Economic Benefits of Malaria Control In the Republic of Indonesia

By WARREN A. KETTERER, M.D., M.P.H.

PUBLIC HEALTH PROGRAMS beget long-range economic benefits which may appear obvious to public health workers but which are often overlooked in considerations of the economy of a nation. In the newly established Republic of Indonesia, such benefits, though difficult to determine precisely since sickness of all kinds is omnipresent and statistics are generally lacking, are becoming evident. The malaria control program, in operation by the Indonesian Ministry of Health with assistance from the Technical Cooperation Administration Mission (formerly the Economic Cooperation Administration Special Technical and Economic Mission) to Indonesia has provided data which are sufficiently reliable and significant to give some indication of its benefits to the economy of the country. These data, though as yet meager, also serve to emphasize the importance of public health endeavors in the underdeveloped countries of the world.

Indonesia, as well as having a high prevalence of tuberculosis, typhoid fever, yaws, leprosy, trachoma—in fact, most of the diseases known to man—is one of the world's most malarious areas. It has been estimated that malaria affects approximately 30 million of its 77 million people each year, causing more deaths than any other disease and greatly limiting the productive capacity of the nation. The number of attacks of malaria infection each year undoubtedly outnumber the population. A spleen index of 80 percent has been found in many areas, and malaria epidemics have been known to kill one-fifth of the population of an area in a single year.

ECA assistance for the Indonesian Ministry of Health's malaria control program began in October 1950. By June 30, 1952, DDT-house-spraying operations had protected 999,000 persons in Java, Sumatra, Celebes, and Amboina from this disease. The malaria section of the Ministry directed $400,000 in 1952 toward house-spraying activities and aimed at a population goal of nearly 2 million for the end of 1952. The World Health Organization has provided $74,000 since 1950 for a malaria control demonstration area on the south coast of Java, and requested assistance from the United States foreign aid programs has totaled $1,449,000, $929,000 of this amount for DDT and the remainder for technical assistance, educational activities, and sprayers and other commodities needed for the program. The population goal of the spraying program for the end of 1953 is 5 million.

Dr. Ketterer has recently returned to the United States after a 2-year assignment as deputy chief of the public health division of the Technical Cooperation Administration Mission to Indonesia.

Benefits to Agriculture

A concept of the broad economic importance of the malaria control program in Indonesia can be obtained from the realization that the activities are carried out in areas which are predominantly agricultural. Thus, malaria

control contributes to the production of rice, which has been called the hinge of Indonesian economy, and of such products as rubber, copra, tobacco, tea, and palm oil, which are among the country's leading exports. With Indonesia importing 600,000 tons of rice yearly, an increase in rice production is perhaps of even greater economic importance in this country than it is in countries which export rice, since it should permit a reduction in expensive importation and in the use of foreign exchange.

DDT-spraying operations have made possible the reclaiming of idle rice fields in some areas and, together with improved agronomic practices, have led to an increase in yearly yield in others. Before World War II, rice fields frequently had to be drained and left to dry for several weeks to eradicate mosquito breeding and to reduce malaria. The DDT-spraying program makes this procedure unnecessary, permitting year-round cultivation.

Rice Production

Along the Bay of Banten in northwest Java, more than 10,000 acres of once highly productive rice land lay idle and deserted for several years after the Japanese occupation. The actions of the Japanese had destroyed the prewar malaria control drainage system; and, as the drainage ditches silted up and salt water from the bay entered the rice fields, *Anopheles sundaicus* multiplied unchecked. The farmers remaining in the area, in their new concept of freedom, did not repair and maintain the permanent drainage system, but attempted to produce rice without regard for the threat of malaria. Malaria epidemics after 1944 affected more than 80 percent of the people, and the farmers were forced to abandon their land. The area soon reverted to tropical wilderness.

In September 1951, two DDT-house-spraying teams were sent into the area by the Indonesian Ministry of Health. As soon as the inhabitants nearby learned of the malaria control work, they began reclaiming the idle land. When the people came into the area, they found that malaria no longer decimated their population as it had done before the spraying.

By March 1952, 2,090 acres of this land were again under cultivation by old inhabitants, and 383 additional acres by new settlers (*1*). By the fall of 1952, almost all of the area was under cultivation, and more farmers and their families were returning every day. When all 10,000 acres are again producing rice, it is expected that the yearly yield will be some 4,400 tons of husked rice to augment Indonesia's food supply. The total value of this rice should be approximately 8,380,000 rupiah ($740,000); the total cost of the initial spraying operation was approximately 140,000 rupiah ($12,000), less than 2 percent of the value of the yearly yield.

In addition to this program, the Ministry of Health plans to set up a yearly DDT barrier in this area between the coast and the inland. This should make possible the reclamation of another 18,000 acres of malaria-depopulated farmland because this DDT barrier will safeguard the inland area from mosquito-breeding places along the bay.

Export Products

A group of estates producing chiefly palm oil, but also other products, on the east coast of Sumatra were sprayed in 1950, protecting a population of 15,000. Evidence is available that malaria, which affected more than 80 percent of the population before the spraying activities, has been greatly reduced. Before spraying, examination of 402 babies revealed a parasite rate of 22 percent; the parasite rate in 298 infants born after the completion of spraying was 0 percent. The parasite rate in school children also declined, from 23 percent before spraying to 4 percent after.

Of great significance to the economy of the estates was the considerable decrease in admissions to the estate hospital after completion of the initial spraying. In the 11 months before spraying operations were begun, 2,363 patients were admitted, 700 of them with malaria. In the 11 months following spraying, 1,346 patients were admitted, 90 with malaria (*1*). The simultaneous decrease in illnesses aggravated by malaria, as reflected by the decrease in admissions excluding those for malaria, is characteristic. The decrease in hospital expenses alone was enough to finance the malaria control operations in this area. In addition, estate managers report a two-thirds decrease in absenteeism among the workers, resulting in an

increase in the number of working days and in production per man (*1*).

Transmigration Projects

Thirty years ago the Government of the Netherlands East Indies attempted a significant transmigration project in south Sumatra in an effort to relieve the population density in Java and to open new rice-producing areas. Malaria hindered the success of the project and curtailed the achievements planned for the area. Only with intensive use of expensive quinine could malaria mortality be maintained at a tolerable level. Late in 1951, DDT-spraying was commenced in the town of Metro, and by the end of 1952, 80,000 persons were protected from malaria. Continuation of the program will protect an additional 250,000 persons in this area (*1*). Already the transmigration area is becoming prosperous. Malaria rates are declining, additional land is being cleared, and new rice fields are opening up.

Another highly malarious transmigration area in North Celebes—around Dumoga—was sprayed in 1952. Before the war, transmigration attempts failed in six areas of Celebes because of malaria.

Other Benefits

Continued malaria control activities are also protecting the people in the major cities of Indonesia, among them Djakarta and Surabaja. In 1952, the hospitals of Djakarta reported a three-fifths reduction in admissions for malaria over the previous year.

In the coastal area around Djakarta, malaria control measures are benefiting the fishing industry. In the village of Marunda, 3 miles east of Tandjungpriok, *Plasmodium falciparum* infection has nearly disappeared. In 1949, the spleen index for children in this town was 91.5 percent and for adults 83.6 percent; malaria infection was totally absent in children born during the year after the spraying. In the village of Tjilintjing, 2 miles from Marunda, which was not sprayed, not only did the spleen index remain unchanged but a severe epidemic of malaria occurred (*1*).

On the prison island of Nusa Kambangan off the south coast of Java, the habitations of its 9,680 persons were sprayed in mid-1952. Malaria was so serious on this island that the yearly cost of quinine for treatment was four times the cost of the malaria prevention operations.

In the area of Painan, Sumatra, which at one time had a spleen index of over 80 percent, 150,000 persons have been protected against malaria. Three months after spraying was begun in June 1952, the number of mosquitoes in the town itself had been so reduced that mosquito nets were no longer necessary.

In the fertile, but security-poor, area around Tjiandjur in central Java, the malaria control program has protected 190,000 persons. Ten months after spraying in an experimental area, the infant parasite rate was 0 percent; in a control (nonsprayed) area nearby, the rate was 18 percent (*1*). In their appeal for protection from malaria, local inhabitants guaranteed the safety of spraying crews in insecure areas.

Spraying of Tjilatjap, the only seaport on the south coast of Java, was begun in April 1952 and completed in June 1952, protecting 56,884 persons from malaria (*1*).

Summary

There is evidence that the malaria control program in Indonesia, which had protected nearly 1 million persons by the end of June 1952, is producing beneficial effects on several phases of the country's economy. Particularly important among these are the production of rice and such export products as rubber and palm oil, the establishment of transmigration projects, and the sea and inland fishing industry. In areas where DDT-house-spraying activities have been carried out, once-idle rice fields have been brought back under cultivation and new rice fields opened up; the number of hospital admissions for malaria, as well as the total number, have declined; and absenteeism among estate workers has decreased.

REFERENCE

(*1*) Soeparmo, H. T., and Stoker, W. J.: Malaria control in Indonesia. Madjalah Kedokteran Indonesia (Journal of the Indonesian Medical Association) 2:1–8 (July 1952).