付　属　資　料

１．合同評価レポート

２．PDM バージョン２

３．評価グリット（結果）

４．カウンターパート質問票（集計結果）

５．専門化質問票（集計結果）

MINUTES OF MEETING
BETWEEN
THE JAPANESE FINAL EVALUATION TEAM AND
THE AUTHORITIES CONCERNED OF THE GOVERNMENT
OF THE REPUBLIC OF INDIA
ON THE JAPANESE TECHNICAL COOPERATION FOR THE PROJECT FOR "PREVENTION OF DIARRHEAL DISEASES (PHASE 2)"

The Japanese Final Evaluation Team organized by the Japan International Cooperation Agency and headed by Dr. Kishio ONO (hereinafter referred to as "the Team") visited India from 14th of November 2007 to 28th of November 2007 for the purpose of jointly evaluating the outcome of the Project for Prevention of Diarrheal Diseases (Phase 2) in India (hereinafter referred to as "the Project").

During their visit, the Team was briefed on the achievements of the project by the project staff and the relevant authorities of the Government of India and through the Evaluation Workshop. Based on the information and data collected through the evaluation, the Team compiled the results of their findings in the evaluation report and presented it to the Joint Coordinating Committee on 28th of November 2007 at New Delhi.

The Joint Coordinating Committee discussed the contents of the report and shared mutual understanding as in the Summary of discussions. (Attachment 1)

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SUMMARY OF THE JOINT EVALUATION

1. Introduction

The Joint Coordination Committee (JCC) reviewed the Final Evaluation Report (Attachment 3), prepared by the Team, based on the workshop held on 23rd of November 2007 at NICED and discussions with relevant authorities in Kolkata and New Delhi.

The team gave a presentation on the findings of the joint evaluation on the Project, and highly commended the achievement made by NICED in cooperation with Japanese experts during the five-year technical cooperation period.

2. Summary of achievements

Project Purpose: Strengthen capacities and augment capabilities at NICED and to disseminate the same throughout the country for prevention and control of diarrheal diseases.

The Project purpose has been achieved to a fair extent. The number of kinds of species and subspecies of diarrheal pathogens that could be identified at NICED rose from 12 in 2003 to 35 at the time of the final evaluation in 2007. The number of research institutions that are capable of identifying diarrheal pathogens at the molecular level rose from 4 to 40 institutions. And although the number of publications by NICED researchers varies by year, the average impact factor has steadily risen from 2.1 in the year 2003 to 2.56 during the years 2006 and 2007.

These achievements were in large due to the following attainment of outputs.

Output 1: Capacity to identify diarrheal diseases at the molecular level is established.

The Project was successful in establishing various techniques for analyzing pathogens at the molecular level at NICED. The number of diarrheal diseases diagnosed at the molecular level has increased with a total isolation rate of 49.3% as compared to 20% in 2003. This is prospected to rise up to around 70% by the year 2008.

Output 2: Strains and diagnostic sera are appropriately managed and archived.

The Project was successful in producing antisera for the *V. cholera* O2 to O104 reaching 105 anti-sera in respect to 27 sero types of *V. cholera* (O1–O26 and O139) at the time of the mid-term evaluation. The "Animal House" established through the

Japanese grant aid highly contributed to increase the capability of NICED to accelerate the production of *V. cholera* anti-sera.

Output 3: Constant surveillance of pathogens of diarrheal diseases is established.

This output is expected to be partly accomplished by the end of the Project period. The purpose of this output was to; 1. establish a model of constant surveillance network in the state of West Bengal, and to 2. strengthen the capacity of NICED to develop preventative measures to control diarrheal outbreaks. The surveillance network is established between Infectious Disease Hospital (IDH), Dr. BC Roy Memorial Hospital and NICED. The plan of the Project included expanding this surveillance system to two more medical institutions, other than IDH and Dr. BC Roy Memorial Hospital in West Bengal. However, this was not accomplished due to insufficient planning and human resources. Good collaboration with the Integrated Disease Surveillance Program supported by the World Bank may be one of the key elements to promote constant surveillance of pathogens.

Output 4: Technical expertise to identify diarrheal pathogens is transferred to other parts of India and neighboring countries

The Project implemented five in-country training programs targeting scientists and technical staff from inside India, and four third-country training programs targeting trainees from neighboring countries (i.e. China, Bhutan, Myanmar, Nepal, Sri Lanka, Philippines, Indonesia, Bangladesh, Zambia, Kenya, Ghana, Tanzania). Both training programs focused on molecular epidemiology of diarrheal diseases, with special reference to *V. cholera*. As result of the training programs, 112 domestic participants and 43 international participants acquired basic knowledge on diarrheal diseases and the capability to conduct research. Follow-up activities of the training programs have yet to be systematically introduced. However, NICED scientists have collaborated with the trainees in their research activities. Eight publications have been made jointly with the in-country training program participants.

Output 5: Surveillance network of diarrheal diseases is established in India.

The concept of the "surveillance network" has evolved throughout the Project term and the final conceptual framework was reported during the final evaluation mission. NICED is planning to develop a constant surveillance network with 25 peripheral medical institutions around India and to provide internet connection amongst these institutions for pathogenic data sharing. This will enable constant surveillance of

diarrheal diseases around India for taking preventive measures for diarrheal disease outbreaks. By the end of the Project, a mechanism for establishing this network between NICED and 25 peripheral research hospitals to actively gather and disseminate diarrheal disease related data throughout India is expected to be established. The mechanism is indicated as follows.

1) Assignment of focal person at NICED and the five initial networking medical institutions to establish this informational network.
2) Setting of a server at NICED for the internet connection.

Nevertheless, NICED has established an institutional connection with the ex-participants of the in-country trainings, which will be beneficial when expanding the model surveillance network across the country.

Output 6: The capacity to investigate the efficacy of drugs for diarrheal diseases is improved.

The capacity of NICED to investigate the efficacy of drugs and other treatments for diarrheal diseases has been enhanced. Starting with this phase of the Project, NICED developed the mechanism to conduct 11 kinds of drug resistance tests for every sample provided from IDH. All of the individual test reports are systematically reported back to the respective hospitals.

3. The results of the evaluation by five criteria

(1) Relevance

Based on the assessment of the needs of the health sector in India and in the State of West Bengal, Indian national policy and the Japanese Official Development Assistance (ODA) policy towards India, the relevance of the Project is considered to be high.

In India's National Health Policy of 2002, it was indicated that diarrheal disease such as gastro enteritis and cholera continues to contribute to a high level of morbidity in the population. Furthermore it highlights the national need to strengthen its surveillance system, which in turn would enable timely intervention to contain the spread of infection for these diseases. The Project's approach to expand its constant surveillance system and to establish surveillance networks is very much in line with such national policy directions.

This is also in line with Japanese Government's 2005 Country Assistance Plan for India, which also highlights the need to support the prevention of infectious diseases not just through support to the development of physical infrastructure, but also with an emphasis on human resource development and institutional strengthening such as

referral systems and networks.

(2) Effectiveness

The effectiveness of the Project is relatively high, as the Project Purpose will be achieved to a fair extent by the end of the Project period in June 2008. The Team has acknowledged the achievements of output 1.2.4.6 and its high correlation in achieving the Project purpose. However, it should be noted that the objectives and concepts of constant surveillance of pathogens (Output 3) and surveillance network of diarrheal diseases (Output 5) were not clear amongst stakeholders at the time of the Project Planning and during the Mid-Term Evaluation exercise. This resulted in the delay of its implementation, thus leading to incomplete attainment of outputs.

(3) Efficiency

The Project's efficiency is high with regards to its inputs and the current achievement levels of most of the Outputs. All equipments and training programs provided, as well as the dispatch of the short-term experts have been viewed favorably by the NICED staff. Despite the short length of stay by the experts in NICED, most of the counterparts considered these visits as a good opportunity to exchange information and technology, which enhanced NICED activities.

(4) Impact

The Project's impact is high with regards to its likelihood to achieve the overall goal in the near future. The Project has contributed greatly towards human resource development throughout India through in-country training programs, dissemination of information and knowledge in the form of; 1. publications of reports, 2. confirmation of the diagnostic results of the samples sent to NICED from other health institutions. These activities contributed greatly to enhance the diagnostic and treatment capacities of other medical and research institutions. As for the Project's impact in achieving the Super Goal to reduce mortality rate of diarrheal diseases in India, the direct impact of basic research work is hard to be assessed in the short-term. However, on-going NICED activities such as vaccine trial for cholerae and typhoid and the trial of use of probiotic drink, which is the subliminal effect of the Project implementation, may contribute towards the reduction of mortality due to diarrheal diseases.

(5) Sustainability

The sustainability of the effects of the Project after its completion is considered high. Institutionally and financially, ICMR continues to support NICED as a centre of excellence, and this is reflected in the appropriate amount of budget allocated for the institution. Technical sustainability of the Project is also high, as NICED continues to retain most of its core research faculty within its organization. The level of their technical sustainability has been proven already with its capacity to host a series of in-country and third-country training programs as well as other human resource development initiatives within the organization.

However the sustainability of the surveillance network needs further consideration for it is still dependent on acquiring the technical expertise for establishing and sustainable operation of the network.

4. Conclusion

This final evaluation confirmed that the Project has shown good achievement, and will accomplish the Project Purpose to a fair extent by the end of the Project implementation period. Although delay in establishing surveillance network of diarrheal diseases is observed, the implementation process has been smooth due to the firm partnership maintained between the Japanese experts and NICED Counterparts, backed by mutual trust nurtured since the first phase of the Project. NICED has shown remarkable progress, both in its physical and human resource capacities, to conduct the crucial research activities for diarrheal disease prevention and control; and now it is in the process to establish a surveillance network in India for further improvement of prevention and control of diarrheal diseases. This establishment will require technical expertise as well as further commitment from the Indian side.

5. Recommendation

1) Measures recommended to be taken before the end of the Project

- It is recommended that NICED may continue to update the training materials for continuous in-country trainings in the future.
- It is recommended that NICED may appoint a focal person in charge of establishing the surveillance network.
- It is recommended that NICED may start to prepare the management manual for the current surveillance network between IDH and NICED as a model of surveillance networking in India for replication to other institutions.
- It is recommended that NICED may start to make a concrete plan (including the budgetary plan and time framework) of the surveillance networking. In doing so

JICA may consider the dispatch of an expert in the field of surveillance networking.

2) Measures recommended to be taken after the end of the Project

- It is recommended that the role of NICED to provide technical guidance to peripheral research centers may be systematized and be strengthened for assuring the quality of laboratories across nation.
- It is recommended that the role of NICED to conduct in-country and third country training programs be strengthened for continuous and sustainable human recourses development. In order to accomplish this, the following measures are recommended.
  - ICMR may encourage sufficient budgeting for continuous implementation of the training programs.
  - NICED may consider setting up an administrative division for implementing systematic training programs and accumulating data of the trainees.
- It is recommended that NICED may establish the surveillance network on diarrheal diseases based on the result of the current Project.

6. Lessons learned from the Project

1) Technology transfer in specific fields of science can be realized through the dispatch of short-term experts when long-term commitment to the project and partnership with counterpart organization is assured.

2) It should be noted that in order to sustain the budget and working conditions for the Project, coordination with not only the Counterpart organization, but also with its policy level advisory body is essential. The Project was successful in increasing the counterpart budget steadily throughout the Project implementation period through sufficient coordination between ICMR, NICED and the Project.

7. Others

NICED requested JICA to continue future cooperation to set up surveillance network on diarrheal diseases in India.

JOINT FINAL EVALUATION REPORT

ON JAPANESE TECHNICAL COOPERATION

FOR

THE PROJECT FOR PREVENTION OF DIARRHEAL DISEASES (PHASE II)

Japan International Cooperation Agency

And

National Institute of Cholera and Enteric Diseases

(Indian Council of Medical Research)

NOVEMBER 2007

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ABBREVIATIONS

BCRCH	B.C. Roy Memorial Children's Hospital
FY	Fiscal Year
ICMR	Indian Council of Medical Research
IDH	Infectious Disease Hospital of the State of West Bengal
JCC	Joint Coordination Committee
JICA	Japan International Cooperation Agency
NICED	National Institute of Cholera and Enteric Diseases
PDM.	Project Design Matrix
Rs.	Indian Rupees

1. INTRODUCTION

1.1 Background and Objective of the Evaluation Mission

Japan International Cooperation Agency (JICA) has collaborated with the National Institute of Cholera and Enteric Diseases (NICED) under the Indian Council of Medical Research (ICMR) in implementing the Project for the Prevention of Diarrheal Diseases with the aim to establish and improve technology for diarrheal disease control at NICED and other institutions in India. This Project succeeds another JICA technical cooperation project in support of NICED, implemented from February 1998 to January 2003. The Project was launched on 1 July 2003, and will be completed on 30 June 2008.

JICA dispatched an evaluation team to India from 14 to 28 November 2007 to conduct a final evaluation. The purpose of the final evaluation is to assess, usually six months prior to the termination of the Project, whether the Project is on track in achieving intended objectives. The evaluation is a joint undertaking by the Indian and the Japanese sides, with full cooperation from NICED and other relevant authorities.

The objectives of the evaluation mission were as follows:

1. To evaluate the overall achievement of the Project since its commencement in 2003, using JICA's standard project evaluation criteria of relevance, effectiveness, efficiency, impact and sustainability;
2. To summarize recommendations for the remaining period of the Project, and draw lessons learned for the benefit of both Indian and Japanese Governments.

1.2 Evaluation Team

The following are the members of the evaluation team.

Table 1-1 Members of the Evaluation Team

	Name	Designation	Position, Organisation
1	Dr. Kishio ONO	Leader	Executive Technical Advisor to the Director-General, Human Development Department, JICA
2	Dr. Hideo HAYASHI	Basic Medical Sciences	Professor, Chugoku Gakuen University
3	Mr. Katsujiro HORI	Evaluation Planning	Staff, Infectious Disease Control Team Human Development Department, JICA
4	Ms. Saeko ICHIKAWA	Evaluation Analysis	Researcher, Social Development Department, Global Link Management, Inc.

1.3 Mission Schedule

The detailed schedule of the Mission is shown in shown in **ANNEX 1**.

1.4 Stakeholders Consulted/Interviewed

The stakeholders who were consulted or interviewed by the Evaluation Mission consisted mainly of the following:

- Counterparts of the Project
- Japanese experts assigned to the Project
- Officials from the Ministry of Health and Family Welfare
- Officials from the State Office of Public Health, West Bengal
- Doctors and staff from Infectious Disease Hospital
- Other partner institutions

Detailed list of the parties consulted by the Team in **ANNEX 2**.

1.5 Methodology of Evaluation

In accordance with the JICA Project Evaluation Guideline[1] of January 2004, the final evaluation of the Project was conducted in the following process.

Step 1: Project Design Matrix[2] for the evaluation (PDM Version 2) was adopted as the framework of the final evaluation exercise, and the Project achievements were assessed vis-à-vis respective Objectively Verifiable Indicators. The level of inputs and activities were evaluated in comparison with the output levels.

Step 2: Analysis was conducted on the factors that promoted or inhibited the achievement levels including matters relating to both the project design and project implementation process.

Step 3: An assessment of the Project results was conducted based on the five evaluation criteria: "relevance", "effectiveness", "efficiency", "impact", and, "sustainability".

Step 4: Recommendations for the Project stakeholders for the remaining 6 months were formulated as well as the lessons learned were formulated for future projects to be implemented by both Indian and Japanese Governments.

Definition[3] of the five evaluation criteria that were applied in the analysis for the final evaluation is given Table 1-2 below.

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[1] "JICA Project Evaluation Guideline (revised: January 2004)," Office for Evaluation and Post-Project Monitoring, JICA

2 Within the latest JICA Evaluation Guideline of 2004, the term Logical Framework, or LogFrame has been introduced in place of Project Design Matrix (PDM). However since the Project continued referring to this tool as PDM throughout the Project Period, this Report will use the term PDM.

Table 1-2 Definition of the Five Evaluation Criteria for the Final Evaluation

Five Evaluation Criteria	Definitions as per the JICA Evaluation Guideline
1. **Relevance**	Relevance of the Project is reviewed by the validity of the Project Purpose and Overall Goal in connection with the Government development policy and the needs of the target group and/or ultimate beneficiaries in India.
2. **Effectiveness**	Effectiveness is assessed to what extent the Project has achieved its Project Purpose, clarifying the relationship between the Project Purpose and Outputs.
3. **Efficiency**	Efficiency of the Project implementation is analyzed with emphasis on the relationship between Outputs and Inputs in terms of timing, quality and quantity.
4. **Impact**	Impact of the Project is assessed in terms of positive/negative, and intended/unintended influence caused by the Project as well as its influence in reaching the overall goal and the super goal.
5. **Sustainability**	Sustainability of the Project is assessed in terms of institutional, financial and technical aspects by examining the extent to which the achievements of the Project will be sustained after the Project is completed.

Both quantitative and qualitative data were collected and utilized for analysis. Data collection methods used by the Team were as follows:

- Literature/Documentation Review;
- Questionnaires (Counterparts, Experts);
- Key Informant (Counterparts, Japanese Long-term and Short-term Experts, Doctors from IDH);
- Participation in the Evaluation Workshop organized by the Project
- Direct Observations

1.6 Background and the PDM of the Project

The infant mortality rate in India is high (67 per thousand live births as of 2003 and 56 per thousand live births as of 2005, according to the State of the World's Children, UNICEF) and the first cause of infant death in the country is acute diarrheal disorder caused by impure water. The Indian Government had set a goal of reducing the infant mortality rate to 45 per thousand live births by 2007 and 28 per thousand live births by 2012 in its Five-Year National Plan (2002-2007) launched in 2002. Under these circumstances, the government of India requested the government of Japan for the technical cooperation with the aims of establishing countermeasures for diarrheal diseases including a fostering plan of the human resources necessary for molecular biology/epidemiology, developing research facilities and promoting collaborative research, making the National Institute of Cholera and Enteric Diseases (NICED) as the implementing organization.

In response to the above request, JICA's technical cooperation project for Prevention of Diarrheal Diseases (Phase I) was implemented between February 1998 and January 2003. After the successful completion of the Project Phase I, another five-year technical cooperation, the Project for Prevention of Diarrheal

Diseases (Phase II) was launched on 1 July 2003, and will be completed on 30 June 2008. During the course of the Project Phase 2, NICED new building was constructed and equipment was provided by the Japanese grant aid in 2006.

The original Project Design Matrix (PDM Version 1) was modified as the PDM Version 2, for better managerial efficiency as the result of the Mid-Term Evaluation carried out in February 2006. This PDM Version 2 is shown in **ANNEX 3**.

2. RECORD OF PROJECT IMPLEMENTATION

2.1 Inputs

2.1.1 Japanese Side

a) Experts Dispatched

All technical inputs on the Japanese side have been implemented as dispatch of short-term experts. To date, 41short-term experts have been dispatched. Their fields of expertise included the following areas: Molecular Biology, Environmental Microbiology, Epidemiology, Clinical Microbiology, Electron Microscopy, Parasitology, and Virology.

In addition, 2 Project Coordinators, as long-term experts, were assigned for a total of 54 man/months (as of the end of November 2007) to administrate the Project in Kolkata.

The detailed list of Japanese experts is shown in **ANNEX 4.**

b) Trainees Accepted

A total of **18** counterparts were trained under the Counterpart Training Scheme in Japan. The following are the areas of training courses and the number of Counterparts accepted in the respective courses.

Table 2-1 Numbers of Trainees accepted under the Counterpart Training Scheme

Training Course	Number of CPs
Virology (including Molecular Virology)	3
Microbiology (including Molecular and Cellular Biology)	6
Epidemiology (including Biostatistics in epidemiological study)	2
Pathophysiology	1
Parasitology	1
Clinical Medicine	3
Training and Extension	1
Facilities Maintenance and Management	1

Source: JICA Project Office

To date, all trainees continue to work in NICED in their pre-training positions except for three

scientists who was promoted or transferred to other divisions within NICED.

The detailed list of Trainees is shown in **ANNEX 5**.

c) Equipment Provided

Machinery and equipment worth **Rs23,816,743.99** or **60,961,337.92JPY** [4] in total were provided by the time of the final evaluation. This is the total of the hand-over equipment, and does not include the cost for the internet server, which is expected to be installed within the FY2007.

The detailed list of equipment is shown in **ANNEX 6**.

d) Operational Expenses

By the of end of October 2007, a total of **Rs2,823,264** or **JPY11,452,124** equivalent was disbursed as direct operational expenses, mainly used for the administrative costs of the Project.

The details of the operational expenses are shown in **ANNEX 7**.

2.1.2 Indian Side

a) Appointment of Counterpart Personnel

A total of **10** NICED scientists have been assigned as counterpart personnel by the Indian side.

The list of counterpart personnel as of 31 October 2007 is shown in **ANNEX 8**.

b) Cost-sharing of Operational Expenses

In comparison with the Phase I of this Project, NICED has increasingly taken on a greater share of the operational expenses. For the current phase from July 2003 to date, a total of **Rs139,525,000 or JPY 502,449,480** was allocated as direct operational costs for project activities.

Details on cost sharing in direct operational expenses by NICED from FY2000 to FY2007 (planned) is shown as **ANNEX 7** together with the operational expenses spent by Japanese side.

2.2 Activities Implemented

Most of the Project's activities, as specified under the PDM Version 2 and the Project's Five-year Plan, have been implemented on schedule. The achievements for each of the activities are summarised in **ANNEX 9**

2.3 Implementation Process

The Project was designed so that most of the technical inputs by the Japanese side were provided through

[4]. Calculation was made with the at 1 R=2.5596JPY, which is the average exchange rate between the period of 1 July 2003 and 31 October 2007.

the dispatch of short-term experts; only the Project Coordinators were assigned full time as the long-term experts. This set up has been effective in this Project's context partly because it is in its second phase and the Counterparts are already well aware of what a JICA technical cooperation project entails. More importantly, NICED Counterparts and the Japanese technical experts have gradually developed a strong partnership based on mutual respect and trust. Such foundation allowed the main stakeholders of the Project to maintain a good channel of communication, and in many cases, the collaboration has evolved into joint studies and other mutually beneficial initiatives.

One of the challenges in project management which was pointed out in the Mid-Term Evaluation Study report was that the Project counterparts and many of the Japanese experts had not had exposure to the JICA standard project management framework of utilizing the PDM. Through the Mid-Term exercise, the counterparts and the Japanese experts became more concerned about its use as key tools and framework for monitoring and evaluation.

Still, some of the characteristics of the Project should be noted:

- Since majority of the activities involves research work in basic medical sciences, challenging targets were set, for the 5 year time frame of the Project.
- Majority of the research work by NICED counterparts is supported by its own resources and with the combination of JICA and non-JICA external resources. Since the achievements from such research work is a fruition of integrated inputs by various parties, attribution to respective contributors is not feasible. Similarly, many activities within the PDM include activities which are directly or indirectly supported by resources outside of the Project.

2.4 Achievement of Outputs

2.4.1 Achievement of Output 1

Output 1:	**Objectively Verifiable Indicators**
Capacity to identify diarrheal diseases at the molecular level is established.	1.1 Number of diarrheal diseases diagnosed at the molecular level increases. 1.2 Results of the reproducibility test of NICED

1.1 Number of diarrheal diseases diagnosed at the molecular level increases.

This indicator has been accomplished. The following Table 2-2 shows the total number of diarrheal diseases identified at the molecular level and its results for the FY 2001 through FY 2007.

Table 2-2 Number of diarrheal diseases identified at the molecular level and its results by NICED

Identified Diseases	FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007
Division of Microbiology							
No. of cases examined	**2131**	**2285**	**1789**	**2430**	**1297**	NA	NA
No. of cases identified	**252**	**266**	**258**	**637**	**298**	**154**	**139**
V. cholerae	243	245	243	613	270	133	131
V. parahaemolyticus	9	21	15	24	28	21	8
No. of cases examined	**1653**	**1782**	**1515**	**1937**	**1370**	NA	NA
No. of cases identified	**72**	**102**	**63**	**19**	**73**	**21**	**19**
Salmonella spp	33	17	9	8	4	1	0
Shigella spp	39	85	53	11	45	20	19
Division of Virology							
No. of cases examined	**548**	**375**	**351**	**561**	**543**	**379**	**142**
No. of cases identified	**107**	**104**	**89**	**121**	**74**	**76**	**41**
Rotavirus	6	19	7	12	87	59	11
Astrovirus	6	5	5	1	6	1	0
Picobirnavirus	-	-	-	16	47	2	1
Norovirus	-	-	-	3	0	12	23
Sapovirus						0	5
Mixed (NV & SV)						0	1
Division of Parasitology							
No. of cases examined	**975**	**400**	**65**	**134**	**357**	**351**	NA
No. of cases identified	**207**	**92**	**62**	**124**	**57**	**69**	NA
E. histolytica	24	12	9	18	8	20	
G. lamblia	30	12	8	16	8	20	
C. parvum	51	22	18	24	13	12	
Ascaris	62	26	18	33	18	2	
H. nana	10	5	2	8	3	4	
T. trichuria	16	7	3	11	3	4	
T. hominis	12	5	3	7	3	4	
Hookworm	2	3	1	7	1	3	

Source: Division of Microbiology, Virology, Parasitology, NICED
**Note: FY2007 data is up to June 2007*

Although various techniques for analyzing pathogens at the molecular level, such as PCR, RT-PCR, Ribotyping were introduced, some of them were not applied yet for diagnoses during the first phase of the Project. In the second phase of the Project, all those techniques were routinely applied for diagnoses, and number of species and subspecies of diarrheal pathogens that could be identified at NICED increased from 12 in 2003 to 35 at the time of the final evaluation. This resulted in the improvement of a total isolation rate from 20% in 2003 to 49.3% at the time of the final evaluation, which is expected to rise up to around 70% by the year 2008.

1.2 Results of the reproducibility test of NICED

This indicator has not been accomplished. Reproducibility test is an external accreditation. A blind test should be conducted either by Japanese experts or by some other institution to examine whether NICED has capacities to identify pathogens correctly. The Chief Advisor of the Project has had the full confidence on the capacities of NICED scientists. Japanese experts had no chance to conduct the reproducibility test, because of the limited period of their stay in India. There was no other institution in India to conduct the reproducibility test.

2.4.2 Achievement of Output 2

Output 2:	Objectively Verifiable Indicators
Strains and diagnostic sera are appropriately managed and archived.	2. Anti-sera is produced for 100 serogroups of *V. cholerea* nonO1/nonO139

Output 2 has been accomplished. Anti-sera for *V. cholerae* O2 to O104, reaching 104 antisera in respect to 27 serotypes of *V. cholerae* O1-26 and O139) has been already produced by the Microbiology Division and aims to produce and archive diagnostic anti-sera of more than 210 serotypes by the end of the Project. The number of archived strains at the maintenance facility is shown in Table 2-3.

Table 2-3 Record of archived strains at the maintenance facility

Archived strains	FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007*	TOTAL
V. cholerae	243	245	243	613	270	133	131	2,042
V. parahaemolyticus	9	21	15	24	28	21	8	97
Salmonella spp	33	17	9	8	4	1	0	71
Shigella spp	39	85	53	11	69	20	19	357
Escherichia coli	-	4	-	-	50	12	67	54

Source: Division of Microbiology, NICED
**Data for 2007 is up to October 2007.*

It should be noted that with the expansion of the "Animal House" in the new NICED building, which was constructed as a part of the Japanese grant aid in 2006, contributed greatly to increasing the production levels of anti-sera. NICED has been providing, as part of its extension activities, doses of these anti-sera upon demand to various research and medical institutions in the country free of charge. The provision of anti-sera aims to enhance other institutions' capabilities to accurately diagnose *V. cholerae* pathogens.

2.4.3 Achievement of Output 3

Output 3:	Objectively Verifiable Indicators
Constant surveillance of pathogens of diarrheal diseases is established.	3. At least 2 more hospital based surveillance system will be established.

This output is expected to be partly accomplished by the end of the Project period. The purpose of this output was to; 1) establish a model of constant surveillance network in the state of West Bengal, and to 2)

strengthen the capacity of NICED to develop preventive measures to control diarrheal outbreaks.

At the time of Mid-Term Evaluation NICED, the evaluators found that NICED already administered two hospital based surveillance of pathogens of diarrheal disease, one with the Infectious Disease Hostpital (IDH) and another one with Dr. B.C. Roy Memorial Children's Hospital (BCRCH)[5]. During the Mid-Term Evaluation exercise, it was agreed that the two more hospital based surveillance systems should be established in 2 more hospitals within West Bengal, at the district hospitals of Howrah and Midnapur. However, the surveillance activities in these 2 hospitals had been discontinued due to the following reasons:

1) Insufficient planning and human resources on the side of the Project and insufficient collaboration by the health personnel in the hospitals of Howrah and Midnapur.

2) 2 hospitals are within the same catchment area and most of the patients in this area with severe diarrhea, especially those with *colerae* are referred to either IDH or BCRCH. As the purpose of the surveillance is to monitor changes in diseases patterns, it was suggested to expand the surveillance throughout India rather than concentrating it within West Bengal recently.

Good collaboration with the Integrated Disease Surveillance Program (IDSP) which is on-going in the State of West Bengal, supported by the World Bank may be one key element to promote constant surveillance of pathogens.

2.4.4 Achievement of Output 4

Output 4:	**Objectively Verifiable Indicators**
Technical expertise to identify diarrheal pathogens is transferred to other parts of India and neighbouring countries.	4. More than 200 scientists (medical/non-medical) will be trained in molecular level identification and characterization.

Output 4 has been mostly accomplished. Since 2003 the Project implemented 5 In-country Training Programs targeting scientists and technical staff from inside India and 4 Third-country Training Programs

[5] The surveillance system for IDH, which begun in 1995, is one of active surveillance, where there is systematic sampling (i.e. every 5th patient on two randomly selected days per week). The main objectives for the surveillance is to monitor changes in disease patterns including drug sensitivity, to provide a data base on diarrheal illness for researchers, to provide regular reports to the State Government of West Bengal and other relevant agencies on diarrheal pathogens, to develop an early warning system for forecasting an epidemic, and to improve care and introduce better preventive measures[5]. For each year approximately 1,000 samples from patients enrolled in the surveillance program are taken for diagnosis in the Divisions of Microbiology, Virology, Parasitology, and Electron Microscopy for the identification of pathogens. The results are usually compiled in biweekly institutional report submitted to the Public Health Directorate of the State Government of West Bengal, IDH; individual patient's reports are also prepared and are made available upon request. Similarly for the BCRCH, samples are collected, diagnosed and reported back to the hospital, but sampling is conducted according to the clinical diagnosis by the doctors from the Clinical Division of NICED.,

targeting trainees from neighbouring countries (i.e. China, Bhutan, Myanmar, Nepal, Sri Lanka, Philippines, Indonesia, Bangladesh, Zambia, Kenya, Ghana, Tanzania).

Both training programs focus on molecular epidemiology of diarrheal diseases, with special reference to *V. cholerae*. The number of participants trained is shown in Table 2-4 below. As a result of the training programs, 112 domestic participants from 21 states of India and 43 international participants from 12 countries acquired basic knowledge on diarrheal diseases and have the capability to conduct research. Their capacity is assessed during the respective training programs where each participant is requested to present their research activities.

Table 2-4 Number of Participants Trained

Year	In-country Training	Third-country Training	Total Trainees
2003	15	12	27
2004	15	11	26
2005	15	10	25
2006	15	10	25
2007	21	0	21
Total	112	43	155

Source: JICA Project Office, 2007

The core faculty of NICED with additional Japanese experts act as the lecturers. In addition, NICED is responsible for the selection of participants and administration of the In-country Training. About 15 participants are selected each year on the basis of 1) their background in clinical biology and whether they have some experience in isolating pathogens, 2) their affiliations (usually scientists from Government hospitals or Medical Colleges, laboratories are invited), and 3) their current job responsibilities since preference is given to frontline scientists who would be in a position to immediately apply the acquired technology.

Two recommendations had been made by the Mid-Term Evaluation Team to NICED regarding the In-country Training Program: 1) to organize a formal training program for Molecular Virology by the end of the Project period, and 2) to have a institutional strategy and an action plan that would integrate the training and surveillance network related activities to optimize results, by planning and implementing more systematic follow-up activities of the training programs.

In response to those recommendations, highly-qualified ex-participants of In-country Training from 25 institutions throughout India were selected, taking into the consideration whether the hospitals, medical colleges or laboratories where they belonged to, have sufficient institutional capacities to function as the network centres in the near future. Out of 25 ex-participants from 25 institutions invited, 21 participated in the In-country Training Program in November 2007. This training program included a formal training program for Molecular Virology for the first time.

It can be said that follow-up activities of the training programs have been strengthened after the Mid-Term Evaluation, although not in a systematic way. Many of the participants give feedback about the success of the training by implementing the research exercise and some of them by making joint publications. So far, eight publications have been made jointly with In-country training program participants.

2.4.5 Achievement of Output 5

Output 5:	Objectively Verifiable Indicators
Surveillance network of diarrheal diseases is established in India.	5. At least 20 institutions will be networked by mid 2008.

It will be difficult to achieve Output 5 by June 2008. The concept of the "surveillance network" has evolved throughout the Project term and the final conceptual framework was reported during the final evaluation mission. The plan is to develop a constant surveillance network with 25 of the peripheral medical institutions around India and to provide internet connection amongst those institutions for pathogenic data sharing. This will enable constant surveillance of diarrheal diseases around India for taking preventative measures for diarrheal disease outbreaks. By the end of the Project, a mechanism for establishing this network between NICED and 25 peripheral research hospitals to actively collect and disseminate diarrheal diseases related data throughout India is expected to be set. The mechanism is indicated as follows:

1) Assignment of focal person at NICED and the five initial networking medical institutions to establish this informal net work.

2) Setting of a server at NICED for the internet connection.

In November 2007, five most advanced institutions were selected as the five initial networking medical institutions. However, since those institutions are under the state governments, an approval by each of those state governments is required so that those institutions can collaborate for networking. An official letter requesting collaboration needs to be sent by ICMR to each of those state governments.

2.4.6 Achievement of Output 6

Output 6:	Objectively Verifiable Indicators
Capacity to investigate the efficacy of drugs for diarrheal diseases is improved.	6.1. Number of drug resistance test will increase than that of 2003. 6.2. At least 2 clinical trials for the treatment of diarrheal diseases will be conducted.

It is considered that Output 6 will be mostly achieved by June 2008.

6.1 Number of drug resistance test will increase than that of 2003.

Substantial number of drug resistance test has been conducted since 2003. NICED's capacity to investigate the efficacy of drugs and other treatments for diarrheal diseases has much been enhanced. Starting with this phase of the Project, NICED developed the mechanism to conduct 11 kinds of drug resistance tests for every sample provided from IDH and BCRCH. The Table 2-5 shows the numbers of tests for *V. cholerae*, *V. parahaemolyticus, Salmonella and Shigella.* All of the individual test reports are systematically reported back to the respective hospitals.

Table 2-5 Number of drug resistance tests performed by NICED FY 2001-FY2005

Year	2001	2002	2003	2004	2005	2006	2007
Shigella	39	85	53	111	45	20	19
Salmonella	33	17	9	8	4	1	0
V. parahaemolyticus	9	21	15	24	28	11	5
V. cholerae	81	80	81	200	90	75	30*

Source: NICED

**Outbreak strains*

6.2. At least 2 clinical trials for the treatment of diarrheal diseases will be conducted.

This indicator has been accomplished, as two clinical trials for the treatment of diarrheal diseases is on-going.

1) Clinical trial of improved oral rehydration salt (ORS) in hospital setting is on-going in IDH by the Epidemiology Division and the Clinical Division of NICED. Clinical trial of the ORS is planned to be implemented in community level later on.

2) Clinical trial of use of probiotics together with the normal protocol of the treatment of diarrheal disease is on-going in IDH by the Epidemiology Division and Clinical Division of NICE.

2.5 Achievement of the Project Purpose

Project Purpose:	**Objectively Verifiable Indicators**
Strengthen capacities and augment capabilities at NICED and to disseminate the same throughout the country for prevention and control of diarrheal diseases	1. Number of kinds of species and subspecies of diarrheal diseases identified at NICED is higher than that of 2003.. 2. Number of research institutions that are capable of identifying diarrheal pathogens at the molecular level. 3. Number of publication produced by NICED scientists. 4. Average impact factor of the publication produced by NICED scientists is higher than that of 2003.

Project Purpose has been achieved to a fair extent.

As shown in the achievement of Output 1, 2, and Output 6, it is evident that the capacities of NICED has been strengthened and augmented substantially in the course of the Project. Also, as shown in the achievement of Output 4, the Project has contributed very much in human resource development of other medical institutions throughout the country as well as those in other countries through its annual training programs and follow-up. Also, most of the counterparts and Japanese experts consider that the Project

Purpose has been achieved fully or to a fair extent by the end of the Project period in June 2008. They are satisfied with the research activities carried out in NICED applying the transferred techniques and making the full use of the inputs provided through the Project.

The following is the degree of achievement shown in the 4 objectively verifiable indicators:

1) Number of kinds of species and subspecies of diarrheal diseases that could be identified at NICED rose from 12 in 2003 to 35 at the time of the final evaluation in 2007, with which a total isolation rate rose from 20% to 49.3% during the same period. The total isolation rate is expected to rise up to around 70% by the end of the Project period in June 2008.

2) Number of research institutions that are capable of identifying diarrheal pathogens at the molecular level increased from 4 in 2003 to 40 at the time of the final evaluation in through annual training programs and follow- up by NICED.

3) Number of publication produced by NICED scientists vary by year, as shown in Table 2-6. The work of NICED's scientists have been published in renowned academic journals such as *Journal of Clinical Microbiology, Journal of Antimicrobial Chemotherapy,* and *Journal of Infectious Diseases.*

Table 2-6 Number of Scientific Publications by NICED staff

Year	No. of Publications
2001	38
2002	21
2003	52
2004	34
2005	57
2006	47

Source; NICED

4) Average impact factor of the publications produced by NICED scientists has steadily risen from 2.1 in 2003 to 2.56 in 2006 and 2007, (up to the end October 2007), signifying the improvement of the quality of their publications (Table2-7).

Table 2-7 Impact Factor of NICED Publications

Year	IF
2001	1.55
2002	1.96
2003	2.10
2004	2.22
2005	2.24
2006 and 2007*	2.56

Source: NICED
**Up to the end October 2007*

2.6 Overall Goal

Overall Goal	Objectively Verifiable Indicators
Capacities of medical institutions in India to prevent diarrheal diseases will be improved.	The results of the reproducibility tests of the networked centres are higher than that of 2003.

Contents of the narrative summary of the overall goal will be achieved to a fair extent within 3 to 5 years after the termination of the Project in June 2008, as the Project has already contributed greatly for the human resource development of over 100 medical institutions from 21 states of India through its in-country training programs and exchange of information and technical support provided by NICED scientists. If the proposed constant surveillance network with 25 peripheral medical institutions for pathogenic data sharing is established, it will be further strengthened.

However, the objectively verifiable indicator (the results of the reproducibility tests of the networked centres are higher than that of 2003) may not be accomplished due to the following reasons:

1) It is not clear to what extent the activities related to the proposed constant surveillance network can be accomplished by the end of the Project period.

2) As the reproducibility tests have not been conducted so far, the baseline data for 2003 is not available.

3) It is not clear whether NICED can conduct reproducibility tests for the networked centres. Since most of the medical institutions are under the state governments, their approval is essential to conduct such tests.

2.7 Super Goal

Super Goal	Objectively Verifiable Indicators
Mortality rate of diarrheal diseases will be reduced in India.	Mortality rate of diarrheal diseases.

The mortality rate of diarrheal diseases has declined in India during the past 15 years, while the morbidity rate remains high. The Table 2-8 shows the number of diarrheal cases and deaths in the IDH, Kolkata since 1992.

Table 2-8 Diarrheal Cases and Deaths at IDH, Kolkata

Year	Diarrheal cases	Deaths	Case fatality rate/1000
1992	23333	723	30.99
1993	44438	1125	25.32
1994	29171	638	21.87
1995	25303	616	24.34
1996	25650	400	15.59
1997	28256	293	10.37
1998	29203	345	11.81
1999	24469	245	10.01
2000	20548	155	7.54
2001	23274	195	8.38
2002	24377	219	8.98

Source: IDH Hospital, Kolkata

In order for the NICED to contribute for further reduction of mortality and morbidity of diarrheal diseases, and achieve this Super Goal, Dr. Nair, the Director of the NICED, expressed that further strengthening of etiological surveillance on diarrheal pathogens is essential. In addition, implementation of culture independent rapid identification of etiological agents will be effective to raise awareness of the health personnel as well as the patients for prevention of diarrheal disease. For this purpose, NICED is now developing a dip stick for on-the-spot identification of *V. cholerae*.

3. Evaluation by Five Criteria

3.1 Relevance

Based on the assessment of the needs of the health sector in India and in the State of West Bengal, Indian national policy and the Japanese Official Development Assistance (ODA) policy towards India, the relevance of the Project is considered to be high.

In India the infant mortality remains high (67 per 1,000 live births according to the State of World Children, UNICEF, 2003) and the diarrheal diseases is the highest cause of infant mortality. Also, diarrheal diseases continue to be the highest cause of hospitalization over any other diseases in West Bengal[6]. Thus it may be concluded that the health needs to prevent diarrheal diseases continues to be very high both in India and in the State of West Bengal.

In India's National Health Policy of 2002, it was indicated that diarrheal disease such as gastroenteritis and cholerae continues to contribute to a high level of morbidity in the population. Furthermore it highlights the national needs to strengthen its surveillance system which in turn would enable timely intervention to contain the spread of infection for these diseases. The Project's approach to expand its constant surveillance network is very much in line with such national policy directions.

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[6] Health Statistics of West Bengal 2005-2006, State Bureau of Health Intelligence, Directorate of Health Services, Government of West Bengal.

According to the JICA Country Assistance Strategy of 2001 for India, the prevention of infectious diseases was identified as one of the main pillars for poverty reduction, which in turn is one of the three main priority areas for JICA's assistance together with environmental protection, and support to economic reforms. The Project is also in line with Japanese Government's 2005 Country Assistance Plan for India, which also highlights the need to support the prevention of infectious diseases not just through support to the development of physical infrastructure, but also with an emphasis on human resource development and institutional strengthening such as referral systems and networks. Thus from both policy documents, it may be concluded that the Project's objectives are also consistent with the Japanese ODA policy to India.

3.2 Effectiveness

The effectiveness of the Project is relatively high. The Project Purpose will be achieved to a fair extent by the end of the Project period in June 2008. The team has acknowledged the achievements of Output 1, 2, 4, 6 and its high correlation in achieving the Project Purpose.

However, it should be noted that the objectives and concepts of constant surveillance pathogens (Output 3) and surveillance network of diarrheal diseases (Output 5) were not clear amongst stakeholders at the time of the Project Planning and during the Mid-Term Evaluation exercise. This resulted in delay of its implementation, thus leading to incomplete attainment of Outputs.

3.3 Efficiency

The Project's efficiency is high with regards to its inputs and the current achievement levels of most of the Outputs. All equipment have been procured and utilized fully by the Counterparts. The training opportunities in Japan have been cited in interviews and questionnaires as extremely useful for the Counterparts not just to obtain new technical capabilities but also for the development of professional networks in view of future collaborative work.

Dispatch of the short-term experts has also been viewed favourably by the NICED staff. In spite of the short length of stay by the experts in NICED, most of the counterparts considered these visits as a good opportunity to exchange information and technology, which enhanced NICED activities.

3.4 Impact

The Project's impact is high with regards to its likelihood to achieve the overall goal in the near future. The Project has contributed greatly toward human resource development throughout India through in-country training programs and dissemination of information and knowledge in the form of 1) publications, reports; 2) conformation of the diagnostic results of the samples sent to NICED from other health institutions. These activities contributed greatly to enhance the diagnostic and treatment capacities of other medical and research institutions. One of the examples is that the number of research institutions that are capable of identifying diarrheal pathogens at the molecular level has increased from 4 to 40 as mentioned in the description on the achievement of the Project Purpose. Once proposed networking of NICED with 25 institutions is established, it will further contribute to improve capacities of medical institutions in India to prevent diarrheal diseases.

Also, there is a growing demand for NICED's extension services such as increasing number of requests for diagnostic anti-sera or outbreak investigations[7], in addition to its role as reference laboratory. Moreover, NICED has been accepted at the international network of medical research institutions, *Pulse Net Asia-Pacific*, which would now enable them to take on the additional role to link the domestic to international institutions.

As for the Project's impact in achieving the Super Goal to reduce mortality rate of diarrheal diseases in India, the direct impact of basic research work is hard to be assessed in short-term. However, on-going NICED activities such as vaccine trial for *colerae* and *typhoid* and the trial of probiotic drink[8] may contribute directly towards the reduction of mortality and morbidity due to diarrheal diseases.

3.5 Sustainability

In view of the current national policies, organizational aspects, financial aspects, and technical aspects, it could be concluded that the sustainability of the effects of the Project after its completion is considered high. Institutionally and financially, ICMR continues to support NICED as a centre of excellence, and this is reflected in the appropriate amount of budget allocated for the institution as shown below in Table 3-1.

Table 3-1 Budget Allocation for NICED for FY 1999 to FY 2006

(in 1000 Rs)

Budget Items	1999	2000	2001	2002	2003	2004	2005	2006
Human Resources	39,770	39,227	40,820	40,864	48,153	55,081	60,136	51,560
Travel Expenses	760	913	1,210	1,308	1,020	1,413	1,006	12,770
Operational & Maintenance	9,546	11,500	14,650	17,725	16,470	30,500	16,226	54,500
Equipment	8,143	22,476	20,916	24,677	11,103	17,227	-	22,529
Capital Budget	26,429	45,649	17,706	5,558	16,102	326,636	613,000	80,161
Total for FY	**84,648**	**119,765**	**95,302**	**90,132**	**92,848**	**430,857**	**690,408**	**221,520**

Source: NICED
Note: FY2007 data is up to end October 2007

Furthermore, it should be noted that the financial sustainability of NICED appears solid, since NICED already has much experience in mobilizing external resources, both domestic and international, to support its activities.

Technical sustainability of the Project is also high, as NICED continues to retain most of its core research faculty within its organization. The level of their technical sustainability has been proven already with its capacity to host a series of In-country and Third-country training programs as well as other human resource development initiatives within the organization. Also, the Team observed that all the facilities and

[7] Where there was only 1 case of outbreak investigation in FY1998, the number has steadily increased to 9 in FY2004. In FY2005 to date, NICED has already conducted 9 outbreak investigations.

[8] Those trials are financed by other organizations but technical and infrastructural foundations are based on the JICA-NICED Project outcomes.

equipment provided by JICA and Japanese grant aid are properly maintained and used in good conditions.

However, the sustainability of the surveillance network needs further consideration for it is still dependent on acquiring the technical expertise for establishing and sustainable operation of the network.

Finally it should be noted that the Okayama University–India Collaborative Research Centre Program, financed by the Ministry of Education and Science, Japan was started in September 2007, on the basis of the experiences and outcomes of the Project, assuring the continuity of research works between Japan and India.

4. Conclusion

This final evaluation confirmed that the Project has shown good achievement, and will accomplish the Project Purpose to a fair extent by the end of the Project implementation period. Although delay in establishing surveillance network of diarrheal diseases is observed, the implementation process has been smooth due to the firm partnership maintained between the Japanese experts and NICED Counterparts, backed by mutual trust nurtured since the first phase of the Project. NICED has shown remarkable progress, both in its physical and human resource capacities, to conduct the crucial research activities for diarrheal disease prevention and control; and now it is in the process to establish a surveillance network in India for further improvement of prevention and control of diarrheal diseases. This establishment will require technical expertise as well as further commitment from the Indian side.

5. Recommendations

1) Measures recommended to be taken before the end of the Project

- It is recommended that NICED may continue to update the training materials for continuous in-country trainings in the future.
- It is recommended that NICED may appoint a focal person in charge of establishing the surveillance network.
- It is recommended that NICED may start to prepare the management manual for the current surveillance network between IDH and NICED as a model of surveillance networking in India for replication to other institutions.
- It is recommended that NICED may start to make a concrete plan (including the budgetary plan and time framework) of the surveillance networking. In doing so JICA may consider the dispatch of an expert in the field of surveillance networking.

2) Measures recommended to be taken after the end of the Project

- It is recommended that the role of NICED to provide technical guidance to peripheral research centres may be systematized and be strengthened for assuring the quality of laboratories across nation.
- It is recommended that the role of NICED to conduct in-country and third country training programs be strengthened for continuous and sustainable human recourse development. In order to accomplish this,

the following measures are recommended.

- ICMR may encourage sufficient budgeting for continuous implementation of the training programs.
- NICED may consider setting up an administrative division for implementing systematic training programs and accumulating data of the trainees.
- It is recommended that NICED may establish the surveillance network on diarrheal diseases based on the result of current Project.

6. Lessons Learned

1) Technology transfer of specific field of science can be realized through the dispatch of short-term experts when long-term commitment to the project and partnership with counterpart organization is assured.

2) It should be noted that in order to sustain the budget and working conditions for the Project, coordination with not only the Counterpart organization, but also with its policy level advisory body is essential. The Project was successful in increasing the counterpart budget steadily throughout the Project implementation period through sufficient coordination between ICMR, NICED and the Project.

7. Others

NICED requested to JICA to continue future cooperation to set up surveillance network on diarrheal diseases in India.

ANNEX 1. Schedule Of The Terminal Evaluation Team To NICED

14th – 29th November 2007

No	Date	Day	Place	Activity
1	14th Nov	Wednesday	Tokyo	Assessment Analysis Member leave for Kolkata 16:00(JL 703) Arrive at Delhi 21:05⇒Leave for Kolkata 23:15 (TG313)
2	15th Nov	Thursday	Kolkata	Arrive at Kolkata 00:20 Consultation with Project
3	16th Nov	Friday	Kolkata	【AM】 ・Courtesy call to NICED ・Interview Experts・(Extract data for PDM indicators, conduct analysis) 【PM】 Organize data
4	17th Nov	Saturday	Kolkata	・ Interview Experts Make Evaluation Report(draft)
5	18th Nov	Sunday	Kolkata	・ Make Evaluation Report(draft)
6	19th Nov	Monday	Kolkata	・ Interview NICED Counterparts ・ Organize data
7	20th Nov	Tuesday	Kolkata	・ Interview NICED Counterparts/other related personnel- ・ Organize data ・ Supervisor, Medical Science, Assistance Planning Member leave for Delhi JL471 11:00⇒17:30 ・ Meeting with JICA India Office (if possible)
8	21st Nov	Wednesday	Kolkata/Delhi	・ Organize data ・ Make Evaluation Report(draft) ・ (Meeting with JICA India Office if possible) ・ Leave for Kolkata 9:20 (9W 922) ・ Arrive at Kolkata 11:25 ・ Meeting with Mission Member
9	22nd Nov	Thursday	Kolkata	【11 AM】 ・ Courtesy call to Japan Consulate General in India 【PM】 Visit Infectious Disease Hospital (IDH) Courtesy call to West Bengal Provincial Health Office ・ Meeting within mission members
10	23rd Nov	Friday	Kolkata	Conduct Evaluation Workshop at NICED

11	24th Nov	Saturday	Kolkata	Visit NICED Organize data/ Make Evaluation Report(draft)
12	25th Nov	Sunday	Delhi	【AM】 Leave for Delhi 8:55 (9W902) (Dr. Takeda also joins the Team by the same flight.) Arrive at Delhi 11:10 Organize data/ Make Evaluation Report(draft)
13	26th Nov	Monday	Delhi	【AM】 Mr. Noshiro Leaves for Delhi 6:30 (9W921),joins the Team.Vehicle for him arranged by the Project. ・ Courtesy call to IC ・ Courtesy call to Ministry of Health 【12:30 PM】 ・ Courtesy Call to DEA (Mr. N.K. Chaudhary, Deputy Secretary; Room-67A; Tel: 011-2309.2326) Organize data/ Make Evaluation Report (draft)
14	27th Nov	Tuesday	Delhi	・ Preparation for JCC ・ Make MM(Draft)
15	28th Nov	Wednesday	Delhi	【AM】Joint Coordination Committee 【PM】 ・ Report to JICA India Office ・ Report to Embassy of Japan in India ・ Supervisor, Assessment Analysis Member leave for Narita JL472 19:50 ・ Mr. Noshiro leaves for Kolkata by 9w911 17.55
16	29th Nov	Thursday	Delhi	・ Medical Science Member leave for Osaka TG316 00:05⇒Arrive Osaka 19:00 ・ Supervisor, Assessment Analysis Member arrive at Narita 09:25 ・ Assessment Plann ng member leave for Bangladesh 05:00 AI 520⇒Dhaka7:30

ANNEX 2. List of Stakeholders Consulted by the Evaluation Mission

PARTICIPANTS OF THE JOINT COORDINATION COMMITTEE MEETING:

(Indian Side)

- Dr.S.K.Bhattacharya, Additional Director General, ICMR HQ
- Dr. V. Muthuswamy, Senior DDG, ICMR, New Delhi
- Dr. Sanjiv Datta, Financial Advisor, ICMR, New Delhi
- Dr. G. B. Nair, Director, NICED, Kolkata
- Dr. M.K. Chakrabarti, Deputy Director Sr. Gr., Division of Pathophysiology, NICED, Kolkata
- Dr. Dipali Mukherji, DDG (SG) and Chief (ECD), IMDR HQ
- Dr. Rashmi Arora, DDG (ECD), IMCR HQ
- Dr. Harjpreet Sandhu, SRO, International Health Division, ICMR HQ
- Ms. Sreyasi Chaudhuri, Undersecretary, (Japan), DEA, Ministry of Finance, New Delhi
- Dr. Sharat Chauhan, Deputy Secretary (International Health), Ministry of Health and Family Welfare
- Ms. Priya Mahadevan, DEA, Ministry of Finance, New Delhi

(Japanese Side)

Evaluation Mission Members

- Dr. Kisho Ono, Leader
- Hideo Hayashi, Basic Medical Sciences
- Mr. Katsujiro Hori, Evaluation Planning
- Ms. Saeko Ichiawa, Evaluation Analysis

(NICED Project Office)

- Dr. Yoshifumi Takeda, Short Term Expert
- Mr. Yutaka Noshiro, Project Coordinator
- Ms. M. Mukherjee, Project Officer

(Embassy of Japan)

- Mr. Keiji Kamiyama, Councellor

(JICA India Office)

- Mr. Tomoyuki Fujii, Resident Representative
- Mr. Nobuaki Koguchi, Assistant Resident Representative
- Mr. Dinakar, Staff
- Ms. Umi Kojima, Country Officer

NICED STUFF CONSULTED BY EVALUATION MISSION

- Dr. G. B. Nair, Director, NICED, Kolkata
- Dr. S.Chakrabarti, Deputy Director Sr. Gr. & Head, Division of Division of Immunology and Vaccine Department, NICED, Kolkata
- (Dr. T.N.Naik, Deputy Director Sr. Gr., NICED, Kolkata)

- (Dr. P. Dutta, Deputy Director Sr.. Gr., NICED, Kolkata)
- Dr. M.K. Chakrabarti, Deputy Director Sr. Gr., Division of Pathophysiology, NICED, Kolkata
- Dr. T. Ramamurthy, Deputy Director, Division of Microbiology, NICED, Kolkata
- Dr. D. Sur, Deputy Director, Division of Epidemiology, NICED, Kolkata
- DR. A. N. Ghosh, Deputy Director, NICED, K
- Mr. A.Palit, Asst. Director, NICED, Kolkata
- Dr. B.Manna, Asst.Director, NICED, Kolkata
- Dr. M.K. Battacharya, Asst. Director, NICED, Kolkata
- Dr. T.Biswas, Asst.Director, NICED, Kolkata
- (Dr. Sandipan Ganguly, SRO, NICED, Kolkata)
- Dr. N.S. Chatterjee, SRO, Division of Biochemistry, NICED, Kolkata
- Dr. R.Nandy, SRO, NICED, Kolkata
- Dr. A.Pal, SRO, NICED, Kolkata
- (Dr. T.Krishnan, SRO, NICED, Kolkata)
- Dr. A. Mukhopadhyay, SRO, NICED, Kolkata
- Ms. Esha, Division of Parasitology, NICED, Kolkata

OTHER PARTNERS

- Dr. S. N. Dutta, Joint Director of Health Services, Directorate of Public Health Services, the Government of West Bengal
- Dr. A. K. Boahme, Deputy Direct of Health Services Directorate of Public Health Services, the Government of West Bengal
- Dr. A. K. Sarkar, Epidemiologist (PH), W.B.
- Dr. M. K. Ghosh, Assistant Director of Health Services, Public Health Branch of Soshya Bhawan
- Dr. M. Ghosh, Infectious Disease Hospital

JAPANESE EXPERTS

- Dr. Yoshifumi Takeda, Chief Advisor of the Project
- Dr. Sumio. Shinoda, Professor, Okayama University of Science
- Dr. Shinji Yamazaki, Professor Osaka Prefectural University
- Dr. N. Kobayashi, Professor, Supporo University
- Dr. K. Okamoto, Professor, Okayama University
- Mr. Fumiaki Yoshizaki, Former Project Coordinator
- Mr. Yutaka Noshiro, Project Coordinator

ANNEX 3. PDMs

PROJECT NAME: **PREVENTION OF DIARRHEAL DISEASES (PHASE2)**
PROJECT PERIOD: FROM JUL. 2003 TO JUN.2008
PROJECT AREA:KOLKATA, INDIA; Target Group: 1. Scientists at NICED, 2. Trainees from other institutions

Version: 2
DESIGNED DATE: 16 FEBRUARY 2006

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATOR	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
SUPER GOAL Mortality rate of diarrheal diseases will be reduced in India.	Mortality rate of diarrheal diseases	1. National Health Statistics	
OVERALL GOAL Capacities of medical institutions in India to prevent diarreal diseases will be improved.	The results of the reproducibility tests of the networked centres are higher than that of 2003.	1. Reproducibility tests implemented by NICED	
PROJECT PURPOSE Strengthen capacities and augment capabilities at NICED and to the same throughout the country for prevention and control of diarrheal diseases.	1 .No. of kinds of species and subspecies of diarrheal pathogens that could be identified at NICED is higher than that of 2003. 2. No. of research institutions that are capable of identifying diarrheal pathogens at the molecular level. 3. No. of publication produced by NICED scientists. 4. Average impact factor of the publication produced by NICED scientists is higher than that of 2003.	1. NICED annual reports 2. NICED annual reports 3. NICED annual reports 4. NICED annual reports	1. Government adapts policy on prevention, treatment and diagnosis of diarrheal diseases based on acquired result. 2. Epidemic investigation is conducted at national level.
OUTPUTS 1. Capacity to identify diarrheal diseases at the molecular level is established. 2. Strains and diagnostic sera are appropriately managed and archived. 3. Constant surveillance of pathogens of diarrheal diseases is established. 4. Technical expertise to identify diarrheal pathogens is transferred to other parts of India and neighbouring countries. 5. Surveillance network of diarrheal diseases is established in India. 6. Capacity to investigate the efficacy of drugs for diarrheal diseases is improved.	1.1 No. of diarrheal diseases diagnosed at the molecular level increases 1.2 Results of the reproducibility test of NICED 2. Antisera is produced for 100 serogroups of *v. cholera* nonO1/nonO139 3. At least 2 more hospital based surveillance system will be established. 4.More than 200 scientists (medical/non-medical) will be trained in molecular level identification and characterization 5. At least 20 institutions will be networked by mid 2008. 6.1. No. of drug resistance test will increase than that of 2003. 6.2 At least 2 clinical trials for the treatment of diarheal diseases will be	1. NICED annual reports 2. Reproducability tests 3. NICED annual reports 4. NICED annual reports 5. NICED annual reports 6. NICED annual reports	1. Adequate network between state and national government 2. Good collaboration is kept with other institutes. 3. More staff are assigned at NICED.
ACTIVITIES 1.1 To examine phenotype of enteric pathogens 1.2 To analyze enteric pathogens at molecular level by DNA typing 1.3 To develop molecular methods of identification of diarrheal pathogens 2.1 To collect, analyze and archive sera from patients with diarrheal 2.2 To establish an institution for producing diagnostic antisera 2.3 To maintain proper animal facility and to facilitate production of antisera	**INPUT Donors' side** 1. Experts : short-term, in the following fields; (Virology, Parasitology, Microbiology, Environmental Microbiology, Molecular Biology, Epidemiology, Clinical medicine etc.) 2. Counterparts training in Japan 3. Equipment: analytical instrument, information gathering instrument, etc. 4. Counterparts training at home and in the third country		1. Trained counterparts stay at work during the project period. 2. Budget allocation for NICED is enough to cover all activities.

2.4 To introduce specimen banking system for strains and antisera 3.1 To setup continuous surveillance system for pathogens 3.2 To select fields for epidemiological research and conduct investigation 3.3 To conduct environmental surveillance for human pathogens to identify 4.1 To provide training for doctors and scientists of relevant hospitals and 4.2 To conduct follow up of the trained doctors and scientists to assess the 5.1 To collect clinical data of patients from hospitals participating in the 5.2 To establish network system for early warning of outbreaks and 6.1 To test drug resistance of enteric pathogens 6.2 To report the results of the drug susceptibility test back to the hospitals 6.3 To improve formulation of ORS for acute secretory diarrhea.	**INPUT: Recipient's side** 1. Administrator 2. Counterparts-Scientist and technician in the fields of Microbiology, Epidemiology, Clinical medicine, 3. Cost for administration, consumable supply etc. 4. Office Building (NICED)	**PRECONDITIONS** 1. Government does not oppose planned work in the project 2. State government and relevant hospitals

ANNEX 4. List of Japanese Experts

JICA Short term Experts who visited NICED in FY2003 to FY2007 (up to January 2007)

No	Name of	Organization	Area of Expertise	Duation	No. Days
1.	Dr. S. Yamasaki	Osaka Prefectural University	Molecular Biology	3~9 November 2003	7
2.	Dr. S. Shinoda	Okayama University	Environmental Microbiology	10~15 November 2003	6
3.	Dr. K. Hirose	National Institute of Infectious Diseases	Epidemiology	3~11 December 2003	9
4.	Dr. E. Arakawa	National Institute of Infectious Diseases	Epidemiology	3~11 December 2003	9
5.	Dr. K. Okamoto	Okayama University	Clinical Microbiology	13~20 December 2003	8
6.	Dr. S. Yamasaki	Osaka Prefectural University	Molecular Biology	11~18 January 2004	8
7.	Dr. Y. Takeda	Jissen Women's University	Microbiology	20~31 January 2004	12
8.	Dr. J. Terajima	National Institute of Infectious Diseases	Epidemiology	28 January~7 February 2004	11
9	Dr. Y. Takeda	Jissen Women's University	Microbiology	11 ~ 24 August 2004	14
10	Dr. S. Shinoda	Okayama University	Environmental Microbiology	30 September~8 October 2004	9
11	Dr. K. Okamoto	Okayama University	Clinical Microbiology	30 September~8 October, 2004	9
12	Ms. M. Arita	Okayama Prefectural University	Electron Microscopy	30 September~8 October 2004	9
13	Dr. S. Yamasaki	Osaka Prefectural University	Molecular Biology	26 September~4 October 2004	9
14	Dr. S. Yamasaki	Osaka Prefectural University	Molecular Biology	22 November ~5 December 2004	15
15	Dr. K.Furuya	National Institute of Infectious Diseases	Parasitology	28 November~ 4 December, 2004	8
16	Dr. Y. Takeda	Jissen University	Microbiology	15~26 January, 2005	12
17	Dr. M. Ishino	Sapporo Medical University	Virology	2~9 January, 2005	8

18	Dr. S. Shinoda	Okayama University	Environmental Microbiology	3~11 June 2005	9
19	Dr. T.Hamabata	International Medical Center of Japan	Microbiology	3~11 June 2005	9
20	Dr. Y. Takeda	Jissen Women's University	Microbiology	29 June~6 July 2005	8
21	Dr. S. Yamasaki	Osaka Prefectural University	Molecular Biology (Third Country Training Program)	16~23 October 2005	8
22	Dr. S. Shinoda	Okayama University	Environmental Microbiology	18~27 November 2005	10
23	Dr. K. Okamoto	Okayama University	Clinical Microbiology	18~27 November 2005	10
24	Dr. S. Yamasaki	Osaka Prefectural University	Molecular Biology (In Country Training Program)	19~26 November 2005	7
25	Dr. Y. Takeda	Jissen University	Microbiology	28 November~8 December 2005	12
26	Dr. A. Sumi	Sapporo Medical University	Virology	21~31 January 2006	11
27	Dr. Y. Takeda	Cine Science Laboratory	Microbiology	3~13 June 2006	11
28	Dr. K. Okamoto	Okayama University	Clinical Microbiology	26 October~3 November 2006	9
29	Dr. S. Shinoda	Okayama University	Environmental Microbiology	3~10 November	8
30	Dr. S. Yamasaki	Osaka Prefectural University	Molecular Biology (In Country Training Program)	7~12 November 2006	6
31	Dr. Y. Takeda	Cine Science Laboratory	Microbiology	14~25 November 2006	12
32	Dr. T.Hamabata	International Medical Center of Japan	Microbiology	14~25 November 2006	12
33	Dr. S. Yamasaki	Osaka Prefectural University	Molecular Biology (Third Country Training Program)	2~10 December 2006	9
34	Dr. K. Taniguchi	Fujita Health University	Virology	18~24 December 2006	7

35	Dr. T.Hamabata	International Medical Center of Japan	Microbiology	18~30 June 2007	13
36	Dr. N. Kobayashi	Sapporo University	Virology	11~18 November 2007	8
37	Dr. K. Okamoto	Okayama University	Clinical Microbiology	11~18 November 2007	8
38	Dr. S. Yamasaki	Osaka Prefectural University	Molecular Biology (Third Country Training Program)	11~21 November 2007	11
39	Dr. Y. Takeda	Okayama University	Microbiology	14~28 November 2007	15
40	Dr. S. Shinoda	Okayama University of Science	Environmental Microbiology	18~25 November 2007	8

JICA Long term Expert

	Name	**Position**	
1	Mr. Fumiaki Yoshizaki	Coordinator	14 June 2003~12 June, 2005
2	Mr. Yutaka Noshiro	Coordinaor	12 June 2005~ to date

ANNEX 5. List of Counterpart Trainees

No.	Name	Training Areas	Training Institutes	Duration
1	Dr. S. K. Bhattacharya, Director	Clinical Medicine of Diarrheal Diseases	International Medical Center of Japan, National Institute of Infectious Diseases and others	16~22 November 2003
2	Dr. M.K.Chakrabarti, Deputy Director	Pathophysiology of Diarrheal Diseases	International Medical Center of Japan, National Institute of Infectious Diseases and others	16~22 November 2003
3	Dr. D. Sur, Deputy Director	Molecular Epidemiology of Diarrheal Diseases	Okayama University, Osaka University and Kyoto University	18 November~ 20 December 2003
4	Dr. S. Chakrabarty, Deputy Director	Molecular Virology	Sapporo University	19 September~ 19 October 2004
5	Dr. B. Manna, Assistant Director	Biostatistics in epidemiological research	National Institute of Infectious Diseases	7 February~9 April 2005
6	Mr. S. Bhunia, Technical Assistant	Molecular Virology	Sapporo University	28 November 2004 ~21 May 2005
7	Dr. M. K. Chakrabarti, Deputy Director	Molecular and Cellular Biology	Institute of Tropical Medicine, Nagasaki University	28 March~31 July 2005
8	Dr. R. Nandy, Senior Research Officer	Microbiology	Research Institute, International Medical Center of Japan	23 August 2005~ 4 February 2006
9	Mr. P.K. Ghoshal, Maintenance Engineer	Facilities Maintenance and Management	Nippon Sekkei and others	28 August~ 8 October 2005
10	Dr. S. Sadhukhan	Virology	Sapporo Medical University	17 January~ 20 May 2006

11	Dr. A. Pal	Molecular Microbiology	Osaka Prefectural University	27 March~ 29 July 2006
12	Dr. U. Mitra	Clinical Medicine	Nagasaki University	12 June~ 19 August 2006
13	Dr. A. Mukhopadhyay	Microbiology	Nagasaki University	12 June~ 18 November 2006
14	Dr.M. K. Bhattacharya	Clinical Medicine	Shimada Municipal Hospital	28 January~ 17 February 2007
15	Mr. A. Palit	Microbiology	Research Institute, International Medical Center of Japan	18 February~ 14 April 2007
16	Mr. R. Mukherjee	Traininng and Extension	Nihon Sekkei Inc.	18 February~ 17 March 2007
17	Dr. S. Ganguly	Parasitology	Gunma University	29 July~ 26 January 2007
18	Dr. H. Koley	Microbiology	Osaka Prefetural University	19 September 2007~ 15 March 2008

ANNEX 6. List of Procured Equipment

List of Procured Equipment for Financial Year 2003-2004

No	Name of Equipment	Manufacturer	Quantities	Amount(RS)	Division (Place of installation)
PL0301	Inverted-Phase Contrast Microscope	Olympus	1	399,660.05	Parasitology Dept. No.209
PL0302	Ice making machine	NTDF(Italy)	1	124,252.80	Microbiology Dept. No.107
PL0303	Research Microscope	Zeiss	1	828,452.52	Parasitology Dept.No.209
PL0304	Color Xerox machine	XEROX - DC1632	1	512,754.86	Training & Extension (Director's room)
PL0305	Autoclave	Sanyo	1	232,571.52	Parasitology Dept. No.211, corridor
PL0306	Electronic balances	Mettler	2	189,200.00	Virology Dept.No.403,Immunoology Dept.No.205
PL0307-1 PL0307-2	Refrigerated microcentrifuge	Eppendorf -5415R	2	466,838.19	Immunology Dept. No.204 Virology Dept.No.208
PL0308	PCR-Thermal Cycler	Applied Biosystems	1	439,236.88	Immunology Dept. No.205
PL0309	Water Bath	Precision	2	745,459.08	Parasitology Dept. No.207, Immunology Dept. No.
PL0310	Gel Electrophoresis system	BioRad	2	115,728.87	Parasitology Dept. No.209, Pathophysiology Dept. No. 414
PL0311	Non-Refrigerated microcentrifuge	SIGMA	2	127,910.24	Virology Dept.No 203,Immuno Dept. No.409
PL0312	Electrophoresis with power supply	BioRad	2	402,821.64	Parasitology Dept. No.207,Pathophysiology Dept. No.414
PL0313	Pipetteman	Gilson	25	1,184,056.80	Microbiology,Virology,Pathophysiology,Immunogy,Parasitology,Biochemistry,EM
PL0314	CO2 Incubator	Hereaus	1	347,136.09	Parasitology Dept. No.209
PL0315	Ratio Imaging System	Intracellular Imaging	1	1,878,705.00	Pathophysiology Dept. No.420
PL0316	Distilled water plant (R1 & R3 facility)	Millipore-Elix 3 Century	1	311,282.00	Parasitology Dept. No.107
PL0317	Liquid Nitrogen Generator with Chiller	Iwatani International	1	2,696,942.15	Microbiology Dept. No.
		Total		**11,003,008.69**	

List of Procured Equipment for Financial Year 2004-2005

No	Name of Equipment	Manufacturer	Quantities	Amount(RS)	Division (Place of installation)
PL0415	Bactec 9120(Blood Culture System Bactec)	Becton Dickinson	1	1,378,000.00	Microbiology Div. ICMR Virus Unit
PL0416	ECM-2001(Electroporation)	Harvard Apparatus	1	982,182.23	Parasitology Div. No.209
PL0414	Turner TD-20/20(Luminometer)	Turner Biosystems	1	378,419.84	Parasitology Div. No.209
PL0410	HeraCell 150(CO2 Incubator)	Hereaus	1	359,924.80	Immunology Div. No.410
PL0411	KS12(Biosafety Cabinet)	Hereaus	1	490,432.60	Immunology Div. No.410
PL0404	Microplate(Spectrophotometer for ELISA reader)	Bio Rad	1	571,626.30	Pathophysiology Div. No.414
PL0405	Smart Spec Plus(Spectrophotome	Bio Rad	1	323,026.30	Pathophysiology Div. No.420
PL0406(1)PL0406(2)PL0406(3)PL0406(4)PL0406(5)	Mini SubCell GT(Mini submarine gel electrophoresis with power supply)	Bio Rad	5	276,826.30	Immunology Div. No.408,Biochemistry Div. No.401,Microbiology Div. No.201,Parasitology Div. No.209,Virology Div. No.202
PL0407(1)PL0407(2)PL0407(3)PL0407(4)PL0407(5)PL0407(6)	Mini Protein 3(Protein electrophoresis with power supply)	Bio Rad	6	340,626.30	Pathophysiology Div. No.414, Immunology Div. No.205,Microbiology Div. No.201,Parasitology Div. No.209,EM Div. No108,Virology Div. No.202
PL0412(1)PL0412(2)	Vacuum pressure pump(Vacuum pump+Accessories)	Millipore	2	43,669.00	Immunology Div. No.408,Parasitology Div. No.207
PL0413(1)PL0413(2)	Stirred Cell+UltrafiltersPM-10K(Ultrafiltration system for Protein purification)	Millipore	2	393,805.00	Biochemistry Div. No401,Pathophysiology Div. No.413
PL0408(1)PL0408(2)PL0408(3)PL0408(4)	37°CJouan Innovens EN 1-118(Incubator (37°C))	Thermo Electron Ltd	4	414,474.93	Microbiology Div. No.201,Pathophysiology Div. No.414,Parasitology Div. No.207,Immunology Div. No.314
PL0402(1) PL0402(2) PL0402(3) PL0402(4) PL0402(5) PL0402(6)	4330(pH Meter, Conductivity meter combined)	Jenway	6	463,227.75	Pathophysiology Div .No.420,Parsitology Div .No.208,Virology Div .No.202,Immunology Div .No.204,Microbiology Div .No.201,EM-No.108
PL0409	Heto Advance HLLF-205(Chest freezer -46°C)	Thermo Electron Ltd	1	182,599.05	Immunology Div. No. 408
PL0417	RC-100 with R :tors(Ultracentrifuge with different rotors)	Sorvall	1	2,(34,221.11	General-Instruments Room
PL0401(1) PL0401(2) PL0401(3) PL0401(4)	AB-104-S(Electronic balance)	Mettler	4	401,664.00	Immunology Div. No.408,Pathophysiology Div. No.413,Parasitology Div. No.207,Virology Div. No.202
PL0403(1) PL0403(2)	Universal 32R(Table top refrigerated centrifuge)	Hettich	2	611,849.24	Immunology Div. No.410 Microbiology Div. Hybridoma
		Total		**10 346,574.73**	

List of Procured Equipment for Financial Year 2005-2006

No	Name of Equipment	Manufacturer	Quantities	Amount(RS)	Division (Place of installation)
PL 05-01	Photo Electric Colorimeter-Model 8003	Bel-Art	1	1,89,280.00	Microbiology
PL 05-02	AC Micro Bus	Swaraj Mazda	1	11,62,209.00	Epidemiology
PL 05-03	Centrilutor	Millipore	1	95,283.00	Pathophysiology
PL-05-04	Photocopier	Canon		1,04,000.00	Project Office
		Total		**1,550,772.00**	

List of Procured Equipment for Financial Year 2006-2007

No	Name of Equipment	Manufacturer	Quantities	Amount(RS)	Division (Place of installation)
1	Perfusion system	Harvard Apparatus	1	414,185.42	Pathophysiology
2	Objectives (40X) for Nikon Eclipse TS 100	Nikon	1	-	Pathophysiology
3	Filter (410-525 nm) for fluorescence spectrophotometry	Nikon	1	100,262.50	Pathophysiology
4	Centrilutor+Filter units for centrilutor	Millipore	1	135,667.00	Biochemistry
5	Polytron Dispersing Unit	Kinematica AG	1	271,656.65	Microbiology
6	Digital Thermometer	Omron	14	3,640.00	Epidemiology
7	Blood Pressure Instrument	Medel	8	24,960.00	Epidemiology
8	Variable Volume Pipettes	Gilson	2 sets	66,017.00	Microbiology
				1,009,654.17	

ANNEX 7. List of Counterpart Personnels (as of November 2007)

NICED	
• DR. G. B. NAIR	**DIRECTOR**
• DR. S. CHAKRABARTI_, DEPUTY DIRECTOR (Senior Grade)	**IMMUNOLOGY & VACCINE**
• DR. P. DUTTA_, DEPUTY DIRECTOR (Senior Grade)	**TRAINING**
• DR. T. KRISHNAN, ASSISTANT DIRECTOR	**VIROLOGY**
• DR.(Mrs). D. SUR , DEPUTY DIRECTOR	**EPIDEMIOLOGY**
• DR. M. K .CHAKRABARTI , DEPUTY DIRECTOR(Senior Grade)	**PATHOPHYSIOLOGY**
• DR. T. RAMAMURTHY , DEPUTY DIRECTOR	**MICROBIOLOGY**
• DR. S. GANGULY, SENIOR RESEARCH OFFICER	**PARASITOLOGY**
• DR. A. N. GHOSH , DEPUTY DIRECTOR	**ELECTRON MICROSCOPE**
• DR. N. S. CHATTERJEE, SENIOR RESEARCH OFFICER	**BIOCHEMISTRY**

ANNEX 8. Operational Expenses

<Japanese Side>

	Indian RS	JPY Equivalent[1]
FY 2003	947,104	2,424,207
FY 2004	1,194,495	3,057,429
FY 2005	1,103,766	2,825,199
FY2006	1,228,820	3,145,288
Total	**2,823,264**	**11,452,124**

<Indian Side>

	Indian RS	JPY Equivalent
FY 2003	39,525,000	101,168,190
FY 2004	47,300,000	121,069,080
FY 2005	52,775,000	135,082,890
FY 2006	56,700,000	145,129,320
Total	**139,525,000**	**502,449,480**

[1] Calculation was made with the at RS=2.5596JPY, which is an average exchange rate between the period of 1 July 2003 and 31 August2007

ANNEX 9. List of Activities Implemented

Activities as per PDM_4	Achievements
Output 1: Capacity to identify diarrheal diseases is established at the molecular level.	
1.1 To examine phenotype of enteric pathogens	■ (M) Isolation and identification of common enteric bacterial are done using the samples from the ID Hospital and BC Roy Children's Hospital in Kolkata. Strains arriving to NICED from other parts of India are identified. ■ (M) The number of strains isolated and identified from diarrheal patients are as follows: 881 *V. cholerae* O1, 8 *V. cholerae* O139, 283 *V. cholerae*, non-O1, non-O139, 79 *V.parahaemolyticus*, 34 *Shigella* spp and 5 *Salmonella* spp. ■ (M) The number of strains isolated and identified from diarrhoeal patients during 2006/2007are as follows, 84 *V. cholerae* O1, 3 *V. cholerae* O139, 37 *V. cholerae*, non-O1, non-O139, 13 *V. fluvialis*, 26 *V.parahaemolyticus*, 12 *Shigella* spp. *Salmonella* spp. was absent during this reporting period. More that 200 strains of *V. cholerae* O1 and O139 were identified from Delhi, Maharashtra, Gujarat, Orissa, rural areas of West Bengal, Andhra Pradesh, Tamil Nadu, and Kerala. ■ (B) Adhesion factor GbpA encoded from locus VCA0811 from Vibrio cholerae is characterized. It is a virulent factor, which is essential for V. cholerae pathogenesis and is expressed by all pathogenic strains. ■ (B) Established method to type Enterotoxigenic Escherichia coli based on Common Colonization Factor Antigens expressed. ■ (V) The number of RNA electrophoresis for detection of rotaviruses and human picobirnaviruses are as follows: 284[Kolkata]; 28/120 [Berhampur, GM]Rotaviruses 8[Kolkata] Human picobirnavirus ■ (Pr) A total of more than 300 diarrheic stool samples per year have been screened for *Giardia lamblia, Entamoeba histolytica* and coccidian parasite by newly developed molecular biological based tools. The samples were collected from BC Roy Children's Hospital and ID Hospital. Cases of pathogenic and non-pathogenic *Entamoeba have* been differentiated applying PCR based molecular techniques. Genotyping of Indian *Cryptosporidium* strains are going on. ■ (Pt) Mechanism of action of heat stable enteroy xin secreted by non-O1 *V.Cholerae* (NAG-ST) was evaluated. This study established the biochemical pathway of action mechanism of NAG-ST with the evidence of involvement of d fferent signal transduction molecule such as calcium, inositol triphosphate,

Activities as per PDM$_4$	Achievements
	nitric oxide, protein kinase C and guanylate cyclase. ■ (Pt) The enterotoxigenic factor from a cholera toxin gene negative *V.cholerae* non-O1, non-O139 strain was purified as hemagglutinin protease. Functional studies were done with the purified protease on different animal model and tissue culture models. ■ (Pr) Microsequencing of *Entamoeba histolytica* Graninin 1 protein has been done. The N terminal sequence was found to be IATNSEEGSEFA and homology analysis has showed that it is hololologous to class 1 type of collagenase. ■ (Pr) Functional aspects of cloned and sequenced Graninin 1 protein has done. Graninin-1 is calcium-binding protein, which share common EF hand motif with a-actinin of *Entamoeba histolytica.*
1.2. To analyze enteric pathogens at molecular level by DNA typing	<u>Microbiology</u> ■ In order to understand the periodic genetic changes occurring in pathogens, DNA typing was introduced for monitor such trends. DNA typing methods such as PFGE, RAPD-PCR, ribotyping were developed and utilized for this purpose - Molecular typing of *V. cholerae* was done using strains collected from 7 cholera outbreaks from different parts of India. During this period, spread of a new clone belongs to O1 serotype Inaba was identified. - Strains of diarrheagenic *E. coli* collected from sporadic and outbreaks of diarrhea were characterized - Dysentery outbreaks caused by *Shigella dysenteriae* type 1 were characterized by PFGE <u>Virology</u> ■ The molecular studies conducted during the study period revealed; - the emergence of human Group A rotaviruses with G12 genotype as an important pathogen in Eastern India. - the low prevalence of human picobirnaviruses as etiological agents of acute watery diarrhea. - the prevalence of astroviruses of similar genotype as etiological agents of acute watery diarrhea. - the increasing prevalence of Noroviruses as etiological agents of acute watery diarrhea

Activities as per PDM4	Achievements
	- the low prevalence of Sapoviruses as etiological agent of acute watery diarrhea. ■ Ten Ph.D Students and eleven short term summer trainees were trained in detection of the various etiological agents. Detection and characterization of Group A,B,C, human rotavirus and molecular characterization of bovine and avian rotaviruses were done. <u>Parasitology</u> ■ A total of more than 300 diarrheic stool samples per year is screened for enteric parasites such as *E. histolytica* with *E. histolytica, G.lambilia* and other intestinal parasites including coccidian parasite by molecular biologically based tools. ■ Biochemical characterization of EDG had been done and partial purification of EDG had also been achieved. ■ The hybridization of collagen activated and normal *E. histolytica* with *E. histolytica* genomic DNA microarray showed 14 reproducible arrayed genes with highest red/green fluorescence indicating upregulation of some genes in collagen activated *E. histolytica* ■ The hybridization of pathogenic and nonpathogenic species of *E. histolytica* with *E. histolytica* genomic DNA microarray showed 5 reproducible arrayed genes with highest red/green fluorescence indicating upregulation of some genes in *E. dispar*. ■ Role of excretory secretory products of *E. histolytica* and *G. lamblia* in apoptosis was studied and found that ESP induces cell death in mammalian cells by apoptosis.
1.3 To develop molecular methods of identification of diarrheal diseases	■ (M) The pandemic strains of *V. parahaemolyticus* are still persisting in Kolkata. Integrons carrying multidrug resistance gene cassettes were detected among enteric pathogens. Novel PCR based assays were established for the identification of *Vibrio fluvialis*, *V. cholerae* O1 bitotypes and *V. mimicus* ■ (M) Multiplex PCR was standardized for the species specific identification of *V. cholera* and *V. fluvialis* targeting *ompW* and *toxR* genes, respectively. ■ (M) PCR and DNA probe methods are established for the identification of emerging pathogens. ■ (M) Identification of pandemic clones of *V. parahaemolyticsus* is established.

Activities as per PDM_4	Achievements
	■ (M) New types of CTX prophages and *rstR* alles are identified among *V. Cholerae*. ■ (V) Detection and analysis of Astroviruses, Picobirnaviruses (large and small profile), Caliciviruses (Sapoviruses and Noroviruses) are done to determine their genetic diversity. ■ (V) Screening of viral gastroenteritis agents using established molecular methods are done. The detection methods used are [1] Polyacrylamide gel electrophoresis and silver staining to detect rotaviruses and picobirnaviruses; [2] ELISA to detect astrovirus and adenovirus [3] RT-PCR for molecular typing of rotaviruses, astroviruses and detection of Norovirus and Sapovirus; [4] Sequencing of amplicons and analysis of sequence data. ■ (Pr) Studies on snRNA - fibrillarin protein was found to interact by gel electrophoresis mobility shift assay and FRET. Extension of the in depth study of biochemical level for better understanding of pathogenic mechanism of the organisms at genomic level was conducted. ■ (B) Chitinase database formed. Database generation in progress. ■ (B) Expression of chitinase under different growth conditions were measured in this context ■ (B) Target proteins cloned and characterized ■ (B) A PCR based diagnostic method has been established to characterize enterotoxigenic E.coli based on colonization factors present. ■ (B) Detailed characterization of CS6 has been done.
Output 2: Strains and diagnostic sera are appropriately managed and archived.	
2.1 To collect, analyze and archive sera from patients with diarrheal diseases	■ (M) Sera samples from acute and convalescent cholera patients were collected for detailed study on protective immunity
2.2 To establish an institution for producing diagnostic anti-sera	(M) Antisera against the serogroups O2 to O104 were prepared. Monoclonal antibodies for *V. cholerae* O1 Ogawa, Inaba and O139 were prepared and supplied to different research Institutes in India
2.3 To maintain proper animal facility and to facilitate production of anti-sera	(M) Antisera against the serogroups O2 to O104 were prepared. Monoclonal antibodies for *V. cholerae* O1 Ogawa, Inaba and O139 were prepared and supplied to different research Institutes in India (Pt) Oral immunization of rabbits with four doses of heat-killed

Activities as per PDM_4	Achievements
	Shigella flexneri 2a showed 100% protection against challenge with virulent *S. flexneri* 2a. In ELISA and immunoblot experiments both whole cell lysate envelope fraction and outer membrane proteins were recognized by the antisera. (I) The target proteins, porin and hemolysin were identified by standard biochemical methods. Porin was identified by its pore-forming ability, while hemolysin was identified by its ability to lyse rabbit RBC. The target proteins were purified and characterized. - Porin was purified by Sephacryl S-200 HR column and 10% SDS-PAGE showed band characteristic of mol. wt. 78,000 (oligomer) and 38,000 (monomer) confirming the protein to be porin. - Hemolysin was purified to homogeneity by a combination of hydrophobic interaction chromatography and anion exchange chromatography. The protein was identified as the 65kDa hemolysin by SDS-PAGE and immunoblotting. - Both porin and hemolysin were recognized by Toll-like receptor (TLR) 2. In association, TLR6 was also expressed by porin but not by hemolysin. - The involvement of specific TLRs helps to understand how the target proteins are distinguished by the mucosal immune system that provides defense against enteric pathogens (I) Antisera against both the target proteins were raised. (I) IgM and IgA were expressed on B-1a cells by Shigella-porin and Vibrio cholerae HlyA, thereby, antibodies to these target proteins were raised in both rabbit and mouse for use as possible diagnostics. Immunological characterization of porin established the protein as a good adjuvant that could activate the innate immune system and trigger the adaptive immune response. (I) hlyA gene was cloned in pUC19 vector using BamHI and PstI restriction enzymes, and expressed in E. coli DH5a cells. HlyA could be released from the periplasm by permeabilization of the outer membrane using polymixin B. HlyA monomer was identified by immunoblotting and its ability to lyse erythrocytes. Similarly, porin gene was cloned in pET-33b vector using BamHI and XhoI restriction enzymes for expression of the protein in E. coli DH5a cells and subsequent molecular characterization. The pore-forming ability of porin was established by liposome-swelling assay.
2.4 To introduce specimen banking system for strains	(M) Enteric pathogens isolated in Kolkata and other parts of India were archived. Phenotypic and genetic characteristics were also included in the strain information. A separate manual was

Activities as per PDM$_4$	Achievements
and sera	prepared for this purpose. (M) About 750 bacterial strains were phenotypically and genetically characterized and archived at NICED. Bacterial culture collected catalogue has also been made.
Output 3: Constant surveillance of pathogens of diarrheal diseases is established.	
3.1 To conduct constant surveillance system for pathogens	■ (M) Collected and characterized strains and sera are properly stored. ■ (M) Investigations are initiated to detect enteric bacteria during outbreaks. ■ (Pr)The following enteric parasites have been found during this period: *Giardia lamblia* 5.14% *Entamoeba histolytica*5.36% *Cryptosporidium* 6.24% *Trichuris trichura* 1.54%, Tricomonas 2.67% Taenia 1.23%Enterbius vermiculis 1.19% Entamoeba coli 1.54% Iodamoeba butschlii 0.93% ■ (E) Collection of clinical data and feed-back to IDH and BC Roy Children's Hospital
3.2 To select fields for epidemiological research and conduct investigation on diarrheal disease	(E) Over 110,000 people from 3 wards within Kolkata metropolitan area were registered. Field based epidemiological research with the objective of reduction of incidence of diarrheal disease in the community was started. (E) Vaccine trial was started for cholera and typhoid in2003. (supported by the International Vaccine Institute) (E) Trial of use of probiotecs for 4000 young children in 2007. (supported by Yakulto, Japan)
3.3 To conduct environmental surveillance for human pathogens to identify reservoirs	(M) Environmental surveillance system has been set up for 5 water sources within Kolkata metropolitan area. On a monthly basis, water quality is monitored for any existence of *Vibrio cholera*, faecal pollution and chlorine levels. (M) Environmental surveillance is being conducted during diarrheal outbreak investigations. On two occasions, water samples were positive of toxigenic *V. cholerae* O1 in Malda (2005-2006).
Output 4: Technical expertise to identify diarrheal pathogens is transferred to other parts of India and neighbouring countries.	
4-1 To provide training for doctors of relevant hospitals and neighbouring countries.	■ (M) Eight In-country training programme were conducted during 2000 to 2007 and 118 scientists were trained (M) Five Third country training programmes were conducted during 2002 to 2006 and about 54 scientists were trained

Activities as per PDM4	Achievements
4-2 To conduct follow up of the trained doctors to assess the effects of the training.	■ (M) Many of the Indian scientists already established molecular research after obtaining the JICA-NICED training. Some of the scientist are having collaborative research with NICED and published many scientific articles ■ (M) Participants give feedback aout the success of the training by implementing the research expertise.
Output 5: Surveillance network of diarreal diseases is established in India.	
5-1 To collect clinical data of patients from hospitals participating in the network	(M, Pr) Clinical data for the Infectious Disease Hospital and Dr. B.C. Roy Memorial Children's Hospital is already being collected in a systematic manner. This activity is expected to increase after establishing the Network System during 2007-2008. (V) Results of detection of enteric viruses are given to the Epidemiology Division for statistical analysis and completion of clinical forms.
5-2 To establish network system for early warning of outbreaks and epidemics.	(E) Early warning system of outbreaks and epidemics for Infectious Disease Hospital was established (M) 25 network centers has been selected from which trainees were invited to NICED for further training on Molecular Microbiology in Nov. 2007. 21 trainees participated in the training. (E) Purchase of server is in process. Communication with hospitals country wide is on-going.
Output 6: The capacity to investigate the efficacy of drugs for diarrheal diseases is improved.	
6-1 To test drug resistance of enteric pathogens	(M) Susceptibility testing was routinely made for many enteric bacteria with commonly used antibiotics for the treatment of diarrhea. In multidrug resistant strains of *V. cholerae*, *Salmonella*, *Shigella*, *Aeromonas*, and enterotoxigenic *E. coli*, class 1 and 2 integrons with resistance gene cassettes were detected and characterized by DNA sequencing (M, E) Investigations will be initiated to detect enteric pathogens along with profiling of drug resistance.
6-2 To report the results of the drug susceptibility test back to the hospitals on a timely basis.	(M) Susceptibility tests are conducted on all samples derived from the surveillance system. The results are systematically reported back to the respective hospitals with the results of the pathogen identification. (E) Drug sensitivity testing system has been established. Information on appropriate antibiotic therapy will be disseminated once the server for the network system is set up.

Activities as per PDM_4	Achievements
6-3 To improve formulation of ORS for acute secretary diarrhea	(E) Improved ORS is being studied in hospital settings – to be implemented in community level later on. (Pt) Different composition of ORS have been treated to find out their efficacy. A study was undertaken to examine the relative absorption efficiency of a hypoosmolar ORS with a reduced sodium concentration compared to that of an ORS with a reduced glucose concentration in a steady state perfusion model of rat jejunum. In conclusion, it was noted that the hypoosmolar ORS with reduced sodium was substantially more absorption efficient compared to the one with reduced glucose.

(M) : Microbiology (V): Virology (Pr): Parasitology (B): Biochemistry (I): Immunology
(Pt): Pathophisiology (E): Epidemiology