

Contribution of water supply systems to the 3 dominant helminthic infections seems to be not so conspicuous. Prevalences of A. lumbricoides and T. trichiura infections were higher in those utilizing deep or semi-deep wells than in those utilizing shallow wells, while that of hookworm infections was lower in the former than in the latter. It might be difficult to explain the cause of these variations, because water sources utilized by each individuals seem to be variable and also sometimes plural.

Cross et al. (1976) examined intestinal parasites for those living in 5 villages of North Sumatra. They noticed some variations for the prevalences of these worms among villages, in which the prevalences varied to 54 - 89% for A. lumbricoides, 69 - 99% for T. trichiura and 10 - 82% for hookworms, though they could not explain the cause of these variations. Now, most of their results is able to be evaluated as an analogy of our observations including areas of rice fields and role of pigs, because social and geographical conditions of their areas are similar to those of our areas. For example, Bagan Asahan, one of their selected villages, is located at the coastal area in Asahan Regency, about 50 km east from our project area, where most inhabitants live on fishery and commerce and have no rice fields. They don't breed pigs. Thus, 89, 99 and 10% of prevalence ratios for A. lumbricoides, T. trichiura and hookworm infections respectively might be reasonable. However, we cannot evaluate the prevalence in the plantation area of rubber or oil palm because we have no evidence in the plantation areas.

Stafford and Joesoef (1976) reported intestinal and blood parasites for those living in coastal and mountainous areas of Aceh Province, Sumatra, approximately 650 km northwest from our project area, in which the prevalences were 77 - 82% for A. lumbricoides, 69 - 82% for T. trichiura and 41 - 95% for hookworms. Their overall estimations seem to be the same level with our results.

Prevalence of E. histolytica infections was high in Limau Sundai. It was highest at the northern part of the village. Most shallow wells in this area are simple holes with around 1 m in depth without any frames. They have no

toilet. Human feces seem to be disseminated to all residential areas by pigs. Thus, in this area, shallow wells might be highly contaminated with human and animal feces.

These parasitic infections seem to be not so much varied seasonally because rainfall and temperature are not so much varied all over the year.

From these evidences, control programs for these enteric parasitic infections might be considered as follows;

1. Installation of toilets in every houses.
2. Control of places to breed pigs.
3. Health education.

Installation of toilets have been done under IMPRES program. However, these toilets have been installed in only places as schools or houses of chiefs of villages. It must be installed in all houses.

Some toilets already installed in some area have not been utilized in good conditions. As inhabitants could not find water after excretion, these toilets were polluted by feces. Thus, toilets with water tanks should be installed, which is common in urban area. Swan neck type toilet in IMPRES program might be recommended to protect bad smell and insects.

Participations of pigs to assist the spread of hookworms were suggested in this paper. In Tapanuli Tengah Regency, pigs have been bred in cages. Thus, breeding pigs in cages might be recommended to control some parasites.

Health education might be one of the most important measures to control enteric diseases. Control measures above mentioned might be successful when most inhabitants learn routes of transmissions and control measures of causative agents. We have had a lot of evidences applicable to the control program.

Improvement of water supply systems must be recommended to control amoebic dysentery and some other parasitic infections, which were already mentioned in a section of bacterial infections.

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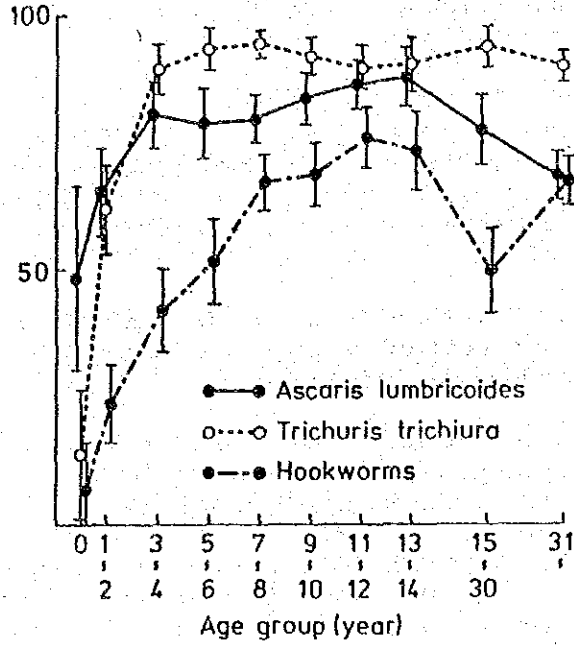
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(Norichika Kumazawa: 1978. Nov. 17 ~ 1980. Nov. 16)

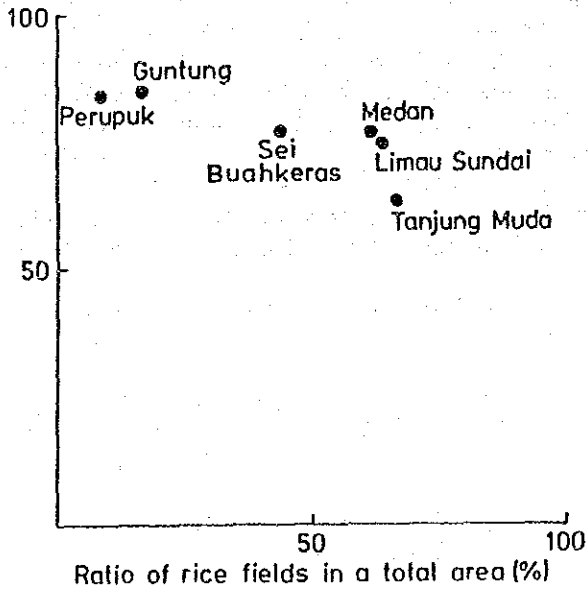
Prevalence rate (%)

Fig. 1



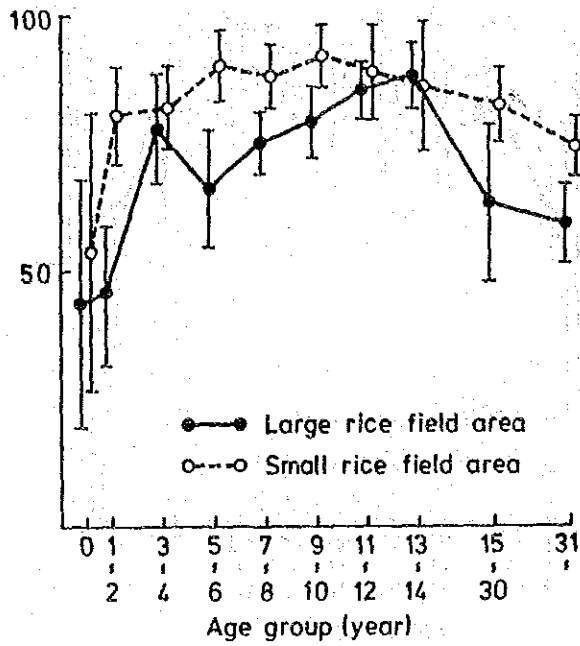
Prevalence rate (%)

Fig. 2



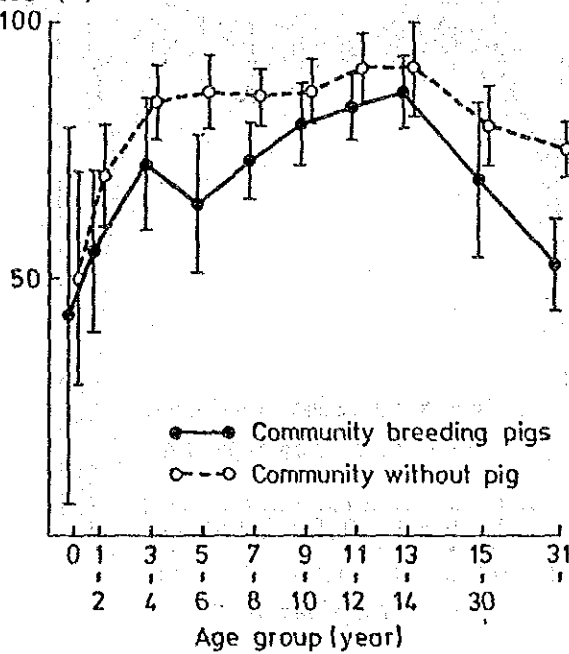
Prevalence
rate (%)

Fig. 3



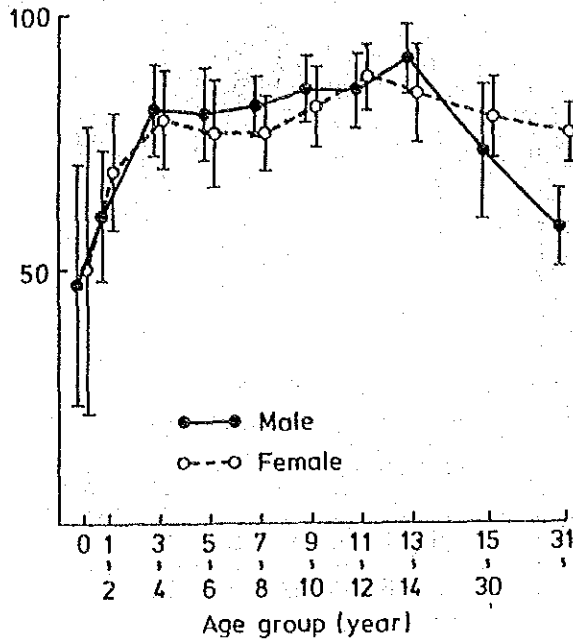
Prevalence
rate (%)

Fig. 4



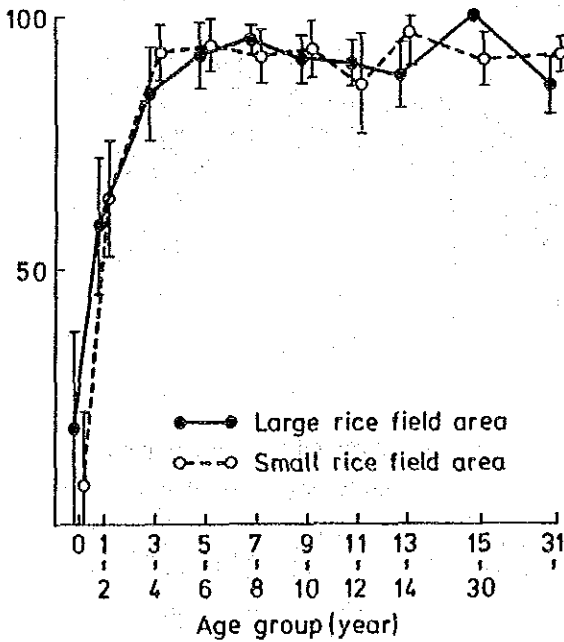
Prevalence
rate (%)

Fig. 5



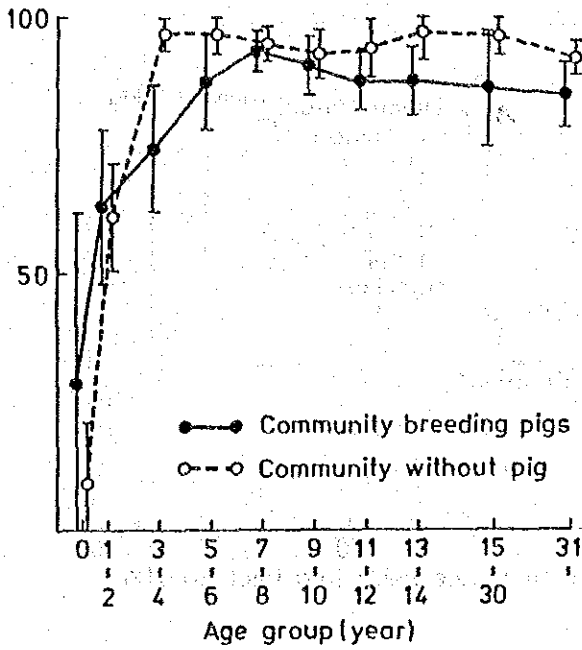
Prevalence
rate (%)

Fig. 6



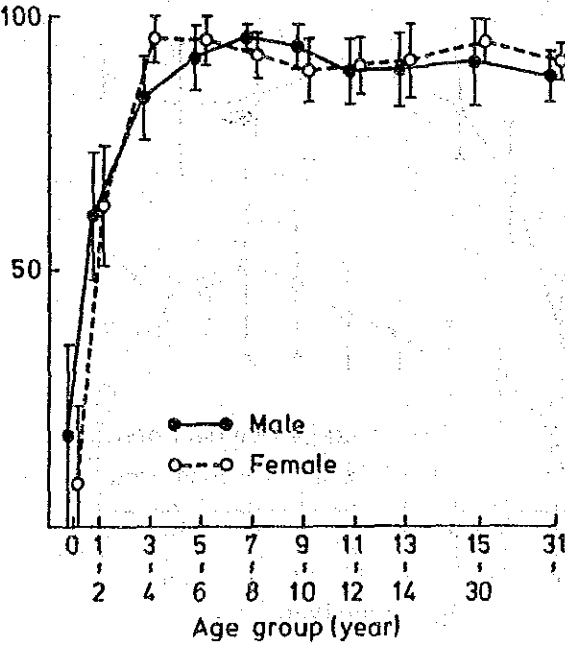
Prevalence
rate (%)

Fig. 7



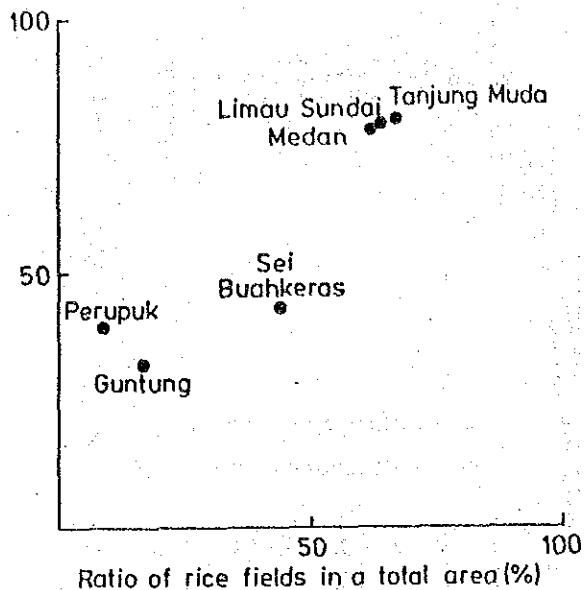
Prevalence
rate (%)

Fig. 8



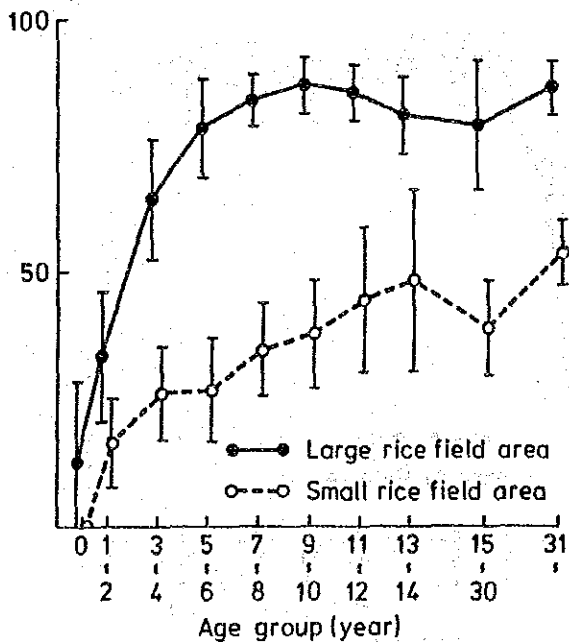
Prevalence rate (%)

Fig. 9



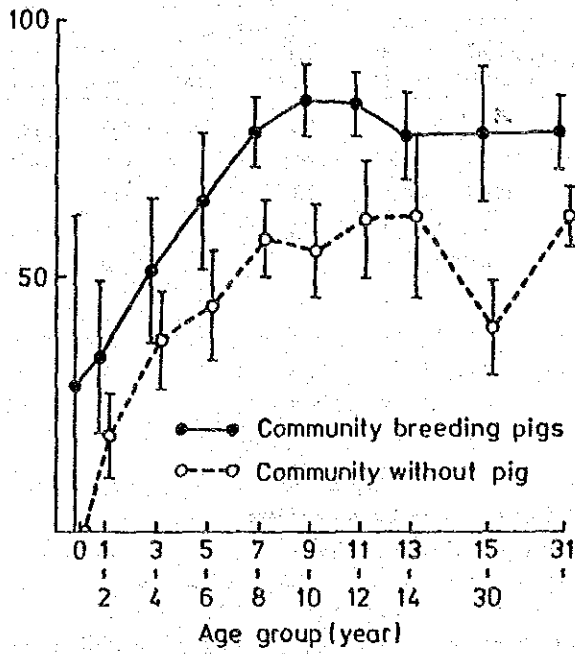
Prevalence rate (%)

Fig. 10



Prevalence
rate (%)

Fig. 11



Prevalence
rate (%)

Fig. 12

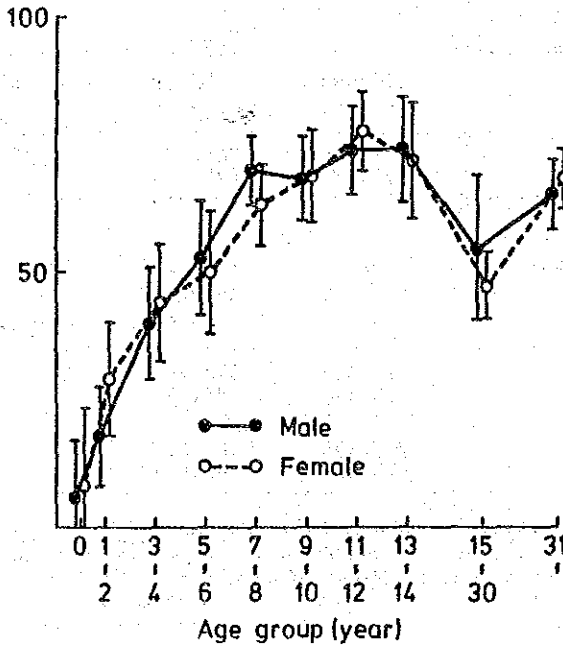


Table 1. Enteric parasites detected in 6 villages

| Parasite | Village | | | | | | Total (n=1,784) |
|--------------------------------|-----------------------------|-------------------|----------------------------|----------------------------|--------------------|--------------------|--------------------|
| | Sei Buhkeras (n=235*) | Medang (n=301) | Limau Sundai (n=512) | Tanjung Muda (n=166) | Perupuk (n=296) | Guntung (n=274) | |
| <i>Ascaris lumbricoidea</i> | 181** | 231 | 383 | 105 | 249 | 233 | 1,382(77.5%) |
| <i>Trichuris trichiura</i> | 200 | 278 | 447 | 136 | 260 | 253 | 1,574(88.2%) |
| Hookworms | 102 | 235 | 406 | 133 | 117 | 87 | 1,080(60.5%) |
| <i>Hymenolepis nana</i> | 0 | 1 | 1 | 0 | 0 | 2 | 4(0.2%) |
| <i>Enterobius vermicularis</i> | 1 | 0 | 0 | 0 | 0 | 1 | 2(0.1%) |
| <i>Entamoeba histolytica</i> | 1 | 1 | 44 | 4 | 2 | 1 | 53(3.0%) |
| <i>Entamoeba coli</i> | 2 | 27 | 0 | 8 | 12 | 6 | 55(3.1%) |
| <i>Giardia lamblia</i> | 0 | 10 | 7 | 6 | 9 | 9 | 41(2.3%) |
| <i>Blasocystis hominis</i> | 1 | 0 | 1 | 0 | 0 | 0 | 2(0.1%) |
| <i>Iodamoeba bütschlii</i> | 0 | 2 | 0 | 0 | 1 | 1 | 4(0.2%) |
| <i>Chilomastix mesnili</i> | 0 | 2 | 0 | 0 | 0 | 0 | 2(0.1%) |

*Number of specimens examined.

**Number of positive specimens.

Table 2. Prevalences of *Ascaris Lumbricoidea* infections classified by rice field area, breeding pigs and water supply system

| Community | Large rice field area* | Small rice field area** | Total |
|--------------------------|---------------------------|----------------------------|------------------|
| Community breeding pigs | | | |
| Deep and semi-deep wells | - | 47/ 60 | 47/ 60(78.3%)*** |
| Shallow well | 430/599 | 45/ 59 | 475/658(72.2%) |
| River | 12/ 16 | 29/ 40 | 41/ 56(73.2%) |
| Sub-total | 442/615 (71.9%) | 121/159 (76.1%) | 563/774(72.7%) |
| Community without pigs | | | |
| Deep and semi-deep wells | 5/ 7 | 186/218 | 191/225(84.9%) |
| Shallow well | 254/337 | 351/417 | 605/754(80.2%) |
| River | 18/ 20 | 5/ 11 | 23/ 31(74.2%) |
| Sub-total | 277/364 (76.1%) | 542/646 (83.9%) | 819/1010(81.1%) |
| Total | 719/979 (73.4%) | 663/805 (82.4%) | 1382/1784(77.5%) |

*A total of 3 villages, Medang, Limau Sundai and Tanjung Muda.

**A total of 3 villages, Sei Buahkeras, Perupuk and Guntung.

***Number positive/number examined (prevalence ratio).

Table 3. Prevalences of *Trichuris trichiura* infections classified by rice field area, breeding pigs and water supply system

| Community | Large rice field area* | Small rice field area** | Total |
|--------------------------------|------------------------|-------------------------|------------------|
| Community breeding pigs | | | |
| Deep and semi-deep wells | - | 56/ 60 | 56/ 60(93.3%)* |
| Shallow well | 515/599 | 39/ 59 | 554/658(84.2%) |
| River | 15/ 16 | 40/ 40 | 55/ 56(98.2%) |
| Sub-total | 530/615 (86.2%) | 135/159 (84.9%) | 665/774(85.9%) |
| Community without pigs | | | |
| Deep and semi-deep wells | 6/ 7 | 207/218 | 213/225(94.7%) |
| Shallow well | 306/337 | 363/417 | 669/754(88.7%) |
| River | 19/ 20 | 8/ 11 | 27/ 31(87.1%) |
| Sub-total | 331/364 (90.9%) | 578/646 (89.5%) | 909/1010(90.0%) |
| Total | 861/979 (87.9%) | 713/805 (88.6%) | 1574/1784(88.2%) |

*A total of 3 villages, Medang, Limau Sundai and Tanjung Muda.

**A total of 3 villages, Sei Buahkeras, Perupuk and Guntung.

***Number positive/number examined (prevalence ratio).

Table 4. Prevalences of hookworm infections classified by rice field area, breeding pigs and water supply system

| Community | Large rice field area* | Small rice field area** | Total |
|--------------------------------|------------------------|-------------------------|------------------|
| Community breeding pigs | | | |
| Deep and semi-deep wells | - | 35/ 60 | 35/ 60(58.3%)* |
| Shallow well | 478/599 | 20/ 59 | 498/658(75.7%) |
| River | 13/ 16 | 33/ 40 | 46/ 56(82.1%) |
| Sub-total | 491/615 (79.8%) | 88/159 (55.3%) | 579/774(74.8%) |
| Community without pigs | | | |
| Deep and semi-deep wells | 6/ 7 | 63/218 | 69/225(30.7%) |
| Shallow well | 269/337 | 154/417 | 423/754(56.1%) |
| River | 8/ 20 | 1/ 11 | 9/ 31(29.0%) |
| Sub-total | 283/364 (77.7%) | 218/646 (33.7%) | 501/1010(49.6%) |
| Total | 774/979 (79.1%) | 306/805 (38.0%) | 1080/1784(60.5%) |

*A total of 3 villages, Medang, Limau Sundai and Tanjung Muda.

**A total of 3 villages, Sei Buahkeras, Perupuk and Guntung.

***Number positive/number examined (prevalence ratio).

Table 5. Results of culture of hookworm positive feces

| Village | <u>Ancylostoma</u> <u>duodenale</u> | <u>Necator</u> <u>americanus</u> | <u>Strongyloides</u> <u>stercolaris</u> | Total |
|--------------|--|-------------------------------------|--|----------------|
| Medang | 35* | 96 | 4 | 135(126 cases) |
| Limau Sundai | 14 | 22 | - | 36(34 cases) |
| Tanjung Muda | 16 | 50 | 2 | 68(61 cases) |
| Perupuk | 1 | 4 | - | 5(5 cases) |
| Guntung | 6 | 15 | - | 21(21 cases) |
| Total | 72 | 187 | 6 | 265(247 cases) |

*Number of positive specimens.

Table 6. Contributions of 4 factors to 3 main protozoa infections

| Factor | <u>Entamoeba</u> <u>histolytica</u> | <u>Entamoeba</u> <u>coli</u> | <u>Giardia</u> <u>lamblia</u> |
|--------------------------|--|---------------------------------|----------------------------------|
| Rice field | | | |
| Large rice field area | 49/ 979(5.0%)* | 35/ 979(3.6%) | 23/ 979(2.3%) |
| Small rice field area | 2/ 805(0.2%) | 20/ 805(2.5%) | 18/ 805(2.2%) |
| Water supply system | | | |
| Deep and semi-deep wells | 1/ 285(0.4%) | 7/ 285(2.5%) | 9/ 285(3.2%) |
| Shallow well | 52/1413(3.7%) | 46/1413(3.3%) | 21/1413(1.5%) |
| River | 0/ 86(0 %) | 2/ 86(2.3%) | 5/ 86(5.8%) |
| Pig | | | |
| Community breeding pigs | 48/ 774(6.2%) | 9/ 774(1.2%) | 13/ 774(1.7%) |
| Community without pigs | 5/1010(0.5%) | 46/1010(4.6%) | 28/1010(2.8%) |
| Sex** | | | |
| Male | 24/ 861(2.8%) | 17/ 861(2.0%) | 24/ 861(2.8%) |
| Female | 29/ 890(3.3%) | 38/ 890(4.3%) | 17/ 890(1.9%) |

*Number positive/number examined(prevalence ratio).

**Thirty three cases in Limau Sundai were removed because their sexes were not recorded, all of which had negative results in any protozoa.

③ Survey on the intestinal helminth infections in the project area (1981)

The cooperative activity of the intestinal parasite control by Japanese expert and Indonesian counterparts in Asahan Health Project has been started in 1979.

The former Japanese expert (Dr. N. Kumazawa, 1979/1980) and staff of Medan Health Laboratory had carried out the serial parasitological survey in six villages of three districts in Asahan Regency, namely in Sei Buah Keras and Medan of Medan Deras district, in Limau Sundai and Tanjung Muda of Air Putih district and in Perupuk and Guntung of Lima Puluh district. While in parallel with their activities, the parasite survey for the base line data and partial follow up by a mass treatment in several communities had been performed by the worm control section of the Provincial Health Service, North Sumatra.

According to the reports of the results of those activities above mentioned, in spite of the evenly high infection rate of roundworm and whipworm in every village, a remarkable difference of the prevalence rate of hookworm had been observed in each different village. Therefore, the present author felt that the study on endemicity in locality of the hookworm infection should be performed to reconfirm those results and to make further development of the investigation.

However, in compliance with the request from Indonesian side, the new program was made as follows;

- 1) To know the prevalence of soil-transmitted helminths in some communities.
- 2) Differentiation of the hookworm species and to know their geographical distribution. Additionally, to standardize the Harada and Mori culture technic.
- 3) To determine the relative efficacy of mass chemotherapy using two kinds of drugs; Combantrin and Trivexan.
- 4) Blood examination for anemia, especially determination of hemoglobin content and hematocrit values.
- 5) Environmental studies on the infection route of the soil-transmitted helminths.

SUBJECTS AND METHODS

The present survey was carried out in a newly selected three villages in the project area, that is in the village of Aek Nauli in Medan Deras district, in Tanjung Kasau of Air Putih district and in Simpang Gambus (Kampung: Pematang Tengah) of Lima Puluh district.

Total population at 6 small communities of the three villages examined was about 1350 persons and the survey was carried out during the rainy season in October 1981 to January, 1982. Stool specimens were obtained from 977 persons, blood samples from 961 and the drugs for treatment were given to 947 inhabitants.

Parasitological examinations for intestinal helminths eggs and larvae were performed in combination of Kato's cellophane thick smear, saturated NaCl flotation technic and modified Harada-Mori culture technic. As for the blood examination, hemoglobin contents in the blood specimens were determined photometrically as methemoglobinazide (HiAz) and the centrifugation technic with microhematocrit tube was applied for the determination of the hematocrit values.

RESULTS

1) Intestinal helminths infections

Parasitological examination by three different methods were performed on 977 fecal specimens collected from the inhabitants of three villages in Asahan Health Project area in 1981.

These survey revealed that 97.5% (953 persons) of the examined population (977 persons) harboured at least one kind of parasite as shown in Table 1. Among the parasites found, Ascaris lumbricoides, Trichuris trichiura and hookworm were abundant in all the areas examined, and the prevalence rate of the three parasites were 85.4%, 93.0% and 83.5% respectively. At the same time, it was observed that Strongyloides stercoralis, Trichostrongylus orientalis, Rhabditis sp., Enterobius vermicularis and Hymenolepis nana infections were relatively low among the studied population. The prevalence rate of the two hookworm species were 38.3% for Ancylostoma duodenale and

45.2% for Necator americanus on the basis of the results of the culture examination. However, looking on the geographical distribution of the both hookworm species, a remarkable difference of the dominancy of the species were found between the three villages. As shown in Table 1, no considerable difference of the infection rate by sex was found in all of four major helminths such as roundworm, whipworm, A. duodenale and N. americanus, even if it was observed in different villages. The age distribution of all major parasites infections seemed to reach at the highest level of prevalence rate as early as the age from 3 to 6 and after that increase very slowly or remain at the same level (Fig. 1). It should be noted that the infection rate of roundworm, whipworm and hookworm in a low age groups as 1 to 4 years were very high as 62.0 - 92.3%, 62.0 - 97.4% and 28.0 - 79.5% respectively.

2) Differentiation of the hookworm species

The previous study had shown inadequate results on the differentiation of the hookworm species because of some uncertain reasons. Later it was found in their reports that there were a problem to be solved before the culture examination were performed. The fecal material collected from inhabitants should be kept at 10 - 25°C under moistened condition and be examined as quickly as possible within 3 days after collected, especially for the culture examination, because the hookworm eggs in feces were destroyed easily and speedily under tropical environmental condition.

Out of three hookworm species, N. americanus, A. duodenale and Ancylostoma ceylanicum, it has been said that the most common species in Indonesia is N. americanus. But their detailed distribution in North Sumatra is almost unknown still now.

Positive cases (687 = 79.3%) among 866 fecal samples were obtained by the culture examination in this survey. The detail of the results of this examination are shown in Figs. 2 and 3. In total 687 cases, the carriers ratio with A. duodenale and N. americanus were 48.8 and 51.2 respectively. However, the dominancy of the hookworm species have shown a considerable difference between the three villages though the prevalence rate of the hookworm

egg carriers were almost the same in every village. That is, Aek Nauli village was the highest for A. duodenale (prevalence rate; A.d. = 49.1%, N.a. = 29.3%), Tanjung Kasau village was the highest for N. americanus (prevalence rate; A.d. = 24.3%, N.a. = 60.3%) and Simpang Gambus village was a area of even distribution for both species (prevalence rate; A.d. = 41.9%, N.a. = 44.1%). While, A. ceylanicum species was not identified in the examination.

The age distribution curves of the two kinds of hookworm infections showed parallel lines which rise rapidly in the 4 - 6 age group and after that increase very slowly or leveling off. However, Aek Nauli village revealed a different distribution curves between the two species (Fig. 3).

The information of the hookworm species obtained by the culture examination are quite interesting but need further examination and analysis for the final conclusion.

3) Comparative effects of the treatment with Combantrin and Trivexan

Some trials were carried out to determine the relative efficacy of mass chemotherapy with the drugs of pyrantel pamoate (Combantrin, Pfizer) and a combination of mebendazole (150 mg/tab.) and pyrantel pamoate (100 mg/tab.) (Trivexan, Mecosin). After initial stool samples were collected, each individual was treated according to the four types of regimens as shown in Table 2. Stool examination for the evaluation of the drug efficacy was done by a saturated NaCl flotation technic at five weeks after the medication. Besides, the fact that medication of Combantrin and Trivexan on the first day were given under the supervision of the doctor or nurse, but Trivexan one/two consecutive days were given by self-medication should be taken into consideration (Table 2).

As the results of a comparative treatment, it was concluded that,

- (A) Both Combantrin and Trivexan were very effective against A. lumbricoides. The anthelmintic effects with 1/2 dose of these drugs were still keeping the same level of the treatment effects with full dose

and the negative conversion rate (n.c. rate) were almost 97.0% in every regimen.

(B) The n.c. rate for hookworm with Combantrin (91.0%) and Trivexan (98.0%) were essentially the same. But, when the regimen was half or 2/3 of the usual doses, the effect of the treatment was also nearly half.

(C) Trivexan had some effect to remove T. trichiura and the negative conversion rate were 64.7% in full dose and 56.8% in 2/3 dose. While, Combantrin had almost no efficacy against whipworm even if it was full dose.

(D) In the practice of a mass-treatment, it is desirable that both Combantrin and Trivexan should be given in full dose, if not, the effect of treatment against hookworm will not be satisfactory.

4) Measurement of hemoglobin content and anemia

It is considered that nutrition-related anemia account for a large proportion of the various types of anemia, and the importance of iron deficiency anemia and infection anemia in tropical climates can not be negligible.

The results of the measurement of hemoglobin (Hb) contents and hematocrit (Ht) values in the blood obtained from rural inhabitants are shown in Tables 3, 4, 5 and Figs. 4 and 5. Average hemoglobin values were 9.9 g/dl for both sexes of the age 1 to 5, 11.2 g/dl for both sexes of the age 6 to 14, 13.2 g/dl for adult males more than 15 years and 11.7 g/dl for adult females more than 15 years. Since average values were on such low levels in comparison with normal values seen in several reports, the ratio of occurrence of anemia based on volume of hemoglobin mentioned below was very high as 69.4% in children of the age from 1 to 5, 63.2% in children of the age from 6 to 14, 38.6% in adult males more than 15 years and 64.4% in adult females. The World Health Organization had established (1959) a criteria of hemoglobin values for diagnosis of anemia, namely, the minimum hemoglobin dividing values which anemia can be considered to exist is as follows; Hb < 11.0 g/dl in children from 1 to 5 years, Hb < 12.0 g/dl in children from 6 to 14 years, Hb < 12.0 g/dl in adult females more than 15 years and Hb < 13.0 g/dl in adult males more than 15 years.

Fig. 4 gives a frequency distribution curve of volume of hemoglobin, and the difference between the sexes is evident especially in adult groups of more than 15 years and then the range of distribution in the females stretches out far to the left of the graph. Dots and the black area represent anemias and its rate. However, these distribution in the age of 15 years below have observed no difference between the sexes. The trend of blood values with advancing age took different course for males and females as shown in Fig. 5, especially it seemed to change considerably from nearly 15 years.

Anemia rate among the inhabitants of the three villages was the highest in a population of Simpang Gambus village and also it was in all age group and sexes (Table 4). Comparison of a prevalence of anemia in the hookworm infection and non-infected groups were shown in Table 5. The groups with varying degrees of hookworm infection were slightly below in average values of hemoglobin and also just high in prevalence of anemia than that of uninfected groups living under similar condition in the same community. The results of a blood examination obtained from this survey had suggested that the difference of anemia or average levels of hemoglobin between hookworm carriers and uninfected groups can not be observed clearly among these high endemic areas of the hookworm infection, because it is difficult to obtain a reliable normal control groups from these high endemic communities.

(Junichi Imai: 1981. Mar. 14 - 1982. Mar. 13)

Fig. 1. Age distribution of three dominant helminths infections in three village populations. (1981)

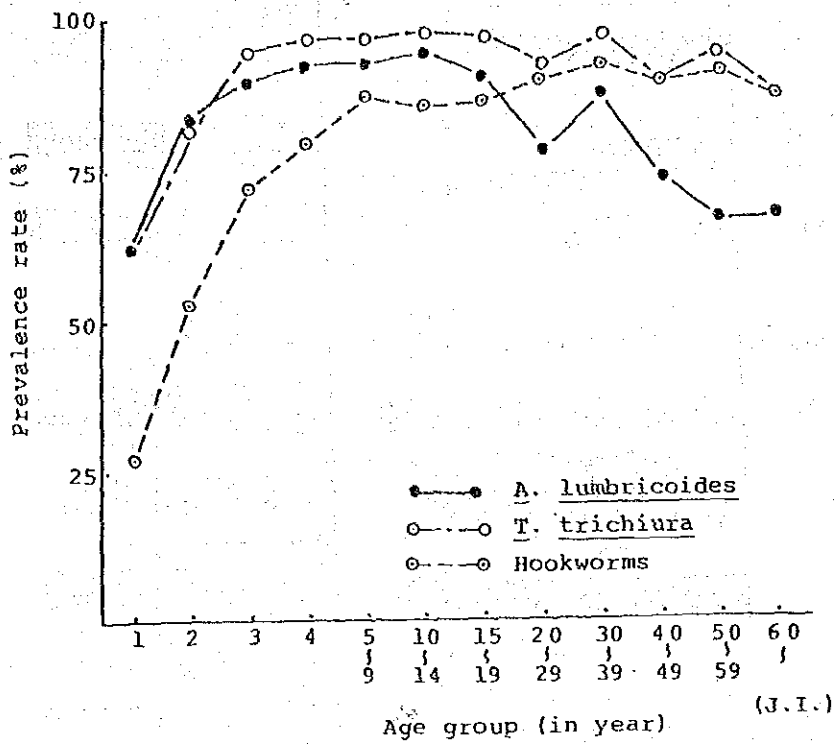
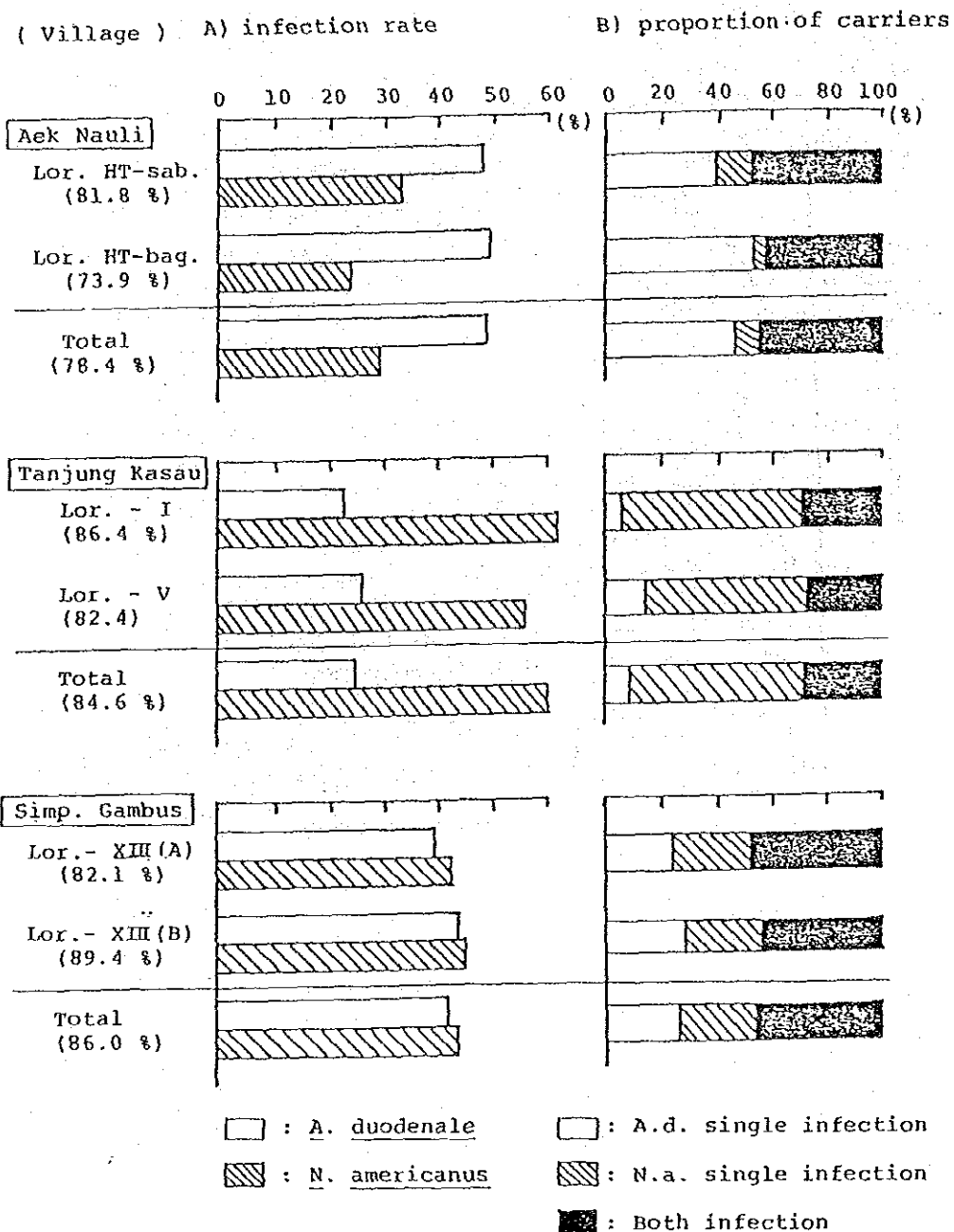


Fig. 2. Results of the differentiation of hookworm species in three endemic communities. (1981)



(J.I.)

Fig. 3. Age distribution curve of two kinds of hookworm infections in three village populations (1981)

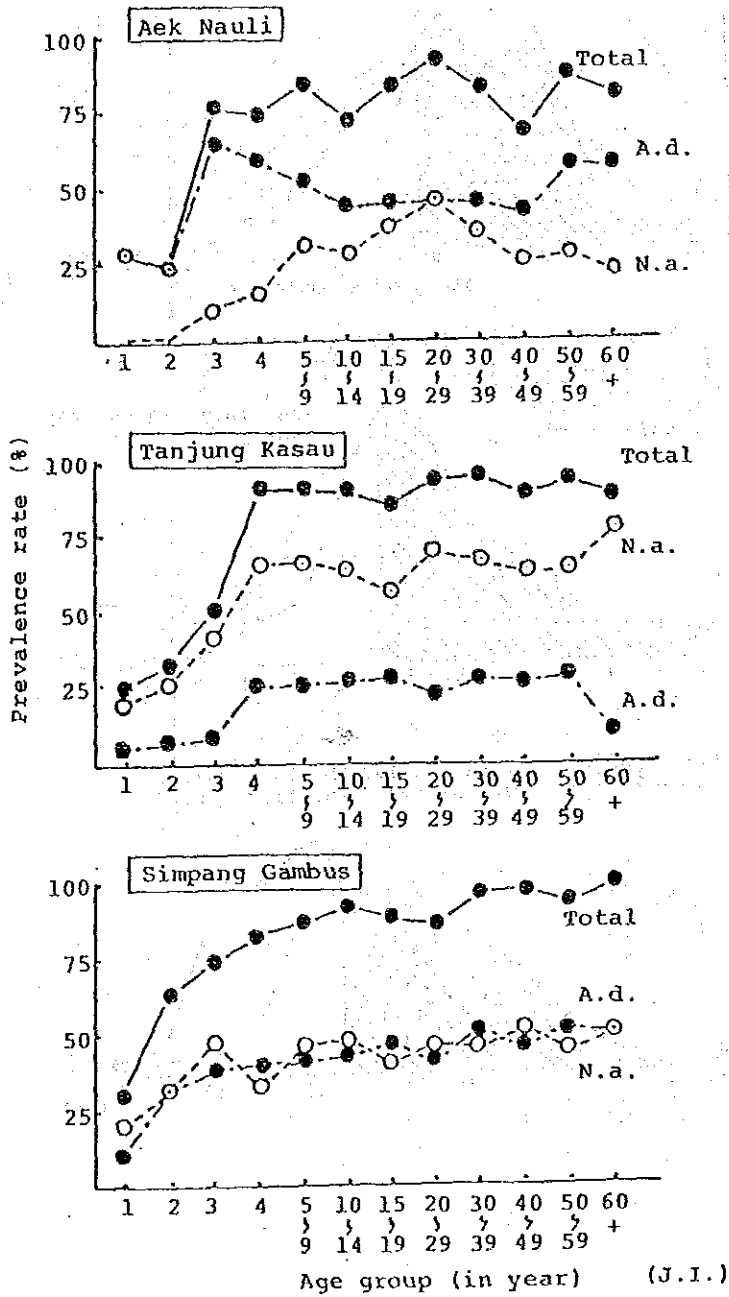


Fig. 4. Frequency distribution curve of volume of hemoglobin in rural residents

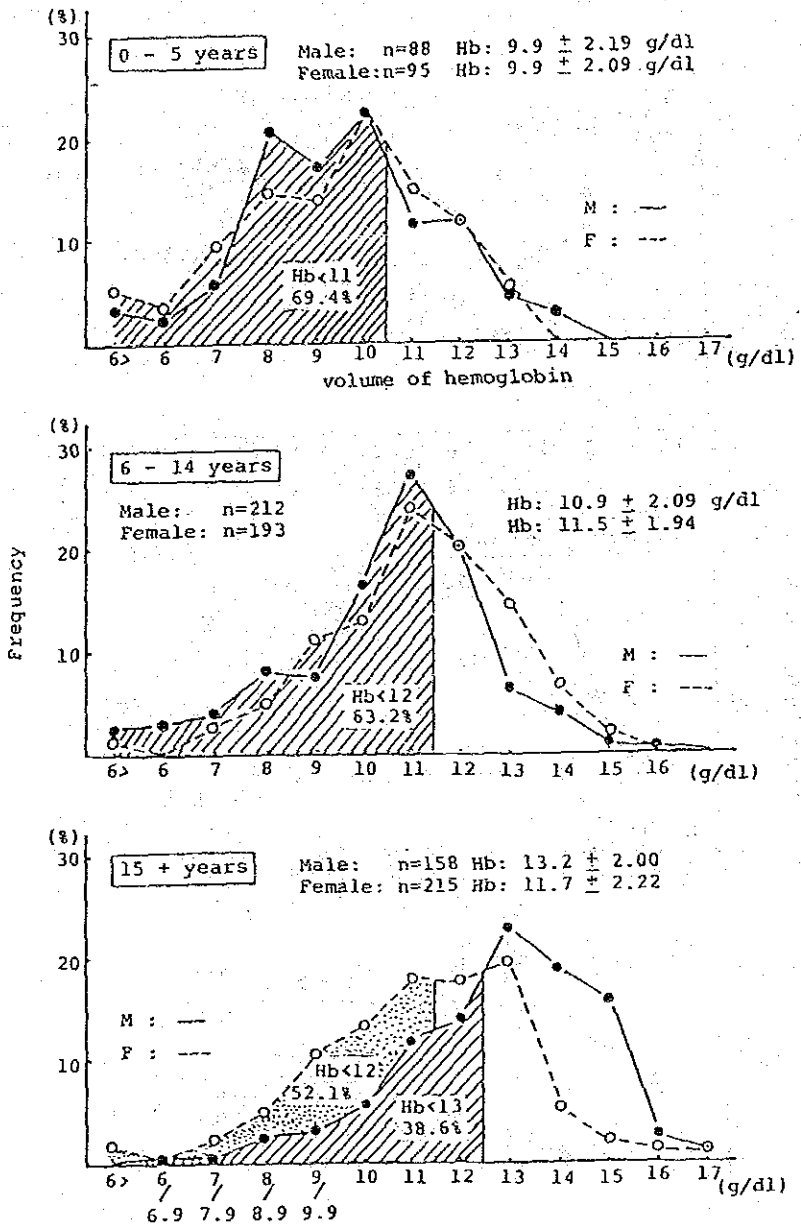
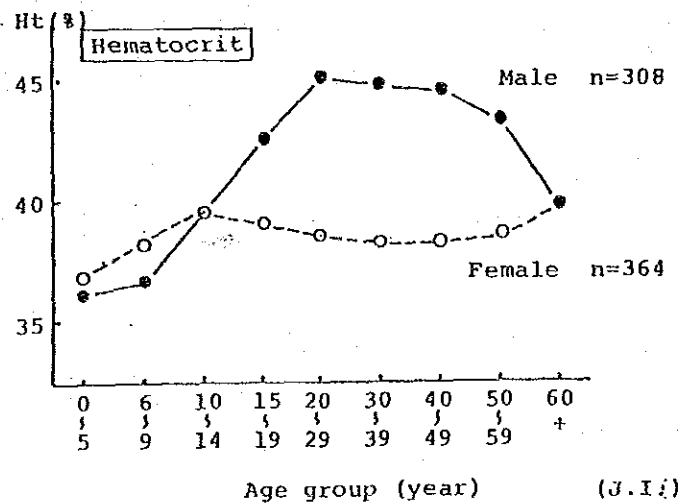
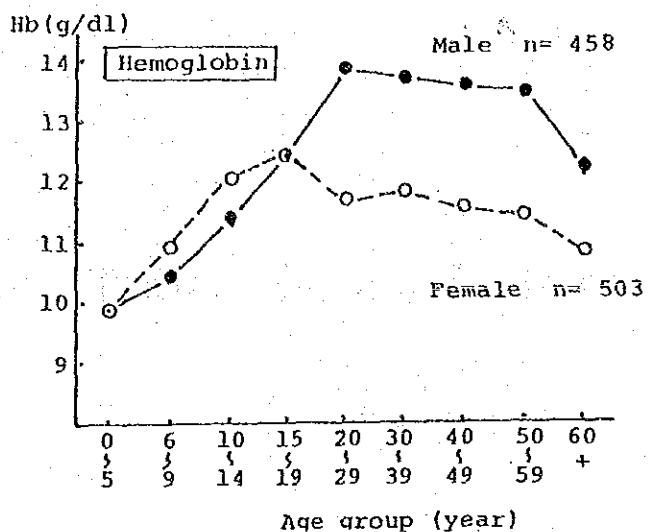
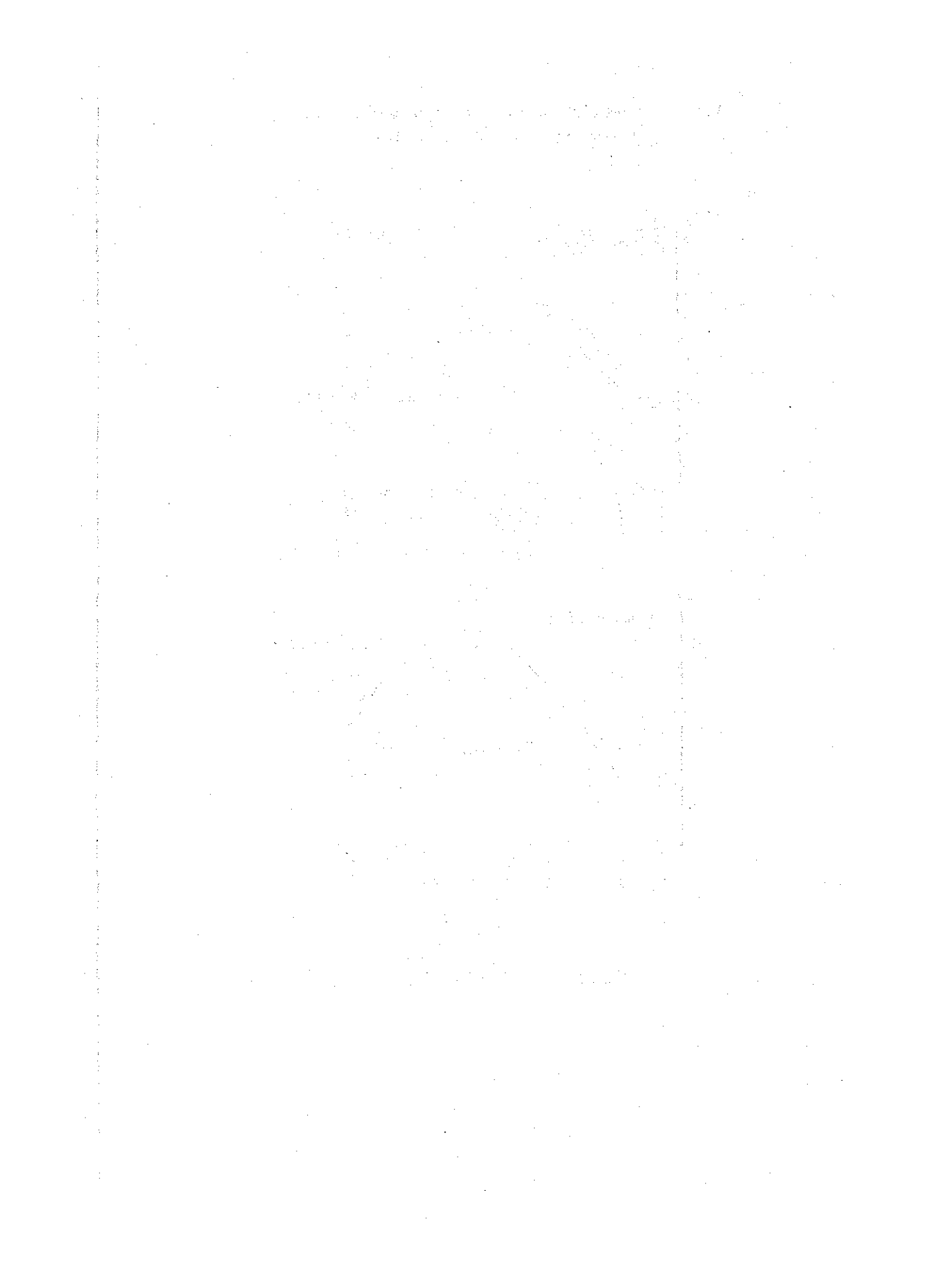


Fig. 5. Hemoglobin contents and hematocrit values by sex and age (1981)





3 . Tuberculosis Control

TB ERADICATION PROGRAM IN THE PROVINCE OF NORTH SUMATRA

(1) TUBERCULOSIS SITUATION IN THE PROVINCE:

① TB Situation in the Province

It is still difficult to say how is the real tuberculosis situation in the Province, because epidemiological information suggesting TB situation are quite limited at present time.

The major indices for the evaluation of tuberculosis situation are given on the annex (I). (Dr. STYBLO). Here, in the Province, any risk of infection and any Mantoux positive rate among general inhabitants had not yet been studied. Incidence rate of meningitis tuberculosa among the specific age or of accurate sputum smear positive rate of the total age has not been reported.

Even total number of birth and death, number of death by specific disease are still not available directly.

Nevertheless it might be dared to say tuberculosis situation in the Province would be very serious and the problems from tuberculosis may be developing very rapidly in these recent years. The results of prevalence survey carried out in 1979 and in 1980 showed the prevalence rate of 0.35 % and 0.44 % of the total inhabitants respectively, while the national average prevalence rate were 0.3 % in each year.

Problems from tuberculosis are suggested in the reports of clinical activities of the governmental hospitals and policlinics (Health Center and it's satelites) in different areas and in different years. According to the report, in the Regency of Asahan, number of TB patients clinically diagnosed amounted to 6,126 in 1978, while it was 1,465 five years ago, in 1973. Total number of clinical tuberculosis in the province in 1978, amounted to 49,123, and 25,274 patients in Municipalities, 23,849 patients in Regencies. The number of clinical tuberculosis of 49,123 is enough big as 0.65 % of the total population in the province. (Tab. 1)

② Organization of Health Institutions

Administrative channels of health/medical services of tuberculosis are a little complicated in Indonesia, especially in the province.

Tab. 1 Statistical Situation of Certain Diseases Observed Among Patients Newly Diagnosed as Ill in Some Governmental Health Institutions in 1973 and 1978

| | 1973 * | | 1978 ** | | | |
|--|--------------|-------------------|-----------------|--------------------|--------------|--|
| | Asahan | All North Sumatra | Total of Cities | Total of Regencies | Asahan | |
| Total Number of the patient newly diagnosed as ill | 49,177 100 % | 612,437 100 % | 222,415 100 % | 390,022 100 % | 54,061 100 % | |
| TB of all forms | 1,465 3.0 | 49,123 8.0 | 25,274 11.4 | 23,849 6.1 | 6,126 11.3 | |
| Dysentery | 1,313 2.7 | 18,828 3.1 | 5,375 2.4 | 13,453 3.4 | 1,605 3.0 | |
| Typhus and Para Typhus | 6 0.0 | 100 0.0 | 38 0.0 | 62 0.0 | 4 0.0 | |
| Cholera | 25 0.1 | 270 0.0 | 64 0.0 | 206 0.1 | 19 0.0 | |
| Total Malaria | 8,116 16.5 | 48,920 8.0 | 3,894 1.8 | 45,026 11.5 | 1,537 2.8 | |
| Hookworms | 240 0.5 |) |) |) |) | |
| Other intestinal Helminthiatis | 2,209 4.5 |) | 6,214 2.8 | 24,017 6.2 | 3,516 6.5 | |
| Other Diseases | 35,803 72.8 | 464,965 75.9 | 181,556 81.6 | 283,409 72.7 | 41,254 76.3 | |

* Laporan Dinas Kesehatan Kabupaten Dati II, Asahan, 1973.

** Buku Statistik Tahunan, Sumatra Utara Dalam Angka, 1978.

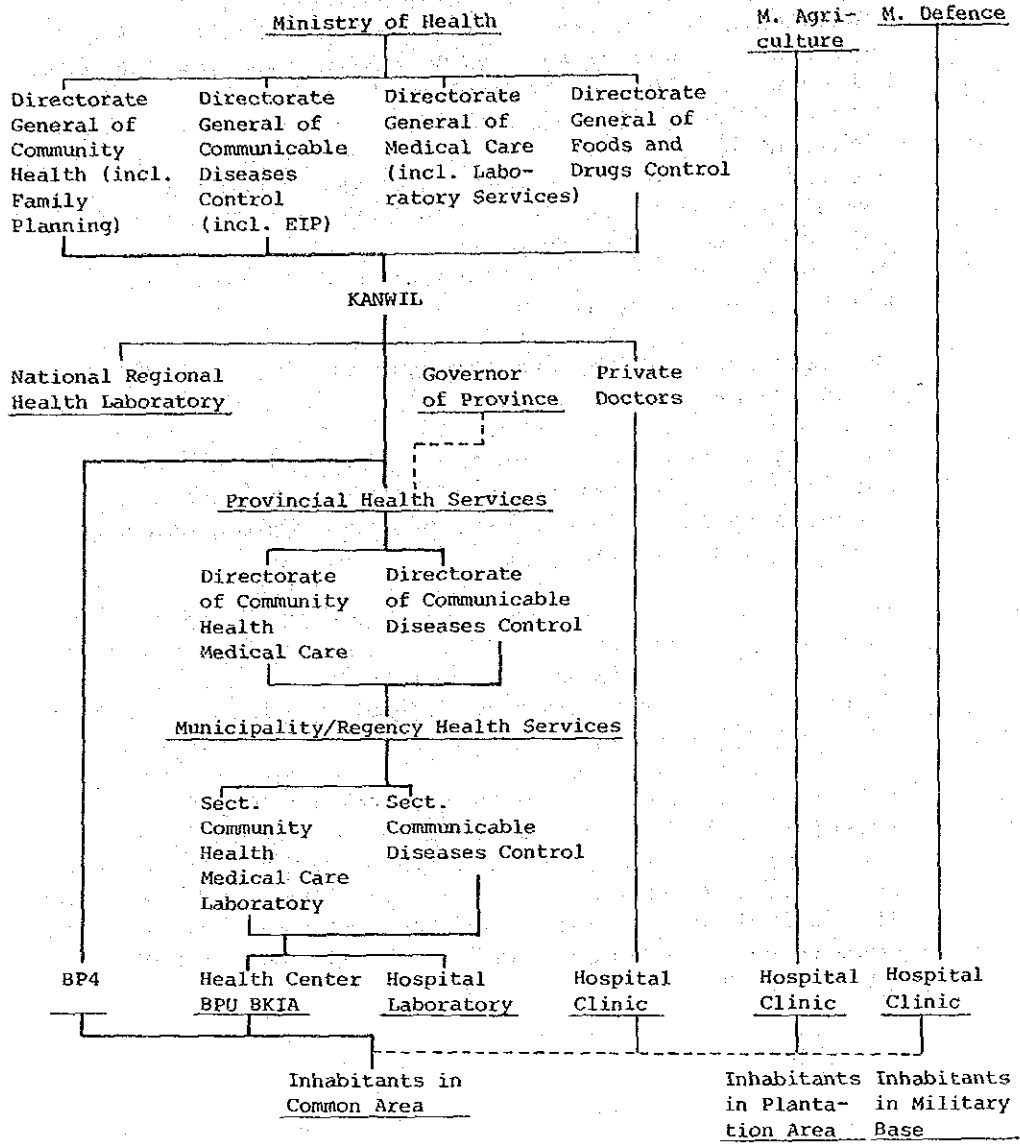
Inhabitants will be divided into three categories, in the province. Inhabitants in common areas, inhabitants in plantation areas and inhabitants in military bases. Inhabitants in the latter two areas have health/medical services provided by their own organizations, those which belong to M. Agriculture and to M. Defence, directly. Only exceptions are the activity of preventive vaccinations, such as vaccination of BCG, small pox, diphtheria, and tetanus, those have been carried out under the administration of EIP (Expanded Immunization Program, Bureau of CDC, Ministry of Health) and covering total area of the Province including plantation areas and military bases. (Tab. 2)

Implementation of the case-finding and treatment of TB cases has been carried out by all health/medical institutions either they belong to the Ministry of Health directly or indirectly, or they belong to other central government. Even private hospitals and clinics are expected to have the activity of case-finding and treatment of tuberculosis.

In 1969, adapting the report and agreement on the "Tjiloto Workshop on TB/BCG" conducted by the Directorate General for CDC, Ministry of Health R.I., National Tuberculosis Control Program was set up along the policy recommended by the WHO Expert Committee on Tuberculosis.

Later in 1971 the first establishment of TB program in 5 (five) Health Centers was realized in the province. But the progress of the participation of the health centers in TB program has been on rather slow pace in usual year. It was realized only in 61 Health Centers among 247 Health Centers and at about 25 % of all by the end of 1980. (Tab. 3)

Tab. 2 Administrative Flow for TB Program in Indonesia



Tab. 3 Number of Health Centers Having Been Participated in TB Program in Each Fiscal Year in the Province of North Sumatra

| | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | Total |
|--------------------|------|------|------|------|------|------|------|------|------|------|-------|
| Total | 5 | 1 | 0 | 4 | 12 | 2 | 1 | 3 | 1 | 32 | 61 |
| Total Municipality | 2 | 0 | 0 | 1 | 4 | 1 | 0 | 0 | 0 | 8 | 16 |
| Medan | 1 | | | | 1 | | | | | 2 | 4 |
| Binjai | | | | | 1 | | | | | 1 | 2 |
| Tebin Tinggi | | | | | | 1 | | | | 1 | 2 |
| Tanjung Balai | | | | 1 | 1 | | | | | 1 | 3 |
| Pn. Siantar | 1 | | | | | | | | | 2 | 3 |
| Sibolga | | | | | 1 | | | | | 1 | 2 |
| Total Regency | 3 | 1 | 0 | 3 | 8 | 1 | 1 | 3 | 1 | 24 | 45 |
| Peli Serdang | | | | 1 | | | | | | 1 | 2 |
| Langkat | 1 | | | | 1 | | | | | | 2 |
| Asahan | | | | 1 | 1 | | | 2 | | 3 | 7 |
| Labuhan Batu | | | | | | | 1 | | | 2 | 3 |
| Karo | | | | 1 | 1 | | | | | 1 | 3 |
| Dairi | | | | | 1 | | | | 1 | 2 | 4 |
| Simalongun | | | | | 2 | | | | | 6 | 8 |
| Tap. Utara | 1 | | | | 1 | | | | | 2 | 4 |
| Tap. Tengah | | 1 | | | | | | | | 2 | 3 |
| Tap. Selatan | 1 | | | | | 1 | | 1 | | 3 | 6 |
| Nias | | | | | 1 | | | | | 2 | 3 |

In the Health Centers under the administration of the national TB Program, case-finding is carried out by sputum direct smear microscopic examination and the treatment is conducted by the standard methods with standard regimen.

(2) BCG VACCINATION IN THE PAST, PRESENT AND FUTURE:

BCG Vaccination is ready to reduce incidence of tuberculosis at about 70 % without any other activities, when it is applied to the people who are not yet infected, when quality of BCG Vaccine and technics of transportation of vaccine and all other procedures of giving vaccination are well standardized at certain level.

When BCG Vaccination is applied in the public health activity, coverage of vaccination should be at enough high level. Usually it is requested to cover more than 70 % of eligible group.

In the Province of North Sumatra, BCG Vaccination to the public has been carried out since the end of 60's decade in the activity of Expanded Immunization Program. For the beginning several years, the eligible group was 0 - 14 years of age, as a campaign of BCG Vaccination. Total number of vaccination in a year was recorded as many as more than four hundred thousands in 1972 and 1974. Finishing the phase of mass campaign with successful results, BCG Program in the maintenance phase has been successively carried out since 1976 until now to the new borne babies (0 - 1 of age) and to some certain age groups at the school entrance and the school leaving. The number of vaccination to the new borne baby simultaneously given with small pox vaccination has been increasing successively, and it reached at 95.8% in 1980.

In the serious situation of tuberculosis in the Province, the primary vaccination for the new borne baby should cover the majority of the eligible group. However, inspite of increase of number of vaccination, it is suggested that the coverage is still low.

Estimation of the coverage rate of BCG Vaccination for new borne baby has been made by this author resulting averagely at 31.9 % with the highest rate at 85.2 % in Pm. Siantar and the lowest rate at 12.0 %, in Nias. (Tab. 4 & Fig. 1)

Tab. 4 Reported Number of BCG Vaccination at 0-1 Year of Age, Estimated Number of the Population of 0-1 Year of Age and Estimated Coverage of BCG

| | Reported Number of Vaccination | Estimated Number of Population* | Estimated Coverage of BCG |
|--------------------|--------------------------------|---------------------------------|---------------------------|
| Total Province | 95,817 | 300,630 | 31.9% |
| Total Municipality | 23,399 | 64,576 | 36.2 |
| Medan | 15,899 | 49,454 | 32.2 |
| Binjai | 1,055 | 2,751 | 38.4 |
| Tebing Tinggi | 701 | 3,314 | 21.2 |
| Tanjung Balai | 633 | 1,503 | 42.1 |
| Pematan Siantar | 4,610 | 5,410 | 85.2 |
| Sibolga | 501 | 2,140 | 23.4 |
| Total Regency | 72,418 | 236,054 | 30.7 |
| Deli Serdang | 8,275 | 44,678 | 18.5 |
| Langkat | 9,490 | 25,249 | 37.6 |
| Asahan | 13,880 | 27,899 | 49.8 |
| Labuhan Batu | 6,885 | 19,698 | 35.0 |
| Karo | 4,284 | 7,891 | 54.3 |
| Dairi | 5,147 | 8,704 | 59.1 |
| Simalungun | 8,626 | 27,356 | 31.5 |
| Tapanuli Utara | 4,469 | 24,566 | 18.2 |
| Tapanuli Tengah | 908 | 6,017 | 15.1 |
| Tapanuli Selatan | 8,433 | 27,147 | 31.1 |
| Nias | 2,021 | 16,844 | 12.0 |

* : Number of population of the age 0-1 year old in 1980 was calculated as follows,

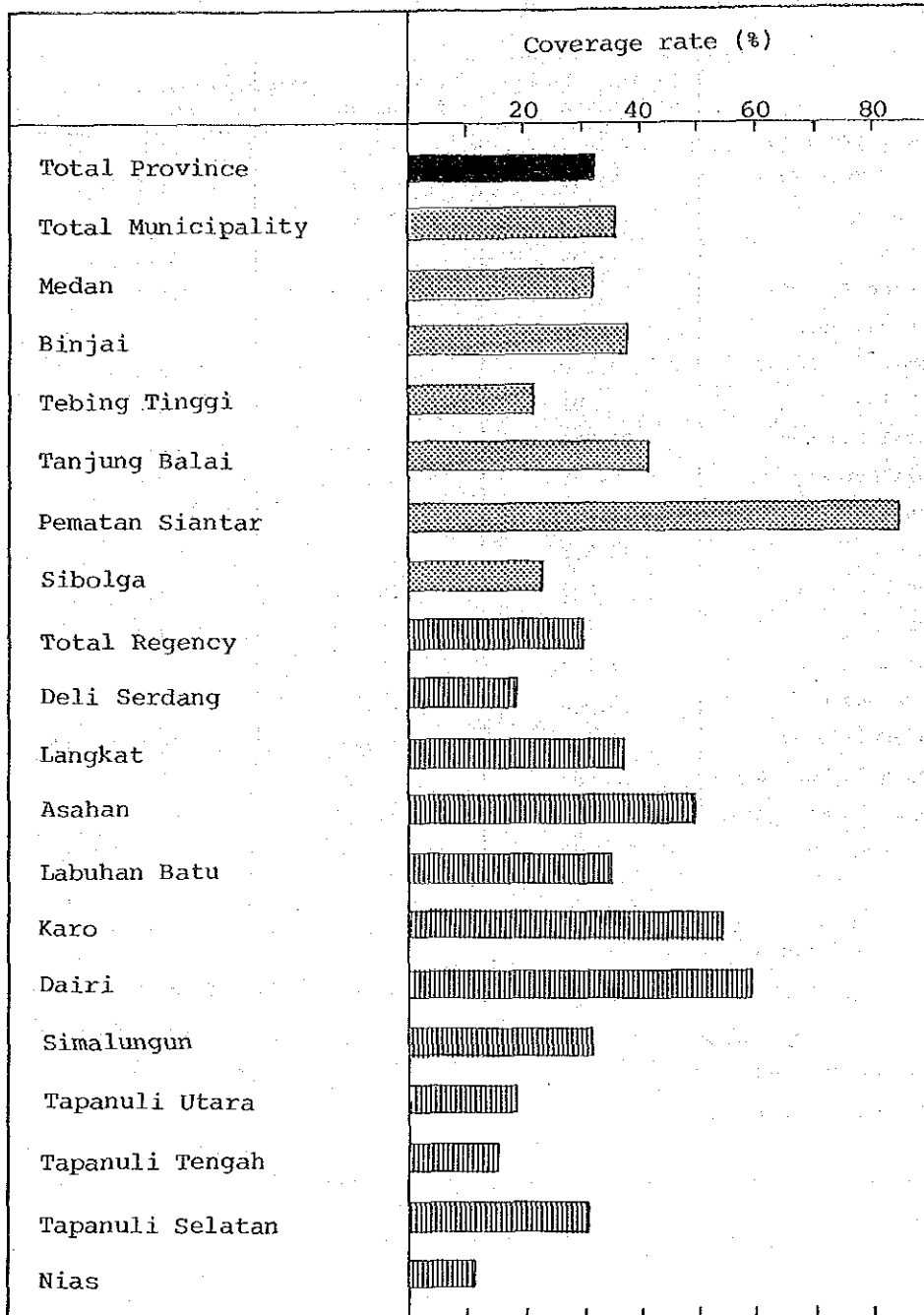
$$\text{Population of 0-1 of age} = \frac{1}{5} (\text{Population of 0-4 of age})^{**}$$

$$\text{Population of 0-4 of age} = \frac{17.6}{100} (\text{Population of total age})^{***}$$

** : Census 1980.

*** : Census 1971.

Fig. 1 Estimated Coverage Rate of BCG Vaccination Among Infants of 0-1 Year of Age in North Sumatra in 1980



The results of the scar survey recently carried out by the Section of Immunization, are considered quite different from real situation because of some mis-operation/calculation in the survey.

Effect of BCG Vaccination will be observed in the clinical feature with marked decrease of incidence of primary tuberculosis. Among them, decrease of miliary tuberculosis and meningitis tuberculosa, those are usually the important cause of death in younger children, will be clearly observed among the vaccinated group.

Epidemiologically, effectiveness of vaccinated BCG will be proved through tuberculin allergy which is induced by vaccination. When, Mantoux tests of the vaccinated group gives positive rate higher than 70 %, the vaccination may be highly effective and it might be carried out with appropriate procedures. If the positive rate of Mantoux tests is less than 50 %, some problems would be happened technically.

Tuberculin allergy after BCG Vaccination will not be altered in several years. So, both technical and operational assessment are available among the children of school entrance, simultaneously by BCG scar examination and by Mantoux testing.

One of advantage of the simultaneous examination of BCG scar and Mantoux Tests is the availability of obtaining the useful epidemiological index of "Risk of Infection" among unvaccinated specific age group.

For the constant/effective vaccination, training of staff in both technical and administrative workers should be considered, even if the workers were well trained in the recruit trainings.

Further problems to be solved would be:

1. Improvement of the coverage of vaccination at 0 - 1 of age.
2. Improvement of health statistics to be able to obtain annual number of live births including those in the area of plantation and military forces and those delivered in hospitals.

In the census statistic, subclassification of age group into 0, 1, 2, 3, 4, 5 - 9 instead of 0 - 9 or 0 - 4, 5 - 9, should be requested.

Periodical supervise and evaluation to be performed in the Provincial/Regency/Municipality Health Services are as follows:

1. Check of the cold chain
2. Calculation of coverage rate
3. Sample Scar survey at specific age
4. Simultaneous scar and Mantoux survey among the sample group of the school entrance

Training should be conducted at the Provincial/Regency/Municipality levels:

1. Training of recruits
2. Refresher course

(3) CASE-FINDING AND TREATMENT OF TUBERCULOSIS

① Treatment

Case-finding and treatment of tuberculosis under the administration of the National TB Program in North Sumatra started in 1971 when five health centers were participated in the Program as the TB Center. Since then until 1979, very small number of TB Centers have been established in usual year and exceptionally twelve TB Centers were established in 1975. However, very much gratefully, 32 Health Centers were participated in the National TB Program in 1980. Thus, total number of TB Centers in the Province reached at 61 at the end of FY 1980/1981. And, at least one TB Center in each municipality and regency had been realized respectively in 1976 and 1979.

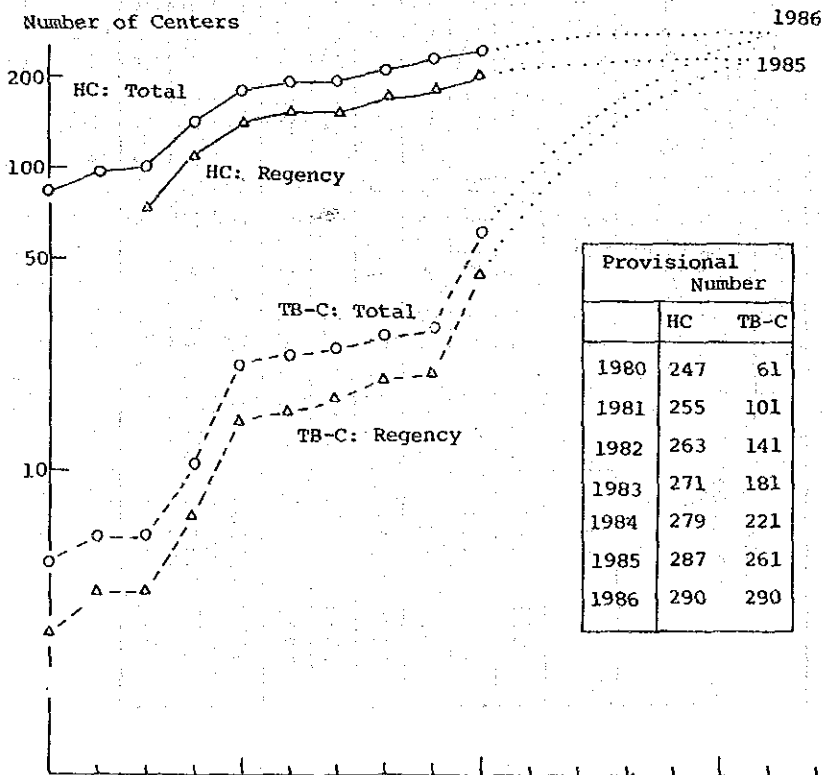
While, the number of health centers has been increased rather rapidly by the non INPRES and INPRES plan in each year since the beginning of 70's decade until now. And, the total number of health centers have reached at 247 in 1980. So, the health centers with activity of the National TB Program are only 24.7 % of all. (Fig. 2)

Total number of TB cases, with sputum (+), detected through the activity of TB Center since 1971, has reached at 9,869 at the end of FY 1979/1980.

While the result of the survey carried out in 1980 showed the prevalence of sputum positive case as 0.44 % of total inhabitants, that means the prevalent case amounts about 37,000 patients in 1980.

As is shown in Tab.1., the problems from tuberculosis in Asahan Regency has been developed very rapidly in these five years. The number of patients initially diagnosed as tuberculosis was 1,465 in 1973 while it was 6,126 in 1978.

Fig. 2 Number of Health Centers and TB Centers Existing and to Be Provided in the Province of North Sumatra



Tab. 5 Rate of Tuberculosis Cases During One Year Treatment

| | Total cases observed (A) | Completed one year course | | | Dropped out (E) | Died (F) | Relapsed during one year after treatment (G) |
|---------|--------------------------|---------------------------|--------------------------------|------------------------------|-----------------|----------|--|
| | | Total (B) | Sputum negative conversion (C) | Sputum remained positive (D) | | | |
| FY 1971 | 918 100 % | 755 82.2 % | 710 77.3 % | 45 | 160 17.4 % | 3 0.3 % | 3 |
| 1972 | 557 100 % | 384 68.9 % | 368 66.1 % | 16 | 170 30.5 % | 3 0.5 % | 2 |
| 1973 | 158 100 % | 134 84.8 % | 131 82.9 % | 3 | 23 14.6 % | 1 0.6 % | 2 |
| 1974 | 481 100 % | 404 84.0 % | 370 76.9 % | 34 | 75 15.6 % | 2 0.4 % | 3 |
| 1975 | 2,218 100 % | 1,532 69.1 % | 1,368 61.7 % | 164 | 686 30.9 % | 0 | 9 |
| 1976 | 1,262 100 % | 921 73.0 % | 777 61.6 % | 144 | 327 25.9 % | 14 1.1 % | 0 |
| 1977 | 1,098 100 % | 809 73.7 % | 749 68.2 % | 60 | 276 25.1 % | 13 1.2 % | 4 |
| 1978 | 1,530 100 % | 1,277 83.5 % | 1,171 76.5 % | 106 | 243 15.9 % | 10 0.7 % | 5 |
| 1979 | 1,647 100 % | 1,442 87.6 % | 1,391 84.5 % | 51 | 197 12.0 % | 8 0.5 % | Uncertain |
| Total | 9,869 100 % | 7,658 77.6 % | 7,035 71.3 % | 623 | 2,157 21.9 % | 54 0.5 % | |

Considering the fact, that the effect of the TB activity up-to-now on the improvement of the epidemiological situation in Indonesia is not very little, and the fact of the serious problems from very high incidence of primarily drug resistant cases recently reported in Java and Bali, in relation with very slow establishment of the nation wide TB Program, the total area of the Province should be covered by National TB Program as early as possible.

High effectiveness of conventional treatment with standard regimen of Streptomycin and Isoniazid has been clearly observed on the Tab. 7. Among 7,658 cases completed one year treatment, 7,035 cases at 91.9 % of total had attained negative conversion of sputum. Until recent time, no increasing tendency of the cases remaining with sputum positive have been observed, and also the relapse rate is consecutively very low, in the Province. (Tab. 5)

Only the problem is the relative high occurrence of dropped-out cases observed during the treatment, as is shown in Tab. 5.

The system of supervision has been already established. Still there might be some problem in the supervision and in the evaluation. The proper use of the individual recording card for each patient should be checked by the supervising officer at certain time interval.

Introduction of Rifampicin should not be hesitated. But it must be strictly limited in the TB Center which has been already well organized for the regular supervised treatment with responsibility of follow-up sputum examination to check negative conversion and with appropriated defaulter action when it is necessary.

When Rifampicin will be introduced in the first choice, the drug for the combination will be better to choose Isoniazid than Ethambutol for the reason of its high effectiveness, low toxicity and low cost, and the sensitivity of Isoniazid is still good in the Province that was suggested by high effectiveness of the conventional treatment.

To encourage the public people for self-participation in the TB program and for the convenience of patients, BPU and other satellite of health center at the most peripheral location should be organized to execute some activities of case-finding and treatment integratedly with other existing duties. It was reported that the number of sputum positive case newly detected has been increased in three health centers in Asahan Regency after having participation of BPU in the TB Program recently.

Training of recruits and also for senior staff should be considered.

② Case-Finding

Activity of case-finding should be developed when the facilities and man-power has been provided and TB program is ready to start. The policy of case-finding with passive participation of the respiratory symptomatics and by the direct smear microscopic sputum examination, which has been recommended in the report of WHO Expert Committee for Tuberculosis, is considered to be applicable in Indonesia and also in the province, if it will be carried out appropriately. Introduction of chest X-Ray or culture examination of sputum for case-finding may not be realistic in the activity of TB centers established in the existing health centers, because of technical problems and also of problems from cost.

Technical supervise by means of double-checks of positive and negative slides is consecutively necessary; only through it, technics will be standardized and will be available to keep it stable at certain level.

For the man-power development appropriate training for the recruits and for the refresher course should be considered.

③ Further Development and Improvement Necessary

1) Facility development, ie. establishment of TB Centers

Both number of health centers and TB Centers in the Province should be the same finally. Considering increase of population in the Province (annual growth rate : 2.62 %) and the policy of development of the

health center, at least one in each thirty thousands of population in Indonesia, the total number of health centers will be reached at about three hundred by the end of 80's decade. If so, the number of health center will be around two hundred ninety in 1986. While, when TB Centers will be established at the same increasing rate in each year as having been shown in the past, the number of total TB center will be two hundred and ninety in 1985/1986. (Fig. 2)

If it is simplified for the convenience of administration, when the additional establishment of health centers and TB centers at the number of eight and fourty respectively in each year until 1986, total number of both health centers and TB centers will reach at 290 at the same time, in 1986. (Fig. 2)

And after that, the newly established health center should be TB center from the initiation of the activity. Thus, the Province will be totally covered by the National TB Program.

2) Man-power Development

For the man-power development, suitable training of recruits and senior workers should be taken in consideration, in connection with different fields of the activities and responsibilities.

(1) Training for recruits, conducted by the Provincial Health Service

Medical Officer (key person in the TB Center)

TB worker

Microcopist

(2) Training for recruits at the Regency level

Injection nurse

Nurse in BPU

(3) Refresher course for the senior workers at Provincial level

Medical officer

TB worker

Microcopist

(4) Travelling seminar in several different blocks in the Province

In each training and seminar, the participation of the TB workers who is in charge of duty in the institutions other than health centers will be welcome. In the traveling seminar, some voluntary organizations, such as Anti-TB-Association/Women Club will be invited when it is necessary.

(4) OPERATIONAL AND EPIDEMIOLOGICAL STUDIES TO BE CARRIED OUT

For the appropriate operation of activities, and to attain the highly effective results of implementation, some operational and epidemiological study should be conducted in the Province. Among those investigations, the priority will be given to the following:

- ① Evaluation of the effectiveness of BCG Vaccination, and technical standardization of vaccination if necessary, by Mantoux Tests among vaccinated.
- ② Estimation of the risk of infection in the urban and the rural area, by Mantoux Tests among not vaccinated.
- ③ Epidemiological study of tuberculosis death. Reporting system of death should be improved to obtain one of the most important health information.
- ④ Epidemiological study of the meningitis tuberculosa.
- ⑤ Epidemiological study of infection among the children in schools where a teacher has been suffered from TB. (High risk group)

- ⑥ Age, sex specific observation of symptomatics and TB cases.
- ⑦ Epidemiological study to motivate a patient to keep regularity of treatment.
- ⑧ To check the primary resistant case and the cases suffered from a typical microbacteria, culture investigation in the laboratory should be established.

It might be rather realistic to make a close cooperation with Regional Health Laboratory in Medan for the implementation of the laboratory studies, under the contract agreement if necessary.

(5) HEALTH EDUCATION

To have a selfmotivated participation of the publics in the community for the implementation of passive case-finding easily and for the regularity of the treatment, health education in the distant peripheral community should be carried out vigorously.

In this way, when people know how, and when they have awareness at their own symptoms, they will not go to Duken or other mysterious medicine, but visit at BPU to have sputum examination before getting so seriously ill.

If possible, duken and other voluntary health persons should be organized to have a participation in the proper TB activities.

When a case and his family know mechanism of infection, very big portion of the family contact will be able to escape from the real infection and from successive occurrence of new cases among them.

Thus health education contributes very much on the public health. Slide forum from Lorong to Lorong is recommendable at this moment to teach people.

- ① Tuberculosis in general
- ② TB program in the community
 - a) BCG vaccination
 - b) Case-finding in BPU
 - c) Domiciliary treatment
 - d) How to escape from infection in the family
- ③ Advise for the establishment of a voluntary health organization.

(6) APPENDIX: TENTATIVE MEASURES BEFORE COMPLETION OF THE FRAME-WORK OF TB CENTERS

- ① Health Centers and Governmental Hospitals not yet organized in the TB Program.

- 1) Case-finding and treatment

The standard technics for case-finding and treatment, sputum direct smear examination, and treatment with the standard regimen for definite interval with regularity and with follow-up sputum examination, will be recommendable. Sputum examination will be available in the referral laboratory.

- 2) Reporting

The same reporting system should be applied as in the TB Center, so to be available at least the number of cases,

- a) Detected
- b) Complete treatment with negative conversion
- c) Remaining sputum positive
- d) Drop-out
- e) Died

② Plantation/Military/Private Institutions

Monthly report of the number of cases will be recommendable;

- a) Newly detected
- b) Completed treatment with sputum negative conversion
- c) Died

③ After Establishment of the TB Center

(A) Governmental Hospitals

Governmental institutions should be participated in TB program, and at least standard technic of the case-finding and treatment should be introduced as a minimal requirement.

Payment of each patient should be free of charge for both case-finding and treatment by standard methods even when the institutions, from where the patients will have services, will differ from the definite TB-Center, if it will be applicable.

When a case will get defaulting, information will be delivered to each health center for the appropriate defaulter action by home visitor in the health center.

Reporting will be operated as same to the TB center.

(B) Plantation/Military/Private Institutions

a) Case-finding and treatment

Standard technics will be recommended. The Laboratory in each health center will be a referral laboratory. Defaulter action will be available by the home visitor in the health center when it is requested.

b) Reporting

Monthly report of the number of cases;

- a. Newly detected
- b. Completed treatment with sputum negative conversion
- c. Died

The staff in the institutions mentioned above should be invited at the training, seminar and other meetings as frequently as possible.

Thus, almost all health medical institutions will be reorganized to have participation in National TB program with integration.

SUMMARY AND RECOMMENDATION

JICA Expert on tuberculosis control activity in the cooperation of Asahan Health Project, has reviewed following items on tuberculosis control problems in the Province of North Sumatra;

- I. Tuberculosis situation in the province
- II. BCG Vaccination
- III. Case-finding and treatment of tuberculosis
- IV. Operational/epidemiological studies to be carried out
- V. Health education
- VI. Tentative measures before completion of the frame-work

As the result of the review the followings were recommended to be realized urgently:

1. Improvement of the coverage of BCG Vaccination
2. Establishment of TB Centers enough to cover the total area of the province along the planned annual schedule.

3. Participation of BPU in the execution of TB Program.
4. Promotion of training for the manpower development
5. Promotion of the epidemiological and operational studies by the Provincial Health Services in cooperation with other health institutions.

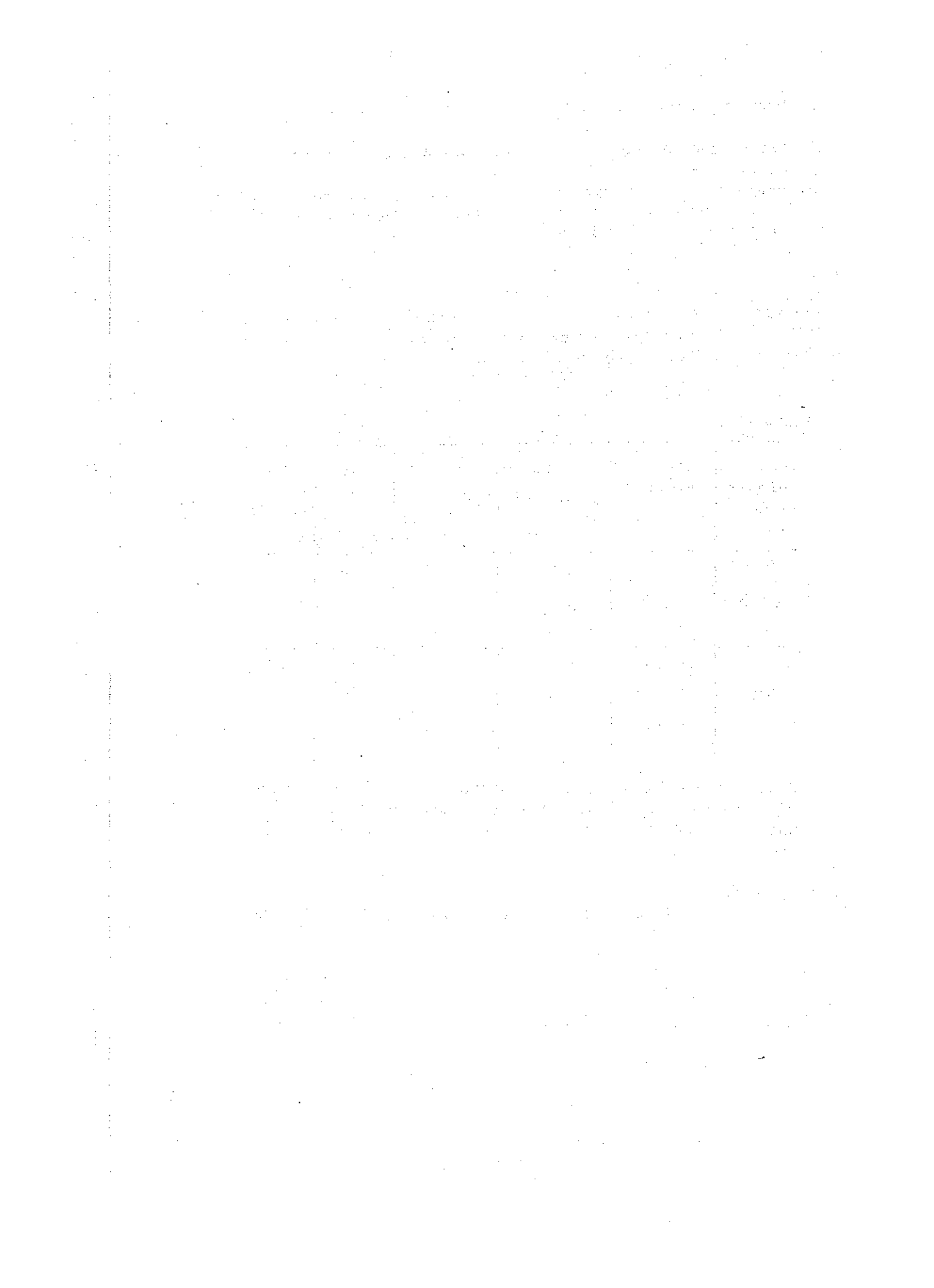
Annex (I) Indices to evaluate the tuberculosis situation in the definite area/country; by Dr. Styblo, XXIIInd National Conference of Tuberculosis

Annex (I)

| Tuber- culosis situa- tion | Risk of infection per year (%) | Incidence/100,000 | | Population Manthoux positive (%) | |
|-------------------------------------|---|-----------------------------|----------------------------------|--|------------------|
| | | Meningitis TB Age 0-4 | Sputum smear (+) Total age | Age 15 | Age 30 |
| | | High | 6 3 1.5 | 30 15 8 | 360 180 90 |
| Low | 0.75 0.38 0.19 | 4 2 1 | 45 22 11 | 11 6 3 | 20 11 6 |

Death rate will be 1/2, and prevalence will be 2 times of incidence of sputum smear (+) case per 100,000, when the effective chemotherapy will be not available.

(Ryoji Takai: 1980. Jun. 2 ~ 1983. Mar. 31)



4 . Water Supply and Sanitation

WATER SUPPLY FACILITY

(1) RESULTS OF THE PRELIMINARY SURVEY FOR RURAL WATER SUPPLY SYSTEM IN THE HEALTH PROMOTION PROJECT IN NORTH SUMATRA (Jan. 1980)

The results through the discussions between Japanese team and the Indonesian authorities concerned of Department of Health and the survey of the project area are as follows:

- ① The direction for rural water supply system of the project area.
 - 1) Deep wells with depth from 100 m to 200 m will be suitable water resources for the rural water supply in the project area.
 - 2) In the case of this type of wells, they will be supposed to be artesian type wells, so, it will not be necessary to use any kind of pumps for drawing-off the ground water.
 - 3) The water will be supplied by stand posts for public use, not by house connection.
 - 4) The pipe line system is not suitable.
 - 5) Facilities for bathing, washing as well as drinking should be made at the place of water supplied.
 - 6) A reservoir should be equipped for the effective use of a water resource.
 - 7) Some above mentioned water supply systems should be made according to the demand of people in each kampong.

② Reasons for the above mentioned direction

- 1) For the rural water supply system in the project area, the most important thing is the quality of the water resource, especially, from the view point of communicable diseases control. Furthermore, it is obvious from the fact that some water supply systems with an elevated tank or hand pumps were abolished to use because of the unsatisfaction of the quality of water; in case of mechanical trouble.

2) Quantity of water is important as well as quality. If clean water would be supplied by using a deep well but quantity is not enough, people use that water only for drinking. They continue to use contaminated water from shallow wells or rivers for bathing, washing, and cleaning of dishes, etc. As the result, public health will not be improved in spite of their getting of clean water.

3) Almost existing drilled type wells are using pipes of 1.25 inches diameter and getting water from the layer of 70 m to 100 m depth. All these wells have good quality of water, but not enough quantity, except for them at Guntung, constructed by Dutch and at the smelter site by INALUM. The depth of these two wells come up to 200 m or 250 m. Therefore, when new drilled wells will be constructed, it is recommended to get water from deeper layer using bigger pipes in diameter, than now. In this case the depth of the layer will come up between 100 m and 200 m.

During drilling of wells, quality and quantity of water must be checked in each layer. If enough quantity and quality of water obtained from shallower layer, there is no problem to use it for supplying the water.

4) To make a new water supply system for public use, it will be required to be attractive and easy to use to the people. For this purpose, it is very effective to make facilities for bathing, washing as well as drinking.

5) In order to construct a pipeline system, it is necessary to reserve water in elevated tank by using electric pumps, but maintenance of this system will be complicated from the view point of technical feasibility, and availability of electricity, and economical aspects. This is the reason why the pipeline system will not be adopted.

6) The water resource will be an artesian well, so that the constant volume of water will spring out for 24 hours. However, people use the water in accordance with their life, from morning to evening, so, in order to increase the quantity of water supplied in day time, a reservoir is indispensable.

7) Even if the water supply system has all the above mentioned abilities, there is a limitation for coverage of a water supplying area. Because it depends on social and natural conditions such as other water resources location etc. Therefore, these conditions should be considered to decide the coverage area of one water supply system.

③ Guide line for feasibility study

In order to formulate the basic plan for rural water supply system in the project area, in line with the direction mentioned above, the study will be conducted as follows:

- 1) Out of 54 kampongs, the plantation area will be excluded from the study. Because almost area has been supplied with enough and good water.
- 2) Some kampongs between 5 to 10 will be selected as an object of survey, considering with the natural and social conditions as well as the outbreaks of chorela.

(2) SUMMARY OF THE REPORT ON WATER SUPPLY FACILITIES OF HEALTH PROMOTION PROJECT IN NORTH SUMATRA (May 1980)

Summary of the report is itemized as follows:

① Project Area

- Districts of the project:
Three districts (Lima Puluh, Air Putih and Medang Deras in Asahan Regency, North Sumatra Province)

- Land area and ground height:

700 square kilometers approximately; 0 - 25 meters above sea level

- Number of villages:

56 villages being composed of 421 sub-villages

- Total population:

Approximately 138,000

- Characteristics of the area:

Very rural area

- Main industries:

Agriculture and fishery

- Sickness rate:

Very high at 94 per 1,000

- Water supply system:

Not existing of public water supply system with pipeline, by the end of 1979

- Current drinking water source:

Mostly unprotected shallow wells

- Public electricity:

Not existing of public electricity supply, by the end of 1979

② Population to be Served by the Project

About 104,000 people

(Out of the total population, inhabitants in the plantation area are excluded from the population to be served.)

③ Basic Concept of Water Supply Planning and Design Criteria

- Purpose of the project:

To find out reliable water source and to install facility for utilization on the spot.

- Water sources:

Semi-deep wells with hand pumps (about 50 - 60 meters) and deep wells (about 150 - 200 meters).

- Number of water supply facilities:

Several places in each village.

- Composition of the facility (per unit):

One deep well/semi-deep well,
One storage tank,
Several water taps,
One open place for water drawing and for washing,
Two walled sheds for bathing, each one for men
and women,
One pit for drain, and
Technical tools for maintenance and spare parts
required.

- Hand pump:

Should be equipped on a well, when ground water has no
positive pressure.

- Pipeline system and power driven pumps:

Would not be employed.

- Operation and maintenance:

Should be carried out by each villages organization.

- Water tariff:

Would not be considered.

- Water quality:

Would be the most desirable quality being locally available.

- Per capita water demand:

50 liters/day.

④ Standardized Units of Water Supply Facilities

| Type of Unit | A | B | C | D |
|---------------------------------|--|----------------------------|-----------------------------|-----------------------------|
| Number of People to be Supplied | 300 - 400 persons | 300 - 400 persons | 600 - 800 persons | 1,200 - 1,800 persons |
| Water Demand | 15 - 20 m ³ /d | 15 - 20 m ³ /d | 30 - 40 m ³ /d | 60 - 90 m ³ /d |
| Well | Semi-deep well with a hand pump; 50 - 60 m | Deep well; 150 - 200 m | Deep well; 150 - 200 m | Deep well; 150 - 200 m |
| Production Expected | 21 m ³ /10hrs | 21 m ³ /10hrs | 36 m ³ /10hrs | 72 m ³ /10hrs |
| Construction Cost per unit | Rp. 4,000,000 (US\$6,500) | Rp. 9,900,000 (US\$16,000) | Rp. 11,820,000 (US\$19,100) | Rp. 12,300,000 (US\$19,900) |
| Construction Cost per Capita | Rp. 11,400 (US\$18.2) | Rp. 28,300 (US\$45.3) | Rp. 16,900 (US\$27.0) | Rp. 8,200 (US\$13.1) |

Note: - Construction costs do not include applicable taxes,

- US\$ 1.00 = Rp. 625

- See detail Annex I, Annex II.

⑤ Number of Facilities to be Constructed in the Project Area

| District | Type "A" | Type "B" | Type "C" | Type "D" | Total |
|--------------|----------|----------|----------|----------|-------|
| Lima Puluh | 26 | 4 | 12 | 9 | 51 |
| Air Putih | 54 | 6 | 12 | 9 | 81 |
| Medang Deras | 12 | 4 | 11 | 7 | 34 |
| Total | 92 | 14 | 35 | 25 | 166 |

⑥ Implementation Schedule

| | First Stage (1980-1982) | Second Stage (1983-1987) | Total (1980-1987) |
|---|--|---|---|
| Construction Cost | Rp. 447,500,000 = US\$720,000 | Rp. 761,500,000 = US\$1,250,000 | Rp. 1,229,000,000 = US\$1,970,000 |
| Number of Facilities to be Constructed | A = 36 B = 7 C = 10 D = 15 Total= 61 | A = 56 B = 14 C = 25 D = 10 Total=105 | A = 92 B = 14 C = 35 D = 25 Total=166 |
| Population to be Served | 44,000 (42%) | 60,000 (58%) | 104,000 (100%) |

Note: The above years indicate fiscal years.

⑦ Maintenance Program

- Operation and maintenance should be carried out by the beneficiary themselves in principle.
- Each village should organize a committee or the like for the maintenance.
- The committee shall nominate certain villagers for the routine works of operation and maintenance of the facility.
- The local committees would be assisted by the governmental organization for the maintenance and procedures of operation.
- The guideline for remedies of hand pump troubles will be provided. (See Annex III.)
- The schedule for maintenance of simple hand pumps will be provided. (See Annex IV.)

(3) RECOMMENDATION. (Feb. 1980)

In the course of the field survey including discussion with officials concerned, and planning of the water supply facilities, following recommendations were issued:

① Implementation Organization:

To implement the project promptly and effectively, an implementation organization should be composed as soon as possible, prior to construction works, at Provincial or Regency level, with the assistance of health Authorities. Afterward, main body of the implementation organization could be transformed into the maintenance management organization.

② Maintenance Management Organization:

To keep the facilities satisfactory conditions and not to leave broken facilities as they are, a supervisory body should be organized at regency level prior to completion of construction works. It should include a sanitary engineer and/or a sanitarian and carry out overall management for the facilities including periodical inspection of the sites of facilities in the whole project area.

③ Repair Shop:

To repair heavy damage of facilities, especially hand pumps, a public repair shop should be opened in the project area, and cover the all three districts. The shop shall store all kinds of spare parts and relating materials in addition to technical tools/machines; the shop shall be staffed with technicians of technical high school graduate. If it is not possible, a certain agent, private shop or contractor, should be hired with continuous contract for the repair work.

④ Participation of Villagers:

In order to promote the project implementation, villagers concerned, that is, beneficiaries of the water supply facilities should participate in the very beginning stage of th project, in addition to be stages of construction and operation/maintenance, in such manners as participation in the meetings for selection of the location of the facilities and offering land required for the facilities; further supplying labor for construction and supervision.

It is advisable that a reasonable remuneration should be paid for villagers who offered labor or land.

⑤ Maintenance Costs:

Water tariff would not be considered in this project; however, marginal substantial cost for facility maintenance, at least repair works should be encouraged to be borne by the people of community as beneficiary. This is essential for bringing up self-help philosophy among villagers.

⑥ Improvement of Environmental Health:

Safe and adequate rural water supply project is indispensable service for control of waterborne communicable diseases. It is also essential for improvement of sanitation and hygiene to develop primary health care in the project area. Environmental health should be considered as a integral part of development planning in the Health Promotion Project.

⑦ Drainage:

As well as water supply, drainage of contaminated water and surface water should be taken into consideration in this program. Though the drainage system covering whole project area will be planned at central government level in the future, for the time being the drainage should be considered by each village itself under the direction of the said operation management organization.

⑧ Health Education:

Educational approach should be integrated from initial stage of implementation of rural water supply project. Community approach without educational efforts can not be expected as successful community preparation and participation. All community efforts should be carefully integrated into community development.

Health education should be performed periodically by sanitarians and/or public health nurses, through elementary schools first and public institutions second; for the education, audio-visual aids is preferably utilized.

⑨ Training of Sanitary Personnels:

Training of sanitary personnels in administration and voluntary villagers should be actively developed. It is highly desirable to initiate vocational training courses with effective training kits for well construction, maintenance and repair works.

⑩ Disinfection:

Water supply facilities planned by the project are not equipped with disinfection apparatus; however, for emergency cases such as outbreak of communicable diseases, preparedness of the disinfection materials should be recommendably arranged by or under the direction of the operation management organization.

⑪ Idea of Future Water Supply:

The proposed rural water supply project is a primary model to meet urgent need for prevention of epidemics of enteric infectious diseases at present. The philosophy of appropriate technology is taken into consideration. However, steady and continuous efforts should be done for uplift of practicable technology for safe and enough water supply for near future. The quantity of water is abundant, but quality is poor. If more advanced water supply technology can be applied, social and economic uplift of community living can be promised.

⑫ Personnel Resources:

Strengthening of personnel resources of sanitarian and engineer in health administration and public works is basic potentials for environmental health development in the project area. The progress of environmental health in development planning can be achieved through those institutional efforts. The technical high school in the project area is to be a important and potential resource for future development.

(4) RESULT OF INVESTIGATION BY JICA MISSION FOR PILOT DEEP WELL PROJECT OF ASAHAN HEALTH IMPROVEMENT PROJECT (Dec. 1981)

The master plan on March 1980 was based on a geoelectric resistivity survey. According to the survey, there are two aquifers above the depth of 200 m. Therefore five pilot facilities were designed to draw water from the second aquifer which exists between 50 and 200 m depth. However it is found that the amount of water by self-flowing from the second aquifer is not always sufficient in the case of two wells out of three artesian wells. So following consideration would be necessary when the development survey based on OTA-81 will be carried on:

- ① As the data about the structure of stratum known by the geoelectric resistivity survey is practically limited to the depth at most 250 m or so, other type of survey such as test boring should be adopted in order to confirm the existence of the third aquifer which is estimated to exist at the deeper stratum.
- ② Not only the experience through the pilot project but also those wells constructed INPRES, should be summarized in terms of selection of hand-pump type, maintenance system of facility and depth of well.

(5) FOLLOWING CONSIDERATION SHOULD BE TAKEN WHEN THE PLAN WILL BE IMPLEMENTED:

- ① The role and responsibility of both Japanese and Indonesian sides should be clarified.
- ② Several options should be provided as a result of the development survey, and implementation plan including type and site of wells. It is necessary to be decided finally by Indonesian side through close deliberation Japanese and Indonesian side. It is better to restrict the sites for wells. Japanese side will construct at the sites decided by Indonesian side.
- ③ Villagers should participate in the programme from the preparatory stage.

- ④ As for contract system, construction of well is contracted based on the detailed implementation design including type and depth of well in Japan. After the construction is accomplished according to the design, expence for construction is to be paid in accordance with the piece rate system. Meanwhile, expence for construction of well is paid simply whether the well yields sufficient water or not in Indonesia. The systems of contract of both countries should be examined comparatively.
- ⑤ Confirmed ground water with positive pressure is preferable. However if such type of water is not available, hand-pump is indispensable to supply safe water. So it is very important to establish the maintenance system in terms of responsible person, technical work and source of expense.
- ⑥ As for acquisition of source of expense, the case of Medan is to be advocated as a successful one, that is, villagers allocated the income from common paddy field to bear the expense for facility maintenance.
- ⑦ It is sure that if the power-driven pump is feasible and available and if proper supporting measures can be achieved in project area, getting sufficient safe water is not so difficult. Therefore, it might be necessary to be considered whether there is possibility to utilize surplus electricity of Asahan Project for rural water supply or not, and also willingness and feasibility of several villages organizing their co-operative unions to carry on effectively the maintenance of facilities with the assistance of district level organization such as health center, and employing an engineer for the duty. It is considered that such engineers are appropriately found among graduates from technical high school in Asahan area.
- ⑧ Counter measures advised by JICA Mission is provided in Annex IV.

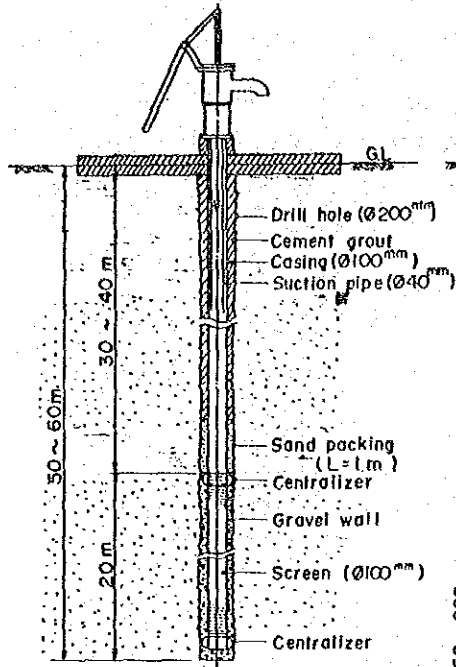
(Ryutaro Yatsu: 1981. Dec. 13 - 1981. Dec. 29)

Annex I Standardized Facilities

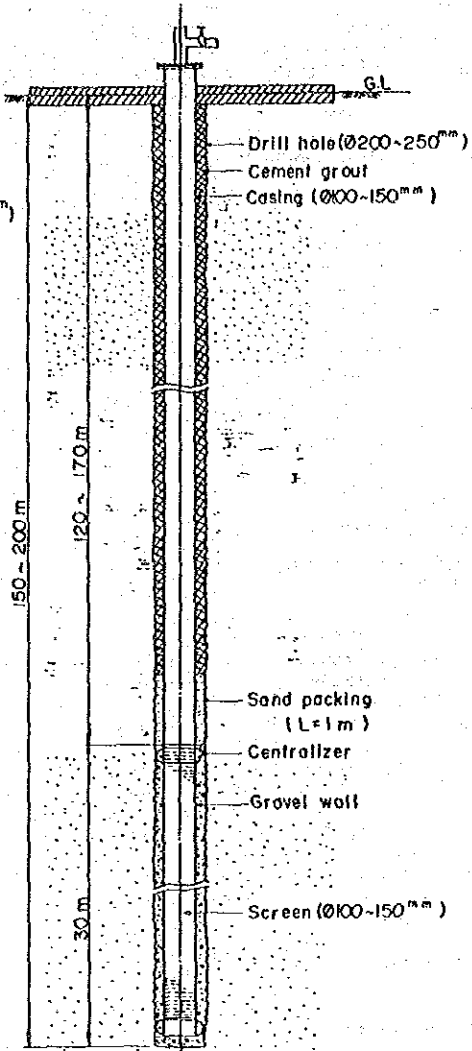
| Type | A | B | C | D |
|---------------------------------|--|--|--|---|
| Number of People to be Supplied | 300 - 400 persons | 300 - 400 persons | 600 - 800 persons | 1,200 - 1,800 persons |
| Water Demand | 15 - 20 m ³ /d | 15 - 20 m ³ /d | 30 - 40 m ³ /d | 60 - 90 m ³ /d |
| Well | Semi-deep well | Deep well | Deep well | Deep well |
| Depth | 50 - 60 m | 150 - 200 m | 150 - 200 m | 150 - 200 m |
| Hand pump | With a hand pump | - | - | - |
| Production Expected | 35 l/min = 21 m ³ /10hrs | 35 l/min = 21 m ³ /10hrs | 60 l/min = 36 m ³ /10hrs | 120 l/min = 72 m ³ /10hrs |
| Well | Diameter of Bore-hole | 200 mm | 200 mm | 250 mm |
| | Diameter of Casing Pipe | 100 mm | 100 mm | 150 mm |
| | Diameter of Screen | 100 mm | 100 mm | 150 mm |
| | Length of Screen | 20 m | 30 m | 30 m |
| Number of Water Taps | 1 for general use, and 1 for bathing | 3 for general use, and 2 for bathing | 3 for general use, and 2 for bathing | 4 for general use, and 2 for bathing |
| Bathing Sheds | Number of Bathing Sheds | 2 (1 each for men/women) | 2 (1 each for men/women) | 2 (1 each for men/women) |
| | Number of person to use/one time | 2 men + 2 women = 4 persons | 2 men + 2 women = 4 persons | 4 men + 4 women = 8 persons |
| | Space of Shed | 4.7 m ² x 2 = 9.4 m ² | 4.7 m ² x 2 = 9.4 m ² | 7.5 m ² x 2 = 15.0 m ² |
| Washing Space | 4.2 m ² | 7.2 m ² | 11.3 m ² | 14.4 m ² |
| Water Reservoir | - | 1.7 m ³ | 3.3 m ³ | 5.0 m ³ |
| Water tank for bathing | 0.43 m ³ | 0.45 m ³ | 0.74 m ³ | 1.16 m ³ |
| Construction Period Anticipated | 45 days | 60 days | 75 days | 75 days |

Annex II. Structure of Well none scale

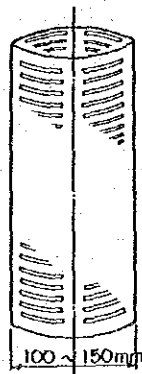
Semi Deep Well : Type - A



Deep Well : Type - B.C.D

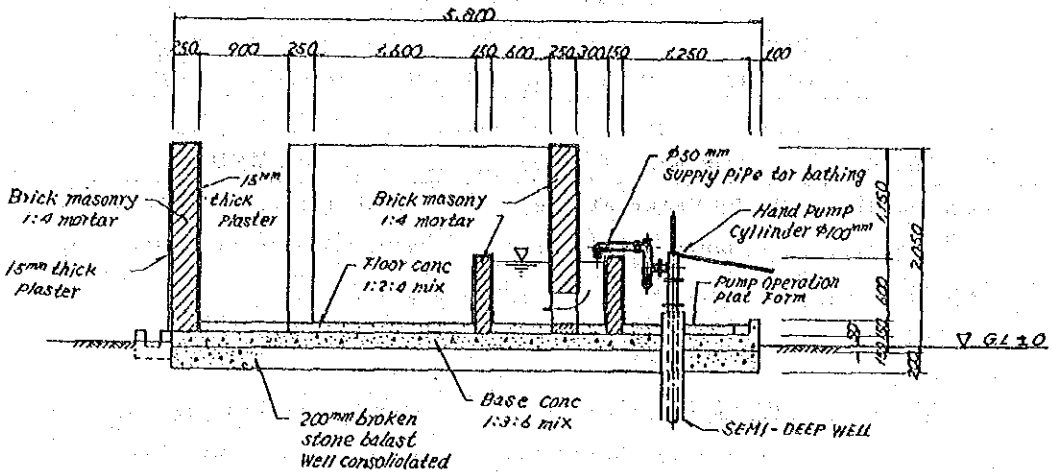


Detail of Slotted Screen



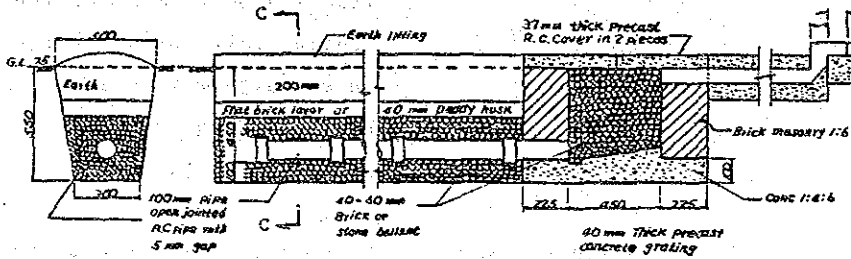
Slot width : 2mm
Open area ratio : more than 5%

Annex II (continued)



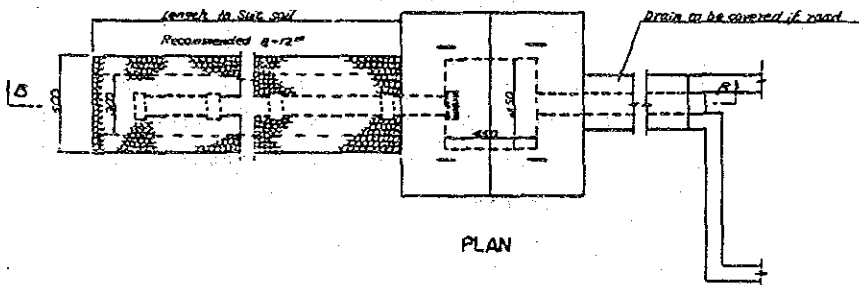
A-A SECTION OF TYPE-A FACILITY S=1/50

SUB-SURFACE TILE FILTER TRENCH (S=1/20)



SECTION C-C

SECTION B-B



PLAN

TABLE III-10

COMMON HAND PUMP TROUBLES AND REMEDIES

| TROUBLE | LIKELY CAUSE | REMEDY |
|---|---|--|
| 1. Pump handle works easily but no water delivered. | A. No Water at the source. Well dry. | Rehabilitate well, or develop a new source or sources of water. |
| | or | |
| | B. Level of water has dropped below suction distance of pump. | Can be checked with vacuum gauge or with weighted string. Reduce pumping rate or lower pump cylinder. |
| | or | |
| | C. Pump has lost its priming. | Prime the pump. If the pump repeatedly loses its priming it may be periodically pumping the well dry, the suction line may be leaking, or the suction valve or discharge check valve may be leaking. Repair line or valve. |
| | or | |
| | D. The cylinder cup seals ("leathers") may be worn out | Renew the cylinder cup seals ("leathers"). |
| | or | |
| | E. The valves or valve seats may be worn or corroded. | Renew valves and repair or renew scates. |
| | or | |
| | F. With a deep-well | This trouble would be indi- |

Annex III (continued)

| TROUBLE | LIKELY CAUSE | REMEDY |
|---|---|---|
| | or | |
| | G. Suction valve(s) may be out of order. | Repair valve(s). |
| | or | |
| | H. Cracked drop pipe or coupling. | Renew drop pipe or coupling. |
| 3. Pump needs too many strokes to start | A. Pump has lost its priming. | Prime the pump. If the pump repeatedly loses its priming it may be periodically pumping the well dry, or the suction line or the suction valve may be leaking. Repair or renew line or valve. |
| | or | |
| | B. The cylinder cup seals ("leathers") may be worn out. | Renew the cylinder cup seals. |
| 4. Handle springs up after down stroke. | A. Suction pipe plugged up below pump cylinder. | Remove pump and clean out suction pipe. If well has filled with dirt up to suction pipe the well should be cleaned out or the pipe cut off. |
| | or | |
| | B. Plunger check valve fails to open or to close. | Repair check valve. |
| | or | |
| | C. Suction pipe too small. | Replace with larger suction pipe. |

| TROUBLE | LIKELY CAUSE | REMEDY |
|--------------------------|---|--|
| | or | |
| | D. Water too far below pump(suction pipe too long). | Place cylinder nearer water. |
| 5. Leaks at stuffing box | A. Packing worn out or lose. | Renew or tighten packing. Leave packing nut loose enough to allow a slow drip of water. The water serves as a lubricant. |
| | or | |
| | B. Plunger rod badly scored. | Renew plunger rod. |
| 6. Pump is noisy | A. Bearings or other working parts of the pump are loose. | Tighten or renew parts. |
| | or | |
| | B. Pump is loose on mountings. | Righten mountings. |
| | or | |
| | C. With deep-well plunger pumps having a steel plunger rod the rod may be slapping against the drop line. | Use a wooden rod or install guides for rod or straighten drop pipe if crooked. |

Annex III (continued)

| TROUBLE | LIKELY CAUSE | REMEDY |
|--|---|--|
| | plunger pump the plunger rod may be broken. | cated by the pump running freer and probably quieter. Turn the pump over by hand and note if there is resistance on the upstroke. Broken rods must be renewed and this usually means pulling the drop pipe and cylinder out of the well. |
| | or | |
| | G. Shutoff valve may be closed(force pump). | Open valve |
| | or | |
| 1. Pump handle works easily but no water delivered (continued) | H. Hole in suction pipe. | Renew suction pipe. Cylinder may be lowered below water level in well. |
| | or | |
| | I. The suction pipe may be plugged with scale or iron bacterial growth or sediment. | Can be checked with vacuum gauge. Remove suction pipe and clean or renew. |
| | or | |
| | J. The pump cylinder may be cracked. | Renew the cylinder. |
| | or | |
| | K. Leak at base of cylinder. | Renew cylinder gasket. |
| | or | |

| TROUBLE | LIKELY CAUSE | REMEDY |
|--------------------------------|---|---|
| | L. One or more check valves held open by trash or scale. | Remove valves and inspect for trouble. With deep-well plunger pumps this may mean pulling the pump cylinder or plunger and valves out of the well |
| 2. Pump runs but delivers only | A. Plunger leathers badly worn(plunger and piston pumps). | Renew leathers. |
| | or | |
| | B. Well not yielding enough water. | Decrease demands or establish new sources of water. |
| | or | |
| | C. Cracked cylinder (plunger or piston pump). | Renew cylinder. |
| | or | |
| | D. Check valve(s) leaking. | Repair valve(s). |
| | or | |
| | E. Screen or suction valve may be obstructed. | Removed and clean |
| | or | |
| | F. Suction pipes are too small. | Can be checked with vacuum Gauge. Install pipe with larger diameter, or for deep well pump lower pump cylinder below water level in well. |

TABLE III-11 SCHEDULE FOR MAINTENANCE OF SIMPLE HAND PUMPS

- Daily 1. Clean the well-head and space for water-drawing.
- Weekly 1. thorough clean-up of pump, well-head and surroundings.
2. oil or grease all thing pins, bearings, and sliding parts, after checking that no rust has developed on them.
3. inspect and take care of the drain ditch and the infiltration trench.
4. record any comments from users about irregularities in working (tightness of parts, leaks from stuffing box, fall-off in water raised). Correct these when possible.
- Monthly 1. if necessary, adjust the stuffing box or gland. Usually this is done by tightening the packing nut. This should not be too tight--there should be a slight leak when the adjustment is correct.
2. check that all nuts and bolts are tight, and check that there is no evidence of loose connections on the pump rods.
3. check for symptoms of wear at the leathers, noting any comments from users about any falling off in the water raised. If the pump fails to raise water when worked slowly (e. g., at 10 strokes per minute), replace the leathers.
4. carry out all weekly maintenance tasks.
- Annually 1. paint all exposed parts to prevent development of rust.
2. repair any cracked concrete in the well-head and surrounds.
3. check wear at handle bearings and replace parts as necessary. On the Craelius pump, worn bushes can be replaced by short sections of pipe of suitable diameter.
4. check plunger valve and foot valve; replace if found leaking.
5. check the pump rod and replace any defective lengths or connectors.
6. replace packing at the stuffing box or gland.
7. carry out all monthly maintenance tasks.

Annex V

COUNTER MEASURES ADVISED BY THE MISSION

Two facilities in Medan and Indrapura Health Center have operated under good condition. However others might be improved:

① Tanjung Muda

The hand-pump must be changed to deep well type. The maintenance system should be carried out by community participation under guidance of district level organization such as H.C.

② Sei Buah Keras

1) The amount of water by self-flowing decreased from 20 l/min. at the beginning to 12.8 l/min on December 15, 1981.

2) The water tap for bathing is 45 cm higher than that for drinking and washing which are given priority when sufficient water cannot be gotten.

3) There are two options to improve the facility as follows:

a) Uses of water should be limited to drinking and washing as they are.

b) The level of the tap for bathing should be lowered to the same level of that for drinking.

They should be decided by villagers themselves.

③ Limau Sundai

1) The amount of water by self-flowing decreased from 10 l/min at the beginning to 5 l/min on December 15, 1981.

2) From the beginning water was not sufficient, therefore a hand pump was installed. However it is not utilized at present.

3) There are following two options to improve the facility:

a) From the view point of utilization of the facility such as tank or bathing space, the manpower should be organized to operate the pump by their own effort.

b) Concerning the willingness of utilizing the hand pump itself, the pump should be detached from the tank to get water directly through the pump.

They should be selected by villagers themselves.

- 4) According to the result of water quality examination by Medan Health Laboratory, the mission could not find any contaminants which cause coloring. However Fe (0.21 mg/l) and Mn (6.3 mg/l) in the water which was sampled from the shallow well in the village are found. But the difference between two examinations is not understandable at present.

5 . Laboratory

I. GENERAL REMARK

In order to promote health in North Sumatra, it is essential to improve health delivery systems in the area. At the initial stage of the project formulation, it was considered to strengthen the facilities in the provincial hospitals for a part of this purpose. However soon later, it was told that another medical cooperation project were to be formulated to lift up the levels of hospitals in Indonesia involving the project area. So the project decided to concentrate on the health laboratory systems.

There is a provincial health laboratory in Medan as a central referel laboratory. It was the first task force project to strengthen and imporve the facilities in the Medan laboratory to prepare the smooth running of the project activities. Up to this moment in 1982, major efforts have been paid to attain this target by the project involving central office of JICA and the performance is remarkable. Many laboratory examinations have become now possible for example bacteriological identification of enteric infections, parasitological and some serological examinations. Several points have been improved by the Medan Laboratory itself, for example increase of electricity supply. Further improvement would be expected in other field of examinations for example virus diseases.

There are three health centers in Asahan Project area. However laboratories in the health centers were far from enough not only for the health managements of people in the area but also for the activities of the project. An request was proposed to the office of JICA and the ministry of foreign affairs to construct a local laboratory in the project area at Indrapura. This was finally realized through repeated negotiations and cooperations of both Indonesian and Japanese sides. Some points of problems are to be solved before making full use of the laboratory but future outlook of the usefullness of it would be very good and great.

(Akira Ishii: 1977. Sep. 29 ~ 1977. Oct. 11, 1979. Feb. 5 ~ 1979. Mar. 15, 1981. Dec. 13 ~ 1981. Dec. 29)

II. MEDAN REGIONAL HEALTH LABORATORY

Medan Regional Health Laboratory is a national laboratory to examine clinical and environmental specimens sent from hospitals and health centers related to communicable diseases and public health. The laboratory supervises Provincial Health Laboratories in Aceh, Liau and West Sumatra Provinces and Regency Health Laboratories in North Sumatra Province under the supervision of the Biomedical Institute in Jakarta.

The laboratory has 4 sections, Chemistry, Microbiology, Serology and Pathology, respective chiefs of which are Mr. T.M. Situmeang, Mr. S. Sinulingga, Dr. Y. Hadiah and Dr. M. Lubis, supervised by Dr. R. Sudiranto, director of the laboratory at that time. Section of Chemistry includes toxicology and water chemistry. Section of Microbiology includes bacteriology and parasitology.

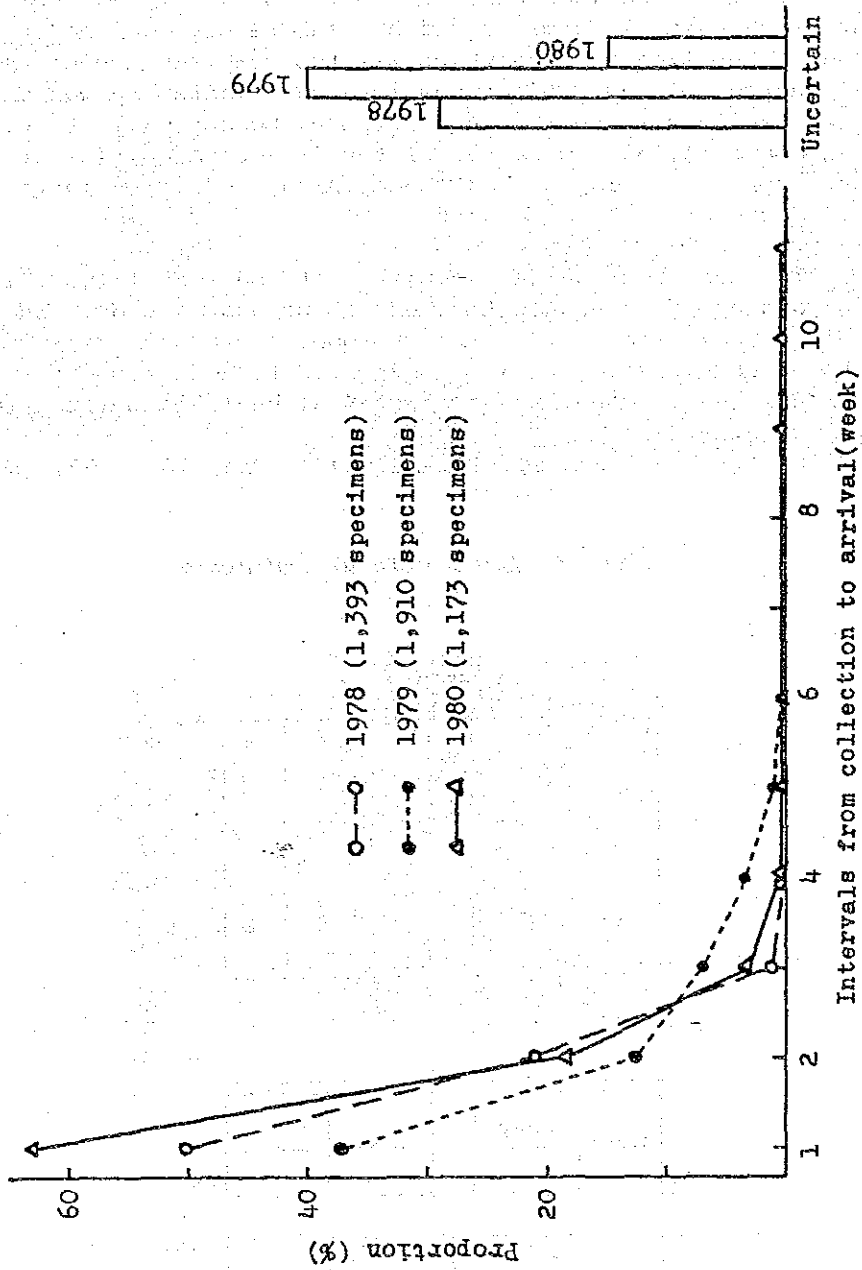
There is a school of medical technology attached to the laboratory. Lectures and practices in this school are done by staff members of the laboratory. Practices are also done in the room of each section.

The equipments donated by JICA were installed in each section to be utilized in good conditions.* In addition to these donated equipments, JICA experts' activities in this laboratory had improved much the level of identification of enteric bacteria.

Gastroenteritis and cholera are two of the most prominent communicable diseases in Indonesia, having high incidence. Since epidemic of cholera started at Nias island, many specimens including rectal swabs, feces and water samples were sent to the laboratory for bacterial examinations. We found that many specimens had a long intervals from sampling to arriving to the laboratory for bacterial examinations. It took a long time for most specimens from sampling to examining as shown in Figure 1, in which the longest case was 11 weeks. Moreover, some specimens had arrived without records on name, sex, date of sampling or place of sampling. In the extreme case, many rectal swabs arrived to Provincial Health Service of North Sumatra in plastic bags without Cary-Blair media and transferred from the plastic bags into the media "at the Health Service" to bring to the laboratory, from which no bacterial pathogen was found. This case was registered as "negative for *Vibrio cholerae*". Thus, records on bacterial examinations could not be utilized for epidemiological analyses even if bacterial examination itself had no mistake.

* In addition to these donated equipments, JICA experts' activities in this laboratory had improved much the function of the laboratory works, particularly on the identification on enteric bacteria.

Figure 1. Intervals from collection to arrival of specimens to Medan Regional Health Laboratory to detect Vibrio cholerae



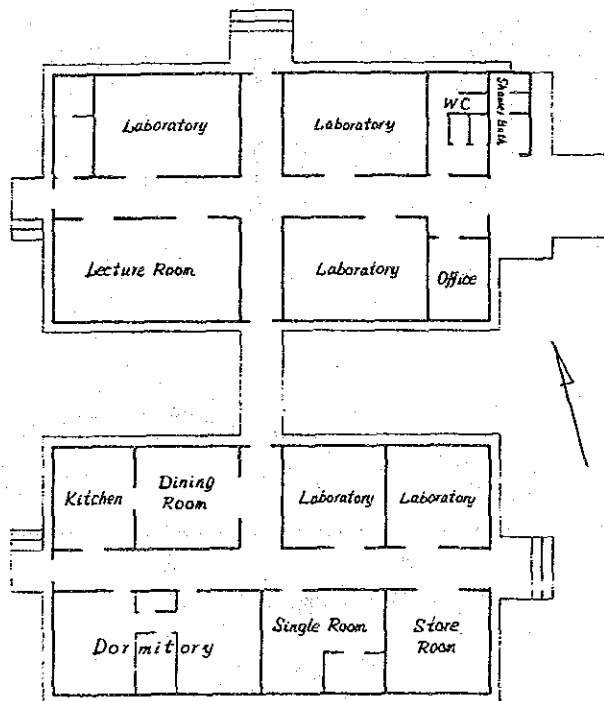
III. LOCAL LABORATORY COMPLEX

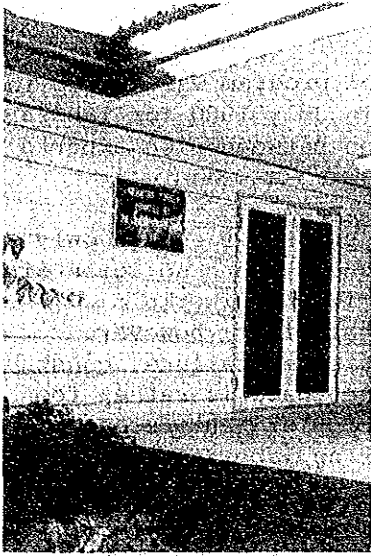
Through preliminary surveys on the Project Area during February 1979, an idea came out to the survey team, that was to establish a small dormitory with a laboratory room as an field base in the Project Area which was too far from Medan where the headquarter of the Project was located. Indrapura was thought to be the best place for this purpose, because (1) it is situated geographically at the center of the Project Area, (2) it is the most urbanized area in the Project Area, and (3) a large-scale health center is located there.

The construction was completed at the end of 1980 FY. The new laboratory is single floored, about 500 m² wide, and has 5 rooms for experiments, a lecture room, storeroom, dining room, kitchen and dormitory. It is expected to contribute for promotion of local health condition as a central health laboratory of the Project Area.

(Kazuo Tanaka: 1979. Jan. 18 - 1981. Jan. 17)

Health Laboratory at Indrapura

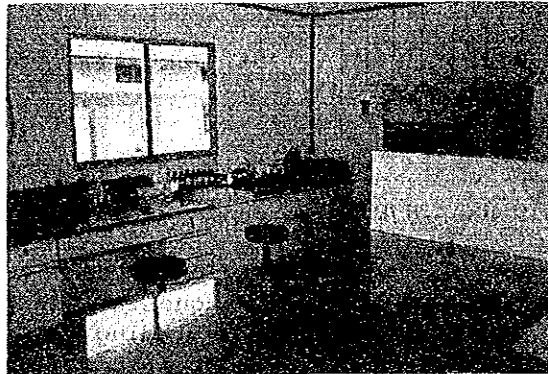




Entrance



Overall outlook



Inside of laboratory

Photograph of the Local Laboratory Complex in Indrapura

IV. MALARIA LABORATORY (IKES)

The laboratory for the malaria control program was set up in the Project Office (so-called IKES lab.) in July 1980 for laboratory studies and for the close co-operation between JICA experts and Indonesian counterparts who are assigned for IKES.

In this new laboratory, (1) Electric power was enough only for table lamps, and power failure is frequent, thus no scientific instrument requiring power could be used; (2) Waterworks including water-pump were installed 2 months after; however, owing to poor amount of water and frequent power failure, constant flow of water couldn't be obtained; (3) The space is rather too narrow; (4) The room for insectary was incomplete but recently an air conditioner was installed. However no laboratory workers have been assigned yet.

Because of these conditions, the JICA experts had been obliged to do much of their laboratory work at their personal houses.

The Provincial Health Service has been making all effort to improve facilities and other conditions in the present incomplete Laboratory. Its completion thus can be expected in the near future.

(Kazuo Tanaka: 1979. Jan. 18 ~ 1981. Jan. 17; Yoshiaki Karoji: 1981. Jan. 15 ~ 1982. Jan. 14)

V. LABORATORY IN HEALTH CENTERS

There are three Health Centers in Asahan area. They have own small laboratory to carry out diagnostic and clinical examinations. Unfortunately facilities including supporting systems for example safe water and electricity are not satisfactory. In order to fulfill basic functions, intensive support would be necessary. This is indispensable for upgrading the primary health care in the area.

(Akira Ishii: 1977. Sep. 29 ~ 1977. Oct. 11, 1979. Feb. 5 ~ 1979. Mar. 15, 1981. Dec. 13 ~ 1981. Dec. 29)

6 . Health Education

HEALTH EDUCATION

It is well understood and accepted that health education has the essential and important role in community health activities. However, it is difficult in reality to obtain satisfactory allocation of budget and personnel within administrative organization. Furthermore, it is not easy task to establish the well co-ordinated and integrated health education approaches to community among diversified community health programmes in practice.

It is the purpose of this paper to review those progress and performance of health education activities in the programme of the promotion of health in North Sumatra with special attention to the Asahan health project based the agreement on R/D on 10 October 1977.

(1) THE RECORD OF DISCUSSION

As the fourth item of outline of the project, it is stated "to promote health education activities" explicitly as one of the four main activities and services in the attached document.

In a staff report of the Japanese Implementation Survey Team, needs for health education is pointed out in relation to nutrition improvement and sanitation with special consideration of local customs and behaviour.

(2) THE PROGRAMME OF ACTIVITY

In December of 1977, the Programme of Activity is prepared by Indonesian side and handed over to Japanese side. This is a important document to understand the original idea of community health approach by Indonesian side. It is stated that the programme of activity concerned covered the first two years period only, while the programme for the next stage will be made in future. In the fourth paragraph, the main target is presented as 12 items.

As the target related to health education, it is stated "to develop and set up the community participation by indicator of the Health Committee at 56 villages. As the activity for target, audiovisual aid set is described one set for Kabupaten and 13 for health center. In addition to the

target for community participation, two targets are described; those are "to increase health center visitors from 26 to 75 per day/health center" and "to increase school health facilities". The indicator for former target is described as the total number of health center visitors, and for later target is described as the number of pieces of school health kit. It is assumed that three targets concern community participation, health center visitors and school health facilities are the most closely related programme to health education as the general issue of community health programme. So far as concern priority decision for programmes and activities, it is the matter of Indonesian Government. However, the matter of target and hole setting with specific activity indicator, it is the matter for mutual discussion and examination of the reasonable identification of the startline based on available information and also assessment of available resources for 2 or 5 years ahead. It is a matter of essential requirements for reasonable planning of the international co-operation programme. The inaction of Japanese side for working out the programme of activity in co-operation with Indonesian side is a matter of regret for the best start of the programme of Health Promotion of in North Sumatra with special attention to the Asahan area. Based on the record of discussion, mutually signed and also the programme of activity, prepared by Indonesian side, the plan of operation and plan of action had been jointly worked out and signed in March 1978.

(3) Background information concerned the Project Area

Background information was prepared by Indrapura Health Center, Lima Puluh Health Center and Kisaran Hospital in relation to the activities, services and community situation.

Health education activity of Indrapulra Health Center had been carried out by health film show three times in 1976/1977 and the school health instruction in primary schools and junior high schools. The doctor candidates under field training at Indrapura health center had also visited 11 villages for health education. In Lima Puluh District, there are one teacher school, 26 elementary schools and 19 elementary schools by IMPRES, one government secondary school, one provincial secondary school and one provincial high school.

The ethnic structure is mainly composed of Malay, Javanese and Batak. The combination of those tribes can be observed in most of villages. The many villages are located along the coastal line with the rice paddy. Nearly half of villagers are farmers. Agricultural productivity is not so high. Based on the classification of living level, related to harvest vs self support, most of the villages in the project area are belong to the second/third class. People in villages of seaside are engaged in fishery, but their productivity appears not high enough. Rubber/palm oil plantations spread along national highway and hillside. One third of population provides labour for plantation. Quantity of water resource is enough, but quality of water is very poor. Sanitary conditions of drinking water and human excreta disposal are mostly poor.

(4) DESIGNATION OF THREE VILLAGES FOR PROMOTION OF HEALTH EDUCATION

In the progress report by Prof. H.M. Yamin at the occasion of Second Steering Committee Meeting, held in November of 1979. It is reported that three villages are designated for promotion of health education, those are; Medan in Kabupaten of Medan Deras, Tanjung Muda in Kabupaten of Air Putih and Guntung in Kabupaten of Lima Puluh. Two out of six villages proposed by Dr. Kumazawa were included in those three.

The programmes for enteropathogenic bacteria and parasites control, entomological study for malaria control and preliminary study for rural water supply had been started since 1979. The designation of those three villages for health education promotion is assumed as the outcome of those programme development. No detail follow-up study of those three village programmes have not yet been reported. However, it is recognized that deep well project at Medan has achieved the best success among five deep well projects. On the other hand, the deep well project at Tanjung Muda had generated the maladjustment of hand pump. The hand pump was changed to different type from technical reason. The next problem is how to make villagers use hand pump of the deep well. This is a matter of health education.

In case of Medan, villagers organize self-support union for maintenance of the deep well, providing rice paddy for management of maintenance cost of the well. In Guntung, there is an

old deep well with best water quality and enough quantity. Those three villages designated for promotion of health education have different characteristic community health problem each other. As it was stressed for the plan of 1980/1981, group approach through meeting in community, system approach through each sectoral technical service and implementation of intensive educational approach in those three villages are highly expected for evaluation of those approaches and outcomes.

(5) THE FINDINGS OF SHORT TERM HEALTH EDUCATION EXPERT (Dec. 1980)

Mr. T. Fujioka, assistant professor of health education, Osaka University of Education had served short term expert at the occasion of Third Steering Committee. It is the short summary of his findings.

- 1) Present status and problem; At national level, Ministry of Health has the Department of Health Education and well organized programme under the excellent understanding and leadership for health education among high level administrators.

The Provincial Health Department at Medan has a section of health education, headed by MD with 6 staffs. The provincial programme of health education follows the directions of national programme of health education. The main programmes are planning, budgeting and implementation of training courses for health center staffs and primary school teachers.

Through the meeting in health education section, following are the problems related to the health promotion project of North Sumatra with special attention to the Asahan project.

- a) In spite of the pressing needs for liason and co-ordination among each sectoral health service programme, the head of each section is so busy that it is difficult to meet for programme co-ordination.
- b) The source of the budget is limited mostly to the allocated fund by national government. Therefore, it is difficult to run the locally initiated programme in reality.
- c) Health education section is willing to co-operate with the health promotion project of North Sumatra. However, it is difficult to contact with key persons of the project. There is no active approach from the project side yet.

d) Director of health center is appointed as key leader of health education. However, they are always too busy.

Through those findings, it was assumed that health education programme at provincial level functions within administrative organization yet.

Through the field visit at Kisaran and project area, the programme of school health service, through training course for teachers of primary school designated for special promotion programme, provision of school health kit by UNICEF assistance, periodic visit of health center doctor and nurse for school health examination, were well informed and important potential of school health programme in the project area was stressed. Mr. Fujioka could have a chance to visit a village master and also the chairman of village health committee. The village health committee is composed of 10 members, 8 of them are male and 2 are female.

The committee meeting is used to be held every month, and popular subject is cleanness and environmental sanitation. If any difficulty arise, health center director is consulted. As the result of interview, it is recognized that villagers are not yet well informed about community health programme of the project. In spite of their positive expressed attitude and willingness of well construction project, they are not consulted in advance for planning, siting, construction and maintenance of new well.

Mr. Fujioka was very much impressed by vital response of people to social and economic change at the stage of Asahan development and expressed high respect and expectation of future advance of Indonesia, and proposed followings;

- a) To strengthen health education programme not only within administrative organizations, but also at the level of villagers' daily life in community, and stimulate their self-initiative for community health promotion.
- b) To disseminate community health information for community health planning so as to bring up problem solving efforts by villagers themselves.
- c) To recognize high potentials of school health programme at present and further development through training of teachers of those designated schools for special promotion programme.

d) Systematic arrangement and presentation of health data and information for health education programme.

e) To strengthen training of health workers at all levels.

Donation of equipments and materials for health education programme had been started since 1980/1981.

Note: The report of Prof. T. Fujioka was dated 4 December 1980.

(6) HEALTH EDUCATION ACTIVITY BY PROJECT TEAM

Dr. Takai, Japanese Team Leader produced series of projector slides for health education media as his voluntary contribution. Those are as follows;

- 1) Technical instruction for staff training in tuberculosis control programme.
- 2) The Asahan Health Project
- 3) Fight against tuberculosis
- 4) Water in Sumatra
- 5) Deep well construction programme in 1980/1981

In case of deep well construction, educational approach from the beginning of community preparation and to the routine stage of maintenance of well through community participation could not be well integrated into the process of planning, construction and handover of the deep wells by administration. This was due to the difficulty in smooth administrative procedure for siting decision by Indonesian side, difference of contract practice between Indonesian side and Japanese side. The term from planning and decision of siting to construction start was not enough to bring up community preparation and participation. However, in case of Medan, the deep well is very much appreciated by villager and they established their own maintenance union to provide fund through the earning from the harvest earmarked rice paddy of villagers common property.

In case of three wells out of 5, the water outflow were less

than expected performance. A handpump of a well was not fit to smooth handling by villagers in this case. It was changed to new one. Active information and education approach to villagers in those three wells concerning appropriate use of wells are needed. Mass educational campaigns had been carried out in case of ceremony for presentation of the laboratory and the well at Indrapura health center. A few thousand of people had attended the event. The movie sessions were held at Perupuk and Guntung in occasion of malaria control programme.

In case of health education activity in community, Japanese experts are expected to provide assistance to the activity of Indonesian fieldworkers. However, budget availability for health education has been very much limited. Activated health center programme for health education at community level through the routine field health programmes are essential.

(7) REORGANIZATION OF PROVINCIAL HEALTH ORGANIZATION

Division of Health Education was set up in December 1981. The Division covers three sections. Those are health education, civil organizations in community, and school health. Furthermore, Division of Environmental Health was also set up to strengthen rural well construction and sanitation programmes. This is the clear evidence of activation of Provincial Health organization and programme from 1982/1983.

In occasion of the Fifth Steering Committee, held in January 1982, remarkable changes to active and well prepared meeting procedure had been observed in Indonesian side. All concerning agencies had been actively participated in presentation and discussion. Small group session was held for programme discussion. Audiovisual aids had been fully used for presentation of problem, performance and planning of the Health Promotion Project of North Sumatra with Special attention to Asahan Project. The strong desire for extension of the project after 1984 were stressed by all concerning organizations.

This is the good changes and evolution, but still within administrative organizations. This is the evidence of new activation for the future development of the project.

(8) THE APPRAISAL OF THE TEAM LEADER

The Japanese team leader expressed his appraisal for health education programme at the stage of February 1982 as follows;

- 1) Shortage of available budget for health education
- 2) Philosophy and principles of health education and primary health care are not yet well deeply rooted within provincial health organization.
- 3) The active participation of health centers themselves are still weak.

Based on those appraisal, he proposes that;

- 1) Examination of practical feasibility of health education at health center level.
- 2) Feed back of health information through field survey concerning communicable disease control through health education programme.
- 3) Production of mass media such as 16 mm movie as the activity of the co-operative project.
- 4) Promotion of those on-going school health programme.
- 5) Encourage villagers to organize their union for well maintenance.

He stressed the need to strengthen JICA programme for technical assistance through provision of equipments and materials further.

(9) SUMMARY

- 1) The Project of 5 Years from 1978 to 1983 has now come to the last year. However, due to the delayed arrival of Japanese expert, the project has been actually started since April 1979.
- 2) The designation of three villages for special health education promotion area was the appropriate start of community health project. However, there has been no systematic follow-up study yet. In spite of the good

success of deep well project at Medan, one of the designated village, there is no available information for analysis of the reason of the success, which is the important and essential information for health education in the project area.

- 3) The findings and proposal of short term expert for health education was helpful for development of health education, especially for understanding the status and potential of village health committee and school health.
- 4) The field survey and control operation for malaria and cholera provide the best chance for health education at community levels. The active joint efforts of expert team with those health workers of health centers, B.P.U. and B.K.I.A. are to be encouraged. The feed back of those information obtained through field survey and control to villagers is essential for their active participation.
- 5) The staff training for health education approaches in the chances of their routine service operation is essential for the effective development of the community health project. Maximum effective use of those materials and equipments, such as self-made slides and other audiovisual aides, is to be achieved. Appropriate allocation of available resources is indispensable.
- 6) New organization of health education at provincial government is expected to have important potentials for future development of health education in the project area. Close liaison, communication and support by Japanese expert team are to be provided. In view of the difficulty of budget availability, JICA project is expected to encourage the new organization and programme through assistance to staff training and supply of equipments and materials needed.
- 7) Needless to say, it is important to understand the reality in the field area of the project, that is, usual mass communication media is not necessary applicable due to the poor coverage of electricity supply and scattered human settlement with transportation difficulty. What is the best practical communication channel and also what is the best educational opportunity well appreciated from villagers side are to be further looked for.

(Michio Hashimoto: 1979. Aug. 1 ~ 1979. Aug. 21,
1979. Nov. 21 ~ 1979. Dec. 20, 1981. Dec. 13 ~
1981. Dec. 29, 1982. Jan. 10 ~ 1982. Jan. 17)

7 . Project Management

PROJECT MANAGEMENT

The project area of OTA-43 is located more than 100 km from Medan, Capital of North Sumatra Province and 60 km from Kisaran, Capital of Asahan Regency. Based on the agreement of "Plan of Operation and Plan of Action for the Promotion of Health in North Sumatra with Special Attention to the Asahan Area" (17th March 1978), the Project has the priority at the surrounding area of Aluminum Smelter Project, i.e. in Air Putih District with two Districts at its surrounding, i.e. Lima Puluh District and Medan Deras District. The population at these three districts is 134,133 persons (23,977 heads of family), consisting of 56 villages/subdistricts in the area of ca. 700 km². There are 3 health centers with 14 clinics and 9 clinics for mother and children. The Indrapura Health Center has 30 beds. There is a Dispensary at INALUM Smelter Site. There are 4 hospitals accessible from the Project Area, those are the Kisaran Regency Hospital with 100 beds, Tibintingi City Hospital with 100 beds and 2 plantation hospitals with 350 beds.

(1) Organization

A steering committee is organized as advisory board composed of the member from Indonesian and Japanese sides. The Chairman of the steering committee is Director General of Community Health, Ministry of Health of the Republic of Indonesia. 5 sessions of the steering committee had been held at the North Sumatra Province since March 1979 to January 1982. The Secretary of the Director General of Community Health is appointed as a liaison officer.

The director of the Provincial Health Department of North Sumatra is appointed as the Project Manager. He has double status of national official and also provincial official.

Deputy project manager is appointed by Director General of Community Health, Ministry of Health. At the level of Asahan Regency and the respective districts concerned, a project manager and his staffs are also appointed. An administrative organization as a managing board under the steering committee is established at Province level and the managing board consists of project manager, deputy project manager and members.

The Team Leader of Japanese expert group is appointed by JICA. The team leader should work in close relationship with the project manager for implementation of the project.

The deputy project manager and Japanese team leader work in the same office attached to the Provincial Health Department. A co-ordinator is appointed by JICA and stays in Medan assisting team leader concerning administrative matters. The requisite service of Japanese experts is provided by JICA upon the request of the Government of the Republic of Indonesia through the normal procedure under the Colombo Plan Technical Co-operation scheme.

The Japanese experts provide necessary technical guidance and advice to the Indonesian staff associate with the project. A counter part person or persons are nominated by the project manager. A secretary is provided by the Provincial Government for the Japanese Team at Medan.

As for the Japanese side, JICA organizes the Domestic Support Committee for OTA-43 since March 1979. The Committee consists of expert members and Ministries concerned. 8 sessions have been held by April 1982. 6 ad hoc experts missions have been sent since December 1976 to December 1981. Those are preliminary study, implementation survey for R/D, circuit guidance and design for implementation. Japanese Embassy locates at Jakarta and Consulate General stations at Medan. JICA has Office at Jakarta. In addition to the diplomatic international relations, inter and intra governmental agencies relations at national and local levels of both countries have inevitably generate complexity of official procedures. As for the jurisdiction of the programme of the project, health center services and health education is under the Director General of Community Health, communicable disease control and sanitation are under the Director General of Communicable Disease Control and medical care and laboratory services are under the Director-General of Medical Care. In case of Japanese side, the source for recruitment of experts is mostly under the jurisdiction of Ministry of Education in relation to universities, Environment Agency in relation to research institute and Ministry of Health in relation to health management, engineer and health education. Non-government organisations and local governments are also important support organisation for expert recruitment and training programme for fellowship programme.

(2) Programme

The technical co-operation for OTA-43 is validated from 1st April 1978 to 31st March 1983. Indonesian Government presented "The Programme of Activity on Health Improvement Co-operation Project with the Government of Japan at Asahan Regency" in December 1977. In March 1978, "Plan of Operation and Plan of Action for the Promotion of Health in North Sumatra with Special attention to the Asahan Area" was worked out and signed by both countries. The plan of action was covered the first year only (1978/1979). The first Japanese expert arrived at Medan November 1978 and the first intake of fellowship programme was started January 1979. The first steering committee was held in March 1979. Meanwhile, the first arrival of equipments and materials was August 1979. That was very much delayed arrival due to the difficulty to custom clearance. That is to say, the first year of the Five Year programme of OTA-43 was over with little substantive programme performance. The co-ordinator arrived on May 1979 and the team leader arrived July 1979. The substantive programme was initiated in the field of enteropathogenic bacteria and parasite survey, then the malaria control programme was started by entomologist, ecologist and parasitologist. The programme of local laboratory at Indrapura and also survey on rural water supply were decided at the first steering committee on March 1979 and survey for implementatin of those two facility programmes were started from August 1979. By April of 1981. Those two facility development programmes had been performed and presented to Indonesian side. Tuberculosis control programme was initiated from summer of 1980. Meanwhile, the programme for strengthening the Provincial health Laboratory of North Sumatra has been actively developed since the arrival of Japanese expert. As the result, the Provincial Health Laboratory has been strengthened. However, the problem of responsibility for maintenance of local laboratory at Indrapura has not yet been settled. The Provincial Laboratory belongs to National Administration and laboratory administration is under the jurisdiction of Directorate of Medical Care. Health Center is under the jurisdiction of Directorate of Community Health. In December of 1981, the Provincial Health Department of North Sumatra had been reorganised for strengthening environmental health and health education. Because of the difficulty for recruitment of expert for sanitary/civil engineer and health

education by Japanese Government, the co-operation performance in those fields had been much limited by this time. At the fifth steering committee, the promotion of primary health care at the level of health center, clinics and maternal and children health clinic in project area.

Activation and participation of project officer and staffs in field level are essential.

(3) Expert, counter-part and fellowship

The characteristic requirement for technical co-operation programme of OTA-43 is the wide scope of programme components with appropriate development process of sectoral programme along appropriate manner towards integration. However, this is very difficult problem in reality.

The cumulated number of expert from 1977 to 1981 is 49. The actual number of expert is 25. The number of expert at present is 5. Among them, 9 experts served more than 12 months. They are team leader, co-ordinator, bacteriologist, entomologist ecologist, parsitologist, malariologist and tuberculosis control experts.

Only short time experts were available for engineer and geologist in the project of rural well construction and one short time expert was available for health education programme at the occasion of Third Steering Committee in November 1980.

The continuity of expert service was maintained for entomology and ecology in malaria control and tuberculosis control by this time. The timing of recruitment of expert has been mostly delayed. The first arrival of expert for bacteriology was on November of 1978. In case of Malaria, it was January 1979. The placement of co-ordinator and team leader was delayed later than sectoral experts.

The nomination of counter-part has not necessary been smooth. This is partially due to the arrival time of expert in relation to annual programme development schedule of Indonesian side. Except team leader and co-ordinator, all experts are recruited from university or research institutions. They are well oriented to academic work, but not so easy to adapt administrative

routine work situation. There are two kinds of counter-part, those are laboratory staff and administrative staff. In case of laboratory staff, adaptation for expert is much smooth. For achievement of satisfactory performance by the team of expert and counter part, materials and equipments support and budget availability are indispensable.

For example, in case of field operation, travel expenses are necessary for counterpart person or persons, expert and drivers. However, counter budget is used to be constraint. The equipments and materials requested to JICA is available after several months later in usual case. In addition to the complex procedure within both government machinaries, the procedure for custom clearance had been used to take long days. Of course, those difficulties have been gradually improved. The improvement is owe to the efforts of steering committee and concerning officials of both sides.

The total number of fellowship award is 16 from 1978 to 1981. The number in 1978 was 6 and in 1981 was 3. Indonesian side expressed unsatisfaction to the decline. All available resources for fellowship are to be utilised in maximum efforts by JICA.

(4) Materials and Equipments

Based on plan of operation and plan of action, signed March 1978, JICA will send equipments and materials and so forth to the port of Medan, in order to implement the project and to support the programme of OTA-43. Domestic transportation, handling, installation, operation, maintenance and repairs will be borne by Indonesian authorities concerned.

The list of equipments and materials requested by the Indonesian authorities will be sent through the procedures under the Colombo plan technical co-operation scheme. The amount of supply of equipments and materials and their main items are as follows;

| Fiscal Year; | Approximate Expenditure; | Main Items; |
|--------------|---------------------------------------|---|
| 1978/1979 | 50,000,000 Yen | Vehicles, Drugs, Laboratory instruments and equipments, Office equipments. |
| 1979/1980 | 90,000,000 Yen | same above |
| 1980/1981 | 110,000,000 Yen | Local Laboratory at Indrapura, 5 Deep Well (Pilot project) vehicle, Drugs, Laboratory instruments and equipments, Audiovisual equipments. |
| 1981/1982 | 50,000,000 Yen (not yet finalised) | Vehicle, Drugs, Laboratory instruments and equipments, Audiovisual equipments, office equipments |

The five rural deep wells as pilot project had been completed by April 1981 and presented to Indonesian side. Water output of two wells out of five are observed less than planned, but well used by villagers.

One of the well had a difficulty of pump handling and changed new pump. However, it is not well used by villagers. The site of the well was changed from planned site due to the problem of land aquisition by local government.

Two wells are satisfactory. One of them in Medan Deras is nicely maintained by villagers with institutional arrangement for provision of maintenance cost through harvest of village rice paddy.

Another one is well operated at Indrapura health center and attached local laboratory. The problem of responsibility for maintenance of local laboratory at Indrapura has not yet been settled among national and local government. of Indonesia. Urgent settlement is needed.

The Director of the Provincial Health Laboratory at Medan is now considering to take the role and support the local laboratory. The activation of participation of North Sumatra University of Medical School is now examined.

From the standpoint of feasibility of maintenance and repairs, the type specification is necessary for some equipments.

As the source of assistance, it is strongly desired to utilise gratuitous aid fund for future development of rural water supply and health care facilities and equipments.

(5) The Project Budget Expenditure

The approximate amount of total expenditure of JICA for the project of OTA-43 is 362 million Yen from 1976 FY to 1980 FY. As the main items of expenditure are as follows;

Expenditure for equipments and materials; 167 million Yen

Expenditure for personnel (Salary, Foreign travel, study allowance etc.); 170 million Yen

Expenditure for various Surveys; 25 million Yen

The expenditure for fellowship programme is not included here.

Meanwhile, the Government of Indonesia takes necessary measures;

i) to ensure the recruitment of Indonesian counterpart personnel in the field of health laboratory technology, environmental health, microbiology, parasitology, health services and other related health fields to be mutually agreed upon as necessary.

ii) to provide at its own expenses;

a; Office and other incidental facilities in the project area;

b; supply or replacement of equipment, materials and so forth for the implementation of the project, other than those provided by the Government of Japan.

- iii) to meet all running expenses necessary for the effective implementation of the project, and expenses necessary for the domestic transportation of the goods provided by the Government of Japan mentioned ii, as well as for their installation, operation and maintenance & repair;
- iv) Expenses for chauffeured vehicles for the Japanese experts during working hours.
- v) Expenses for the internal travel in Indonesia relevant to the project of the Japanese experts on duty, limited to transportation cost only.
- vi) Expenses necessary for furnished housing accommodation for the Japanese experts, according to Indonesian standard. (In reality, it is substantially impossible.)

In addition to those shares of the Government of the Republic of Indonesia, the tax exemption of custom duties, internal taxes and other similar charges, if any imposed in Indonesia in respect to the goods provided by the Government of Japan for the implementation of the project. There are some other privileges, for experts and their families, personal tax exemption and free medical service based on the R/D.

Therefore, the total cost of the project of OTA-43 is the total sum of those shares of the Government of Japan and the Government of the Republic of Indonesia and local government for implementation of the project.

(6) Co-ordination, liason and information.

The needs for co-ordination among agencies concerned both in Japanese side and Indonesian side is innumerable. The inter and intra agencies co-ordination is indispensable task for smooth and effective development of the project.

In the fifth steering committee, it was stressed to pay much attention and efforts for liason and information for those agencies concerned outside of public health organisation. At provincial level, four sessions of scientific meeting have been held by the end of 1981. The subjects of those meetings were enteropathogenic bacterial and parasites, malaria and cholera. It is reported that those meetings were very profitable for the development of the project,

through stimulating each other and formulation of co-operative team efforts. The Japanese experts also try to promote among international co-operation programmes for malaria and tuberculosis control by WHO, UNICEF and US Aid programme.

At the occasion of inauguration of Power plant and Smelter plant of the Asahan development project, there is almost no news in relation to the project of OTA-43 in Japanese mass media. This is the sign of inactive public relation by Japanese side. Therefore, the active efforts of Consulate General at Medan for support of expert team of OTA-43 through provision of press interview session was highly appreciated by the Japanese team, and very effective to inform Indonesian publics about the co-operation and progress of the project.

(Michio Hashimoto: 1979. Aug. 1 - 1979. Aug. 21, 1979.
Nov. 21 - 1979. Dec. 20, 1981. Dec. 13 - 1981. Dec. 29,
1982. Jan. 10 - 1982. Jan. 17)

8 . Summary

SUMMARY

The end of 5 year program of OTA-43 will come on 31st March 1983. All concerning organizations and persons of national, provincial and local levels of Indonesian side expressed their strong desire for extension of the project at the Fifth Steering Committee Meeting in January 1982. So far as the problem of extension, it will be decided based on the report of Evaluation Team in coming August.

(1) Performance of Activity

Dr. H. Djafar, Director of North Sumatra Provincial Health Services and Project Manager of OTA-43, presented the progress report by the end of 1981 at the Fifth Steering Committee Meeting in January 1982.

- i) Malaria control and surveillance have been operated. The parasite rate in 1980/1981 was 1.81%. (It was stated in the Program of Activity, prepared by Indonesian side that the parasite rate of malaria is to be improved from 8.26% to 1.02%.)
- ii) The three health centers in the project area have functioned as Tuberculosis Treatment Center. The number of bacteriological examination of sputum smear sample has largely increased. Treatment of tuberculosis patients has also been actively carried on. The evaluation of control program and the training of staff concerned have been actively developed.
- iii) Extended Immunisation Program (EIP) has been achieved with high performance rate of 96.7% for BCG vaccination and of 84.6% for DPT vaccine in 1980/1981. Those performance rates have been markedly improved compared to 1979/1981.
- iv) The big epidemics of cholera since 1978 have been clearly declined in 1980/1981. The performance of bacteriological examination has been markedly increased in 1980/1981 up to 3,800 specimens. Bacteriological identification of pathogenic micro-organisms has become feasible as routine work in Medan Public Health Laboratory.

- v) The positive rate of helminth is still high. However, the prevalence rate in a model project district seems to decline.
- vi) The number of population with safe water supply (well) is 27.8%, with family latrine is 44.2% and with garbage disposal is 64.45% in 1980/1981. Those coverage rates have been gradually improving.
- vii) Three villages are designated as the project district for intensive work area of health education activity.
- viii) Total number of examination is doubled in bacteriological examination and 1.8 times in parasite examination in 1980/1981. The water quality examination was started for the project area in 1980/1981.

Of course, clinical services have been provided through three health centers and their satellite clinic network. However, no statistical service figures were presented in his report.

OTA-43 has provided technical assistance through experts, trainees and donation of materials and equipments for those health programs of North Sumatra Provincial Public Health Services. As the summary of individual reports of experts, main performance of programs were as follows:

- i) In Malaria control program, those experts of medical entomology, ecology and parasitology (M.D.) have been provided as technical assistance with necessary provision of materials and equipment for field survey and laboratory study. The parasite rate among villagers has been verified. The problem was raised about the effectiveness of DDT house-spray in Perupuk. The ecological behaviour of *An. sundaicus* was posed the needs for further clarification. The field investigation for larva control has been initiated. The role of health centers and their peripheral satellite clinic network for the better effective management of diagnosis and treatment of malaria was urged through the field study of parasitology by blood samples and clinical examination. An expert of medical entomologist of Indonesian side was recruited to North Sumatra Provincial Health Organization and a laboratory was provided at Provincial Health Department building.

- ii) Successful technology transfer for bacteriological examination from field swab samples and identification at Medan Public Health Laboratory as routine practice has been achieved. The result of bacteriological identification for cholera cases at epidemics has been intergrated into epidemiological information at provincial level, and epidemiological investigation for tracing primary patient in epidemics has been carried on as the intensive control district at Megan Deras. Donation of materials and equipments for expanded immunisation program was helpful for marked increase of performance rates in BCG and DPT vaccination.
- iii) In the parasite control program, expert contribution is limited to the demonstration of better examination methods, mass treatment and its evaluation in a model district.
- iv) Tuberculosis control expert has provide technical assistance for development of long term tuberculosis control program in North Sumatra Province by 1990. Active guidance and co-operation for case management program at hospital, health center, tuberculosis treatment center and its peripheral satelite clinic network have been provided. The development of evaluation program and staff training have been developed through the guidance of expert.
- v) Five deep wells have been constructed through donation of materials and equipments by JICA. Follow-up examination and advice for those 5 wells have been provided by short time expert of sanitary engineer. However, long term expert has not yet been provided inspite of strong request by Indonesian side.
- vi) The laboratory equipments at Medan Public Health Laboratory have been greatly strengthened by technical assistance. Local laboratory was established at Indrapura Health Center and now serves as the base of field operation by experts and counter-parts. However, final decision of jurisdiction of administrative responsibility for maintenance of the local laboratory has not yet settled.
- vii) Donation of audiovidual aids through technical assistance could provide substantive support to the program of health education only a short time expert had been provided.

Expert of other programs had participated in field health education in some cases. Voluntary contribution of self-made slides for OTA-43 have also provided helpful contribution.

(2) Discussion

① Development and Health

Asahan Development Plan had been initiated since 1970 with the co-operation of a Japanese enterprise. Japanese Government had decided to provide government financial assistance for the Asahan Development Project at Cabinet Meeting on 4th July 1975. The Master Agreement was signed among Indonesian Government and 12 Japanese enterprises concerned. The Asahan Development Authority was established by Indonesian Government in January 1976. In December 1976, Preliminary Survey Team for Medical Assistance Program by JICA had visited Indonesia and requested by Indonesian Government to provide technical assistance for health care delivery system of national government and then visited Medan and Asahan Area. This was the first chance to have relation with North Sumatra and Asahan Project. In March 1977, Indonesian Government proposed the list of technical assistance including OTA-43 as "Health Control in North Sumatra and the Surrounding Asahan Project Area". The Implementation Survey Team was dispatched and signed to the R/D in 13th October 1977. The sentence of Background in the R/D clearly presented the basic philosophy of the Project to meet the challenge caused by changes in community, environment, population through the Asahan industrial development project. Meanwhile, REPELITA II (April 1974 to March 1979) advocated the slogan of "High Growth", and REPELITA III (April 1979 to March 1984) renewed the slogan as "Social Equity". OTA-43 had been initiated and the R/D was signed with those background situation. It was really timely decision for both countries. However, the project had been delayed by the late arrival of the first expert by November of 1978 and also the late arrival of team leader by July 1979, in spite of the starting date of 1st April 1978 validated by the R/D.

It is important to recognise the unique differences between traditional technical assistance program for single subject and the new project of OTA-43 of wide scope of multiple programs with community level practice. Those approaches along the course of preparatory survey, organizational set-up of expert team and planning for program and activity with appropriate understanding and orientation concerning community health problems, available resources and feasibility to

start the new technical assistance program pose unique challenge. The selection and recruitment of team leader is the most important initial task to start this type of program. It is highly desirable to recruit appropriate expert as the candidate of team leader, and dispatch in advance of the Implementation Survey Team for the settlement of the R/D. Those problems of constraints, stated in the report of Dr. Djafar, Project Manager and the Director of North Sumatra Provincial Health Service, are to be seriously examined and taken into consideration for further recruitment and placement of experts to meet the real needs of the country at appropriate time with steady continuity and consistency in future program similar to OTA-43.

② Community Health Project and Technical Assistance

The community health project is essentially to be long year program. It is necessary to meet the basic human needs in community, and indispensable for sound social and economic development of every country. There can be various patterns of community health project, depending upon the stage of development at given community and country. Multiple kinds of sectoral programs are necessary along the process of project development, at the same time the integrated of approach is essential.

The community health project is requested to meet the social, cultural and natural features of the community and the country. The process, method and procedure for community health approach must be worked out so as to meet the practice at community level in addition to the technical and administrative levels at national and local governments. The acceptance, co-operation and participation of people at community level can be expected only through the successful formulation and development of those process, method and procedure for given situation so as to make accesible and tangible for people in the community.

In usual technical assistance program, Technology Transfer and Infrastructure Development are the key principles. In case of OTA-43, how to work out the effective technology transfer to the field technical staff at health center and its peripheral satellite network level concerning routine technical operation and also how to develop those grassroot infrastructures such as artisan well and handpump repair shop in the project area are the crucial issues, expected to the next stage of development.

The activation of public health team under the leadership of a director of the health center is the most essential issues for community health approach.

On the other hand, people in a community demands visible and tangible benefit through the community health project. The favourable understanding, co-operation and participation of villagers can be developed only through their daily perceptual images and concrete life experience through the community health project. Here is the problem of Primary Health Care. OTA-43 is now coming to meet the stage of community level approach by Indonesian staff themselves with appropriate support, encouragement and advice through technical assistance program. The Japanese domestic principles and practice through differentiation among preventive and therapeutic approach and personal health and environmental approach can not be applied to the situation of the project area.

Here are the new dimension for technology transfer and infrastructure development in OTA-43. The team play between administrator and scientific expert, and also interdisciplinary approach among various fields of experts are essential for effective development of OTA-43. "The Proposal for the Development of Community Health Project" by The Advisory Committee for Oversea Medical Co-operation, provided by JICA had examined those essential and crucial issues.

③ The Problem of Environmental Impact

The problem of environmental impact assessment and following monitoring and surveillance are mentioned in the report of the Implementation Survey Team in 1977. The project area of OTA-43 is defined in the R/D and following Plan of Operation and Plan of Action, signed on 17th March 1978.

The project area is designated three surrounding districts (Kecamatan) of the Aluminum Smelter Site of INALUM.

The environmental pollution generated by Aluminum Smelter had been common in the past. In case of Aluminum Smelter of INALUM at Asahan Project, the high level of environmental pollution control technology had been integrated into the design of plant construction, which is equal to the Aluminum Smelter Plant of Sumitomo at Toyo of Ehime Prefecture. The Toyo Aluminum Smelter is the most advanced modern smelter equipped highest grade of control technology in Japan.

It is also known that the technical staff of environmental conservation of Sumitomo Group were dispatched to the Asahan project for environmental study in advance to the plant operation. The aluminum smelter process at Asahan is only the process of electrolysis process, without the first smelter process for alumina production. Therefore, it was assumed that environmental pollution control measure can be considered after the starts of operation. The fellowship program in 1982/1983 provides training for environmental pollution control and effect study opportunity in Japan for the responsible person at Provincial Health Services. The more urgent health problems, such as malaria, cholera, tuberculosis, sanitation and rural well construction have been chosen as with priority at this 5 year program.

④ Special Important issue at present

Indonesian side has expressed the most strong desire for rural well construction project, as the best well accepted and welcome program for villagers. Therefore, OTA-81 was strongly expected to implement as early as possible. Nevertheless, OTA-81 had been suddenly cancelled in February 1982. This is the serious impact to OTA-43 and also North Sumatra Provincial Health Administration and also Asahan Regency. The report of team leader claimed the difficulty caused by the cancellation of OTA-81 recently. We hope necessary counter measures is to be provided with maximum efforts by JICA and Ministry of Foreign Affairs as early as possible.

(3) Conclusion

The outline of development, performance and problems of OTA-43 Project is reviewed based on the request of JICA to prepared for the program of Evaluation in the later half of 1982. In spite of various constraints and difficulties, clear progress and improvement of community health activity has been observed. It is also stated in the report of Dr. Djafar, Project Manager and Director of North Sumatra Provincial Health Service. OTA-43 has generated positive and favourable support and stimuli for the development of public health service with special attention to the Asahan project area (at Smelter site).

The North Sumatra Health Administration had completed the epoch-making reorganization, with special emphasis on the environmental health program (including well construction) and health education in the end of 1981. The Fifth Steering Committee had been held with remarkable active participation and in systematic ways with high efficiency for discussion, examination and planning for the program of 1982/1983 and progress review. This is the remarkable sign of activation of administration at national and provincial levels.

Now, program development has reached to the stage of activation of health center and also initiation of integration for Primary Health Care at community level. How to bring up active public health team and potential community infrastructure to meet those problem demand is the crucial challenge to OTA-43 with the project title of "Community Health Project" explicitly in the R/D.

In concluding this review, we would like express our deep respects and thanks to all those persons and organizations of the Republic of Indonesia and Japan related to OTA-43 for last 4 years. Without the joint work among experts and counter-parts at North Sumatra and the Project Area, no progress of OTA-43 could not be achieved in the past. We hope OTA-43 could contribute to the advancement of welfare of the people and social development of the Republic of Indonesia.

(Michio Hashimoto: 1979. Aug. 1 ~ 1979. Aug. 21,
1979. Nov. 21 ~ 1979. Dec. 20, 1981. Dec. 13 ~ 1981. Dec. 29,
1982. Jan. 10 ~ 1982. Jan. 17)

9 . Appendix

(2) TUBERCULOSIS

Under cooperation by JICA experts the activities of Tbc section have been improved in the project area. The Health Centers in the three kecamatans have functioned as Tuberculosis treatment centers. The experts have played a great role in evaluation of the program, improvement of routine work and training of staff members of the health centers. In tbc program, some epidemiological data is still needed. That data is considered necessary for supporting master-plan for health services.

(3) IMMUNIZATION

Equipment assistance by JICA has helped the immunization section to improve its program implementation so that the section can reach the target better than before.

(4) WORM CONTROL

Worm infection is a widespread disease in North Sumatra. The prevalence rate of the disease is very high, so that if this disease is to be eradicated, it will cost a lot of money. Because of the effect caused by worm infection is not very serious compared with other infectious diseases, worm control program is not considered as high priority.

Worm control in the project area has been carried out according to budget availability. In the villages where the program was carried out, prevalence rate of the worm infection seemed to decline.

(5) CHOLERA AND GASTRO ENTERIC DISEASES

In North Sumatra, Cholera and Gastro enteric diseases are endemic diseases. But sometimes the disease can become epidemics.

Treatment of cholera and gastroenteric diseases has been improved by controlling outbreak as early as possible and improvement of laboratory examination of suspected cases.

(6) HYGIENE AND SANITATION

By construction of artesian wells, supply of safe drinking water for the population in project area has been improved. More people can enjoy safe water supply so that the danger caused by waterborne diseases can be reduced.

(7) HEALTH EDUCATION

By equipment assistance supplied by JICA, the health education unit can do its job better, so that the unit can support any other health programs in the project area.

(8) LABORATORY SERVICES

By improvement of laboratory equipment, the laboratory service has been improved. More numbers of examinations can be done, more complicated laboratory examinations can be carried out. Nowadays, the laboratory services are available not only to the project area but available to North Sumatra and bordering provinces.

Note: See Annex I.

II. CONSTRAINTS

Experience in a couple of years of cooperation indicated that some constraints can be identified as follows.

- Difference in time scheduling for program planning and budget proposal in the two countries.
- Number of fellowships is limited and processing is very complicated.
- Number of experts dispatched is large compared with number of fellowships accepted.
Sometimes the kind of expertise of the dispatched expert does not precisely meet the need of Indonesian side.
- Shipment of equipment and materials from Japan to Indonesia takes much time due to complicated procedures in both countries, so that they cannot arrive in project area in short time.

Usually, the equipment and materials can be ready for use after one fiscal year is over. For that reason it is very hard to make a plan in advance about the use of the equipment and materials.

Planning of counter budget is also difficult because of that.

Construction of artesian wells in the project area was carried out without close contact with Indonesian side. In that situation the Indonesian side cannot point out valuable suggestions for successful implementation of the project. So, when the construction of the artesian wells is finished by a boring company a few of the wells cannot function as expected.

III. ANALYSIS

When the Record of Discussions was signed on October 10th 1977, it was evident that the project could not be really started on April 1st, 1978. The real start of the cooperation project had to be delayed a couple of months because both sides needed some time for preparation of joint operation.

The Indonesian side needed time for provision of office space, recruitment of counterpart personnel and provision of budget for running expenses of the project.

In the first fiscal year of the cooperation project, there was almost no special budget for project operation provided by Indonesian government. It was probably due to lack of involvement of related institutions which should be concerned. On the one hand, the national government thought that the operational cost for the project should be borne by provincial government, while on the other hand the provincial government thought that national government should bear the responsibility to allocate budget for the project.

In the second fiscal year this problem was immediately put forward to be solved. Both national and provincial government provided budget so that the programs of the project could be implemented better.

When the project was started, it soon became clear that for project implementation the service of experts were needed and various experts were requested to JICA. However, since the health delivery service systems in both country are different, it was difficult for JICA to provide experts who could precisely meet the need of Indonesian side. Another problem was the fact that it was not always easy for JICA to dispatch experts for long term assignment. The Indonesian side considered long term assignment more favorable for some reasons based on experiences in the past. Any expert must spend some time for adaptation before he could work well in Indonesia. First of all he should adapt himself to the Indonesia administrative way and later he should adjust himself with how to work with the Indonesian staff members. Adaptation with communication language also took some time, because English was a foreign language to both sides, so if an expert is assigned in Indonesia only for short term, he

will probably spend most of his time for adaptation before he could do something fruitful for both sides.

Fellowship processing seemed to be rather difficult. It was evident that to provide a training program for an Indonesian staff member in Japan, was not always easy for JICA. Probably it was because the courses requested by Indonesian staff members were not always available in Japan. Furthermore, the total number of fellowship for every fiscal year was not always made clear.

Equipment and material supply always took considerable amount of time. This was due to complicated procedures in both countries. Purchase of equipment and shipment processing in Japan took much time, while tax free processing in Indonesian harbours and handling procedures in warehouses also took much time. These factors made almost all of the equipment and materials arrive late in project area. When equipment and materials were requested in one fiscal year, they usually arrived in the following fiscal year. If the equipment and materials could be purchased in Indonesia cooperation would run more smoothly.

One of the most crucial problems which was always faced by Indonesian side, was budget proposal planning for operational cost of the project. The number of experts dispatched in one fiscal year could not be known one year in advance so that planning of budget for their counterparts was difficult.

IV. PRIMARY HEALTH CARE ACTIVITIES

According to national health development program, P.K.M.D. (Village Community Health Development) is an approach in the health development. PKMD has been carried out in the project area.

In the three kecamatan health centers have been established and the health centers have provided services to local communities. The community people have taken part in promotion of health services and they have actively participated in various kinds of essential health efforts.

In the three kecamatan nutrition programs have been carried out. Weighing operation has been conducted by community workers who have been trained by health workers from local

health centers. This fact shows that the local community have been aware of their health needs and consequently, they have participated in the efforts to fulfil their needs. Awareness of the community has been stimulated to improve their own drinking water supply.

In kecamatan Medang Deras and Air Putih where JICA has constructed deep wells, some people from the community have been trained to maintain the wells and the responsibility to keep the wells in good condition has been collectively borne by the local community.

In kecamatan Limapuluh some artesian wells have been constructed with the fund from the national budget. Maintenance of these wells will be carried out the same way with other kecamatan.

In kecamatan Air Putih and Limapuluh some water supply facilities with aeration system have been constructed. Maintenance of the facilities will be handed to the community.

In kecamatan Medang Deras, community in several places constructed mini artesian wells (80 - 120 m deep) as water supply system. To finance the construction, they spent the village financial assistance (Bantuan Desa) from the government and community financial contribution. This fact shows that the community people have also participated in the financing of the activities.

Furthermore the activities which have been done in the project area are the activities with practical technology, activities which are scientifically sound and acceptable to the community.

Immunization activities in the three kecamatan indicated coverage increase also.

Health education activities have helped increase the awareness of people about immunization so that more parents want to have their children immunized.

By observing various activities of community groups in the project area we can apparently see that the activities of the Asahan Health Project have stimulated the PKMD activities in the area. These activities need to be developed continually in the future.

V. INVOLVEMENT OF THE MEDICAL FACULTY

According to the Record of Discussions signed on October 10th 1977, the activity in the Asahan Health Improvement Project is expected to improve health conditions in North Sumatra.

Based on this, the outlines of the Project area:

1. To promote communicable disease control activities
2. To improve the health care delivery services
3. To improve health laboratory services
4. To promote health education activities
5. To promote other related health fields mutually agreed upon as necessary.

Those activities are carried out according to the annual programs which are planned together, between Indonesian side and JICA side to reach some targets.

Already for some years, the Medical Faculty of North Sumatra University (U.S.U.) utilized the Asahan District, Especially the Provincial Training Centre in Indrapura as training facilities for medical school students in Community Medicine. Their Scope is limited only to train the students in Health Education and Health Problem Identification.

By the Asahan Health Improvement Project, improvement of health facilities and activities in the area is possible.

Improvement of medical equipment in PTC Indrapura as well as Laboratory equipment and activities can be made.

Development of the health center activities in three kecamatan of the project can be carried out. So the involvement of the Medical Faculty of the University of North Sumatra is of great importance, since more activities could be done.

With more involvement of the Medical Faculty in the project area, it will be more beneficial for both sides. The faculty itself and the community in the area will grow.

For that reason and facts, it will be of great use especially for the development of Community Medicine in the future.

A more conceptual and detailed plan for both sides need to be developed so that those improving facilities and activities in the area will yield more positive impacts.

VI. EXPECTATIONS FOR FY 1982/1983

Target achievement in FY 1981/1982 can be used as a working basis for the activities in FY 1982/1983.

The activities which could not be realized in FY 1981/1982 should be endeavoured to be realized in 1982/1983.

For that purpose a detailed plan of action for FY 1982/1983 is furnished as attachment.

The plan is open for discussion to find out best measures to overcome the constraints to achieve better goal.

VII. EXPECTATION FOR THE FUTURE

See attached paper. (Some consideration for future cooperation).

*This is the paper, presented in Fifth steering Committee Meeting in January 1982.

Medan, January 9, 1982

SOME CONSIDERATION FOR FUTURE COOPERATION BETWEEN
THE GOVERNMENT OF INDONESIA AND THE GOVERNMENT OF JAPAN

I. BACKGROUND FOR CONSIDERATION

By looking at some health promoting activities carried out through cooperation between JICA (on behalf of the government of Japan) and the government of Indonesia which has been held since 1978 specially at Asahan district, it is evident that many kinds of success have been achieved in promotion of health conditions for the community. The success condition is particularly focused on 3 kecamatans in Kabupaten Asahan.

The cooperation has been carried out through many health activities since 1978 and it will be finished in 1983.

From the beginning of cooperation, many programs and activities have to be arranged by the two governments.

Even though much success has been achieved in the past, it is felt that the health condition of the people in the project area is still far from desired state. For that reason it is necessary to take some steps in working out the possibilities of continuation of the cooperation to guarantee further promotion of health condition particularly in that area with its surroundings.

In accordance with development of national health program and with the specific condition of North Sumatra, the cooperation needs to be adjusted so that it can best suit the needs of local community.

II. ACTIVITIES

Based on the experience in cooperation and assessment of the activities in the past year, it is suggested that activities in the future cooperation be considered in some alternatives as follows:

1. Similar activities at the same location (as of OTA - 43)

Annex I ASAHAN HEALTH IMPROVEMENT PROJECT
SUMMARY OF HEALTH CONDITIONS

| SECTION | 1979/1980 | 1980/1981 | 1981/1982 (under process) | 1982/1983 (Estimated) |
|---|--------------|--------------|---------------------------------|--------------------------|
| MALARIA | | | | |
| Parasite rate | 1.52% | 1.81% | | < 2.00% |
| House spraying | 9576% | 2564% | | |
| TUBERCULOSIS | | | | |
| Target realization | | | | |
| Bacteriological Examination | 89.00% | 124.00% | | 100.00% |
| Patient treatment | 99.36% | 95.00% | | 100.00% |
| Prevalence Rate | 0.60% | 0.49% | | 0.30% |
| IMMUNIZATION | | | | |
| Target realization | | | | |
| BCG | 39.20% | 96.70% | | 90.00% |
| DPT Complete | 35.60% | 84.60% | | 90.00% |
| TT Complete | 17.60% | 32.70% | | 70.00% |
| WORM | | | | |
| Prevalence Ascaris lumbricoides.. | 90.35% | 69.83% | | < 10.00% |
| Trichuris Trichura | 77.84% | 64.87% | | < 10.00% |
| Ankylostoma duodenale | 23.55% | 13.17% | | < 10.00% |
| HYGIENE & SANITATION | | | | |
| Number of population with safe water supply | 24.10% | 27.80% | | 33.90% |
| Number of population with family latrines | 40.20% | 44.20% | | 52.10% |
| Number of population with garbage disposal | 60.15% | 64.45% | | 69.60% |
| HEALTH EDUCATION | | | | |
| Intensive work areas | 2 Villages | 3 Villages | | 9 Villages |
| LABORATORY | | | | |
| Examination of specimens | | | | |
| Bacteriology | 1796 samples | 3800 samples | | 4000 samples |
| Parasitology | 1047 samples | 1894 samples | | 3000 samples |
| Water from wells | | 20 samples | | 400 samples |

2. Similar activities in extended area outside the three kecamatan.
3. More activities with more extended area in Kabupaten Asahan.
4. More activities in the whole North Sumatra.

III. RECOMMENDED PROGRAM

In future cooperation between the government of Indonesia and the government of Japan, some activities need to be taken for strengthening and development of prior cooperation. Recommended programs are as follows:

- 1) Communicable disease control
- 2) Drinking water supply and other Hygiene Sanitation/ Environmental Health activities
- 3) Promotion of community health services through health centers with involvement of medical school.
- 4) Promotion of nutrition program, especially nutrition education/health education
- 5) Promotion of laboratory services
- 6) Promotion of Primary Health Care programs.

Appendix II. List of Authors

(in alphabetical order)

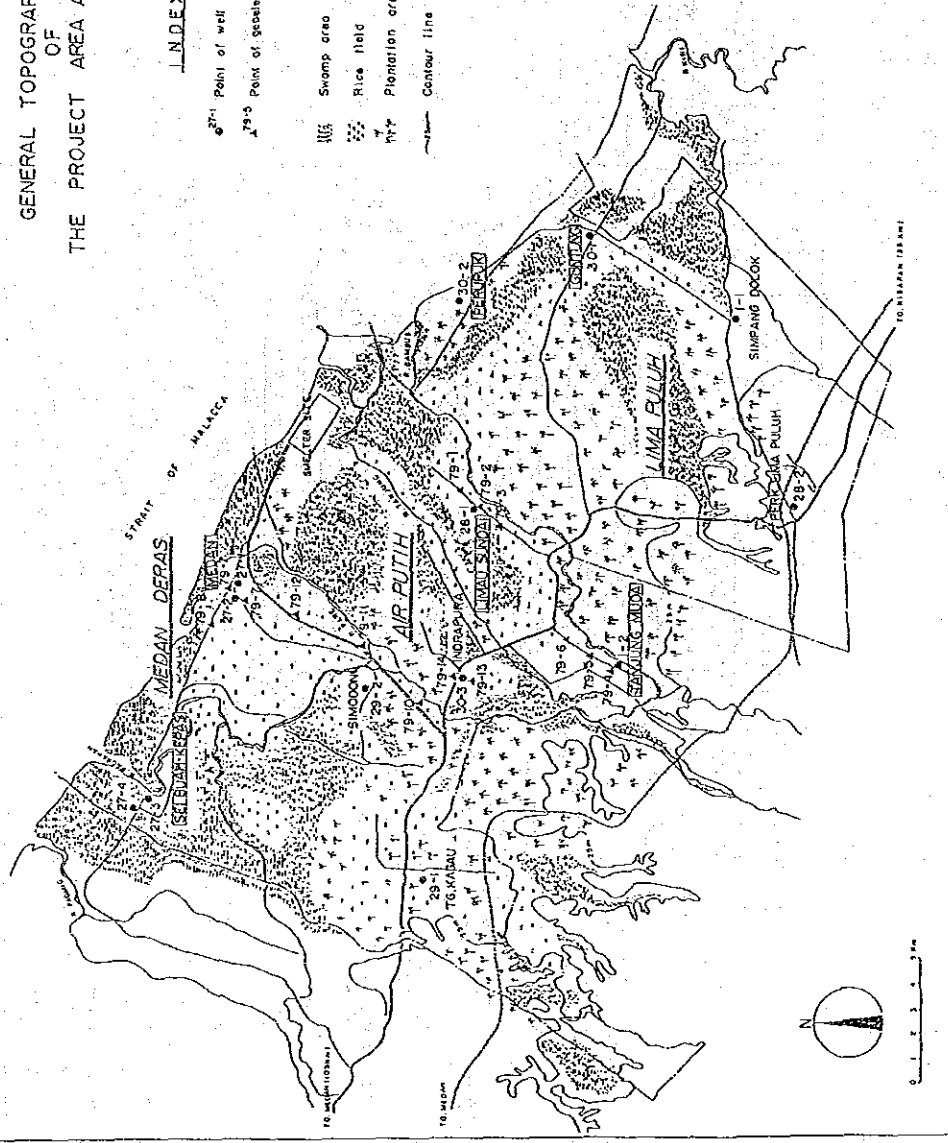
| | | |
|------------------------|---|---|
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| Ishii, Akira | Parasitology, Department of Parasitology, Miyazaki Medical College | 2-I, II, III-(1), (5), (6)-①; 5-I, V |
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GENERAL TOPOGRAPHICAL MAP OF THE PROJECT AREA AND VICINITY

INDEX

- Point of well investigated
- ▲ Point of geotechnical stability survey
- Swamp area
- ▨ Rice field
- ▧ Plantation area (rubber and palm)
- Contour line



JICA