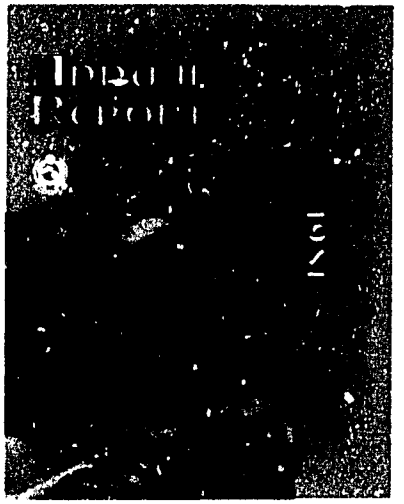
ANNUAL REPORT

INTERNATIONAL CENTRE FOR
DIARRHOEAL DISEASE RESEARCH,
BANGLADESH

1981

Annual Report 1921



INTERNATIONAL CENTRE FOR
DIARRHOEAL DISEASE RESEARCH, BANGLADESH

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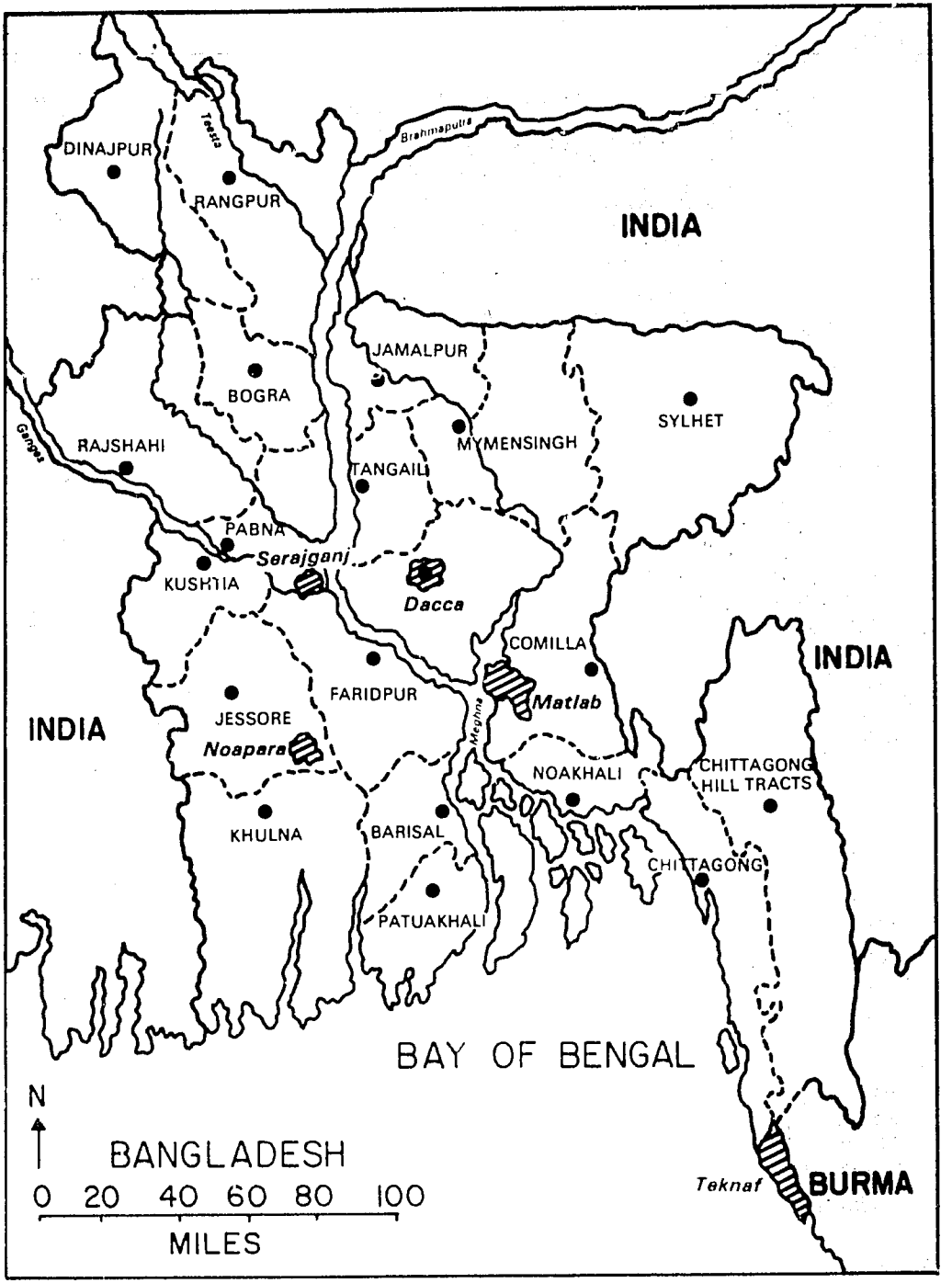

Key: ▨ study areas

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Late President Ziaur Rahman of Bangladesh at the Foundation Laying Ceremony

INTRODUCTION

The year 1981 was a productive one at the International Centre for Diarrhoeal Disease Research, Bangladesh. Not only was a great deal of successful research carried out but also the reorganization of the Centre from its former character of a bilateral project to that of a full-fledged international organization was completed. There were about 80 publications during 1981 in international scientific journals or the internal publications series. In addition to this, no less than 119 abstracts, letters and talks (reflecting the work in progress) saw the light of day. We are confident that 1982 will see a significant increase in the level of such activity.

The Training Programme has matured and has convened four international courses, and four workshops or courses within Bangladesh. The Chandpur Extension Project has shown considerable progress and a new initiative in Maternal Child Health-Family Planning has been implemented in Munshiganj in cooperation with the Government of Bangladesh and supported by the Federal Republic of Germany. The first joint projects with the Government of Bangladesh will begin in 1983 and will be funded by UNFPA in two new areas. We hope that the knowledge gained in our controlled study areas in Matlab will be applied through the health system.

Improvement of health and an increased standard of living are general goals for all developing countries. The Teknaf Water Intervention Study has been in progress for eighteen months and shows the impact of the interventions selected on the transmission of diarrhoeal diseases.

A study confirming the utility of substituting rice for glucose or sucrose, as a basis for the oral rehydration solution, has been completed and its extension to hospital and field populations has become a top priority in 1982. New methods of identifying diarrhoea-causing bacteria have been introduced in collaboration with the Microbiological Institute of Osaka, Japan and with Harvard University and the University of Washington in Seattle, Washington, U.S.A.

We have completed the necessary work on a new financial system and it has been implemented with the use of the Centre's own computer. This now allows for accurate budgeting and the best utilization of resources.

The foundations for a new building have been completed on schedule and it is expected that the ground floor will be ready to accommodate the hospital and clinical research facilities by mid-1982.

There have been other significant improvements in equipment and facilities during the year, including the installation of a new ultracentrifuge and the replacement of many of the old fuel-inefficient vehicles by new diesel-powered models.

Dr. Thomas C. Butler has joined our senior staff as Programme Head for Pathogenesis and Therapy and Host Defense. Dr. S.C. Sanyal, a visiting Professor from India also joined ICDDR,B during 1981. Three members of the scientific staff, Drs. L. Gothefors, S. Becker and D. Wirjawan completed their assignments and left. The Centre is still relatively short-staffed in scientific leadership positions which are essential for fully vigorous programmes.

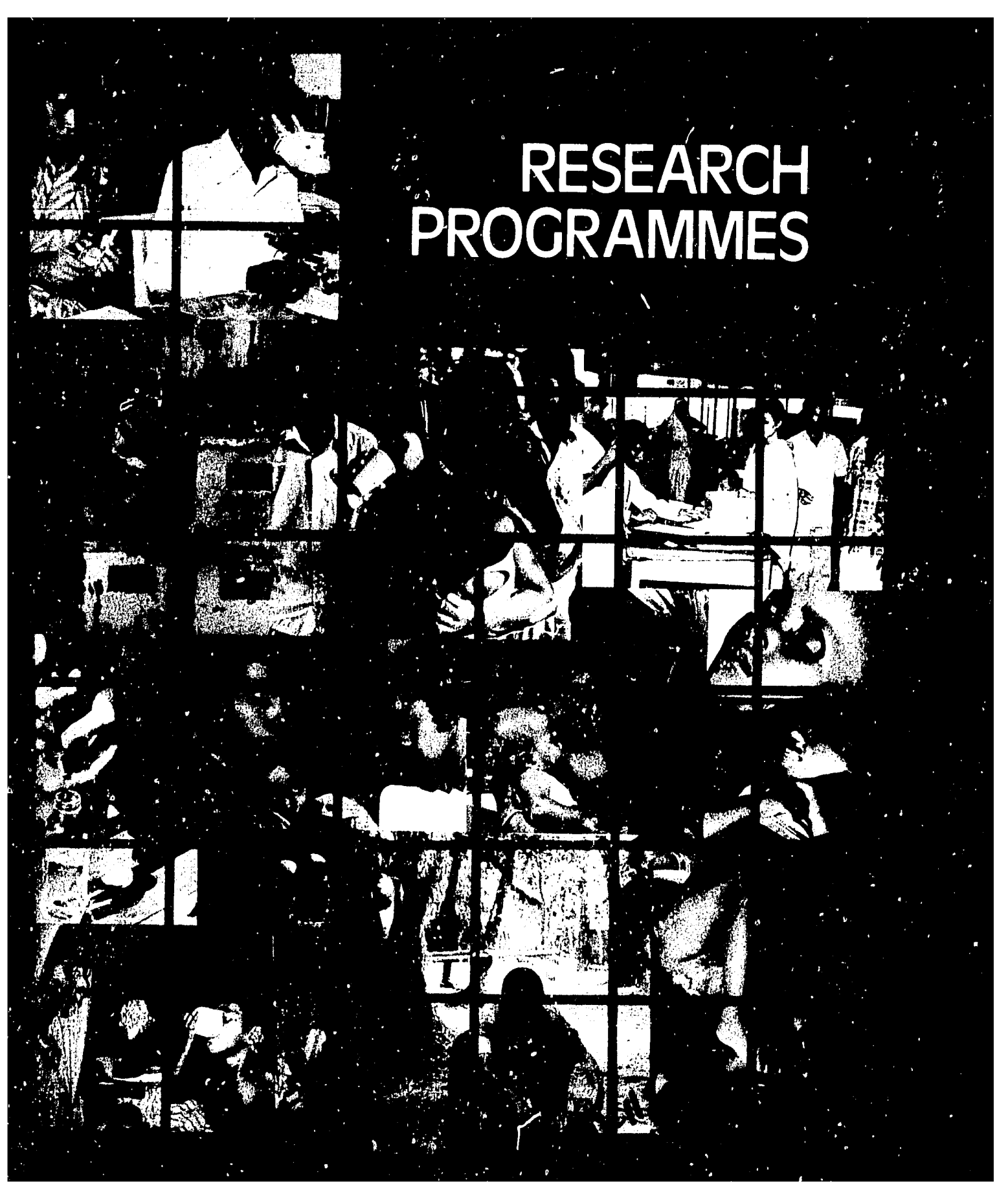
During the year four new countries and agencies joined as participants in the Centre's work; two governments renewed contributions to the Centre's activities and facilities and there were 12 continuing donors.

An external scientific review was carried out during June as mandated by the Ordinance of the Centre. This review was most helpful, being not only generally positive in nature, but also because it pointed out areas where improvements could be made.

During the year 1981, the Centre collaborated closely with the World Health Organization in hosting six courses and 14 fellows. Members of the senior staff have participated in both Regional and Global Steering Committees for the Control Programme of Diarrhoeal Diseases. The Centre much appreciated the excellent cooperation of the local office of the WHO in Dacca and of the Regional office in New Delhi.

The Board of Trustees met twice during 1981 and passed a number of resolutions relevant to the management of the Centre. Several members of the Board participated actively in training and scientific activities. Mr. Michael F.L. Goon from Malaysia was recruited for the top financial and administrative position, and will join the Centre in March 1982. It is expected that financial and logistic supports for the scientific and training programmes will be more efficient in 1982, and will steadily improve the cost-effectiveness of the Centre's activities in all areas. The Board of Trustees approved a budget of US $6.5 million, which is an additional US $1.5 million above currently available funds. This figure is almost US $1 million short of requirements projected in the Five-Year-Programme Budget: staff and facilities will be put to optimal use only if the Five-Year-Programme Budget is realized. This indicates that 1982 will be a year of significant constraints in which activities will have to be carefully selected.

In 1981 the Centre initiated a small project in Kenya to ascertain the types of Rotavirus prevalent in East Africa as compared to those in Bangladesh. Expertise to help solve problems in diarrhoeal diseases in several Middle Eastern countries has been requested during 1982.


RESEARCH
PROGRAMMES

The demographic surveillance system in Matlab has been recording all births deaths and migrations in the area since 1966. This offers a data base for studies unique in developing countries

COMMUNITY SERVICES RESEARCH PROGRAMME

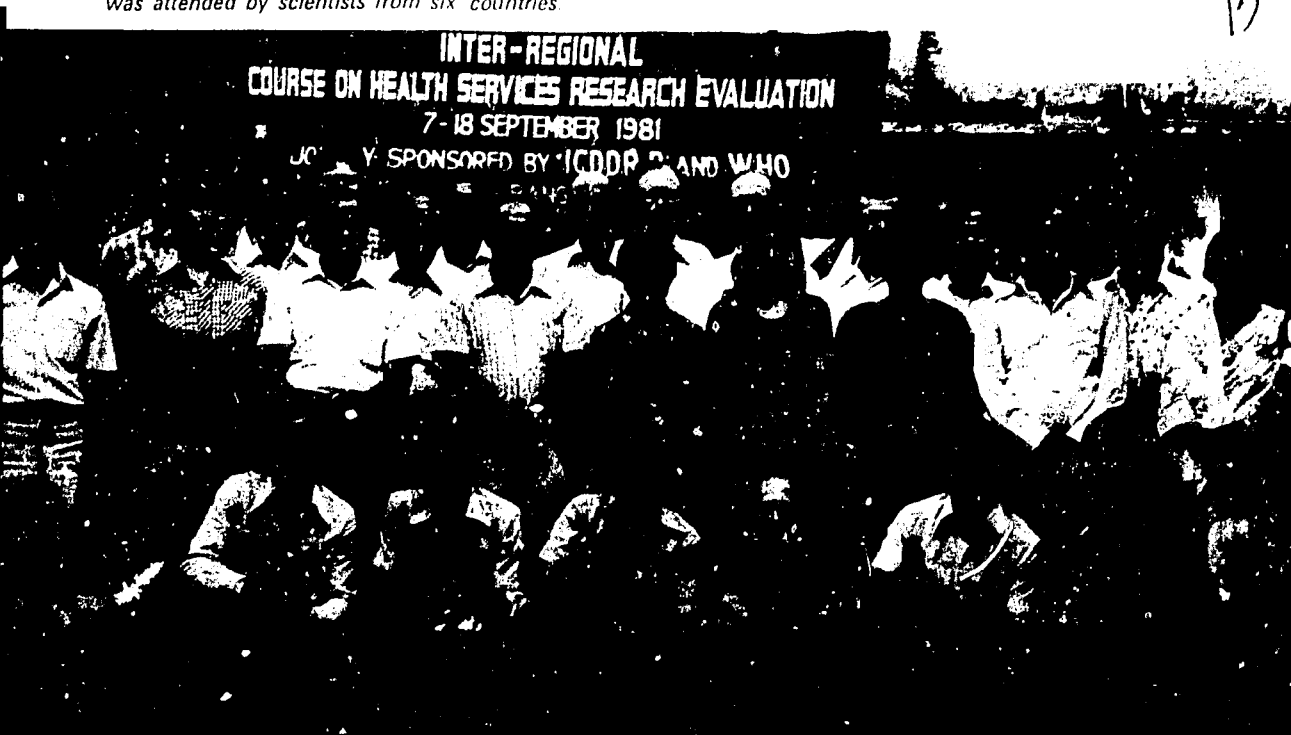
The most important projects of the Community Services Research Programme remain the Matlab Demographic Surveillance System and the intervention linking simple primary health care to family planning measures in the population served by the DSS. The improvement in health and reduction in population growth noted in last year's Annual Report have been sustained for the whole period of 1981 with no new inputs.

During 1982 the health services provided by the Community Health Worker will be enhanced to include immunization against diseases which cause the most morbidity and mortality, improved antenatal care, and a nutrition education programme paying particular attention to the period of breast feeding and weaning. The intervention study will examine whether improvements in basic health services that save children's and mothers' lives can increase acceptance of fertility control measures. Although a very rapid increase in acceptance of contraceptive measures was seen during the first nine months of 1979 when maternal child health was linked with family planning, this achievement was concentrated mainly within the segment of population already willing to participate in such programmes. The challenge now is to recruit mothers and families who are relatively resistant to the idea of controlled family size and to understand the underlying factors contributing to areal variation in contraceptive practice.

There is a growing world-wide interest in documenting socio-economic differentials in mortality. The Matlab study area has been chosen as one of five case studies on mortality sponsored by the World Health Organization and the United Nations Population Division. The four other countries providing case studies are Sri Lanka, Kenya, Senegal and Guatemala (INCAP). In order to monitor mortality and morbidity in developing countries, the use of lay-reporting is being increasingly advocated. Studies have been set up using symptom lists to improve the "cause of death" reporting of the Demographic Surveillance System. The factors relating morbidity and nutrition are also under study.

A major study comparing the standard formula for oral rehydration solution advocated by WHO with a simple salt-sugar solution has been completed. This study covered a population of 80,000 people and the results are now under analysis. Initial results indicate

A course to enhance skills in evaluating field projects was jointly sponsored by ICDDR,B and WHO. The course was attended by scientists from six countries.



that there was no difference in hospitalization rates or mortality between the groups, but there were significantly lower hospitalization rates in both the oral hydration groups as compared to populations in other areas. (However, it must be borne in mind that the presence of health workers in the treatment area, one of whose functions is to refer people to the treatment centre, could have contributed to the decrease.) In this study, the whole population is covered by the ambulance system developed over many years by the Centre in the Matlab area, hence mortality due to acute watery diairhoea is very infrequent in the whole of the study area.

Processing of these large data sets requires ready access to a computer. During 1981 the IBM Systems 34 Computer has been managed and run by locally hired staff trained either in Bangladesh or abroad. On-the-job training at the Centre has been undertaken with the assistance of the United Nations Statistical Office and a collaborative arrangement with the University of Namur, Belgium. Appropriate software to permit analysis of data has been and is being developed. A current and updated population register is being established for the Matlab population. Large data sets have been transferred back to the Centre from the Johns Hopkins University in Baltimore. However, for data analysis requiring more powerful scientific computer capacity, arrangements with the Asian Institute of Technology in Bangkok have been worked out, and plans are being discussed with the Mahidol University in Bangkok for access to their larger computers. The Engineering University's IBM 370 in Dacca has also been utilized, but technical problems have limited its effective use for data analysis up to the present time. In view of the growing computer requirements–both scientific and administrative–and the proven capacity of locally hired staff to run the S–34, the Centre is taking steps to purchase a large, scientifically oriented computer.

Ready access to the data sets has permitted analysis by our own scientific staff and provides the opportunity for Fellows from outside Bangladesh to come and carry out projects here at the Centre, addressing critical issues relating to health in developing countries. Scientists from national institutions are also encouraged to utilize ICDDR,B data sets for their own research and training and several collaborative research projects are now being undertaken. Among those who have recently completed their training are Dr. R. Bairagi of the Institute of Statistical Research and Training, Dacca who has received his Ph.D. from Johns Hopkins University on "Alternative Anthropometric Indicators of Nutrition of Young Children", and Dr. K.M.A. Aziz who has received his Ph.D. from Rajshahi University. His thesis topic was "Sex socialization and fertility".

Several members of the Community Services Research Working Group are now abroad undergoing training to develop their capacities or pursue data analysis on Matlab data sets using computer and professional facilities not available here. Among institutions at which members are under training or undertaking research are the Australian National University and the London School of Hygiene and Tropical Medicine. In-depth analysis of Matlab data is being undertaken at Princeton and the Institut National d'Etudes Demographiques in Paris.

In addition to research activities, the Community Services Research Programme together with the Training Branch designed and carried out a course on research evaluation from 7th-18th September. This course was designed to enhance skills in evaluating field projects. Scientists from Malaysia, Indonesia, Thailand, Nigeria, India and the Philippines participated. The visiting faculty included, as Associate Directors of the course, Dr. Patrick Vaughan from the London School of Hygiene and Tropical Medicine and Dr. Lado Ruzicka from the Australian National University. Other staff members were Dr. Bogdan Wotjnaik from the National Institute of Hygiene, Poland and Dr. Shushum Bhatia from Johns Hopkins

University, Baltimore. The course was jointly sponsored by ICDDR,B and the World Health Organization. Practical examples of evaluation were provided based on the wealth of ICDDR,B experience.

The Community Services Research Programme also supported the initiation of a new extension project in the Munshiganj area in collaboration with the Government of Bangladesh and funded by the Federal Republic of Germany. The aim of this initiative is to evaluate through simplified surveillance methods the effectiveness of the health and family planning services. The experience gained from this project will be applied to Extension projects for 1982 planned jointly by ICDDR,B and the Government of Bangladesh. Technical assistance to voluntary agencies engaged in oral rehydration projects, such as the Bangladesh Rural Advancement Committee, is also provided under the programme.

Linking simple primary health care measures with population control activities in the Matlab area resulted in improvement in health and reduction in population growth. The doctors and surveillance workers of the area maintained a close contact with the local population

A Package Breast feeding [illegible] mothers the importance of breast feeding cannot be over emphasized

NUTRITION PROGRAMME

During 1981 the Nutrition Programme carried out a series of clinical studies with careful laboratory analysis, and pursued its main field intervention in the Teknaf Field Station. In Teknaf a population of approximately 50,000 has been under demographic surveillance since 1975. A Water and Sanitation Intervention Project covering two communities with populations of 2,000 each was set up. The study community was provided with hand-pumped tubewells, and a programme of health education to maximize the use of tubewell water for all personal and domestic purposes. All households in the study area will soon be provided with water-seal latrines. The goal is to reduce to the maximum extent feasible, diarrhoeal morbidity and mortality and parasitic loads with these simple interventions. The hypothesis is that these interventions will improve the nutritional status and health of children under five. The comparison community will be under the same intensive surveillance as the study area, the diarrhoeal morbidity and mortality being recorded every week, but the only intervention will be care of the ill at the diarrhoea treatment centre or by oral rehydration as utilized by the rest of the population of the Teknaf area. Faecal contamination of tubewells during the monsoon and dry season has been measured and the results are shown in Figure 1. Results of the intervention measures are expected during 1982.

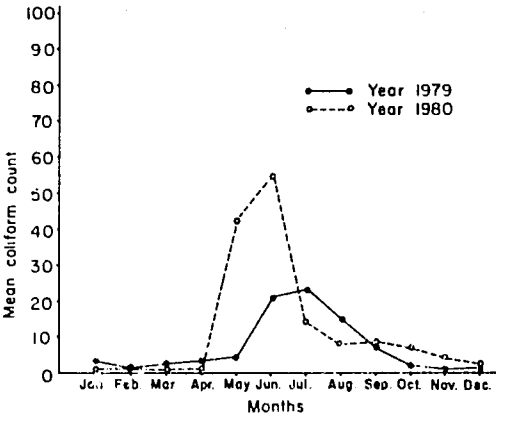


Figure 1. Mean coliform count by months in 1979, 1980.

The effect of diarrhoea on the intake of food has been studied (Figure 2). Absorption of micronutrients, particularly vitamin A and zinc, and the macronutrients, i.e. fat, protein and carbohydrate, occurred both in the acute and recovery stages. This suggests that vitamin A can be provided by mouth during diarrhoea to ensure effective absorption. Since zinc is linked with vitamin A metabolism and possibly with susceptibility to diarrhoea, studies have been carried out on this metal. In a study involving normal Bangladeshi subjects and patients with diarrhoea, it was found that the serum zinc level of diarrhoea patients was significantly lower than the level found in normal volunteers (Figure 3). Whether this is caused by the diarrhoea or malnutrition associated with diarrhoea has not yet been clarified. The relationship between zinc deficiency and diarrhoea and its consequences in vitamin A metabolism will be explored during 1982.

The importance of vitamin A deficiency in the field was emphasized by two studies in which the Matlab population was surveyed for evidence of corneal vitamin A deficiency manifest by keratomalacia or drying of the sclerae. It was found that after measles there was an increase in dysentery and evidence of scleral drying thus linking measles, dysentery and vitamin A deficiency. In a larger study involving a population of 175,000, it was found that there were more than 580 people with impaired vision per 100,000 study population of which 254 cases were due to corneal opacity. Of this group 11% were due to suspected keratomalacia from vitamin A deficiency. Night blindness was found to be highly associated with diarrhoea. Further studies to ensure adequate vitamin A intake during and

Attendance at a diarrhoea clinic by women and children is directly related to the distance of the clinic from home. Consequently more complications and deaths are seen among patients living at a greater distance from a clinic. But with use of oral rehydration solution in the home, complications arising out of dehydration can be reduced.

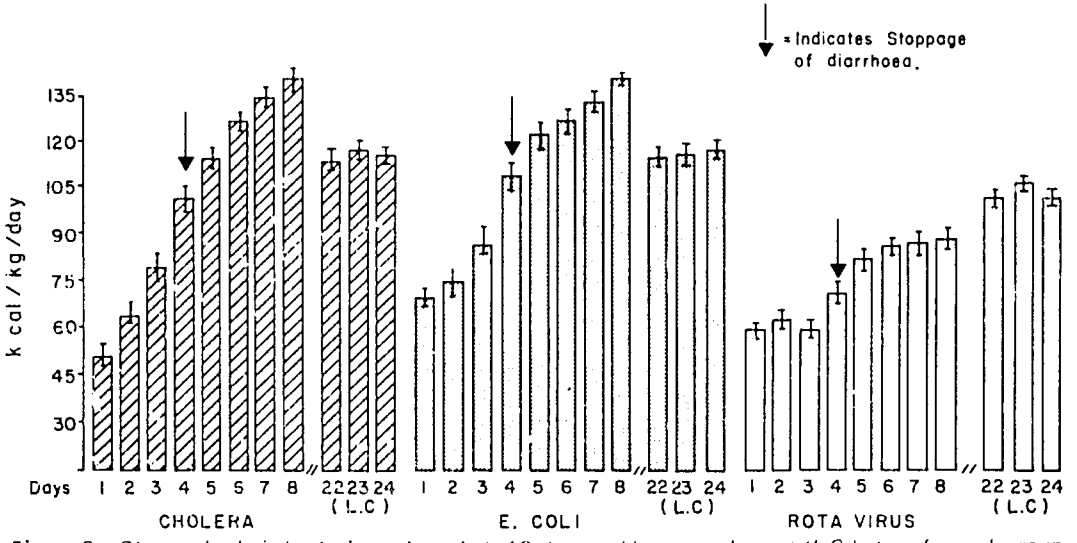


Figure 2. Observed calorie intake in study period of 8 days and late convalescent (L.C.) stage for each group (mean ± SEM)

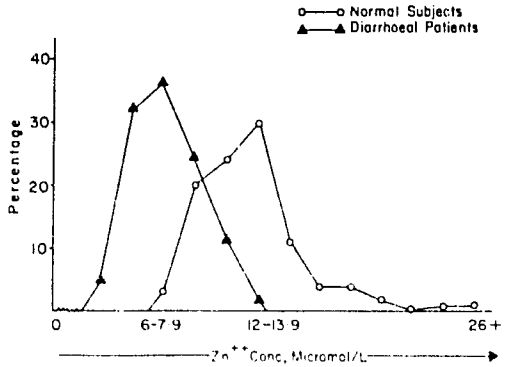


Figure 3: Distribution curve representing the serum level of 100 normal adults and 62 diarrhoeal patients

after diarrhoea will be undertaken during 1982.

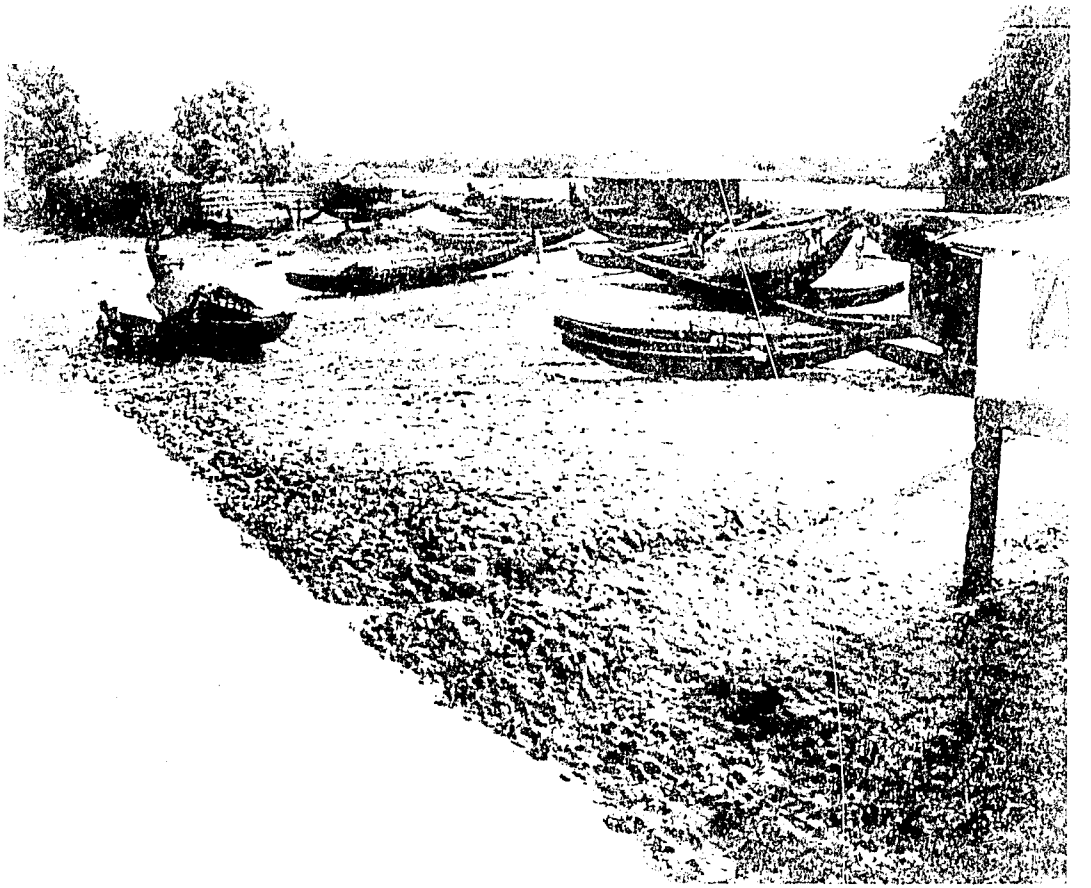
The excellent absorption of carbohydrate during all kinds of diarrhoea was further confirmed during 1981, unlike absorption of fat and protein which was more affected. When comparing absorption during acute and recovery stages there was improvement in the absorption of all nutrients two weeks after recovery from diarrhoea. Shigellosis and rotavirus had greater impact on food absorption than did cholera or enterotoxigenic diarrhoeal diseases (Table 1).

TABLE 1
COEFFICIENT OF ABSORPTION (MEAN±ISD) OF CARBOHYDRATE DURING ACUTE (A) DIARRHOEA AND AFTER 2 (R1) AND 8 WEEKS (R2) OF RECOVERY

	Coefficient of Absorption		
Aetiology	A	R_1	R_2
Cholera (29)	87.8±19.5	92.8±6.9	92.1±4.6
Rotavirus (17)	77.8±23.7	89.8±5.7	85.8±11.8
ETEC (13)	91.2±5.6	85.7±9.2	91 ±5.9
Shigella (9)	76.5±26.5	83.3±18.0	92.1±3.3

The Teknaf Project was initiated in 1974 after an outbreak of *Shigella dysenteriae* type 1 in the area. Because of the increasing evidence linking shigellosis to malnutrition following diarrhoea, an international conference on shigella was convened in Cox's Bazar with field visits to the Teknaf area. Scientists from seven countries actively carrying out research on shigellosis attended the conference. It is anticipated that the impetus from this conference will lead to increased emphasis on research on shigella at ICDDR,B and also in laboratories of other participating countries. The importance of shigellosis as a sequelae to measles and its relevance to nutrition were brought out and are being investigated further.

A conference on shigellosis was held in Cox's Bazar and was attended by scientists from Bangladesh, China, Costa Rica, Switzerland, Poland, USA and the World Health Organization.



DISEASE TRANSMISSION PROGRAMME

During 1981 the Disease Transmission Programme was concerned with the further characterization of new causative agents of diarrhoeal disease; improvement of methods for recognizing enteropathogens; a field study of the B subunit of cholera enterotoxin as a candidate component for oral cholera vaccine; studies on transmission of cholera by water and the relationship to other vibrios found in water; and continuing the surveillance of patients coming to ICDDR,B Treatment Centre, Dacca.

Studies on the epidemiology of *Campylobacter jejuni* have been going on at ICDDR,B since 1980. *Campylobacter* was detected commonly in healthy children below the age of five in Matlab. In some patients *Campylobacter* infection and diarrhoea have been associated with an increase in convalescent titres by complement fixation test. Studies have been undertaken to examine the pathogenicity of *Campylobacter* isolated here. Collaborative studies have been set up with laboratories investigating *Campylobacter* in Belgium, Sweden, Canada, the U.K. and the U S A. Strains isolated from Matlab and other places in Bangladesh are being shared by many laboratories currently working on *Campylobacter;* ICDDR,B is also receiving strains for testing here. A major research plan has been drafted and Dr. Suhas C. Sanyal, a visiting Professor from Banaras Hindu University in India, together with other members of the ICDDR,B scientific staff, will attempt to distinguish the different strains of *Campylobacter.* The Centre will sponsor an international conference on *Campylobacter* in 1983.

Search for other new pathogens and their characterization has been going on, particularly in the area of *Aeromonas, Plesiomonas,* adenovirus and other vibrio species. *Yersinia enterocolitica* could not be isolated from patients suspected of having this organism, despite the fact that it was easily isolated from test materials.

Two new methods suitable for isolation of enteropathogens in field situations were developed at the Centre this year. The first is a simple method incorporating antiserum in medium for the recognition of enterotoxigenic *E. coli* which secrete heat labile enterotoxin. This method was set up by Dr. T. Honda of the Institute for Microbial Diseases (Biken), Osaka, Japan in collaboration with workers at ICDDR,B. The second method involves the use of single stranded P_{32} labelled DNA genome probe for detection of LT and ST. This method was used successfully to recognize, directly from the stool, *E. coli* capable of producing these enterotoxins. This bacteria causes the bulk of diarrhoea in Bangladesh. These methods will be adapted for use in field situations during 1982 and will greatly facilitate understanding of the epidemiology of enterotoxigenic *E. coli* diarrhoea. Studies on serotyping of Rotavirus continued during this year. It was found that Rotavirus could be isolated from hand washings of patients' attendants, demonstrating the presence of the virus on the hands of family members and the fact that it can be traced from the patient to another point in the environment.

Basic studies on characterization of plasmids responsible for resistance in *V. cholerae* 01 continued in 1981. A new outbreak of *V. cholerae* 01 El Tor, resistant to gentamycin as well as to ampicillin, kanamycin and tetracycline, was detected in Dacca during 1981. A total of 264 out of 2880 *V. cholerae* 01 isolated were tested and found to be resistant to four antibiotics (Table 2). R factors from the ten resistant strains listed were plasmid borne and had identical transfer factors. The outbreak was a new one and did not represent a reappearance of the previous multiple resistant *V. cholerae* 01. Chloramphenicol resistant *Salmonella* typhi Vi phage type A was isolated for the first time in Bangladesh from patients admitted to the hospital during the year 1981.

A study utilizing the binding subunit of cholera toxin as a blocking and immunizing agent was conducted this year. It was administered orally, had few side reactions and has been given to family members who are at high risk of cholera;240 families were studied and

TABLE 2

DRUG RESISTANCE IN *Vibrio cholerae* BIOTYPE EL TOR FROM BANGLADESH

Serovar	No.	R Type	No.
Ogawa	264	AKTG	264

Resistance symbols & MIC (ug ml): A Ampicillin (1600) K Kanamycin (6400), T Tetracycline (50-100), G-Gentamycin (800-1600)

approximately 30% of family members became culture positive, half developing symptoms of diarrhoea. Analysis of the results of this trial is expected to be completed in 1982. Further studies on the spread of cholera within families, its relation to blood groups, salivary IgA levels and the protective effect of antibodies in breast milk have been carried out.

A surveillance system has been established at the ICDDR,B Treatment Centre, Dacca and is now providing a carefully studied subset of all patients entering this hospital. Some of the results from this study are illustrated in Table 3. The system also allows investigators to have a continually available random sampling of diarrhoea patients for other studies which can be carried out with minimal extra cost when linked to the surveillance studies.

The Treatment Centre in Dacca during 1981 was under the supervision of the Disease Transmission Programme. During this period a study has shown the cost-effectiveness and efficacy of oral rehydration therapy (Table 4).

ICDDR,B hosted a conference on experimental cholera vaccines, which was attended by scientists from Bangladesh, Hungary, Italy, Japan, Kenya, Kuwait, Nigeria, Switzerland USA and the World Health Organization.

The Microbiology Branch under this Programme established a counter-immuno electrophoresis technique for the identification of antigenic components of various organisms. During 1982 this method will be applied in studying respiratory complications in diarrhoea in relation to *Haemophilus influenza* and *Pneumococcus*.

ICDDR,B hosted a major international conference on cholera vaccines in May. This conference brought together scientists from countries working on candidate vaccines for cholera. The results of this meeting suggest that the Centre must develop competence in microbial genetics and improve its ability to study living oral vaccine strains in the future. This is particularly emphasized by the successful development of a highly effective oral vaccine against typhoid which has been field-tested during the past few years.

TABLE 3

ISOLATION RATE OF PATHOGENS, ICDDR,B HOSPITAL SURVEILLANCE, DACCA, BANGLADESH, DECEMBER 1979-NOVEMBER 1980

Pathogen	Rate/1000 Patients*
Enterotoxigenic *E. coli*	200
Rotavirus	194
Shigella	116
Campylobacter jejuni	116
Entamoeba histolytica	61
Giardia lamblia	56
Vibrio cholerae group 0:1	55
Non-group 0:1 *Vibrios*	11
Salmonella	6
No pathogen identified	176

*N - 3550 patients for *Salmonella, Shigella* and Vibrios, 3230 for rotavirus, 3123 for ETEC, 3038 for *Campylobacter* and 2246 for *E histolytica* and *G. lamblia*

TABLE 4

COMPARISON OF COST PER PATIENT FOR THE FIRST FIVE MONTHS OF THE YEARS 1980 & 1981

	1980 N. 10379			1981 N. 9897		
	No. of units	Cost per unit (US $)	Total Cost (US $)	No. of units	Cost per unit (US $)	Total Cost (US $)
Scalp Vein Needle	12,610	0.85	10,718	3,811	0.85	3,240
IV Fluids including IV sets (litres)	13,077	2.81	36,749	6,433	2.81	18,077
ORS (litres)	1,038	0.11	114	11,480	0.11	1,263
Staff Commitment			9,009			10,473
X-Ray & Laboratory Tests			4,525			4,713
Medicine and other supplies			5,031			3,667
Food			2,449			2,316
Total			68,595			43,749
Cost per Patient			6.61			4.42
Saving						33.13%

A field-test of a non-toxic subunit of cholera toxin proved it to be a promising immunogen against cholera when given either orally or by injection

HOST DEFENSE PROGRAMME

The response of mucosal surfaces to the antigens of *Vibrio cholerae* and enterotoxic *E. coli* have been the main focus of the Host Defense Programme during 1981. Studies have been carried out on the composition of the outer membrane protein of both El Tor and classical biotypes of *Vibrio cholerae* and both serotypes of Ogawa and Inaba. A major protein band of 48,000 Daltons molecular weight was present in all strains and was shown to have lower toxicity in experimental animals than the lipopolysaccharide of this organism. Studies to purify and specify the nature of this component as a possible vaccine candidate will be continued in 1982.

The factors responsible for the adhesion of *Vibrio cholerae* to host tissue surfaces were explored in several experimental systems including hydrophobic gels and blood cells. The importance of close association of vibrio to gut epithelium has been emphasized previously in studies with charcoal-bound GM_1 ganglioside which absorbs all toxin produced in the lumen of the gut but fails to influence the course of cholera other than slightly during initial phases.

The cholera binding subunit has been shown to be a promising immunogen when given orally to both Swedish and Bangladeshi volunteers. There have been no side effects with oral administration and few minor local reactions after intramuscular injection. Specific IgA antitoxin responses have been demonstrated in 9 out of 11 women after oral exposure and in 9 out of 12 given 0.5 mg by the intramuscular route. A study has been designed to test whether the local immune system is responsible for the termination of cholera infection. This protocol will be carried out in 1982.

International collaboration in this Programme included that with the University of Göteborg and Drs Ann Marie Svennerholm and Jan Holmgren; Dr David Sack of The Johns Hopkins University, Baltimore, Maryland, U.S.A., and with the Serum Institute of Stockholm.

Scientists attending the conference on cholera vaccines visited the laboratories of the ICDDR,B.

Doctors seeking signs of Vitamin A deficiency in a village. Shigellosis and other [illegible] causes of diarrhoea lead more often to malnutrition and [illegible]

PATHOGENESIS AND THERAPY PROGRAMME

Simplification and refinement of oral rehydration solution was one of the main concerns of the Programme during 1981. In addition further work on the utility of chlorpromazine in reducing fluid loss and thereby the requirement for oral rehydration solution was completed. Studies on salicylate as an agent to reduce fluid loss in cholera were initiated. Studies of chronic diarrhoea and acute colitis were carried out and further investigations on the pathogenesis of cholera were made in collaboration with Keio University, Tokyo, Japan. A visiting scientist, Dr. Toshifumi Hibi, was able to ascertain the state of the epithelium of the duodenum by fibreoptic endoscopy during cholera and to measure its electrolyte content. The importance of giardiasis in a periurban village was studied and the role of antibodies in pathogenesis and prevention were investigated. A randomized double blind study for a new amidinopenicillanic acid antibiotic, mecillinam, in shigellosis was initiated.

The new Programme Head, Dr. Thomas Butler, joined the Centre early in November. However, even before formally taking up his appointment, he was involved in discussions and development of research leading to a shift in programme emphasis focused on the pathogenesis of shigellosis and other invasive diarrhoeal pathogens.

The question whether citrate or acetate can be substituted for bicarbonate in oral rehydration solution was settled in a study carried out at the Centre this year. Figure 4 shows the corrections of acidosis in the three groups of patients.

The effectiveness of a rice powder electrolyte solution in the treatment of diarrhoea was established in a study comparing patients treated with rice electrolyte and sucrose electrolyte formulae. In addition, a larger number of patients was treated with the rice powder electrolyte, and the loss of carbohydrates in the stool measured. The results of this study have shown that rice serves as an excellent carbohydrate source for electrolyte absorption during diarrhoeal diseases observed in Bangladesh. This study will be accelerated with practical applications in a large scale treatment centre setting and field trials during 1982 and 1983. The use of rice in place of sucrose or glucose means that only the salts, sodium chloride, potassium chloride, and sodium bicarbonate need be packed, thus resolving the difficulties involved in packaging mixtures of sugar and salts, which have a short shelf life. An added benefit of rice based solutions is that the water in which rice is prepared is always boiled and therefore will be safe and pure. The measurement of rice is known to every village mother in rice eating countries of the world and this measurement is not critical since starch is a large molecule and does not have dilatory osmotic effects when eaten or drunk. It is expected that other cereals with starch will also serve as a basis for oral replacement solution. It is felt that the use of starch is the ultimate simplification for oral

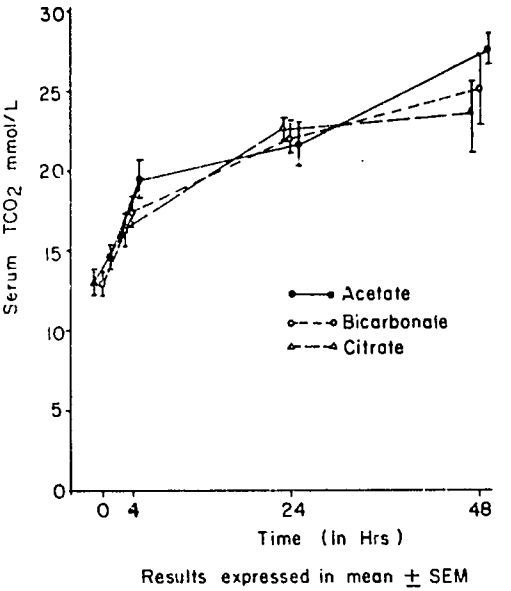


Figure 4: Changes in serum bicarbonate (in adults)

rehydration. The ability to substitute a non-reactive base such as citrate or acetate for bicarbonate also further simplified packaging and transporting problems.

In a paper completed but still in press it has been shown that chlorpromazine reduces the requirement for oral rehydration solution in young children with acute cholera. However, if all causes of diarrhoea in all age groups are considered there was no effect demonstrated. An emphasis on other candidates for reduction of fluid loss will continue and several other agents will be explored in 1982 including completion of a study of salicylates and initiation of a study on indomethacin, chloroquine and other agents proven effective in experimental systems.

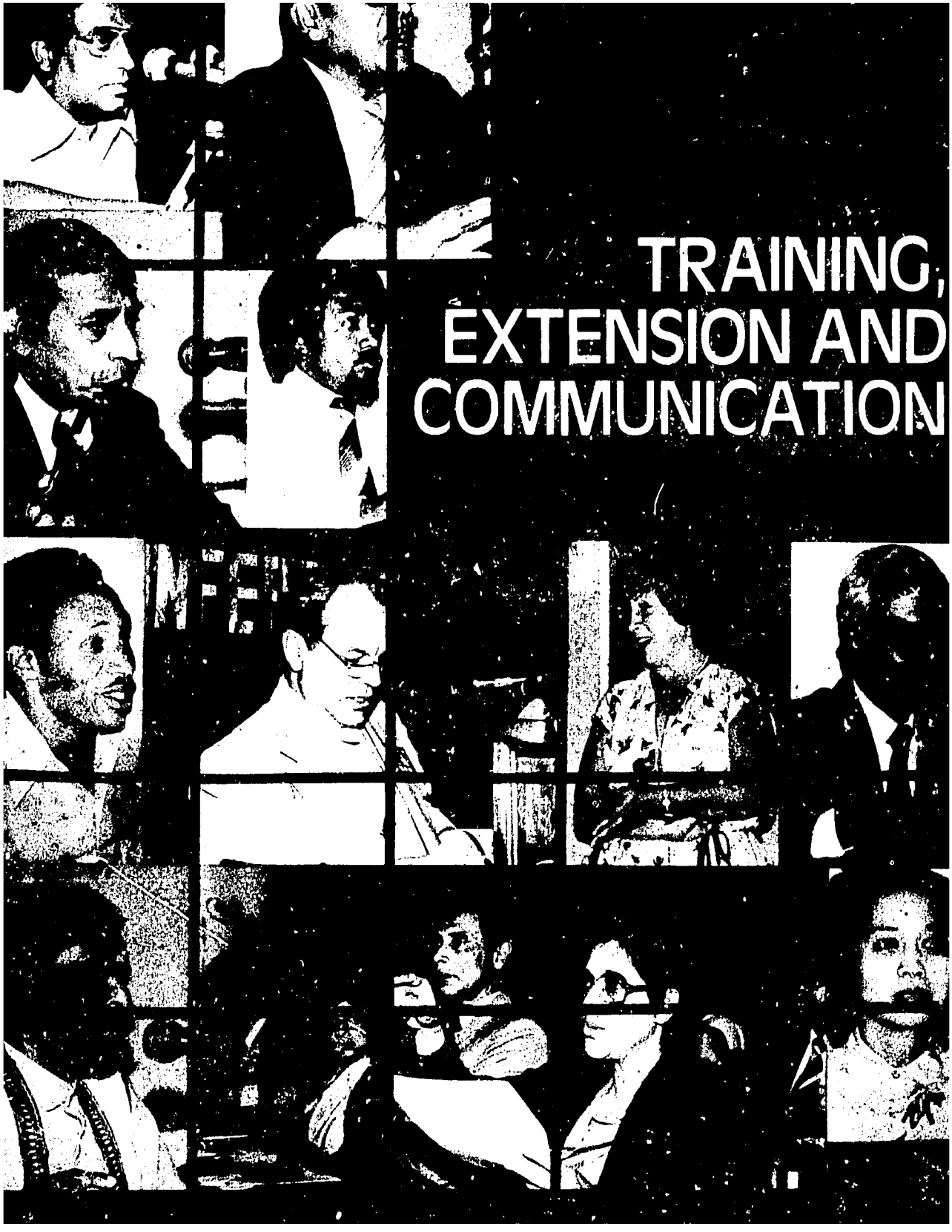
Studies of acute colitis with a fibreoptic colonscope have shown that varied patterns of colonic inflammation and ulceration occur in these diseases extending to upper levels of the colon. Analysis of materials from these studies will be performed by light and electron microscopy and will continue into 1982.

In Travellers' Diarrhoea studies, 400 patients were examined with various complaints. Approximately 75% of these presented with watery diarrhoea and 25% with a dysentery syndrome. In the study of those presenting with dysentery, *Shigella* was found in 26%, *Campylobacter* 18%, *E. histolytica* in 6% and no pathogens in 50% of cases. This emphasizes our lack of ability to recognize the causes of dysentery syndrome in Bangladesh in comparison to the better than 90% ability to recognize the cause in acute watery diarrhoea.

In a study in Nandipara, a periurban village, it was shown that Giardia colonized infants at an early age. Early infection occurred despite breastfeeding, with the milk shown to contain anti-Giardia antibodies. The possible influence of maternal breast milk antibody on the acquisition of infection is being analysed.

The hospital and treatment centre were partly under the supervision of the Disease Transmission Programme and partly under the Pathogenesis and Therapy/Host Defense Programme. The cost-effectiveness of ORT was demonstrated. The report on the hospital activities is as follows: a total of 78,822 patients were treated during 1981 of whom 2,877 (3.6%) were admitted with complications to the general ward. Another 603 patients were admitted for research protocol studies. Deaths occurred in 401 patients or 14% of those admitted to the general wards. Analysis of the complications leading to death have been carried out and submitted for publication during 1981. In a survey of selected patients with watery diarrhoea in the treatment centre, 11,456 had darkfield examination. Of these, 3,031 were positive for *Vibrio cholerae*. Positive cultures for *Shigella* species were found in 517.

Most diarrhoea patients in the Treatment Centres of ICDDR,B are managed with oral rehydration therapy, administered by the patients' attendants and supervised by paramedics. In cases of moderate to severe dehydration, the nurses keep a close watch and if necessary consult the physician-in-charge.


TRAINING,
EXTENSION AND
COMMUNICATION

Women from the community with little or no formal education are trained by qualified nurses experienced in management of diarrhoea. The trained women receive supplies of oral rehydration therapy packets and manage cases of diarrhoea in their own communities

TRAINING, EXTENSION AND COMMUNICATION PROGRAMME

The Training Programme has steadily expanded its activities during the first three years of the Centre's operation. This year four international courses were given in collaboration with the World Health Organization, and four courses and workshops were given in Bangladesh directed principally at training those who would be teaching and training others. In addition research training fellowships have been provided to six candidates from Bangladesh and 14 from outside, often under the auspices of the World Health Organization. The Training Programme has collaborated with national institutions to assist in strengthening their programmes. These institutions include the Dacca Medical College, the National Institute of Preventive and Social Medicine (NIPSOM), the Institute of Post Graduate Medicine and Research (IPGMR), the Institute of Public Health Nutrition, the Paramedical Institute, the National Oral Rehydration Programme, the Atomic Energy Commission, and a variety of voluntary agencies. The Training Programme has also sponsored a series of seminars by staff members and visiting scientists. Scientists from 10 different countries participated in the seminar programme.

The Training Programme for 1981 can be seen in Table 5 and the prospective programme for 1982 in Table 6. The country distribution of fellows from each country is shown in Table 7 and the seminar programme by country in Table 8.

TABLE 5

COURSES & WORKSHOPS HELD DURING 1981

	TITLE	DATE		SPONSORED BY
1.	First Asian Conference on Diarrhoeal Diseases	16–21	February	ICDDR,B/NICED/WHO
2.	Inter-Regional Training Course on Diarrhoeal Diseases: Laboratory Aspects	23 3	March– April	WHO/ICDDR,B
3.	Conference on Experimental Cholera Vaccines	6–9	April	WHO/ICDDR,B
4.	International Conference on Shigellosis	15–20	June	ICDDR,B
5–6.	Trainers' Training on use of Manual on Treatment and Prevention of Diarrhoea and the Trainers' Guide	10–14 24–28	August August	ICDDR,B
7.	Inter-Regional Training Course on Health Services Research Evaluation	7–18	September	WHO/ICDDR,B
8.	Inter-Regional Training Course on Diarrhoeal Diseases: Clinical Aspects	12–23	October	WHO/ICDDR,B
9.	Workshop to Develop Training Modules on Diarrhoeal Diseases	7–10	December	ICDDR,B
10.	Workshop on Ethical Consideration in Research on Human Subjects: Special Reference to Developing Countries.	14–18	December	WHO/ICDDR,B

TABLE 6

PROGRAMME FOR COURSES AND WORKSHOPS DURING 1982

	TITLE	DATE	
1.	Trainers' Training on use of Manual on Treatment and Prevention of Diarrhoea and Trainers' Guide (Trainers' Training Course)	4–8	January
2.	Trainers' Training on use of Manual on Treatment and Prevention of Diarrhoea and Trainers' Guide (Trainers' Training Course)	18–22	January
3.	Inter-Regional Training Course on Diarrhoeal Diseases: Laboratory Aspects	15–26	March
4.	Inter-Regional Training Course on Diarrhoeal Diseases: Clinical Aspects	19–30	April
5.	Trainers' Training Course	5–9	July
6.	Trainers' Training Course	19–23	July
7.	Course on Research Methodology	1–30	September
8.	Inter-Regional Training Course on Diarrhoeal Diseases: Epidemiological Aspects	20–30	September
9.	International Workshop on Evaluation of Measuring the Impact of Combined Water and Sanitation Programme	29 3	November– December

Participants of a training course run by ICDDR,B see for themselves how diarrhoea is managed in the treatment centre during the practical sessions.

In implementing its international training programme the Centre had dedicated its own resources together with those of WHO and UNDP. New ground has been broken in the course of field evaluation methodologies organized by the Community Services Research Programme. It is expected that in future the Centre will lay emphasis on training individuals from developing countries in research methodologies in the laboratory, hospital and field areas.

It has been gratifying to see that a number of participants of the courses held in the past have established programmes in their countries of origin and started to carry out research on return to their home institutions. Specific examples of developments in these directions can be seen in the Philippines, Indonesia, Vietnam and China. The development in China has been particularly interesting, where after becoming acquainted with the methodology for identifying pathogens which cause diarrhoea during a course on laboratory aspects in ICDDR,B, *Campylobacter* has been isolated for the first time in that country during 1981.

TABLE 7

COUNTRYWISE DISTRIBUTION OF FELLOWS

Country	No. of Fellows
Burma	2
Egypt	2
India	2
Japan	1
Nigeria	2
Philippines	1
U S A	4

TABLE 8

1981 ICDDR,B SEMINAR PROGRAMME BY COUNTRY

Country	No. of Seminars
Bangladesh	16
Canada	1
Czechoslovakia	2
India	1
Indonesia	1
Japan	1
Nigeria	4
Philippines	1
Sweden	1
U S A	8

It is felt that one of the main emphases within Bangladesh should be the addition of current knowledge on the basic sciences and epidemiological information on diarrhoeal diseases to the medical school curriculum, so that the students may have a clear concept of diarrhoeal diseases, their mechanisms, causes and manner of spread. To this end a second workshop has been convened with faculty members from all medical colleges in Bangladesh to address the issues of this proposed change in the curriculum content.

A further initiative taken by the Government of Bangladesh together with the ICDDR,B was to address the issues of ethics of health research in developing countries. This meeting was convened in December and has resulted in guidelines which adapt the Helsinki Declaration to the situation in Bangladesh.

TABLE 9

COUNTRYWISE PARTICIPATION IN COURSES AND CONFERENCES—1981

Title of Events	No. of partici-pants	Participants from		Faculty Members from
First Asian Conference on Diarrhoeal Diseases: 16—21 February	44	Bangladesh	20	
		India	16	
		Kuwait	2	
		Philippines	1	
		S. Arabia	2	
		Sri Lanka	1	
		WHO	1	
		Thailand	1	
Inter-Regional Training Course on Diarrhoeal Diseases: Laboratory Aspects: 23 March—3 April	12	Bangladesh	2	United Kingdom
		Burma	1	Denmark
		China	1	WHO
		Fiji Island	1	USA
		Indonesia	1	
		Papua New Guinea	1	
		Philippines	1	
		Sri Lanka	1	
		Sudan	1	
		Thailand	1	
		Vietnam	1	
Conference on Experimental Cholera Vaccines: 6—9 April	41	Bangladesh	24	
		Hungary	1	
		Italy	1	
		Japan	2	
		Kuwait	1	
		Nigeria	3	
		WHO	1	
		U S A	7	
		Switzerland	1	
International Conference on Shigellosis: 15—20 June	47	Bangladesh	35	
		China	1	
		Japan	1	
		Poland	2	
		WHO	1	
		United Kingdom	1	
		U S A	6	

Continued on page 35

Table 9 contd.

Title of Event	No. of participants	Participants from		Faculty Members from
Inter–Regional Training Course on Health Services Research Evaluation 7—18 September	10	Bangladesh	2	Australia
		India	1	Bangladesh
		Indonesia	1	U.S.A.
		Malaysia	1	United Kingdom
		Nigeria	2	
		Philippines	1	
		Poland	1	
		Thailand	1	
Inter-Regional Training Course on Diarrhoeal Diseases: Clinical Aspects: 12—23 October	18	Bangladesh	2	India
		Bhutan	1	WHO
		Egypt	2	U.S.A.
		Japan	1	
		Kenya	1	
		Kuwait	1	
		Papua New Guinea	1	
		Philippines	1	
		Sri Lanka	1	
		Syria	1	
		Thailand	2	
		U.S.A.	3	
		Yemen Arab Republic	1	

Participants of a training course do practical work in the laboratory. They can then perform tests to identify the causes of diarrhoea in their own countries.

New initiatives were taken to extend findings from ICDDR,B's research programmes to the Government Health System of Bangladesh. A project was taken up jointly with the Government and the Federal Republic of Germany to carry out surveillance and evaluation of the health status of six *thanas* in Munshiganj, Dacca District, which is adjacent to the Comilla District where the Matlab Field Station area is located. The methods developed and implemented in this study will be further modified to serve as a basis for the extension of a maternal child health and family planning programme to be sponsored jointly with the Government of Bangladesh in three new *thanas* in 1982. The objectives of the Munshiganj Project were as follows:

A. To document the demographic characteristics of Munshiganj Sub-Division at the beginning of the German technical assistance, and demographic changes in the course of the project.

B. To identify the leading causes of maternal mortality, and mortality and morbidity among children under five years of age.

C. To document the patterns of contraceptive behaviour and correlates to include indicators of institutional commitment to programme implementation.

D. To conduct operational research by:

-measuring the community health needs;

-measuring the quantity and quality of health resources currently available for the service programme;

-identifying ways in which health services are currently utilized to satisfy effective demand for care; and

-quantifying specific activities of health centres both at the centre and at community level.

E. To make specific recommendations to improve the present situation.

The work on this project is going according to schedule and the analysis will be completed in the middle of 1982.

The Chandpur community training project has continued through 1981 and the goal has been to introduce oral rehydration solution for the treatment of diarrhoea in the community without any maternal or other services delivered directly by ICDDR,B staff. A variety of ways have been used including training of village practitioners, and direct training of village volunteers with the help of posters and other educational material. Evaluation of this project was carried out during 1981. The first point was to assess the knowledge of ORT among mothers, village practitioners and the general public, and the extent of use of ORT in the community when diarrhoea strikes. The second point was to evaluate the safety of the composition of the ORT solution prepared by mothers in the project area. The findings of this evaluation indicate that the village practitioners and family members, or mothers, prove to be the group most effective in managing episodes of diarrhoea. It was however easier, less time consuming and requires less manpower to organize and train village practitioners than family members and mothers. This was because the strategy for training family members was to go directly to the house and show how solutions can be made and used, while village practitioners could be brought for one week intensive courses in groups of twenty or more with good results. Though it was easier to train village practitioners and they continued to use ORS, family members used more ORS and sustained use of larger amounts for each episode. Training materials were found to be satisfactory but substantial improvements could be made and further investigation was needed to determine the type of training materials most effective in Bangladesh.

Eminent persons from different walks of life and distinguished medical professionals discussed the ethical conduct of research on human subjects, especially in developing countries, during a workshop jointly sponsored by the Government of Bangladesh, Bangladesh Medical Research Council, WHO and ICDDR,B.

Ethical Review Committee:

Following a resolution of the ICDDR,B Board of Trustees and the provisions of the Ordinance establishing the Centre, an Ethical Review Committee (ERC) started functioning in order to regulate research involving human subjects. The objectives of this Committee are to examine and monitor the ethical aspects of the research protocols on human subjects. There are twelve members representing different disciplines, only three of whom are from ICDDR,B. The list of members is as follows :

ICDDR,B Members:

Dr. K.M.S. Aziz
(Basic Scientist & Chairman)

Dr. M. Mujibur Rahaman
(Clinician & Relieving Chairman)

Dr. Brian Seaton
(Laboratory Scientist)

Other Members:

Dr. T.A. Chowdhury
(BMRC Representative)

Dr. Humayun K.M.A. Hye
(Pharmacologist)

Dr. Z. Sestak
(WHO Representative)

Dr. Khaleda Banu
(Paediatrician)

Dr. Sufia Ahmed
(Woman & Non-scientific Member)

Mr. Md. Mofazzal Hussain Khan
(Religious Representative)

Mr. K.Z. Alam
(Legal Professional)

Mrs. Husnara Kamal
(Behavioural Scientist)
Mrs. Tahrunnesa Abdullah
(Behavioural Scientist)

According to the recommendations of the meeting of the Ethical Review Committee held in June 1980, a "Workshop on Ethical Consideration in Research on Human Subjects: Special Reference to Developing Countries" was held from 14-19 December, 1981. The Workshop was jointly sponsored by the Government of Bangladesh, BMRC, WHO and the ICDDR,B. The Workshop was organized on a national scale and the dates were chosen at the request of WHO which was able to fund the Workshop partially if it were held in 1981 and on an in-country basis. At the conclusion of the Workshop, recommendations were made regarding the guidelines of ethical considerations in research on human subjects, with particular reference to developing countries in the spirit of the Helsiniki Declaration and its subsequent amendments.

Research Review Committee:

According to a decision taken in its meeting held on 19 March 1981 the Research Review Committee was reorganized to include, in addition to the existing members, the Scientific Programme Heads and three scientists from ICDDR,B for a one-year term. Renewal or rotation of membership would be decided by the Committee. The Committee is now composed of Drs. W.B. Greenough III, M.M. Rahaman, K.M.S. Aziz, A.M. Molla, A.R. Samadi, Stan D'Souza, Thomas Butler, Najma Rizvi and M.U. Khan. The purpose of this Committee is to review the scientific aspects of the research protocols, and to examine the scientific values, significance and relevance of each protocol, the capability of the investigators proposing the research, feasibi-

Dr. I.D. Ladnyi, Assistant Director General, WHO during his visit to ICDDR,B to participate in the 1st Asian Conference on Diarrhoeal Disease, reviews ICDDR,B publications.

lity of the project at ICDDR,B, evaluation of the budget and the plan for data analysis. The Committee meets once a month generally a few days after the Ethical Review Committee.

During 1981, the Committee reviewed 53 protocols of which 42 were approved. The protocols submitted to the Committee during 1981 are as follows:

Identification of colonization factors (CFA) in *E. coli*.

Effect of mecillinam in the treatment of shigellosis.

Giardiasis and amoebiasis among expatriates in Dacca, Bangladesh. Clinical, epidemiological, immunologic and treatment aspects, a prospective study.

Investigations on the biological activities of lipopolysaccharides and cholera toxin/toxoid available in the routinely manufactured anti-cholera vaccines.

Use of base–precursors as a substitute for bicarbonate in the oral rehydration solution.

Study of seasonal variation of cholera in Dacca over the past eighteen years.

Cholera seasonality and geographical patterns in Matlab 1966-1979.

Does domestic animal determine neonatal deaths.

Pilot study of the family life cycle in a rural area of Bangladesh.

Determinants of return migration in the DSS, Matlab.

Characterization of antibiotic resistance in the multiply resistant *Vibrio cholerae*, related Vibrios and *Enterobacteriaceae*.

A study on the incidence of diarrhoeal disease in domestic animals of Bangladesh and its relationship to that in human beings.

Influence of WCV on the immunogenicity of B-subunit given by the oral route.

Maternal and child care (sociocultural aspects).

Investigations on the mechanism of adhesion of *Vibrio cholerae*.

Socio-economic differentials of diarrhoeal morbidity and mortality in selected villages of rural Bangladesh.

Colitis in patients with *Campylobacter, V. Parahaemolyticus* or shigella-infection.

Gastric emptying time in children with acute diarrhoea due to different etiologies.

Subsequent mortality of hospitalized children in relation to their nutritional status.

Local immunity and natural termination of acute cholera.

Antenatal and postnatal care–sociocultural aspects.

Respiratory infections as complication to diarrhoea in hospital patients.

Growth rate and early introduction of weaning food.

The efficacy of ORS in correcting hypokalaemia due to acute dehydrating diarrhoea in children under 5 years of age.

Pneumonia as a complication of diarrhoea: a retrospective analysis.

The role of prostacycline in the development of haemolytic-uremic syndrome in acute shigellosis.

Further studies on the mechanisms of cholera and the host defense mechanisms against cholera infection (Limited study).

Studies on the clinical manifestations and toxicities by *Aeromonas Hydrophila* strains isolated from cases of diarrhoea and their serological responses.

Studies on the pathogenic mechanisms of *Campylobacter fetus* ssp *jejuni* isolated in Bangladesh and their role in the aetiology of diarrhoea.

Isolation and Characterization of anaerobic bacterial flora from diarrhoeal patients.

Development of potential live oral vaccine strains of *Vibrio cholerae*.

Inter-village transmission of cholera in Matlab during the epidemic season.

The programmes and activities of the ICDDR,B are explained to a group of participants at a training course.

Study of standard ORS in treatment of dehydration of infants less than six months of age.

Measles antibody in serum and saliva.

Limited study of the dehydration status of Matlab patients (3,000) (1 September to 15 November, 1981)

Pilot study on socio-economic status and its association with nutrition and morbidity

Intervention in environmental contamination with intestinal pathogens by using Oxfam Sanitary Unit in a periurban refugee camp.

Etiologic, clinical and epidemiological characterization of hospitalized rural diarrhoea cases.

Hydrogen breath test for estimation of lactose malabsorption in healthy volunteers and children with diarrhoea.

Pilot project to follow up surveillance patients with shigella and other dysentery diseases.

Protein-losing enteropathy in post-measles diarrhoea.

Limited study of contraceptive prevalence in Matlab.

The effect of somatostatin on intestinal fluid loss in cholera.

Beliefs, attitudes and practices towards measles in rural Bangladesh.

Further identification of colonization factors (CFA) in *E. coli* and assays of antibodies of these factors as well as of enterotoxins.

Studies on rotavirus serotypes in Bangladesh and Kenya.

The Hot and Cold Belief System and its Effect on Food Intake of Children During Normal, Acute and Recovery Stages of Diarrhoea.

Reproductive Endocrinology in Relation to Contraceptive Safety in Bangladesh.

Study on Socio-Economic and Mortality Differentials.

Retrospective Study of Shigellosis at ICDDR,B Hospital.

Community Health Service Project, Matlab (The MCH Component).

Determination of the occurrence of different fastidious enteric adenoviruses (FFAs) and an evaluation of their pathogenic role in viral diarrhoea in Bangladesh.

Determinants of Areal Variation of Contraceptive Practices in Bangladesh.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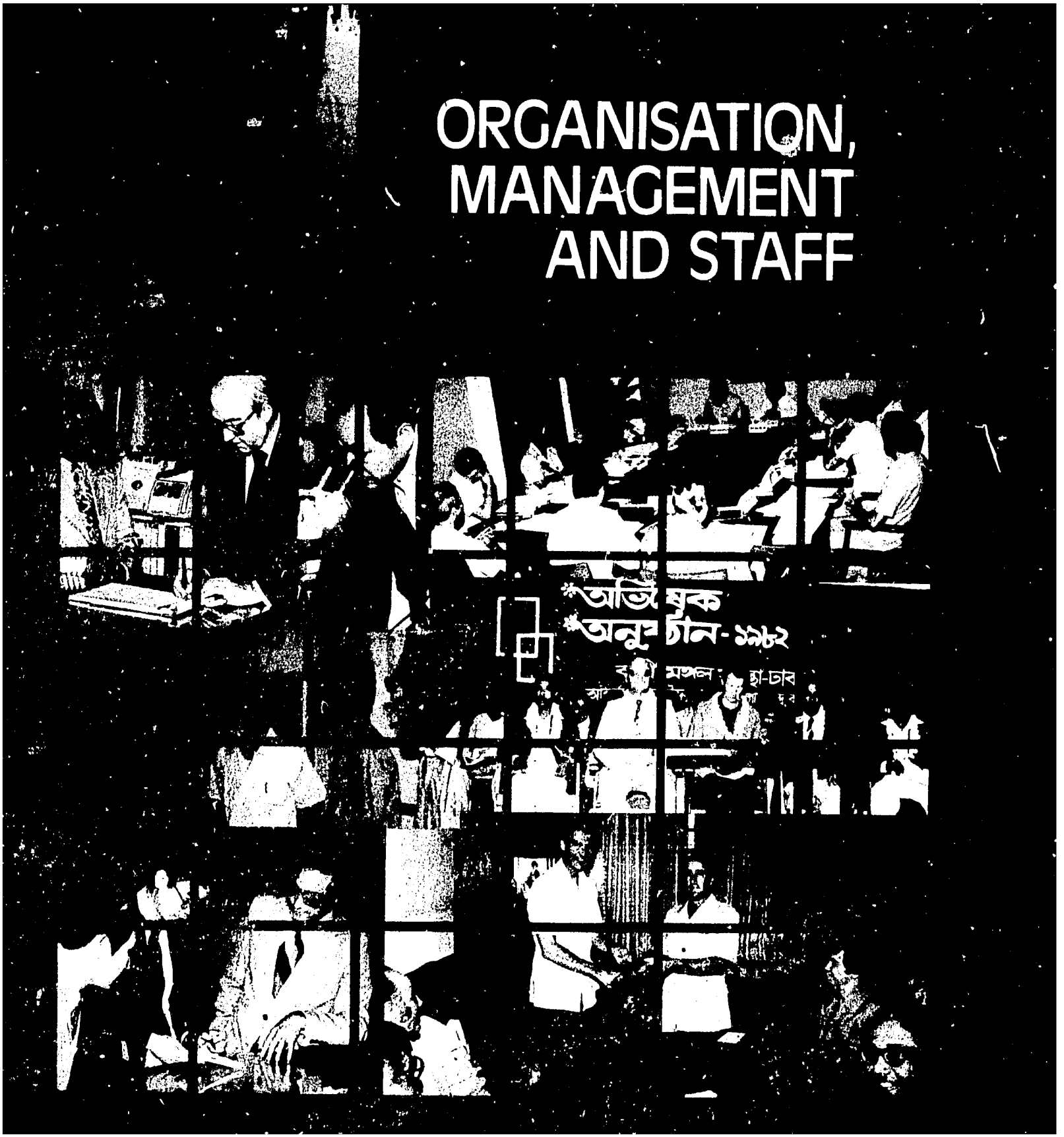
ORGANISATION, MANAGEMENT AND STAFF



BOARD OF TRUSTEES

The Board of Trustees met in June and November of 1981. The valuable services of Dr Julie Sulianti Saroso as Chairman during the first two years of the Centre's operation were acknowledged. Dr M.A. Matin was elected Chairman of the Board for a one year term beginning 1 July 1981.

At their June meeting the Board members observed a minute of silence and passed the following resolution:

"Resolution 1/June 81–The Board of Trustees of the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B) expressed deep sorrow at the untimely demise of President Ziaur Rahman. The late President worked tirelessly in all sectors for the development of Bangladesh, and was invaluable to the internationalization of ICDDR,B."

Steps were taken to complete fully the transition to an international institution. In addition an external review of programmes was carried out and presented to the Board. The reviewers were–

Professor Orjan Ouchterlony, Department of Bacteriology, Institute of Medical Microbiology, University of Göteborg, Sweden.

Professor Alexander Muller, Director, Royal Tropical Institute, Amsterdam, Netherlands.

Dr Dilip Mahalanabis, Kothari Centre of Gastroenterology. The Calcutta Medical Research Institute, Calcutta, India.

Additional consultants were selected to complete the scope of the review in the areas of Population/Demography and Nutrition. It was further decided that Administration & Management and Training & Extension should be included in the scope of future reviews.

The consequences of an important decision to move to full comparability with the rules and payscales of the World Health Organization have been defined for further consideration by an expert consultant. Steps in this direction will insure congruency with the practices of the United Nations.

An Associate Director of Administration and Finance, Mr Michael F.L. Goon, was successfully recruited after a review of more than two hundred applicants.

There were no changes in the composition of the Board during 1981.

The members of the Board of Trustees of ICDDR,B paying homage at the mazar of the Late President Ziaur Rahman of Bangladesh.

MANAGEMENT AND ADMINISTRATION

The implementation of a new system to provide financial and management information was nearly completed in 1981. New projects and a rapid increase in the Training Programme with no expansion of space and very little expansion of staff was a challenge to the administration which provides the support and logistics for these field-intensive activities.

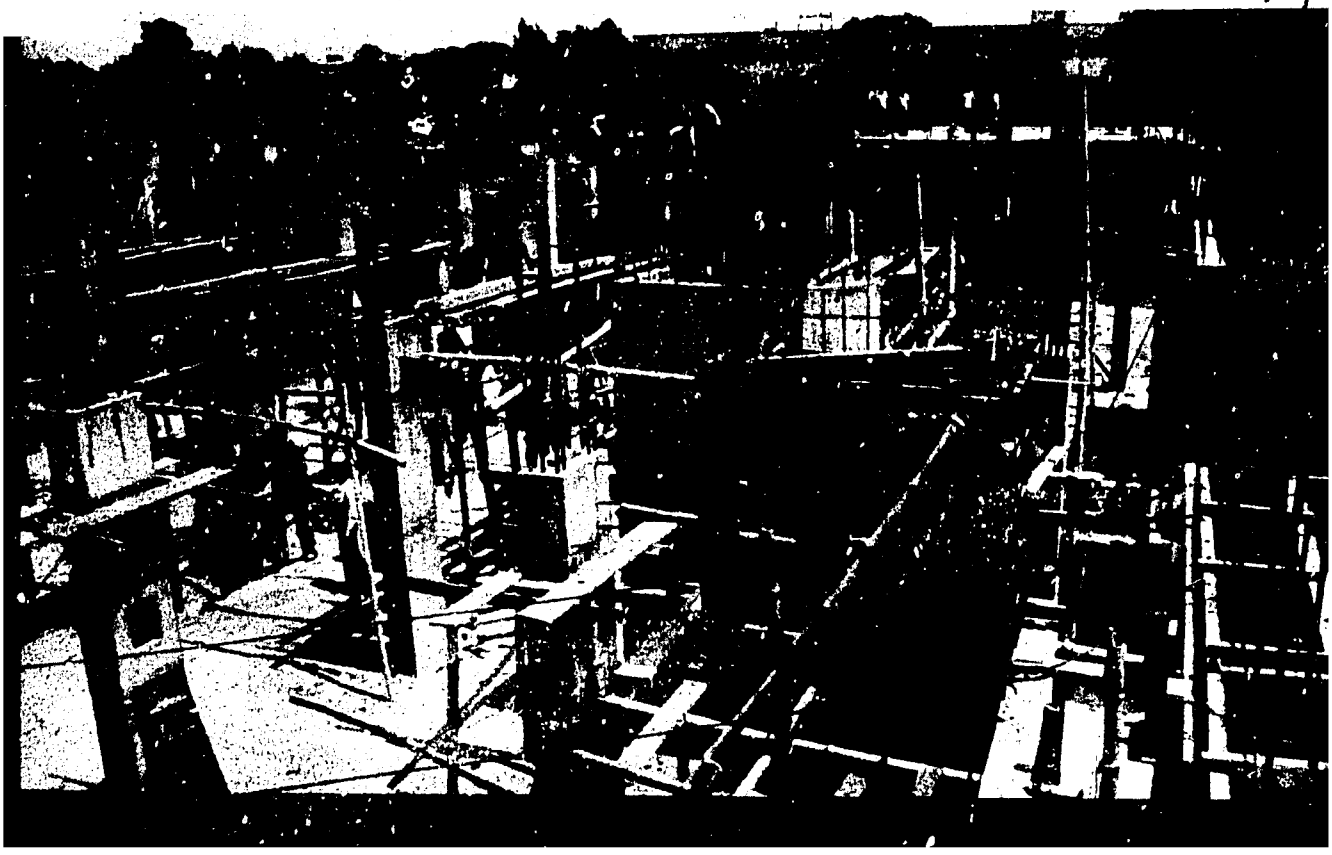
Starting during the monsoon rains, the first phase of the new hospital and clinical research unit has progressed almost on schedule. The corner stone was laid by the honourable late President of the People's Republic of Bangladesh.

Progress was made toward providing new community centres in two communities in Matlab and one in Nandipara, a small village near the Centre in Dacca city. Special appreciation has been expressed to the embassies of Australia and The Federal Republic of Germany for their contributions which made this possible.

The rapid progress of the building programme in Dacca has been made possible by the excellent cooperation and hard work by the staff of the UNDP Office of Global Programs, the OPEC Fund and WHO. Improvements in Dacca, Matlab and Teknaf were made possible by a gift from the Kingdom of Saudi Arabia which allowed progress in the rural areas at the same time as an active building programme proceeded in Dacca.

Improvements were made in the transport and supply areas increasing efficiency and cost-effectiveness.

A new building provided by the UNDP/OPEC Fund will provide accommodation for the hospital and clinical research activities during 1982.



STAFF CLINIC

The ICDDR,B Staff Clinic was set up in October 1980 to render medical services to employees and their dependants. In addition, the Clinic runs a preventive medical programme which provides vaccination against diphtheria, whooping cough, tetanus, polio, measles, typhoid and paratyphoid. It also supplies malaria suppressant pills.

Prevention of illness was emphasized through seminars on health and family planning and a Staff Clinic Newsletter. There were four issues, with information on self care, preventive medicine and important aspects of common diseases. During 1981 the Staff Clinic completed its organization and started referral procedures for specialized medical care and hospitalization. A Senior Staff Nurse was trained in IUD insertion and family planning methodology. Family planning aspects were emphasized.

TABLE 10
NUMBER OF PERSONS TREATED AT THE STAFF CLINIC

	Dacca	Matlab	Chandpur
Employees	2496	4184	80
Dependants	2721		38
Hospitalization	118	135	—
Delivery cases	17	—	—
Vaccinations given	411	106	—
Referred to Dacca	—	7	—

Figures for Teknaf are not available

Seminars were organized by the staff clinic to create awareness of preventive health and family planning among the staff and their spouses.

STAFF WELFARE ASSOCIATION

The Staff Welfare Association (SWA) is an organization recognized and supported by the ICDDR,B management and has a constitution guiding the principles of its operation. The SWA is committed to promoting the welfare of the staff irrespective of rank or status and to maintaining a congenial working atmosphere and harmony among the staff. In the past year the association has organized recreational activities, such as the annual drama, annual picnic, inter-departmental tournaments, sports and games and literary and cultural functions. The SWA maintains a library and has published the annual magazine, 1981. Stipends have been provided to meritorious dependants of the staff. In 1981 a night school for illiterate staff of ICDDR,B was set up and a benevolent fund has been established to provide financial assistance to needy employees in extreme distress. The benevolent fund depends entirely on donations and is operated by a five-member trustee-board, which manages the fund and ensures its proper use.

The Staff Welfare Association enlists volunteer teachers to conduct a night school to increase reading skills of the staff.

RESOURCES DEVELOPMENT

ICDDR,B has continued to seek prospective donors and participants for development of scientific cooperation and collaboration particularly from the developing countries. Currently 32 governments and agencies are participating with the Centre; 17 of these are financial contributors.

During the year the Centre obtained support and participation from several new sources: from the governments of France, Japan, Kuwait and Poland, and from German Technical Cooperation (GTZ) and SAREC of Sweden. Of the existing donors Sweden and Switzerland renewed their contributions. Also in 1981 ICDDR,B established contacts with the Aga Khan Foundation, the Asian Development Bank, the Federal Republic of Germany and UNICEF for their support.

ICDDR,B provides expertise to certain developing countries which leads to financial support. The Centre has developed programmes to assist the governments of the Kingdom of Saudi Arabia and the State of Kuwait in the management and control of diarrhoeal diseases. In Kenya, ICDDR,B staff are assisting in the development of laboratory procedures to identify Rotavirus, a "new" diarrhoea pathogen.

In 1981 the Centre also conducted several regional and inter-regional training courses on clinical, laboratory and research evaluation aspects of diarrhoeal diseases. The trainees with their newly-gained technological know-how are now working in their respective countries, resulting in not only more effective diagnosis and treatment methods but an awareness of the Centre and its programmes.

The Centre convened its second Consultative Group meeting at the UNDP Governing Council in New York. The meeting was chaired by UNDP; 18 countries and agencies discussed the Centre's programme and requirements. The third Consultative Group meeting will be held in June 1982 in conjunction with the UNDP Governing Council.

Mr M.G.D. Williams, High Commissioner of Australia in Bangladesh, conveys his government's contribution for continued support to ICDDR,B.

The mandate given to the Centre is of an international order, so that ICDDR,B may make an effective contribution towards solving the problem of diarrhoeal disease. The Centre is currently facing a budgetary shortfall which will seriously constrain all its activities. It is hoped that the international community, particularly the more fortunate members, will come forward with support for the Centre during the coming years.

FINANCIAL REPORT

The Centre has continued to progress as an international institution. Important steps taken in 1981 included an improved salary structure, procurement of new equipment and recruitment of international staff for programme leadership. During the year the Centre improved the financial system through extensive computerization in cost accounting and personnel activities.

The budget for FY 1981 was originally US $ 6.1 million, which was subsequently revised due to donor constraints. The financial year closed with a shortfall of US $ 436,924 caused by delay in receipt of committed funds (Tables 11 and 12).

The Centre's Capital Development Programmes are proceeding on schedule. With support of US $ 1.75 million from the UNDP/OPEC Fund and the Government of Saudi Arabia, the new 37,000 square foot clinical centre is expected to be operational by the second half of 1982. The second phase of construction will consist of an additional six floors above the clinical centre, an auditorium, training centre, service building and new facilities at the Centre's two field stations. Completion of this second phase will require an additional US $ 15 million.

The ICDDR,B Board of Trustees appointed Price Waterhouse & Co. Calcutta and Rahman Rahman Huq & Co. Dacca to audit the Centre's financial activities for 1981. The amounts shown in this report conform to the audited

Sheikh Fouad Abdul Hameed Al Khatib, Ambassador of Saudi Arabia, discusses the programmes with ICDDR,B senior staff. Saudi Arabia is contributing both to the programmes and capital development of ICDDR,B.

TABLE 11

CARRYOVER FROM 1980		$ 881,639
RECEIPTS		
Australia	343,594	
Bangladesh	99,120	
Ford Foundation	200,000	
Kingdom of Saudi Arabia	100,000	
Sweden (SAREC)	94,062	
Switzerland	378,692	
United Kingdom (including equipment supply)	321,243	
USA (AID)	,900,000	
Private contributions	123,862	
Ohyama Foundation	3,000	
UNFPA (DSS-Matlab)	325,360	
UNFPA (MCH-FP Matlab)	54,486	
UNDP/WHO (Clinical Research, Regional Training & Evaluation Courses)	218,500	
IDRC/Canada (Water Sanitation & Human Reproduction Survey)	50,139	
Federal Republic of Germany (German Technical Cooperation-Munshiganj)	70,000	
Ford Foundation (Human Reproduction Survey and MCH-Mortality & Reproduction Interaction)	13,000	
Kuwait (to support Shigella Conference)	10,000	
Other (UN University & Pfizer Laboratory)	10,430	
Revenue and other Receipts	209,056	
		4,524,544
TOTAL FUNDS AVAILABLE		5,406,243
EXPENDITURE		5,843,167
NET DEFICIT		436,924

1/ 1980 Annual Report shows a closing balance of $ 1,598,455 breakdown as below.

	Operational Fund	Capital Development Fund	Total
Cash	$ 326,357	$ 653,381	$ 979,738
Stock of Stores and Spares	555,342	63,375	618,717
	$ 881,699	$ 716,756	$ 1,598,455

Ms. Jane Abel Coon, Ambassador of the USA to Bangladesh visited the Centre and took an active interest in its programmes

Financial Statement. The auditors' report will be submitted to the Board of Trustees at its June 1982 meeting.

The budget for FY 1982 totals US $ 6.5 million, with donor commitments short of this target. The Centre looks forward to having new donors to support its international research activities, scientific collaboration and training, and dissemination of information to achieve the control and prevention of diarrhoeal diseases.

TABLE 12

EXPENDITURES BY PROGRAMME

Programmes	Expenditure	Percentage
Disease Transmission	$ 423,045	7.24
Pathogenesis & Therapy	250,088	4.28
Host Defense Therapy	283,978	4.86
Nutrition	298,586	5.11
Community Services	822,718	14.08
TOTAL RESEARCH	$2,078,415	35.57
Research Facilities	1,208,367	20.68
Training, Extension & Communication	752,015	12.87
TOTAL RESEARCH & TRAINING	$ 4,038,797	69.12
Maintenance & Logistics	569,709	9.75
Management	778,894	13.33
Mandatory Committee	170,036	2.91
Resources Development	217,950	3.73
Employee Benefit	67,781	1.16
TOTAL OPERATION	$ 5,843,167	100.00

The Swiss Ambassador to Bangladesh, Mr. Paul Erb, renewing the Swiss contribution to ICDDR,B.

GLOSSARY OF ABBREVIATIONS

SAREC	—	Swedish Agency for Research Cooperation with Developing Countries
DSS	—	Demographic Surveillance System
BMRC	—	Bangladesh Medical Research Council
WHO	—	World Health Organization
UNDP	—	United Nations Development Programme
UNFPA	—	United Nations Fund for Population Activities
INCAP	—	Institute of Nutrition of Central America and Panama
$	—	U.S. dollars
OPEC	—	Organization of Petroleum Exporting Countries
IUD	—	Intra-uterine Device
IDRC	—	International Development Research Centre
NICED	—	National Institute of Cholera and Enteric Diseases
IV	—	Intravenous
UNICEF	—	United Nations Children's Fund
ORT	—	Oral rehydration therapy
ORS	—	Oral rehydration solution