

**STUDY REPORT
ON
THE PROJECT
FOR
ACCELERATED MEASLES CONTROL
IN
THE SOCIALIST REPUBLIC OF VIETNAM**

FEBRUARY 2001

**JAPAN INTERNATIONAL COOPERATION AGENCY
(JICA)**

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Preface

In response to a request from the Government of the Socialist Republic of Vietnam, the Government of Japan decided to conduct a study on the Project for Accelerated Measles Control, and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Vietnam a study team from November 7 to November 29, 2000.

The team held discussions with the officials concerned of the Government of Vietnam, and conducted a field study at the study area. After the team returned to Japan, further studies were made, then, as this result, the present report was finalized.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

I wish to express my sincere appreciation to the officials concerned of the Government of the Socialist Republic of Vietnam for their close cooperation extended to the team.

February 2001

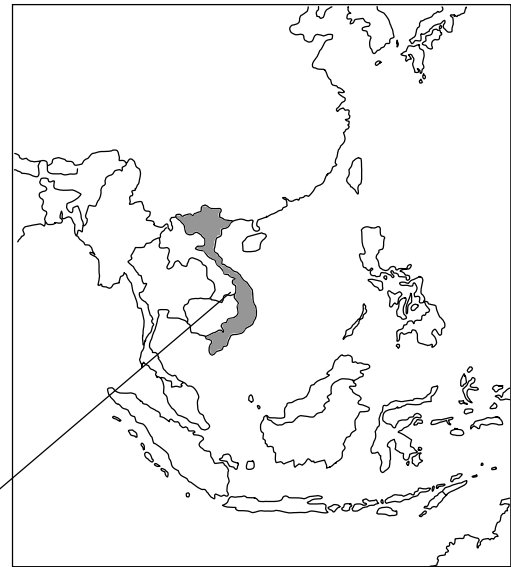


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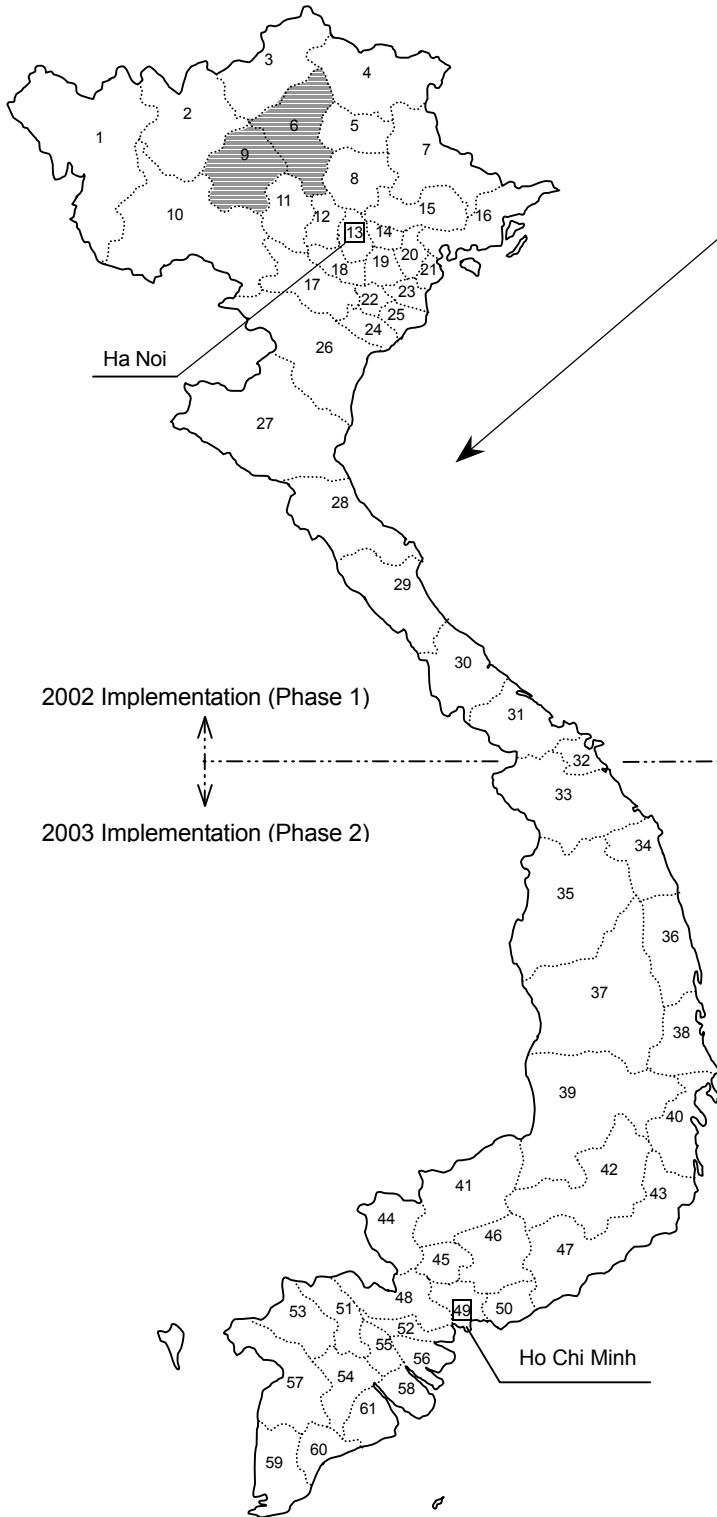
President

Japan International Cooperation Agency

Location Map



South-East Asia



2002 Implementation (Phase 1)



2003 Implementation (Phase 2)

Target Provinces

Canpaigh in 2002 (Phase 1)	Campaigh in 2003 (Phase 2)
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- | | |
|------------------------------|---------------------|
| 1. Lai Chau | 33. Quang Nam |
| 2. Lao Cai | 34. Quang Ngai |
| 3. Ha Giang | 35. Kon Tum |
| 4. Cao Bang | 36. Binh Dinh |
| 5. Bac Kan | 37. Gia Lai |
| 6. <u>Tuyen Quang</u> | 38. Phu Yen |
| 7. Lang Son | 39. Dak Lak |
| 8. Thai Nguyen | 40. Khanh Hoa |
| 9. <u>Yen Bai</u> | 41. Binh Phuoc |
| 10. Son La | 42. Lam Dong |
| 11. Phu Tho | 43. Ninh Thuan |
| 12. Binh Phuc | 44. Tay Ninh |
| 13. Ha Noi | 45. Binh Duong |
| 14. Bac Ninh | 46. Dong Nai |
| 15. Bac Giang | 47. Binh Thuan |
| 16. Quang Ninh | 48. Long An |
| 17. Hoa Binh | 49. Ho Chi Minh |
| 18. Ha Tay | 50. Ba Ria Vung Tau |
| 19. Hung Yen | 51. Dong Thap |
| 20. Hai Doung | 52. Tien Giang |
| 21. Hai Phong | 53. An Giang |
| 22. Ha Nam | 54. Can Tho |
| 23. Thai Binh | 55. Vinh Long |
| 24. Ninh Binh | 56. Ven Tre |
| 25. Nam Dinh | 57. Kien Giang |
| 26. Thanh Hoa | 58. Tra Vinh |
| 27. Nghe An | 59. Ca Mau |
| 28. Ha Tinh | 60. Bac Lieu |
| 29. Quang Binh | |
| 30. Quang Tri | |
| 31. Thua Thien Hue | |
| 32. Da Nang | |

(Provision of incinerators is planned for underlined provinces)

Abbreviations

EPI	Expanded Program on Immunization
ISO	International Organization for Standardization
NIHE	National Institute of Hygiene and Epidemiology
PVF	Primary Vaccine Failure
SVF	Secondary Vaccine Failure
UNICEF	United Nations Children's Fund
VND	Vietnam Dong
WHO	World Health Organization
WHO/WPRO	WHO Western Pacific Regional Office

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Chapter 1 Background of the Project

1-1 Present state and goals

1-1-1 Present state of EPI and measles immunization in Vietnam

The Expanded Program for Immunization (EPI) formulated by WHO in 1974 is one of the most effective strategies for reducing infant mortality. This Program was started in Vietnam in 1981. Since then, on the strong initiative of the Vietnamese government and with the firm support of UNICEF and WHO, immunization against poliomyelitis, diphtheria, pertussis, tetanus, tuberculosis, and measles has been conducted throughout the country. Furthermore, in order to achieve the goal of the Universal Child Immunization Program to bring the immunization rate up to 80% by 1990, the EPI system of Vietnam was strengthened in 1986, becoming one of the most important goals of the Vietnamese government. This goal was achieved in 1989 in Vietnam and a high immunization rate of 90% has been maintained since 1993.

Immunization against measles in Vietnam is conducted once for infants aged 9-11 months. As shown in Figure 1, the morbidity and mortality rates from measles dropped rapidly due to the strengthening of the EPI in 1986. The number of cases of measles dropped from 82,000 in 1985 to about 5,000-6,000 within 10 years. The cases of death from measles also dropped from 274 to 9 in the same period. However, morbidity started to rise later, regardless of the fact that the immunization rate remained at a high level, reaching 13,604 cases in 1999, which is equal to 2.6 times the number in 1995. According to the Vietnamese Ministry of Health, the increase in the number of cases of measles since 1997 is due to the fact that it was mainly contracted by children between 5 and 14 years old.

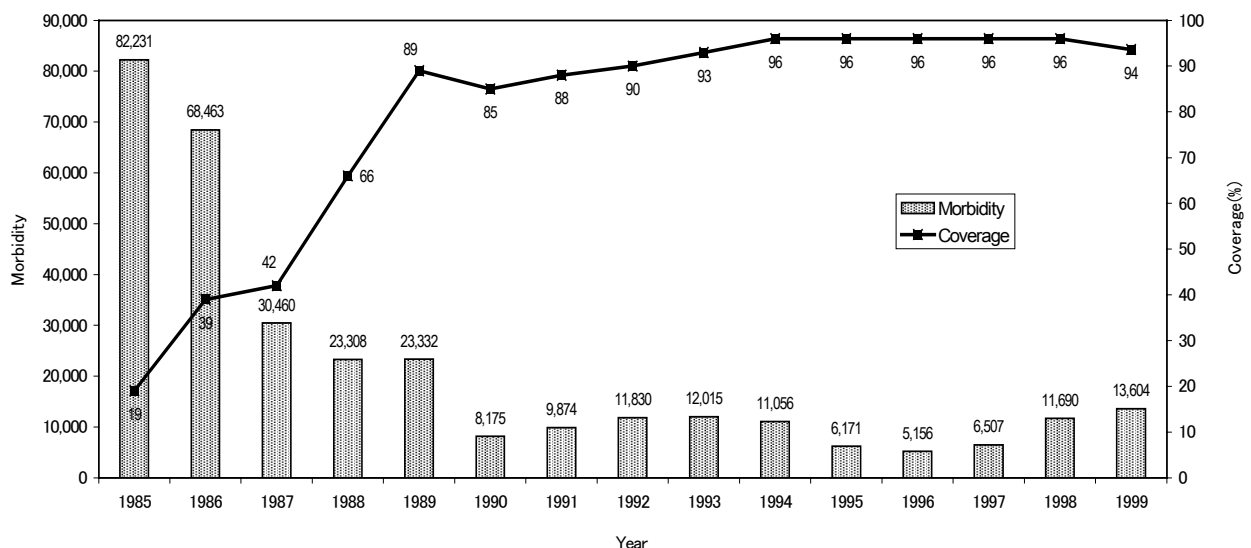


Figure 1 Shifts in the immunization rate and number of reported cases of measles

For the above-mentioned reasons, the Vietnamese government launched the program called Accelerated Measles Control Program to control measles by implementing a mass measles immunization campaign for children all over the country followed by adding the second dose of

measles vaccine to the routine schedule. This policy was made in accordance with the Measles Control Strategy proposed by the WHO Western Pacific Regional Office (WHO/WPRO). Similar campaigns are planned in the nearby countries of Laos and Cambodia.

1-1-2 Need for a second dose immunization of measles vaccine

The stability of the measles vaccine is affected by the ambient temperature. Especially in developing countries, the potency of the vaccine drops due to insufficient low-temperature storage and transport systems (cold chain). Thus even if the immunization rate is high, the antibody may not be acquired. Therefore, some reports say that the efficacy of vaccination in tropical areas is only 60 to 70%.

However, even if cold chain system is developed, the antibody acquisition rate (the ratio of immunized children among injected) will not reach 100%. Infants shortly after birth do not contract measles because they have acquired the antibody from their mother (transitional antibody). On the other hand, if infants with the transitional antibody are immunized with the measles vaccine, the transitional antibody is neutralized and may become ineffective. The time when the transitional antibody of measles disappears is later than other diseases and is said to be approximately 6 months after birth. Allowing for differences among individual infants, immunization against measles is generally conducted 12 months or later after birth in advanced countries. On the other hand, in developing countries, where the risk of infection is high, it is desirable to immunize infants against measles when they are still very young in order to prevent serious infection during the period after the disappearance of the transitional antibody and before they are immunized. Therefore, in many cases, the immunization age is set at 9 months after birth. However, immunization at 9 months is considered to increase the possibility of not acquiring immunity by the residual transitional antibody.

As mentioned above, because of the reduced potency of the vaccine and the neutralizing effect of the transitional antibody, failure to acquire the antibody at the time of immunization is called primary vaccine failure (PVF). In order to reduce the number of people with PVF, the second dose immunization of measles have been used in the U.S.A. since 1989.

In addition, there is also the problem of patients infected with measles several years after acquiring the antibody (secondary vaccine failure: SVF). Immunological competence against measles was thought to be maintained for a long time after immunization. However, in an environment where no wild strain of measles exists, such as in isolated islands, the cases were reported where 5 years after immunization, the antibody value of the blood had dropped to half of the value at immunization. Thus the immunological competence maintained after immunization was demonstrated to be not as high as expected. In areas where measles is fairly prevalent, measles viruses are always present. So even if the antibody value drops, some people may get a booster effect through stimulation by re-infection. However, when the immunization rate is raised, no prevalence of measles occurs, which reduces the chances of re-infection. Therefore immunological competence cannot be maintained and the number of patients showing symptoms of measles (SVF) is thought to increase.

In order to control measles due to PVF/SVF, improvement of the immunization rate is not sufficient, and additional immunization by a second shot must be considered. Immunization against measles in Vietnam is conducted once for infants between 9 months and 11 months old. However, the number of the countries conducting second-dose immunization is increasing worldwide. WHO/WPRO recommends second-dose immunization as a necessary measure to prevent the prevalence of measles. More than half of the member countries of WHO/WPRO conduct measles immunization twice per child. The countries not conducting second-dose immunization, remaining half of WPRO members, are Laos, Cambodia, Vietnam, Malaysia, the Philippines, Papua New Guinea, Solomon Islands, Vanuatu and Japan.

1-2 Background of the Request for Grant Aid

1-2-1 Strategy to Introduce Second Dose of Measles Vaccination in Vietnam

The Vietnamese Ministry of Health will gradually introduce second dose vaccination against measles in its routine immunization programs starting from 2004 and it will be implemented for all children in the country by 2008. Before this, the Ministry of Health has adopted a strategy for a second-dose immunization campaign against measles for children between 9 months and 10 years old.

The ratio of PVF in Vietnam has not been clarified. However, by assuming both the effective rate, including the loss of potency caused by inadequate vaccine storage, and the antibody acquisition rate as 95%, the ratio of successfully immunized children at 9 months after birth is calculated to be approximately 90% ($0.95 \times 0.95 = 0.9025$). Even if the immunization rate can be maintained at 95%, still the remaining 5% of infants are not given immunization. As a result, the ratio of children who acquire the measles antibody is only 86% of the total number of children (0.9025×0.95). The remaining 14% are assumed to be susceptible to measles. This ratio is equivalent to approximately 2.8 million children under 10 years old. The manifestation rate of measles is not clear, but a fairly large number of people subject to SVF who have become susceptible due to reduced immunological competence several years after immunization will be added to the above-mentioned figure.

Measles is highly infectious, but once a person is infected with and recovers from measles, he/she acquires strong immunity and is excluded from the risk of infection. Therefore, only the accumulation of newly susceptible people is a problem in terms of prevention. When the newly susceptible people are added to the group of susceptible population in the area due to birth or immigration, and the chance of coming into contact with measles patients increases, it will result in prevalence. From the fact that the number of cases is increasing despite the high immunization rate, a fairly large number of susceptible people is considered to have accumulated in Vietnam. Unless the susceptible population is drastically reduced, the chain of patients cannot be broken and the effects of second-dose immunization will not easily be seen. Furthermore, even if the susceptible population in some areas is reduced, immigration from other areas cannot

be prevented. Therefore, the increase of potential patients cannot be avoided. The significance of an intensive national campaign lies herein.

The concept of the Vietnamese Ministry of Health regarding the introduction of routine second-dose immunization can be summarized as follows.

① Pilot campaign

This will be a trial campaign to be conducted before the nation-wide campaign. The pilot campaign is for children between 9 months and 10 years old. Pilot campaigns were implemented in Hai Phong in December 1999, followed by the 5 provinces of Hanoi, Thua Thien-Hue, Da Nang, Ba Ria Vung Tau, Can Tho, and two selected districts (Da Bac district in Hoa Binh province and Krong Pak district in Dak Lak province) at the beginning of December 2000.

② National campaign

The national campaign is for all children aged between 9 months and 10 years in the entire country of Vietnam. In 2002 (Phase 1), the campaign shall be conducted in the northern region and in 2003 (Phase 2), the campaign shall be conducted in the central and the southern regions.

③ Catch-up campaign

4 years after the above-mentioned national campaign, an additional campaign shall be conducted for children between 9 months and 5 years old. The additional campaign is intended to suppress re-accumulation of the PVF population and to make routine second-dose immunization more effective.

④ Introduction of regular second-dose immunization

Routine second-dose immunization shall be started the year following the catch-up campaign. All children shall receive the second immunization at the age of 6.

1-2-2 Background of the Request for the Project

The pilot campaign conducted in Hai Phong at the end of 1999 was successful. The immunization rate was as high as 99.84% and no patient suffering from measles was reported after the campaign. Against this background, preparations for the second pilot campaign at the end of 2000 were steadily undertaken by creating a manual and implementing training courses. The materials, including vaccines and syringes, were procured with the Vietnamese government budget without depending on any donors. However, the national campaigns for 2002 (Phase 1) and 2003 (Phase 2) have larger areas to cover. For this reason, securing of the operating costs is the most the Vietnamese government can do and procurement of expensive materials is not within their capabilities. The Vietnamese government is promoting domestic production of measles vaccine in the country. As shown in Table 1, vaccines for the major diseases covered by EPI are already manufactured in Vietnam. However, with regard to measles, domestic production raises many technical problems and there is no prospect that the measles vaccine can

be manufactured in Vietnam. Therefore, all the necessary vaccines will have to be imported, creating a heavy financial burden for the government.

Table 1 Ratio of vaccines manufactured in Vietnam

Vaccine name	BCG	DPT (diphtheria, pertussis, tetanus)	Poliomyelitis	Measles	Neonatal tetanus
Ratio of vaccines manufactured in Vietnam	100%	40%	100%	0%	60%

Against the above-mentioned background, the Vietnamese government requested grant aid from Japan for the materials required for the national campaign. The contents of the request include measles vaccine, auto-disable syringes, safety boxes, disposable syringes and incinerators.

Chapter 2 Contents of the Project

2-1 Basic Concept of the Project

2-1-1 Upper Level Objectives and Project Objectives

(1) Upper level objectives

The Vietnamese government declares in its Strategy for People's Health Care 2001-2010 that it will reduce mortality among infants under the age of one to 25 out of 1,000 births (31 as of 1998) and that of children under five to 32 (42 as of 1998) as the targets for improvement of the health indicators, and it also considers the reduction of morbidity and mortality from contagious diseases and control of the prevalence of contagious diseases as important issues. The actual improvement target for each disease is shown in Table 2, and the 50% improvement of mortality and morbidity from measles is clearly indicated.

Table 2 Improvement targets of diseases in the Strategy for People's Health Care

Item	Target in 2010
Malaria	To reduce morbidity to less than 200/100,000
Tuberculosis	To reduce the incidence and prevalence of tuberculosis to 70% compared to those in 2000
Iodine deficiency	To reduce morbidity of goiter of children 8-12 years old to less than 5%, Iodine deficiency will have been eliminated by 2005
Leprosy	To eliminate leprosy from Vietnam
Routine immunization	To maintain an immunization rate of more than 90%
Japanese B encephalitis, hepatitis B, cholera, typhoid	To increase the number of children who can be immunized
Measles, diphtheria, pertussis	To reduce morbidity and mortality by 50% compared to the rate in 2000
Dengue fever	To reduce morbidity year by year

The Project is directly related to the upper level plan because it contributes to the reduction of morbidity and mortality from measles.

(2) Project objectives

The Vietnamese government has declared control of the prevalence of contagious diseases and the reduction of infant mortality as important issues. In response to these objectives, the Ministry of Health formulated an Accelerated Measles Control Program to drastically reduce morbidity and mortality by introducing the second-dose immunization of measles vaccine. In the Plan, the Ministry of Health indicated an actual target of reducing morbidity per population of 100,000 from the present 18 to 1.

The objective of the Project is to drastically reduce the population susceptible to measles and reduce morbidity and mortality due to measles by providing vaccines and related products needed for nationwide immunization campaign.

2-1-2 Outline of the Project

The Project shall supply the materials and equipment that are indispensable for implementation of the nationwide second-dose immunization campaigns scheduled for 2002 (Phase 1) and 2003 (Phase 2) including vaccines and syringes. With the implementation of the national campaigns, the population susceptible to measles shall be reduced, the effect of routine second-dose immunization shall be guaranteed, and the control of measles in Vietnam will be possible.

2-2 Basic Design of the Requested Japanese Assistance

2-2-1 Design Policy

The objective of this grant aid Project shall be to greatly reduce the number of children suffering and dying from measles and to suppress the disease. In order to help implementation of the Vietnamese government plan, called the Accelerated Measles Control Program, the Project shall supply the funds for procuring the vaccines and syringes to be used in the national immunization campaigns.

The Project was formulated based on the following concepts.

① Relating to natural conditions

As the roads are not all paved, it is desirable to schedule the campaign outside the rainy season (from May to October). The transportation of materials in the southern delta region is greatly affected by flooding. During the dry season, especially in December and January, the temperature is low and is suitable for the campaign. However, considering the tender period and the time required for manufacturing and transporting the equipment, it will be difficult to carry out the campaign during the dry season. Unavoidably, therefore, the campaign shall be conducted after the dry season.

② Relating to social conditions

Management of used syringes at the local health centers can be considered satisfactory as far as routine immunizations are concerned. However, during the campaign, as a large quantity of syringes will be used in a short period of time, it will be difficult to avoid their being stolen in storage or after disposal, then re-packaged and sold on the market. For this Project, auto-disable syringes that have a mechanism that prevents them from being re-used shall be adopted.

③ Relating to environmental considerations

The used syringes shall be handled as infectious plastic waste. For routine immunizations, the used syringes are disposed of by open burning or burial underground. However, the amount of the waste generated during the immunization campaign cannot be overlooked. WHO/WPRO, which has promoted measles control programs in the Western Pacific region, is also pushing forward with the establishment of a collection and proper disposal system for used syringes using safety boxes in Cambodia. Especially at district levels, the effectiveness

of incineration using simple incinerators has been demonstrated. WHO/WPRO strongly recommends the inclusion of incinerators in the Project. As the Vietnamese government requested the introduction of incinerators, the model of incinerators recommended by WHO/WPRO shall be used.

The significance of proper disposal of used syringes can be summarized as follows.

- To prevent the spread of infectious diseases (hepatitis B and/or AIDS) through re-use of used syringes
- To prevent accidental contact with the sharp needles
- To reduce the environmental burden by reducing the volume

④ Relating to the establishment of model and quality

WHO reviews and selects vaccine manufacturers that produce a large amount of vaccines at a reasonable price and that satisfy certain quality standards to procure vaccines for UN organizations including UNICEF (UN pre-qualified vaccine manufactures). The Project shall also consider the procurement of vaccines from the UN pre-qualified manufacturers that meet the above-mentioned requirements. With regard to auto-disable syringes, there is a standard specification set by WHO, and products conforming to the said standard shall be considered.

2-2-2 Basic Plan

(1) Total plan

1) Areas to be covered by the Project

The initial plan of the Ministry of Health was not intended to include the areas in which the pilot campaign was carried out in December 1999 (except for Hai Phong), and the 5 provinces in which the pilot campaign was conducted in December 2000, that is, Hanoi, Thuathien-Hue, Da Nang, Ba Ria Vung Tau, and Can Tho, and one district each in Hoa Binh and Dak Lak provinces. However, these areas are scattered all over Vietnam and exclusion of these areas is not feasible from an epidemiological standpoint considering the population that comes from the surrounding areas. The population expected to come from nearby areas during the period from the implementation of the pilot campaign until the national campaigns of 2002 and 2003 is considered to be relatively large and cannot be ignored, especially in the case of urbanized areas such as Hanoi, Da Nang, and Ba Ria Vung Tau, because exclusion of these areas will result in allowing the re-accumulation of a population susceptible to measles. For more effective measles control, WHO points out that it is desirable to implement immunization simultaneously in all regions of the country. During the discussions with the survey team, the recipient country agreed to this. Therefore, all the areas shall be covered by the Project, regardless of whether a pilot campaign was implemented or not.

Table 3 Amended schedule until routinizing the second-dose immunization of measles vaccine

FY	Hai Phong	Hanoi, Tua Tien Hue, Da Nang, Hoa Binh (Da Bac district)	Ba Ria Vung Tau, Can Tho, DaK Lak (Krong Pac district)	Northern region (Phase 1)	Central and southern regions (Phase 2)
1999	Implementation of pilot campaign				
2000		Implementation of pilot campaign	Implementation of pilot campaign		
2001					
2002	Implementation of national campaign	Implementation of national campaign		Implementation of national campaign	
2003			Implementation of national campaign		Implementation of national campaign
2004					
2005					
2006	Implementation of catch-up campaign	Implementation of catch-up campaign		Implementation of catch-up campaign	
2007	Start of routine 2nd dose immunization	Start of routine 2nd dose immunization	Implementation of catch-up campaign	Start of routine 2nd dose immunization	Implementation of catch-up campaign
2008	↓	↓	Start of routine 2nd dose immunization	↓	Start of routine 2nd dose immunization

Similarly, WHO points out that it is better to implement immunization all over the country at once rather than over a 2-year period considering movement of the population between the northern and southern regions. However, because the burden on the Vietnamese government has increased too much to be borne by a one-year budget and the budget cannot be secured, the immunization program shall be carried out over a 2-year period according to the initial plan.

For the above-mentioned reasons, the plan until the introduction of routine second-dose immunization is modified as shown in Table 10.

2) Implementation period

Phase 1 immunization shall be implemented in 32 provinces north of Da Nang from February to March 2002. Phase 2 immunization shall be implemented in 29 provinces south of Quang Nam province from February to March 2003. However, because there is not enough time for manufacturing the vaccines for Phase 1 immunization, procurement might be delayed. Therefore, Phase 1 immunization might be postponed up to May in maximum when the rainy season starts.

3) Population covered by the Project

The target population for immunization in 2002 (Phase 1) and 2003 (Phase 2) is estimated by assuming an annual population increase rate of 1.8% (average from 1990 to 1999, according to UNICEF statistics) based on the population of each province in 1999. This estimated population is multiplied by the population ratio of 20 to 24% of children between 9 months and 10 years old (varying for each province) to estimate the population to be covered by the Project. The population to be covered in 2002 (Phase 1) shall be 9,693,986 and in 2003 (Phase 3) 9,817,796, to give a total of 19,511,782 people.

4) Content of the supplies to be procured

The following 4 most important items as well as incinerators shall be supplied to implement this campaign.

① Measles vaccine:

The vaccine is of the freeze-dried, live, attenuated measles virus. Vials containing 10 doses (one vial contains enough for 10 people) shall be selected.

② Auto-disable syringes:

In order to prevent transmission of diseases such as HIV and/or hepatitis B through the re-use of used syringes, the syringes to be procured shall be of disposable type with a plunger that is locked after the first use (auto-disable mechanism). The capacity of the syringe shall be 0.5 ml, enough for 1 person. The syringes shall meet WHO quality standards.

In Vietnam, disposable or reusable syringes are usually used, but auto-disable syringes are rarely used. Therefore, there may be some confusion when using this type of syringe. However, the staff is thought able to become familiar with this type of syringe after practicing with it a few times. Therefore, spare syringes shall be included to some extent. In the pilot campaign in Hai Phong, this type of syringe was used and no special problems were reported.

③ Syringes for reconstitution of vaccine:

As the measles vaccine is freeze-dried, it must be dissolved in the attached solvent for use in immunization. As the amount of solvent mixed in one vial is 5 ml, disposable syringes with a capacity of 5 ml shall be procured. The quality of the syringes shall be ensured by procuring them from manufacturers certified in accordance with ISO9001 or ISO9002.

④ Safety boxes:

The safety box is a paper container in which to put used syringes. The capacity of the safety box is usually 5 liters (big enough to hold 100 syringes). The staff in charge of immunization shall put the syringes into this container immediately after use. After the completion of immunization, the container shall be collected and disposed of by incineration at specified locations. The safety boxes shall conform to WHO standards in relation to the pierce-resistant test for syringe needles, the water resistant test and combustion test.

⑤ Incinerators:

In the national campaign, altogether 22.6 million auto-disable syringes and syringes for dissolving vaccine shall be used, and 113 to 158 tons of waste (the weight differs according to the model) shall be discharged.

In the pilot campaign implemented in Hai Phong province, the used syringes were collected by a patrolling vehicle, except in remote areas, and the disposal by incineration was

entrusted to a private industrial waste disposal company. In the national campaign in this Project, the Ministry of Health initially planned to dispose of all the used syringes by installing an incinerator in each province, making a total of 61 incinerators. However, as mentioned later, several problems can be assumed in the installation of incinerators at the provincial level. Therefore, incinerators shall be installed in 15 districts in two model provinces. After the campaign, the incinerators shall be used for incinerating the syringes from routine immunizations and the infectious waste generated from daily health care services.

The incinerator shall be small auto-combustion type as recommended by WHO/WPRO. This model is made of a single stainless steel chamber and is simply structured with no blower or stabilizing burner. Incinerators of the same model were introduced in Cambodia in large quantities and are reported to have been used effectively under the guidance of WHO/WPRO. The capacity of chamber is 1 m³ and the incineration capacity is 40 kg/hour. Installation sites must be carefully selected to avoid urban areas, and consideration must be given to restricting factors such as the low incineration ability and the limitation on items that can be incinerated. Taking the above-mentioned situation into account, WHO/WPRO directs that syringes in approximately ten safety boxes (slightly more than 1000 syringes) be incinerated along with dry combustible waste with a volume about three times that of the syringes.

With the introduction of highly advanced incinerators, environmental contamination caused by combustion gases such as dioxin can be reduced, and the disposal of all syringes on a provincial level theoretically becomes possible because a large amount of waste can be incinerated. However, supplies of electricity and fuel are required as well as operating and maintenance techniques. In addition, a syringe collection system must be established that covers not only provincial capitals but local areas with poor transportation. Therefore, this plan has many uncertain elements and the advanced incinerators must be introduced cautiously. It is difficult to select the proper model. However, since WHO/WPRO recommends the same model as the one planned in the Project and is committed to providing proper instruction at the time of and after installation, this model of incinerator shall be procured.

Other than the above, consumables such as absorbent cotton and alcohol for disinfection, and printed matters such as registration cards and manuals will be necessary when implementing the Project. The cost of these items shall be borne by the Vietnamese government.

The cold chain equipment for storing the vaccine at low temperature and transporting it to surrounding facilities was improved by the "Project for Improvement of Immunization Systems" implemented with Japanese grant aid in 1995. The state of maintenance at the vaccine storage facilities in several provinces and districts which the field survey team for the Project visited is confirmed to be very good and the equipment to be effectively used.

The Ministry of Health considers that the cold chain equipment is adequate and therefore, it is not included in the request for the Project.

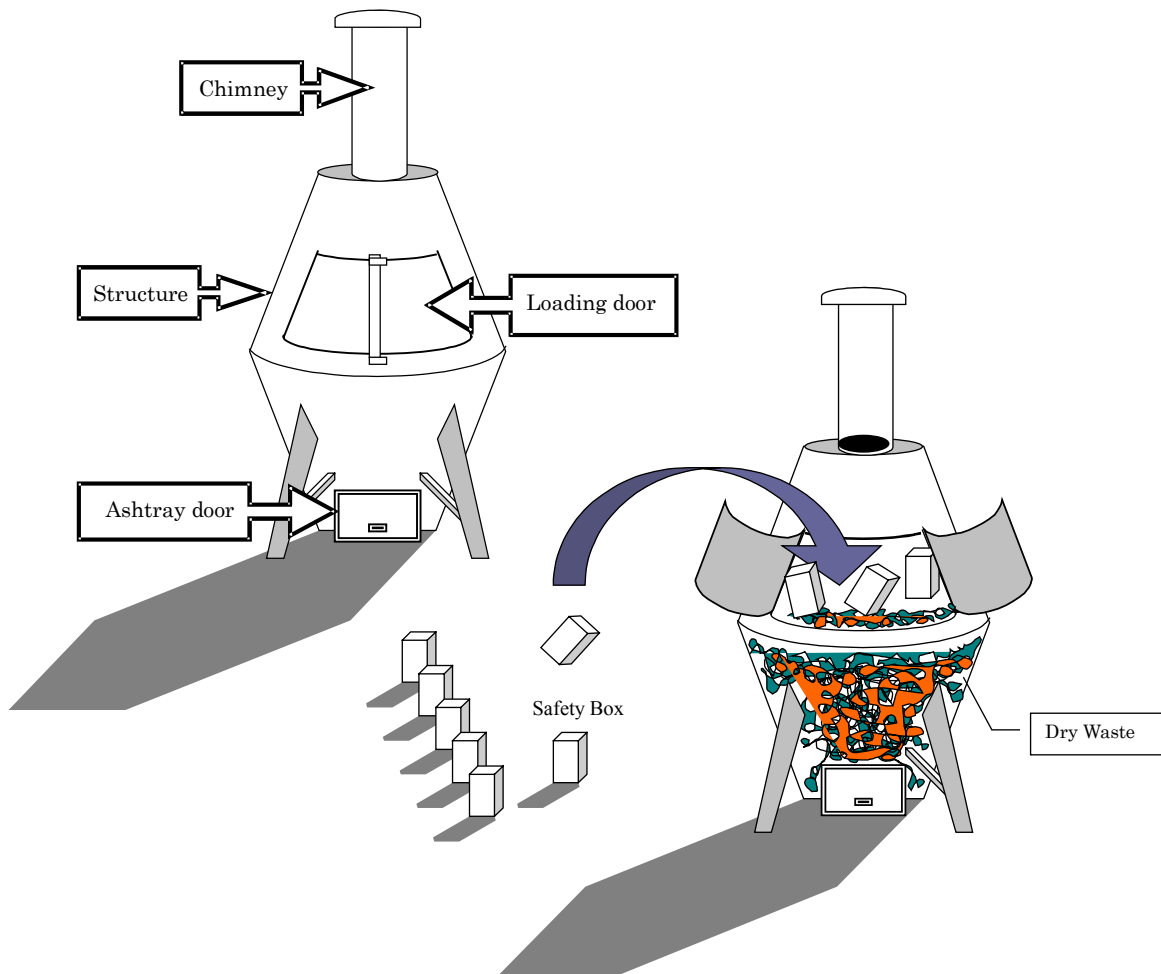


Figure 2 Incinerator recommended by WHO/WPRO. Safety boxes containing syringes shall be incinerated with ordinary dry waste.

5) Estimation of the quantity of products to be procured

The amount of individual equipment to be procured is estimated as follows based on the expected population to be covered by the aforementioned campaign,

① Measles vaccine:

Based on the estimation method used in the pilot campaign in Hai Phong province, the following formula shall be used.

Quantity (in doses) = Population to be covered x (Wastage factor + Reserve factor)

In estimating the amount of vaccine to be procured, the amount of waste due to the loss of activity caused by inappropriate cold chain equipment, damage and loss during transportation, and leftover dissolved vaccine shall be included. This additional rate is the wastage factor and refers to the ratio of the number of vaccine doses consumed (estimated figure) to the population to be immunized (1). In the Project, the wastage factor for cities

with advanced transportation means and ordinary provinces in flat areas was assumed as 1.2 and for provinces in mountainous regions where transportation to remote areas and cold storage are difficult, it was assumed as 1.4.

The reserve factor shall be 1.1 regardless of whether the area is in a city or a mountainous region. As the population estimate cannot always be accurate, the reserve factor shall be calculated in advance. The reserve factor covers unpredictable incidents, such as an increase in vaccine demand due to the inflow of population from nearby areas.

② Auto-disable syringes:

Quantity = population to be covered x reserve factor

Unlike the vaccine, the loss coefficient can be almost ignored. Therefore a reserve factor of only 1.1 shall be included.

③ Syringes for reconstitution:

Quantity = procurement amount of vaccine / 3 x reserve factor

In normal immunization, one syringe is necessary for one vial of vaccine. However, in the campaign, as a large number of people can be immunized at one time, one syringe per 3 vials is assumed. The reserve factor shall be 1.1.

④ Safety boxes:

Quantity = (auto-disable syringe + syringe for dissolving vaccine) / 100 x reserve coefficient

One hundred syringes shall be placed in one safety box. The reserve coefficient shall be 1.1.

⑤ Auto-combustion incinerators:

As mentioned before, the simple incinerator recommended by WHO/WPRO has some limitations in capacity and function. Therefore, a disposal plan shall be formulated that takes these limiting factors into account. As the Vietnamese Ministry of Health has already executed the aforementioned guidelines, the incinerators are required to conform to the guidelines too. The guidelines set out the basic principles relating to the sorting, storage, collection and disposal of medical waste, among which the following are considered to be related to the Project.

Regulations on the disposal of medical waste (August 1999); Extract

- Incineration is the best disposal method for infectious waste.
- Sharp waste such as syringes shall be disposed of in a similar manner to infectious waste regardless of the presence of infection.
- Sharp waste such as syringes shall be collected, stored and transported in solid, combustible, yellow containers.
- Infectious waste shall not be stored for more than 48 hours. However, at facilities that generate small amounts of such waste such as health centers, the waste can be stored for up to one week.
- In cities, regional incineration center that covers the whole area or installation of incinerator for cluster of hospitals shall be looked into. The incinerator shall be a large-size model with a post-combustion chamber (to re-incinerate the gas generated from primary combustion chamber at high temperature to decompose toxic substances).
- In regional cities, each hospital can dispose of its waste individually. However, if possible, priority shall be given to installing a regional incineration center or hospital cluster incinerator. A model with the secondary incineration chamber shall be used.
- District health offices can use rudimentary iron or brick-made incinerators if no central incineration facility is available.
- Open-air burning is only possible at commune-level health stations except those located in towns.

Based on the above-mentioned conditions and the results of the field survey, the incinerators to be introduced in the Project were examined as shown in Table 11. As a result, the following conclusions were reached.

- It is not appropriate to install incinerators at provincial level. The waste by far exceeds the incineration capacity of the incinerator. It will take a long time to incinerate all the syringes used in the campaign. The center of the province is usually populated and the effect of smoke on nearby residents would be significant. The above-mentioned regulations would also be violated in many aspects.
- The incinerator is too large to be installed at commune level.
- For the purpose of incinerating the syringes generated by routine immunization and the medical waste generated by regular health-care activities, it is best to install incinerators at district level.
- Even at district level, incinerating all the syringes used during the campaign presents some problems in terms of capacity. However, if sufficient consideration is paid to the conditions such as location of incinerator, incinerating method and the amount of waste, it is considered possible to cover a certain amount of used syringes generated from the surrounding area.

Table 4 Examination of the installation plan for simple incinerators

Item	For installation in province	For installation in district	For installation in commune
Syringes used in the campaign:			
① Incineration capacity per day: About 10 safety boxes, 1,000 to 1,200 syringes (5 to 7 kg)	Approximately 370,000 syringes will be used in each province. It will take 308 to 370 days until incineration is completed. It is not desirable to store the used syringes for such a long time, and it is against the regulations.	Approximately 36,000 syringes will be used in each district. It will take 30 to 36 days to incinerate them. The incineration period is shorter than the case of province, but it exceeds the period specified in the regulations.	2,150 syringes will be used. They can be incinerated in 2 days.
② Generation of smoke and odor	The population density is high and complaints from residents affected by smoke and odor can be expected.	The population density is low and complaints can be expected to be less than in the province. There may be many places where the incinerator can be installed.	Because the incineration period is short, no complaints would be expected.
③ Supply of dry waste It is necessary to include dry waste with a volume 3 times that of the syringes in order to control smoke generation.	The amount of dry waste discharged from the provincial preventive health centers is not large. It is doubtful if the necessary amount can be secured	The situation is similar to the province, but the problem is less serious because the amount to be incinerated is small.	Since dry waste for two incinerations will be sufficient, there is no problem.
④ Easiness of collection	Transportation from remote areas is difficult.	Transportation just to the district is easier.	Collection is not necessary.
Syringes used for routine immunizations:			
① Incineration capacity	Approximately 16,000 syringes are generated in a month. It will take about 2 weeks to incinerate them.	Approximately 1,600 syringes are generated in a month. It will take 2 days to incinerate them.	Only 1 or 2 boxes are generated in a month. The size of the incinerator is too large.
② Generation of smoke and odor	Generation extends shorter period than in the campaign, but complaints cannot be avoided.	There will be no problem.	There will be no problem.
③ Supply of dry waste	There is a possibility that the amount will not be sufficient.	There will be no problem.	There will be no problem.
④ Easiness of collection	In routine immunizations, safety boxes are not used. Therefore, safe transportation is not possible.		Waste is disposed of at the site and there is no need for transportation.
Conformity with the existing disposal system:	In highly urbanized provinces, disposal of waste is entrusted to the local government or private operators, and hospitals with advanced incinerators perform their own disposal. Therefore, this should not be reversed.	It will be effective for provinces with no incinerators or with incinerators with low incinerating capacity.	In the present circumstances, incineration at the site where generated is the most common method.
Overall evaluation	Not appropriate for the campaign. Even for routine immunization, complaints of environmental pollution cannot be avoided.	There will be fewer problems relating to disposal of wastes generated from routine immunization and regular health care activities if the use of safety boxes is popularized. Strict management and guidance are necessary regarding wastes from the campaign.	It is an excessive facility for the commune level.

For the above-mentioned reasons, the initial plan of the recipient country to install incinerators at provincial level was changed and the survey team determined it appropriate to install incinerators at district level. However, there are 622 districts in the country and it is not appropriate to install incinerators in every district by this project for the following reasons.

- Many districts in the city are not expected to be suitable for installation.
- There may be some districts that already have an incinerator and do not need to have a new one installed, but the central government does not have the information on these districts and cannot screen them.
- It is difficult to instruct and provide training on safe disposal of used syringes and how to operate the incinerators on a nationwide scale in a short period before campaign.

- In Vietnam, there is no successful record of collection and batch disposal of a large amount of used syringes with auto-combustion incinerator. It is highly risky to introduce a large number of incinerators in the course of the Project.

Therefore, as a trial introduction in order to examine the plan for appropriate installation of incinerators in the future and to use the Project as an opportunity to increase awareness of safe disposal of syringes among the parties involved in EPI, model provinces shall be selected for the Project and one incinerator shall be installed in each district of the said provinces. The selection criteria for model provinces are as follows.

- The model province shall not have an incinerator already in use.
- The model province shall not be highly urbanized and it shall be possible to ensure a place of installation where residents will be little affected.
- The model province shall not be far from Hanoi so that the Ministry of Health can monitor progress.
- Transport within the province shall be developed to a certain extent to enable the used syringes to be collected over a wide area.

As a result of discussions with the recipient country, Yen Bai and Tuyen Quang provinces which satisfy the above-mentioned conditions and are located in the northwestern mountainous region of Hanoi were selected. The number of districts in the former province is 9 and in the latter 6. One incinerator shall be installed in each district, making a total of 15 incinerators.

Table 5 Plan for installation of auto-combustion incinerators

District name	No. of communes	Total population	Infants under age one	Population covered by the Project		No. of syringes		No. of days required for incineration
				Present	2002	Auto-disable	Disposable	
Tuyen Quang Province								
1 Tuyen Quang City	7	71,829	674	17,239	17,865	19,652	983	21
2 Son Duong District	38	129,375	3,231	31,050	32,178	35,396	1,770	38
3 Yen Son District	37	137,550	3,668	33,012	34,211	37,633	1,882	40
4 Ham Yen District	18	133,875	2,570	32,130	33,297	36,627	1,832	39
5 Chiem Hoa District	29	136,333	3,107	32,720	33,909	37,300	1,865	40
6 Na Hang District	21	84,373	1,240	20,250	20,986	23,085	1,155	25
Total	150	693,335	14,490	166,401	172,445	189,693	9,487	
Yen Bai Province								
1 Yen Bai City	11	33,150	747	7,956	8,245	9,070	454	10
2 Nghia Lo District	4	19,500	269	4,680	4,850	5,335	267	6
3 Yran Yen District	29	88,125	1,852	21,150	21,918	24,111	1,206	26
4 Yen Binh District	25	95,250	2,580	22,860	23,690	26,060	1,303	28
5 Van Yen District	27	99,375	2,507	23,850	24,716	27,188	1,360	29
6 Luc Yen District	24	132,000	2,170	31,680	32,831	36,114	1,806	38
7 Van Chan District	34	128,250	2,234	30,780	31,898	35,088	1,755	37
8 Tram Tau District	12	39,758	713	9,542	9,889	10,878	544	12
9 Mu Caang Chai District	14	62,623	1,268	15,030	15,576	17,134	857	18
Total	180	698,031	14,340	167,528	173,613	190,978	9,552	

The plan for installation of equipment other than incinerators in each province is shown in Table 6.

Table 6 Population of each province and amount of equipment to be procured (excluding incinerators)

No.	Province (* indicates mountainous region)	Estimated population (from age 9 months to 10 years)	Procurement amount			
			Vaccine (No. of vials)	Syringes (0.5 ml)	Syringes (5 ml)	Safety boxes
1	Ha Noi	559,376	72,800	615,400	26,700	7,075
2	Hai Phong	391,726	51,000	430,900	18,700	4,950
3	Thai Binh	456,102	59,300	501,800	21,800	5,775
4	Nam Dinh	482,362	62,800	530,600	23,100	6,100
5	Ha Nam	202,206	26,300	222,500	9,700	2,575
6	Ninh Binh	225,822	29,400	248,500	10,800	2,875
7	Thanh Hoa*	885,743	132,900	974,400	48,800	11,275
8	Bac Giang*	381,155	57,200	419,300	21,000	4,850
9	Bac Ninh	240,463	31,300	264,600	11,500	3,050
10	Phu Tho	322,230	41,900	354,500	15,400	4,075
11	Vinh Phuc	278,928	36,300	306,900	13,400	3,525
12	Hai Duong	421,408	54,800	463,600	20,100	5,325
13	Hung Yen	272,982	35,500	300,300	13,100	3,450
14	Thai Nguyen*	267,224	40,100	294,000	14,800	3,400
15	Bac Kan*	70,309	10,600	77,400	3,900	900
16	Quang Ninh*	256,571	38,500	282,300	14,200	3,275
17	Ha Tay	609,661	79,300	670,700	29,100	7,700
18	Hoa Binh*	193,528	29,100	212,900	10,700	2,475
19	Nghe An*	730,095	109,600	803,200	40,200	9,300
20	Ha Tinh	324,149	42,200	356,600	15,500	4,100
21	Lai Chau*	150,366	22,600	165,500	8,300	1,925
22	Lang Son*	179,989	27,000	198,000	9,900	2,300
23	Tuyen Quang*	172,445	25,900	189,700	9,500	2,200
24	Ha Giang*	153,945	23,100	169,400	8,500	1,975
25	Cao Bang*	125,330	18,800	137,900	6,900	1,600
26	Yen Bai*	173,613	26,100	191,000	9,600	2,225
27	Lao Cai*	151,889	22,800	167,100	8,400	1,950
28	Son La*	225,133	33,800	247,700	12,400	2,875
29	Quang Binh	202,779	26,400	223,100	9,700	2,575
30	Quang Tri	146,448	19,100	161,100	7,100	1,875
31	T.Th-Hue	266,961	34,800	293,700	12,800	3,375
32	Da Nang	173,048	22,500	190,400	8,300	2,200
33	Quang Nam	356,873	46,400	392,600	17,100	4,525
34	Q.Ngai	309,438	40,300	340,400	14,800	3,925
35	Binh Dinh	379,917	49,400	418,000	18,200	4,800
36	Phu Yen	204,636	26,700	225,100	9,800	2,600
37	Khanh Hoa	268,160	34,900	295,000	12,800	3,400
38	Binh Thuan	272,263	35,400	299,500	13,000	3,450
39	Ninh Thuan	131,369	17,100	144,600	6,300	1,675
40	TP.HCM	1,309,815	170,300	1,440,800	62,500	16,550
41	BR-VT	210,200	27,400	231,300	10,100	2,675
42	Dong Nai	517,342	67,300	569,100	24,700	6,550
43	Tien Giang	417,388	54,300	459,200	20,000	5,275
44	Long An	339,654	44,200	373,700	16,300	4,300
45	Lam Dong	259,048	33,700	285,000	12,400	3,275
46	Tay Ninh	250,991	32,700	276,100	12,000	3,175
47	Can Tho	470,952	61,300	518,100	22,500	5,950
48	Soc Trang	305,230	39,700	335,800	14,600	3,875
49	An Giang	532,810	69,300	586,100	25,500	6,750
50	Ben Tre	337,238	43,900	371,000	16,100	4,275
51	Tra Vinh	251,114	32,700	276,300	12,000	3,175
52	Vinh Long	262,759	34,200	289,100	12,600	3,325
53	Dong Thap	406,941	53,000	447,700	19,500	5,150
54	Binh Duong	186,292	24,300	205,000	9,000	2,375
55	Binh Phuoc	169,967	22,100	187,000	8,200	2,150
56	Kien Giang	388,597	50,600	427,500	18,600	4,925
57	Ca Mau	291,042	37,900	320,200	13,900	3,700
58	Bac Lieu	191,468	24,900	210,700	9,200	2,425
59	Dac Lac*	461,902	69,300	508,100	25,500	5,875
60	Gia Lai*	252,730	38,000	278,100	14,000	3,225
61	Kontum*	81,660	12,300	89,900	4,600	1,050
Total		19,511,782	2,637,400	21,466,000	969,700	247,525
Phase 1 (2002)		9,693,986	1,343,800	10,665,000	493,900	123,125
Phase 2 (2003)		9,817,796	1,293,600	10,801,000	475,800	124,400

Note: The amount of individual equipment to be procured is rounded up as follows based on the minimum packaging unit.

Vaccine: unit : 100 vials, 2 types of syringe: unit : 100 syringes, Safety boxes: unit : 25 boxes

(2) Equipment plan

Table 7 Equipment plan

No.	Equipment name	Specifications and use	Amount	
			Phase 1	Phase 2
1	Measles vaccine	Freeze-dried attenuated live measles virus, infective units 1000 TCID ₅₀ / dose or more, 10 doses / vial. To immunize children aged 9 months to 10 years in order to provide them with the antibody against measles.	1,343,800	1,293,600
2	Auto-disable syringe	Capacity: 0.5 ml, 23 G 25 mm, WHO specifications (E8 / DS.1) To be used for injecting measles vaccine.	10,665,000	10,801,000
3	Disposable syringe	Capacity: 5 ml, 18 G 38 mm, lure slip, sterilized and individually packed To be used to reconstitute the freeze-dried measles vaccine.	493,900	475,800
4	Safety box	Capacity: 5 l, made of paper, WHO specifications (E 10 / IC.1) To put used syringes in, in order to transport and store them safely	123,125	124,400
5	Simple incinerator	Camber capacity: 1 m ³ , incineration ability: 40 kg / h, made of stainless steel To dispose of used syringes by incineration.	15	0

2-2-3 Implementation Plan

2-2-3-1 Implementation Policy

- 1) Procurement of a large amount of vaccine is assumed to be difficult and implementation as a single fiscal year project by grant aid must be undertaken with care. As it is also anticipated that there will be changes of manufacturer after entering into agreement with the contractor or delays in delivery, the state of production shall be known at all times and prompt measures shall be taken.
- 2) WHO is verifying the manufacturers of EPI vaccines for the supply to UN agencies. The products of these UN pre-qualified manufacturers shall be procured for the Project. Regarding measles vaccine, only one Japanese manufacturer holds pre-qualification, the Research Foundation for Microbial Diseases of Osaka University (BIKEN). However, as productivity of BIKEN is quite limited, it has been confirmed that it will not be able to supply vaccine for the Project. Therefore the vaccine shall be procured from third countries.
- 3) Vietnam has full ability to implement EPI. The storage and transportation systems for the vaccine and other products function relatively well. Domestic transportation by grant aid shall be kept to the minimum, except for the incinerators, because Vietnam is judged to be capable to perform the Project with the self-support efforts.
- 4) Considering the preparation period until implementation of the campaign, the equipment shall be delivered by the end of February 2002 (Phase 1) and by the end of February 2003 (Phase 2).
- 5) As mentioned before, the manufacturer and model of the incinerators shall be pre-specified. The manufacturer has already submitted a signed memorandum to the effect that the incinerators shall be supplied to all tenderers under the same conditions.

2-2-3-2 Implementation Conditions

Seven manufacturers of measles vaccine passed the pre-qualification of WHO. They answered as shown in table 8 about capability in supplying vaccine for the Project.

The only manufacturer that can offer unconditional supply is the Serum Institute of India (SII). However, the National Institute of Hygiene and Epidemiology (NIHE) indicated that, from its experience of using SII vaccines in Vietnam, their vaccines produce more cases of side-effects than others, are of low quality and result in many cases of failure to acquire immunity. Therefore the NIHE requested Japan to exclude the Serum Institute of India from the Project. As no scientific data was provided, the soundness of NIHE's comments could not be verified. However, as the inability of the NIHE to announce the reason publicly was understandable, their judgment was accepted.

As shown in Table 8, the number of suppliers is limited. Furthermore, vaccines of this quantity are usually ordered from the manufacturer one or two years ahead of time. However, due to the grand aid cooperation system of Japan, whether or not the equipment shall be procured is not confirmed until the time of tendering and signing contracts. According to the experiences of past grant aid projects, these vaccine manufacturers are likely to violate the agreement and cancel supply just before delivery. Therefore, it is necessary to be prepared in advance to meet various changes in the situation with flexibility.

Table 8 Prospective supply of measles vaccine by each manufacturer

Manufacturer	Country of origin	Response
Aventis Pasteur	France / Canada	Can physically manufacture vaccine if ordered early.
Biofarma	Indonesia	Cannot supply vaccine for the Project because they can only manufacture enough to meet domestic demand.
Chiron Vaccines	Italy	Possible depending on timing of order.
Microbiology Laboratory of Osaka University	Japan	Cannot supply vaccine for the Project as they lack the manufacturing capacity.
Serum Institute of India	India	Possible.
SmithKline Beecham	Belgium	Declined to quote.
Swiss Serum and Vaccine Institute	Switzerland	Has ceased production.

2-2-3-3 Scope of Works

Content		Japanese side	Vietnamese side
Procurement of equipment	All equipment	○	
Inland transportation	Vaccine		○
	Syringes and safety boxes	To MEDINSCO warehouse	To immunization site
	Incinerators	To province	To place of installation (district)
Installation	Incinerators		○

2-2-3-4 Consultant Supervision

- ① As mentioned above, procurement of the vaccine is expected to entail difficulty. Greater strengthening of mutual communication and smooth transmission of information between the manufacturers, trading companies and consultants are required than for ordinary equipment procurement projects. For this reason, the qualified trading company shall have a branch office or liaison office in the country producing the vaccine and management of the manufacturing and shipping processes shall be strengthened.
- ② In addition to pre-shipment inspection by a third party, pre-shipment inspection by the consultant shall be conducted at the time of the first shipment or the completion of manufacturing.
- ③ In accordance with delivery of the equipment, an inspection at the final destination by the consultant shall be conducted at the site.

2-2-3-5 Quality Control Plan

- ① With regard to the vaccine, issuance of a batch certificate, test record and release certificate shall be obligatory for each manufacturing lot. As NIHE is competent to analyze vaccines, they shall conduct sample tests as necessary.
- ② The factories manufacturing auto-disable syringes and disposable syringes shall conform to ISO9001 or ISO9002 as a prerequisite. In particular, a test based on the specifications shall be obligatory for the first sample lot.

2-2-3-6 Procurement Plan

As shown in Table 9, all items shall be supplied by a third country. There is only one manufacturer of safety boxes that conforms to the specifications. However, the contract is made so that the safety boxes shall be supplied under the same conditions to all trading companies, and there should be no problem. The brand and model of incinerators shall be specified, but the manufacturer promised to supply them in fair manner.

Table 9 Origin of suppliers

	Equipment name	Origin			Remarks
		Local	Japan	Third country	
1.	Measles vaccine		○	○	Not manufactured locally. In Japan, only one manufacturer makes measles vaccine. In order to ensure competitiveness, procurement from a third country shall be assumed.
2.	Auto-disable syringe			○	Not manufactured locally or in Japan. Procurement from a third country shall be assumed.
3.	Disposable syringe	○	○	○	Local manufacturers are available. However, only one manufacturer makes syringes that conform to the specifications. Purely Japanese syringes are expensive and the price is 3 to 4 times higher than those manufactured by the same Japanese manufacturer in a third country. Procurement from a third country is assumed.
4.	Safety box			○	Not manufactured locally or in Japan. Procurement from a third country is assumed.
5.	incinerator			○	This item shall be a WHO recommended product and the model shall be specified.

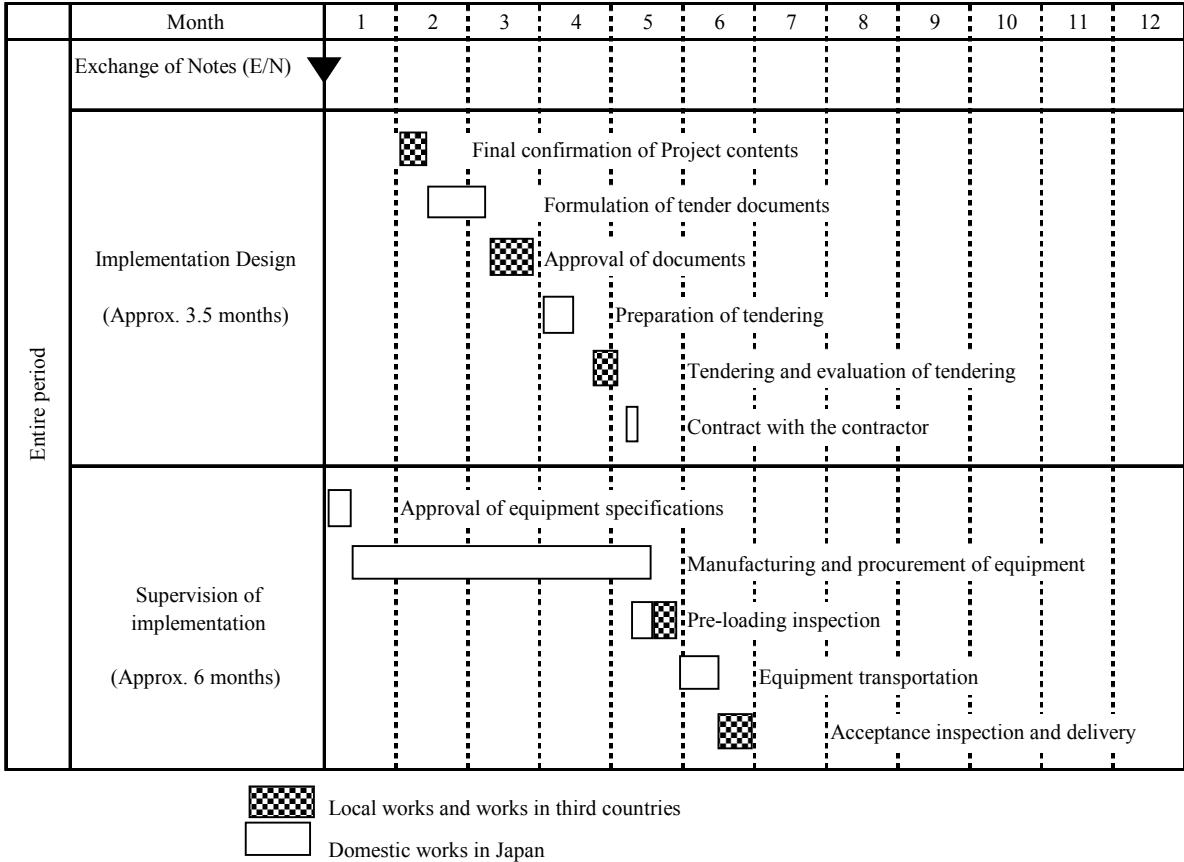
The shipping schedule for each item of equipment shall be as follows.

Table 10 Equipment transportation plan

	Equipment name	Loading port	Transportation method	Phase 1		Phase 2	
				Unloading port	Inland transportation	Unloading port	Inland transportation
1.	Measles vaccine	Third country	Air transportation	Hanoi Airport	None	Ho Chi Minh Airport	None
2.	Auto-disable syringe	Third country	Marine transportation	Hai Phong Port	To MEDINSCO warehouse in Hanoi city	Ho Chi Minh Port	To MEDINSCO warehouse in Ho Chi Minh City
3.	Disposable syringe	Third country or locally	Marine transportation or inland transportation	Hai Phong Port	To MEDINSCO warehouse in Hanoi City	Ho Chi Minh Port	To MEDINSCO warehouse in Ho Chi Minh City
4.	Safety box	Third country	Marine transportation	Hai Phong Port	To MEDINSCO warehouse in Hanoi City	Ho Chi Minh Port	To MEDINSCO warehouse in Ho Chi Minh City
5.	incinerator	Third country	Marine transportation	Hai Phong Port	To MEDINSCO warehouse in Hanoi City		

2-2-3-7 Implementation Schedule

Figure 3 Implementation schedule



2-3 Obligations for the Recipient Country

- ① The recipient country shall implement the following and bear the costs according to the arrangements of the grant aid cooperation.
 - Conclude the Bank Arrangement (B/A). And issue the Authorization to Pay (A/P) in accordance with the B/A and bear the necessary expenses.
 - Ensure prompt execution for unloading of the procured equipment and customs clearance and bear the necessary expenses.
 - Exempt the procured items and procurement operations from customs duty and internal taxes.
 - Take the necessary measures to facilitate entry into and residence in Vietnam for the Japanese nationals related to the procurement of equipment.
 - Take the budgetary measures necessary for operation and maintenance and secure the staff.
- ② The operating costs for training, publicity and evaluation necessary for implementing the national campaign and the cost of supplying the consumables and equipment other than those to be procured under the Project shall be borne by the recipient country.

- ③ The transportation costs of the equipment to be procured under the Project (except for the incinerators) to each province shall be borne by the recipient country. The transportation costs of the incinerators from the province to the place of installation in each district shall be borne by the recipient country.
- ④ Adequate consideration shall be paid to nearby residents and an appropriate place of installation for the incinerator shall be selected. Accessory facilities such as a protective fence shall be installed around the incinerator.
- ⑤ When using the incinerator, the specified incinerating conditions regarding the type and amount of waste shall be observed and the optimum incinerating state shall be maintained at all times. Careful attention shall be paid to ensure that smoke and odor do not affect nearby residents.
- ⑥ Adequate training shall be conducted in the collection, storage and incineration of used syringes.
- ⑦ Second-dose immunization with measles vaccine shall be introduced as planned into routine immunization at an early opportunity after implementing the campaign in the Project.

2-4 Project Operation Plan

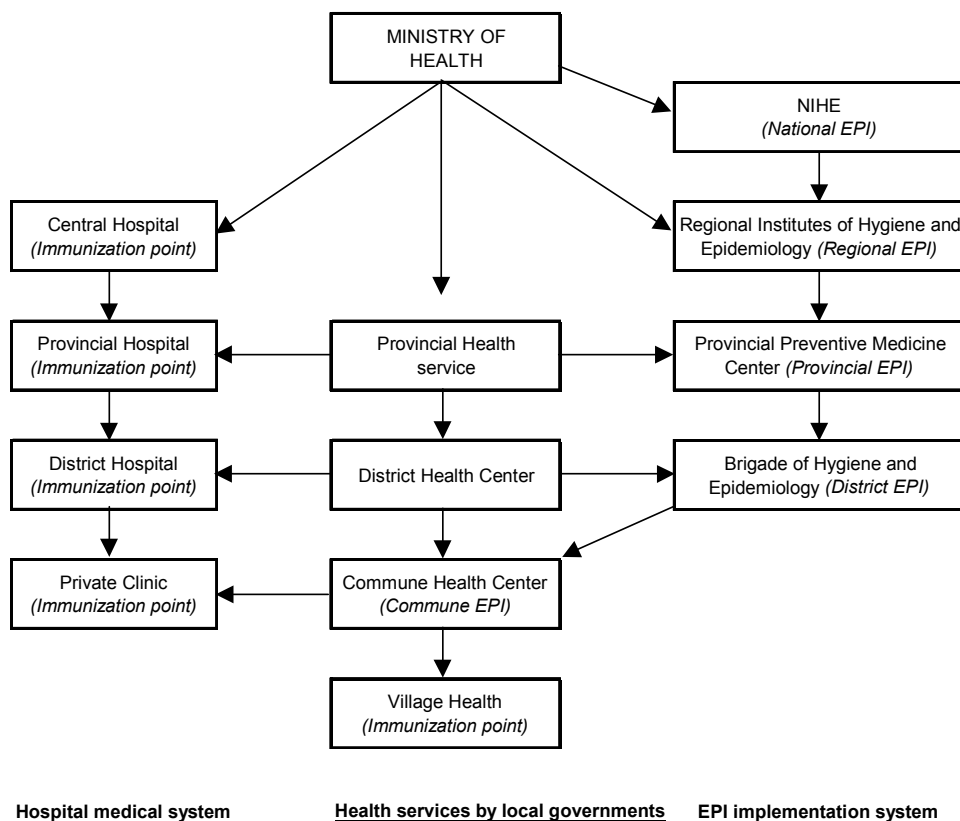


Figure 4 Health care systems in Vietnam

An outline of the health-care and system in Vietnam from central government level to provincial, district and commune level is shown in Figure 4. To implement the campaign, not only the EPI system, but also the cooperation of all local government health service systems and hospital medical systems is necessary. At the provincial and district levels, the EPI and the health services are generally accommodated in the same facility.

① The role of the EPI system

The EPI system plays a central role in formulating plans at each level, providing training and instruction, monitoring and evaluation, for the campaign. Supply of materials is also an important responsibility of the EPI. In the 2002 campaign (Phase 1), the procured vaccine shall be stored in NIHE's cold rooms (total capacity: 80 m³ for refrigeration and 60 m³ for freezing), then transported to each province. In the 2003 campaign (Phase 2), the Pasteur Institute (total capacity: 56 m³ for refrigeration and 36 m³ for freezing) in Ho Chi Minh City shall play the same role. The procured vaccine for the central and highland areas shall be delivered to provinces under the jurisdiction of the Central Region Pasteur Institute and the Highland Institute of Hygiene and Epidemiology which serve as relay bases. However, neither base has the capacity to store the large amount of vaccines to be procured in the Project at one time.

The refrigerators used for vaccine storage shall be installed in the provincial and district health centers. The number of refrigerators differs for each facility, but approximately 4 refrigerators with a capacity of 150 to 200 m³ and 2 freezers shall be installed in the facilities at provincial level and 1 to 2 refrigerators and 1 freezer shall be installed in the facilities at district level. Transportation of vaccine from province to district shall normally be the responsibility of the district authorities. Transportation of syringes and safety boxes is also the responsibility of the EPI. Transportation to provinces shall be consigned to MEDINSCO (a self-supporting public corporation under the governance of the Ministry of Health whose main job is to procure, store, transport and maintain the pharmaceutical products and medical equipment).

② Immunization implementation system

The commune health centers play a most important role as immunization bases. A refrigerator is not usually provided in the commune health centers but vaccines are transported and stored in vaccine containers (cooling boxes with ice). Therefore, vaccines are delivered on the day before immunization or in the early morning of the day of immunization.

At the time of the campaign, 3 to 4 immunization points shall be established other than the health center in a commune. Each health center needs at least 2 persons in charge of immunization (health and medical technicians). In addition, several volunteers help the campaign by checking the registration of the children receiving immunization, dissolving vaccines and changing the safety boxes. As the measles vaccine may, in very rare cases, cause allergic shock symptoms (anaphylaxis) due to ingredients such as the stabilizing

agent, antibiotics or egg protein, emergency medical teams of doctors shall be organized in each district.

Immunization is given to schoolchildren first, and then children under school age. The children not covered by the campaign shall receive immunization from the mobile team that directly visits their homes. A mobile team consisting of 4 people shall be organized in each commune. Depending on the population and access, immunization is expected to take 2 weeks to complete all operations.

The role of doctors, nurses, medical assistants and other technicians cannot be played by the employees of the health centers. Therefore doctors, nurses and technicians are dispatched from the hospitals or clinics in each area. Even if they are paid, the amount they receive is very small and they should be considered as volunteers. Furthermore, many teachers and members of young men's associations and women's associations participate as volunteers. The district committee, which is the administrative organization of the district, mobilizes such volunteers and also supports the supply of vehicles.

The system for implementing the campaign in the entire country of Vietnam includes 49,449 immunization posts, 17,780 mobile teams, and 98,898 staff in charge of immunization. The budget allotted to each province averages 194,590,164 dong (approximately 1.52 million yen), totaling 11,870 million dong (approximately 92.59 million yen) for the entire country.

The implementation system and the budget for each province are shown in Table 18.

③ Collection and disposal of used syringes

The system for managing used syringes from the immunization sites to incineration, including collection, transportation from the immunization posts to the center of the district and storage, requires adequate consideration. If they are left for a long period of time without securing transportation means or are accumulated in places where outsiders can easily penetrate, they should be disposed of immediately at the immunization site. Approximately one month is required for the district to dispose of all the used syringes generated by the campaign, and the storage of used syringes during this period is an important issue.

As there is no past record available at present of the collection and batch processing of a large quantity of used syringes by auto-combustion incinerator, there are plans to improve this disposal system before implementation of the Project. As mentioned before, since the incinerators shall only be installed in 2 model provinces, the Ministry of Health shall be able to adequately support and manage them.

However, in the present situation in which no detailed operating guidelines have been laid down regarding the disposal of medical waste at site level, it is difficult to implement systematic instruction on the collection and management of waste in the model provinces by the self-support efforts of the Vietnam side only. In this regard, in combination with the

installation of the incinerators and instruction in their actual use, WHO/WPRO plans to implement the training of the staff in charge of management in each district. The following training contents are being examined.

- Distribution of safety boxes
- How to use the safety boxes
- Collection of used syringes
- Proper disposal of used syringes

Formulation of manuals on the management and disposal of waste during the campaign, monitoring during implementation of the campaign, and evaluation after the campaign shall be conducted with the cooperation of the Ministry of Health.

After the campaign, it is intended to incinerate the syringes used for routine immunization and the infectious waste generated at district health centers in the incinerators. However, the collection of syringes from the immunization sites (commune level) presupposes the spread of safety boxes. At present, safety boxes are not usually used, but domestically made boxes are already available and they shall be used in the pilot campaign in 2000. The Ministry of Health aims to introduce safety boxes for all routine immunizations and has already taken the budgetary measures for 60,000 safety boxes in FY 2001 (approximately 40% of the quantity required for the entire country).

In the WHO-WPRO instruction manual, dead leaves, waste paper and used dry medical waste such as absorbent cotton are to be incinerated together with the syringes. However, it must be recognized that when vinyl chloride products are mixed with the above-mentioned waste, auto-combustion incinerators easily generate dioxin. Judging from the situation at the sites where all waste is incinerated in one batch, it is unrealistic to separate dioxin-generating substances only when using the incinerators procured in the Project. Even if the dioxin-generating wastes are separated, it is certain that the separated substances will be incinerated by open burning in the same compound around the incinerator. It goes without saying that the incinerators should be used strictly according to the manual. However, it is the most important thing to reduce the effect on surrounding area by adjusting the incineration amount and selecting where to install the incinerator carefully.

④ Support from other donors

For the implementation of the national campaign, UNICEF plans to contribute 1 million dollars to cover the operating costs and WHO plans to contribute 100,000 dollars to cover training and instruction costs.

Table 11 Campaign implementation system in each province

No.	Province	Local government uni		Manpower Requirement				Estimated Budget (VND)
		District	Commune	Fixed posts	Mobile teams	Supervisors	Vaccinators	
1	Ha Noi	12	288	700	288	288	1,400	1,000,000,000
2	Hai Phong	14	220	880	220	220	1,760	300,000,000
3	Thai Binh	8	285	1,140	285	285	2,280	150,000,000
4	Nam Dinh	10	225	900	225	225	1,800	50,000,000
5	Ha Nam	6	114	456	114	114	912	100,000,000
6	Ninh Binh	8	142	568	142	142	1,136	50,000,000
7	Thanh Hoa	27	627	2,508	1,254	627	5,016	200,000,000
8	Bac Giang	10	227	908	227	227	1,816	120,000,000
9	Bac Ninh	8	123	492	123	123	984	110,000,000
10	Phu Tho	12	151	755	352	302	1,510	100,000,000
11	Vinh Phuc	7	136	680	272	272	1,360	100,000,000
12	Hai Duong	12	263	1,052	263	263	2,104	100,000,000
13	Hung Yen	10	161	644	161	161	1,288	100,000,000
14	Thai Nguyen	8	177	885	531	354	1,770	100,000,000
15	Bac Kan	7	122	610	366	244	1,220	50,000,000
16	Quang Ninh	13	184	736	184	184	1,472	120,000,000
17	Ha Tay	14	324	1,296	324	324	2,592	280,000,000
18	Hoa Binh	10	215	860	430	215	1,720	50,000,000
19	Nghe An	19	463	1,852	926	463	3,704	100,000,000
20	Ha Tinh	10	262	1,048	524	262	2,096	100,000,000
21	Lai Chau	10	154	770	462	308	1,540	100,000,000
22	Lang Son	11	225	1,125	675	450	2,250	150,000,000
23	Tuyen Quang	6	145	725	435	290	1,450	150,000,000
24	Ha Giang	10	191	955	573	382	1,910	100,000,000
25	Cao Bang	11	189	945	567	378	1,890	100,000,000
26	Yen Bai	9	180	900	540	360	1,800	150,000,000
27	Lao Cai	10	180	900	540	360	1,800	150,000,000
28	Son La	10	201	1,005	603	402	2,010	230,000,000
29	Quang Binh	8	151	604	302	151	1,208	150,000,000
30	Quang Tri	9	136	544	272	136	1,088	100,000,000
31	TT Hue	9	151	604	302	151	1,208	200,000,000
32	Da Nang	6	47	188	94	47	376	55,000,000
33	Quang Nam	14	212	848	424	212	1,696	300,000,000
34	Quang Ngai	13	174	696	348	174	1,392	100,000,000
35	Binh Dinh	11	152	608	152	152	1,216	100,000,000
36	Phu Yen	7	98	392	98	98	784	190,000,000
37	Khanh Hoa	7	132	528	132	132	1,056	150,000,000
38	Binh Thuan	9	110	420	110	220	840	150,000,000
39	Ninh Thuan	4	55	200	110	110	400	125,000,000
40	Ho Chi Minh	22	303	1,120	303	606	2,240	500,000,000
41	Ba Ria Vung Tau	8	69	200	69	138	400	350,000,000
42	Dong Nai	10	180	1,080	180	360	2,160	520,000,000
43	Tien Giang	9	163	1,210	163	326	2,420	150,000,000
44	Long An	14	183	900	183	366	1,800	485,000,000
45	Lam Dong	11	135	810	270	270	1,620	240,000,000
46	Tay Ninh	9	86	516	172	172	1,032	150,000,000
47	Can Tho	8	105	1,430	105	210	2,860	600,000,000
48	Soc Trang	7	99	594	99	198	1,188	250,000,000
49	An Giang	11	140	840	140	280	1,680	280,000,000
50	Ben Tre	8	158	948	158	316	1,896	170,000,000
51	Tra Vinh	8	94	564	94	188	1,128	150,000,000
52	Vinh Long	7	107	642	107	214	1,284	200,000,000
53	Dong Thap	11	139	834	139	278	1,668	400,000,000
54	Binh Duong	9	98	392	196	196	784	250,000,000
55	Binh Phuoc	9	151	690	302	302	1,380	250,000,000
56	Kien Giang	13	110	750	110	220	1,500	300,000,000
57	Ca Mau	7	73	438	73	146	876	100,000,000
58	Bac Lieu	5	49	294	49	98	588	150,000,000
59	Dak Lak	18	210	1,700	420	420	3,400	100,000,000
60	Gia Lai	12	170	1,050	340	340	2,100	50,000,000
61	Kon Tum	7	79	520	158	79	1,040	195,000,000
	Total	622	10,493	49,449	17,780	15,531	98,898	11,870,000,000

Chapter 3 Project Evaluation and Recommendations

3-1 Project Effects

3-1-1 Direct Effects

- 1) The prevalence of measles can be prevented by mass immunization campaign throughout the country and major progress made towards its elimination. The nationwide immunization in the Project shall cover the entire country of Vietnam and benefit 20 million children. Under the traditional single-dose immunization method in the past, the population of children who did not receive immunization for some reason, who did not acquire immunity even after being immunized, or who lost their acquired immunity have gradually accumulated, causing the re-prevalence of recent years. As all children between 9 months and 10 years old, including those who have been immunized before, shall be immunized under the Project, the population susceptible to measles shall be greatly reduced.
- 2) With the supply of auto-disable syringes and safety boxes, the safety of immunization shall be increased. In Vietnam, disposable syringes are generally used, but auto-disable syringes are only partly used because they are not manufactured in Vietnam. Safety boxes are not popular yet and are not used except in some areas. If the used syringes are not properly disposed of, there shall be the risk of accident caused by careless contact or infection with HIV or hepatitis B through the re-use of syringes. Supply of these items in the present Project shall greatly contribute to improving the safety of immunization.
- 3) 15 incinerators shall be supplied to the 2 model provinces that do not have any incinerators for medical waste. With the installation of the incinerators, dangerous medical waste such as syringes can be disposed of, and consistently safe immunization can be expected from immunization and collection of syringes up to the final disposal.

3-1-2 Indirect Effects

- 1) Mass immunization campaign of measles throughout the country of Vietnam in the Project shall not only contribute to the control of measles itself, but open the way to the elimination of measles in the near future as a prerequisite for routine second-dose immunization.
- 2) The auto-disable syringes and safety boxes to be supplied this time shall not only increase the safety of measles immunization, but serve as a model for the safe disposal of all used syringes. At the same time, they shall provide the opportunity for EPI-related parties all over Vietnam to broaden their awareness of the safe injection and safe disposal of used syringes. The Ministry of Health is preparing the budget for providing safety boxes, and their use is expected to spread even after the supplied boxes are gone.

- 3) Incinerators shall be supplied on a small scale to limited areas. However, as concrete data on the safe disposal methods of medical waste such as syringes can be obtained, a rational and realistic method appropriate for each area can gradually be expected to be employed.
- 4) The present campaign shall be implemented with the cooperation of Cambodia and Laos. Therefore, the Project shall have a significant effect on the control of measles not only in Vietnam but in the entire region of Indochina.

3-2 Recommendations

- 1) If the campaign in the Project is properly implemented, the number of measles patients is certain to decrease. However, delay in successive plans will allow re-accumulation of the population susceptible to measles, which may result in the re-prevalence of measles. For this reason, it is important first of all to maintain the routine immunization rate at the present high level of over 90%. This rate is a goal to be continuously observed after the routine immunization method is changed to 2-dose immunization.

Strengthening of the surveillance system will be indispensable when the occurrence of measles is suppressed by the Project and it moves to the stage of elimination. WHO/WPRO has declared "the development of a surveillance system by promptly studying the prevalence of measles and taking measures up to the stage of predicting and preventing prevalence" as one of the goals of the measles control program in the Western Pacific region. In Vietnam, immunization activity itself is excellent, but the construction of a surveillance system lags behind.

To change the immunization system from single to the 2-dose immunization method and continue with this immunization system while paying attention to the above-mentioned points is considered the way to suppress measles.

- 2) WHO is trying to increase the safety of injections by "safe injection" programs, which is one of its activities in Vietnam. The definition of safe injection can be summarized in the following 3 points.
 - There shall be no danger for those being immunized.
 - Health and medical employees shall not be exposed to danger.
 - No third party shall be exposed to danger by disposal.

This definition has been made because the improper disposal of used syringes is one of the major causes of the spread of infectious diseases such as hepatitis B and HIV. The following 3 points are indicated as the main causes of the spread of infectious diseases.

- Imperfect sterilization of re-usable syringes
- Re-use of disposable syringes
- Improper disposal of used syringes

Procurement of auto-disable syringes in the Project shall be implemented in accordance with the above-mentioned concept. However, auto-disable syringes have not been introduced at routine immunization sites in Vietnam. As can be seen from the fact that advanced countries do not use auto-disable syringes, auto-disable syringes are not necessary if there is thorough training and instruction and high moral standards. However for the time being, use of auto-disable syringes is considered an effective measure for increasing the safety of immunization. The problem with auto-disable syringes is that they cost twice as much as ordinary disposable syringes, but the cost that society has to pay in infected people is much higher than the cost of prevention. Future popularization of auto-disable syringes is desired.

Popularization of safety boxes is also an effective measure for increasing the safety of immunization. Safety boxes are starting to be used in very limited areas. In general, miscellaneous containers such as washbouts, buckets and empty boxes are used instead. There are plans to collect and dispose of the used syringes generated from routine immunizations. However, unlike the campaign where the used syringes can be collected, safely stored and transported in safety boxes, there is no uniform container for collecting the used syringes from routine immunizations, which is more dangerous.

The recipient country is applying for the budget to purchase 60,000 safety boxes for routine immunizations. This positive attitude on behalf of the recipient country is highly evaluated, but the amount is less than half of the amount necessary for the entire country, and future expansion is desirable. Fortunately, trial production of reasonably priced domestic products is proceeding, and this is expected to promote their popularization.

- 3) The requested incinerator was introduced as a test case in Long An province in the south of Vietnam in 1997 by WHO for the purpose of disposing of syringes. However, as problems were encountered, such as the start of a small fire and complaints from residents, the use of the incinerator was discontinued after one year. At present, incinerators are used to incinerate ordinary waste from hospitals. The field survey studied the disposal of medical waste in 6 provinces and found that in all places, residents were highly concerned about the smoke and odor from incineration, and in some cases the use of the incinerator had to be terminated.

Later, WHO examined the use of the incinerator in Cambodia and finally established certain standards. When implementing the Project, the location where the incinerators is installed shall be carefully selected and training based on the manual shall be implemented under the guidance of WHO. Furthermore, during the campaign, monitoring shall be strengthened and any problem cases shall be promptly dealt with.

Vietnam already has guidelines for disposal of medical waste and emission standards for atmospheric pollutants. These standards are not strictly adopted at present, however, the government plans to install incinerators with a secondary incineration chamber in 25 hospitals around the country (already installed in 3 hospitals). Increased awareness equal to

that of advanced countries was observed in Vietnam, which made us realize that the waste disposal problem in Vietnam could not be considered as a simple problem. Not only the disposal of syringes in campaign and routine immunizations, but the establishment of model areas by the Project are expected to lead to the construction of a proper disposal system for all infectious waste.

APPENDICES

Member List of the Study Team

Mr. Katsutoshi MIYAKAWA	Team Leader	Vice Director, Grant Aid Division, Economic Cooperation Bureau, Ministry of Foreign Affairs
Dr. Yoshikuni SATO	Advisor	Medical Officer Regional Office for the Western Pacific World Health Organization
Ms. Saeda MAKIMOTO	Coordinator	Second Project Management Division, Grant Aid Management Department, Japan International Cooperation Agency
Mr. Yo KATO	Equipment Planner	General grant aid division, Grant aid management department, Japan International Cooperation System
Mr. Kazuhiro KUROSAWA	Procurement Planner	General grant aid division, Grant aid management department, Japan International Cooperation System

Study Schedule

Date		Contents of study		Venue
7-Nov	Tue	a.m. p.m.	Tokyo 09:50(NH909)→Hongkong 13:55/14:55(VN791)→Hanoi 15:55	
8-Nov	Wed	a.m.	Meeting with Embassy of Japan and JICA office	Embassy of Japan JICA Vietnam Office
		p.m.	Courtesy call on Ministry of Health (MoH)	Ministry of Health
9-Nov	Thu	a.m.	Meeting with MoH/NIHE	NIHE
		p.m.	Meeting with WHO and UNICEF officers in charge	WHO Hanoi Office UNICEF Hanoi Office
10-Nov	Fri	a.m.	Evaluation of pilot campaign in Hai Phong Province Study on health care waste management	Hai Phong Preventive Medicine Center Hung Thinh Incineration Plant
		p.m.	Study on EPI System in Hai Duong Province	Hai Duong Preventive Medicine Center Tanh Hai Commune Health Center
11-Nov	Sat	a.m. p.m.	Internal meeting, Data analysis	
12-Nov	Sun	a.m. p.m.	Internal meeting, Data analysis	
13-Nov	Mon	a.m.	Survey on preparation/planning for pilot campaign in Hoa Binh	Da Bac District Health Center
		p.m.	Study on EPI System in Hoa Binh Province Study on waste management in Provincial Hospital	Hoa Binh Preventive Medicine Center Hoa Binh Provincial Hospital Dan Chu Commune Health Center
14-Nov	Tue	a.m.	Study on EPI System in Ha Nam Province	Ha Nam Provincial Health Service Ha Nam Provincial Hospital
		p.m.	Meeting with NIHE Observation on National Vaccine Storage facility	NIHE
15-Nov	Wed	a.m.	Hanoi 11:10(VN217)→Ho Chi Min 13:10	
		p.m.	Meeting with Pasteur Institute	Pasteur Institute
16-Nov	Thu	a.m.	Survey on preparation/planning for pilot campaign Study on EPI system in Ba Ria Vung Tau Province	Ba Ria Vung Tau Provincial Medicine Center Than Thanh District Health Center Than Thang People's Committee My Xuan Commune Health Center
		p.m.	Study on health care waste management	
17-Nov	Fri	a.m.	Research on the trial on disposal of Syringes with SICIM incinerator conducted by WHO in 1997	Long An Provincial Medicine Center Long An TB Hospital
		p.m.	Study on medical waste management	Benluc District Hospital
18-Nov	Sat	a.m. p.m.	Internal meeting, Data analysis	
19-Nov	Sun	a.m. p.m.	Ho Chi Min 14:50(VN226)→Hanoi 16:50 Arrival of Dr. Sato and Ms. Makimoto at Hanoi(CX791)	
20-Nov	Mon	a.m.	Meeting with WHO	WHO Hanoi Office
		p.m.	Meeting with NIHE	NIHE
21-Nov	Tue	a.m.	Survey on the cost for domestic transportation and storage Observation of pilot campaign at primary school	MIDINSCO Hanoi Trung Trac Primary School
		p.m.	Meeting with NIHE	NIHE
22-Nov	Wed	a.m.	Meeting with NIHE	NIHE
		p.m.	Arrival of Mr. Miyagawa, internal meeting	
23-Nov	Thu	a.m.	Meeting with NIHE Meeting with MoH	NIHE MoH
		p.m.	Meeting with NIHE	NIHE
24-Nov	Fri	a.m.	Signing on Minutes of Discussion	MoH
		p.m.	Report to Embassy of Japan and JICA	Embassy of Japan JICA Vietnam Office
25-Nov	Sat	a.m.	Departure of Mr. Akimoto, Dr. Sato, Ms. Makimoto, and Mr. Kurosawa	
		p.m.	Hanoi→Hongkong→Tokyo	
26-Nov	Sun	a.m.		
		p.m.	Hanoi →Tuyen Quang	
27-Nov	Mon	a.m.	Survey on the sites for installation of incinerators in Tuyen Quang Province	Tuyen Quang Preventive Medicine Center
		p.m.	Survey on the sites for installation of incinerators in Yen Bai Province	Yen Bai Preventive Medicine Center Yen Binh District Health Center Tan Thinh Commune Health Center
28-Nov	Tue	a.m.	Meeting with NIHE Report to JICA	NIHE JICA Vietnam Office
		p.m.	Report to WHO Report to UNICEF	WHO Hanoi Office UNICEF Hanoi Office
29-Nov	Wed	a.m. p.m.	Hanoi 11:00(CX790)→Hongkong 13:45/15:30(NH910)→Tokyo 20:15	

List of Parties Concerned in the Recipient Country

1. Embassy of Japan

Hitoshi OZAWA	Counsellor
Kenji MIYAGAWA	Second Secretary
Noboru USUDA	Second Secretary

2. JICA Vietnam Office

Masato TOGAWA	Deputy Resident Representative
Kozo WATANABE	Assistant Resident Representative
Koyumi ENOMOTO	Medical Adviser

3. WHO

Ms. Pascal Brudon	Representative in Vietnam
Masahiro TANAKA	Medical Officer, WHO Vietnam
Dr. Jeffrey W. McFarland	Medical Officer, WHO/WPRO

4. UNICEF

Dr. Nguyen Minh Tuan	Project Officer, EPI
Dr. Guido Borghese	Senior Project Officer

5. Ministry of Health

Dr. Trinh Bang Hop	Director General, Department of International Cooperation
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6. National Institute of Hygiene and Epidemiology

MD Hoang Thuy Long	Director
MD Dang Duc Trach	Director, National EPI
Dr. Do Si Hien	Secretary, National EPI
Dr. Duong Thu Hong	National EPI
Dr. Nguen Van Cuong	National EPI

7. Hai Phong Province

Dr. Nguyen Van Hieu	Director, Haiphong Preventive Medicine Center
Dr. Nguyen Ba Nho	Vice Director, -Ditto-
Dr. Nguyen Van Vy	Director, Health Service, Hai Phong Province

8. Hai Duong Province

Dr. Luong Duc Dan	Director, Haiduong Preventive Medicine Center
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9. Hoa Binh Province

Mr. Quach The Tan	Vice Chairman, Hoa Binh Province People's Committee
Mr. Vu Dinh Vinh	Director, Hoa Binh Health Service
Dr. To Thanh Phuong	Preventive Medicine Center
Dr. Vu Quoc Hai	Provincial Hospital
Dr. Dinh Thi Nghien	Vice Director, Da Bac District Health Center
Mr. Vu Dinh Vinh	Charman, Da Bac District People's Committee

10. Ha Nam Province

Dr. Tran Dac Phu	Vice Director, Ha Nam Health Service
Dr. Nguyen Lap Quyet	Director, Center of Preventive Medicine
Dr. Bui Van Teu	Director, Ha Nam Provincial Hospital

11. Pasteur Institute Ho Chi Minh City

Dr. Pham Kim Sac	Vice Director
Dr. Ngyen Thi Thanh Ha	EPI

12. Ba Ria Vung Tau Province

Dr. Nguyen Xuan Hoan	Director, Preventive Medicine Center
Dr. Dhan Nhut Minh	Vice Director, Provincial Hospital
Mr. Nguyen Khat Khi	Caretaker, Provincial Hospital
Dr. Nguyen Pham Ha	Vice Director, Than Thang District Health Center
Dr. Ngo Thanh Chanh	District Health Center
Dr. Tran Vhi Ngoc Lan	Vice Director, My Xuan Commune Health Center

13. Long An Province

Dr. Pham Cong Dung	Director, Long An Health Service
Dr. Tran Ngoc Huu	Director, Preventive Medicines Center
Mr. Le Van Ton	Caretaker (for incinerator), Preventive Medicines Center
Dr. Pham Thi Minh	Director, Ben Luk Hospital
Dr. Ho Hoang Oanh	Vice Director, Ben Luk Hospital

14. Ha Noi City

Dr. Tran Van Lang	Director, Preventive Medicines Center
Mr. Hoang Thuy Lac	Director, MEDINSCO

15. Tuyen Quang Province

Dr. Ma Ngoc Phy	Vice Director, Tuyen Quang Health Service
Dr. Trieu Kim Long	Director, Preventive Medicine Center
Dr. Nguyen Trong Mai	Vice Director, Preventive Medicine Center
Mr. Nguyen Dac Du	Preventive Medicine Center
Dr. Ban Van Vuong	Director, Yen Son District Health Center
Dr. Ngyen Trong Minh	Vice Director, Yen Son District Health Center

16. Yen Bai Province

Dr. Tran Viet Thang	Director, Preventive Medicine Center
Dr. Kim	Director, Tan Thinh Commune Health Center
Dr. Hoang Ngoc Thu	Director, Yen Binh District Health Center
Dr. Bui Van Thanh	Vice Director, Yen Binh District Health Center

References

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- 13 Safe Management of Wastes from Health Care Activities, WHO
- 14 SICIM Users Manual, WHO–WPRO
- 15 Socio–Economic Development Strategy 2001–2010 (draft), Communist Party of Viet Nam
- 16 UNICEF Viet Nam
- 17 Vaccine Handbook, National Institute of Infectious Diseases
- 18 Consideration on Immunization for Measles, Kitasato Institute
- 19 New Manual on Medical Waste Disposal

**MINUTES OF DISCUSSIONS
ON
THE STUDY
ON
THE PROJECT
FOR
MEASLES MASS IMMUNIZATION CAMPAIGN
IN
THE SOCIALIST REPUBLIC OF VIETNAM**

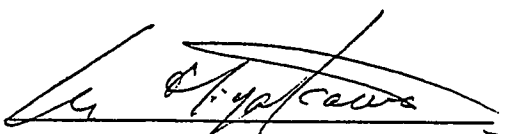
In response to the request from the Government of the Socialist Republic of Vietnam (hereinafter referred to as "Vietnam"), the Government of Japan decided to conduct a Study on the Project for Measles Mass Immunization Campaign in Vietnam (hereinafter referred to as "the Project") and entrusted the study to Japan International Cooperation Agency (JICA).

JICA sent the Study Team (hereinafter referred to as "the Team") headed by Mr. Katsutoshi Miyakawa, Grant Aid Division, Economic Cooperation Bureau, Ministry of Foreign Affairs, to Vietnam from November 7 to 29, 2000.

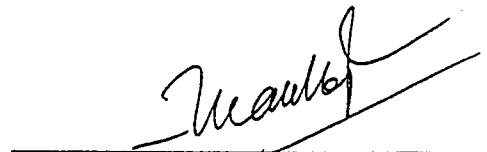
The Team had series of discussions with the officials concerned of the Government of Vietnam and conducted a field survey.

In the course of discussions and field studies, both parties confirmed the main items described in the attached sheets. The team will proceed to further works and prepare the Study Report.

Hanoi, November 24, 2000



Mr. Katsutoshi Miyakawa
Leader
The Study Team
Japan International Cooperation Agency
Japan



Dr. Trinh Bang Hop
Director General
Department of International Cooperation
Ministry of Health
The Socialist Republic of Vietnam



Prof. Hoang Thuy Long
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ATTACHMENT

1. Objectives

The Objectives of the Project is to accelerate the control of measles and to reduce the morbidity and mortality of measles among children in Vietnam through the provision of equipment required for mass measles immunization campaign for children under ten years old scheduled in 2002 and 2003.

2. Project Sites

The project sites are 32 provinces north of and including Da Nang for Phase 1 (2001-2002 implementation), and 29 provinces south of and including Quang Nam for Phase 2 (2002-2003 implementation), as shown in Annex 1.

3. Responsible and Executing Agency

Responsible Agency : Ministry of Health
Executing Agency : National Institute of Hygiene and Epidemiology

4. Items Requested by the Government of Vietnam

(1) After discussion with the Team, the Government of Vietnam made a final request to the Government of Japan to consider providing the items described in the table below as part of the Project.

However, items to be included in the Project will be decided after further study in Japan.

	Item	Quantity		
		Phase 1	Phase 2	Total
1	Measles Vaccine	14,211,890	13,301,860	27,513,750
2	Autodisable Syringe	10,705,323	10,863,353	21,568,676
3	Safety Box	122,970	124,374	247,344
4	Reconstitution Syringe	473,730	443,395	917,125
5	Incinerator	15	0	15

(2) The Government of Vietnam made the list of districts as shown in Annex-2 to which incinerators are to be installed as models for safe disposal of used syringes.

5. Japan's Grant Aid System

(1) The Government of Vietnam has understood the system of Japan's Grant Aid on Annex-3 explained by the team.

(2) The Government of Vietnam will take necessary measures as described in Annex-4 for the smooth implementation of the Project on the condition that the Grant Aid is extended to the Project by the Government of Japan.

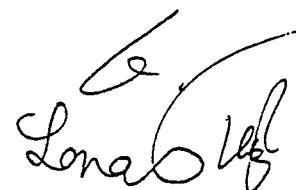


6. Schedule of the Study

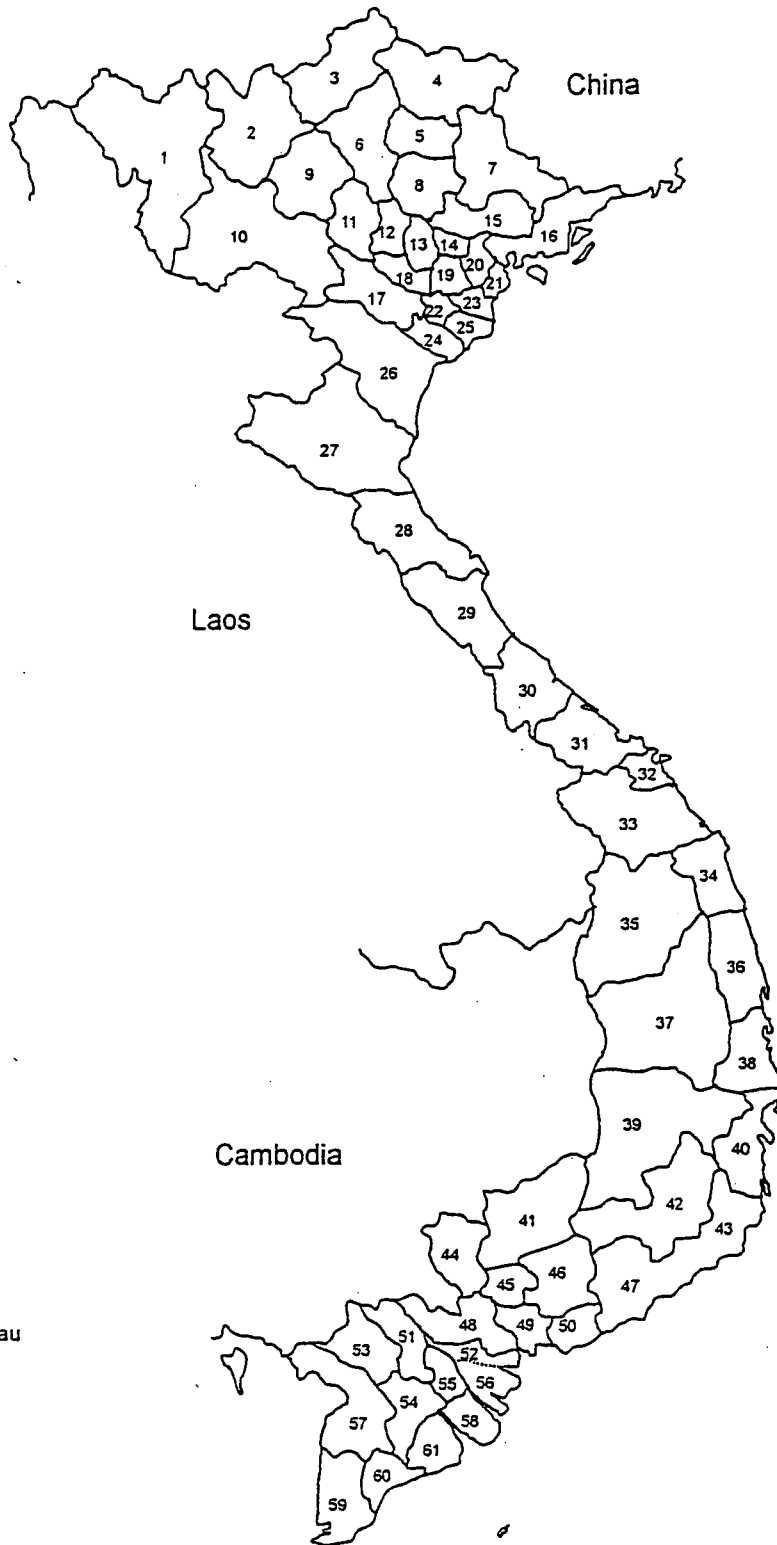
JICA will prepare a study report on the Project and send it to the Government of Vietnam around March 2001 provided that the Government of Japan approves the report.

7. Other relevant issues

- (1) The Government of Vietnam shall allocate the necessary budget and personnel for implementation of the Project.
- (2) The Government of Vietnam shall properly distribute and utilize the equipment which will be procured under the Grant in collaboration with WHO and UNICEF.
- (3) Both sides understand that the Project shall be implemented under the supervision of WHO especially on the following issues.
 - ① Both sides understand that safe disposal of used syringes is essential. The Government of Vietnam is required to take necessary measures to dispose safely used syringes under the technical advise of WHO. The Government of Vietnam is required to submit a report after the campaign finished in 2002 to Japanese side on safe disposal of used syringes including utilization of incinerators.
 - ② The Government of Vietnam is required to undertake such necessary measures as following for proper installation and utilization of the incinerator.
 - a) To minimize the emission of smoke and pollutants by strictly following the standards / procedures instructed by WHO and other authorities concerned.
 - b) To conduct necessary training courses for incineration workers and supervisors under the technical advise of WHO in all the provinces incinerators will be installed.
 - c) To install the incinerators at the places distant from private houses and facilities where a large number of people gathers such as school, church, factory, etc. It is advisable to consult with WHO for evaluation of appropriateness of the proposed sites.
 - d) To furnish a protective fences at least 5 meters around. Constriction of incinerator house is recommended by WHO.
- (4) The Government of Vietnam shall get the government approval on the Project and send a letter to inform it to the Embassy of Japan and/or JICA in Hanoi by late January 2001.



Annex 1.



Province for Phase 1

1. Lai Chau
2. Lao Cai
3. Ha Giang
4. Cao Bang
5. Bac Kan
6. Tuyen Quang
7. Lang Son
8. Thai Nguyen
9. Yen Bai
10. Son La
11. Phu Tho
12. Binh Phuc
13. Ha Noi
14. Bac Ninh
15. Bac Giang
16. Quang Ninh
17. Hoa Binh
18. Ha Tay
19. Hung Yen
20. Hai Dong
21. Hai Phong
22. Ha Nam
23. Thai Binh
24. Ninh Binh
25. Nam Dinh
26. Thanh Hoa
27. Nghe An
28. Ha Tinh
29. Quang Binh
30. Quang Tri
31. Thua Thien Hue
32. Da Nang

Province for Phase 2

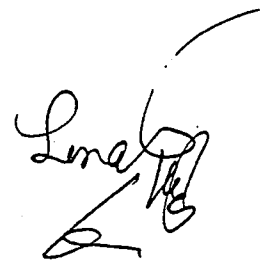
33. Quang Nam
34. Quang Ngai
35. Kon Tum
36. Binh Dinh
37. Gia Lai
38. Phu Yen
39. Dak Lak
40. Khanh Hoa
41. Binh Phuoc
42. Lam Dong
43. Ninh Thuan
44. Tay Ninh
45. Binh Duong
46. Dong Nai
47. Binh Thuan
48. Long An
49. Ho Chi Min
50. Ba Ria Vung Tau
51. Dong Thap
52. Tien Giang
53. An Giang
54. Can Tho
55. Vinh Long
56. Ven Tre
57. Kien Giang
58. Tra Vinh
59. Ca Mau
60. Bac Lieu
61. Soc Trang

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ANNEX 2

PROPOSED SITES TO INSTALL INCINERATORS

Province	District	Quantity
Yen Bai	Yen Bai Town	1
	Nghia Lo Town	1
	Tran Yen	1
	Yen Binh	1
	Van Yen	1
	Luc Yen	1
	VanChan	1
	Tram Tau	1
	Mu Cang Chai	1
Tuyen Quang	Tuyen Quang Town	1
	Son Duong	1
	Yen Son	1
	Ham Yen	1
	Chiem Hoa	1
	Na Hang	1
Total		15



Annex-3

Japan's Grant Aid Scheme

1. Grant Aid Procedure

(1) Japan's Grant Aid Program is executed through the following procedures.

Application: (Request made by a recipient country)
Study: (Study conducted by JICA)
Appraisal & Approval: (Appraisal by the Government of Japan and Approval by Cabinet)
Determination of (Notes exchanged between the Governments of Japan
Implementation: and the recipient country)

(2) Firstly, the application or request for a Grant Aid project submitted by a recipient country is examined by the Government of Japan (Ministry of Foreign Affairs) to determine whether or not it is eligible for Grant Aid. If the request is deemed appropriate, the Government of Japan assigns JICA (Japan International Cooperation Agency) to conduct a study on the request.

Secondly, JICA conducts the study, using (a) Japanese consulting firm(s).

Thirdly, the Government of Japan appraises the project to see whether or not it is suitable for Japan's Grant Aid Program, based on the Basic Design Study report prepared by JICA, and the results are then submitted to the Cabinet for approval.

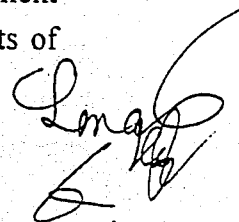
Fourthly, the project, once approved by the Cabinet, becomes official with the Exchange of Notes signed by the Governments of Japan and the recipient country.

Finally, for the implementation of the project, JICA assists the recipient country in such matters as preparing tenders, contracts and so on.

2. Contents of the Study

(1) Contents of the Study

The purpose of the Study (hereafter referred to as "the study"), conducted by JICA on a requested project (hereafter referred to as "the Project") is to provide a basic document necessary for the appraisal of the Project by the Japanese Government. The contents of the Study are as follows:



- 1) Confirmation of the background, objectives, and benefits of the requested Project and also institutional capacity of the agencies concerned of the recipient country, for the Project's implementation.
- 2) Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, social and economic point of view.
- 3) Confirmation of items agreed on by both parties concerning the basic concept of the Project.
- 4) Preparation of a basic design of the Project
- 5) Estimation of cost of the Project

The contents of the original request are not necessarily approved in their initial form as the contents of the Grant Aid project. The Basic Design of the Project is confirmed considering the guidelines of Japan's Grant Aid Scheme.

The Government of Japan requests the Government of the recipient country to take the measures necessary to ensure its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization in the recipient country actually implementing the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country through the Minutes of Discussions.

(2) Selection of Consultants

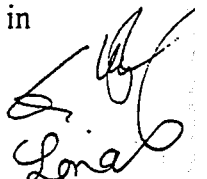
For smooth implementation of the Study, JICA uses (a) registered consultant firm(s). JICA select (a) firms(s) based on proposals submitted by interested forms. The firm(s) selected carry(ies) out a Study and write(s) a report, based upon terms of reference set by JICA.

The consulting firm(s) used for the study is(are) recommended by JICA to the recipient country to also work on the Project's implementation after the Exchange of Notes, in order to maintain technical consistency.

3. Japan's Grant Aid Scheme

(1) What is Grant Aid?

The Grant Aid Program provides a recipient country with non-reimbursable funds to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for economic and social development of the country under principles in



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accordance with the relevant laws and regulations of Japan. Grant Aid is not supplied through the donation of materials as such.

(2) Exchange of Notes (E/N)

Japan's Grant Aid is extended in accordance with the Notes exchanged by the two Governments concerned, in which the objectives of the Project, period of execution, conditions and amount of the Grant Aid, etc., are confirmed.

(3) "The period of Grant Aid" means the one fiscal year which

the Cabinet approves the project for. Within the fiscal year, all procedures such as exchanging of the Notes, concluding contracts with (a) consultant firm(s) and (a) contractor(s) and final payment to them must be completed.

However in case of delays in delivery, installation or construction due to unforeseen factors such as weather, the period of the Grant Aid can be further extended for a maximum of one fiscal year at most by mutual agreement between the two Governments.

(4) Under the Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased.

When the two Governments deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country.

However the prime contractors, namely, consulting constructing and procurement firms, are limited to "Japanese nationals". (The term "Japanese nationals" means persons of Japanese nationality or Japanese corporations controlled by persons of Japanese nationality.)

(5) Necessity of "Verification"

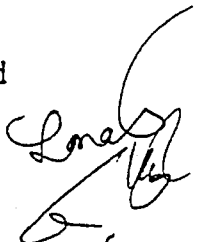
The Government of recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by the Government of Japan. This "Verification" is deemed necessary to secure accountability to Japanese taxpayers.

(6) Undertaking required of the Government of the Recipient Country

In the implementation of the Grant Aid project, the recipient country is required to undertake such necessary measures as following;

1) to secure land necessary for the sites of the Project and to clear and reclaim the land prior to commencement of the construction,

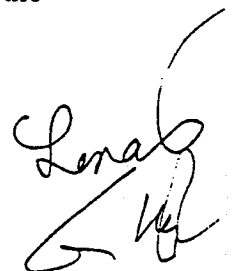
2) to provide facilities for the distribution of electricity, water supply and drainage and other incidental facilities in and around the sites,



- 3) to secure buildings prior to the procurement in case the installation of the equipment,
- 4) to ensure all the expenses and prompt execution for unloading, customs clearance at the port of disembarkation and internal transportation of the products purchased under the Grant Aid,
- 5) to exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the Verified Contracts,
- 6) to accord Japanese nationals whose services may be required in connection with the supply of the products and services under the Verified contracts, such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work,
- 7) "Proper Use"

The recipient country is required to maintain and use properly and effectively the facilities constructed and equipment purchased under the Grant Aid and to assign staff necessary for this operation and maintenance as well as to bear all the expenses other than those covered by the Grant Aid.
- 8) "Re-export"

The products purchased under the Grant Aid should not be re-exported from the recipient country.
- 9) Banking Arrangements (B/A)
 - (a) The Government of the recipient country or its designated authority should open an account in the name of the Government of the recipient country in a bank in Japan (hereinafter referred to as "the Bank"). The Government of Japan will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government to the recipient country or its designated authority under the Verified Contracts.
 - (b) The payments will be made when payment requests are presented by the Bank to the Government of Japan under an authorization to pay issued by the Government of the recipient country or its designated authority.

A handwritten signature in black ink, appearing to read 'Lena' or similar, with a large flourish underneath.

Annex-4

Major undertakings to be taken by each government

NO	Items	To be covered by the Grant Aid	To be covered by the Recipient side
1	To bear the following commissions to a bank of Japan for the banking services based upon the B/A		
	1) Advising commission of A/P		●
	2) Payment commission		●
2	To ensure prompt unloading and customs clearance at the port of disembarkation in recipient country		
	1) Marine(Air) transportation of the products from Japan to the recipient country	●	
	2) Tax exemption and custom clearance of the products at the port of disembarkation		●
	3) Internal transportation from the ports and/or storage facilities of disembarkation to the project sites		●
3	To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contract such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work		●
4	To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the supply of the products and services under the verified contract		●
5	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid		●
6	To bear all the expenses, other than those to be borne by the Grant Aid, necessary for the transportation and installation of the equipment		●