Biosphere Reserve” by a declaration of Government of India in 1989.

### **The human face**

The area outside the reserve forest (54 islands), home of about 4 million people, is the human face of the Sundarbans. The inhabitation in the Sundarbans started even before the islands fully emerged through the siltation of rivers. Historically, the islands were occupied by migrant/refugees coming from several parts of India and Bangladesh. Initially, the inhabitants are the tribal labors brought by the British government to clear the forest who with time have settled in the region. Later, due to various natural calamities many people migrated from the neighboring districts (mainly Midnapore). In addition, during India’s independence and during India-Pakistan war of 1972, a large number of migrants from Bangladesh found shelter in the tide-country of the Sundarbans. The human flow of multiple origins has made it a land of mixed culture.



In sharp contrast to its natural face, the human face of the Sundarbans epitomizes abject poverty, deprivation and acute suffering. Due to harsh geographical challenges, the islanders struggle to survive on subsistence-level return from diminishing natural endowments. Almost all of them depend on rain-fed / mono-crop agriculture, the forest (for forest products) and the rivers / estuaries (for fishing) which hardly provide adequate support to the households in terms of income and employment. The extent of poverty can also be gauged by the fact that a little less than half of the population (47%) belongs to the historically marginalized groups (such as scheduled castes and scheduled tribes) and more than half of the farming community (55%) are landless laborers.



The suffering face of the Sundarbans is perpetuated by a poor physical infrastructure. There are only 42 km of railway line and about 300 km of metal roads in the entire area of about 4500 square KM, almost half of which are inaccessible in the monsoons. People have to depend on simple or mechanized country boats (*bhutbhuti*) and limited number of steamer launches for moving from one island to the other or to the mainland.

Due to inaccessibility, most of the inhabited areas still do not have conventional electric supply. Ironically, the area which is surrounded only by water, chronically suffers from lack of safe drinking water since the river water is salty and of no use for drinking. The system of earthen embankments which covers a length of 3500 KM and was built mostly by the settlers to protect themselves from flood is conspicuously fragile against the tidal actions which undercut the banks and often causes them to collapse.

In brief, the Sundarbans symbolize a world of human poverty and fragility packaged with natural richness; a world which is so close to the lights of development, yet so far. Interestingly, poverty here is cyclically entwined with the ecosystem; increasing economic stress makes people recklessly feed on natural resources which, in turn, leads to erosion of the traditional source of livelihood for the poor and builds more stress. Increasing pressure of population, unregulated drives towards commercialization of natural products, and poor resource management add strength to this cyclical movement.



A glaring example of this conflicting relation is the practice of collecting shrimp spawns (*Meen* in Bengali) from the rivers. A significant proportion of the women population in the dwellings adjacent to the rivers and rivulets of the Sundarbans are engaged in this activity primarily to meet the demand for the spawns in the neighboring fisheries. The relatively easy money that comes to the people who catch the spawns, at the lowest end of a long chain that constitutes the shrimp trade, comes at considerable cost. Besides a high occupational risk of falling prey to crocodiles and small sharks while collecting the seeds and other health hazards, the process has already started showing symptoms of serious ecological damage, such as (1) extinction of many indigenous varieties of fishes which were abundant a few decades ago (since in course of collecting the seeds, the women (unknowingly) destroy many other aquatic lives), (2) dwindling catches of shrimp spawns over the years due to indiscriminate collection, and (3) damaging the mangrove vegetation while fishing and the consequent erosion of the embankments. These damages, taken together, paint a dark picture of future livelihood of the Sundarbans' poor.



Encouragingly, policy makers and other key stakeholders alike concurred long time ago that the unique problems of the Sundarbans, rooted in a set of atypical man-nature conflicts, should deserve special attention from all quarters. In response to this concern, the Government of West Bengal set up the Sundarbans Development Board (SDB) - a quasi-autonomous institution – in 1973 under the Department of Development and Planning. Later on (in 1994), the government created a separate department for the Sundarbans (Department of Sundarban Affairs) with a full time Minister-in-charge at its helm and SDB as the core agency for development. The Board was reconstructed in 2001 with wide representations from the local government and non-government agencies. The primary functions of the Board have been (1) formulations of integrated programs for effective utilization of the resources placed at its disposal from various sources, (2) coordination of execution of plans for the development of the region, (3) supervision of the development projects, and (4) review and evaluate the progress of implementation and make policy adjustments accordingly. The government-led initiatives



have been supplemented by the works of several NGOs in and around a few pockets and supported by development agencies such as Asian Development Bank and NABARD.

The initiatives undertaken by the SDB and other non-government agencies have produced some visible results especially in infrastructure development. These include (a) construction of rural roads, jetties, bridges, sluices and culverts, (b) re-excavation of derelict ponds for rain water harvesting, (c) providing tube wells for supply of drinking water, (d) social forestry, (e) electrification through solar power, and so on. In addition, the state has embarked on several special initiatives through other departments; for example, it invested a substantial amount on a Public-private partnership model to operate mobile health care units for the remote islanders (see Chapter 3 for details).

To some extent, the initiatives helped address the much-required need for development of infrastructure. This helps in market expansion and economic transformation. The transformation, albeit slow, is discernible if one compares today's Sundarbans with the one a few decades ago. The local economy is opening up with links to Kolkata, the nearest city. Access to education is improving not only within the islands, but also out to Kolkata.



A large number of youth populations are migrating out to seek jobs in the cities across the country. Purchasing power among a section of population is on the rise as evident from their changing lifestyles and growing aspirations.

An unregulated market-driven growth, however, has a cost. It tends to cut out a perverse and inequitable growth path and intensifies the conflict between man and nature. In case of the Sundarbans, for example, the prominent market actors trail even the remotest villages of the Sundarbans to sell consumer products; at the same time, they extract natural products from its rivers and forests with cheap and abundant labor. While better accessibility to economic opportunities has entitled a section of population with cash and increased purchasing power, a large section still reels under poverty and aspirations failures. The full impact of this linkage effect on the erstwhile closed

economy of the Sundarbans is yet to be researched; yet one cannot escape the evident paradoxes which often manifest in apparent absurdities. The local village markets beam with modern consumer goods and services, ranging from mobile phone connections to chic packets of snacks, while more than half of the children grow up with malnutrition. The farmers have better access to chemical insecticides and fertilizers which not only help them raise productivity but also, ironically, increase suicide rates. Many girls are now going to school, but, as the newspapers regularly flash, so are many other being trafficked out to unknown destinations. The indigenous communities, who were intuitively careful in maintaining ecological balance, are now seeking benefits from irrational exploitation of the natural resources and, hence, destroying the balance. It is a world of contrasts and asymmetries produced by a liberalized development process often with serious implications on people's health and their health seeking behaviour (see Chapter 3 for details).

### **Threat to extinction**

The issues related to biodiversity, ecological balance, and livelihoods in the Sundarbans are, however, dwarfed by a more serious threat which is generated by the worldwide climatic change. Increasing height of sea-levels, due to global warming, has already led to disappearance of a few islands within the region and threatens to guzzle a large part of the Sundarbans in a few decades. The enormity of the potential threat to the Sundarbans may be gauged by the fact that surface water temperature in this area has been rising at an alarming  $0.5^{\circ}$  Celsius per decade since 1980 compared to the rate of  $0.06^{\circ}\text{C}$  globally and  $0.2^{\circ}\text{C}$  in the Indian Ocean<sup>3</sup>. In other words, the observed change of  $1.5^{\circ}\text{C}$  over the last three decades presents a clear challenge to the survival not only of the floral and faunal diversity but also many of the 4 million people of the Sundarbans.

The impact is also evident. It is estimated that about 82 Sq. KM land has already disappeared in the last three decades and about 70,000 people will turn homeless by 2020 in the Sundarbans due to global warming and consequent rise in sea levels. In other words, the Sundarbans have already started emitting a large number of *environmental refugees* - a new brand of hapless people uprooted by nature's whims. The *Lohachara* island, located in the western part of the Sundarbans, is one such example which has already gone beneath the waves. It was the world's first populated

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<sup>3</sup> Mitra Abhijit et al. "Observed changes in water mass properties in the Indian Sundarbans during 1980-2007". *Current Science*, Vol 97, No 10, November 2009.

island to be lost to climate change and its disappearance left more than 7000 people homeless. Neighboring Ghoramara is now under threat and has already lost a third of its land mass in the last five years (Box 1.1).

The vulnerability of the Sundarbans to climatic shocks is, however, exacerbated by perennially poor response of the key stakeholders – the government and non-government agencies, and the inhabitants - to the environmental challenges. The embankments are regarded as the 'life lines' of the Sundarbans; yet, till date, there is no

#### Box 1.1. Going under

"We started meeting the people we were looking for as soon as we got on the boat, around 9 a.m. on a sparkling November morning. They were returning home on the first of the only two motorized boats that ferry every day to and from Ghoramara and Kakdwip, the island's closest point of contact with the mainland. Most of them were fishermen and farmers, wiry men and women with sunburnt faces. Almost all of them said that their families once owned "a lot of land" now swallowed up by the angry waters that surround their existence."

"Haldia was once so close to Ghoramara that people could carry out shouted conversations across the river, said Nasir Mia, son of a schoolmaster but himself a school dropout who goes out to fish on the high seas to feed his family. But now the river has widened, claiming huge chunks of the island, and Haldia is just a speck in the horizon. Later that day, villagers on Ghoramara would point to ships far out in the mouth of the Hooghly, close to the Haldia port, and say that they sailed over what once were paddy fields. That was probably not an exaggeration; experts say that by 2001, Ghoramara was reduced to 59 per cent of what its size was in 1969".

*[Excerpts from "Going under" by Sarbari Sinha, Frontline (Magazine), 26 January, 2007]*

real action to transform their fragile states into a solid and sustainable chain of resistance. Consequently, the nature often takes its toll in terms of cyclonical storms and floods which breach the banks, inundate the localities, make people homeless, and make agricultural lands completely unusable for a few years. Following the calamity, a new embankment gets routinely built up only to be breached again by another storm. The cycle goes on and the people learn to live with resilience under an inescapable insecurity until a catastrophic cyclone gives a whirling push and brings forth a complete state of devastation, as recently experienced (see below).

## The Cyclone Aila

The Sunderbans have recently become headline news after a devastating cyclone – named *Aila* – rampaged through West Bengal, and more specifically the Sunderbans, on May 25, 2009. Within minutes, storm and consequent high tide wiped out a large part of river embankments, made thousands of villages disappear under water, killed hundreds of people, and rendered more than 400,000 homeless. Penetrated saline water has already made serious damages to the agricultural land, leaving a deep scar. The area now symbolizes extreme gloom and a losing battle for survival. Natural calamities are common in the Sunderbans, but this one had broken all records in terms of its intensity and impact.

The FHS research team visited several islands just three days after the devastation. The visit revealed a state of complete ruin and misfortune. The least fortunate are those who are still stranded in the remote villages with no food, no drinking water, no access to medical facilities, and absolutely nowhere to go. Even those, who took shelter in relief camps, are struggling to survive because the relief distributed by the government and NGOs is too little and too late. The absence of proper hygiene is evident everywhere and remnants of dead fishes and other animals are constantly polluting the environment. Sources of drinking water are now submerged under saline water.



Consider, for example, the village Giripara under the Sridharkathi gram panchayat where hundreds of families had to live on the trees without food and water for the initial two days when *Aila* struck on May 25. The distant island located in the extreme southern edge of the Sunderbans is highly inaccessible. It was only after three days that the survivors received *chira* (rice-flakes) and *gur* (jaggery) as relief. Although local NGO's have provided them with few halogen tablets, the shortage for drinking water continues with survivors fetching water from a long distance making way through waist high water.

Discussions with local NGOs revealed that most of the villagers in the Sunderbans are suffering from

enteric infection and diarrhea as people have no choice but to consume contaminated water. Added



to this the victims of snake bites, dog bites, accident injuries, skin infection and other diseases mean the health of the Sunderbans has moved from a sorry to the worst state. In brief, it is a public health nightmare. In many places, the sub-centers and primary health centers were completely washed off by the flood. There is a colossal need for ORS, anti-diarrheal medicine and other basic medicines but, so far, the supplies are drops in the ocean.



Out of the 3,500 km of embankments, 400 km are completely broken and the rest are vulnerable. The high tides during lunar cycles (full moon and new moon) are considerably stronger than normal tides and easily reclaim the already ravaged villages again and again through the breached embankments. It is probably more than a herculean task to repair the embankments, rehabilitate millions of affected people, and recoup the lost sources of drinking water.

*Aila* has well demonstrated Sunderbans' vulnerability to natural disaster and the reality of the threat of its total extinction. This unearths a much bigger issue before the FHS researchers: how should we respond to the health problem of a region which is being threatened to extinction tomorrow? In other words, does the traditional way of designing public health interventions for the areas like the Sunderbans make much long-term sense if it is not connected to the larger issue of human existence?

[From the field report of the FHS research team, June 2009]



### **1.3. Why this study?**

The principal driving force behind this study has been the keen interest of the government and a few non-government agencies to prepare a special health plan for the Sundarbans which would align to the existing master development plan for the area. The first step towards this plan is to identify the gaps in the health care delivery system and, accordingly, to project the unmet health needs of the people. Unfortunately, the available data, especially on the demand side, are too sparse and inadequate to identify the gaps. Consequently, there are several questions which remain unanswered: to what extent the health care needs of the Sundarbans are different from the rest of the state? How strong are the barriers to access a reliable source of health care? How even (or uneven) is the distribution of accessibility problem across all blocks of the area? What proportion of population remains uncovered by the present health care delivery system? And, so on.

The first step of the planning process should, therefore, be generation and compilation of adequate evidences to answer these and many other questions which could be used as necessary inputs towards the second step, i.e., preparation of a realistic, innovative, and comprehensive intervention plan for the Sundarbans area. The present study aims to meet the need for the first step and build an operational framework for the second step.

#### **Objectives of the Study**

The general objective of the study is set to provide an evidence base for the policy makers in support of the formulation of a Master Health Plan customized for Sundarbans. Towards this broad objective, the specific objectives of the study include,

1. To provide a detailed understanding of the prevailing disease profile including; minor illness, hospitalization, situation of maternal and child health, non-communicable diseases and mental health;
2. To understand the health seeking behavior of the inhabitants and to identify the barriers to access health care services encompassing social, physical and economic aspects;
3. To study the health system responsiveness of the higher tier government health facilities across the blocks, especially in terms of preparedness;
4. To understand the role of rural medical practitioners in the entire gamete of healthcare delivery and utilization; and
5. To provide advocacy to the policy makers along with a budget for the implementation of the health plan.

## 1.4. Data and Methods

The study is largely based on a set of primary data collected during January – March, 2009 from all 19 blocks of the Sundarbans occupying parts of two districts of West Bengal - North and South 24 Parganas (Figure1.2). The Primary dataset includes data obtained through following three surveys parallelly carried out in the above 19 blocks:

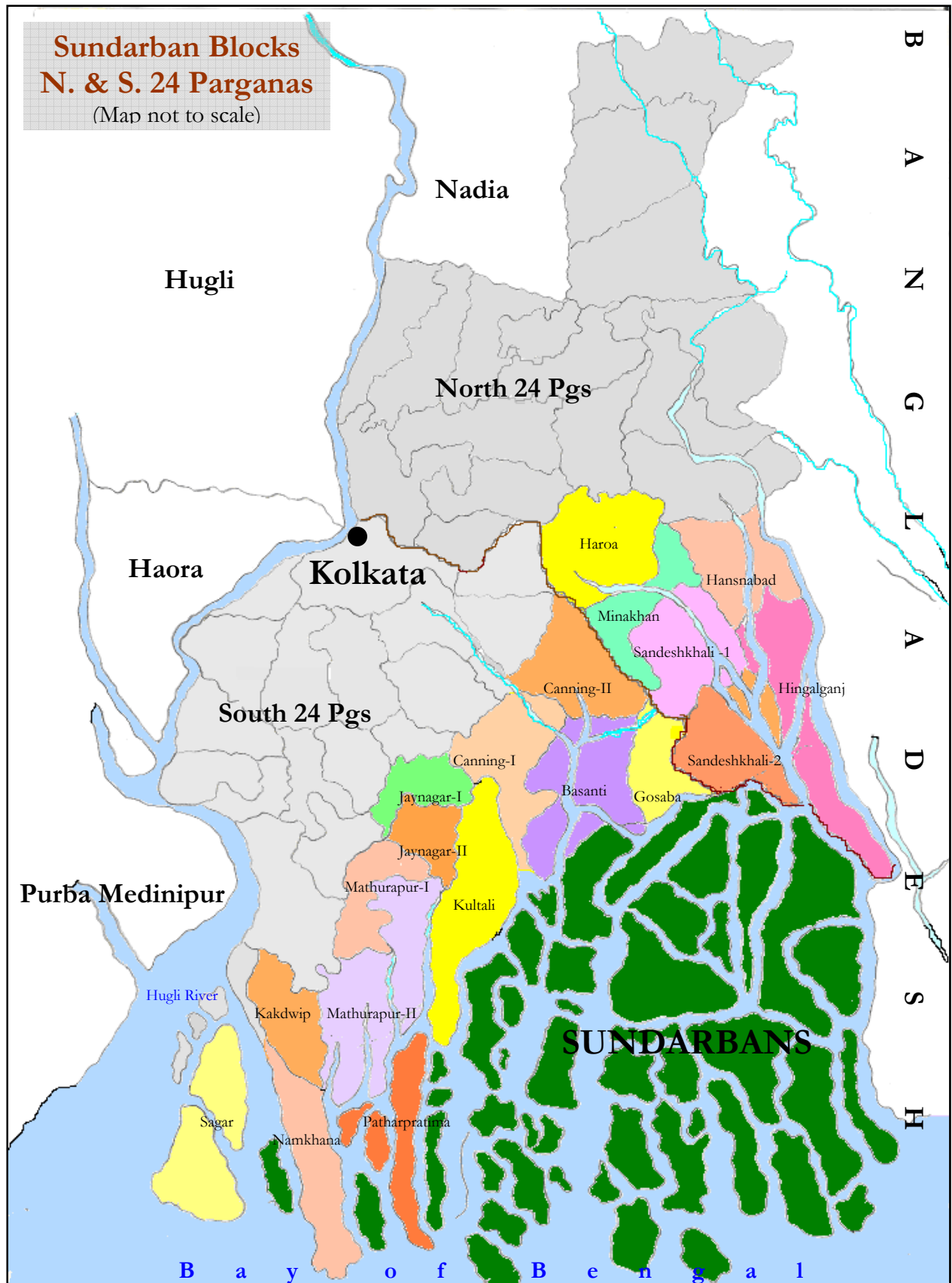
- A households survey covering 1130 households in 57 selected villages
- Capacity assessment of the government health facility at the Block headquarter level (Block PHC) in every block.
- In-depth interview with 185 Rural Medical Practitioners (RMP) in 6 selected blocks

Each of the above was executed with a set of structured questionnaire. The 19 Sundarbans blocks covered by this study are:

Six blocks from North 24 Parganas: Hingalganj, Haroa, Minakhan, Hasnabad, Sandeshkhali-I and Sandeshkhali-II

Thirteen blocks from South 24 Parganas: Canning-I, Canning-II, Gosaba, Basanti, Jaynagar-I, Jaynagar-II, Kultali, Mathurapur-I, Mathurapur-II, Kakdwip, Sagar, Namkhana and Patharpratima.

A location map of the blocks is presented below.





## Household survey

The selection of the households involved a two-stage random sampling procedure. The procedure was almost identical to the one followed in National Family Health Survey (NFHS) or Rapid Household Survey for National RCH project. In the first stage the PSU/Villages were selected. From each of the 19 blocks three primary sampling units (PSU) were selected through purposive sampling. In practice, villages have been considered as PSUs for the study. The selection of PSU's/villages was based on their distance from the block headquarter. One PSU each was selected from – very remote area of block, relatively less remote area and nearest (located within 5 km) to block head quarter. In this way, 57 PSUs/villages were sampled for carrying out the survey from all 19 blocks. In the second stage, a total of 20 households were selected from each of the selected PSUs/villages. A 10% over-sampling (i.e., additional 2 households in each PSU) of the households was considered in order to adjust for non-responses. The survey covered a total of 1141 households from 57 villages covering 6145 individuals.

The survey was conducted using a structured questionnaire which primarily focused on the health status, health seeking behaviour, utilization of health care facilities, and out of pocket payments of the selected households. More specifically, the investigation focused on four sources of information:

- (1) those who were hospitalized (for inpatient care) in last 365 days;
- (2) those who sought outpatient care in last 30 days, but not hospitalized;
- (3) selected household members above 40 years of age to enquire whether they have been suffering from any of the selected major chronic health problems or have associated risk factors;
- (4) selected women who delivered births during last five years. The focus was on the maternal health and the health and nutritional status of the last-born child.

For collection of information on maternal and child health, only one mother from each household, who delivered at least one live birth during last five years, was selected. In case a household had more than one eligible mother, the respondent mother was selected following Kish table, a procedure adopted by the National Family Health Survey (NFHS). Similarly for information on non-communicable/chronic diseases and its risk factors, household member aged more than 40 years was selected following procedures as described above.

### **Capacity assessment of public health facilities (SDH, RH, and BPHCs)**

The FHS research team visited 19 public health facilities, each located at the headquarter level of the 19 blocks, to understand the supply side capacity of the government's health care system. These include (1) two sub-division hospitals namely, Canning (Canning-I) and Kakdwip (Kakdwip); (2) nine rural hospitals namely, Minakhan (Minakhan), Sandeshkhali (Sandeshkhali-II), Taki (Hansnabad), Jaynagar (Kultali), Mathurapur (Mathurapur-I), Sagar (Sagar), Raidighi (Mathurapur-II), Padmarhat (Jaynagar-I), and Sri-Ramkrishna (Jaynagar-II); and (3) eight block primary health centers namely, Haroa (Haroa), Ghoshpur (Sandeshkhali-I), Sundalerbil (Hingalganj), Basanti (Basanti), Gosaba (Gosaba), Dwarikanagar (Namkhana), Matherdighi (Canning-II) and Madhabnagar (Patharpratima). In all cases, the facility-in-charge (i.e., the chief medical officer) was met and interviewed. The interview was guided by a checklist about information on the available capacity and utilization of various outpatient and inpatient services, infrastructure, availability of drugs, availability of critical services for maternal and child health care, vulnerable and difficult-to-reach area in the block, and so on.

### **Rural Medical Practitioners (RMP)**

The RMPs were selected through a two-stage sampling procedure. In the first stage, 6 blocks from North and South 24 Parganas were purposively selected based on their distance from the district head quarter. From North 24 Parganas, Haroa (nearest to district HQ) and Hingalganj (relatively far from district HQ) were selected. Similarly, for South 24 Parganas, Kultali (nearest to district HQ) and Basanti, Sagar and Patharpratima (farthest from district HQ) were selected. In the second stage, 30 RMP from each block was selected. 15 RMP from the block head quarter and another 15 from remote villages of block were selected. In total, 185 RMP were interviewed through this process. The focus of the interview was on their background, background of their patients, knowledge about various diseases and treatment procedures, and treatment and referral behavior.

### **Secondary data**

The analysis of primary data is supplemented by data compiled from several national level surveys, wherever necessary. Three major datasets were used: (1) National Sample Survey 60<sup>th</sup> round data on morbidity, health care and the condition of the aged (NSSO, 2004), 2) RCH district level household survey, phase-3 (DLHS III, 2009), and (3) National Family Health Survey (NFHS-3).

## Key sources of information (for this Chapter)

### Books

1. Banerjee Anuradha. *Environment, population and human settlements of Sundarban delta*. Concept publishers, 1998
2. Jana Debaprasad (ed.). *Sreekhanda Sundarban*. Kolkata: Deep Prakashan, 2004.
3. Kanjilal Tushar. *Who killed the Sundarbans?* Kolkata: Tagore Society for Rural Development, 2000.

### Website

1. [www.sadepartmentwb.org/About\\_us.htm](http://www.sadepartmentwb.org/About_us.htm): Official website of the Department of Sundarban Affairs, Government of West Bengal.
2. [www.sundarbanbiosphere.org](http://www.sundarbanbiosphere.org): Sundarban Biosphere Reserve
3. [www.wb.nic.in/westbg/Sundarban.htm](http://www.wb.nic.in/westbg/Sundarban.htm)

. Photographs used in this chapter were obtained from various newspapers/journals.

## **2. People and their health in the Sundarbans**

## 2.1. Introduction

This chapter presents a brief overview of the demand side issues related to the health system of the Sundarbans. More specifically, it focuses on three interrelated components of the system: (1) socio-economic environment, (2) health status, and (3) health seeking behavior. All three components are addressed largely on the basis of the primary data collected from the surveys conducted in 57 villages across all the 19 Sundarbans blocks (referred below as FHS survey)<sup>1</sup>.

## 2.2. Socio-economic environment

### Villages

In 2001, the average population of a block in the Sundarbans was about 198,000 (160,000 in North Sundarbans and 215,000 in South Sundarbans). Each block consists of about 130-140 villages surrounding the block headquarter town which is the prime centre for major administrative, development, and economic activities of all villages under the block.

Although geography plays a very important role in defining the socio-economic environment of the Sundarbans, it is important to note the variations in geographical challenges across the blocks. People, who live in the 'remote' Sundarbans - the blocks adjacent to the forest area or the Bay of Bengal – face much harder problems compared to those who live in the 'peripheries' (and closer to Kolkata). The blocks in the first group include Sagar, Namkhana, Patharpratima, Kultali, Gosaba, Basanti, Sandeshkali-II, and Hingalganj (map given in Chapter 1). The rest 11 blocks who are located closer to urban centers – the periphery Sundarbans – are benefitted in differing degrees by the spread of basic amenities including roads and electricity.

There are actually two Sundarbans - the *periphery* Sundarbans, which is closer to urban centers, more accessible, and more developed, while the other - the *remote* Sundarbans - is closer to forest, hard to access, and less developed.

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<sup>1</sup> The results given in the rest of this chapter are primarily drawn upon the detailed report on this survey ("Health and health care in India's Sundarbans delta", unpublished report, IIHMR, 2009). The report would be available upon request.

The variation in accessibility may be gauged by the time taken to reach the block town from the remotest village in a block. For example, it takes less than an hour to reach the headquarter town from the remotest (sample) village in the block *Haroa*, a periphery block, while the minimum estimated time between the remotest village and the town in *Gosaba*, a remote block, is more than 4 hours.

Access to basic amenities within a village in the Sundarbans has improved over the years; however, there is still a huge scope to make it better. As mentioned earlier, poor availability of drinking water is a chronic problem within the region. This is reconfirmed by the study since the major source of drinking water for more than three-quarters of the surveyed villages was deep tube well / hand pump. This is a vulnerable source

About three-quarter of the villages depend primarily on hand pumps / deep tube well for drinking purpose. This is a vulnerable source especially in flood-prone and arsenic-contaminated areas.

especially in the flood-prone areas since, once submerged by the saline flood water, they become completely unusable. Moreover, some of the blocks (e.g., *Haroa*, *Hasnabad*, *Canning*) have groundwater heavily contaminated with arsenic; due to lack of any alternative source, the people are therefore exposed to arsenic poisoning<sup>2</sup>.

The snapshot on 57 surveyed villages also reflects some progress towards better sanitation and improved road conditions within the villages. For example, subsidized covered pit toilets (pit latrine with slab) provided by the panchayats (the local self governments) were found to be the main type of toilet in 42 percent of the villages. About 40 percent of the villages were found to have their main roads (within the village) concreted or brick-bound.

## Households

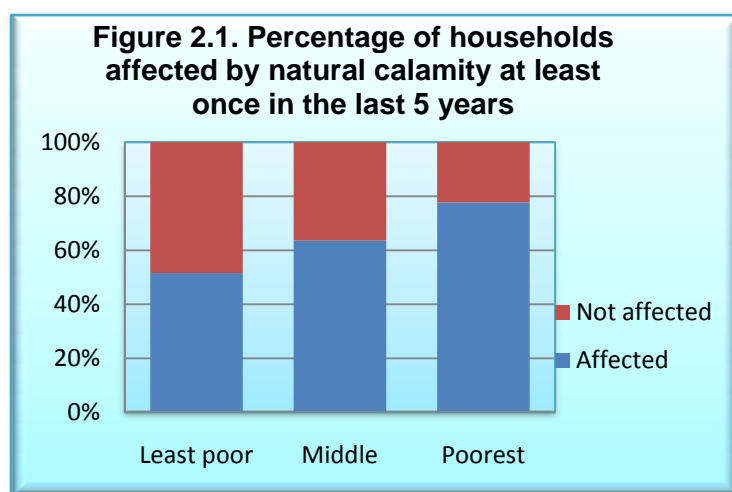
The poverty status of a typical household in the Sundarbans is quite evident from the sample data on households. Almost half (46%) of the households in the sample households belonged to SC / ST, the traditionally marginalized groups in India. More than 40 percent of the households were Below-poverty-line (BPL) and 13 percent among

<sup>2</sup> *Groundwater Arsenic Contamination Status in West Bengal*, A Report prepared by the School of Environmental Studies, Jadavpur University, 2006.

them are officially ‘poorest among poor’<sup>3</sup>. Nearly, three-fourths of the households lived in *Kuccha* houses (made of mud, thatch and other locally available material). The picture emerging out of these indicators mostly align to what people perceived about their own poverty status. While 41 percent of households reported ‘always’ deficits in their budget, about 13 percent reported that they could not manage two square meals for every member in some or all days in the last week.

As mentioned in Chapter 1, natural calamity is closely correlated with the lives of the Sundarbans. This is reconfirmed by the result that about two-third of the households (64%) had experienced damage to their property due to natural calamity at least once in the last five years. The close link between calamity and poverty is also evidenced by the result that poor (self-assessed) households were affected in greater proportion than the

non-poor households (Figure 2.1).



The average household size in the sample households was 5.4 which is higher than the national rural average (4.7)<sup>4</sup>. The age-sex distribution of the household members showed a wide base and a narrow apex with a high proportion of children

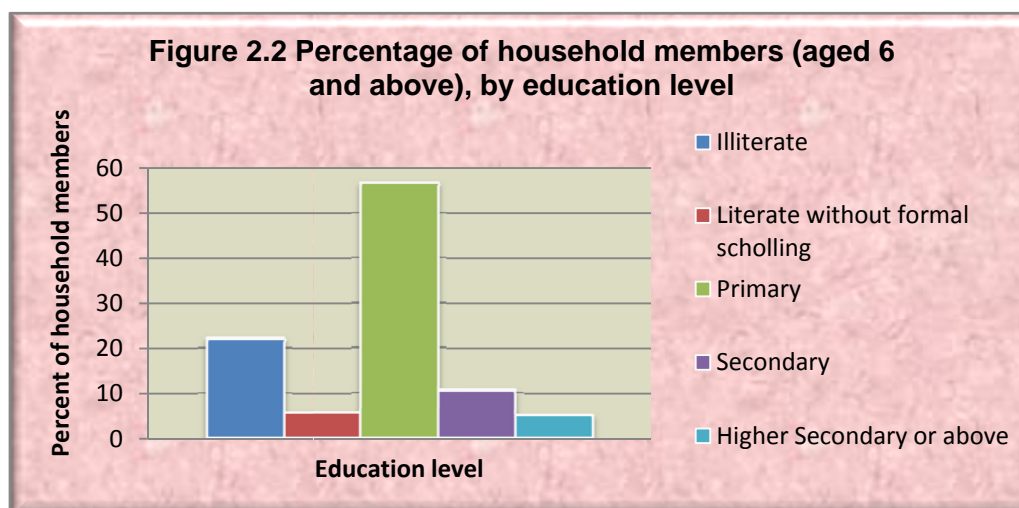
in the households, which matched with the pattern found in a typical developing region. Teenage marriage is very common since 37 percent of females aged 15-19 were (currently) married compared to 2 percent males of the same age group.

The survey also made it quite evident that the people largely feed on agriculture and natural products such as collecting forest products and fishing. About 21 percent of the population in the working age group (15-59 years) earned from agriculture and about 2 percent of the same were engaged in fishing, honey collection, and wood cutting. The

<sup>3</sup> Antodaya Anna Yojana (AAY) is a scheme launched by Government of India in 2000 to ensure food security for the poorest of the poor. Nationally, the AAY families were estimated to be 15% of all BPL families.

<sup>4</sup> NFHS 3 (2005/06), West Bengal.

progress in education has been mixed; while a large number (22%) were illiterate, around 57 percent of the individuals have attained at least primary level of education; about 5 percent were educated up to secondary level or above (Figure 2.2).



It is however important to add that the proportion of illiterate is much less among the youngest population (10-14 years) implying that children of the surveyed household have now better access to school education compared to their parents. The progress in educational attainment overtime is also evident from the results that only 4 percent of males aged 50 and above could complete their school education in comparison to 19 percent of the members aged between 20 – 24 years. The similar pattern is also observed for females. The gender gap in literacy was observed decreasing across the age groups over time.



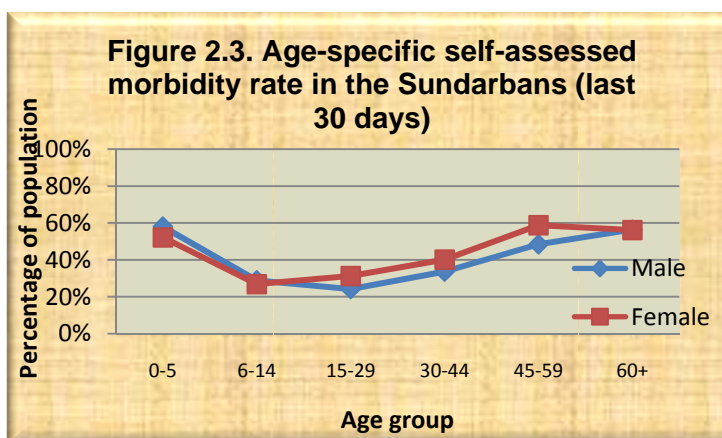
## 2.3. Health Status

### Mortality

The estimated crude death rate in the Sundarbans is 7.6 (47 died in the last 365 days before the survey) which is higher than that of rural West Bengal (6.3)<sup>5</sup>. As expected, the rate is much higher among people above 60 years of age (62 per 1000) followed by the under-5 children (9.3 per 1000). About 40 percent of these deaths could be attributed to symptoms related to whole range of digestive problems. Almost all those who died (85%) received some sort of medical attention before death although only 30 percent of them were hospitalized before death implying that the underlying cause of death might have remained largely unknown.

### General morbidity

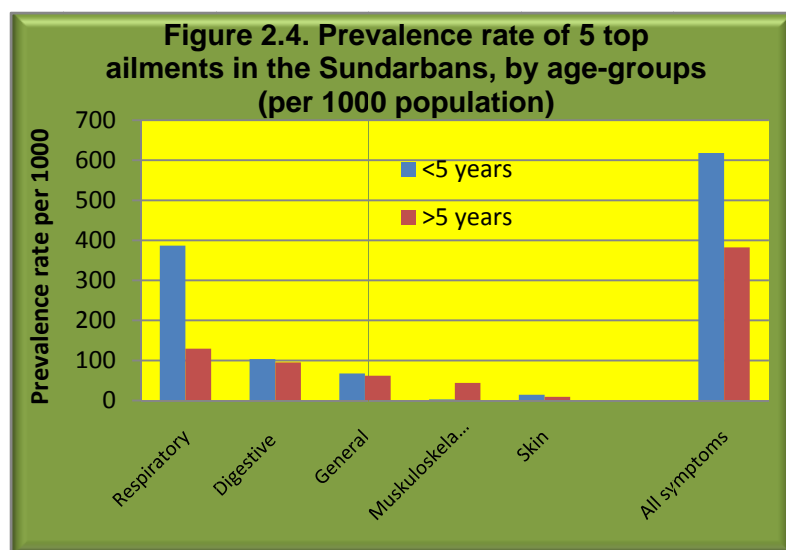
How sick are the people of the Sundarbans? The scenario emerging from the self-perceived morbidity reflects a worrying health profile of the region. About 38 percent of the male and 40 percent of the female population experienced some sort of ailments in the last one month, either old or new. These rates are significantly higher than the state average – 24 percent of the male and 26 percent of the female population – as reported in the NSSO report in 2004<sup>6</sup>. The rate when disaggregated by age-groups shows a usual U-shape indicating higher concentration of morbidities among the children and the older persons (Figure 2.3). It is also worth noting that the morbidity is slightly skewed towards female population in the middle age groups (15 – 59 years).



<sup>5</sup> SRS, 2007. The comparison should be taken with caution since the sample frame of this study is much smaller than that of SRS.

<sup>6</sup> There are three major caveats in using NSSO data for comparison purpose: (1) the reference period for the NSSO was 15 days; doubling the rates (which has been done here) may not be equivalent to 30-days rate, (2) the NSSO data was weighted while the Sundarbans data were unweighted, and (3) the NSSO data are five years older than the Sundarbans data. However, another FHS survey conducted in 3 districts of West Bengal in 2007 reported about the same rate as NSSO.

The symptoms reported by the ailing responders indicate that most of the ailments were



common and related to either digestive (or, gastro-intestinal) system, or respiratory system, or partial disability due to general symptoms such as weakness (Figure 2.4). The most common symptoms for respiratory ailments were (1) fever with cold and cough and

(2) difficulty in breathing. The major digestive system related symptoms were (1) intestinal gas, and (2) pain in lower abdomen. Among all musculoskeletal problems, the most common symptom was 'back pain'.

The nature of morbidity derived from a symptomatic search may not be adequate to conclusively determine the burden of diseases in an area. However, despite the limitation, several epidemiological leads are worth noting. First, the children (below 5 years) were three times more vulnerable to respiratory ailments than the rest. Second, almost all types of communicable diseases – primarily related to respiratory and gastro-intestinal systems - are highly prevalent in the Sundarbans in varying degrees making it a perfect public health laboratory for health managers. For example, the survey found 13 TB cases (diagnosed and under treatment) implying an estimated prevalence rate of 2.61 per 1000 population which was slightly higher than the Indian average of 2.27<sup>7</sup>. Third, the link between the geo-climatic environment of the Sundarbans and people's health is evidenced by high prevalence of a few environmental health problems. For example, skin related

Children are three times more vulnerable to respiratory ailments which also top the prevalence list. In general, almost all types of communicable diseases are highly prevalent. Environmental problems, such as skin related ailments are also very common.

<sup>7</sup> Chakroborty, A. "Epidemiology of tuberculosis: Current status in India". *Indian J Med Res* 120, Oct 2004, pp 248-276.

problems, such as itching in hands and legs were found to be very common across all blocks. The impact of arsenic poisoning was quite visible in the blocks where groundwater is heavily contaminated with arsenic. A large number of RMPs (Unqualified village doctors) in Hingolganj reportedly observed an increasing trend of arsenic related skin problems in the area during last few years (Box 2.1).

Besides water borne and air borne diseases, there are other concerns where environment plays a major role. For example, according to the FHS survey, about 60 persons per 1000 population were estimated to be affected by accidents or injuries in a year due to poisoning, animal bites, or any other reasons. The number underestimates the true incidence since the survey was carried out in winter when the incidence of snake bites is less common. The threat of animal bites (tiger or crocodiles) is grave especially among those who frequent the swamps and waterways of the Sundarbans for fishing and collecting forest products. According

#### **Box 2.1. Arsenic poisoning**

Ajmira Bibi of Hingolganj block at North 24 Parganas district had been suffering from ulcer on her left leg for the last 6 months. Finally she visited a local RMP (unqualified village doctor) who diagnosed its root to high exposure to the arsenic contaminated water. When interviewed on the case, the RMP stated "...people are consuming water that is very high in content of arsenic---it is no wonder that so many people develop such problems". Other RMPs in the block echoed his concern.



People, who collect forest and river products, are under constant threat of animal attacks. The incidences of snake bites recorded in the local hospitals were high (about 700 in a year).

to official estimates, about 30 persons fall prey to animal attacks every year during when they are engaged in fishing or collecting honey or woods from the forest. This is also an underestimation since many of the affected persons, who enter the forests without official permits, may fail to be counted in the official lists. The high incidence of snake bites is evident from the official estimates of

the Block level health centers which, taken together, recorded about 700 cases (outpatient and inpatient) in 2008.

## Chronic and non-communicable ailments

Ailments related to communicable and acute health conditions, however, present an incomplete health scenario of the Sundarbans. To complete the picture one needs to look at the non-communicable and chronic ailments which usually remain neglected by the policy makers despite significant poverty dimensions of these ailments. The present study, which investigated the prevalence of six major chronic ailments (Arthritic pains, Cardio-vascular problems, asthma, diabetes, skin related problems, and vision problems) among 834 persons of more than 40 years old (413 male and 421 female members), came up with some serious concerns in this regard.

People's vulnerability to chronic and non-communicable diseases is no less severe in the Sundarbans in comparison to other parts of the state. In other words, the Sundarbans now face the dual burden of communicable and non-communicable diseases like urban West Bengal. For example, coronary heart diseases (CHD), which are usually linked to urban lifestyles, are estimated to affect 6 percent of population aged 40 years or more (Table 2.1). This means that about 240,000 people in the Sundarbans are highly vulnerable to CHD<sup>8</sup>. Similarly, about 2.4 percent of adult population (>40 years) indicated high risk of arthritis while 42.4 percent were already diagnosed which was higher than the corresponding state average (35.3%)<sup>9</sup>. Bronchial Asthma chronically affects the elderly population at 8 percent prevalence rate. The inequalities in the spread of these ailments are also worth noting. For all of these ailments, the poor and the women (except CHD for biological reasons) were more likely to be affected. For

People are fighting with dual burdens of diseases (both communicable and non-communicable). About 240,000 people are estimated to be suffering from CHD. Prevalence of arthritis and asthma are also significantly high.

Women and poor are more vulnerable to chronic ailments such as Arthritis and Asthma

example, the prevalence of bronchial asthma among poorer section was about six times higher than among the better-offs. The data also suggest that, contrary to the conventional beliefs, the

<sup>8</sup> The vulnerability or risk for each of the above health conditions was estimated on the basis of a set of symptoms and risk factors, similar to the procedure followed in the World Health Survey (WHS). The persons who reported all the primary symptoms and have additional risk factors (e.g., smoking and overweight for CHD) were identified as 'high risk' population.

<sup>9</sup> World Health Survey 2003, IIPS / WHO (2006)

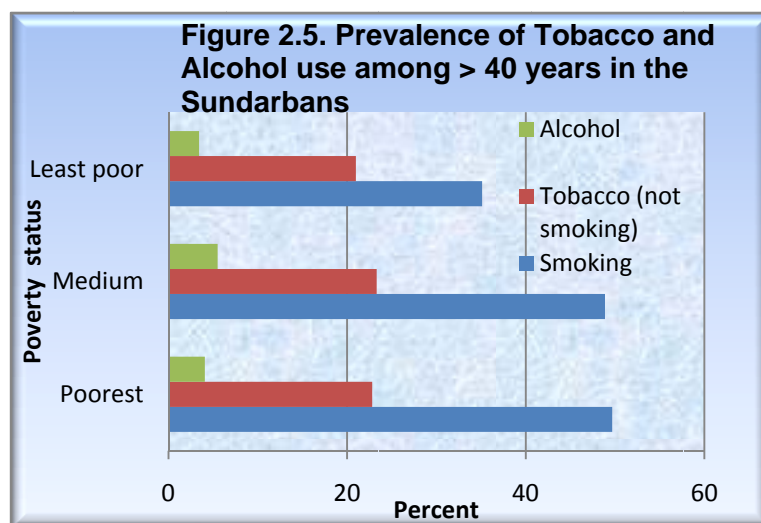


prevalence of CHD risk would be considerably high among the poorer people.

**Table 2.1. Percent of people aged 40 years and more with high risk for three selected chronic diseases, the Sundarbans 2009**

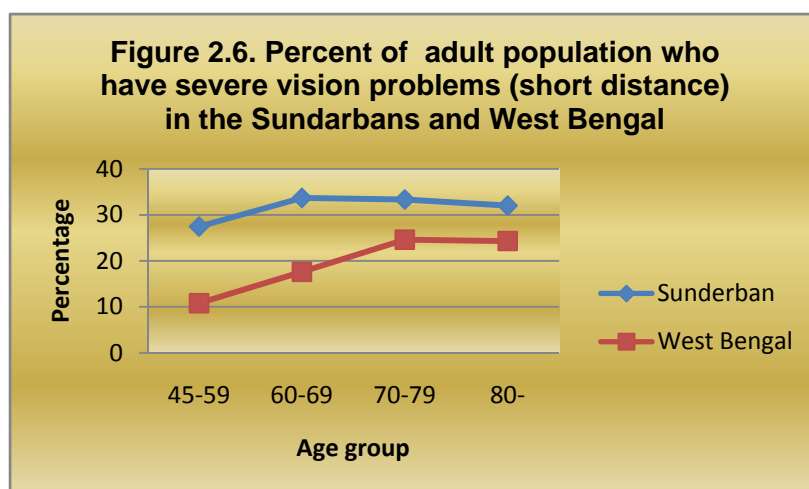
		% of population with high risk (40 years and older)		
	N	CHD	Arthritis	Bronchial Asthma
<b>Sex</b>				
Male	413	7.3	1.2	7.7
Female	421	4.8	3.6	8.3
<b>Economic condition</b>				
Poor	273	5.1	3.3	10.3
Medium	276	8.0	1.8	8.0
Least poor	285	4.9	2.1	6.0
<b>Health condition in last 30 days</b>				
Severe	325	7.3	4.3	13.2
Moderate	194	3.6	2.1	7.7
No or mild problem	315	6.0	0.6	2.9
<b>Total</b>	<b>834</b>	<b>6.0</b>	<b>2.4</b>	<b>8.0</b>

Analysis of risk factors for cardiovascular disease shows that throughout the Sundarbans, the prevalence of tobacco and alcohol use is higher among the poor, which increases their risk of cardiovascular disease (Figure 2.5). In the future, these higher



risks may lead to higher rates of cardiovascular disease, cancer, liver disease, and injuries among the poor relative to the nonpoor.

There are several other chronic problems which are often overlooked possibly due to



their low perceived severity. Ailments related to vision are one example which loads the Sundarbans' health with significant burden. The extent of vision difficulties is evident from the results that the prevalence of

Presbyopia (or, farsightedness) in the Sundarbans was much higher for all age-groups above 45 years than that in West Bengal (Figure 2.6). The pattern was similar in myopic cases except in the 70-79 age group<sup>10</sup> where the prevalence in West Bengal (42%) was higher than the Sundarbans (33%). The prevalence of diagnosed cataract among the elderly male population (60 years and above) was also found higher in the Sundarbans (20%) in comparison to the state (17%).

## Mental health

Mental health problems threaten to be one of the most critical public health issues in the Sundarbans. The FHS household survey did not attempt to assess the mental health conditions; however, evidences from other sources indeed indicate an alarming prevalence and spread of these conditions. The most visible indicator of psychiatric disorders is the prevalence of deliberate self harm (DSH), or grossly the 'attempted suicide' cases, which, despite its severe limitation in capturing the total mental disease burden, projects the severity of the problem to a large extent. According to a study based on the admission data in 13 BPHCs in the Sundarbans, a little more than 5000 non-fatal DSH cases were registered in three years (1999-2001)<sup>11</sup>. In other words, an average of approximately 11 such cases were registered per month in each BPHC. Two crucial findings of this study are worth noting: (1) about two-third of the admitted persons

<sup>10</sup> The West Bengal data is sourced from "World Health Survey 2003 West Bengal", IIPS (Mumbai) / WHO.

<sup>11</sup> Chowdhury AN, Banerjee S, Brahma S, Biswas MK. Pesticide poisoning in non-fatal deliberate self harm: A public health issue: Study from Sundarban delta, India, *Indian J. Psychiatry* 2007;49: 262-6.

(for non-fatal DSH) were female, and (2) 85 percent of the admitted persons had committed DSH by consuming chemical poison or, more specifically, *organophosphorous pesticides*.

The more recent evidences on registered DSH, collected through the FHS survey, reflect an increasing trend in its prevalence. In the period of six months between April and September, 2008, a total of 1181 cases of non-fatal DSH were registered in the same 13 BPHCs implying that the average of such cases per month in each BPHC has gone up from 11 to 15 in the period between 2001 and 2008. The share of pesticide or chemical poisoning in total DSH cases had also increased to 89 percent during the same period.

Deliberate Self-Harm is however an extreme manifestation of mental ill-health and affects only a few. Lying underneath DSH remains a complex set of psycho-social stressors which are closely linked to the gripping livelihood challenges in the region and may trigger a pandemic of mental health problems. Several studies have indicated high presence of such stressors in the Sundarbans. Besides poverty and economic stress, these include marital conflicts, alcoholism and resultant torture, extra-marital affairs, and growing insecurity against nature's challenges. The most common diseases, as found in one study, are major depressive disorders, followed by Somatoform pain disorder, post-traumatic (animal attack related) stress disorder, and adjustment disorder<sup>12</sup>. Chronic neglect of these problems, women's low status, and easy availability of pesticides in an agro-based region may explain why an increasing proportion of affected persons – mostly women - have been seeking solace in self destruction. In villages adjacent to forest, where communities depend on fishing and collecting forest products, people are especially unsecured against animal attacks which often make them adopt a fatalistic coping strategy such as superstitious responses and dependence on local god / goddess (such as, *Banbibi*) and traditional faith healers (such as, *Gunin*) which probably act as protective shield against mental disorders. However, these do not cancel out the

Prevalence of mental health problems is high and seeking attention from public health leaders. Deliberate self harm cases have increased in the last few years. Significant presence of psycho-social stressors may have triggered the spread of these problems.

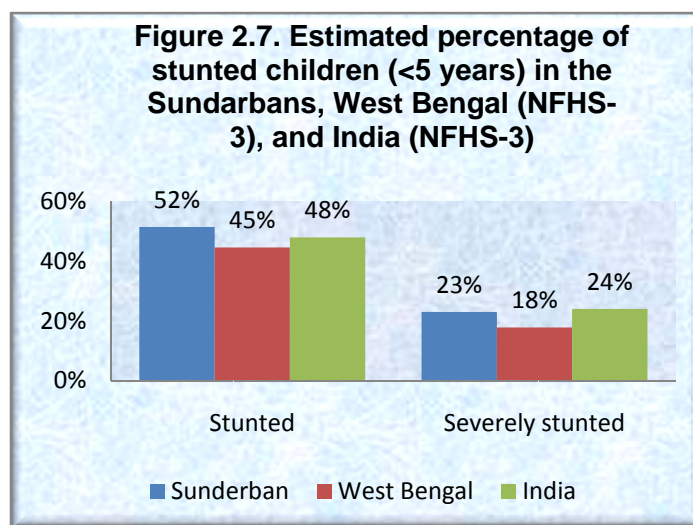
<sup>12</sup> Chowdhury AN, Mondal R., Brahma A, Biswas MK. Eco-psychiatry and environmental conservation: Study from Sundarban delta, India, *Environmental Health Insights*, 2008;2:61-76.

combined effect of the above mentioned stressors, which have left the mental health of the people of this region in a highly vulnerable state.

## Child health

The health status of the children of the Sundarbans is in a sorry state. This is partly reflected in the nutritional status

of the children under the age of 5 years. Based on the weight, age, and height data of 632 children (<5 years), the anthropometric indicators reflected that about half of the children in the Sundarbans (52%) were stunted (i.e., low height for age), or, in other words, were suffering from chronic malnutrition (Figure



2.7). The proportion of chronically malnourished children is higher than both state (45%) and national average (48%) implying that in the Sundarbans a comparatively higher proportion of the children are growing up with serious nutritional retardation.

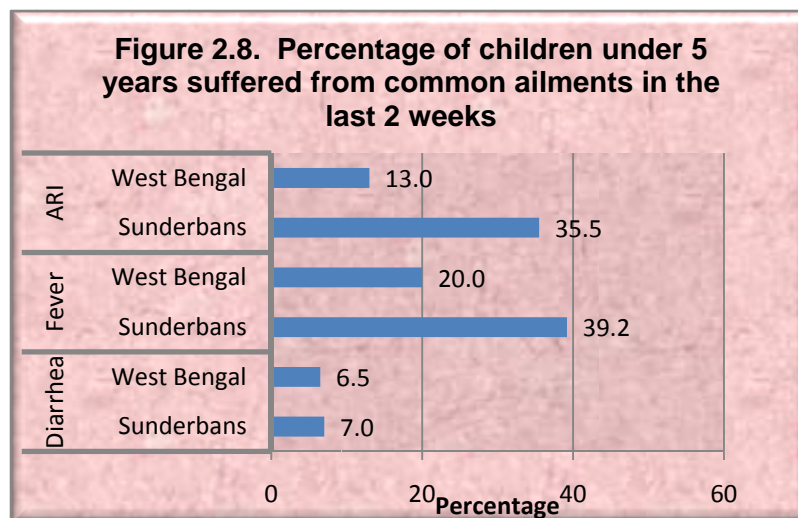
Why are so many children stunted or chronically malnourished? Stunting, which is usually regarded as the best indicator of children's long run health status and well being<sup>13</sup>, is a biological adaptation to inadequate food, frequent episodes of disease, or both during the first few years of life. In other words, a high stunting level among the children in the Sundarbans mirrors chronic poverty and food insecurity among a large part of the population.

Chronic malnutrition usually has a spiraling effect on the vulnerability of the children to respiratory and gastro-intestinal ailments. Figure 2.8 reestablishes this phenomenon in the present context and reveals a disproportionately higher burden of these ailments in the Sundarbans. The proportion of children under age five who had at least one spell of fever during the last two weeks was almost double in the Sundarbans compared to the

<sup>13</sup> Onis, Mercedes de (2000) "Measuring Nutritional Status In Relation To Health" *Bulletin of the World HealthOrganization*, 78(10), p. 1271-1274.



state average (NFHS-3). The prevalence of Acute Respiratory Infection (ARI) such as Pneumonia was also exorbitantly high in the Sundarbans – one in three children had suffered at least one episode of cough with difficulty in breathing



(faster than usual, short and rapid breaths) compared to only 13 percent in West Bengal. The incidence of diarrhea was also slightly higher in this region even though the survey was carried out in a relatively low-prevalent season (December-January).

Incidences of respiratory ailments are much higher among the Sundarbans' children. There is a great deal of inequalities in incidences across age, sex, and socioeconomic status.

The inequality in the spread of the common childhood ailments across age, location, and socio-economic status is also worth noting. For example, a child in the age group 12 -23 months was more likely to be affected by ARI (40%) compared to his / her younger counterpart (28% for 0-6 months). Similarly, girls were more vulnerable to diarrhea (8.2%) than the boys (6%).

The same held good for the children from the relatively poorer section who had suffered all of these ailments at a disproportionately higher rate. Children from the South Sundarbans were also found in worse condition compared to their north counterpart.

## Women's health

The evidences collected through the FHS survey did not reflect an impressive scenario about women's health in the Sundarbans. In general, women reported general ailments in larger proportion than their male counterpart especially in the 15-59 age-group (Figure 2.5) without much difference in the ailment profile. They were also more vulnerable to common chronic ailments (such as asthma, arthritis, and vision problems). The inequity manifests more prominently when data are disaggregated by socio-economic status. For example, in the 'poorest' section, 131 women per 100 men reported severe or

extreme vision problem while in the 'least poor' category the corresponding number was 91 (per 100 men). A closer scrutiny of the health of the mothers (who delivered at least one child in the last five years) reveals more. The body mass index (BMI) based on the weight, age, and height data collected from 489 mothers indicate that a little less than one-third of women (31.5%) were underweight (i.e., BMI<18.5).

It is hard to exaggerate the gender issues which underpin the health status of women in the Sundarbans. For example, catching spawns in riverbeds is a pretty common affair of the women from a fisherman family since the activity perceptibly does not require much skills or physical strength. The activity brings little extra money to the families but with a huge health risk. The women (and children), while catching spawns, become an easy prey to crocodile and sharks, get affected by skin diseases due to constant touch with saline water, and develop back pain due to bending pressure on back. Similarly, they are vulnerable to various reproductive tract infections communicated while bathing in highly contaminated pond water.

As mentioned earlier, women in the Sundarbans are disproportionately affected by mental health problems. A study conducted on the clinical records of patients admitted for deliberate self harm (i.e., attempted suicide) to six government hospitals in the Sundarbans found that women accounted for 65 percent of DSH admissions and 67 percent of the deaths (due to DSH)<sup>14</sup>. The vulnerability of women to mental disorders in particular and to general health problems in general has its root in highly fragile status of women in the Sundarbans, chronically perpetrated by poverty, destitution, domestic violence, and utter indifference of society to their problems (Box 2.2).

#### **Box 2.2. A woman without mind**

The family does not force her do any work against her will. When FHS team visited the household, Kamala, in her mid 50s was sitting on the front staircase. Badal, her eldest son, who seems to be at early 30s, always has seen her mother being different than other women of the village. He in his early childhood was told by the neighbours that her mother has "mathar byamo" (mental health problem). "Has anybody ever got her treated?" No, Badal could not remember such thing; moreover, she is physically alright and can do many household works.

<sup>14</sup> Banerjee S et al. Deliberate self-harm and suicide by pesticide ingestion in the Sunderban region, India. *Tropical Medicine & International Health*. Vol 14 Issue 2, PP 213-219, February 2009.

## 2.4. Health seeking behavior

The health seeking behavior of the people in the Sundarbans may be analyzed by following categories: (1) inpatient care, (2) outpatient care, (3) maternal and (4) child health care. In each case, attempts have been made to highlight the key issues related to utilization of and accessibility to the existing health care system.

### Inpatient care

The first column of Table 2.2 presents the most recent estimates on hospitalization in the Sundarbans generated by the FHS survey. Overall, about 4.2% of populations were hospitalized during a year, a significantly high rate and almost the same as the rate estimated by another FHS survey conducted in three districts of West Bengal in 2007<sup>15</sup>.

**Table 2.2. Hospitalization rate (% of population) in the Sundarbans and West Bengal**

% of population hospitalized in a year			
	Sundarbans 2009 (IIHMR)	West Bengal 2007 (IIHMR) <sup>1</sup>	West Bengal 2004 (NSSO) <sup>2</sup>
<b>Sex</b>			
Male	4.24	4.50	2.75
Female	4.13	3.96	2.49
<b>Economic condition</b>			
Poor	4.57	3.59	2.03
Medium	3.54	3.65	2.25
Least poor	4.26	5.01	3.22
<b>Age group</b>			
Below 15	3.34	3.51	1.80
15-59	4.00	4.33	2.56
60 -	8.38	6.53	6.05
<b>Source of care</b>			
Public hospital	2.72 (65%)	3.49 (82%)	1.90 (74%)
Private hospital	1.46 (35%)	0.75 (18%)	0.67 (26%)
<b>Total</b>	<b>4.18</b>	<b>4.23</b>	<b>2.57</b>

1. From Household Survey in 3 districts of West Bengal for FHS project

2. NSSO 60<sup>th</sup> round

<sup>15</sup> Health, equity, and poverty: exploring the links in West Bengal. 2007, FHS, IIHMR.

Several points are worth noting in the context of inpatient care. First, about two-thirds of total hospitalized persons in the Sundarbans sought admission in public hospital, which by Indian standard was quite high but by West Bengal's standard was low (40% in India and about 82% in West Bengal). The relatively weaker role of the public sector at the

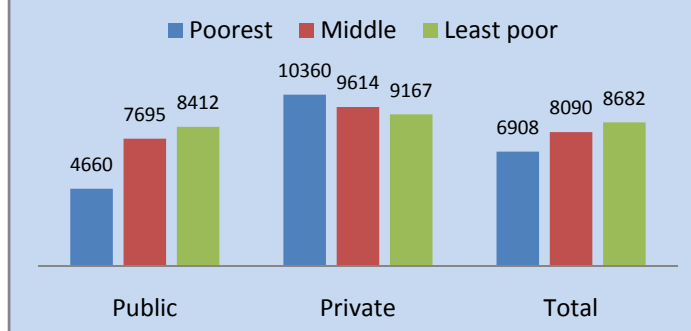
Hospitalization rate in the Sundarbans is same as in the state. However, dominance of public sector is not as high as in the rest of the state. There is a clear pro-poor bias in utilization of public hospitals.

Sundarbans in the backdrop of its overwhelming dominance in rural West Bengal is apparently perplexing but may be explained by the fact that a large number of small private hospitals / nursing homes have grown up at different gateways of the Sundarbans as an alternative accessible source of inpatient care. Improved road connectivity between Kolkata and the peripheries have

seemingly facilitated the process. Second, the demand for inpatient care was higher among the poorest section possibly implying higher rates of major ailments among poor. It is also noteworthy that the poorest section used public hospitals at a higher rate than the least poor evident by the result that 71 percent of all poor inpatients and 59 percent of all least poor inpatients used public hospitals. Third, a little more than one-fifth (21%) of all inpatients had sought admission from Kolkata and 43 percent of them were self-referred. Clearly, there is a trend of health migration which, ironically, is likely to be triggered by improving communication system and deteriorating local public health care delivery system.

Increasing rate of hospitalization indicates that a sizeable number of households are getting exposed to major health shocks which may result in their destitution due to high financial drain associated with it. On average, a poor household in the Sundarbans spent about Rs. 4660 on medicines, hospital charges, diagnostic tests, and travel when a member got admitted

**Figure 2.9. Out of pocket expenditure for inpatient care in the Sundarbans, 2009 (in Rs.)**



in a public hospital (Figure 2.9). The same household would spend more than its double (Rs. 10360) if the hospital was privately owned. The consequence of such a financial

shock is often catastrophic and forces the household into a perennial poverty trap (Box 2.3). As suggested by other studies, about two-thirds of the out of pocket expenditure may be attributed to drugs and medicines<sup>16</sup>. This might explain why even public clients had to spend so much since the results also show that almost everyone among them had to buy some or all prescribed drugs from private pharmacies.

### **Box 2.3. How hospitalization saved a life but killed a family**

Mala Mondal is a 17-year-old married woman of Patharpratima block. Both her husband and brother-in-law are van-pullers. Mala delivered her first baby a year ago in a private nursing home at Patharpratima. The delivery was normal but the baby was motionless with feeble breathing. The doctor shifted the baby to a special care unit and put her with oxygen and IV saline. Almost after three hours she cried. Doctor prescribed lots of medicines and kept the baby in the unit for the next seven days.

The baby survived but with a high cost. To meet the medical bill of Rs. 40,000 Mala's family mopped up all their savings and still had to borrow a large sum from neighbors and relatives. A year is gone, still half of the loan is pending and they do not know how to repay this amount. The overhanging burden of debt has already forced them to cut consumption of food and some other basic necessities.

The baby has completed a year, but is largely inactive. Neighbours suggest her mother to take her to a good doctor, but how could they? Who will pay for it?

### **Outpatient care**

In general, most of the islanders in the Sundarbans seek some type of treatment when they are ill. This is evident from the result that around 84 percent of the persons reported ailing anytime during the reference period (last 30 days) were treated by any qualified or unqualified provider. For the remaining untreated 16 percent, the most important barrier was lack of money; about two-thirds (64%) could not access any treatment due to this reason. As expected, the barrier is more prohibitive for families in the poorer groups; around 77 percent of the persons belonging to the poorest group could not access outpatient

Poverty, not physical inaccessibility, is the primary reason for not seeking medical care when needed

<sup>16</sup> *Health, equity, and poverty: exploring the links in West Bengal*. 2007, FHS, IIHMR, p-31.

services for economic reasons – the corresponding figure for the least poor group was 47 percent.

Where from do ailing people seek treatment for minor ailments? The results unequivocally confirm absolute dominance of Rural Medical Practitioners (RMP), the private health care providers who practice modern medicines without any formal training and are also identified as “unqualified” / “less than fully qualified” or simply “quacks”. As

62% of outpatient clients were treated by Rural Medical Practitioners (RMPs) who rampantly practice modern medicines without any formal training. This is a much higher rate than what was found in rural West Benaal (53%).

Table 2.3 shows about 62 percent of outpatient clients sought treatment from RMPs while government facilities were visited by only 11 percent. It is also noteworthy that the dependence on RMPs was greater among the people from the southern part of the Sundarbans, the blocks in the remote Sundarbans, and the poorest section. The estimated market share of RMPs in the

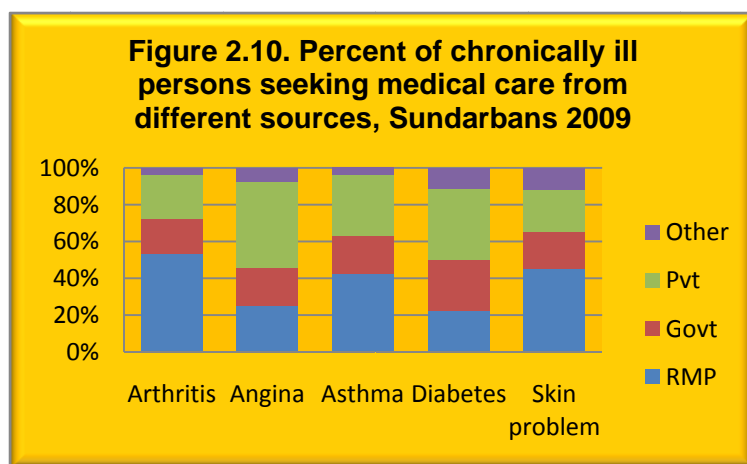
Sundarbans (from FHS-Sundarbans survey, 2009) was also much higher than that in rural West Bengal (from another FHS survey in 3 districts, 2007).

**Table 2.3. Percent of ailing persons seeking outpatient care, by source of care, Sundarbans 2009**

	% of ailing persons who sought treatment from			
	RMP	Government Facilities	Private Qualified	NGO/Charity
<b>District</b>				
North Sundarbans	56.9	13.7	21.8	4.2
South Sundarbans	64.3	10.1	21.6	0.9
<b>Blocks</b>				
Remote Sundarbans	63.1	10.7	21.4	2.9
Periphery Sundarbans	61.5	11.5	21.9	1.2
<b>Socio-economic group</b>				
Poor	68.9	9.1	17.1	1.7
Middle	62.1	12.1	20.8	2.8
Rich	54.9	12.4	27.5	1.2
<b>Sundarbans</b>	62.1	11.2	21.7	1.9
<b>West Bengal (Rural)</b>	53.7	22.9	14.7	-



It is expected that most of the RMP clients would be those who have been suffering from some acute ailments (i.e., ailments with high severity but short duration such as fever or diarrhea). The data from the Sundarbans, however, revealed that many chronic patients would also seek treatment from RMPs. As Figure 2.10 shows, more than half of the respondents with arthritic pains (53%) had been treated by RMPs. The proportion was,



however, relatively low for patients with Angina or Diabetes (25% and 22%, respectively) perhaps due to the need for specialized tests involved in their detection.

Why do people prefer RMPs despite their questionable quality of services?

According to the study results, the most obvious answers are physical proximity and affordable market prices of RMP services (Table 2.4). On average (median) a RMP client had to travel less than 1 KM to reach the clinic, while those, who availed services of a public facility, travelled about 4 KM. Similarly, it would cost at least Rs. 100 less to an ailing person if he / she is treated by a RMP instead of a PHC doctor.

**Table 2.4. Median distance travelled and median out of pocket expenditure of outpatients, by source of care, Sundarbans 2009**

	RMP	Government Facilities	Private Qualified	NGO/Charity
Median distance travelled (KM)	<1	4	9	4
Median out of pocket expenditure (RS.)	250	350	600	150

Lower market price and proximity might be important determinants of people's choice of RMPs; however, the anecdotal evidences collected through the survey also indicate that there are several other crucial explanatory factors. For example, a public facility, even if it is closely located to a village, may be bypassed due to non-availability of a regular doctor. All medicines prescribed by a PHC doctor may not be available within the facility. Consequently, the patients have to remain prepared to pay upfront for the



medicines they would purchase from private pharmacies. Moreover, the prescribed medicines, which are purchased from pharmacies, may not always be of the cheapest brand. These deficiencies imply a high transaction cost associated with the provision of services at the public health facilities. RMPs flourish by significantly reducing this transaction cost. They are usually always available, closely located, and sell medicines as a part of their service often on credit. Clearly, their operations manifest the economic phenomenon that a market, when it fails to control transaction costs, begets a parallel but low-cost alternative. Besides low transaction cost, the other important factor behind the spread of RMPs is

people's trust (Box 2.4) which often manifests in people's long memory of favourable results produced by RMPs (and short memory of undesired results).

#### **Box 2.4. Why do people prefer RMPs?**

About a year ago, Mr. Gopinath Rana, 70 years old man, suffered a mild stroke and was immediately admitted to the Rudranagar Rural hospital (Sagar Block). After 9 days, situation deteriorating, the doctor announced his helplessness and referred the case out. The family of Mr. Rana, however, took him back to home and called the local RMP for his treatment. After a month-long treatment, the patient survived and got up on his feet.

This morning Mr. Rana has come with his daughter-in-law to the same RMP clinic to treat a minor gastro-enteric problem. It is 9 AM and the clinic is already crowded. Why here? Is the government health centre too far? "No", his daughter-in-law quipped, "it is not too far; why should we go to the same hospital who could do nothing one year ago.. ?" "This doctor (i.e., the RMP) saved him at that time, where else would we go?"

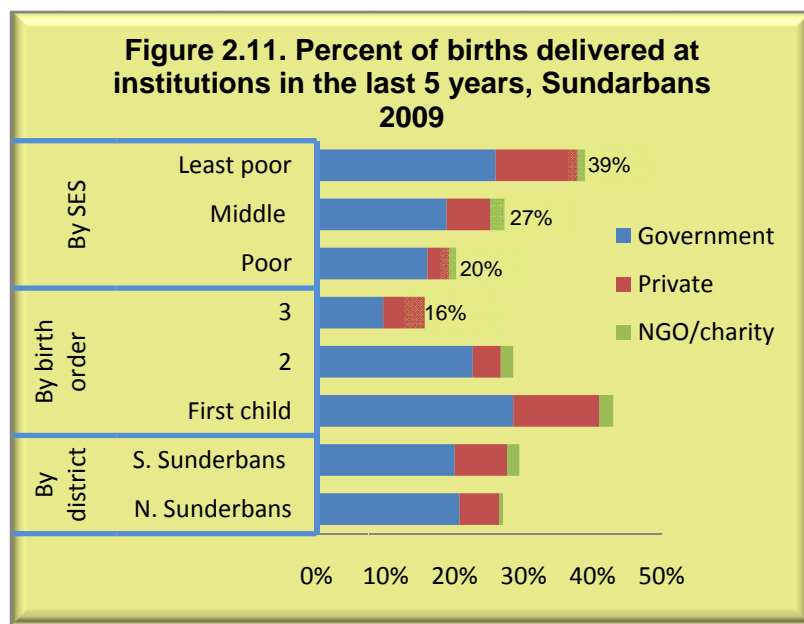
#### **Maternal health care**

Increasing institutional delivery is one of the top priorities to the policy makers of the state although NFHS estimates show only a little progress in this case (in the state) – the rate of institutional delivery just increased by 3 percent points in the last ten years, from 40.1 percent in 1995-96 (NFHS-2) to 43.1 percent in 2005-06 (NFHS-3). The more recent evidences from the DLH survey (2007-08) however recorded a better progress of the state in this direction (49.2% overall, 43.2% in rural areas).

The evidences from the Sundarbans, however, paint a gloomy picture. Out of sample 569 mothers, who delivered at least one child in the last five years, only 29 percent delivered their last child at public or private institutions. This is comparable to the rural

areas of the most backward districts in West Bengal such as Uttar Dinajpur (23.6%) or Malda (26.4%), but much lower than North 24 Pargonas (43.4%) and South 24 Pargonas (36.4%) – the two districts the Sundarbans are part of.

The link between utilization of institutional care and poverty is also remarkable. Only



one out of five women from poor families utilized institutional care for birth delivery compared to 40 percent from the least poor (Figure 2.11). Similarly, the first child of a mother was more likely to be delivered at a hospital than was the second or third child. There was, however, no significant

difference between the southern and the northern part of the Sundarbans with respect to institutional delivery.

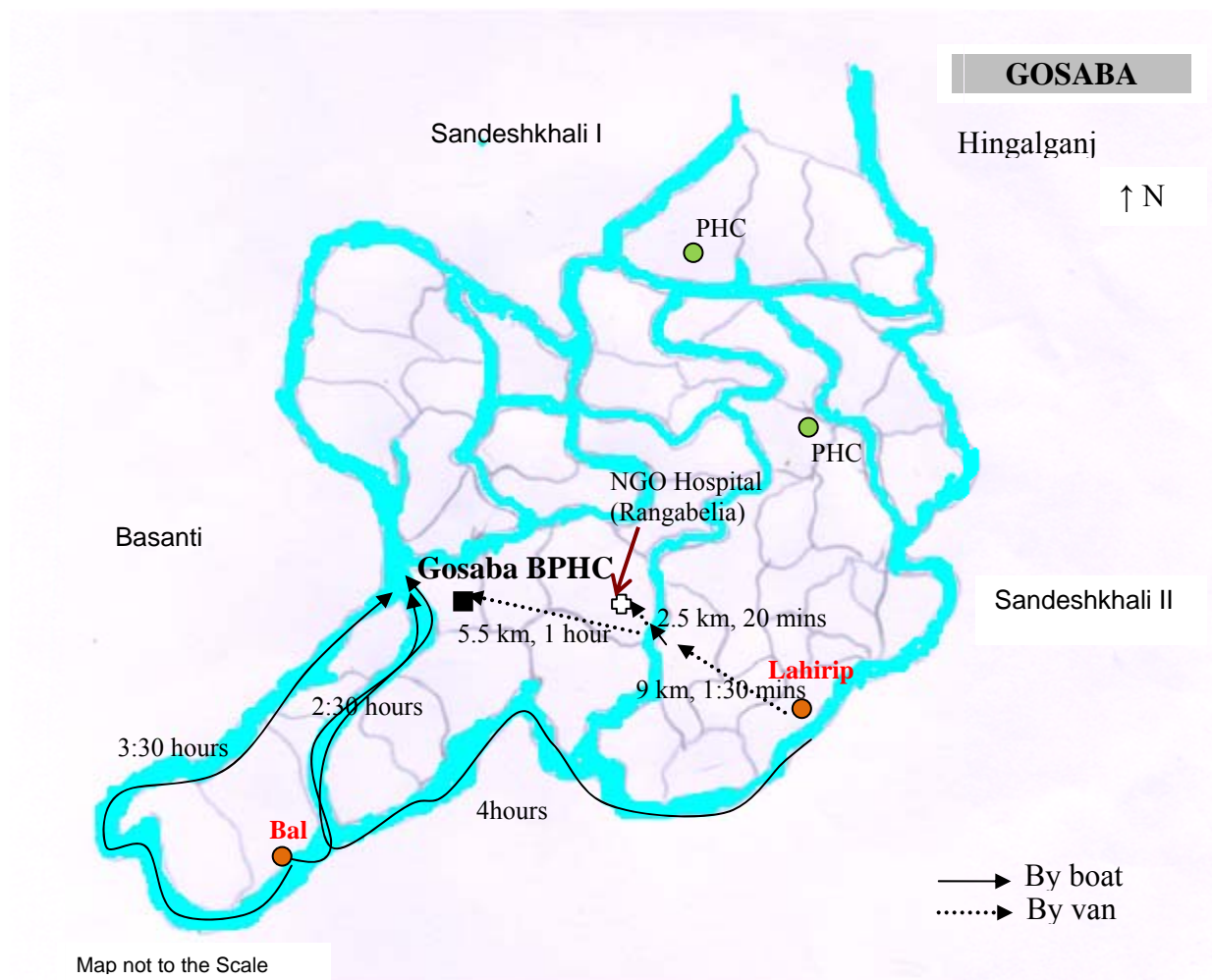
Regarding institutional deliveries, there are two other crucial points to be noted. First, most of these deliveries (about 71% of all institutional deliveries) were conducted at government hospitals. Second, the incidence of caesarian section (CS) was exorbitantly high among the users of private hospitals – 55 percent of all private users had delivered caesarian baby compared to 14 percent of public users. This may be due to either or both of the following possibilities: (1) the complicated pregnancy cases self-selected private hospitals pushing up the rate of CS to a naturally high level, and (2) there might be high degree of supplier-induced demand for CS (i.e., the users were recommended CS even if it was not necessary) due to excessive greed of the private providers. Due to data constraints it is however not possible to measure the contribution of these causes in the present case.

What factors are responsible for such a low rate of institutional deliveries in the Sundarbans? On the demand side, poverty or economic constraint plays an important

determinant behind choice of place of delivery as is evident from Figure 2.11 above. The above evidence points out to a glaring dichotomy: while the utilization of general inpatient care was high, maternity inpatient care remained significantly low. Two plausible explanations for such discrepancy are: (1) a cheaper option (i.e., home delivery) is available in the latter case while non-maternity inpatient care has no alternative except accepting death or disability; (2) the perceived risk (or, opportunity cost) of not seeking institutional care is much less in case of maternity cases. The second explanation could be reconfirmed on the ground that the most common reason (elicited from the mothers who delivered at homes) for not delivering at hospital was 'not necessary' implying that birth delivery is still treated by a large section as a 'normal' affair for which hospitalization is not required.

Most of those who could break the above two barriers are trapped by another important constraint – the geographical adversities – which are embedded within the economic and social barriers and are often difficult to assess from quantitative data. The results show that a woman, who delivered birth at home, would have to travel 8 KM on average had she decided to deliver birth at the nearest public hospital. However, the physical distance in the Sundarbans often fails to reflect the degree of inaccessibility as travelling a short distance in some pockets may mean quite a hardship due to broken transportation linkages or unavailable water transportation when it is most required. For example, a woman living at Lahiripur in Gosaba block would be required to visit Gosaba BPHC (hospital at the block headquarter) if she wants to deliver birth at a hospital (Figure 2.12). The shortest route to reach the BPHC would require her to walk or travel by van rickshaw a distance of 9 KM, cross a river, and then again ride a van rickshaw to cross a distance of 5.5 KM. In addition to hardships of cross-transportation, the whole journey would take about 3 to 3.5 hours. If she decides to avoid break-journeys and to travel by a single mode, she would take the river route (from Lahiripur to Bali, Bali to Gosaba BPHC) and reach the destination after a journey of 6-7 hours. A more viable alternative, in this case, would be to take a risk of delivering birth at home, or to helplessly wait for the morning if the problem starts at night (Box 2.5).

**Figure 2.12. A virtual journey from a remote village to the nearest BPHC in Gosaba block, Sundarbans 2009**



On the supply side, an effective and strong pre-natal care is usually considered as one of the critical pre-conditions for increasing demand for institutional maternal care. The household data, however, fail to establish the link despite commendable achievement in pre-natal care. For example, almost all mothers, interviewed during the survey, registered their pregnancies with a health worker (93.5%), received at least one ante-natal care (93%), had at least one TT injection (98%), and consumed iron tablets during pregnancies (75%). Yet most of them delivered at home implying that improving routine maternal care – with cultural and geographical barriers intact - is not enough to bring in safer birth delivery practices in the Sundarbans.

**Box 2.5. How inaccessible are the health care facilities?**

Saraswati (real name changed) lives at Borobantat under G plot Island, a highly inaccessible place especially after sunset since no ferry service would be available to go outside the village.

Incidentally, Saraswati felt her labor pain after the dark set in. She was immediately taken to Sitarampur PHC located on the same island only to find that the doctor had gone to Kolkata. The next best alternative is the BPHC located at Patharpratima which would take about 6 hours to reach by boat and van rickshaw. The last ferry had left about a couple of hours ago, hence Saraswati's husband took her back home to anxiously wait for the next morning relying on the ferry service that resumes from 6:30 am onwards. Saraswati had to spend a horrible night with increasing frequency of contraction and profound bleeding. Notwithstanding her sufferings, she had to travel next day almost for five long hours to reach to the BPHC.

It was her luck that after reaching the facility, Saraswati safely delivered a girl child under professional care. Both the mother and the baby were safe. Though all looks well as it ends well, Saraswati's mother-in-law expressed her fear "*r aktu deri hole amar bouma ke fire petam nd'*" (we may have lost our daughter-in-law had there been further delay).

**Child health care**

Table 2.5 presents a mixed progress in child health care in the Sundarbans in comparison to West Bengal. For example, the mothers in the Sundarbans were a bit ahead in following the correct timing of breastfeeding – 45 percent of mothers started breastfeeding within one hour of child's birth compared to 41 percent in West Bengal. However, they lagged behind in following the other desirable practice; about 32 percent mothers of the children aged 0-5 months exclusively breastfed their children compared to 45 percent in West Bengal. The relative weakness of public health care delivery system is also evident in the results that 7 percent of the children of 12-23 months in the Sundarbans received no vaccination compared to 3 percent in West Bengal.

**Table 2.5. Selected indicators of child health care, Sundarbans 2009 and West Bengal**

Child health indicators	Sundarbans	West Bengal (Rural)
% of Children under 3 years breastfed within 1 hour of birth	45	40.7
% of Children aged 0-5 months exclusively breastfed	31.8	45.4
% of Children 12-23 months received no vaccination	7.3	3.1
% of Children with diarrhea received treatment	95	82.4
% of Children with ARI received treatment	81.2	76.5

1. DLHS-3, West Bengal (2007/08)

The probability of seeking care for a sick child in the Sundarbans is very high (95% for diarrhea and 81% for ARI). The possible explanation of this behavior is easy availability of RMPs who provide prompt solutions to all common childhood diseases. The dependence on RMPs in the context of childhood diseases is quite evident from the survey data: about 74 percent of the children with diarrhea and 79 percent of the children with ARI problems were treated by the RMPs. In brief, the basic and curative child health care in the Sundarbans is almost exclusively provided by the RMPs.

## 2.5. Conclusion

The health scenario of the Sundarbans offers little to celebrate. A typical resident of the Sundarbans carries an extra load of ill-health and health risks compared to others living within the same district. Poverty, coupled with sharp geo-climatic challenges, make him / her especially vulnerable to health shocks caused by environmental and life style related agents. As the FHS survey found, the islanders are doomed to struggle with both communicable and non-communicable diseases often leading to complete disorder in priorities to tackle the problems. The children are the worst sufferers; most of them are chronically malnourished and, hence, perennially suffer from disproportionately higher burden of respiratory and gastro-enteric troubles. Women and poor are especially vulnerable to the chronic and acute health conditions. In brief, with 4 million people currently estimated to live in the region, this neglected population has become a major reservoir for a wide spectrum of health conditions that are not always well recognized by the existing formal health sector.



People's response to these challenges is often perplexing primarily due to complex interface of the social, economic, and geographical barriers to access health care and perceived severity of the problem. For example, utilization of inpatient care in public institutions is remarkably high implying that the perceived severity and benefits of getting a seriously ill person admitted to a hospital is higher than the perceived costs and barriers of doing so. On the contrary, the family of a pregnant woman feels constrained to take her to a hospital for delivering a birth probably because the equation between benefits and costs is reversed. The village unqualified doctors dominate the outpatient market because people think it would be too costly, or unnecessary, or hazardous to seek treatment for a minor ailment from a qualified provider. The psychiatric disorders swell with increasing suicide attempts because neither the people nor the providers consider their prevention as a serious health action. In other words, physical accessibility to a government health facility apparently becomes a prohibitive issue when people seek ambulatory or birth delivery care (due to low perceived severity and benefit) but becomes non-prohibitive when they need admission to a hospital (due to high perceived severity and benefit). *The clear implication of this complex response behavior is that adding more health facilities to the less accessible areas may not improve 'access' unless the social barriers are simultaneously addressed to influence the perception about severity of health needs and increased benefits of accessing these facilities.*

People's choice or coping mechanism at a particular time does not necessarily lead to a socially optimal or desirable state. This is especially true in the context of the Sundarbans where people often do not have many 'desirable' choices regarding health care. The findings presented in this Chapter highlight three needs to address this situation: (1) expansion of the choice set, i.e., to make desirable health care services more easily available, (2) to weaken the barriers and effectively entitle the people of the Sundarbans absorb the benefits of such expansion, and (3) to integrate the action against health challenges with the same against broader issues of ecological and livelihood insecurity.



### **3. Who provide health care and how much?**

### 3.1. Introduction

This chapter presents a brief overview of the supply side environment related to the health care delivery system of the Sundarbans. More specifically, it focuses on three major providers of health care: (1) public (or, government) providers, especially the block level public facilities, (2) Mobile health clinic services provided by a few NGOs, and (3) the rural medical practitioners (RMPs). For each provider, the following three questions would be addressed: (a) what types and how much of the health needs of the Sundarbans are being met? (b) what are the constraints on the way to work more for the people of the Sundarbans? and (c) how the full potential of the provider could be utilized? All these questions would be addressed on the basis of a set of primary and secondary data collected through an extensive providers' survey conducted by FHS in 19 blocks of the Sundarbans (referred below as FHS survey)<sup>1</sup>.

### 3.2. Who provide health care?

The health care delivery system in the Sundarbans is built on an assortment of public and private providers. The public services, delivered through a multi-tier infrastructure, are primarily financed by public funds. The private providers may be classified into several groups based on their economic motive and qualification: (1) the qualified private providers practicing solo or at private institutions, (2) private hospitals and nursing homes with capacity to provide inpatient care, (3) unqualified private providers or RMPs, and (4) not-for-profit organizations providing preventive and curative services through different programs and facilities, especially through mobile health units under a unique public-private partnership program and institutional birth delivery centers.

### 3.3. Public health care system

The public health care system in the Sundarbans, following the same pattern as in other parts of rural West Bengal, delivers preventive and curative services at multiple levels of institutions (or, facilities) and through outreach workers. The public facilities range from 2 Sub-divisional hospitals with specialized physicians and inpatient services to about 800 small sub-centres (SC) at the village level staffed by trained multi-purpose workers

<sup>1</sup> The results given in the rest of this section are primarily drawn upon the detailed report on this survey ("Health and health care in India's Sundarbans delta", unpublished report, IIHMR, 2009). The report would be available upon request.

(Table 3.1). Within this range there exist 19 block level facilities (9 Rural Hospitals (RH) and 10 Block Primary Health Centers (BPHCs)) and 47 Primary Health Centers (PHCs) – arranged in order of secondary to primary levels of care. The Block level facility (BPHC/RH), in addition to playing a role of a referral unit, acts as a hub of all primary health care activities within a block.

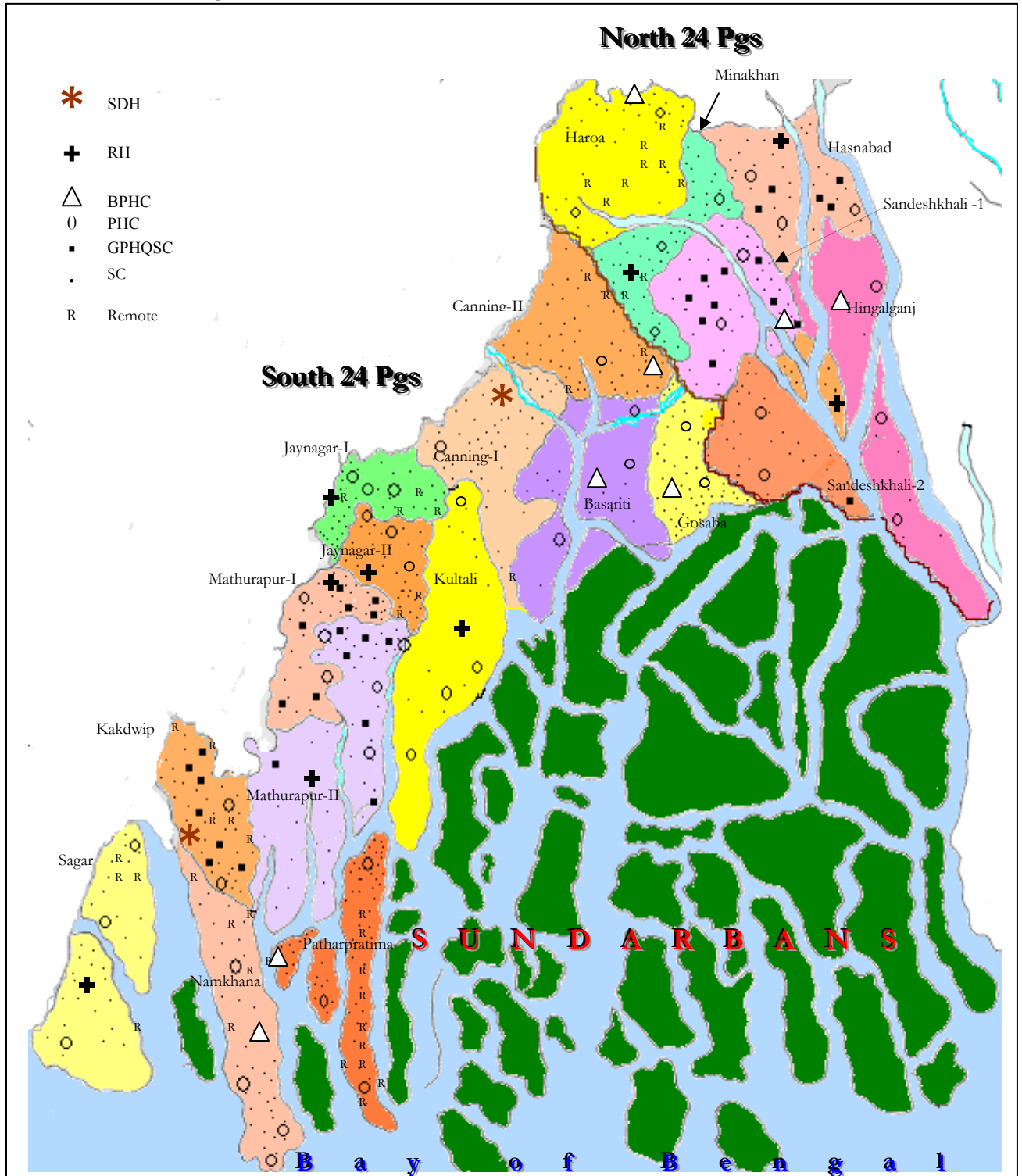
As Table 3.1 shows, the sub-centers are adequate in number if one goes by the usual standard (5000 population per sub-centre). The number of PHCs, on the other hand, is evidently inadequate by the same standard (30,000 per PHC). The inadequacy is more prominent in South Sundarbans especially in some blocks (Gosaba, Canning I and II, Patharpratima, and Kakdwip). Figure 3.1 shows the location of the block level facilities spread over the Sundarbans.

**Table 3.1. Public health facilities in the Sundarbans, by blocks**

District	Block	Type of block level hospital*	No. of PHC	No of SC	Population per PHC	Population per SC
North 24 Pargonas	Hingalganj	BPHC	3	42	52333	3738
	Hasnabad	RH	3	33	67023	6093
	Sandeshkhali II	RH	2	35	75117	4292
	Sandeshkhali I	BPHC	2	35	78305	4475
	Minakhan	RH	2	29	97034	6692
	Haroa	BPHC	2	29	102905	7097
	<b>Total North Sundarbans</b>	<b>6</b>	<b>14</b>	<b>203</b>	<b>76056</b>	<b>5245</b>
South 24 Pargonas	Gosaba	BPHC	2	51	120787	4737
	Basanti	BPHC	3	63	92848	4421
	Canning I	BPHC & SDH	1	56	285000	5089
	Canning II	BPHC	1	45	244998	5444
	Jaynagar I	RH	2	50	123324	4933
	Jaynagar II	RH	3	47	75312	4807
	Mathurapur I	RH	2	37	93524	5055
	Mathurapur II	RH	3	45	74877	4992
	Kultali	RH	4	43	54555	5075
	Namkhana	BPHC	4	37	45658	4936
	Patharpratima	BPHC	3	65	103405	4773
	Sagar	RH	3	42	61877	4420
	Kakdwip	BPHC & SDH	2	54	135762	5028
	<b>Total South Sundarbans</b>	<b>13</b>	<b>33</b>	<b>635</b>	<b>94018</b>	<b>4886</b>
	<b>Total Sundarbans</b>	<b>19</b>	<b>47</b>	<b>838</b>	<b>88668</b>	<b>4973</b>

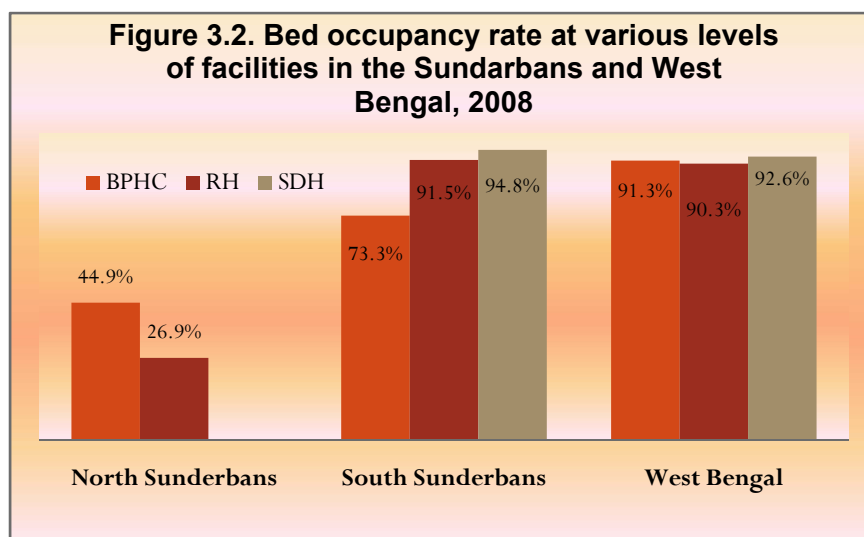
BPHC= Block Primary Health Center, RH = Rural Hospital, SDH = Sub-divisional Hospital, PHC= Primary Health Center, SC = Sub-center

Figure 3.1. Public health facilities in the Sundarbans



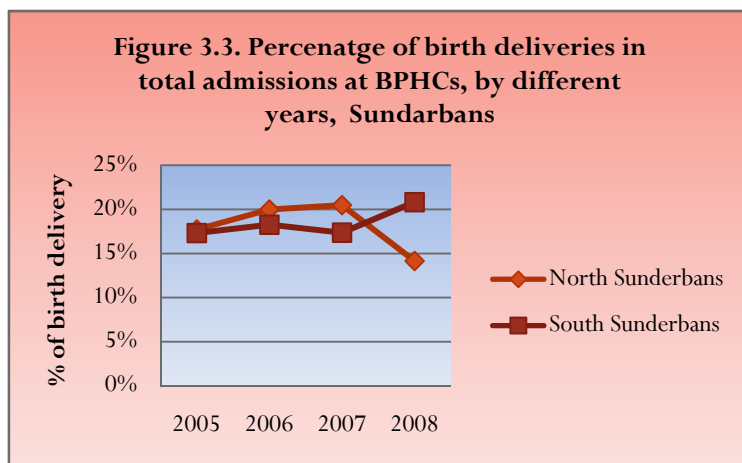
How much of the health care needs of the Sundarbans is being met by the public facilities? As mentioned in Chapter 2 (FHS household survey), about two-thirds of all inpatients in the Sundarbans sought admission in public hospitals. However, it is also interesting to note that a large part of them (about 40%) were admitted not at the block level facilities but at the upper-tier public hospitals (either SDH or tertiary hospital in Kolkata). A possible implication from the above results is that a large number of inpatients bypass the block PHCs leaving their Bed Occupancy Rate (BOR) much less than the desired level especially where the access to higher level facility is better. The official data on hospital admission (HMIS data, 2008), as shown in Figure 3.2, support this hypothesis.

Two important issues are worth noting: (1) the BOR at the BPHCs was comparatively lower in both parts of the Sundarbans than that of the whole state; and (2) the utilization of



inpatient beds was much lower in the northern part presumably because of better accessibility to urban facilities.

The bed occupancy for diseases, however, would be further lower in the local facilities since a little less than one-fifth of total admissions were due to delivering births. The



proportion (of birth delivery cases) significantly increased in the South Sunderbans since 2005 with a downward trend in the most recent year (Figure 3.3). The implications from the overall picture are that the local facilities (especially the BPHCs) are

not utilized to their optimum level even though there is a high demand for inpatient care. A corollary to this observation is that the secondary and tertiary hospitals are overutilized exposing the weakness in the referral system.

A few other clues regarding utilization of inpatient care emerge when the official (HMIS) data are disaggregated further by blocks. For example, as Figure 3.4 shows, the utilization rate is quite diverse across the blocks. Overall, the hospitalization rate at the local facilities (PHC, BPHC / RH, and SDH) in the Sundarbans, estimated from the 2008 HMIS data, was 2.16 percent (which almost corresponds to the rate estimated from the household survey – 2.18%)<sup>2</sup>. However, the inequality in utilization would be quite evident from the fact that 4 blocks (Canning-2, Gosaba, Basanti, and Sandeshkhali-1) recorded extremely low rates (less than 1%) while, on the other extreme, the rates were quite high (more than 4%) in 3 blocks (Hasnabad, Kakdwip, and Canning-1) clearly implying that inpatients from the first group of blocks have a higher propensity to bypass local facilities compared to those from the second. The inference could be further strengthened by the fact that the bed occupancy rate in the first group was extremely low in 2008 – 43%, 62%, 35%, and 24% respectively in Canning-2, Gosaba, Basanti, and Sandeshkhali-1.

The second point of concern is the potential role of the lowest level facilities (such as PHCs) to share the load of inpatient care with the block and higher level facilities (such as BPHC / RH and SDH). The PHCs currently share a negligible part of inpatients (only 4% of all local inpatients) primarily due to their low capacity to handle inpatient services, a common trait of Indian health care system. However, the exceptions – for example, some PHCs in Hingalganj, Sandeshkhali – 2, and Gosaba (Figure 3.4) are notable which stand alone and manifest their potential not only in sharing the burden but also in providing low-cost solutions for common inpatient and birth delivery services.

<sup>2</sup> The rates were calculated in the following way:

**From official HMIS data**

Total estimated population (2008) in the Sundarbans = 3.76 million. Total admissions (2008) in PHC/BPHC/RH/SDH = 81284. Hence, the hospitalization rate at local public hospitals =  $81284 \div 3.76$  million = 2.16%.

**From FHS Household survey data**

Total hospitalization rate (In local and Kolkata, public and private hospitals) = 4.18% (see Table 2.2).

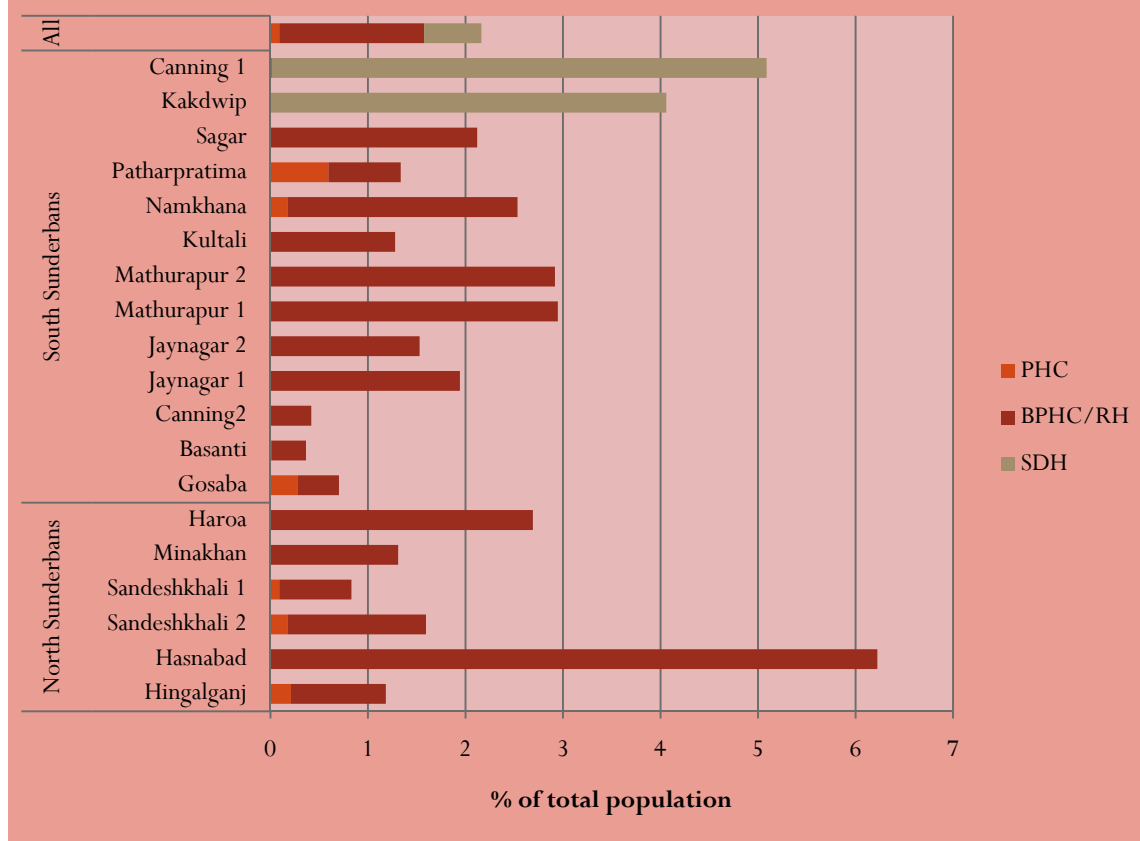
(1) Percent used public hospitals = 66%

(2) Percent of (2) used local facilities = 79%.

Hence, hospitalization rate at local public hospitals (PHC, BPHC/RH, and SDH) would be =  $4.18\% \times 0.66 \times 0.79 = 2.18\%$ .



**Figure 3.4. Percent of total population admitted at various levels of health facilities, Sundarbans 2008**



The reference to birth delivery services is important in this context; a recent initiative by the government which helped set up several *Delivery points* across a few islands in partnership with local NGOs stands out as an example of such a low cost solution. The points are often located in a part of a PHC and run by a local NGO (with required medical and paramedical staff) with the sole objective to provide institutional delivery services to women of the Sundarbans especially at the least accessible areas of the region. It appears that there is a huge potential of this initiative to meet this urgent need (Box 3.1). All of these *Points* have been functioning for more than a year and were handling 10-40 deliveries per month and thereby pushing up the admission rate of the PHCS they are part of.

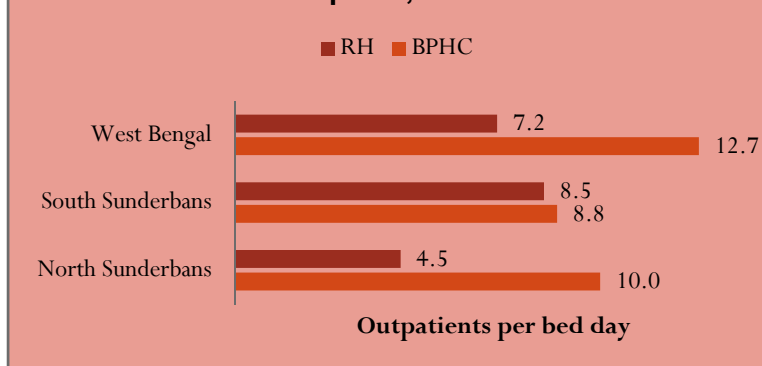
### Box 3.1: Delivery Points at the Sundarbans

Khadija Bibi, a young woman from Shekhpara village in Basirhat sub-division, was waiting to deliver her second child at a NGO-run Delivery Point attached to Najat PHC. Delivering birth of her first child, now a 2-year old boy, was a nightmare. Due to severe complications during pregnancy period, she was taken to Kolkata's Chittaranjan hospital - a tedious journey of about 6 hours. It was a caesarean baby costing her poor husband, a rickshaw puller, a fortune. He had to mortgage their only asset - a small piece of land - and sell his wife's ornaments to pay for travel, accommodation, medicines, and other expenses.

She and her husband feel much better this time. The delivery services were unavailable in this hospital even six months ago. Now, what a change! It is very close to her residence (2 KM), doctors and nurses are always on vigil, and she can now eat *ghorer khabar* (home-cooked food). And, all these things without cost! "*Daktarbabu bolechen ebaar aar asubidha hobena*" (The doctor has assured me that there would be normal delivery), Khadija said with a faint smile.

The evidences demonstrate the sub-optimality of utilization of outpatient care as well. The results derived from the FHS household survey and given in Chapter 2 clearly indicated that a major share of ambulatory (or, outpatient) care was catered by the local RMPs, a phenomenon which is evidenced also in other parts of the state albeit at a lesser degree. Data on outpatient visits at lower level facilities corroborate the phenomenon since the number of outpatients per bed day<sup>3</sup> at the BPHCs of the Sundarbans worked out to be 25 to 30 percent less than the state average (Figure 3.5). In other words, despite high demand for treatment of minor and chronic

**Figure 3.5. Outpatients per bed day at the block level hospitals, Sundarbans 2008**



<sup>3</sup> 'Outpatients per bed day' is an output measure of the OPD services of a hospital and is calculated as total outpatients in a year ÷ (sanctioned beds × 365 days). Increasing value of this indicator at a constant input level indicates increasing hospital efficiency.

ailments, the outpatient services at the primary health care facilities in West Bengal meet only a small fraction of the demand, less so in the similar facilities of the Sundarbans. Overall, the utilization pattern reflects the existence of crucial barriers which often remain invisible under the myriad of complex, and potentially confusing, health care choices available to people. The most prominent barriers include time and physical stress to reach a facility, or non-availability of required services, or even the fear of border security guards who may intercept any movement at night. Clearly and logically people choose to access the nearest facility – even if it is a low profile PHC – if and when the barriers are reduced to minimum (Box 3.2).

How prepared or constrained are the local public facilities to address these barriers? Data collected from 19 block level facilities (including 2 SDHs) reveal that almost all facilities were functioning with basic services such as general OPD, IPD, and labor room. Ambulances were available and functional. All of them had required capacity to provide basic maternal and child health care such as normal birth deliveries, or treatment of diarrhea-affected children. Basic pathological test services were also available in all but one (Minakhan BPHC) facilities. Management of animal/snake bite which constitutes an important part of emergency care in the Sundarbans was present in all the block level facilities.

Notwithstanding a visibly enabled environment in the block level facilities, it is hard to overlook several caveats in the system. First, the translation of capacity into effective utilization in case of some services is seriously constrained by inadequacy of some critical and complementary inputs. For example, equipment for provisioning of critical services like resuscitation and thermal protection was available in almost all the blocks but in absence of regular and steady power supply its utilization was highly restrained. In many cases equipment was non-functional implying sheer negligence on maintenance. Second, almost 80 percent of the blocks did not have facility to conduct caesarian section and / or basic EMOC services. Even the three First Referral Units (FRUs), facilities designated to provide 24 × 7 comprehensive EMOC services, were found lacking in several critical inputs. For example, the SDH situated in Canning-I reported shortage of equipment for resuscitation and baby warmer. The rural hospital in Taki, another designated FRU, was running without any blood storage unit. Third, about half of the facilities were found deficient in providing basic neo-natal services. And, fourth, the radiology and imaging services were conspicuously weak; for example, only

### Box 3.2. How do people of Sridharkathi access public health care facilities?

Sridharkathi is one of the villages located at one extreme corner of Hingalganj block (North Sundarbans), home to about 1500 farming households. The roads inside the village are mostly paved with brick although the recent natural disaster, caused by the cyclone *Aila*, has made a mess of them.

The people of this village have three choices when they decide to seek treatment from a public facility: (1) the easiest: visit the nearest PHC at Jogeshganj by a single transport within 30-40 minutes; (2) moderately difficult: to a higher level facility - the RH at Sandeshkhali which would require them to use multiple modes and cross a river, and (3) highly difficult: to Sandalerbill BPHC which would also require equal number of changes in transportation but would take longer time. It would take about 4-6 hours and Rs. 70 (per person) in return journey if someone plans to visit this BPHC (see the table below). At night, the difficulty and cost will multiply several times since, due to non-availability of the regular transportation, one will have to 'reserve' special service at every stage.

From	To	Mode of transportation	Approx time (one way)	Degree of hardship
Sridharkathi	Jogeshganj PHC	Walk / van rickshaw	30 min	Low
	Sandeshkhali RH	Walk + van + auto/trekker + boat + van	15 + 5 + 30 + 5 + 30 = 1.5 hour (excluding waiting time)	Moderate
	Sandalerbill BPHC	Walk + van + auto/trekker + boat + van/ taxi	15 + 5 + 30 + 5 + 60 = 2 hours (excluding waiting time)	High

Peoples' revealed preferences precisely reflect the access hardships. For example, if it is an emergency case, they will first try the PHC (Jogeshganj) and will be served in most cases since it is a designated 24 × 7 hours PHC, also a Delivery Point, at the door step. A common perception is that the availability of services at this PHC has effectively cut into the local RMP business. About two-thirds of births in this village were delivered in this PHC - as found in the household survey - an exceptional trait by the Sundarbans standard. **Unambiguously it highlights the importance of strengthening the PHCs as a solution to accessibility problems.**

In case the PHC fails to deliver, the patient will be taken to Sandeshkhali RH, the hospital in the adjacent block. Why not to the BPHC of their own block (Sandalerbill BPHC)? Saving in time and money is the obvious answer, but there is also a hidden barrier (to access the BPHC). Since the route to the BPHC crosses a patrolling area of the Border Security Force (BSF), it is usually avoided at night as the BSF might unnecessarily 'harass' them.

two block facilities (Jaynagar I and II) were found to have an USG machine and only eight could provide X-ray facilities to the users.

As expected, availability of frontline workers was one of the most crucial determinants of facility effectiveness. This is especially a matter of concern at the sub-centre level where about 16 percent of ANM's positions remained vacant in 2008 (15% in North and 17% in South Sundarbans)<sup>1</sup>. It is also important to note that two-thirds of all ANM vacant positions could be attributed to only five 'remote' blocks – Hingalganj, Sandeshkhali-2, Gosaba, Basanti, and Patharpratima – implying a negative correlation between the need and supply of health workers. The situation is not better at the PHCs, the next higher level, where 6 out of 46 PHCs were found to have no doctor (hence, virtually remaining non-functional). The real shortage would however be more acute if one considers the issue of absenteeism among the frontline providers. Anecdotal evidences and observations of the FHS team suggest that absenteeism among doctors and health workers, especially in the remote health facilities, is a chronic and serious problem. It is also a common grievance that the incidence of government doctors regularly attending the clinics is distressingly low especially in remote areas. However, due to lack of scientific data on this, the present study did not attempt to quantify the phenomenon.

The shortage of manpower at the upper level local facilities (BPHC, RH, and SDH) was however less acute. On an average, each of these facilities had 4 medical officers and 12 nursing staff, which corresponds to Indian standards. However, the data, when disaggregated, reveals several problems in allocation of this workforce. First, there are inequalities in allocation as demonstrated by the fact that three BPHCs were running with only 2 medical officers (Gosaba, Haroa, and Sandeshkhali-1) while six other reported more than 5 medical officers. Second, there had been an acute shortage of technical persons making the service delivery package less effective in several facilities. For example, out of 19 facilities 11 did not have any radiographer and 6 were running without a lab technician. The relatively weaker supply environment in the remote Sundarbans is also evident from the fact that three remote block facilities in the South Sundarbans– Gosaba, Basanti, and Patharpratima – did not have either of these two technical hands. Lastly, the distribution of utilization of basic health care is heavily skewed towards easy to reach islands so that the people living in hard to reach areas are mostly excluded by the public health network (Box 3.3).

<sup>1</sup> Estimated from FHS Facility Assessment Survey, 2008.

### **Box 3.3. A typical BPHC in the Sundarbans**

Madhabnagar BPHC of Patharpratima situated in the bank of river Matla is 130 kilometer away from the district head quarter of South 24 Parganas. The BPHC caters to a total population of 3,10,216 spread over 17 islands. The performance of this BPHC is above average even by the state's standard. Running with 15 beds, the hospital recorded 141% Bed Occupancy Rate (compared to state's 91%) in 2008. However, the proportion of birth delivery cases in total admission was conspicuously high (37%) indicating that the facility was used extensively for normal birth deliveries. About 64,000 outpatients visited this BPHC in a year (2008) for minor treatments (implying 12 outpatients per bed day), a remarkable performance by the South Sundarbans standard (9 per bed day). The BPHC, like others, is also a nodal point for coordinating all public health programs within the block (Patharpratima).

Several constraints and gaps underpinning the tough geography of this block are however hidden under the impressive numbers. For example, the block covers 15 Gram Panchayets (GP). Of these, four are on the mainland, while the rest are on the various islands in and around Patharpratima. Some of them are very hard to reach, and yet do not have any health facility. Brajabhallavpur, G-plot, and Digambarpur have PHCs, but, Achintyapur, another large island, does not. The southernmost part of Achintyapur, K Plot, has just two ferries - one in the morning and one in the evening - to connect with the block headquarter. For some of them (for example 'G' Plot Island) the BPHC is a full 3-4 hours away by motor boat. In brief, it is extremely challenging to reach most of the people in this block with minimum health services.

The supply constraints are also visible in the designated First Referral Units (FRUs) which would supposedly provide comprehensive EMOC services and, hence, play a crucial role in MCH care. At present three facilities in the Sundarbans— two sub-divisional hospitals (Canning-1 and Kakdwip) and one rural hospital (Hasnabad or Taki) — are designated as FRUs. Apart from the fact that the numbers are inadequate by WHO standard (minimum 5 EMOC facilities per 500,000 population, at least one of which



would provide comprehensive EMOC<sup>2</sup>), there are few key concerns regarding the existing set up. While the existing strength of specialized manpower (for example, gynecologists, obstetricians and anesthetists) satisfies the norm in all these three FRUs, service provision of critical new-born care was found inadequate due to shortage of equipments or some other critical manpower. For example, the SDH situated in Canning-I did not have enough equipment for resuscitation and baby warming. The rural hospital at Taki did not possess any blood storage unit and also pediatrician was not in position.

Finally, the governance structure, especially at the district level, needs to be reorganized to deal with enormous challenges of the Sundarbans. The major issue in this context is that the Sundarbans receive no structured and focused attention at the district level. The region is geographically spread over two districts (North and South 24 Parganas); hence the governance of public health care is divided between the district health offices of these two districts. There is hardly any formal coordination between these two offices (on the Sundarbans). Even, within each of them, there is no specific mechanism to keep distinct focus on the blocks of the Sundarbans vis-à-vis the non-Sundarbans blocks in the same district. For example, it is hard to get an aggregated data on the Sundarbans blocks in a district office (or, the district hospital) since the district collates and aggregates data of all blocks making it difficult to sort out the problems of the Sundarbans part.

The governance is further burdened with the problem of accessibility. The district health offices (for both the districts) are located in greater Kolkata. It takes about 5-6 hours to reach even the headquarter of some of the blocks in the Sundarbans (from the district office). This makes it extremely difficult to keep regular tracks of these blocks and provide emergency support from the district office. A better way of governance is to set up a full-fledged zonal office at the center of the Sundarbans (for example, Basanti and Namkhana in the South and Hingalganj in the North Sundarbans) which would have maximum autonomy to coordinate and regulate the service delivery system within the Sundarbans part of the district. The existing zonal structure (i.e., the ACMOs) may be empowered and restructured for this purpose.

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<sup>2</sup> *Monitoring Emergency Obstetric Care: a Handbook*. WHO, 2009, p-10

In brief, the public health care network in the Sundarbans symbolizes a system with serious constraints, yet deemed to deal with extraordinary challenges of meeting the health care need of the Sundarbans. The constraints manifest in lower level facilities – the PHCs and sub-centers - operating far below their potential, and the block level facilities being able to meet only a small part of the need. Strengthening the block level facilities is extremely crucial since they not only act as the first point of inpatient care, but also operate as a hub for all public health programs carried out by their lower-level counterparts including those located in hard-to-reach locations. This would, in turn, require a series of initiatives as given below:

1. Identifying the vulnerable villages based on health status, inaccessibility, and vulnerability to natural disasters in each block.
2. Establishing a strong referral chain with these villages, starting from a basic service delivery point within the village and ending at the BPHC. The chain should be built on a linked referral transport system consisting of earmarked road and water transportations.
3. Establishing partnership with civil societies and informal providers (RMPs) to build the basic service delivery point which would provide all preventive care, birth delivery services, and basic curative services.
4. Building capacity at the PHC level to provide primary care for non-communicable diseases (such as, CHD, diabetes, ophthalmological, and skin-related problems) and mental disorders. This should be complemented with capacity building in the BPHC to provide secondary (or, inpatient) care on these conditions.
5. Scaling up the successful innovations (such as mobile health clinics) and testing new models in vulnerable village to address the accessibility issues.

### **3.4. Public private partnership: Mobile health clinics and Delivery Points**

Given the low effectiveness and coverage of the public health care system, an alternative and innovative delivery model was designed for the Sundarbans in late 1990s by the Department of Health and FW (DoHFW) of GoWB under the State Health System Development Project. The model involved a partnership between DoHFW and a few local NGOs to provide mobile health clinic services to remote islands by using motor launch. Starting with one voluntary agency (Tagore Society for Rural Development or

TSRD) working in 24 villages in two blocks of South 24 Parganas in 1999, the experiment gradually expanded, involving four more agencies (SHIS, SVGSS, BSS, and SRKA) in different points of time to provide services to 351 villages (38% of the Sundarbans' population) until the end of project period (2004). As evidenced in end-line evaluation of the project, the innovation had a high impact on people's health seeking behavior<sup>3</sup>. Encouraged by the impressive performance of this innovative PPP model, DoHFW decided to continue the partnership model even after the external support under SHSDP came to an end.

Typically, a mobile clinic under this model is transported by a motor launch which is operated by one of the contracted NGOs. Equipped with all basic equipment (including the equipment to conduct some basic pathological tests, portable X-ray machine, Refrigerator for vaccines storage, generator set, etc.) and manpower (including a doctor) the launch makes periodical trips to distant islands and operates clinics at local clubs, sub-centres, and riverside. At times the clinics also serve as delivery points. The NGOs circulate monthly mobile clinic plans in advance to their respective catchments. The monthly clinics are organized for general clinical services along with *well-baby* (child health), ante / post-natal cum family planning clinics. In some cases, speed boats are also used as river ambulance for emergency cases especially for the residents of remote islands.

Evidently, mobile health clinics offer a highly potential model for delivering services to water-locked islands. However, it also exposes several constraints in the design and implementation process. First, these clinics still could meet only a small part of the huge need for health care. For example, in 2007, Tagore Society for Rural Development (TSRD) provided mobile services to 46000 people in a year – or, about 3800 in a month - of selected 60 villages in two blocks of the South Sundarbans (Gosaba and Basanti). This is just 3.8 percent of estimated total ailing persons in these villages<sup>4</sup>. Second, given that the clinic operates just once in a month at a particular point, the probability of meeting the need of care for acute ailments is low especially for those diseases which require continuum care for a short period of time. This is evident from the data that out of 46,000 patients treated by TSRD, 61 percent was suffering from non-communicable

<sup>3</sup> *Impact evaluation of West Bengal SHSDP-II*, IIHMR, 2004

<sup>4</sup> Total estimated population in these 60 villages = 250,000. Estimated ailment rate per month (from FHS household survey) = 40% = 100,000. Hence, % of ailing persons covered by mobile clinics =  $(3800 \div 100000)\% = 3.8\%$

(i.e., chronic or less acute) ailments. Third, the clinics are usually set up close to the riverside villages, often leaving the remote villages uncovered. Fourth, despite their best efforts, the NGOs face a tough job to retain qualified human resources for these clinics; for example, according to one study, the services are provided with 15 percent shortages in manpower (primarily physicians)<sup>5</sup>. Finally, the model is weakly integrated with the public health care system implying that the outcome generated from this initiative has remained largely unknown and unexamined<sup>6</sup>. The services provided by the agencies have almost established a channel parallel to the government system without a strong linkage effect. It effectively looks like another independent NGO project although it was not meant to be so. The BPHCs receive a quarterly performance report from the agencies. The reports are ritually signed and sent upwards like any other government papers. There is no effective mechanism to monitor the performance at the local level.

Another important partnership initiative in the same direction was the establishment of *Delivery Points*, under Health System Development Initiatives (HSDI) program, to provide institutional delivery services to the women from the least accessible areas of Sundarbans, with the help of local NGOs. At present there are five NGOs running these delivery points at various remote places across the blocks. The available evidences suggest that these Points, wherever established, have effectively addressed the barriers to access institutional care for birth deliveries to a large extent (see Box 3.1 and 3.2). However, apart from the fact that the numbers of such points are conspicuously small compared to people's need, the initiative is also constrained by the same set of factors as experienced in the cases of mobile clinics (see above). In addition, treatment of common diseases should be included in the package – which is limited to birth delivery services at present – to buy in people's demand<sup>7</sup>.

Besides PPP, there are several other exemplary health care initiatives organized by a few NGOs who have been working at the grassroots level for decades. For example, *Sabuj Sangha* runs an outpatient clinic in one block (Mathurapur-2) where villagers are able to get treatment from qualified medical professional and procure medicine in subsidized rates. *Southern Health Improvement Samity (SHIS)* runs multiple public health programs (e.g., TB control program, Malaria control program, RCH services, and

<sup>5</sup> Public Private Partnership – Review Report, DoH&FW, Govt. of West Bengal, May 2008

<sup>6</sup> *Impact evaluation of West Bengal SHSDP-II*, IIHMR, 2004

<sup>7</sup> Midterm review of HSDI, West Bengal, Unpublished report, IIHMR, 2008.

so on) in remote islands, in addition to operating mobile health care services in 175 villages across 9 blocks under PPP program. *TSRD* set up a hospital at Rangabeila island decades ago, which, till date, caters to a large number of population with low-cost quality curative care. It also started the RCH Innovative program in 1999 and was the only NGO in eastern India to work under such a program under the Ministry of Health and FW, Government of India. Besides providing a substantial portfolio of RCH care in three island blocks, it also provides mobile health care services to two blocks under PPP scheme. In addition, there are several other charitable agencies, such as Sarbik Vivekananda Seva Samity (SVSS), Bharat Sevashram Sangha, and Sri Ramkrishna Ashram, who are actively present in the health service delivery space of the Sundarbans.

In brief, the NGOs working for the Sundarbans' health are positioned at a key and strategic point in the health care delivery system of the region. Given the poor reach of government's health services in the region, it seems imperative to bring local organizations into the core of a broad framework of service delivery. However, this would require these organizations and the government to address the following challenges:

1. Notwithstanding their increasing presence in the health sector, the added-up contribution of the non-government agencies is still too inadequate to meet the demand of un-served population of the Sundarbans. There is an urgent need to build more capacity within the agencies as well as within the network.
2. At present, the initiatives reflect high degree of innovations, but they are carried out largely as independent NGO 'projects' in some pockets without much effort to craft out a broad and integrated approach to address the key issues. There is an urgent need to switch from piecemeal approach to a holistic one where the initiatives – within and outside the health sector - would remain connected and be positioned to comprehensively address the pressing gaps in the system.
3. There is also a need to build a common repository of knowledge and data on the process, output, and outcomes of all NGO initiatives which would help monitor the improvements in the whole region and find out the gaps.
4. The 'project' mode is also based on some 'assumptions' about people's specific needs and does not necessarily allow enough space to target population to voice their own priorities and concerns. The way to reflect these voices would be to

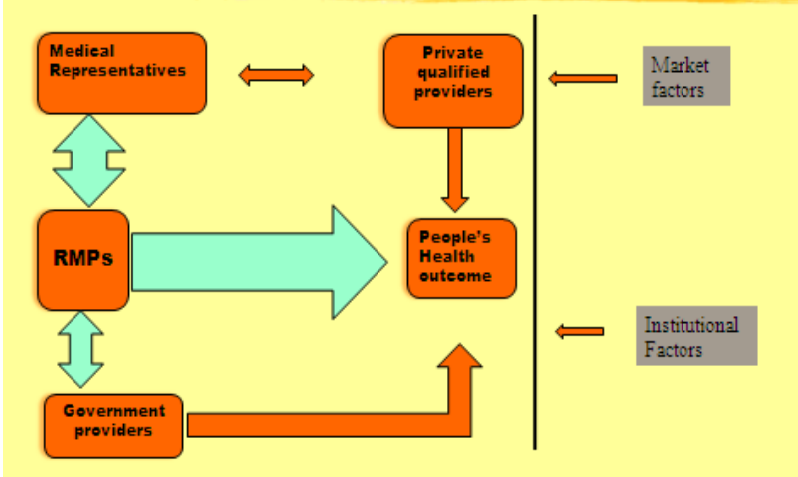
- involve other community-based organizations – for example, the local panchayets, women’s self-help groups, etc. – in planning and implementing the projects.
5. Finally, the voluntary agencies working at the Sundarbans need to have a strong functional relationship within them and with the government machineries to share experiences and to create a synergic effect. It is also necessary to create a common learning platform to help these organizations develop management capacity and meet a common goal.

### 3.5. Parallel providers: Rural Medical Practitioners (RMPs)

The dominance of RMPs, the village doctors practicing modern medicines without any formal training, has already been highlighted in Section 2.4. Based primarily on the survey of a sample set of RMPs, the present chapter explores further to assess the supply side issues associated with this group of informal providers. According to the FHS survey estimates, on an average a village in the Sundarbans had three RMPs practicing, each treating about 16 patients per day. Alternatively, the average population covered by one RMP was around 2000.

The overwhelming dominance of the RMPs in the Sundarbans’ health care market makes it imperative to direct the policy focus towards their role as an institution. The first step towards this direction would be to develop a framework for analyzing the market

**Figure 3.6. Rural outpatient care market in the Sunderbans**



structure in which the key actors – especially the RMPs - play their roles. Figure 3.6 presents such a simple framework based on the elements of New Institutional Economics.

The key market actors are (1) the RMPs, (2) government providers,



(3) private qualified providers (including NGOs), and (4) medical representatives (or, drug detailers) who canvass medicines to anybody who practice modern medicines. The informal (or, unofficial) links, indicated by blue arrows, are well established between the RMPs and medical representatives (MR) and government providers. The link with MRs is particularly interesting since the RMPs also act as medicine vendors and, hence, absorb the larger share of pharmaceutical products as the dominant actor. Their interface with MR, however, remains indiscernible to a large extent since the RMPs are not officially or legally recognized as medical practitioners. Similar is the case with their links with government doctors, who, admittedly, often 'refer' cases to RMPs and 'receive' cases referred by RMPs at their work stations or at private clinics.

The red arrows show the formal link, which, as the width of the arrows indicates, is easily dwarfed by sheer strength of the parallel and informal link. The strength is derived from two forces: (1) market or price factors, and (2) institutional factors. The price factors, as discussed earlier (see Table 2.4), are more visible; evidently, people save money and time when they visit a RMP (instead of visiting a public health centre) because RMPs are available anywhere anytime. However, no less important are the 'institutional' factors, mostly arising out of the informal structure of the RMP-people connection which help reduce the transaction cost on both sides and wrap it with a strong bondage.

The informality in the parallel market has its roots in the background characteristics of the providers (RMPs) and their treatment behavior. Some of the key characteristics, as collated by the FHS survey of 185 RMPs, are as follows:

1. About three-fourths of all RMPs did not have a college degree and almost all (86%) had taken it as a full time profession. The implication is that practicing allopathic medicines offers a no-bars-held earning opportunity to rural unemployed.
2. A major section of RMPs (two-third) had past experience of working with some qualified private practitioners. This experience helps them 'learn' the treatment path and medicines for common diseases and develop some basic skills (such as, pushing injections, checking blood pressure, and even reading X-ray plates).
3. Almost all of them (90%) were available on-call even at mid-night although they also had been operating clinics on a normal routine.

4. About 80 percent of RMPs provide drugs with treatment. Half of them procure these drugs from local pharmacies (the rest from wholesalers and MRs). Most of the RMPs (85%) would sell drugs on credit or at subsidized prices if the client does not have enough cash at the point of service delivery.

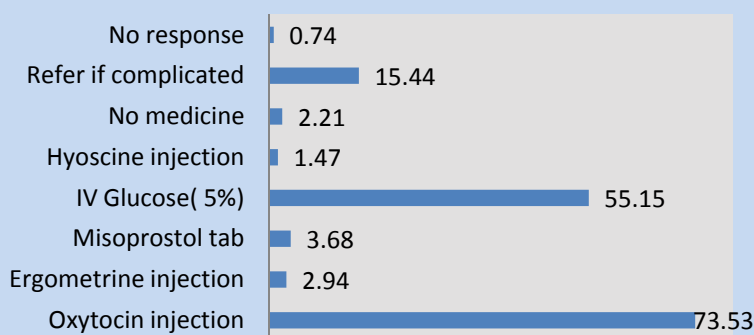
The operational procedures of RMPs clearly reflect a mutually beneficial agency relationship. For example, during ailments rural people tend to depend on those health care providers who would be easily accessible, understand their socio-economic constraints, respond quickly, and offer a quick medicine for their ailments at an affordable cost. The benefit of deferred payment (i.e., payment for drugs on credit basis) generates huge incentives to the buyers of services. On the other hand, the providers or the agents (RMPs) find significant market incentives in terms of clients who have no or very poor information about their own health problems or treatment procedures but always look for some packaged medicines or injections whenever they fall sick. In addition, easy access to knowledge on modern medicines (through medical representatives), good understanding of people's social behavior and economic constraints, and a very weak public health care system make them a formidable player in the outpatient market.

The treatment behaviors of RMPs are worth noting in this context. On average, a RMP treats 15-20 patients every day, about one-third of them being children below 5 years. Most common diseases treated by them are (as reported by the selected RMPs) related to gastro-enteric (e.g., diarrhea) and respiratory ailments (common cough, cold, fever, and Asthma). However, people seek care also for relatively less common ailments; for example, about 22 percent of RMPs reported to have treated patients with mental health problems in the last one year. Assisting in birth delivery seems to be a common and regular part of their profession for more than half of the RMPs (57%). It is also a matter of concern that, even with high probability of underreporting, 25 percent of RMPs admitted that they provided frequent abortion services.

In brief, RMPs play a crucial role in providing mother and child health (MCH) care in the Sundarbans. A pertinent question is: how safe is MCH at their hands? Do they have adequate knowledge on how to diagnose and how to treat in a particular situation? Do they practice the proven safe methods in birth deliveries or in treating a child with diarrhea? The KAP (Knowledge, Attitude, and Practice) study conducted on the selected RMPs reveal a mixed picture. On the one hand, many of them were found to have basic knowledge about the diagnosis and primary purpose of modern medicines related to common diseases; on the other, the practices (or, treatment) often reflect lack of judgment regarding rational use of drugs. For example, pushing Oxytocin during labor pain (for induction of labor) was found to be a popular part of assisting in birth deliveries by a large section of RMPs (Figure 3.7) even though unmonitored intrapartum use of Oxytocin has been found to have several adverse outcomes<sup>8</sup>. Similarly, despite having knowledge about importance of ORS in diarrhea treatment, 70 percent of RMPs indicated use of IV fluids as the first line treatment of children's diarrhea. Data on the RMPs' preferred line of treatment also indicate rampant use of antibacterial / antibiotic drugs (e.g., Ciprofloxacin and Metronidazole for normal diarrhea, Cefalexin for common respiratory troubles). Given no data base on the degree of irrationality in the use of these drugs it is, however, difficult to assess the harmful impact of these practices.

Despite uncertainties about the health impact in case of non-surgical treatments, the potential harm can be captured in a more

**Figure 3.7. Percentage of RMPs indicating their preferred treatment procedure in case of normal birth delivery (N=136)**



concrete way in three other related RMP practices: (1) their increasing engagement in surgical intervention, (2) their gradual penetration in the inpatient market (i.e., clinics with beds), and (3) their poor referral practices. Available data indicate an alarming trend of surgical interventions – including major surgeries - by RMPs. About three-fourth of the RMPs interviewed by the FHS team indicated their occasional or frequent tryst with

<sup>8</sup> See for example, Jeffery P et al. Unmonitored intrapartum use of Oxytocin use in home deliveries, evidence from UP, India. *Reproductive Health Matters*, Vol 15, No 30, pp 172-178, November 2007.

surgical equipment. The surgical cases ranged from female sterilization to operating on 'liver abscesses'. There is virtually no barrier to be a surgeon which also induces an established RMP to venture into hospital 'business', i.e., running a clinic with inpatient facilities (Box 3.4). Clearly, in a poorly unregulated environment, RMPs penetration into inpatient market implies a sizeable risk to their clients.

Risk manifests also in the referral behavior of RMPs. Do they refer potentially or actual complicated cases to public facilities or qualified private doctors? According to the FHS data, on average 15 patients were referred out by a RMP in the last three months, which works out to only about 1 percent of the patients who visited his clinic (assuming 15 patients per day). Low referral rate reconfirms the common perception is that they refer only when cases go completely

out of their control. The scenario is, however, less discouraging in complicated birth delivery cases; for example most of the RMPs, according to their responses, would refer to government hospitals or private nursing homes in case a woman comes with obstructed labor, or bleeding before delivery, or eclampsia.

Discussions with villagers revealed that most of the RMPs have a good working relation with private nursing homes which popped up over the years at the periphery of the Sundarbans. Few of them work as a linkman to particular private nursing homes and refer cases whenever they have to. This finding is corroborated by the FHS household

#### **Box 3.4. A nursing home owned and operated by a RMP**

A nursing home, owned and operated by a RMP is located at Sonakhali (Basanti Block). The business is roaring, as evidenced by the large crowd on the day the FHS team visited the nursing home. The facility has 70 beds all of which were occupied on that day. It has separate maternity ward, OT, and labor room. Most of the indoor patients were surgical cases, the operations done by the RMP himself. He is assisted by 11 'apprentice' RMPs and 3 'trainee' nurses. The most common surgery cases were 'liver abscesses', removal of appendix, female sterilization, and C-section deliveries. According to the patients, the cost of treatment is much lower than the market price and the doctor is trustworthy.



survey estimates that two-third of all RMP-referred cases were advised to visit particular private clinics or institutions.

To summarize, RMPs are an integral and vital part of the Sundarbans' health care structure. They have a strong grip over the health care market, much stronger than the public health care system. From the policy perspective, there is an inherent dilemma in acknowledging this fact and taking a clear stand on this issue. On the one hand, RMPs' dominance is too obvious to ignore, while on the other, the legal and technical barriers are too strong to formally acknowledge RMPs and redirect their market power in a controlled and guided manner. The proposed health plan attempts to resolve this dilemma through a concrete roadmap for utilizing this huge potential (see Chapter 4)

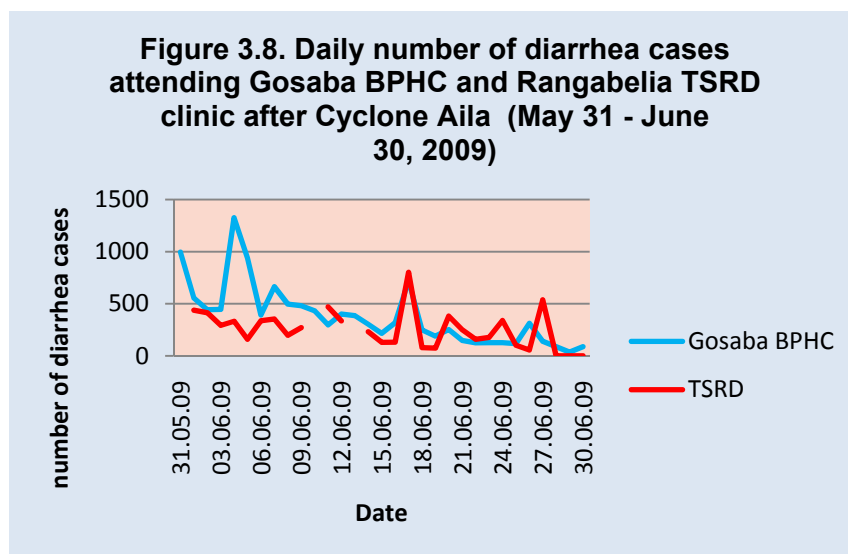
### **3.6. How does the system respond after natural disaster?**

The vulnerability of the Sundarbans to climatic shocks has been under discussion for long but its real demonstration was adequately experienced during the most recent cyclonic shock *Aila* which devastated a large number of islands (see p 10). These types of shocks, by all projections, will continue to hit the Sundarbans by varying degrees and intensity due to its geo-climatic location. One of the gravest impacts of such calamities, as learnt from *Aila* experience, is health disaster immediately after the shock. Most visible among them is pandemic spread of water-borne diseases (e.g., gastro-enteric diseases) as people have no choice but to consume contaminated water. In addition, there are increased incidences of snake bites, accident injuries, skin related problems, and vector-borne diseases (such as, malaria). As expected, children and aged population are more vulnerable to these shocks.

How prepared is the service delivery system to deal with such catastrophic health shock? The *Aila* experience clearly exposed the unpreparedness of the system to fight the primary waves of the pandemic although it could respond more effectively at a later stage due to herculean efforts put forth by the government and non-government agencies. The risk of water-borne diseases spread almost immediately after the cyclone. Those who could access local health facility (BPHCs) started crowding in the facility and overpowered its capacity to deal with such emergency situation. Those who were stuck in remote flood-affected villages and could not access the health facilities

simply fought on their own or sought treatment from the RMPs. It took weeks for the state health department and several voluntary agencies to pull together their resources and send medical teams to remote villages and distribute drugs to affected people. The pandemic situation was finally brought under control only after the unreadiness of the local system against initial disaster was exposed.

The magnitude of pressure of a post-cyclone health disaster on a typical health center at the Sundarbans may be gauged by the evidence presented in Figure 3.8 where the registered number of diarrhea cases in two health clinics of a block (Gosaba) – one run by government (BPHC) and the other by a NGO (TSRD) – immediately after Aila disaster (May 25, 2009). As the graphs show, the arrival of diarrhea cases (outpatient) was abnormally high in the initial weeks (May 31 onwards) – as high as 1000-1200 per



day at the BPHC and 400 at the TSRD clinic. The rate gradually climbed down in the later phase possibly due to extensive camp-based treatment by the government and non-government doctors at remote areas. It is also

noteworthy that total admission (inpatient) for diarrhea at the same BPHC shot up to 248 in the post-Aila month (i.e., June, 2009) from just 18 in the pre-Aila month (i.e., May, 2009).

Clearly, the burden of treatment of this spurt of pandemic cases within such a short period was too heavy for local health facilities. Overcrowded wards made admitted patients share one bed with others, and to find their space in waiting places or even on the roads. The drug supply quickly exhausted even at the local private pharmacies. The condition of remote and isolated villages was worse since, without any source of safe drinking water, surrounded by the most unhygienic conditions, and remaining inaccessible for the relief workers, the health risk compounded at alarming rate. As



mentioned earlier, the medical teams and drug supply sent by the Department of Health and Family Welfare and several voluntary organizations ultimately, notwithstanding the delay, brought the situation under control. The contribution of RMPs is also notable since they were the only accessible source of health care for many villagers immediately after the calamities.

How can the disaster be better managed? The Aila experience highlighted the need to focus on two areas to meet this objective: (1) it is imperative to establish (health) disaster management units at the micro level (or, GP level) especially in the calamity-prone areas which would be enabled to deal with the initial shocks with basic treatment and medicines. The community health workers and selected community representatives would be specially trained in basic disaster management for this purpose. (2) Given that the public health care remains out of reach for a large section of islanders due to compounded physical inaccessibility (after flood or cyclone), the local RMPs should be integrated as a part of this local disaster management initiative. The next chapter elaborates further on this concept in the context of a proposed health plan for the Sundarbans.

### 3.7. The gaps in service delivery system

The purpose of the present section is to present an estimate of gaps in health care delivery system of the Sundarbans. In other words, it attempts to assess the potential 'service delivery space' or the *availability of room that would allow the government and its development partners to provide additional resources or to undertake new initiatives for improving service delivery and to reach specific targets of health outcome in the Sundarbans*. In other words, based on a simple supply-demand framework it will assess how much of health care needs of the people of the Sundarbans is currently being met by the present delivery system (or, alternatively, how much remains unmet).

The analysis and the results may be used to answer two important policy questions in the context of the Sundarbans' health service delivery system: (1) *Service Delivery Space by service categories*: how much additional capacities need to be added to the

present system to meet the desired health outcomes *for various service categories*<sup>9</sup>, and (2) *Service Delivery Space by geographical divisions*: which areas (blocks / villages) are more vulnerable (i.e., with maximum gap between supply and demand for services) and require more intensive investment of resources? The following analysis attempts to find answer to each of these two questions.

### *Service Delivery Space by service categories*

The *service delivery space* is not, however, constant across different components of health care such as inpatient care, outpatient care, institutional deliveries, immunizations, and so on. For example, the need for immunization is being met at a much higher rate by the local facilities compared to the same for institutional deliveries. While the formal sector (public and private) is being able to respond to the need for inpatient care, the same for outpatient care remains largely unaddressed. It is, therefore, important to prioritize the allocation of resources according to magnitude of the *space*.

In the present analysis, two scenarios are created: (1) base scenario, and (2) desirable scenario. The estimates from base scenario are derived from the data of the FHS studies and the same for the desirable scenario is based on a set of assumptions. The *space* may be assessed by comparing these two scenarios. Table 3.2 summarizes the result (see Box 3.5 for a demonstration on how this was done).

As presented in Table 3.2, the *space* is quite wide open for all categories of health care except the routine preventive services and pre-natal care<sup>10</sup>. However, the feasible way to fill in the space varies across the categories. For example, while the space in institutional maternal care can be filled up by strengthening local PHCs and scaling up PPP initiatives, the space for general ambulatory care provides excellent opportunity for a unique government-NGO-RMP partnership. Similarly, the public health programs (e.g., control of TB and malaria) could be spread over the available space by introducing innovative technology for diagnosis (e.g., a low cost kit to test malaria).

<sup>9</sup> Service categories may be classified as general inpatient care, general outpatient care, maternal and child health care, public health programs, mental health care, and so on.

<sup>10</sup> Not enough space in preventive care (e.g., child immunization) does not mean that it has reached the desirable level. It implies that the performance in this area can be improved by strengthening the routine process or existing delivery system.

*Box 3.5. Estimation of gap in institutional delivery, Sundarbans 2009*

	Estimated births in 2008 (assuming population=4 million)	Estimated institutional deliveries in 2008	Estimated deliveries in public hospitals (local and outside)	Total births delivered at local facilities (PHC/BPHC / RH and SDH) in 2008	Bypass + referral rate to non-local public hospitals	Additional load on local public facilities if institutional delivery increases by 10%
	(a)	(b)	(c)	(d)	(e)	(f)
Assumptions	Population 4 million, birth rate=2.5%	30% (from FHS household survey)	70% (from FHS household survey)	From HMIS data	$1 - [(d) \div (c)]$	
N Sundarbans	25000	7500	5250	3450	34.3%	1150
S Sundarbans	75000	22500	15750	10770	31.6%	3590
Total	100,000	30,000	21,000	14,220	32.3%	4740

The above estimation indicates that about 4700 births would be additionally delivered at public hospitals in the Sundarbans in a year if, all other things remaining the same, institutional delivery increases by 10%. Assuming 3 days as average length of stay for a birth delivery, this number could be translated roughly into 14000 inpatient days (or, roughly 6% of the present capacity of local facilities). Given that the present capacity for providing birth delivery services at the block level facilities are already close to saturation level (about 18% of the inpatient days in BPHCs and the SDHs are already being used for birth deliveries), this would imply that **6% additional inpatient capacity has to be created in the local facilities if overall institutional delivery rate increases by 10%.** Clearly, the additional requirement will proportionately increase if bypass / referral rate (to outside public hospitals) is simultaneously reduced.

Table 3.2. Service delivery space in the Sundarbans at a glance

Service Delivery Space for	Major components	Base Scenario	Desirable scenario	Prospects for Service Delivery Space (at the local level)	Who could fill in the space?
<b>Mother and Child's health care</b>	Institutional delivery	Only 30% of births are institutionally delivered. About 45% of them are in local public hospitals. Local PHCs are underutilized but BPHCs are optimally used.	A feasible target would be to achieve 40% institutional deliver rate for which the local capacity has to increase by 6%.	Very good NRHM provides an excellent opportunity to increase the rate.	<b>Government through strengthening PHCs</b>  <b>NGOs through scaling up partnerships</b>
	Ante-natal care	70-80% coverage	90-100% coverage	Could be achieved through strengthening routine process	<b>Government through existing NRHM network</b>
	Child immunization				
	Neo natal care	No local intensive care unit for sick neo-nate. Poor infrastructure for providing quality neo-natal care	Basic neo-natal care facilities at all local PHCs.	Very good NRHM provides an excellent opportunity to increase the rate.	<b>Government through strengthening PHCs</b>
	Treatment of common child diseases	Preference of unqualified providers for treatment	Treatment by trained professionals	Excellent opportunity to involve RMP services through training and integration	<b>RMPs with adequate training</b>
	Child nutrition	More than half of the children are chronically malnourished	Less than 25% of the children malnourished	Very good. Community level intensive intervention for addressing malnutrition	<b>Community-based organizations in collaboration with government</b>

Service Delivery Space for	Major components	Base Scenario	Desirable scenario	Prospects for Service Delivery Space (at the local level)	Who could fill in the space?
General curative care	General inpatient care	Use of inpatient care is already high (4.18%). However, use of local facilities is about half and bed occupancy rate is also lower in the BPHCs compared to state average. Reduction of bypassing to outside facilities and treating them at local hospitals may be targeted. Very weak referral mechanism	Utilization of local facilities for inpatient care would increase to 75%. A strong Referral mechanism for local hospitals is operational.	<p>Good</p> <p>Establish a guided referral system within local hospitals</p> <p>Establish partnership with local private hospitals</p> <p>Ensure supply of critical inputs to all BPHCs</p> <p>At least one PHC at each block with 24 × 7 services and with functional inpatient care facilities</p>	<p><b>Government through strengthening PHC inpatient services</b></p> <p><b>Local private nursing homes in partnership with the public hospitals</b></p>
	General outpatient care	62% of all outpatients are treated by unqualified providers (RMPs). Public facilities treat only 11%. The mobile clinics cover only a little part (less than 5%).	A desirable state is to bring 50% of RMPs into formal health care system. Simultaneously, mobile health clinics should be scaled up.	Excellent opportunity to involve RMP services through training and integration	<b>A government-RMP-NGO partnership</b>
Mental health		Not much quantitative evidence on general mental disorders except that the prevalence of DSH is very high at public hospitals. Indirect evidences indicate huge need for special intervention.	Basic mental health care available and accessible to all islanders. DHS rate is reduced to negligible level.	Very good opportunity to initiate mental health care at the community level through trained local community workers	<b>A government – NGO partnership</b>

Service Delivery Space for	Major components	Base Scenario	Desirable scenario	Prospects for Service Delivery Space (at the local level)	Who could fill in the space?
<b>Public health programs (TB, Malaria, etc.)</b>	RNTCP, Vector control program, etc,	Not much quantitative evidence on prevalence. However, the limited FHS data indicate a higher prevalence of TB and Malaria.	TB / Malaria incidence reduced to state average or below	<p>Routine programs could be strengthened by innovative technology; for example, innovations in use of low-cost diagnostic kits for Malaria at the community level</p> <p>Use of information technology (e.g., mobile phones) in monitoring performance and prompt response</p>	<b>National innovators / operational research organizations in collaboration with local NGOs</b>
<b>Climatic effect</b>	Post-cyclone response	Highly prone to natural calamities. Very poor preparedness to meet additional health care needs in the time of natural disaster	A prompt response system in all disaster-prone villages to meet post-cyclone health care needs (e.g., diarrhea)	Excellent opportunity to align to post-Aila disaster management initiatives	<b>A government-led initiative as a part of overall disaster management plan</b>



### *Service Delivery Space by geographical divisions*

Finally the question is: which areas (blocks / villages) are more vulnerable (i.e., with maximum gap between supply and demand for services) and require more intensive investment of resources? It is also worth investigating whether and to what extent the *space* is correlated with physical inaccessibility.

To address this question, two indices were computed and used to rank the Sundarbans blocks according to physical accessibility and service delivery space: (1) *physical accessibility index*, reflecting the degree of hardship regarding people's mobility to and from most areas of a block, and (2) *service delivery space index* which reflects the adequacy or room for significantly improving the service coverage by new initiative. The methodology applied to compute these two indices is explained in Box 3.6 and the blocks ranked by using them are identified in Figures 3.9 and 3.10.

The matrix presented below summarizes the results derived from Figures 3.9 and 3.10. Out of 19, 6 blocks shaded in the matrix (Gosaba, Hingalganj, Patharpratima, Sandeshkhali-2, Namkhana, and Kultali) are least accessible with maximum scope for expansion of service delivery. In other words, these six blocks need priority in planning and resource allocation. As expected, all of them are on the 'core' part of the Sundarbans. On the other hand, 4 blocks – located at the left top corner of the matrix – are in much better position and need less resource since they are more accessible and have got their service delivery space more utilized. An interesting case is the block Haroa which is more accessible but has wide room for expansion of services.

Service delivery space	Physical accessibility		
	Good	Moderate	Poor
Good (narrow space)	Mathurapur-1, Jaynagar-1, Hasnabad, Canning -1		Kakdwip, Mathurapur-2
Moderate		Sagar, Jaynagar-2, Canning-2, Basanti, Minakhan	Sandeshkhali-1
Poor (wide space)	Haroa		Gosaba, Hingalganj, Patharpratima, Sandeshkhali -2, Namkhana, Kultali

**Box 3.6. Methodology for computing *Physical accessibility index* and *Service delivery space index* in a Block**

Physical Accessibility Index

Accessibility in a block is classified in three categories: (1) Good, (2) Poor, and (3) Moderate on the basis of following indicators:

Categories of blocks	Indicators (source: Census 2001)
Good	<33.5% of villages have navigable water service within 5 kms & >50% of the villages have bus services within 5 kms & >10% of the villages have railway service within 5 kms & <10% of villages have navigable water bodies as their approach road & <10% of the villages have 10% villages area under forest cover OR (Distance of the further sub-centre from the BPHC <20 kms & time to reach the furthest sub-centre to BPHC is <=2 hours)
Poor	50% of villages have navigable water service within 5 kms & <50% of the villages have bus services within 5 kms & <33.5% of the villages have railway service within 5 kms & (>50% of villages have navigable/not navigable water bodies as their approach road OR >10% of the villages have 10% villages area under forest cover) OR (Distance of the further sub-centre from the BPHC <20 kms & time to reach the furthest sub-centre to BPHC is <=2 hours)
Moderate	Otherwise

Service Delivery Space Index

All 19 blocks were ranked mostly on the basis of block level data on a set of indicators. The indicators are (for each BPHC): (1) physical infrastructure, (2) manpower availability, (3) bed occupancy rate, (4) utilization rate of institutional care in birth delivery, (5) number of mobile health clinic points, and (6) percentage of outpatients treated by government facilities / NGO clinics. Using Principal Component Analysis (PCA) on these indicators the predicted score (or index) was derived. Finally the scores were ranked in descending order and grouped into three categories: (1) "good" which have high values and indicates relatively less space for service expansion, (2) "poor" which are ranked low and indicates wider space, and (3) "moderate" with median values and space.

Figure 3.9. Blocks ranked by Service Delivery Space index

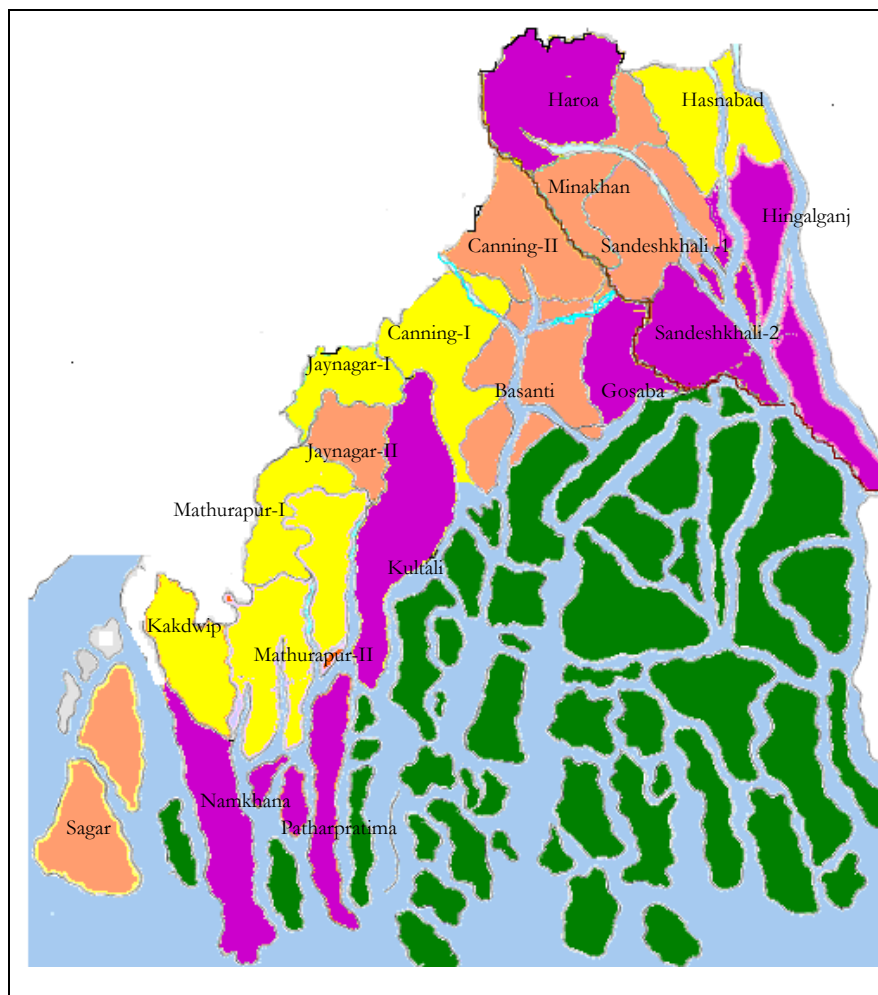
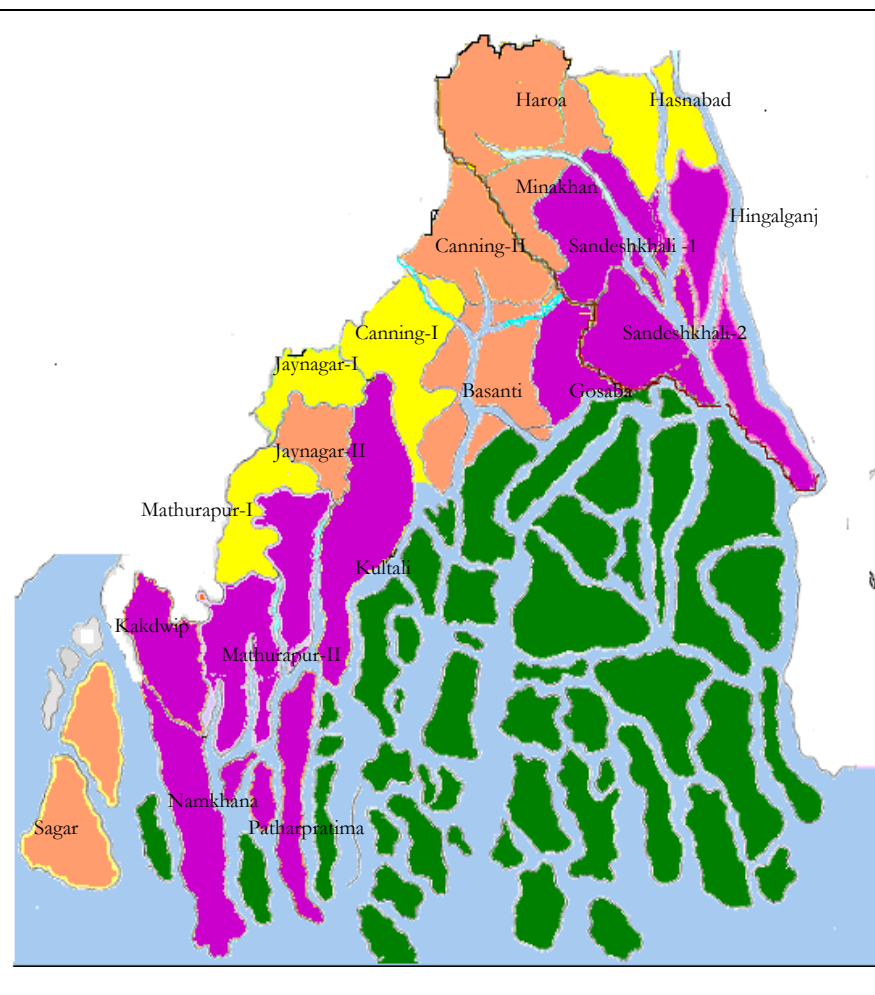


Figure 3.10. Blocks ranked by Physical accessibility index



Poor

Moderate

Good

The block level scenario presented above is, however, inadequate to identify the service delivery space at the micro (sub-centre or village) level. The “wide space” blocks are evidently those where supply (of quality health care) falls far short of demand, but one needs to stretch down to village level to identify the most vulnerable villages even within these blocks for priority of interventions. It is expected that each block (irrespective of its ranks in the service delivery space), during the detailing process of the health plan, would identify and list the least accessible pockets within its service area based on a set of available information technology. In this context, there is an excellent opportunity to take advantage of the technology based on Geographic Information System (GIS) to map out physical accessibility to health care and to estimate the geographic coverage (combination of availability and accessibility coverage) of the existing health facility network in each block of the Sundarbans. Use of **AccessMode** – a software developed by WHO for modeling physical accessibility to health care – is highly recommended for this purpose.

## **4. Plan for a better future**

## 4.1. Introduction

Built on the findings presented in the previous chapters, this chapter proposes a broad plan for initiatives to improve the health care delivery system of the Sundarbans. The purpose of this plan is to help build a sustainable and affordable health care delivery system in the Sundarbans which would address the major health care needs of the islanders by improving the availability, accessibility, equity, and efficiency of the system. In brief, it will help people take the quickest and right choice to address their health problems and reach a secured health status.

The evidences presented in this document unequivocally justify the proposition that the health care delivery system in the Sundarbans need special attention and unique approach. Against the backdrop of geo-climatic challenges coupled with man-nature conflicts and livelihood insecurity, people in this region have to depend on a fragile health service delivery mechanism which fails to reach most of them with a low-cost but good-quality service package. The challenges are special; so should be the solutions. The specialty of the Sundarbans has been duly acknowledged by the Government of West Bengal and a separate ministry on the Sundarbans has been launched for this purpose. New development initiatives are being taken to protect the region from misery brought about by natural adversities and consequent poverty. Time has now come to acknowledge the uniqueness of the health care needs of this region and focus them with special attention.

The plan presented here is intended to reflect the broad strategic options for improvement in service delivery at the Sundarbans, not an implementation for a specific intervention. A logical step forward would be to discuss and debate the options with all key stakeholders and finalize a roadmap with necessary modifications. A detailed implementation plan is the necessary next step which should be drawn up in consultation with the agencies (including government agencies) working at the ground level.

The plan is guided by the proposition that, given their complex landscape and barriers, the Sundarbans require a multi-pronged strategy to meet the health care need of people. A single intervention (such as mobile health clinics), even at a large scale, is less likely to bring about the desired changes in health outcome if other things (for example, public health service delivery) remain the same. In other words, it requires a series of

initiatives engaging all types of service providers and innovatively putting pieces of interventions together to create a big push and reach a sustainable and high level of delivery system. The following sections attempt to outline the cornerstones of such a multi-pronged strategy.

## **4.2. Goal and objectives of the proposed initiative**

The goal of the proposed initiative is to provide a comprehensive, low-cost, and accessible platform for health care for the inhabitants of the Sundarbans so as to reduce mortality and morbidity among them.

The specific objectives are:

1. Improve availability of and access to affordable and quality health care in the Sundarbans, especially in least (physically) accessible areas.
2. Improve efficiency of the existing delivery system through reorganization of key institutions and applications of innovative technologies.
3. Strengthen the primary health care and the referral system through linking the broken chain of transportation
4. Broaden the delivery base of primary health care by including highly relevant but neglected local health problems, such as mental health problems and chronic diseases.
5. Build a health disaster management system to deal with health effects of natural calamities.

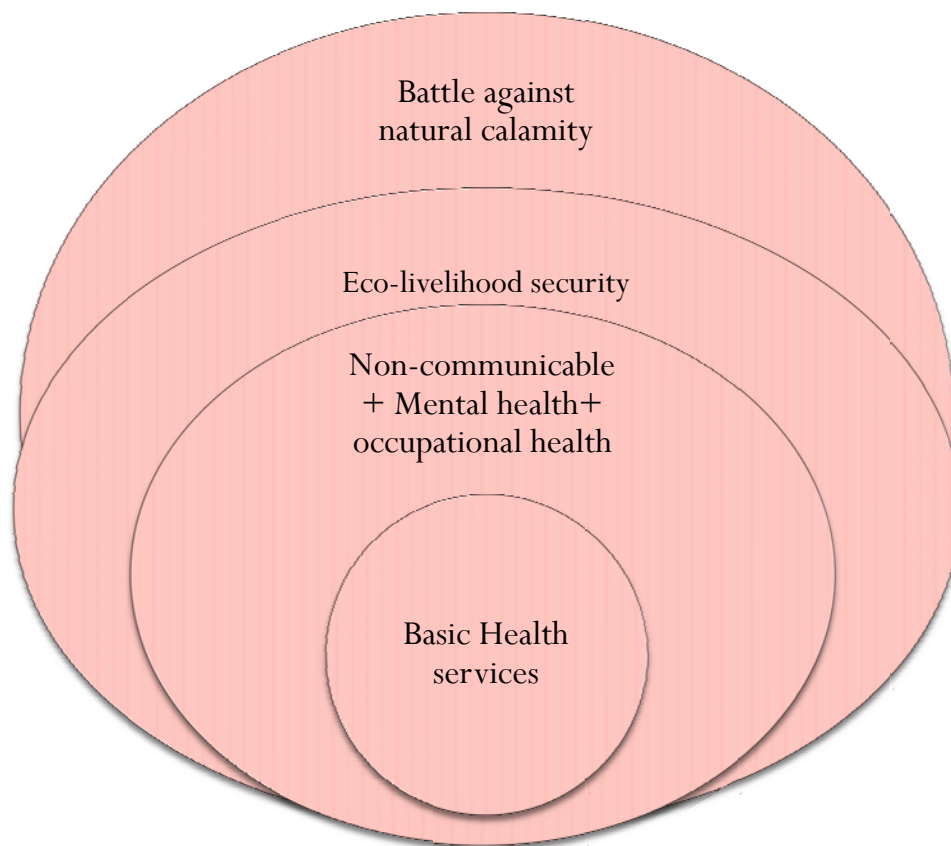
## **4.3. Salient features of the plan**

The health plan envisions the future health initiatives in the Sundarbans as an integral part of the Sundarbans' reconstruction plan especially undertaken after *Aila*, the cyclone. In other words, it is based on the presumption that improving health delivery system in this area should be internalized in the ongoing initiatives to provide the people with security against erosion in eco-livelihood and natural calamities (Figure 4.1).

With the above perspective and given the lessons learnt from the past and ongoing interventions in the region, the proposed initiative can be described in the form of following unique features:



**Figure 4.1. Health plan as a part of an overall development plan**



*1. Providing basic health care packages to all with special focus on hard-to-reach*

The plan envisages a delivery set up where a basic health care unit will be operational within 5 kilometers of every village especially in the hard-to-reach parts of the Sundarbans. The unit will operate at the Gram Panchayet Headquarter Sub-centre (or, GPHQ) on a daily basis and will revitalize the concept of comprehensive primary health care approach with special focus on disadvantaged groups of population.

*2. Alignment to other key health initiatives:*

The plan aligns to all existing health care initiatives – government as well as non-government – and orients them towards the common goal. More specifically, it will align to the initiatives packaged under the National Rural Health Mission

(NRHM) program. In other words, the proposed initiative would have enough flexibility to exploit the space given by NRHM for innovative interventions.

3. *Powered by local resources and technology:*

The proposed initiative would use local resources to the optimum level. The resources include (1) local community based organizations (e.g., self-help groups and local NGOs), (2) local health care providers (such as RMPs), (3) local transportations for referral (e.g., mechanized boat and rickshaw van), and (4) space and other support from village panchayets. It also emphasizes on using new but low-cost technologies which could be adapted to the need of health care delivery structure. For example, the innovations in using solar energy, which already touched some areas of the Sundarbans may be used for supplying electricity to health facilities. The computer based GIS technology may be used at the block level to identify the under-served and least accessible areas. The mobile communication network may also be used to improve performance of frontline workers, and so on.

4. *Integrating non-state health care providers on a large scale*

The non-state health care providers, i.e., ranging from the local voluntary agencies to the less qualified private providers play crucial roles in the health care landscape of the Sundarbans. However, as FHS findings indicate, their acts are often uncoordinated, unregulated, and virtually parallel to the public health care system. It is also evident that the voluntary agencies need to substantially upscale their presence in health market to fill in the service delivery space especially in the least accessible areas. The proposed initiative envisages a more pervasive role of organizational arrangements and practices that involve population groups and civil society organizations, particularly those working with socially disadvantaged and marginalized groups. It also constructs a space for innovation with respect to working with the informal and less qualified providers.

5. *Response to and recovery from calamities-induced health shock*

The vulnerability of the islands to frequent natural calamities and consequent health disaster has been exposed by *Aila*, the recent cyclonic attack on the

Sundarbans. The shock was too colossal for the public health care system, which is, traditionally, ill-equipped to deal with such massive disaster. There is, therefore, an urgent need to build capacity of health disaster management within the local public health care system. The proposed initiative would address this urgent need.

#### **4.4. Structural components of the planned initiative**

The initiative proposed in this plan has following five components:

- A. Strengthening public health facilities
- B. Providing basic health services at the village level
- C. Establishing a referral transport network
- D. Reorganizing existing and introducing new PPP initiatives at the least accessible areas
- E. Innovations in use of information and communication technology

Below we present a brief outline of each component.

##### **A. Strengthening public health facilities**

The success of the plan depends crucially on a significantly improved and reorganized public health care system. For this purpose, the primary focus will be on the PHCs which are currently operating at less than desirable state. The number of PHCs is conspicuously low in the Sundarbans (only 47 covering about 90,000 population per PHC) and it is estimated that the area will need at least 80 additional PHCs to meet the universal standard (30,000 per PHC). However, more serious concern is how to activate and enable the existing PHCs most of which are functioning at much lower than their potential. It is also to be noted that the latest initiative in strengthening the public health care system in the Sundarbans – the State Health System Development Project in late 1990s and early 2000s - focused entirely on the BPHCs. Hence, the PHCs, the backbone of the rural public health care, remained chronically weak and partially disabled. The centers are further trapped by the chronic manpower shortage (especially the doctors who are usually reluctant to get posted in a remote PHC of the Sundarbans).

The proposed initiative will strongly emphasize the process of strengthening the PHCs to utilize their full potential and even add to that. This is extremely important also because the NRHM initiatives are expected to generate additional demand for local institutional

care and the supply environment needs to be geared up to meet this demand. The desired outcome is that these centers absorb a large part of the local burden of health care services and becomes the first point of institutional contact. For this purpose, the following interventions are proposed:

1. The FHS study clearly indicates that the presence of a fully operational PHC (under the Block PHC) makes effective difference in improving access especially in the least accessible regions. At present there are only 2-3 PHCs in the whole Sundarbans region designated as 24 x 7 service centers. **The present plan proposes to designate at least one PHC as 24 x 7 center, initially at each of the 8 remote blocks and subsequently to rest, and make necessary supply arrangements within a year.**
2. A vigorous attempt would be made to meet the shortage of doctors and allied manpower at the PHCs, especially those which are deemed to serve people living in the least accessible region. A special incentive scheme for these personnel may be worked out for this purpose.
3. All the PHCs will be renovated and equipped according to their need.
4. Each PHC in the most vulnerable blocks (as identified in Chapter 3) will be linked to the respective GP units through a referral link (see below for details).

**In addition, it is proposed that the BPHC/ RHs of six priority blocks (Sandeshkhali-2, Hingalganj, Gosaba, Namkhana, Kultali, and Patharpratima)<sup>1</sup> are upgraded to provide basic EMoC and neo-natal services with an aim to make them full-fledged FRU in the long run.** It is extremely important to reduce maternal and neonatal deaths in these highly difficult areas. Simultaneously, the two SDHs – which are already designated as FRUs but running short of some critical inputs (see Chapter 3) – will be made effective FRUs.

It is also proposed that each of the remote BPHCs will have one specially designed and equipped river ambulance (a mini launch). This service may be operated through a PPP model by which a local agency will be contracted by the RKS as service provider. The ambulance will be readily available 24 x 7 hours and will be used to transport patients to and from least accessible islands.

<sup>1</sup> Note that 'priority' status of these six blocks was derived from the analysis presented in Chapter 3 (p-71).

The key interventions for the public health care system are summarized in Table 4.1.

**Table 4.1. Basic components of strengthening public health facilities**

Facilities	Present scenario	Plan scenario	Priority areas
SDH (2)	Designated as FRU, but a few critical inputs are missing.	Each of them is fully functional in real sense	Kakdwip SDH
BPHC / RH (19)		Each BPHC / RH at six vulnerable blocks enabled to provide basic EMoC services Special focus (manpower, infrastructure, and critical equipment) particularly on BPHCs with low utilization. Provide equipped river transport as an ambulance to remote blocks	Six priority blocks  Six priority BPHCs + three BPHCs with low utilization - Basanti, Canning-2, and Sandeshkhali-1  All nine remote blocks (listed above)
PHCs		At least one PHC is designated 24 x 7 in each remote block (9 blocks) Renovated according to their needs Making non-functional PHCs functional	PHCs closer to least accessible islands / hamlets  All 47 PHCs  All six non-functional PHCs

## B. Basic health services at the village level

In response to huge need for ambulatory care and accessible and safe birth delivery system, the plan proposes establishment and operationalization of at least one *Basic Health Guard Unit* (BHGU) at each GPHQ to complement, but not to substitute, the existing public service delivery system<sup>2</sup>. The unit will provide the population of 5-6 GPs (i.e., about 10000 – 15000 population) with the following services (Figure 4.2):

<sup>2</sup> This concept is not new. It is a modified version of the “Village Health Unit” concept proposed by the National Commission on Macroeconomics and Health commissioned by Government of India. [source: Report of the National Commission on Macroeconomics and Health, Ministry of Health & FW, GOI, August 2005]

1. *Basic curative services* which include treatment and medicines for most common and minor ailments. Daily clinics will be operated at the same place (i.e., at GP HQ) where the weekly mobile clinics are held. Treatments for common communicable diseases, such as diarrheal diseases, respiratory infections, kala-azar, and malaria will be the special focus. The unit will follow a standard treatment guideline to ensure scientific and cost-effective interventions for such common but minor ailments.
2. *Referral services* for those who would need care from institutional OPD. A standard referral manual will be prepared which would distinctly guide the

**Figure 4.2. Services to be provided by a BHGU**



provider about the referral cases based on the degree of complications and potentially danger signals. The referral services will be linked to the specially designed referral network as outlined below (see C).

3. *Safe delivery services* for normal delivery cases with a basically equipped labor room (in the GP HQ or in the nearest sub-center) and trained community workers. For complicated cases, the unit will provide referral services to the nearest FRU using

the same referral network. Basic neo-natal services will be provided by trained workers. Low birth-weight and sick babies will be promptly referred to institutions by using referral network. In addition, the unit will provide technical support to community-based interventions, such as IMNCI.

4. *Counseling* for mental health care which includes surveillance of suspect and vulnerable cases within the BHGU area and counseling of those cases by trained community workers. The emphasis will be to identify potential DSH cases within the BHGU area and timely intervene with counseling.
5. *Post calamity care services* will be provided to people who are affected by natural calamities (cyclone and flood) and consequent health hazards. The unit

will have adequate stocks of medicines and other supplies to prevent and to deal with health emergencies, especially gastro-enteric diseases.

### *Infrastructure*

At present the GP-HQ building is used for weekly mobile clinics where a doctor from the nearest PHC is expected to make a weekly trip for a few hours and treat patients. This process, notwithstanding its immensely useful additional value, meets only a small part of people's need (see Chapter 3). It is therefore proposed that the clinic will be run on a daily basis by a local provider under the supervision of the local PHC doctor.

This facility will have one consultation room and a set-up for normal birth delivery and basic neo-natal care. The consultation room, identified for mobile health clinic, is already available. In case of space shortage in GPHQ, the nearest sub-center will be equipped as labour room.

### *Organizational structure*

Each BHGU will have three trained personnel:

1. *A diploma holding clinical practitioner* who will act as the team leader and provide basic curative and referral services on a daily basis. He/she may be recruited from the local pool of RMPs and will be put through a rigorous short-term training before joining. In future, the person will be selected from the graduates of the government-sponsored three-year diploma program for rural health services<sup>3</sup>. In principle, he/she will act as the gate-keeper
2. *Two community health workers* selected from the already available pool of health workers (e.g., ASHA and the second ANM) who will receive special training in safe delivery and basic child and neo-natal care. In addition, they will receive training on disaster management and on basic non-clinical intervention in detection and counseling of mental health cases.

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<sup>3</sup> A bill introducing this diploma program has recently been introduced in the state assembly by the West Bengal Government. It is expected that the course will soon start and the first batch of trained rural doctors will pass out within 3-4 years.



### *Management*

The unit will be managed by a voluntary agency or a community-based organization (e.g., a Self-help group or Panchayet) depending on the availability and stronger presence. The management process will be guided by a PPP contract with the Block PHC (or, the district health office) with a set of clearly defined indicators of health activities and outcome. The Block PHC will assign a medical officer (from BPHC or one of the PHCs) to weekly supervise the unit and provide technical support. It will also organize regular training program for the unit with technical guidance from the respective ACMOs.

### *Intervention blocks*

The BHGU intervention will be initially implemented in the six priority blocks of the core Sundarbans (see page 71): **Sandeshkhali-2, Hingalganj, Gosaba, Namkhana, Kultali, and Patharpratima**. These blocks account for about one-third of total population of the Sundarbans (about 1.3 million). Assuming that each unit will cover 10000-15000 population a total of around 100 BHGUs need to be set up to cover all of these priority blocks.

### *Financing*

A rough estimation of annual cost of operating one BHGU works out to Rs. 0.4 million<sup>4</sup> and that of all BHGUs to Rs. 40 million. This is an extremely cost-effective investment with very low operating cost.

The services and required inputs required to operate the BHGU are summarized in Table 4.2.

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<sup>4</sup> The manpower cost is about Rs. 0.12 million per year for the team leader (assuming that two community health workers will be selected from the existing pool and no additional cost is required for them). It is also assumed that 50% of drug supplies will come from the PHCs. Adding overhead cost of the contracted managing agency (0.15 million) and rest of the drug supply (0.15 million), total cost = 0.4 million (approx).

**Table 4.2. Summary of BHGU intervention**

<b>Services</b>	<b>Description</b>	<b>Inputs required</b>
Basic curative services (daily)	Treatment of <ul style="list-style-type: none"> <li>▶ Common respiratory ailments</li> <li>▶ Common digestive ailments</li> <li>▶ Minor injuries</li> <li>▶ Chronic ailments (hypertension, asthma, skin problems, diagnosis of eye problems, etc.)</li> <li>▶ DSH cases</li> </ul>	<ul style="list-style-type: none"> <li>▶ A furnished room in GP-HQ (the mobile clinic)</li> <li>▶ Minor equipment</li> <li>▶ Drugs and supplies</li> <li>▶ Technical inputs (e.g., standard treatment guideline)</li> <li>▶ Training inputs</li> </ul>
Referral services	Referring complicated cases to PHC / BPHCs	<ul style="list-style-type: none"> <li>▶ Referral transportation (see C)</li> <li>▶ Communication technology (e.g., mobile phone)</li> </ul>
Safe delivery services	Assisting birth delivery at the unit or at home	<ul style="list-style-type: none"> <li>▶ A basic equipped labour room with basic neo-natal care</li> <li>▶ Drugs and supplies</li> </ul>
Counseling	Surveillance of potential DSH cases and counseling	<ul style="list-style-type: none"> <li>▶ Training inputs (from qualified mental health care provider)</li> </ul>
Post calamity care	Providing prompt preventive and curative services for the post-calamity public health hazards	<ul style="list-style-type: none"> <li>▶ Drugs and supplies</li> <li>▶ Training inputs</li> </ul>

### **C. Establishing a referral transport network**

The BHGU intervention outlined above will be complemented by a referral transport network based on local transport modes. The primary objective of this component is to link the broken transport chain which makes the journey to a health facility a nightmare for a sick person or a pregnant woman especially at night. The basic features of this network are outlined below:

1. A set of local transports will be leased and attached to each BHGU exclusively for transporting referred patients to the nearest BPHC. This includes specially designed van rickshaws and a mechanized boat.
2. Once a patient is referred by the BHGU, the leased rickshaw van and the boats (either or both, depending on required transportation) will be alerted and aligned. For example, if the patient requires first to travel on land, then cross a river, and then again travel on land to reach the nearest BPHC, a chain of van-boat-van will be ready at respective nodes before the patient reaches there. The service will be available on call at any point of time. The chain may also include motor

ambulance in case the referred person requires traveling long distance on a metallic road.

3. For an emergency referral case (especially for a woman requiring emergency obstetric and maternal care), the destination (BPHC or SDH) will be alerted by the source of referral (i.e., BHGU) to minimize delay in receiving treatment after the patient reaches the destination. The users of the network should get priority treatment in destination facility.
4. The referral network may be financed by alternative ways: (1) the providers of transport services will be contracted by the agency managing BHGU (voluntary agency, SHG, or Panchayet). The service providers will be paid through a voucher scheme by which the poor users will receive vouchers and the service providers will be reimbursed by the agency on vouchers. The agency, in turn, will be reimbursed by the block or district health society (or, Rogi Kalyan Samity) (2) Alternatively, the service providers may be paid on capitation basis by the agency, i.e., on monthly or quarterly basis irrespective of number of trips they would make and get reimbursed by the same way.
5. The whole process needs to be monitored on two indicators: (1) whether a poor user, when referred, receives prompt services at every node, and (2) whether the user, after reaching destination with prior alert, receives prompt treatment. It is, hence, important that a watch mechanism at the community level is set up; or, alternatively, the Rogi Kalyan Samiti at the PHC level monitors the process.

#### **D. Reorganizing existing and introducing new PPP initiatives at the least accessible areas**

The plan intends to strengthen the existing two PPP initiatives – mobile launch clinic service and delivery points – and proposes reorganization and up-scaling of these two initiatives in the following ways:

1. The mobile launch clinics, which started more than a decade ago, have proved to be a successful innovative model in the Sundarbans. However, it also suffers from a few weaknesses which stand on the way of the utilization of its full potential (see Chapter 3). The major weakness remains in its disconnect with the public health care system. The present plan proposes alignment of these

services to the proposed BHGU. For example, the mobile clinics may focus more on diagnostic services which can complement the BHGU services. Alternatively, these two units may be linked in hub and spoke relation.

2. The plan also envisages extension of partnership with voluntary agencies on the NRHM platform. BHGU itself is a new PPP model. In addition, it will introduce innovative models which will address the geographical barriers faced by mothers and children on the way of accessing institutional care. For example, every FRU will have a mothers' waiting room for the pregnant women with complications (from the least accessible islands); the mothers would come to the FRU a few days before the due delivery date and stay in a homely atmosphere.
3. In addition, the Rogi Kalyan Samiti (RKS) of each facility will play an oversight role with active participation of local community organizations. The annual block action plan prepared by the BPHC will have inputs from these organizations through RKS.

#### **E. Innovations in use of information and communication technology (ICT)**

The plan is uniquely characterized by its emphasis on extensive use of low-cost and appropriate technology in health service delivery. Technology will, however, be used as a complementary input to system reorganization as outlined above. The applications of ICT will include (but not limited to) the following interventions:

1. For effective surveillance and planning, a GIS-based software (such as *Accessmode*) will be used at every BPHC by which the block will be mapped by different accessibility indicators. The software will be updated regularly and used also as a part of information system. For example, the technology will help the BPHC identify the least accessible areas, plan a specially designed delivery system, and monitor the progress of performance in these areas.
2. The second intervention will facilitate introduction of new and low-cost self-diagnostic technology for communicable diseases which can be used at the BHGU level (or, community level). For example, the initiatives will strongly emphasis on collaborating with global innovators for using self-test kit for

diagnosis of malaria and cholera at this level which may be tested if and when the research products are available.

#### 4.5. Governance structure based on decentralization principle

As argued elsewhere (see Section 3.3) the governance structure (of health care) at the district level is constrained by several factors. More important among them are: (1) the virtual distance of the remote Sundarbans blocks to the district health office, and (2) the split of the whole region between two districts and lack of focus on the Sundarbans part in each district. The special health care package for the Sundarbans, as outlined above, strongly requires a reorganization of the structure to bring in adequate focus on the Sundarbans. It is quite obvious that this process would require an effective decentralization process by which the region will be able to sort out its own problems, make a separate health plan, and manage it with exclusive attention on the Sundarbans blocks.

A reorganized structure is proposed below. Since the plan wants the government to take stewardship role, the proposed restructuring is targeted to the offices of DoHFW at various levels<sup>5</sup>.

**State level:** At the state level, a small but separate cell on the Sundarbans will be created within the DoHFW. The cell will coordinate all new initiatives, as outlined above, exclusively undertaken for the Sundarbans. It will collate program data and establish operational link between the two parts of the Sundarbans (North and South 24 Pargonas). It will monitor the progress of initiatives and provide the department with regular inputs for improving performance.

**District level:** Similarly at the district level (South and North 24 Pargonas) a separate unit will be operational which would provide management support to the District CMOH office exclusively for the Sundarbans region of the district. Data on Sundarbans will be separated and analyzed. It will coordinate the activities related to new initiatives among all blocks of the Sundarbans. Virtually it will act as a separate program wing (like various public health programs) within the district office and will bridge the gap between the zonal office and the district office.

<sup>5</sup> This is just a brief outline of the proposed process and does not include a detailed Terms of Reference for each level.

**Zonal level:** Three zones will be created – one in the North and two in the South Sundarbans. A full-fledged office will be set up at each zone with an ACMOHs as in-charge. The offices will be set up at the central place of the ‘core’ Sundarbans (for example, Basanti and Namkhana in the South and Hingaljanj in the North). The ACMOH will virtually act as a CMOH within the zone and report jointly to the CMOH and the state cell. He /she will coordinate all activities within the zone and be primarily responsible for implementing the new initiatives.

**Block level:** The block level health office (BMOH office) will be responsible for coordinating and contracting referral transport mechanism as given in the plan. In the six priority blocks it will also contract and supervise the local agencies for operating BHGU at the GP level. The block level Health & FW Societies will ensure adequate participation of local stakeholders (especially the voluntary agencies) and will virtually act as the Governing Board of new program. The GIS technology will be introduced at the BMOH office and a person will be specially trained to use it as a platform for surveillance and health information system. In addition, it will procure, stock, and supply essential drugs required in a post-calamity situation according to the advanced indent of the BHGUs within the block. One of the Medical Officers will provide technical support to the BHGUs and act as a nodal person for all PPP initiatives within the block.

**Community level:** The mobile health clinics and delivery points will continue to be operated by voluntary agencies. However, they will report exclusively to the respective BMOH office which, in turn, will compile all data, use them for decision making, and send it to the Sundarbans wing of the district office. The block society will also be the sole decision maker with respect to scheduling of service points and up-scaling of activities. The proposed BHGU at priority blocks will be run by community-based organizations. In addition to the voluntary agencies, local self-help groups may also be contracted to organize this unit. A GP level *health watch group*, consisting of representatives from local self-help groups, public health workers, local RMPs, and voluntary agencies, will also be formed to regularly monitor the PPP initiatives (including BHGU).

## 4.6. Resource implications

A detailed budget to implement the planned initiative may be worked out only after the operational / action plan is designed. It also depends on the finally decided scale of operations. However, by all accounts, the additional resources would not be a major constraint in this process since most of the the interventions are prioritized by blocks (9 remote blocks including 6 priority blocks). A ball park estimate of additional resources, based on the unit costs derived by National Commission on Macroeconomics and Health (see p 148-49 of the report) works out to Rs. 830 million for the initial capital costs and major recurrent cost for the first year (Table 4.3). However, the estimate gives only a broad indication about the additional resources for major cost components of the initiatives. The action plan, if derived from the plan given above, would require coming up with more realistic estimates.

**Table 4.3. A ball-park estimate of additional resource requirement (in Rs.)**

Components	Sub components	Description	Total approximate cost (in Rs. Million)
Strengthening public health facilities	Strengthening and maintaining existing 47 PHCs	Unit cost Rs. 3.42 million	161
	Upgrading 6 Priority BPHCs	Unit cost Rs. 15 million	90
	River ambulance (equipped) for 9 BPHCs	Unit cost Rs. 50 million	450
Setting up BHGU	All recurrent costs for 1 year for 100 BHGU	Unit cost Rs 0.4 million	40
Referral transport	All recurrent costs (lease costs) per year for 100 units	Unit cost Rs. 0.5 million (assuming 50% recovery)	50
Innovations in ICT	GIS based surveillance in 19 blocks	Unit cost Rs. 2 million	38
Total			829 (or, approx, 830)

\* The total estimate does not include the existing cost on mobile health clinics and delivery points. The amount can be estimated only after an assessment of required additional numbers.

\*\* Source of unit cost: Report of National Commission on Macroeconomics and Health, GOI (slightly modified).





**A Research Initiative by IHMR**

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