

India

Ex-post Evaluation of Japanese Grant Aid Project
“The Project for Construction of Diarrheal Research and Control Centre”

External Evaluator: Tomoko Murayama, Global Link Management

0. Summary

This Grant Aid Project constructed a diarrheal disease research and control centre and provided necessary equipment to the National Institute of Cholera and Enteric Diseases (hereinafter referred to as NICED) in accordance with the activities planned in the Japanese Technical Cooperation Project for Prevention of Diarrheal Diseases (hereinafter referred to as the Phase II Project).

This Project has been highly relevant to the country’s development plan and development needs both at the time of planning and at the time of the ex-post evaluation as well as Japan’s ODA policy at the time of planning. Expected outputs (facility construction and equipment provision) were obtained mostly as planned with proper inputs, which led positive effects. Synergetic effects with the Phase II Project were observed as positive impacts. In general, the facility and most of the equipment have been utilized with proper operation and maintenance. In light of the above, this Project is evaluated to be highly satisfactory.

1. Project Description



Project Location



National Institute of Cholera and Enteric Diseases (NICED)

1.1 Background

Infant Mortality Rate (hereinafter referred to as IMR) in India is higher than other Asian countries and acute diarrheal disease has been one of the leading causes. Much of this relates to lack of proper methods for prevention, diagnosis, and treatment of diarrhoeal diseases. At the same time, newly emerging diarrheal diseases such as drug resistant dysentery and new types of cholera strains (O139, hybrid variants) were identified in the country during 1990s and thus

appropriate countermeasures were urgently required.

Under these circumstances, the Government of India requested the Government of Japan for the Technical Cooperation with the aim of strengthening capabilities for prevention and control of diarrheal diseases at NICED, including human resource development for molecular biology/epidemiology, improving research facilities and promoting collaborative research. NICED is one of the premier institutes of the Indian Council Medical Research¹ (hereinafter referred to as ICMR) conducting research and training on diarrheal diseases as the main national center. In response to the above request, Japan International Cooperation Agency (hereinafter referred to as JICA) implemented the Technical Cooperation Project for Prevention of Emerging Diarrheal Diseases (hereinafter referred to as the Phase I Project) in NICED as a five year project from 1998 to 2003. While remarkable progress of diagnostic techniques at the molecular level was seen for bacterial diarrheal diseases in the Phase I Project, next challenge, which was how NICED could contribute to reduce mortality from diarrheal diseases and benefit people, was clarified.

After the Phase I Project, the Phase II Project was implemented from 2003 to 2008 in order to strengthen diagnostic and treatment skills at the molecular level on viral and parasitological diarrheal diseases and to disseminate the advanced technology throughout India. At the same time, it was identified that the existing facility and equipment were not adequate to implement the Phase II Project effectively. Therefore, the Government of India requested the Government of Japan for the Grant in Aid Project.

1.2 Project Outline

The objective of the Grant-in-aid Project is to strengthen capabilities for prevention and control of diarrheal diseases at NICED in Kolkata City, West Bengal State, by creating a diarrheal diseases research and control centre, an incinerator, a sewage plant, and providing necessary equipment in accordance with the activities planned in the Phase II Project.

¹ The Indian Council of Medical Research (ICMR) is the apex body in India for promoting biomedical research. There are 30 research institutes/centers/units under ICMR and NICED is one of the centers.

Table 1 Project Outline

Grant Limit/ Actual Grant Amount	2,134 million yen / 2,116 million yen
Exchange of Notes Date	June, 2004
Implementing Agency	Indian Council of Medical Research (ICMR) and National Institute of Cholera and Enteric Diseases (NICED)
Project Completion Date	March, 2006
Main Contractors	Sumitomo Mitsui Construction Co., LTD (Construction) Mitsubishi Corporation Co., LTD (Equipment) Ogawa Seiki Co., LTD (Equipment)
Main Consultant	Nihon Sekkei Co., LTD.
Basic Design	From November, 2003 to May, 2004
Detailed Design	From June, 2004 to September, 2004
Related Projects	<p>(1) Japanese Technical Cooperation for the Project for Prevention of Emerging Diarrheal Diseases (February, 1998- January, 2003) Project Purpose: Technology will be developed and established for emerging diarrheal diseases at the NICED. Project Outputs: 1)Effective identification of enteric pathogens is developed up to molecular level, 2)Newer therapeutic approaches are developed for emerging diarrheal diseases, 3)Serum bank concerning diarrheal diseases is established, 4)Drug resistance on enteropathogenic organisms can be monitored effectively, 5)Referral library for the strains and diagnostic serum of enteropathogens is established, 6)Etiologic monitoring of diarrheal pathogens is conducted in human and reservoir, 7)Network of relevant hospitals is improved.</p> <p>(2) Japanese Technical Cooperation for the Project for Prevention of Diarrheal Diseases (Phase II) (July, 2003- June, 2008) Project Purpose: Strengthen capacities and augment capabilities at NICED and to disseminate the same throughout the country for prevention and control of diarrheal diseases Project 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 neighboring countries, 5)Surveillance network of diarrheal diseases is established in India, 6)The capacity to investigate the efficacy of drugs for diarrheal diseases is improved.</p>

Source: The Joint Final Evaluation Report on the Phase I Project and Phase II Project

2. Outline of the Evaluation Study

2.1 External Evaluator

Tomoko Murayama, Global Link Management Inc.

2.2 Duration of the Evaluation Study

Duration of the Study: December, 2010 - November, 2011

Duration of the Field Study: 23rd March, 2011 – 3rd April, 2011

5th June, 2011 – 13th June, 2011

2.3 Constraints during the Evaluation Study

No particular constraint was identified.

3. Results of the Evaluation (Overall Rating: A²)

3.1 Relevance (Rating: ③³)

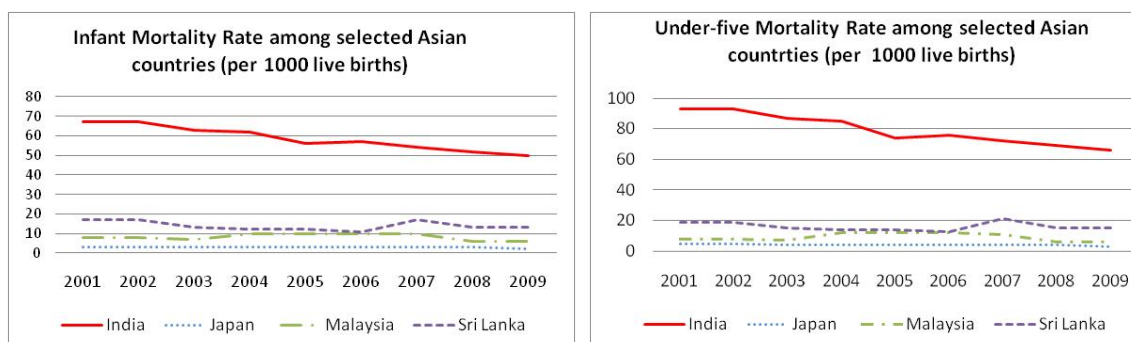
3.1.1 Relevance with the Development Plan of India

At the time of planning, National Health Policy 2002 was adopted as the latest national health policy in the country. The high morbidity and mortality from common water-borne diseases, such as gastroenteritis, cholera, hepatitis A and hepatitis E, were found to be concerns and thereby the Ministry of Health and Family Welfare set up a goal by 2010 to reduce mortality from infectious diseases by 50%. At the same time, the importance of developing therapeutic drugs/vaccines and diagnostic tools for neglected diseases were also emphasized in the policy. Establishing an efficient disease surveillance network for common communicable diseases such as cholera was also recognized as crucial to provide prompt and cost-effective health care service.

At the time of the ex-post evaluation, the latest national health policy was the Eleventh Five Year Plan (2007-2012), which followed the same track with the National Health Policy 2002. Reduction of IMR from 58 to 28 per 1,000 live birth was one of the time-bound goals by 2012 and acute diarrheal disease was one of the target diseases for reduction of IMR. In the policy, the research area dealt under this Grant Aid Project and the Phase II Project was recognized as an essential area in order to improve the nation's health in long term.

3.1.2 Relevance with the Development Needs of India

As shown in Figure 1, IMR and Under-five mortality rate in the country have been continuously higher than other Asian countries and as shown in Figure 2, acute diarrheal disease has been one of the leading causes.

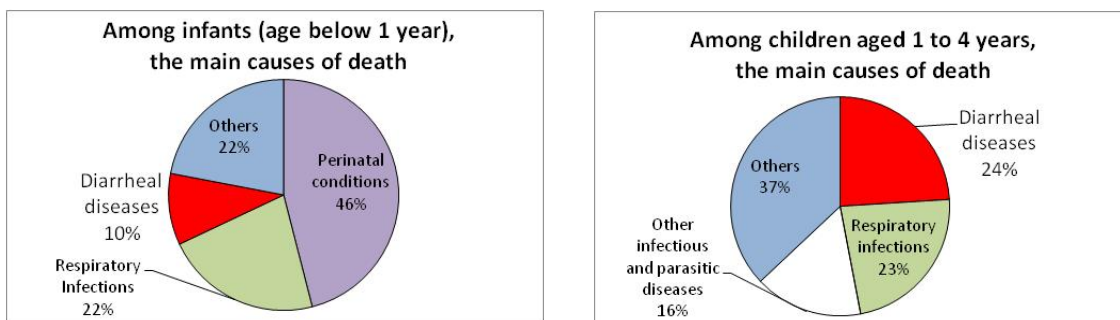


Source: The state of the world's children 2003-2011, UNICEF

Figure 1 IMR and Under-Five year mortality rate in India and several Asian countries (2001-2009)

2 A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

3 ③: High, ②: Fair, ① Low



Source: Report on causes of death in India 2001-2003, Ministry of Home Affairs, India

Figure 2 Main causes of death among infants and children aged 1 to 4 years old in India

The national policies at the time of planning and also at the time of ex-post evaluation noted the necessity of better understanding on the molecular and biological mechanisms underlying diarrheal diseases, developing new vaccines, diagnostic tools, and cost effective therapies, and establishing a series of surveillance network as a public health instrument for timely intervention in order to improve IMR and Under-five mortality rate. Hence, the project purpose is in alignment with development needs of India.

3.1.3 Relevance with Japan's ODA policy

Economic cooperation towards India has targeted following four areas since May 2003: healthcare, agricultural and rural development, environmental conservation, and economic infrastructures.

At the time of planning, priority areas in Japan's ODA policy towards India (2001) were as follows: environmental conservation, economic reform assistance, and poverty reduction. Infectious disease prevention and control program is under the poverty reduction area.

This Project has been highly relevant with India's development plan, development needs, as well as Japan's ODA policy, therefore its relevance is high.

3.2 Efficiency (Rating: ③)

3.2.1 Project Outputs

As shown in Table 2, most outputs were accomplished as planned. The layout was slightly changed from the plan after close discussion in order to improve usability. Therefore the change was appropriate. All 121 types of equipment except DNA Array System⁴ were properly provided from Japan. The DNA Array System could not be utilized in NICED since the type purchased was not for microorganisms as planned but for mouse. The reason for listing for

⁴ DNA Array System: Equipment which allocated a collection of microscopic DNA spots to a solid surface in order to analyze expression level of a particular gene in a cell.

bidding by error was that when draft was made by Japan side and finalized by NICED, there was no system to get it checked by end-users, such as researchers, in NICED and thereby it was passed unnoticed.

Table 2 Output (planned and actual)

Items	Planned ¹	Actual ²
Construction		
1. A research center	Reinforced concrete, Four-story building with 6,652m ²	As Planned
2. A generator room	Flat building 61m ²	As Planned
3. A sewage treatment plant	Flat building 23m ²	As planned
4. An incinerator plant	Flat building 70m ²	As planned
Procurement of equipment		
	Atomic Force Microscope, Inverted Fluorescence Phase Contrast Microscope, Scanning Electron Microscope, Multi Angle Laser Light Scattering, Automated Proteomics Workstation with LC/MS/MS, Spectrofluorometer, FTIR Spectrophotometer, etc.	As planned except a DNA Array System

Source: 1. The Basic Design Study Report (2004)
2. NICED

The Project outputs from India side, which had been planned to complete before starting construction by Japan side, was implemented on time, including legal acquisition of the construction sites, provision of temporary sites, and other necessary arrangement. The land for the research center was purchased from the Government of West Bengal and sites for the incinerator and the sewage treatment plant were donated from the Government of West Bengal.



Incinerator



Sewage treatment plant

3.2.2 Project Input

3.2.2.1 Project Cost

The total Project cost was almost within the planned budget (99.8%). As shown in Table 3, actual funds spent by the Government of Japan was lower than the ceiling amount at the ex-ante,

while the actual spent as counterpart funds from the Government of India was higher than it was originally planned. It is because the charges to obtain no objection certificate from the West Bengal Fire Service, foreign bank charges, and authorization to pay were not included in the estimation and hence the increase was necessary.

Table 3 Project Cost (Planned and Actual)

(Unit : Million yen)

	Planned Cost ^{*1}	Actual Cost	Ratio (%)
The Government of Japan	2,134	2,116 ^{*2}	99.2
The Government of India	22	36 ^{*3}	163.6
Total	2,156	2,152	99.8

Source: 1.The Basic Design Study Report (2004)

2. Data from JICA

3. NICED

3.2.2.2 Project Period

The Project period was 22 months from June 2004 to March 2006 as planned.

Both project cost and project period were mostly as planned, therefore efficiency of the project is high.

3.3 Effectiveness (Rating: ③)

3.3.1 Quantitative Effects

The following four indicators were set up at the time of planning without any numeric target levels. Although it is difficult to objectively measure degree of achievements without any target level, upward trends were observed in the all indicators.

(1) Number of diarrheal diseases diagnosed at the molecular level in NICED

As shown in Table 4, the number of diarrheal diseases diagnosed at the molecular level has continued to rise since 2002. During the Phase I Project, diagnostic methods at the molecular level were introduced mainly for bacterial diarrheal diseases. Later, the Phase II Project strengthened diagnostic methods for parasitological diarrheal diseases and viral diarrheal diseases with the equipment provided by this Grant Aid.

Table 4 Number of diarrheal diseases diagnosed at the molecular level in NICED (Planned and Actual)

	Baseline (2002)	Planned (2010)	Actual (2010)
Number of diarrheal diseases diagnosed at the molecular level in NICED	938	Increase	1,696

Source: NICED

(2) Number of NICED staff who obtained molecular biological diagnostic skills

As shown in Table 5, the number of NICED researchers who obtained skills to diagnose diarrheal diseases at the molecular level using PCR⁵ provided by this Grant Aid Project and technical assistance through the Phase II Project was increased.

Table 5 Number of NICED researchers who obtained molecular biological diagnostic method (Planned and Actual)

(Unit: people/year)

	Division	Baseline (2002)	Planned (2010)	Actual (2010)
Number of NICED researchers who obtained skills to diagnose diarrheal diseases at the molecular level)	Bacteriology	1	Increase	25
	Biochemistry	1	Increase	2
	Clinical Medicine	1	Increase	9
	Immunology	1	Increase	2
	Parasitology	1	Increase	10
	Pathophysiology	1	Increase	3
	Virology	1	Increase	15

Source: NICED

Note: Diagnosis at the molecular level was defined as being able to use PCR for diarrheal disease diagnosis.

(3) Number of diagnostic sera stored and Number of strains stored

As shown in Table 6, NICED did not have appropriate environment to produce and store diagnostic sera and strains at the time of planning. Type and amount of diagnostic sera were dramatically increased with high quality of animal house provided by this Grant Aid Project and obtained techniques to produce monoclonal antibody, which enabled NICED to increase and store 105 types of diagnostic sera. Accordingly, NICED has started to provide the diagnostic sera freely to other research and health institutions according to their request.

Table 6 Number of diagnostic sera stored and number of strains stored (Planned and Actual)

	Baseline (2002)	Planned (2010)	Actual (2010)
Number of diagnostic sera stored (specimen)	0	Increase	105
Number of strains stored (strain)	0	Increase	821

Source: NICED

(4) Number of identifiable pathogens in NICED

By utilizing the facility and the equipment provided by this Grant Aid Project and technical assistance through the Phase II Project, identifiable species were increased from four or five at the time of planning to twenty five with which the total isolation rate rose

⁵ PCR enables researchers to generate millions of copies of a particular DNA sequence from a small amount of desired DNA.

from 20% to 70%.

3.3.2 Qualitative Effects

3.3.2.1 Utilization Status of the Facilities and Equipment provided

The newly constructed building in this Grant Aid Project has functioned as a main center in NICED⁶. Utilization status of the equipment provided by this Project is fairly good except one machinery. There are two successful factors to achieve high utilization status : 1) NICED staff, JICA experts of the Phase II Project and Japanese consultants of this Project closely discussed research topics, types, specs, amount, and necessary maintenance in order to develop the equipment list and 2) the Phase II Project provided technical assistance on utilization of the equipment and maintenance.

This Project has largely achieved its objectives, therefore its effectiveness is high.

3.4 Impact

3.4.1 Intended Impacts

3.4.1.1 Total number of networked institutions for surveillance network

As shown in Table 7, the total number of networked institutions for surveillance remained the same. This is because necessary manpower, equipment and computers were not allocated in target health institutions although this Grant Aid Project provided a surveillance network room, server and computers to NICED and relevant trainings for target health institutions were done by NICED during the Phase II Project period.

Under these circumstances, NICED has continuously conducted training for the target institutions in cooperation with Okayama University⁷. Also, NICED has submitted the application “Multi-Center National Diarrhea Surveillance⁸” to ICMR in order to obtain necessary budget for providing manpower, equipment and computers to target institutions. ICMR is most likely to approve the application, and hence the number of networked institutions is expected to increase from two to ten in the near future.

6 At the time of the ex-post evaluation, NICED has three buildings. The oldest building is under renovation.

7 Okayama University, Japan has established a Collaborative Research Center of Okayama University for Infectious Diseases (COUID) in NICED since 2005 and has engaged in research on emerging and reemerging infectious diseases.

8 Multi-Center National Diarrhea Surveillance aims to monitor changes in disease patterns including drug sensitivity, to provide a data base on diarrheal diseases for researchers, to provide regular reports to the State Governments and other relevant agencies on diarrhea pathogens, to develop an early warning system for forecasting an epidemic and to improve care and introduce better preventive measures.

Table 7 Number of networked institutions for surveillance network (Planned and Actual)

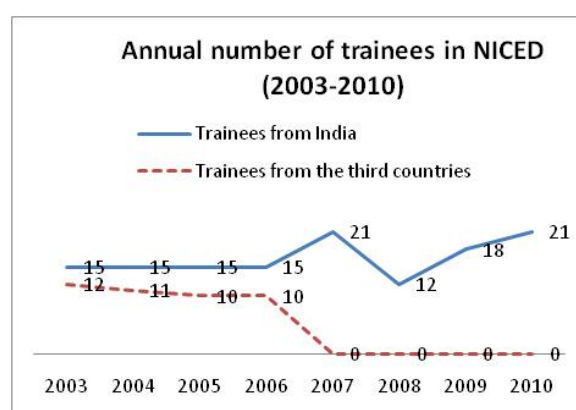
	Baseline (2002)	Planned (2010)	Actual (2010)
Total number of networked institutions for surveillance network	2	Increase	Remained the same

Source: NICED

3.4.1.2 Total number of Indian and oversea trainees

As shown in Figure 3, NICED has continuously conducted trainings on diagnostic method at the molecular level for Indian researchers. Annually from 12 to 21 Indian researchers take the course.

Although some researchers from other countries⁹ also received the training every year during the Phase II Project, no training was arranged from 2007 to 2010 after the Phase II Project. The training on food borne diseases, however, was conducted for 30 researchers in year 2011 at NICED, which training programme was financially supported by World Health Organization (hereinafter referred to as WHO).



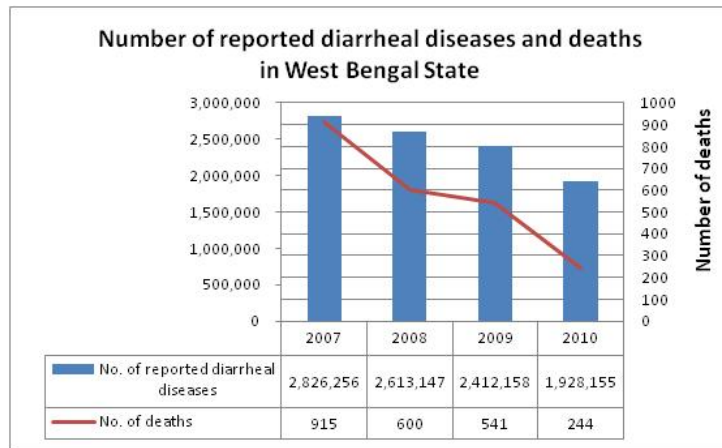
Source: 1. Data from 2003 to 2008: The joint final evaluation report of the Phase II Project
2. Data from 2009 to 2010: NICED

Figure 3 Annual number of trainees at NICED (2003-2010)

3.4.1.3 Reduction of mortality from diarrheal diseases in the State of West Bengal

As shown in Figure 4, both the number of reported cases and the number of the death from diarrheal diseases have declined steadily in the State of West Bengal. The fatality rate fell from 0.03% to 0.01% from 2007 to 2010.

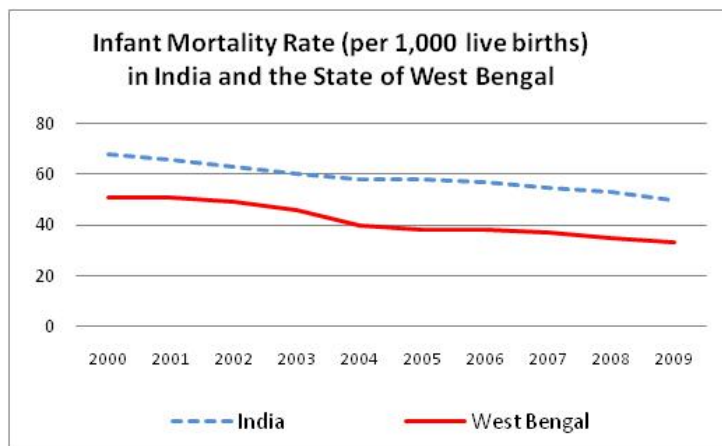
⁹ Scientists from China, Bhutan, Myanmar, Nepal, Sri Lanka, Philippine, Indonesia, Bangladesh, Zambia, Keniya, Ghana, and Tanzania participated the trainings at NICED during the Phase II Project.



Source: Department of Health and Family Welfare, the Government of West Bengal

Figure 4 Annual No. of reported diarrheal and the deaths in the State of West Bengal (2007-2010)

As shown in Figure 5, the State of West Bengal has achieved 35% of reduction in IMR (from 51 to 33 per 1,000 live births) for past ten years, which was the second highest reduction throughout India.



Source: Department of Health and Family Welfare, the Government of West Bengal

Figure 5 Infant Mortality Rate in India and the State of West Bengal (2000-2009)

The Government of West Bengal recognizes that Japan's cooperation has contributed to control of diarrheal diseases in the State. It is because NICED acquired the ability to identify more pathogens with advanced facility and equipment provided by this Grant Aid Project and technical assistance through the Phase I and Phase II projects and thereby NICED enabled to provide higher technical assistance to the State.

More specifically, NICED has directly contributed to the reduction of morbidity and mortality from diarrheal diseases in the West Bengal State from following four aspects: 1) conducting investigation when outbreaks occurred and providing appropriate countermeasures against

identified pathogens, 2) providing trainings for health staff of the State to improve diagnostic skill, 3) sharing monthly/weekly surveillance reports from Infectious Disease Hospital and Dr. B.C. Roy Memorial Children's Hospital, and 4) providing updated information and technology for diarrheal diseases diagnosis.

In addition to the above mentioned contribution, patient work at communities by health workers is recognized as another key successful factor. Several channels were utilized by health workers in order to strengthen communities: 1)improving accessibility and safety of drinking water, 2)improving sanitation of latrines, 3)developing capacity of community health workers and health volunteer, 4)improving accessibility to Oral Rehydration Salts (ORS)¹⁰, and 5)disseminating Information Education and Communication (IEC)¹¹ activities for mothers, and so on.

3.4.1.4 Impacts on other States

During the Phase II Project, NICED conducted trainings on diagnostic skills at the molecular level with the equipment provided by this Grant Aid Project targeting about 230 health staff from 21 States out of 28 States throughout India.

The number of requests for technical assistance from the States to NICED has increased since the Phase II Project started. It is because more pathogens became identifiable through the trainings, and those trainings promoted active exchange of information between NICED staff and the training participants. The number of outbreaks and requests for identification of pathogens were 25 and 122 respectively from 2009 to 2011.

It is expected that expansion of the surveillance network promotes strengthening cooperation among States and NICED, and NICED is most likely to make contribution to reduction of the mortality from diarrheal diseases throughout India.

3.4.2 Other Impacts

3.4.2.1 Synergetic effect with Technical Cooperation Projects

The synergetic effects between this Grant Aid Project and the Phase II Project were observed as several positive impacts, which were underpinned by following three successful factors.

The first factor was the presence of an overall plan. The plan was made when this Grant Aid started in order to clarify role of each Project and the overall goal, which was set based on recommendation extracted from the Phase I Project. More specifically, this Grant Aid Project was recognized as the complementary project for the Phase II Project and the overall goal was

10 ORS is a simple, cost-effective treatment for diarrheal diseases to prevent dehydration.

11 IEC combines strategies, approaches and methods that enable people to play active roles in achieving protecting and sustaining their own health.

aimed at reducing diarrheal disease mortality in India.

The second factor was timely implementation. This Grant Aid Project had produced expected outputs on time, which enabled the Phase II Project to make the best use of the facility and equipment during the rest of the project period (two years and three months).

The third factor was presence of the strong relationship and trust among interested parties. The cooperation among the interested parties, such as ICMR, NICED, Japanese consultants of this Grant Aid Project, JICA experts of the Phase II Project, and JICA staff, was promoted actively with high recognition of the past Japanese cooperation in the health sector, achievements during the Phase I Project in NICED, and long term relations among NICED researchers and JICA experts.

3.4.2.2 Impacts on the natural environment

The incinerator meets the environmental criteria of India and its combustion temperature is over 800-1,000, which avoids dioxin emission. Chimney of the incinerator was set up higher than 30m, not only due to the environmental criteria but also giving sufficient consideration to neighboring buildings. Hence, no major problem was observed regarding the impact on environment.

Lab animal carcass is disposed in the incinerator while medical waste, such as disposable needles and gloves, and produced ash from the incinerator are disposed through a private agency.

Effluent treatment is done separately for sewage from research divisions and animal house and send to precipitation fractionation tank. Then, all sewage joins together in the main sewer and is released to outside. No major problem was observed regarding the impact on environment.

3.4.2.3 Land Acquisition and Resettlement

Land for the new research center was properly acquired from the Government of West Bengal. Land for the incinerator and the sewage was provided free of cost by the Government of West Bengal. There was no resettlement.

3.4.2.4 Activation of collaborative research

Collaborative works with foreign research centers and universities, including ones in Japan, have been fostered after this Grant Aid Project. NICED conducted the large scale field trials with the International Vaccine Institute¹² for oral cholera vaccine¹³ and high protection rate

12 The International Vaccine Institute conducts research for new vaccine development targeting dysentery, cholera, typhoid etc. founded by the Bill & Melinda Gates Foundation.

13 Oral Cholera Vaccine was developed in international vaccine institute and the technology was

(70%), safety, and herd immunity effect¹⁴ were scientifically confirmed. The series of JICA's cooperation contributed to equip the research center and to strengthen capacity of NICED staff to be able to conduct the trials. Although WHO pointed out that cholera vaccine is only an additional measure but not a substitute for all other measures, it is evaluated with high expectations that availability of an inexpensive, safe and effective vaccine in India will facilitate role of the vaccine to control re-emerging cholera which cause dehydration and symptom of shock and can kill people within hours.

As of June 2011, the vaccine is under prequalification process¹⁵ in WHO. Bangladesh and Zimbabwe have already started to study possibility of introducing the vaccine.



Oral Cholera Vaccine which efficacy, safety and herd immunity was confirmed by NICED

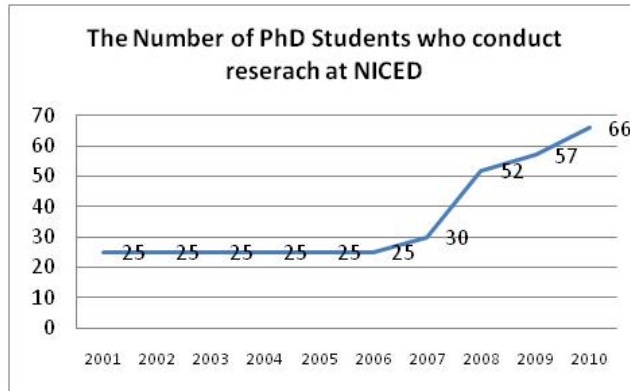


Ward for female diarrheal disease in-patients in ID hospital, the State of West Bengal

After completion of this Grant Aid Project in 2006, advanced facility and equipment have attracted PhD students and other foreign research organizations to conduct research at NICED. As shown in Figure 6, the number of PhD students who conduct research at NICED has clearly increased after 2006.

transferred to Indian pharmaceutical company. After several field trials, the Drug Controller General of India has licensed and being marketed in India. The Ministry of Health and Family Welfare has been recommended to first introduce it in a guided manner in cholera endemic areas of West Bengal and Orissa and expected to expand to other areas later.

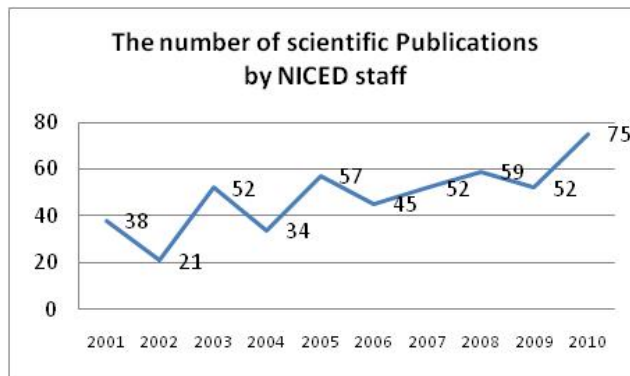
- 14 Herd immunity is a form of immunity that occurs when vaccination of a significant portion of a population provides a measure of protection for individuals who have not taken vaccine.
- 15 Once a vaccine is prequalified by WHO, the vaccine is recognized quality, safety, and efficiency meet international standard. The production country can export the vaccine to other countries. WHO categorizes diseases by four categories to prioritize the process and oral cholera vaccine is in the second highest category. As of June 2011, the only WHO-prequalified Oral Cholera Vaccine is the double dose Swedish vaccine called Dukoral. This vaccine is considered too costly (\$15 a dose) and difficult to administer for routine general use for children due to necessity of relatively large volume of buffer solution.



Source: NICED

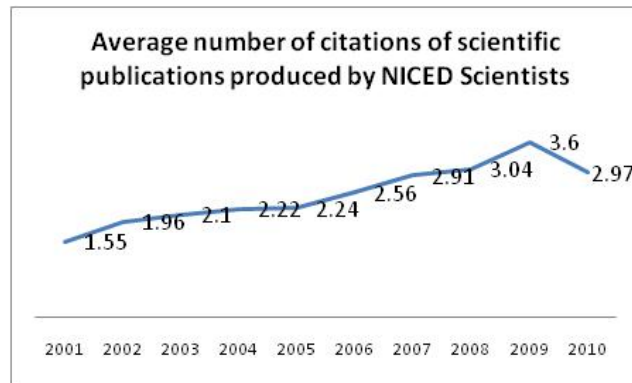
Figure 6 The number of PhD students who conduct research at NICED (2001-2010)

NICED’s scientists have published their research results in renowned academic journals such as Lancet, New England Journal of Medicine, Proceedings of the National Academy of Sciences of the USA, Journal of Biological Chemistry etc. NICED has gained global recognition as the main research centre in India for diarrheal diseases. As shown in Figure 7, the number of published papers has continued to rise. As shown in Figure 8, average number of citation has increased from 1.5 in 2001 and remained over 2.5 since 2007, which indicates improvement in the quality of papers. NICED recognizes that the series of JICA’s cooperation enabled NICED to conduct higher quality of research and produce higher quality of papers.



Source: NICED

Figure 7 The number of scientific publications by NICED staff (2001-2010)



Source: NICED

Figure 8 Average number of citation of the publication produced by NICED scientists (2001-2010)

3.4.2.5 International reputation of NICED

NICED has been accepted as a member of Pulse Net Asia-Pacific¹⁶ since 2005 as the first institution in the country as a result of strengthened diagnostic skill which reached the international level. NICED is also one of the reference centers of CHOLDInet¹⁷, which is the laboratory network on diarrheal diseases and cholera initiated by WHO from 2009.

3.4.2.6 Growing support to NICED by ICMR

ICMR has increased supports to NICED with the growing international reputation. For example, ICMR constructed a new building for NICED after starting this Grant Aid Project and installed latest equipment, such as fluorescence activated cell sorter¹⁸ with request from NICED. As described in 3.5 Sustainability, annual budget from ICMR to NICED has been increased almost three times compared with 2003, at the time of beginning this Grant Aid Project. ICMR also approved this year the creation of a Biorepository¹⁹ in NICED which will become a National Reference Centre for enteric pathogens.

16 PulseNet is an international network organized by Centers for Disease Control and Prevention (USA) in order to detect foodborne diseases, facilitate early identification of common source outbreaks, and assist epidemiologists in investigating outbreaks. PulseNet participants must be certified by stringent PulseNet standards and pass annual proficiency testing in order to maintain certification.

17 CHOLDInet is a web-based information system aiming to strengthen laboratory capacity for monitoring and rapid detection of cholera and other causes of diarrheal diseases to advance the application of control measures.

18 Fluorescence Activated Cell Sorter is a machine that can rapidly separate the cells in a suspension on the basis of size and the color of their fluorescence.

19 Biorepository is a repository that collects, processes, stores, and distributes biological specimens and associated information to support future scientific investigation.



New building constructed by ICMR



Fluorescence activated cell sorter
which was provided by ICMR

In summary, positive impacts such as activation of collaborative research and increasing international reputation were observed in addition to intended impacts (No. of networked institutions for surveillance network and No. of Indian and overseas trainees, Reduction of diarrheal disease cases and the mortality). No particular negative impact of the Project was observed.

3.5 Sustainability (Rating: ③)

3.5.1 Structural Aspects of Operation and Maintenance

Maintenance of the building has been outsourced to a private company and hence it is clear where responsibility lies. The company has dispatched about 20 technical experts which is enough number of staff with appropriate level of skills to maintain the facility. Condition of the maintenance and schedule is supervised by a chief maintenance engineer of NICED.

3.5.2 Technical Aspects of Operation and Maintenance

Technical capability to handle operation and maintenance of the facility is satisfactory. The outsourcing company was engaged in this Project as a subcontractor and obtained proper skill for maintenance during the Project period. The chief maintenance engineer of NICED received relevant trainings for 70 days in Japan and no particular technical problems on supervision of maintenance was identified.

3.5.3 Financial Aspects of Operation and Maintenance

As shown in Table 8, budget allocation from ICMR to NICED has increased around 1.5 to 3 times from 2003 to 2009. All budget requested from NICED to ICMR have been approved every year and no major problems were identified in the balance of income and expenditure. After completion of this Grant Aid Project, many foreign research institutions, such as Center for Disease Control and Prevention, USA and University of Maryland, have shown interests in funding collaborative research with NICED, and proportion of extramural funds have been

continued to rise as shown in Table 9.

Meanwhile, maintenance cost of the new building became four times higher than expected cost at the time of planning. It was revealed at the time of investigation of detection that the State Government of West Bengal did not have a capacity to provide proper maintenance of water treatment system, regular replacement of high quality filter of AC system of animal house section etc, and regular maintenance of hot and cold room. Hence the building maintenance had to be outsourced to a capable and reliable mechanical company in order to maintain high standard of laboratory quality.

Table 8 Budget allocation from ICMR to NICED and expenditure (FY2003 - FY 2009)

(Unit: 1,000 Indian Rupee)

		2003	2006	2007	2008	2009
Total Budget from ICMR		92,848	223,424	141,785	333,292	267,177
Approximate expenditure	Human Resources	48,153	64,333	70,170	128,208	156,613
	Travel Expenses	1,020	1,450	1,450	41,236	
	Operational & Maintenance	16,470	44,000	41,367	77,745	42,610
	Publication	N/A	10,950	4,500	5,186	N/A
	Equipment	11,103	22,529	8,430	80,572	64,461
Capital (Budget – Expenditure)		16,102	80,162	15,868	345	3,493

Source: NICED

Note: Not available (N/A) due to change of categorization at financial management office, NICED

Table 9 Approximate total amount of extramural funds from foreign research institutes and foundations

(Unit: 1,000 Indian Rupee)

	2003	2006	2007	2008	2009
Extramural funds	N/A	18,541	26,429	55,829	65,552

Source: NICED

3.5.4 Current Status of Operation and Maintenance

In general, operation and maintenance status of the facility and equipment is highly satisfactory. Although some parts such as filters for air conditioners and spare parts for toilets need to be imported from Singapore, no trouble has been reported yet. The Atomic force microscope, which was provided to the division of electron microscopy by this Grant Aid Project, has not received any regular maintenance from the beginning. It is because no agent can provide such maintenance in Kolkata City. NICED has, however, started to find an agent outside of Kolkata City.

No major problems have been observed in the operation and maintenance system, therefore sustainability of the Project is high.

4. Conclusion, Lessons Learned, and Recommendation

4.1 Conclusion

This Project is highly relevant to the country's development plan and development needs, both at the time of planning and at the time of ex-post evaluation. As well, the Project was in line with Japan's ODA policy at the time of planning. Hence, its relevance is high. Efficiency is rated high since the expected outputs were obtained mostly as planned within the planned project cost and period. The Project has largely achieved its objectives, as thus, the effectiveness is also rated high. The synergetic effects of the series of JICA's cooperation contributed to reduce morbidity and mortality due to diarrheal diseases in the State of West Bengal as well as to activate collaborative research and to increase international reputation of NICED. Although one of the instruments was not properly maintained, sustainability of this Project is considered high in general in view of structural, technical, and financial aspects and current status of operation and maintenance. In light of the above, this Project is evaluated to be highly satisfactory.

4.2 Recommendations

4.2.1 Recommendation to ICMR

To accelerate approval procedure for "Multi-Center National Diarrhea Surveillance" and support smooth implementation of the network so that each State can effectively utilize NICED's technology in order to reduce morbidity and mortality from diarrheal diseases.

4.2.2 Recommendation to NICED

To arrange regular maintenance for the atomic force microscope.

4.3 Lessons Learned

- (1) Development of an overall plan, timely implementation, and development of trusting relationships

The series of JICA's cooperation to NICED created synergetic positive impacts. The successful factors of cooperation were 1) development of an overall plan, 2) timely implementation, and 3) development of trusted relationships. When developing a series of collaboration projects, it is ideal to carefully make an overall plan for all Projects based on lessons learned from the former Project. With the overall plan, each Project is required to implement on time in order to produce synergetic effects and impacts. Also, it is essential to clearly share vision and challenges among relevant stakeholders and develop mutual trust among them.

(2) Confirmation of equipment list with end-users

In this Project, a wrong model of equipment was provided by mistake due to lack of system to confirm details with end-users and also due to relatively large number of equipment. Hence, it is ideal that an implementation organization and a consulting company should carefully examine type of equipment and purpose of the use with end-users before finalizing the list for bidding.

(3) Thorough investigation for status of equipment at the time of investigation of detection

In the investigation of defection in this Project, any issues regarding equipment such as provision of inappropriate equipment and failure of regular maintenance were not revealed and hence any countermeasure was not taken at the time. It is ideal to confirm not only status of the facility provided but also status of operation and maintenance of the equipment.

(4) Close cost estimation on annual maintenance

In this Project, annual maintenance cost for the constructed facility was four times higher than the estimated cost at the time of planning. Although it has been affordable in this Project due to understanding and additional support from higher level of the institution till now, there is possibility to lower sustainability of the Project. Therefore, it is ideal to examine maintenance cost more closely including its feasibility at the time of planning.

(5) Set up target level for indicators on quantitative effects

In this Project, numeric target was not set up for quantitative effect indicators. It is ideal to set up proper numeric targets to secure objectivity of the evaluation.