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WHO WESTERN PACIFIC REGIONAL OFFICE -
REPORT OF INDEPENDENT ASSESSMENT TEAM -
ON MALARIA ERAD. IN SOLOMON ISLS. - 1973

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Onchocerciasis - World Health Organization [WHO] - Western Pacific Regional Office -
Report of Independent Assessment Team on Malaria Eradication Programme in the

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Baker Report on Malaria Eradication
in the Solomon Islands - Comment

1. My review of this report does not reveal any of the "several points" ~~that~~ Mr. Baker considers "may be relevant for the OCP long-term Strategy" (letter dated 22 Dec 1983).
2. In fact the whole report is so feeble and incoherent that it would be intolerably tiring to draw attention to all of its weaknesses. However, I select one as an example.
3. Having rejected the opportunity of undertaking a cost-benefit analysis of the ~~eradication~~ eradication program, Mr. Baker asserts that "What we can do, however, is to determine whether the MEP is cost-effective and therefore economic. In other words, what is the least-cost method of achieving the objective of malaria eradication?" (p.3), OK....
4. In order to determine the least-cost means of achieving eradication Mr. Baker lists 5 program options, only one of which appears to be relevant to the objective cited, namely

"Continue present program". Three of them are variants of control programs, each of which would, by definition, fail to achieve the objective cited. The ~~final~~ final option is to close down the eradication program in 1974, ~~or~~ seven years before the programmed end of the eradication program: this option also seems guaranteed to fail to achieve the eradication objective.

5. Thus if we remove 4 of the 5 eradication 'options' - since they are not relevant to the eradication objective - we are left with only one option, namely to "continue present programme". In a way this turns out to be rather fortunate because "since the Government is already committed to an eradication program, the arguments for and against these options are not discussed..." (p.4). But we are ~~still~~ left fully uninformed about the possible choices that the Government might face in order to achieve eradication, e.g. more or less frequent housepraying, active versus passive case detection, etc.

6. Although the menu of options is essentially irrelevant to the issue at hand, Mr. Baker

presents data on the cost of each of these 'options'. These appear to be plucked from thin air, since no account is given as to how they were derived — and therefore no opportunity for the reader to judge their validity.

7. Finally, the effectiveness side of the purported cost-effectiveness analysis is not introduced. How many malaria cases are there? How many malaria deaths? How many would be prevented by the intervention? These questions are neither raised nor answered.

8. Thus we are faced with a cost-effectiveness analysis that is based on irrelevant alternatives, uses seemingly imaginary cost data and uses no effectiveness data at all. In truth there is no analysis at all!

9. Thus one really wonders if it was necessary for Mr. Baker to undertake the arduous itinerary that is described in detail in Annex 1 of the report. But there is no need to wonder whether Mr. Baker — or indeed anybody else from WHO — can give the Bank any useful assistance in designing or undertaking any economic analysis related to the OCP long-term strategy. The answer is clearly: NO.

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Mr Jean-Paul Dailly
Onchocerciasis Coordinator
West Africa Region
World Bank
1818 H. Street N.W.
Washington, D.C. 20433
USA

22 December 1983

Dear Jean-Paul,

Further to our discussions in Paris at the Frontel Windsor on Friday, 16 December, I have written down my comments on the Prost/Prescott paper along the lines we discussed and have passed it on to Douglas Marr, in the form of a memorandum.

As regards the paper on the economic aspects of the WHO Independent Assessment Team on the Malaria Eradication Programme in the British Solomon Islands Protectorate (4-19 June 1973), I eventually located it and enclose a copy as you requested. I think it contains several points that may be relevant for the OCP Long-Term Strategy. Any comments are always welcome.

With best wishes et à bientôt.

Bill

W.G. Baker

with correction pp. 23-24

WORLD HEALTH ORGANIZATION



ORGANISATION MONDIALE DE LA SANTÉ

REGIONAL OFFICE FOR THE WESTERN PACIFIC
BUREAU RÉGIONAL DU PACIFIQUE OCCIDENTAL

WPRO 2002-E (ICP/MPD/02)
BSIP 2001-E (BRS/MPD/01)

18 October 1973
ENGLISH ONLY

REPORT OF THE WHO INDEPENDENT ASSESSMENT TEAM
ON THE MALARIA ERADICATION PROGRAMME IN THE
BRITISH SOLOMON ISLANDS PROTECTORATE (BSIP)

(Economic Aspects)

4-19 June 1973

by

Dr W.G. Baker¹
Economist

Political Scientist

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¹WHO Short-term Consultant.

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1. INTRODUCTION

The following is an independent report of the economist-member of the Independent Assessment Team (IAT). He visited the Solomon Islands from 4-19 June 1973. The other two team members, Public Health Administrator and Malariologist, briefed the economist on their findings in Bangkok on 19 and 20 April 1973. The following terms of reference were agreed upon:

- 1) To analyse and to assess the economic foundation of the Malaria Eradication Programme. This would include a financial analysis of past and future expenditure and a comparison of expenditure on a per capita basis.
- 2) To examine the nature of the relationship between the malaria eradication programme and the health infrastructure of the Protectorate. This should include:
 - a) a comparison of the expenditure on the malaria eradication programme with the health budget;
 - b) the financial implication of the malaria eradication programme on the health infrastructure.
- 3) To examine the nature of the relationship between the malaria eradication programme and the Sixth Socio-Economic Development Plan. This should include a review of sector priorities in the development plan and an examination of the linkage between the malaria eradication programme, the health plan, and the social economic development plan.
- 4) To examine the impact of the malaria eradication programme on selected aspects of social economic development, i.e., agriculture, industry, and education. Although it is doubtful that this impact can be quantified, it seems worthwhile to make the effort since more favourable circumstances seem to exist in the British Solomon Islands Protectorate.
- 5) To assess the economic basis of an eradication programme compared with a control programme.

An itinerary for the economist is found in Annex I.

2. THE ECONOMIC FOUNDATIONS OF THE MALARIA ERADICATION PROGRAMME

This section is addressed to the following questions: What has been the total cost of the anti-malarial programme? How have they been funded? What is the estimated cost of achieving eradication? Is malaria eradication an economic venture?

The chief nature of a project's contribution to the economy is its ability to generate more value than it uses over its estimated life. Thus, an economic analysis of a malaria eradication programme would require a measure of its value to the economy as a whole. This would involve a comparison of the contribution from a malaria programme with that from other programmes, such as oil palm schemes, timber projects, etc., to determine whether more value was coming from the malaria project than from other programmes. Such an analysis was impossible in the time available. Even with sufficient time, such a task would be extremely difficult.

We shall concentrate, instead, on a cost profile. This profile could provide the basis to analyse the efficiency of the malaria programmes, if so desired.

2.1 The total cost of malaria eradication programmes, 1961-1981

The total cost to achieve malaria eradication has been estimated at A\$ 5 947 654.98 (constant prices) over a period of twenty-one years. Average annual expenditure has been estimated at A\$283 221. Graph 1 (Annex II) reveals that expenditure is expected to peak during 1973 and decline rather sharply until the end of the programme in 1981.

2.2 Cost profile 1961-1972 (actual expenditure)

Expenditure on malaria eradication efforts from 1961-1972 total A\$2 801 422.98 (constant prices). Average annual expenditure during this period is A\$233 452. The per capita cost of the anti-malarial programme is about A\$18.07 for the twelve-year period. For 1972 alone, the MEP cost approximately A\$2.80 per capita (see Annex III for details and calculations).

Another important question is who provided the funds (see Graph 2, Annex IV). The sources for funding and the amount are as follows:

Source	Amount (in A\$ at constant prices)
1. Government of the United Kingdom	1 165 644.17
2. Government of the British Islands Protectorate	800 228.31
3. United Nations Development Programme (UNDP)	551 819.49
4. WHO	166 477.37
5. Private sector	115 200.00
6. UNICEF	2 053.64
T O T A L	2 801 422.98

2.3 Cost profile, 1973-1981 (estimated expenditure) (see Annex V)

The estimated expenditure to achieve eradication by the end of 1981 is A\$3 146 232. Average annual expenditure during this period is estimated to be A\$349 581.

The funding of MEP through 31 March 1974 seems secure, but subsequent funding is uncertain. The recent shift in funding from the BSIP Government to the Government of the United Kingdom would suggest an inability on the part of the former to meet the future financial obligations of the programme. Therefore, one would expect continued reliance on external sources for funding.

2.4 Is the MEP an economic venture?

It has already been stated that it is not possible to measure the contribution of the MEP to the economy as a whole, and hence we are unable to compare the contribution of MEP with other programmes, e.g., oil palm or timber projects. What we can do, however, is to determine whether the MEP is cost-effective and therefore economic. In other words, what is the least-cost method to achieve the objective of malaria eradication?

This can be accomplished if one considers all the plausible options and then estimates the cost of each. The first option is to continue the MEP through 1981 as planned. A second option is to institute a malaria control programme for the entire Protectorate. A third option is a control programme that is limited to the productive sectors of the economy, e.g., large copra estates and timber projects. A fourth option is a control programme limited to areas of high population density and high transmission potential. A fifth option is to terminate the MEP when present funds expire at the end of March 1974.

The following are the cost estimates for each option:

Option No.	Content	Estimated cost in A\$
1	Continue present programme	3 146 232 (9 years)
2	Control programme for entire Protectorate	217 870 per annum 2 178 700 for ten years 4 357 400 for twenty years
3	Control programme for productive sectors only	72 800 per annum 728 000 for ten years 1 456 000 for twenty years
4	Control programme for areas of high population and vector density	118 800 per annum 1 188 000 for ten years 2 376 000 for twenty yrs
5	Close down MEP when present funding is exhausted	Negligible

Since the Government is already committed to an eradication programme, the arguments for and against these options are not discussed, except for some disadvantages of a control programme (see Annex VI).

The evidence presented above might tempt one to conclude that certain types of control programmes are more economic than eradication. However, it should be pointed out that the above figures represent only the expenditure for a malaria control programme and do not include any estimate of the cost of malaria¹, or additional programme costs should increase in prevalence occur.

Moreover, the cost of dealing with an epidemic could be many times the cost of Option 1 - continuation of the eradication programme. This point will be pursued in Chapter IV.

Unless malaria eradicates itself, the cost of a control programme will continue year after year for an indefinite period. One can estimate that a break-even point, as far as programme expenditure for Option 2 is concerned, is about 15 years, but even this assumes that the incidence of malaria will not increase - a risky assumption. The break-even point on Option 3 is close on 40 years, but other than economic criteria would suggest a denial of this option.

Add to the above, the nearly A\$3 000 000 already invested in malaria eradication should be protected. With an upsurge of malaria, not only will programme costs, direct costs of malaria (hospital in-patient and outpatient care, self-treatment), and indirect costs due to malaria (time loss from work and imputed cost of premature death) rise dramatically, but the nearly A\$3 000 000 investment could be lost. One has only to recall the example of Ceylon during the 1960's. Thus, taking all factors (economic, political and epidemiological) into account, MEP would appear economic in the long run.

3. THE MEP AND THE HEALTH INFRASTRUCTURE²

The Government health policy is outlined in the Sixth Development Plan, 1971-1973:

For the past decade government has concentrated on the development of preventive medicine with particular emphasis on the eradication of communicable diseases such as leprosy, tuberculosis and malaria. An extensive rural health service based on strategically sited rural health clinics has also been developed.

¹Direct costs: in-patients, outpatients and self-treatment.
Indirect costs: loss due to morbidity in economically active population, imputed cost from premature death.

²The financial implications of the national medical service schemes are discussed in the Public Health Administrator's report.

In the plan period priority must be in income-producing sectors of the economy and this precludes any major expansion of health services. There is, however, no question of reduction of existing services.

This statement of health policy implies that existing services will be maintained for an increasing population.

Expenditure in the health sub-sector of the social sector at the end of 1972 was A\$438 880. Expenditure on malaria was A\$346 000 and represented nearly 79% of development expenditure in the health sub-sector during 1972. Thus, in its peak year, the malaria eradication programme constitutes the major part of all public expenditure on health.

The impact of the MEP on the health and health services has also been dealt with in the report of the malariologist and the public health administrator.

Another area of linkage between the MEP and the health infrastructure is the capital investment in such items as buildings, etc., that have an economic life longer than that of the project, and as such are valuable assets which can eventually be transferred to the general health services or elsewhere.

The staff trained by the MEP are also an asset to the general health services. As eradication is achieved, the MEP staff, with a very little or no additional training, may be employed elsewhere in the health services. Since MEP employment is temporary, permanent employment would appear an attractive prospect.

Yet another area of linkage between MEP and the health infrastructure concerns the external benefits and disbenefits that arise from the MEP. One external benefit of DDT spraying against malaria is that it also interrupts the transmission of filariasis, which is also transmitted by the principal malaria vector.

Filariasis is endemic in Ngella and the Eastern Islands. In 1970, the micro-filaria rates were 19.4% among 1981 persons examined in San Cristobal and the Eastern Islands and 13.4% among the 1504 persons examined in the Eastern outer islands respectively.

There are also a few disbenefits of the MEP, but they are only of marginal importance, namely: that DDT spraying may kill small cats. It has been reported that spraying also kills ants that prey on bedbugs. Neither phenomenon is widespread.

As shown on Graph 1, Annex II, MEP expenditures will progressively decline after the peak in 1973. The decreasing amount of expenditures on MEP for each year after 1973 will allow considerable savings in the overall health budget which may be used for strengthening of health services. In order to maintain the malaria eradication achieved, the basic health services should be developed to a stage that there is total health coverage of the population.

4. THE MEP AND SOCIO-ECONOMIC DEVELOPMENT

A comprehensive view of the economy of the British Solomon Islands Protectorate is found in the following documents:

- 1) International Bank for Reconstruction and Development and International Development Association. The Economy of the British Solomon Islands Protectorate, Report No. EAP-3a, 15 April 1969;
- 2) British Solomon Islands Protectorate. Sixth Development Plan 1971-1973, Honiara, June 1971;
- 3) British Solomon Islands Protectorate, Sixth Development Plan 1971-1974, Second Annual Review, Governing Council Paper No. 22/73, Honiara, March 1973.
- 4) Review of the BSIP economy by the Asian Development Bank, which was unavailable at the time of writing.

It is intended to examine in general terms the relationship between malaria eradication and socio-economic development in the Protectorate. This will be followed by an epidemiological and economic analysis. Finally, implications of MEP for socio-economic development during the Seventh Development Plan (1975-1979) will be considered.

In the Sixth Development Plan, immediate priorities are attached to the early development of timber extratidition and mining, the only sectors capable of rapidly increasing output in the early 1970's. In the long run, by the early 1980's, agriculture is likely to be the predominant activity, following the expansion of traditional crop production and the introduction of new crops. Gross Domestic Product (GDP) per capita is about A\$80.

Since the Sixth Plan was launched, there has been conspicuous and encouraging progress towards objectives in fisheries, oil palm, cattle, new planting of coconuts, roads and malaria eradication. On the other hand, there has been little or no progress in the reduction of the budgetary deficit, copra and timber production, coconut replanting and rehabilitation, marketing, high level manpower output, rationalization of shipping and trade, development of local government and urban housing for lower income groups. The principal setbacks have been high inflation, depression in the copra and timber markets, and destruction of valuable crops by cyclones. Due to a delay in preparation of the plans and the climatic setbacks of 1972, there has been a delay of 6-12 months and it was decided to extend the Plan through 1974.

One obvious effect of the malaria eradication programme has been on the Protectorate's population growth rate. Mortality and morbidity rates have fallen and birth rates have increased. This relationship has been partially quantified in the Malariologist's report and one or two observations may be of interest. First, the population growth rate appears to be rising exponentially. This results in a very young population as illustrated in Graph 3, Annex VII. Between 1931 and 1959

the growth rate was estimated at 1.1%. Between 1959 and 1968, the estimated rate of increase was 2%¹. The Sixth Development Plan (June 1971) estimated a 2.5% annual increase and finally the Second Annual Review of the Plan (March 1973) calculated a 3.1% rate of population increase. That some of this rise was due to anti-malaria programmes seems undeniable, but just how much is not clear. Although no immediate problems are posed by this state of affairs, it is a danger signal which has been recognized in the form of a plan to implement a family planning programme.

The relationship between economic development and malaria in BSIP is obvious, even though it is usually expressed in qualitative terms. In sum, the economic development of the Guadalcanal plains could not have taken place without effective programmes against malaria. During World War II deaths from malaria were far greater than those from the war itself. Professor Robert H. Black produced an excellent survey (May-June 1952) which testifies to the high prevalence of malaria at that time. Since the presence of malaria threatened development of human activity, its elimination became a high priority item.

One indicator of the relationship between the MEP and socio-economic development is the size of the MEP expenditure compared with that of the social sector (including health) and with the total development expenditure. We have already noted that expenditure on malaria was 79% of the health sub-sector under the Sixth Development Plan during 1972. (It comprised 22.5% of expenditure on the social sector and 5.1% of total development expenditure for the same year.) This attests to the importance and relative size of MEP in overall socio-economic development.

Two of the most important contributors to national income in BSIP are the copra and timber industries. In general, malaria eradication will reduce illness, increase the quality and quantity of manpower resources, improve the image projection for tourism, and reduce absenteeism in school. These qualitative arguments aside, let us consider the development strategy for the Sixth and Seventh Plans and how these are likely to interact with the MEP during the period 1973-1981.

The objective of policies outlined for sectors of the economy concerned with primary and secondary production is to raise the rate of domestically-generated growth through the exploitation of agricultural forest and mineral resources. As stated above, the immediate priority is the early development of timber extraction and mining, the only sectors capable of rapidly increasing output in the early 1970's. Specific areas of potential economic development are indicated on the economic map (Map 1).

The economic map was produced from a survey of resources which is expected to be published in 1975. Of particular note are the areas marked for copra, timber and oil palm. Copra production is centred in

¹International Bank for Reconstruction and Development and International Development Association, The Economy of the British Solomon Islands Protectorate, 15 April 1969.

the following areas and will be further developed during the Sixth and Seventh Development Plans: North Guadalcanal, Russell Islands, Vella Lavella, San Cristobal, Malaita. Timber operations will continue and expand in the following areas: Shortland Islands, Kolombangara, New Georgia, Vangunu, Guadalcanal, and Ndende. Oil palm will be developed in Guadalcanal and Kolombangara.

A second map (Map 2) identifies areas by vector density. The density is given only for the main vector, Anopheles farauti. It will be noted that a very high density (biting rate of more than 10 mosquitos/man/hour) is found on the northern coast line of Guadalcanal including the Guadalcanal plains. High density (5-9 bites/man/hour) is found on most of Malaita, Santa Isabel, New Georgia, Vangunu, San Cristobal and Ndende. Low density (less than one bite/man/hour) was found on Kolombangara and Rennell (see Annex VIII). It should be noted that after spraying is withdrawn, the vector population will build up to its original level within a few years.

A third map (Map 3) identifies areas by per cent. of parasite rate. In particular it is noteworthy that the pre-spraying parasite rate is over 50% in the northern part of Guadalcanal and Nggela. A parasite rate of 41%-49% is found on Santa Isabel and San Cristobal. A parasite rate of 31%-39% is found on Malaita, in the coastal areas of New Georgia, and on Ndende. A 21%-29% parasite rate is found on the Russel Islands, the southern part of Guadalcanal. A rate of 11%-19% is found on Vella Lavella, Kolombangara, and Rendova Island. A parasite rate of 1%-9% is found on Rennell.

Finally, let us consider the map (Map 4) that delineates the current problem areas (mid-1973). These are the northern part of Guadalcanal (including the plains), Nggela and a part of Western Gizo. Areas of high vulnerability and high transmission potentials are also indicated.

These maps reveal that the area of greatest economic development, namely, Northern Guadalcanal, is also an area of high vector density and high parasite rate as well as a current problem area. Other areas of economic growth and potential are also implicated but to a lesser degree. One may conclude, therefore, that this combination, especially in the Guadalcanal plains, is a potentially explosive situation which could easily lead to a malaria epidemic if the eradication programme was withdrawn. Again attention is drawn to what happened in Ceylon. Where the threat of an epidemic exists so does a threat to the socio-economic development of the Protectorate. Thus, the argument to follow through on the eradication programme is more powerful than ever. Not only must the initial investment be protected, but one risks serious dislocation to socio-economic development in the event of an epidemic of malaria.

5. ATTEMPT TO QUANTIFY THE ECONOMIC IMPACT OF MEP ON SELECTED ASPECTS OF DEVELOPMENT

During the writer's visit obviously a comprehensive control study such as the one undertaken in Pakistan by the Harvard group, was not possible, but a case-study attempt was made to quantify the impact of malaria

eradication on three areas of socio-economic development: copra production, timber production and absenteeism in schools. Even a rough cut at the problem revealed serious difficulties. Nevertheless it is worthwhile to examine the situation in more detail.

Since copra is a major income earner in the economy, it seemed an appropriate choice for an effort to quantify the impact of malaria eradication. Of the various areas that produce copra, the Russell Islands were chosen because both estate holdings (100 acres or more) and small holdings (less than 100 acres) were accessible and within a reasonable distance from each other. Moreover, 50% of all copra production takes place in the Central District and 30% of the Central District's production takes place in the Russell Islands.

The General Manager of Levers Ltd. (Russell Islands) was able to produce in-patient and outpatient records for the last ten years complete with diagnosis for each patient. Thus, it was possible to isolate the effect of malaria from the effect of other diseases on the production of copra. Production figures for estate holdings and small holdings were also available. The remaining requirement was to correlate the two, but this was impossible because substitute labour was available on the large copra estates. Moreover, the coconuts could lie on the ground for 30 days without any effect on production or costs, except for a slight increase in overhead.

Therefore, an attempt to correlate declining malaria with rising production in the estate holding was useless.

Since labour was paid on a per unit basis of copra cut, it was decided to investigate the small holdings on Loun Island where labour conditions seemed favourable. Production figures for Loun and three other islands were secured from the Agriculture Department and are shown in Annex IX. Although labour substitution was a problem on the small holdings, there were no records to support the amount of sickness due to malaria. Hence, it was not possible to correlate the decline of malaria with increased production of coconuts.

The second effort was to examine the largest timber producing area, which was also earmarked for further development. This was located on Kolombangara Island. Production figures were available, but there was an absence of malaria data. The commercial firms sprayed against malaria from the very first efforts at commercial exploitation. Hence, the number of malaria cases was insignificant for any analysis. The situation seemed ideal because skilled labour was involved in operating the heavy equipment such as cranes, bulldozers, etc.

The third attempt was to measure the effect of malaria on school absenteeism and the area chosen was the Seventh Day Adventist school on Kolombangara. It was to be expected, although slightly disappointing, to find that only qualitative data were available. The headmaster

attested to 50% absenteeism due to malaria 10 years ago, but none at the present time. No school records had been kept as to absenteeism, let alone to the cause of absenteeism, e.g., malaria.

One is obliged to conclude that the correlation between malaria eradication and production was not possible because (1) of a lack of base-line data; (2) of a difficulty to isolate malaria from other diseases, although this was possible from private hospital figures on Russell Island; (3) malaria was only a minor variable in production, e.g., 1972 cyclone that destroyed nearly all the timber operations on Santa Isabel. Also one must conclude that it was too late in the programme for any economist to quantify the economic benefits from MEP.

6. CONCLUSIONS

By June 1973, an economist could only make a limited contribution. A maximum contribution could have been made in the early days of the programme before the spraying campaign. Nevertheless, several useful points emerge. The first is the nature of the cost profile by source of funding and the estimated costs to complete eradication. Second, MEP is an economic venture, that is, cost-effective. A third useful point is that the initial investment should be protected in view of the threat posed by the epidemiological situation and a threat to socio-economic development.

It was pointed out that the malaria eradication budget will progressively decrease from 1973 and the amount so saved should be utilized for strengthening of the basic health services.

Finally, we must conclude that it is not possible to quantify the impact of MEP on socio-economic development because a number of necessary preconditions cannot be met.

7. ACKNOWLEDGMENTS

The economist member of the independent assessment team would like to express his deep appreciation for all the assistance rendered in preparing this report. Particular thanks are due to the Director of Health Services, the Acting Government Malariologist, and the Chief Executive Officer, Department of the Treasury.

Itinerary for Economist
Member of Independent Assessment Team

Briefing Schedule

Name Baker, Dr William G.

Post Consultant

Project WPRO 2002 (BSIP) Malaria Eradication
Assessment Team

Operational Officer Dr W.J.O.M. van Dijk
Senior Regional Malaria Adviser

- 30 May 1973 - Arrived Manila
- 31 May (Thursday) - Meeting with Dr Van Dijk
- 1 June (Friday) - Meeting with Dr G. Emery, Regional
Adviser, Strengthening of Health Services
- Meeting with Dr A.C. Reyes, Assistant
Director of Health Services
- 4 June (Monday) - Met at Henderson Airport by Dr D. Mackay
(Acting Government Malariologist) and
Dr Y. Paik (WHO Senior Malaria Adviser)
- Also met:
Dr J.D. MacGregor (Director of Medical
Services);
Dr R. Bailey (Deputy Director of Medical
Services);
Dr B. Eyres (Medical Officer, Community
Health);
Mr Schick (WHO Sanitarian);
Dr D. Gibson (WHO Laboratory Specialist);
Dr D.A. Turner (Chief Field Operations
Officer);
Miss K. Revie (Public Health Sister)
- 5 June (Tuesday) - Met:
Mr T. Russell (Chief Secretary
Mr J. Yaxley (Acting Financial Secretary
Mr P.M.A. Spread (Government Economist)
Mr J. Callan (Acting Government Statistician)
Mr George Eder, Peace Corps Volunteer (PCV)

Annex I (cont'd.)

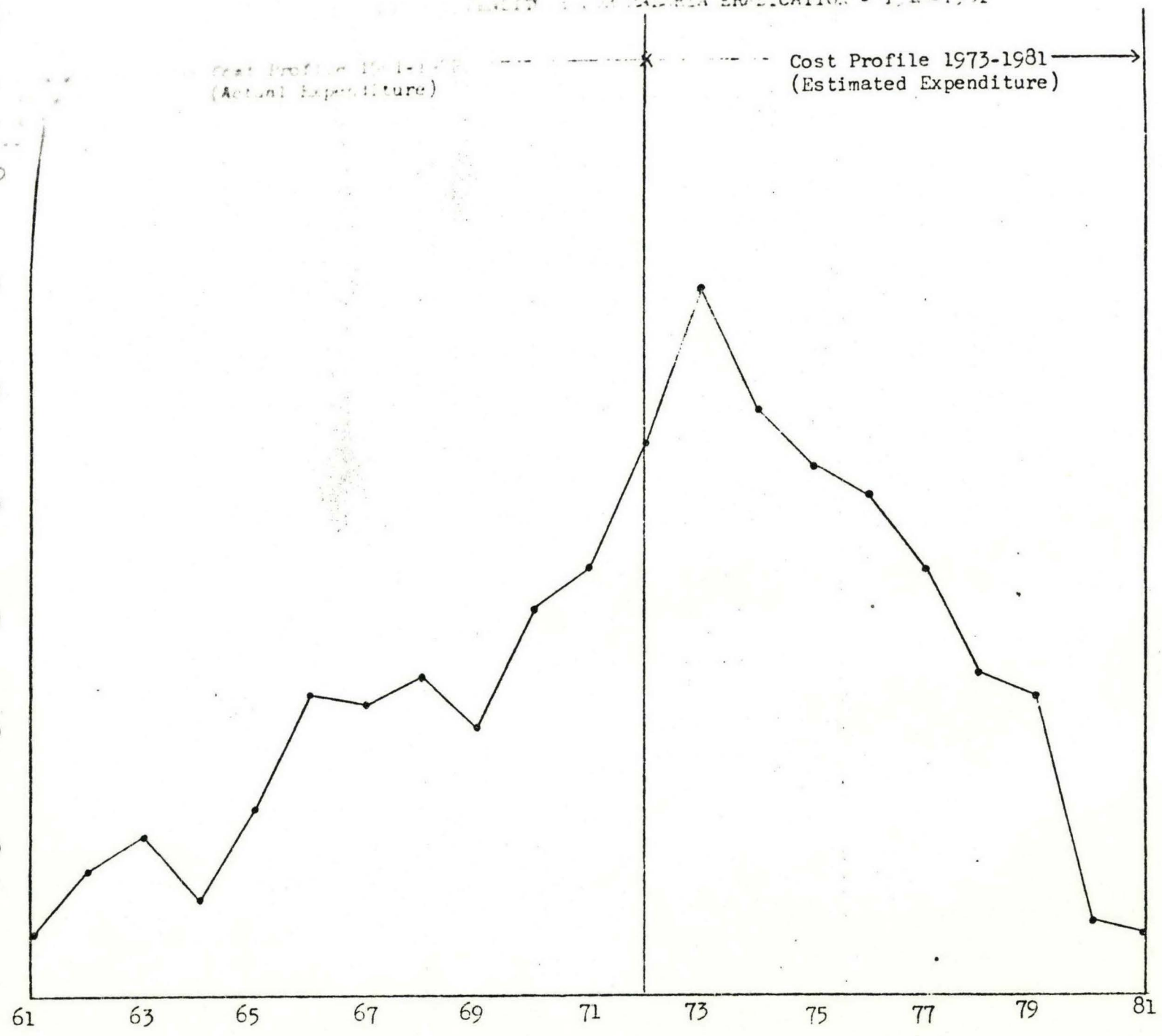
- 6 June (Wednesday) - Met: Dr D. Taysum (Principal Research Officer
Department of Agriculture);
Mr B. Leach (Soil and Plant Nutrition Officer,
Department of Agriculture);
Mr H.M.F.M. Heinemans (Senior Produce Officer,
Department of Agriculture)
- 8 June (Friday) - Departed Honiara - arrived Gizo.
Met: Mr E. Brooks (District Commissioner)
Mr E.C. Brandt (Forest Management Officer)
Mr A. Osugi (Peace Corps Volunteer)
- Departed Gizo - arrived Ringgi Cove (by canoe)
Met: Mr Stibbard (General Manager Levers
Timber Co.)
- Kukudu Seven Day Adventist Mission Station
Met: Mr B. Vavoso (Medical Assistant)
Mr J. Tutuna (Headmaster, Kukudu Adventist
School) - Returned to Gizo
- 10 June (Sunday) - Toured Gizo Hospital
Met: Dr T. McConnell (Medical Officer)
- 11 June (Monday) - Departed Gizo - returned Honiara
- 12 June (Tuesday) - Departed Honiara - arrived Yandina
Met: Mr R. Reece (Acting Managing Director,
Levers' Pacific Plantations Pty., Ltd.)
Mr J. Brocm (Commercial Manager)
Mr S. Timi (Medical Assistant)
- Departed Russell Island - arrived Loun
(by canoe)
Met: Mr E. Baddeley (Executive Officer of
Russell Islands Council)
- Departed Loun - arrived Russell Island (By canoe)
Visited Yandina Hospital (private hospital,
Levers', Ltd)
- Complete tour of all facilities ---
- Departed Russell Islands - arrived Honiara.
- 1st June (Thursday) - Tour of Zone 4, North Guadalcanal with Dr Paik,

Villages -

1. Red Beach
2. Old Koli (demolished)
3. New Koli
4. Commonwealth Development Corporation
(oil palm area)
5. Chuva village
6. G.P.L. (rice field)
7. Binu Rural Health Clinic
8. Kemaboko (road end)

- 15 June (Friday) - Meeting: Mr Graham Johnson, Chief Executive Officer,
Treasury Department, BSIP
- 19 June (Tuesday) - Briefing of Dr Peter Beck, Medical Superintendent
of Central Hospital (Acting Deputy Director of
Medical Services)
- Final briefing of Dr Bailey, Acting Director of
Medical Services
- Final briefing of Dr Mackay, Acting Government
Malariologist
- 19 June (Tuesday) - Departed Honiara - arrived Manila
- 20 June (Wednesday) - Debriefing and report writing
- 22 June (Friday)
- 23 June (Friday) - Departed Manila - arrived Bangkok

PROJECT FOR MALARIA ERADICATION - 1973-1981



Population

1931 - 94 000 (complete census)
1959 - 124 000 (sample census)
1968 - 148 000 (estimated at 2% growth rate)
1970 - 160 500 (complete census) - mid-year
1972 - 173 500 (mid-year) at 2.5% growth rate

Source: World Bank Report No. EAP-3a dated 15 April 1969 and
BSIP, Second Annual Review of Sixth Development Plan.

Based on the above, it was estimated that the average population during the period 1961 - 1972 was about 155 000. (This is slightly higher than the arithmetic average since the population growth rate seems to be increasing exponentially that is, from 2%, estimated in 1959, to 2.5% in 1970, to an estimated 3.1% in 1972.)

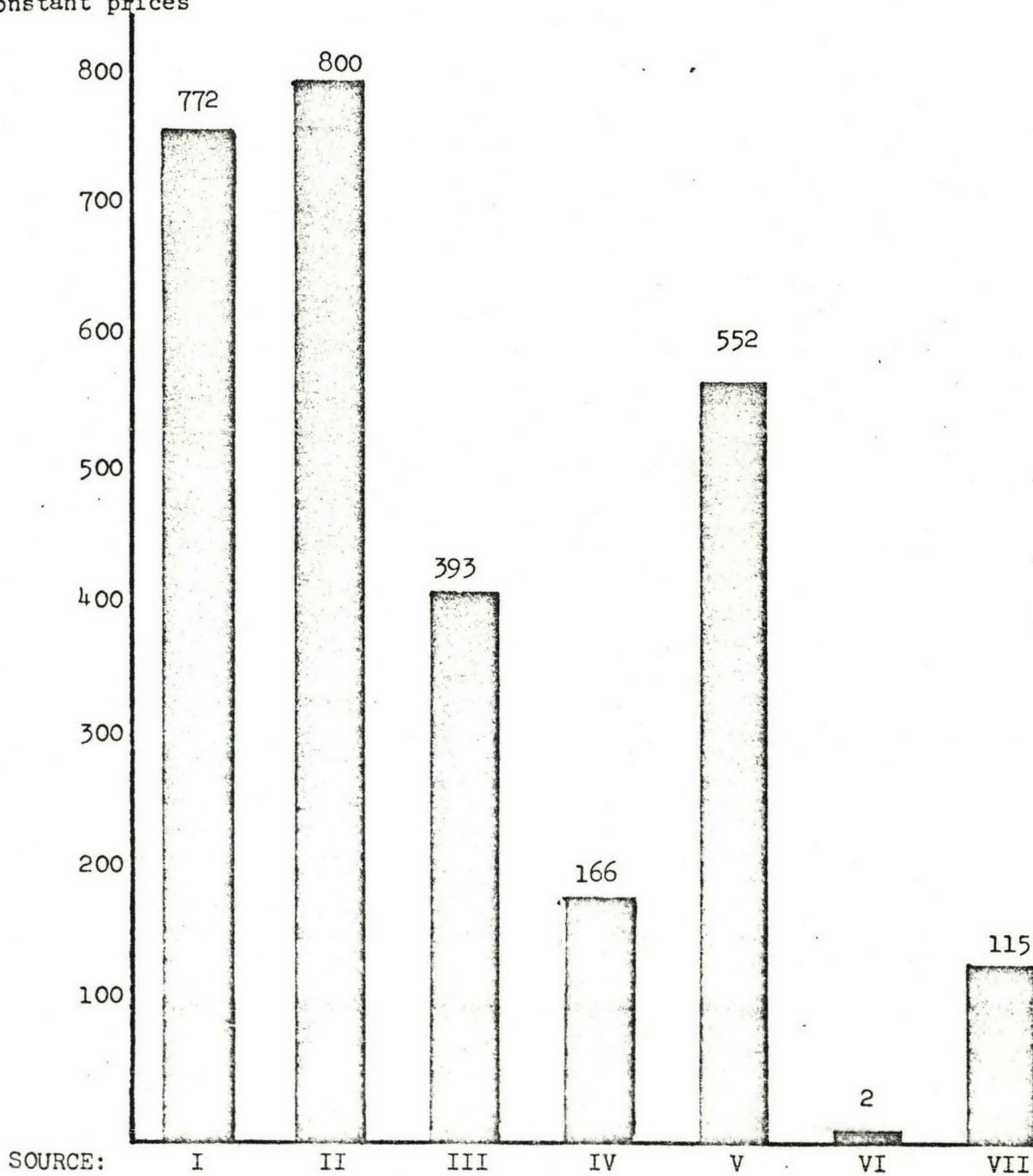
If we then divide total actual expenditure 1971-1972 by the average estimated population (2 801 422.98 divided by 155 000) we arrive at an estimated per capita cost of the programme from 1961-1972 has been A\$18.07 (at constant prices).

To determine the per capita expenditure of MEP during 1972, we simply divided total expenditure for 1972 by the mid-year population figures. (487 196.30 divided by 173 510). Thus MEP has cost about A\$2.80 per capita during 1972.

Graph No. 2

EXPENDITURE BY SOURCE
(1961 - 1972)

Expenditure
in A\$(000) at
constant prices



(71)
rt. (71)
ment)
(72)
(72)
(72)
Sector (72)

COST PROFILE - ESTIMATED EXPENDITURE - 1973-1981^{1/}

I. Estimated Capital Expenditure from 1973^{2/}
(in Australian dollars - constant prices)^{3/}

I T E M	Y E A R									
	1973	1974	1975	1976	1977	1978	1979	1980	1981	
Malaria Building	2 800	3 900	3 000	3 000	3 000	3 000	1 500	1 500	750	
Malaria Equipment	9 900	14 400	12 000	12 000	12 000	12 000	6 500	6 500	3 250	
Total	12 700	18 300	15 000	15 000	15 000	15 000	8 000	8 000	4 000	

1/ Includes a six-month reserve supply of DDT as recommended in malariologist's report, but does not include the stopping of spraying in Western District at the end of 1974.

2/ The latest estimate available for 1973 (March) was A\$12 700 and A\$18 300 for 1974. Estimates from 1975-1981 are only a rough guess and will require subsequent revision as do all estimates. The idea is to gain some concept of what the Malaria Eradication Programme is likely to cost in the period 1973-1981.

3/ From 1972, prices for all years are constant. Only the inflation, which was 7% during fiscal 1972, is not included. Since inflation rates are subject to change, it was decided to omit this factor so that the cost profile (1961-1972) would be in terms comparable with the estimated cost profile for 1973-1981.

Recurrent Expenditure for 1973^{1/}
(Estimates)

	(1) Revised Cost ^{2/} 1.1.72 to 31.12.73 (Current Prices)	(2) Actual Expenditure 1972 (Constant Prices) ^{4/}	(3) Estimated Expendi- ture 1973 (Constant Prices)
A. Personal Emolument	263 473	89 161	174 312
1. Independent Assessment Team	-	-	6 000 ^{3/}
B. Other Charges			
1. Wages	119 993	49 993	70 000
2. Gratuities	6 646	1 903	4 743
3. T&T incl. subsistence	90 396	41 356	49 040
4. Shipping hire	250 208	88 208	162 000
5. Vehicle hire	38 898	18 898	20 000
6. Insecticides	189 568	69 568	120 000
7. Anti-malarials	13 245	5 245	8 000
8. OBM and canoe maintenance	6 061	2 761	3 300
9. Office expenses	5 417	2 417	3 000
10. Printing	4 477	2 177	2 300
11. Library & stationery	3 072	1 272	1 800
12. Training materials	1 116	416	700
13. Laboratory stores	3 520	1 520	2 000
14. Clothing and equipment	13 913	5 913	8 000
15. Utilities and telephone	5 425	2 925	2 500
16. Rent	279	8	271
17. Office furniture	200	84	116
18. Housing allowance	131	131	0
Total other charges	752 565	294 795	457 770
GRAND TOTAL	1 016 038	383 956	638 082

^{1/} From 1972 prices for all years are constant. Only the inflation, which was 7% during fiscal 1972, is not included. Since inflation rates are subject to change, it was decided to omit this factor so that the cost profile (1961-1972) would be in terms comparable with the estimated cost profile for 1973-1981.

^{2/} Source: Government Malariologist, BSIP.

^{3/} Source: Senior Regional Malaria Adviser, WPRO.

II. ESTIMATED RECURRENT EXPENDITURES FROM 1973

(in A\$ at Constant Prices)

I T E M	1973	1974	1975	1976	1977	1978	1979	1980	1981
Personal Emolument	A\$180,312	A\$137,000	A\$137,000	A\$137,000	A\$137,000	A\$109,600	A\$102,750 ²⁵	A\$ 30,000 ²⁰	A\$ 30,000
Other charges -									
) Wages	70,000	62,000	49,600 ^{1/}	46,500 ^{5/}	31,000 ^{9/}	18,600 ^{25/ 16}	18,600	6,000	6,000
) Gratuities	4,743	4,000	4,000	4,000	4,000	3,000	3,000	400	400
) T & T incl. subsistence	49,040	46,000	46,000	46,000	46,000	36,800 ^{13/ 17}	34,500 ^{23/ 23/}	4,600	4,600
) Shipping hire	162,000	133,000	116,400 ^{2/}	99,750 ^{6/}	66,500 ^{10/}	48,000 ^{23/ 18/}	48,000	10,000	10,000
) Vehicle hire	20,000	18,000	18,000	18,000	14,400 ^{12/ 13}	9,000 ^{19/}	9,000	1,800	1,800
) Insecticides	120,000	69,000	55,200 ^{3/}	51,750 ^{7/}	34,500 ^{13/ 11}	20,700 ^{16/ 20}	20,700	3,500	3,500
) Anti-malarials	8,000	9,500	9,500	9,500	9,500	7,000	5,000	500	0
) OBM and canoe maintenance	3,300	2,600	2,600	2,600	2,600	2,080 ^{21/ 21/}	2,080	200	200
) Office expenses	3,000	2,000	2,000	2,000	2,000	2,000	2,000	300	300
) Printing	2,300	1,900	1,900	1,900	1,900	1,900	500	200	200
) Library and stationery	1,800	2,000	2,000	2,000	2,000	2,000	2,000	200	200
) Training materials	700	850	850	850	680 ^{13/ 14}	680	680	100	100
) Laboratory stores	2,000	1,800	1,800	1,800	1,800	1,800	1,800	900	900
) Clothing and equipment	8,000	9,000	7,200 ^{4/}	6,750 ^{8/}	4,500 ^{12/ 12}	4,000	3,500	900	900
) Utilities and telephone	2,500	2,000	2,000	2,000	2,000	2,000	2,000	1,000	1,000
) Rent	271	150	150	150	150	150	150	0	0
) Office furniture	116	100	100	100	100	100	100	100	100
Total other charges	457,770	363,900	319,300	295,650	223,630	159,810	153,610	30,700	30,200
GRAND TOTAL	A\$638,082	A\$500,900	A\$456,300	A\$432,650	A\$360,630	A\$269,410	A\$256,360	A\$60,700	A\$60,200

23

Source: W.H.O. Malaria Adviser to B.S.I.P.
He also provided the calculations
in the footnotes.

NOTE: For footnotes please see next page.

$$\begin{array}{r} \checkmark 1/ \text{ Wages} \\ \$62,000 - \\ (62,000 \times \\ 0.2) = \\ 49,600 \end{array}$$

$$\begin{array}{r} \checkmark 2/ \text{ Shipping} \\ \text{Hire} \\ \$133,000 - \\ (133,000 \times \\ 0.2) = \\ 116,400 \end{array}$$

$$\begin{array}{r} \checkmark 3/ \text{ Insecti} \\ \text{cides} \\ \$69,000 - \\ (69,000 \times \\ 0.2) = \\ 55,200 \end{array}$$

$$\begin{array}{r} \checkmark 4/ \text{ Clothing} \\ \$9,000 - \\ (9,000 \times \\ 0.2) = \\ 7,200 \end{array}$$

$$\begin{array}{r} \checkmark 5/ \text{ Wages} \\ \$62,000 - \\ (62,000 \times \\ 0.25) = \\ 46,500 \end{array}$$

$$\begin{array}{r} \checkmark 6/ \text{ Shipping} \\ \text{Hire} \\ \$133,000 - \\ (133,000 \times \\ 0.25) = \\ 99,750 \end{array}$$

$$\begin{array}{r} \checkmark 7/ \text{ Insecti-} \\ \text{cides} \\ \$69,000 - \\ (69,000 \times \\ 0.25) = \\ 51,750 \end{array}$$

$$\begin{array}{r} \checkmark 8/ \text{ Clothing} \\ \$9,000 - \\ (9,000 \times \\ 0.25) = \\ 6,750 \end{array}$$

$$\begin{array}{r} \checkmark 9/ \text{ Wages} \\ \$62,000 \\ \times \frac{50}{100} \\ = 31,000 \end{array}$$

$$\begin{array}{r} \checkmark 10/ \text{ Shipping} \\ \text{Hire} \\ \$133,000 \\ \frac{50}{100} \\ = 66,500 \end{array}$$

$$\begin{array}{r} \checkmark 11/ \text{ Insecti} \\ \text{cides} \\ \$69,000 \\ \times \frac{50}{100} \\ = 34,500 \end{array}$$

$$\begin{array}{r} \checkmark 12/ \text{ Clothing} \\ \$9,000 \\ \times \frac{50}{100} \\ = 4,500 \end{array}$$

$$\begin{array}{r} \checkmark 13/ \text{ Vehicle} \\ \text{Hire} \\ \$18,000 - \\ (18,000 \times \\ 0.2) = \\ 14,400 \end{array}$$

$$\begin{array}{r} \checkmark 14/ \text{ Training} \\ \text{Materials} \\ \$850.00 \\ (850.00 \times 0.2) \\ = 680.00 \end{array}$$

$$\begin{array}{r} \checkmark 15/ \text{ PE} \\ \$137,000 - \\ (137,000 \times \\ 0.2) = \\ 109,600 \end{array}$$

$$\begin{array}{r} \checkmark 16/ \text{ Wages} \\ \$62,000 \\ \times \frac{30}{100} \\ = 18,600 \end{array}$$

$$\begin{array}{r} \checkmark 17/ \text{ T \& T} \\ \$46,000 - \\ (46,000 \times \\ 0.2) = \\ 36,800 \end{array}$$

$$\begin{array}{r} \checkmark 18/ \text{ Shipping} \\ \text{Hire} \\ 5 \text{ 'T' class} \\ \text{ships for} \\ \text{surveillance} \\ \$40 \times 20 \text{ days} \\ \times 12 \text{ months} \times \\ 5 = 48,000 \end{array}$$

$$\begin{array}{r} \checkmark 19/ \text{ Vehicle hire} \\ \$18,000 \\ \times \frac{50}{100} \\ = 9,000 \end{array}$$

$$\begin{array}{r} \checkmark 20/ \text{ Insectic-} \\ \text{ides} \\ \text{idea} \\ \$69,000 \\ \times \frac{30}{100} \\ = 20,700 \end{array}$$

$$\begin{array}{r} \checkmark 21/ \text{ OIF} \\ \$2,600 - \\ (2,600 \times \\ 0.2) = \\ 2,080 \end{array}$$

$$\begin{array}{r} \checkmark 22/ \text{ PE} \\ \$137,000 - \\ (137,000 \times \\ 0.25) = \\ 102,750 \end{array}$$

$$\begin{array}{r} \checkmark 23/ \text{ T \& T} \\ \$46,000 \\ (46,000 \times \\ 0.25) \\ = 34,500 \end{array}$$

III. TOTAL (Capital and Recurrent)
in A\$ at Constant Prices

Account	Y E A R								
	73	74	75	76	77	78	79	80	81
Capital	12,700	18,300	15,000	15,000	15,000	15,000	8,000	8,000	4,000
Recurrent	638,082	500,900	456,300	432,650	360,630	269,410	256,360	60,700	60,200
Total	650,782	519,200	471,300	447,650	375,630	284,410	264,360	68,700	64,200

Grand Total 1973-1981 = A\$ 3,146,232.00

ANNEX VI

Technical Disadvantages of a Control Programme

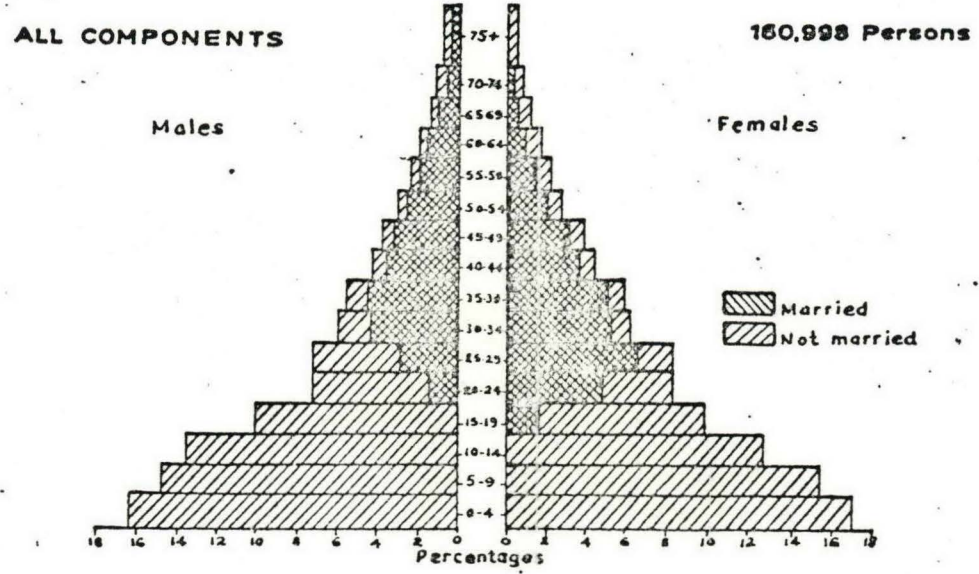
1. Possible DDT resistance developing with the need for altering to a more expensive, perhaps prohibitive, alternative method of control.
2. Resistance of parasites to chloroquine (already present in the Western Pacific Region).
3. Nuisance value of bedbugs, and increasing refusals invalidating the programme.
4. Massive increase in malaria in uncontrolled areas affecting all ages due to loss of tolerance, particularly with Options 3 and 4.

Political and Economic Disadvantages of a Control Programme

1. Annual recurrent costs with probable annual inflation at about 6%.
2. Probable political opposition.
3. Increased hospitalization of malaria cases (in 1961 this accounted for 7.4% of total admissions).
4. Tourist industry would probably regress.

Graph No. 3

POPULATION STRUCTURES 1970
British Solomon Islands Protectorate



DEFICIENCY OF ANOPHELINES IN UNSPRAYED AREA

Guadalcanal

	Bush (before July 1963)	Koli (coast) (before May 1963)	Ilu Farm (plain) (before May 1963)	Weather coast (before March 1963)	Savo (before Feb. 1963)
OM	0.6f 2.0p	50f Ok Op	26f 4k 41p	Of Ok	33f
IM	Of 1.3p	47f 3k Op	22f Ok 66p	Of 1k	57f
IS	Of 5p	81f Ok 1p	30f Ok 95p	Of 3k	162f
IS	Very low	Very high	Very high	Very low	Very high

Nggela (before '69)	Russell (before '69)	Rennell (before '69)	Choiseul 1968	St. Isabel (before '69)	Kolombangara & Rendova (1963)	Gizo (1963)	Malenta (before '69)	Santa Cruz (before '69)	San Cristobal (before '69)
4.7f	4.2f	0.3f	3.1f	1.3f	0.2f	2.0f	1.5f	1.3f	1.6f
7.3f	5.6f	0.2f	2.9f	1.3f	0.1f	Of	0.5f	1.5f	1.1f
3.0f	1.5f	0.3f	2.3f	1.0f	0.0f	Of	0.3f	0.7f	0.7f
8.9f	1.8f	Of	10.3f	7.8f	0	0	6.8f	2.9f	6.3f
High	High	Very low	Moderate	Moderate	Very low	Moderate	Moderate	Moderate	Moderate

Key:

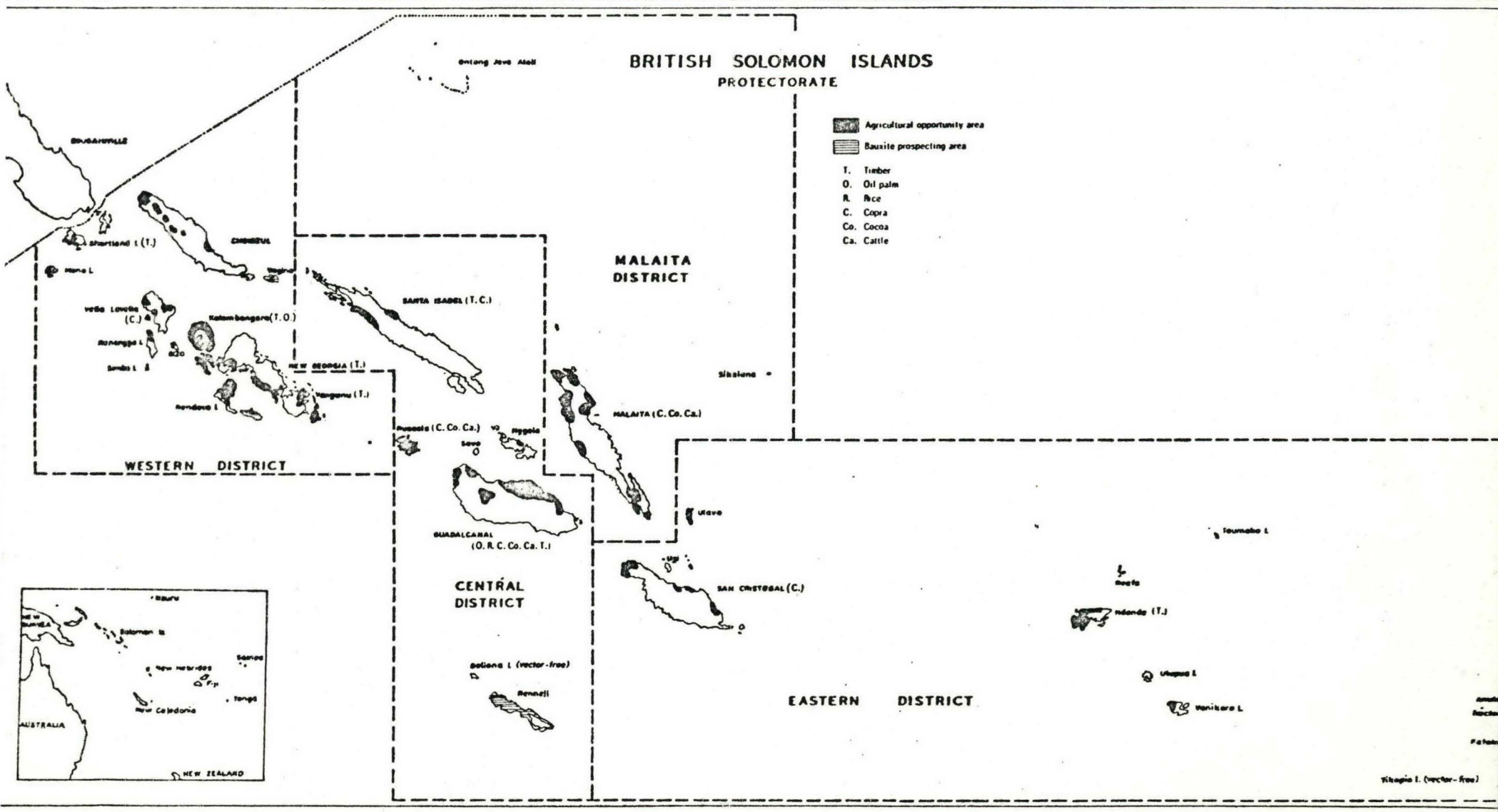
- OM = Outdoor man-biting
- IM = Indoor man-biting
- IS = Indoor resting
- f = faranti
- p = punctulatus
- k = koliensis

SOLOMON ISLANDERS PRODUCTION - RUSSELL ISLANDS - in TONS*

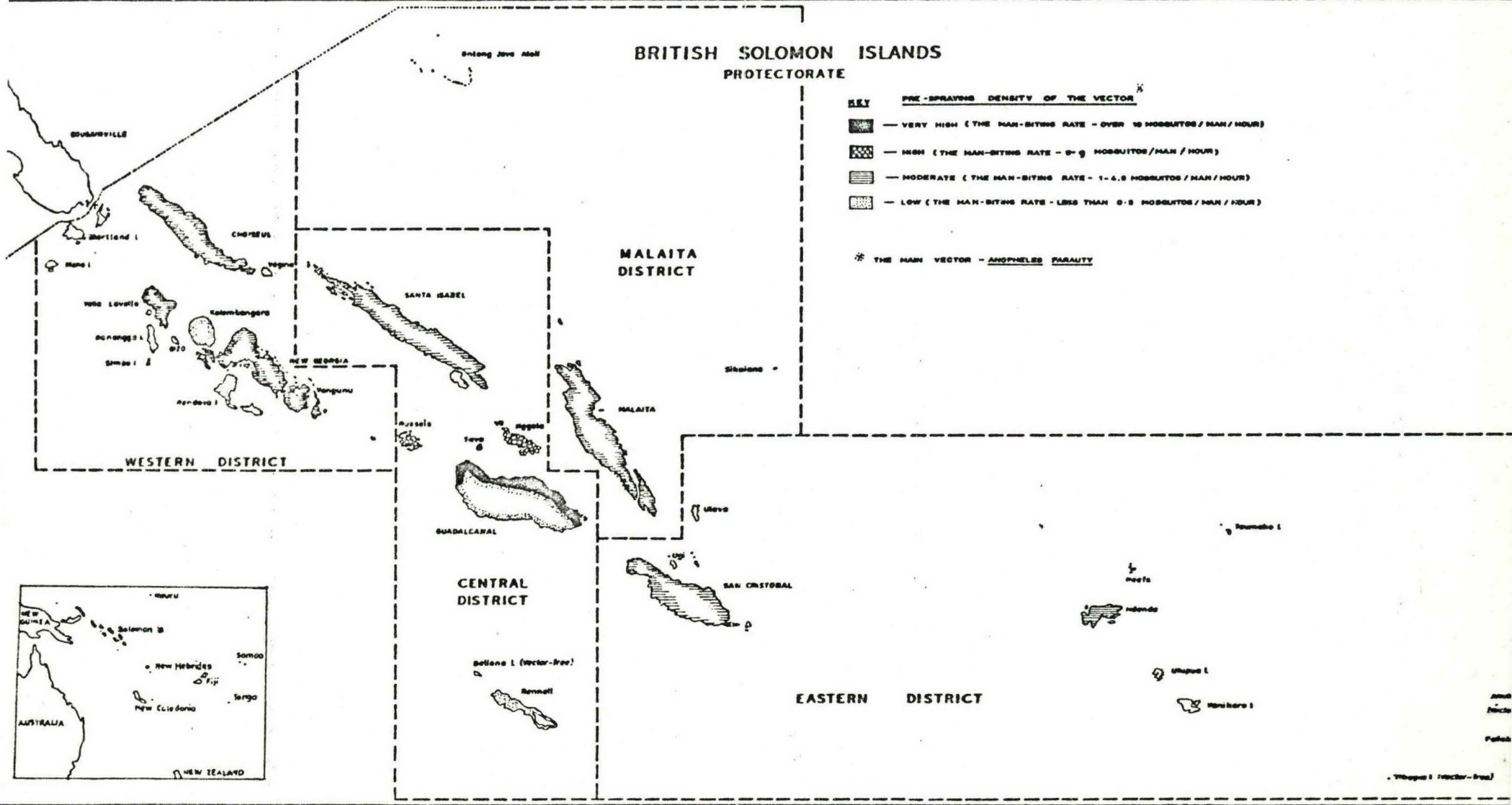
<u>Year</u>	<u>1st Qtr</u>	<u>2nd Qtr</u>	<u>3rd Qtr</u>	<u>4th Qtr</u>	<u>TOTAL</u>
1962	55	57	56	97	265
1963	111	35	50	74	270
1964	96	59	67	83	305
1965	52	44	67	66	229
1966	84	58	73	52	267
1967	79	66	66	66	277
1968	58	78	64	89	289
1969	64	83	75	71	293
1970	85	78	50	75	288
1971	58	67	81	84	290
1972	99	69	62	59	289
1973	49				

*Includes: 1 Loun
2 Karama Loun
3 Sagelua
4 Maraloun

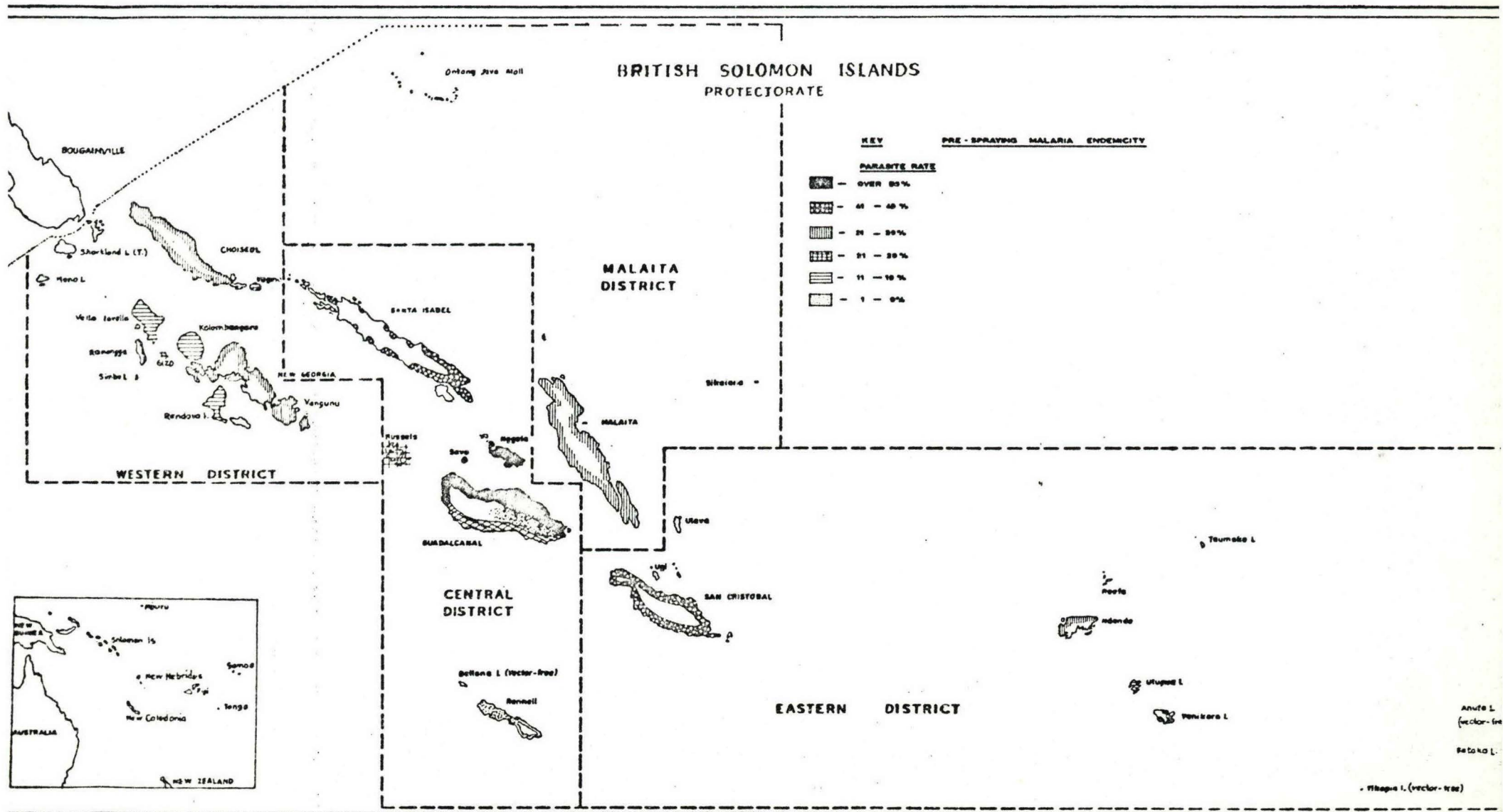
Map 1 - Economic Map



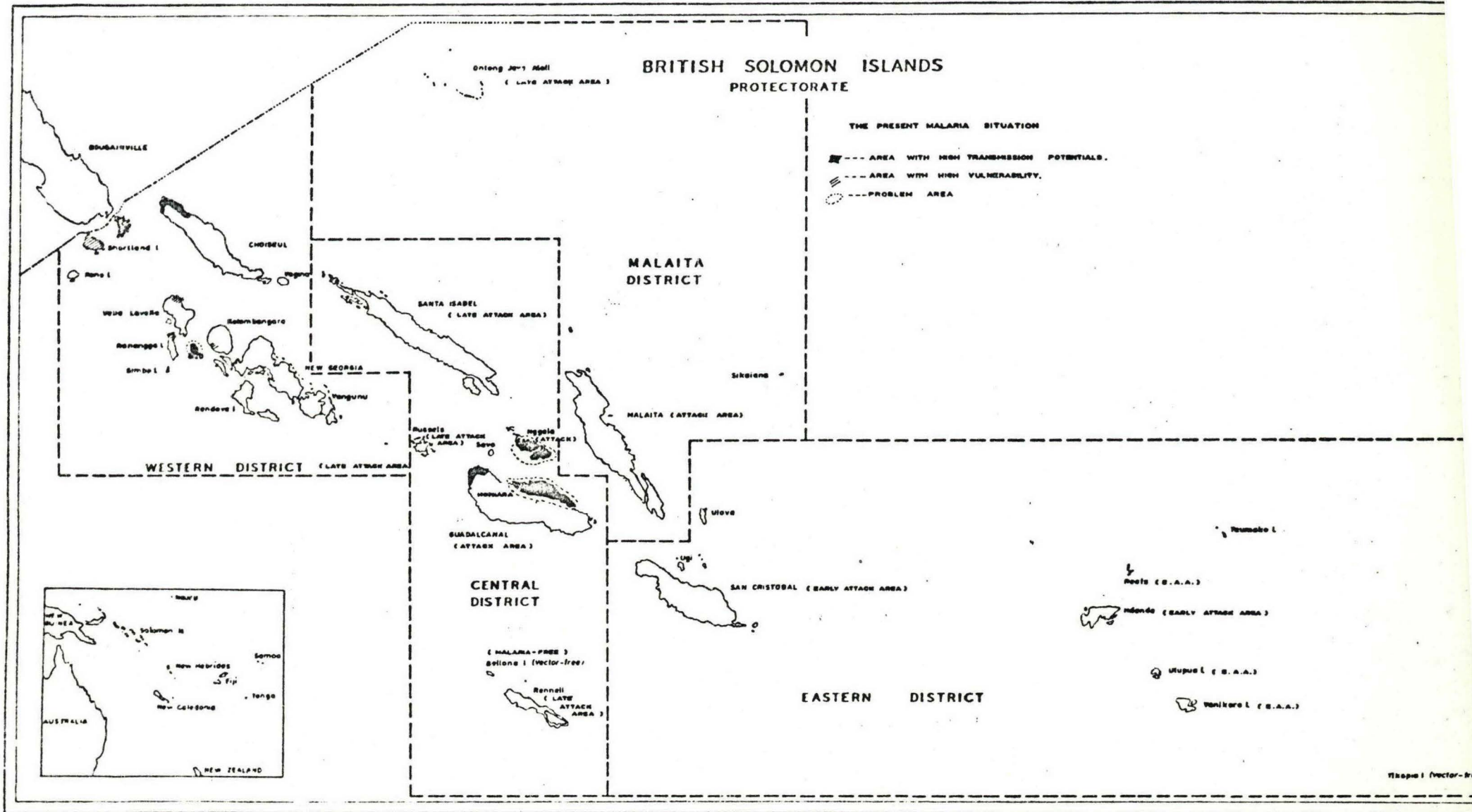
Map 2 showing - Density of A. Faranti, BSIP



Map 3 - Pre-spraying Parasite Rates, BSIP



Map 4 - Areas with High Transmission Potentials. B SIP 1973



*Copy sent to Prost
1/11/84 DA*

DECLASSIFIED

PERSONAL

APR 22 2021

WBG ARCHIVES

Mr Jean-Paul Dailly
Onchocerciasis Coordinator
West Africa Region
World Bank
1818 H. Street N.W.
Washington, D.C. 20433
USA

22 December 1983

Dear Jean-Paul,

Further to our discussions in Paris at the Frontel Windsor on Friday, 16 December, I have written down my comments on the Prost/ Prescott paper along the lines we discussed and have passed it on to Douglas Marr, in the form of a memorandum.

As regards the paper on the economic aspects of the WHO Independent Assessment Team on the Malaria Eradication Programme in the British Solomon Islands Protectorate (4-19 June 1973), I eventually located it and enclose a copy as you requested. I think it contains several points that may be relevant for the OCP Long-Term Strategy. Any comments are always welcome.

With best wishes et à bientôt.

Bill

W.G. Baker

With correction pp. 23-24



REGIONAL OFFICE FOR THE WESTERN PACIFIC
BUREAU RÉGIONAL DU PACIFIQUE OCCIDENTAL

WPRO 2002-E (ICP/MPD/02)
BSIP 2001-E (BRS/MPD/01)

18 October 1973

ENGLISH ONLY

REPORT OF THE WHO INDEPENDENT ASSESSMENT TEAM
ON THE MALARIA ERADICATION PROGRAMME IN THE
BRITISH SOLOMON ISLANDS PROTECTORATE (BSIP)

(Economic Aspects)

4-19 June 1973

by

Dr W.G. Baker¹
Economist

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¹WHO Short-term Consultant.

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1. INTRODUCTION

The following is an independent report of the economist-member of the Independent Assessment Team (IAT). He visited the Solomon Islands from 4-19 June 1973. The other two team members, Public Health Administrator and Malariologist, briefed the economist on their findings in Bangkok on 19 and 20 April 1973. The following terms of reference were agreed upon:

- 1) To analyse and to assess the economic foundation of the Malaria Eradication Programme. This would include a financial analysis of past and future expenditure and a comparison of expenditure on a per capita basis.
- 2) To examine the nature of the relationship between the malaria eradication programme and the health infrastructure of the Protectorate. This should include:
 - a) a comparison of the expenditure on the malaria eradication programme with the health budget;
 - b) the financial implication of the malaria eradication programme on the health infrastructure.
- 3) To examine the nature of the relationship between the malaria eradication programme and the Sixth Socio-Economic Development Plan. This should include a review of sector priorities in the development plan and an examination of the linkage between the malaria eradication programme, the health plan, and the social economic development plan.
- 4) To examine the impact of the malaria eradication programme on selected aspects of social economic development, i.e., agriculture, industry, and education. Although it is doubtful that this impact can be quantified, it seems worthwhile to make the effort since more favourable circumstances seem to exist in the British Solomon Islands Protectorate.
- 5) To assess the economic basis of an eradication programme compared with a control programme.

An itinerary for the economist is found in Annex I.

2. THE ECONOMIC FOUNDATIONS OF THE MALARIA ERADICATION PROGRAMME

This section is addressed to the following questions: What has been the total cost of the anti-malarial programme? How have they been funded? What is the estimated cost of achieving eradication? Is malaria eradication an economic venture?

The chief nature of a project's contribution to the economy is its ability to generate more value than it uses over its estimated life. Thus, an economic analysis of a malaria eradication programme would require a measure of its value to the economy as a whole. This would involve a comparison of the contribution from a malaria programme with that from other programmes, such as oil palm schemes, timber projects, etc., to determine whether more value was coming from the malaria project than from other programmes. Such an analysis was impossible in the time available. Even with sufficient time, such a task would be extremely difficult.

We shall concentrate, instead, on a cost profile. This profile could provide the basis to analyse the efficiency of the malaria programmes, if so desired.

2.1 The total cost of malaria eradication programmes, 1961-1981

The total cost to achieve malaria eradication has been estimated at A\$ 5 947 654.98 (constant prices) over a period of twenty-one years. Average annual expenditure has been estimated at A\$283 221. Graph 1 (Annex II) reveals that expenditure is expected to peak during 1973 and decline rather sharply until the end of the programme in 1981.

2.2 Cost profile 1961-1972 (actual expenditure)

Expenditure on malaria eradication efforts from 1961-1972 total A\$2 801 422.98 (constant prices). Average annual expenditure during this period is A\$233 452. The per capita cost of the anti-malarial programme is about A\$18.07 for the twelve-year period. For 1972 alone, the MEP cost approximately A\$2.80 per capita (see Annex III for details and calculations).

Another important question is who provided the funds (see Graph 2, Annex IV). The sources for funding and the amount are as follows:

Source	Amount (in A\$ at constant prices)
1. Government of the United Kingdom	1 165 644.17
2. Government of the British Islands Protectorate	800 228.31
3. United Nations Development Programme (UNDP)	551 819.49
4. WHO	166 477.37
5. Private sector	115 200.00
6. UNICEF	2 053.64
T O T A L	2 801 422.98

2.3 Cost profile, 1973-1981 (estimated expenditure) (see Annex V)

The estimated expenditure to achieve eradication by the end of 1981 is A\$3 146 232. Average annual expenditure during this period is estimated to be A\$349 581.

The funding of MEP through 31 March 1974 seems secure, but subsequent funding is uncertain. The recent shift in funding from the BSIP Government to the Government of the United Kingdom would suggest an inability on the part of the former to meet the future financial obligations of the programme. Therefore, one would expect continued reliance on external sources for funding.

2.4 Is the MEP an economic venture?

It has already been stated that it is not possible to measure the contribution of the MEP to the economy as a whole, and hence we are unable to compare the contribution of MEP with other programmes, e.g., oil palm or timber projects. What we can do, however, is to determine whether the MEP is cost-effective and therefore economic. In other words, what is the least-cost method to achieve the objective of malaria eradication?

This can be accomplished if one considers all the plausible options and then estimates the cost of each. The first option is to continue the MEP through 1981 as planned. A second option is to institute a malaria control programme for the entire Protectorate. A third option is a control programme that is limited to the productive sectors of the economy, e.g., large copra estates and timber projects. A fourth option is a control programme limited to areas of high population density and high transmission potential. A fifth option is to terminate the MEP when present funds expire at the end of March 1974.

The following are the cost estimates for each option:

Option No.	Content	Estimated cost in A\$
1	Continue present programme	3 146 232 (9 years)
2	Control programme for entire Protectorate	217 870 per annum 2 178 700 for ten years 4 357 400 for twenty years
3	Control programme for productive sectors only	72 800 per annum 728 000 for ten years 1 456 000 for twenty years
4	Control programme for areas of high population and vector density	118 800 per annum 1 188 000 for ten years 2 376 000 for twenty yrs
5	Close down MEP when present funding is exhausted	Negligible

Since the Government is already committed to an eradication programme, the arguments for and against these options are not discussed, except for some disadvantages of a control programme (see Annex VI).

The evidence presented above might tempt one to conclude that certain types of control programmes are more economic than eradication. However, it should be pointed out that the above figures represent only the expenditure for a malaria control programme and do not include any estimate of the cost of malaria¹, or additional programme costs should increase in prevalence occur.

Moreover, the cost of dealing with an epidemic could be many times the cost of Option 1 - continuation of the eradication programme. This point will be pursued in Chapter IV.

Unless malaria eradicates itself, the cost of a control programme will continue year after year for an indefinite period. One can estimate that a break-even point, as far as programme expenditure for Option 2 is concerned, is about 15 years, but even this assumes that the incidence of malaria will not increase - a risky assumption. The break-even point on Option 3 is close on 40 years, but other than economic criteria would suggest a denial of this option.

Add to the above, the nearly A\$3 000 000 already invested in malaria eradication should be protected. With an upsurge of malaria, not only will programme costs, direct costs of malaria (hospital in-patient and outpatient care, self-treatment), and indirect costs due to malaria (time loss from work and imputed cost of premature death) rise dramatically, but the nearly A\$3 000 000 investment could be lost. One has only to recall the example of Ceylon during the 1960's. Thus, taking all factors (economic, political and epidemiological) into account, MEP would appear economic in the long run.

3. THE MEP AND THE HEALTH INFRASTRUCTURE²

The Government health policy is outlined in the Sixth Development Plan, 1971-1973:

For the past decade government has concentrated on the development of preventive medicine with particular emphasis on the eradication of communicable diseases such as leprosy, tuberculosis and malaria. An extensive rural health service based on strategically sited rural health clinics has also been developed.

¹Direct costs: in-patients, outpatients and self-treatment.
Indirect costs: loss due to morbidity in economically active population, imputed cost from premature death.

²The financial implications of the national medical service schemes are discussed in the Public Health Administrator's report.

In the plan period priority must be in income-producing sectors of the economy and this precludes any major expansion of health services. There is, however, no question of reduction of existing services.

This statement of health policy implies that existing services will be maintained for an increasing population.

Expenditure in the health sub-sector of the social sector at the end of 1972 was A\$438 880. Expenditure on malaria was A\$346 000 and represented nearly 79% of development expenditure in the health sub-sector during 1972. Thus, in its peak year, the malaria eradication programme constitutes the major part of all public expenditure on health.

The impact of the MEP on the health and health services has also been dealt with in the report of the malariologist and the public health administrator.

Another area of linkage between the MEP and the health infrastructure is the capital investment in such items as buildings, etc., that have an economic life longer than that of the project, and as such are valuable assets which can eventually be transferred to the general health services or elsewhere.

The staff trained by the MEP are also an asset to the general health services. As eradication is achieved, the MEP staff, with a very little or no additional training, may be employed elsewhere in the health services. Since MEP employment is temporary, permanent employment would appear an attractive prospect.

Yet another area of linkage between MEP and the health infrastructure concerns the external benefits and disbenefits that arise from the MEP. One external benefit of DDT spraying against malaria is that it also interrupts the transmission of filariasis, which is also transmitted by the principal malaria vector.

Filariasis is endemic in Ngella and the Eastern Islands. In 1970, the micro-filaria rates were 19.4% among 1981 persons examined in San Cristobal and the Eastern Islands and 13.4% among the 1504 persons examined in the Eastern outer islands respectively.

There are also a few disbenefits of the MEP, but they are only of marginal importance, namely: that DDT spraying may kill small cats. It has been reported that spraying also kills ants that prey on bedbugs. Neither phenomenon is widespread.

As shown on Graph 1, Annex II, MEP expenditures will progressively decline after the peak in 1973. The decreasing amount of expenditures on MEP for each year after 1973 will allow considerable savings in the overall health budget which may be used for strengthening of health services. In order to maintain the malaria eradication achieved, the basic health services should be developed to a stage that there is total health coverage of the population.

4. THE MEP AND SOCIO-ECONOMIC DEVELOPMENT

A comprehensive view of the economy of the British Solomon Islands Protectorate is found in the following documents:

- 1) International Bank for Reconstruction and Development and International Development Association. The Economy of the British Solomon Islands Protectorate, Report No. EAP-3a, 15 April 1969;
- 2) British Solomon Islands Protectorate. Sixth Development Plan 1971-1973, Honiara, June 1971;
- 3) British Solomon Islands Protectorate, Sixth Development Plan 1971-1974, Second Annual Review, Governing Council Paper No. 22/73, Honiara, March 1973.
- 4) Review of the BSIP economy by the Asian Development Bank, which was unavailable at the time of writing.

It is intended to examine in general terms the relationship between malaria eradication and socio-economic development in the Protectorate. This will be followed by an epidemiological and economic analysis. Finally, implications of MEP for socio-economic development during the Seventh Development Plan (1975-1979) will be considered.

In the Sixth Development Plan, immediate priorities are attached to the early development of timber extraterritoriality and mining, the only sectors capable of rapidly increasing output in the early 1970's. In the long run, by the early 1980's, agriculture is likely to be the predominant activity, following the expansion of traditional crop production and the introduction of new crops. Gross Domestic Product (GDP) per capita is about A\$80.

Since the Sixth Plan was launched, there has been conspicuous and encouraging progress towards objectives in fisheries, oil palm, cattle, new planting of coconuts, roads and malaria eradication. On the other hand, there has been little or no progress in the reduction of the budgetary deficit, copra and timber production, coconut replanting and rehabilitation, marketing, high level manpower output, rationalization of shipping and trade, development of local government and urban housing for lower income groups. The principal setbacks have been high inflation, depression in the copra and timber markets, and destruction of valuable crops by cyclones. Due to a delay in preparation of the plans and the climatic setbacks of 1972, there has been a delay of 6-12 months and it was decided to extend the Plan through 1974.

One obvious effect of the malaria eradication programme has been on the Protectorate's population growth rate. Mortality and morbidity rates have fallen and birth rates have increased. This relationship has been partially quantified in the Malariologist's report and one or two observations may be of interest. First, the population growth rate appears to be rising exponentially. This results in a very young population as illustrated in Graph 3, Annex VII. Between 1931 and 1959

the growth rate was estimated at 1.1%. Between 1959 and 1968, the estimated rate of increase was 2%¹. The Sixth Development Plan (June 1971) estimated a 2.5% annual increase and finally the Second Annual Review of the Plan (March 1973) calculated a 3.1% rate of population increase. That some of this rise was due to anti-malaria programmes seems undeniable, but just how much is not clear. Although no immediate problems are posed by this state of affairs, it is a danger signal which has been recognized in the form of a plan to implement a family planning programme.

The relationship between economic development and malaria in BSIP is obvious, even though it is usually expressed in qualitative terms. In sum, the economic development of the Guadalcanal plains could not have taken place without effective programmes against malaria. During World War II deaths from malaria were far greater than those from the war itself. Professor Robert H. Black produced an excellent survey (May-June 1952) which testifies to the high prevalence of malaria at that time. Since the presence of malaria threatened development of human activity, its elimination became a high priority item.

One indicator of the relationship between the MEP and socio-economic development is the size of the MEP expenditure compared with that of the social sector (including health) and with the total development expenditure. We have already noted that expenditure on malaria was 79% of the health sub-sector under the Sixth Development Plan during 1972. (It comprised 22.5% of expenditure on the social sector and 5.1% of total development expenditure for the same year.) This attests to the importance and relative size of MEP in overall socio-economic development.

Two of the most important contributors to national income in BSIP are the copra and timber industries. In general, malaria eradication will reduce illness, increase the quality and quantity of manpower resources, improve the image projection for tourism, and reduce absenteeism in school. These qualitative arguments aside, let us consider the development strategy for the Sixth and Seventh Plans and how these are likely to interact with the MEP during the period 1973-1981.

The objective of policies outlined for sectors of the economy concerned with primary and secondary production is to raise the rate of domestically-generated growth through the exploitation of agricultural forest and mineral resources. As stated above, the immediate priority is the early development of timber extraction and mining, the only sectors capable of rapidly increasing output in the early 1970's. Specific areas of potential economic development are indicated on the economic map (Map 1).

The economic map was produced from a survey of resources which is expected to be published in 1975. Of particular note are the areas marked for copra, timber and oil palm. Copra production is centred in

¹International Bank for Reconstruction and Development and International Development Association, The Economy of the British Solomon Islands Protectorate, 15 April 1969.

the following areas and will be further developed during the Sixth and Seventh Development Plans: North Guadalcanal, Russell Islands, Vella Lavella, San Cristobal, Malaita. Timber operations will continue and expand in the following areas: Shortland Islands, Kolombangara, New Georgia, Vangunu, Guadalcanal, and Ndende. Oil palm will be developed in Guadalcanal and Kolombangara.

A second map (Map 2) identifies areas by vector density. The density is given only for the main vector, Anopheles farauti. It will be noted that a very high density (biting rate of more than 10 mosquitos/man/hour) is found on the northern coast line of Guadalcanal including the Guadalcanal plains. High density (5-9 bites/man/hour) is found on most of Malaita, Santa Isabel, New Georgia, Vangunu, San Cristobal and Ndende. Low density (less than one bite/man/hour) was found on Kolombangara and Rennell (see Annex VIII). It should be noted that after spraying is withdrawn, the vector population will build up to its original level within a few years.

A third map (Map 3) identifies areas by per cent. of parasite rate. In particular it is noteworthy that the pre-spraying parasite rate is over 50% in the northern part of Guadalcanal and Nggela. A parasite rate of 41%-49% is found on Santa Isabel and San Cristobal. A parasite rate of 31%-39% is found on Malaita, in the coastal areas of New Georgia, and on Ndende. A 21%-29% parasite rate is found on the Russel Islands, the southern part of Guadalcanal. A rate of 11%-19% is found on Vella Lavella, Kolombangara, and Rendova Island. A parasite rate of 1%-9% is found on Rennell.

Finally, let us consider the map (Map 4) that delineates the current problem areas (mid-1973). These are the northern part of Guadalcanal (including the plains), Nggela and a part of Western Gizo. Areas of high vulnerability and high transmission potentials are also indicated.

These maps reveal that the area of greatest economic development, namely, Northern Guadalcanal, is also an area of high vector density and high parasite rate as well as a current problem area. Other areas of economic growth and potential are also implicated but to a lesser degree. One may conclude, therefore, that this combination, especially in the Guadalcanal plains, is a potentially explosive situation which could easily lead to a malaria epidemic if the eradication programme was withdrawn. Again attention is drawn to what happened in Ceylon. Where the threat of an epidemic exists so does a threat to the socio-economic development of the Protectorate. Thus, the argument to follow through on the eradication programme is more powerful than ever. Not only must the initial investment be protected, but one risks serious dislocation to socio-economic development in the event of an epidemic of malaria.

5. ATTEMPT TO QUANTIFY THE ECONOMIC IMPACT OF MEP ON SELECTED ASPECTS OF DEVELOPMENT

During the writer's visit obviously a comprehensive control study such as the one undertaken in Pakistan by the Harvard group, was not possible, but a case-study attempt was made to quantify the impact of malaria

eradication on three areas of socio-economic development: copra production, timber production and absenteeism in schools. Even a rough cut at the problem revealed serious difficulties. Nevertheless it is worthwhile to examine the situation in more detail.

Since copra is a major income earner in the economy, it seemed an appropriate choice for an effort to quantify the impact of malaria eradication. Of the various areas that produce copra, the Russell Islands were chosen because both estate holdings (100 acres or more) and small holdings (less than 100 acres) were accessible and within a reasonable distance from each other. Moreover, 50% of all copra production takes place in the Central District and 30% of the Central District's production takes place in the Russell Islands.

The General Manager of Levers Ltd. (Russell Islands) was able to produce in-patient and outpatient records for the last ten years complete with diagnosis for each patient. Thus, it was possible to isolate the effect of malaria from the effect of other diseases on the production of copra. Production figures for estate holdings and small holdings were also available. The remaining requirement was to correlate the two, but this was impossible because substitute labour was available on the large copra estates. Moreover, the coconuts could lie on the ground for 30 days without any effect on production or costs, except for a slight increase in overhead.

Therefore, an attempt to correlate declining malaria with rising production in the estate holding was useless.

Since labour was paid on a per unit basis of copra cut, it was decided to investigate the small holdings on Loun Island where labour conditions seemed favourable. Production figures for Loun and three other islands were secured from the Agriculture Department and are shown in Annex IX. Although labour substitution was a problem on the small holdings, there were no records to support the amount of sickness due to malaria. Hence, it was not possible to correlate the decline of malaria with increased production of coconuts.

The second effort was to examine the largest timber producing area, which was also earmarked for further development. This was located on Kolombangara Island. Production figures were available, but there was an absence of malaria data. The commercial firms sprayed against malaria from the very first efforts at commercial exploitation. Hence, the number of malaria cases was insignificant for any analysis. The situation seemed ideal because skilled labour was involved in operating the heavy equipment such as cranes, bulldozers, etc.

The third attempt was to measure the effect of malaria on school absenteeism and the area chosen was the Seventh Day Adventist school on Kolombangara. It was to be expected, although slightly disappointing, to find that only qualitative data were available. The headmaster

attested to 50% absenteeism due to malaria 10 years ago, but none at the present time. No school records had been kept as to absenteeism, let alone to the cause of absenteeism, e.g., malaria.

One is obliged to conclude that the correlation between malaria eradication and production was not possible because (1) of a lack of base-line data; (2) of a difficulty to isolate malaria from other diseases, although this was possible from private hospital figures on Russell Island; (3) malaria was only a minor variable in production, e.g., 1972 cyclone that destroyed nearly all the timber operations on Santa Isabel. Also one must conclude that it was too late in the programme for any economist to quantify the economic benefits from MEP.

6. CONCLUSIONS

By June 1973, an economist could only make a limited contribution. A maximum contribution could have been made in the early days of the programme before the spraying campaign. Nevertheless, several useful points emerge. The first is the nature of the cost profile by source of funding and the estimated costs to complete eradication. Second, MEP is an economic venture, that is, cost-effective. A third useful point is that the initial investment should be protected in view of the threat posed by the epidemiological situation and a threat to socio-economic development.

It was pointed out that the malaria eradication budget will progressively decrease from 1973 and the amount so saved should be utilized for strengthening of the basic health services.

Finally, we must conclude that it is not possible to quantify the impact of MEP on socio-economic development because a number of necessary preconditions cannot be met.

7. ACKNOWLEDGMENTS

The economist member of the independent assessment team would like to express his deep appreciation for all the assistance rendered in preparing this report. Particular thanks are due to the Director of Health Services, the Acting Government Malariologist, and the Chief Executive Officer, Department of the Treasury.

Itinerary for Economist
Member of Independent Assessment Team

Briefing Schedule

Name	Baker, Dr William G.
Post	Consultant
Project	WPRO 2002 (BSIP) Malaria Eradication Assessment Team
Operational Officer	Dr W.J.O.M. van Dijk Senior Regional Malaria Adviser

30 May 1973	- Arrived Manila
31 May (Thursday)	- Meeting with Dr Van Dijk
1 June (Friday)	- Meeting with Dr G. Emery, Regional Adviser, Strengthening of Health Services - Meeting with Dr A.C. Reyes, Assistant Director of Health Services
4 June (Monday)	- Met at Henderson Airport by Dr D. Mackay (Acting Government Malariologist) and Dr Y. Paik (WHO Senior Malaria Adviser) Also met: Dr J.D. MacGregor (Director of Medical Services); Dr R. Bailey (Deputy Director of Medical Services); Dr B. Eyres (Medical Officer, Community Health); Mr Schick (WHO Sanitarian); Dr D. Gibson (WHO Laboratory Specialist); Dr D.A. Turner (Chief Field Operations Officer); Miss K. Revie (Public Health Sister)
5 June (Tuesday)	- Met: Mr T. Russell (Chief Secretary) Mr J. Yaxley (Acting Financial Secretary) Mr P.M.A. Spread (Government Economist) Mr J. Callan (Acting Government Statistician) Mr George Eder, Peace Corps Volunteer (PCV)

Annex I (cont'd.)

- 6 June (Wednesday) - Met: Dr D. Taysum (Principal Research Officer
Department of Agriculture);
Mr B. Leach (Soil and Plant Nutrition Officer,
Department of Agriculture);
Mr H.M.F.M. Heinemans (Senior Produce Officer,
Department of Agriculture)
- 8 June (Friday) - Departed Honiara - arrived Gizo.
Met: Mr E. Brooks (District Commissioner)
Mr E.C. Brandt (Forest Management Officer)
Mr A. Osugi (Peace Corps Volunteer)
- Departed Gizo - arrived Ringgi Cove (by canoe)
Met: Mr Stibbard (General Manager Levers
Timber Co.)
- Kukudu Seven Day Adventist Mission Station
Met: Mr B. Vavoso (Medical Assistant)
Mr J. Tutuna (Headmaster, Kukudu Adventist
School) - Returned to Gizo
- 10 June (Sunday) - Toured Gizo Hospital
Met: Dr T. McConnell (Medical Officer)
- 11 June (Monday) - Departed Gizo - returned Honiara
- 12 June (Tuesday) - Departed Honiara - arrived Yandina
Met: Mr R. Reece (Acting Managing Director,
Levers' Pacific Plantations Pty., Ltd.)
Mr J. Broom (Commercial Manager)
Mr S. Timi (Medical Assistant)
- Departed Russell Island - arrived Loun
(by canoe)
Met: Mr E. Baddeley (Executive Officer of
Russell Islands Council)
- Departed Loun - arrived Russell Island (By canoe)
Visited Yandina Hospital (private hospital,
Levers', Ltd)
- Complete tour of all facilities ---
- Departed Russell Islands - arrived Honiara.
- 14 June (Thursday) - Tour of Zone 4, North Guadalcanal with Dr Paik,

Villages -

1. Red Beach
2. Old Koli (demolished)
3. New Koli
4. Commonwealth Development Corporation
(oil palm area)
5. Chuva village
6. G.P.L. (rice field)
7. Binu Rural Health Clinic
8. Kemaboko (road end)

- 15 June (Friday) - Meeting: Mr Graham Johnson, Chief Executive Officer,
Treasury Department, BSIP
- 19 June (Tuesday) - Briefing of Dr Peter Beck, Medical Superintendent
of Central Hospital (Acting Deputy Director of
Medical Services)
- Final briefing of Dr Bailey, Acting Director of
Medical Services
- Final briefing of Dr Mackay, Acting Government
Malariologist
- 19 June (Tuesday) - Departed Honiara - arrived Manila
- 20 June (Wednesday) - Debriefing and report writing
- 22 June (Friday)
- 22 June (Friday) - Departed Manila - arrived Bangkok

Graph No. 1
TOTAL EXPENDITURE FOR MALARIA ERADICATION - 1961-1981

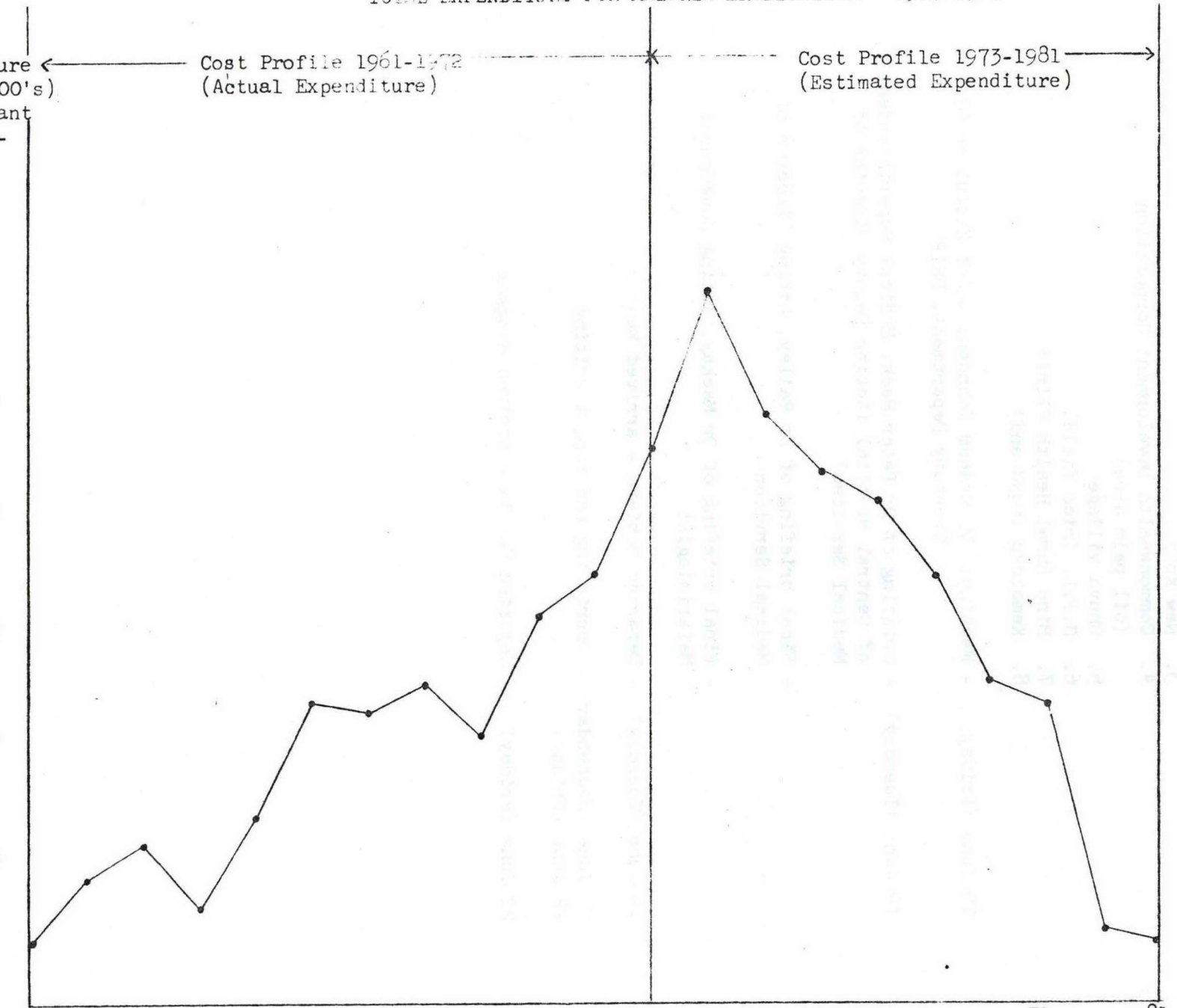
Expenditure
(in A\$ (000's))
at constant
prices --

Cost Profile 1961-1972
(Actual Expenditure)

Cost Profile 1973-1981
(Estimated Expenditure)

700
600
500
400
300
200
100

61 63 65 67 69 71 73 75 77 79 81



Population

1931 - 94 000 (complete census)
1959 - 124 000 (sample census)
1968 - 148 000 (estimated at 2% growth rate)
1970 - 160 500 (complete census) - mid-year
1972 - 173 500 (mid-year) at 2.5% growth rate

Source: World Bank Report No. EAP-3a dated 15 April 1969 and
BSIP, Second Annual Review of Sixth Development Plan.

Based on the above, it was estimated that the average population during the period 1961 - 1972 was about 155 000. (This is slightly higher than the arithmetic average since the population growth rate seems to be increasing exponentially that is, from 2%, estimated in 1959, to 2.5% in 1970, to an estimated 3.1% in 1972.)

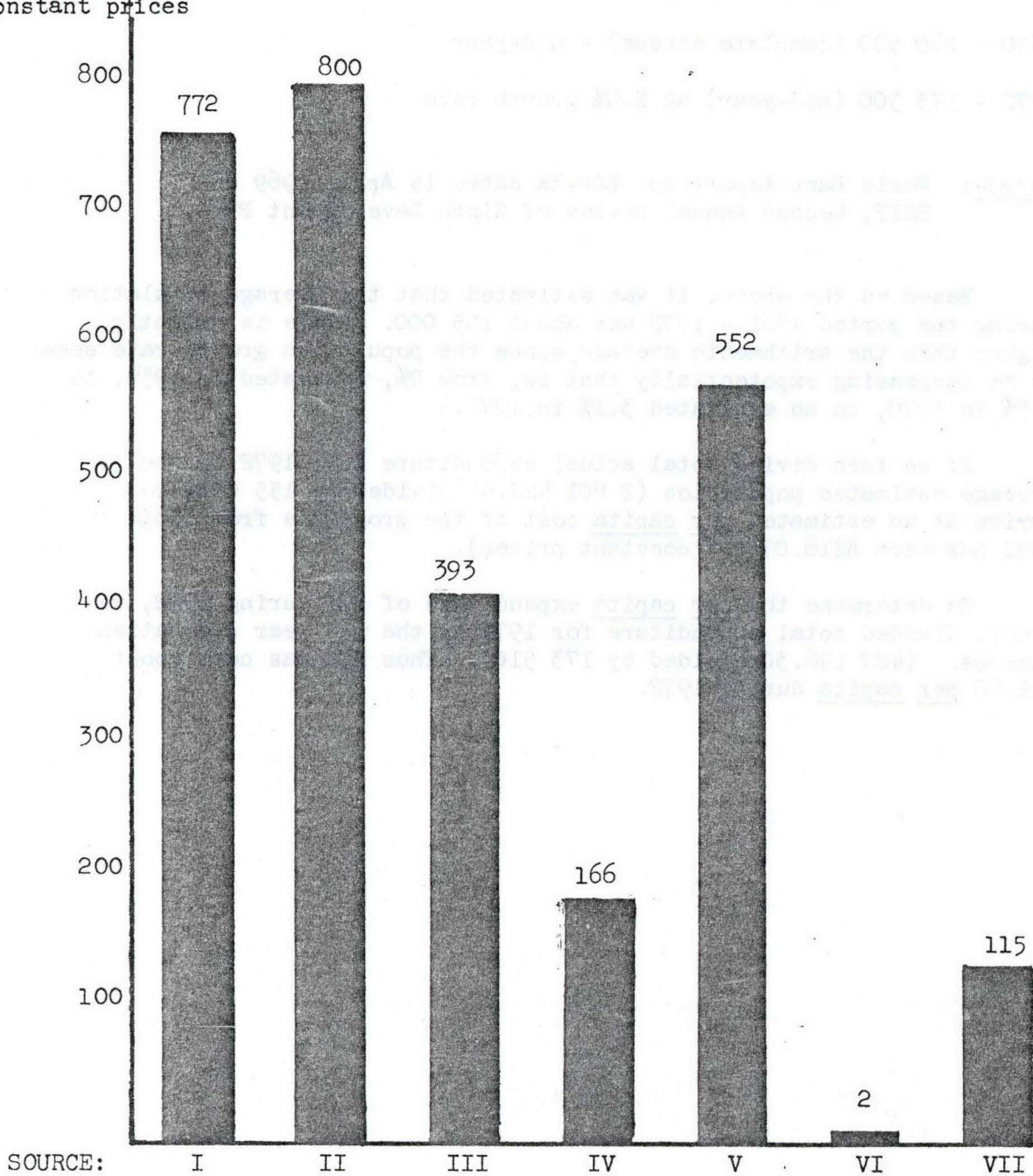
If we then divide total actual expenditure 1971-1972 by the average estimated population (2 801 422.98 divided by 155 000) we arrive at an estimated per capita cost of the programme from 1961-1972 has been A\$18.07 (at constant prices).

To determine the per capita expenditure of MEP during 1972, we simply divided total expenditure for 1972 by the mid-year population figures. (487 196.30 divided by 173 510). Thus MEP has cost about A\$2.80 per capita during 1972.

Graph No. 2

EXPENDITURE BY SOURCE
(1961 - 1972)

Expenditure
in A\$(000) at
constant prices



SOURCE:

JK Govt
(CD&W)
(1961-1971)

KSIP Govt.
(1968-1971)

JK Govt
(Development)
(1972)

V H O
(1965-1972)

INDP
(1961-1972)

INICEF
(1970-1972)

Private Sector
(1963-1972)

COST PROFILE - ESTIMATED EXPENDITURE - 1973-1981^{1/}

I. Estimated Capital Expenditure from 1973^{2/}
(in Australian dollars - constant prices)^{3/}

I T E M	Y E A R								
	1973	1974	1975	1976	1977	1978	1979	1980	1981
Malaria Building	2 800	3 900	3 000	3 000	3 000	3 000	1 500	1 500	750
Malaria Equipment	9 900	14 400	12 000	12 000	12 000	12 000	6 500	6 500	3 250
Total	12 700	18 300	15 000	15 000	15 000	15 000	8 000	8 000	4 000

- 1/ Includes a six-month reserve supply of DDT as recommended in malariologist's report, but does not include the stopping of spraying in Western District at the end of 1974.
- 2/ The latest estimate available for 1973 (March) was A\$12 700 and A\$18 300 for 1974. Estimates from 1975-1981 are only a rough guess and will require subsequent revision as do all estimates. The idea is to gain some concept of what the Malaria Eradication Programme is likely to cost in the period 1973-1981.
- 3/ From 1972, prices for all years are constant. Only the inflation, which was 7% during fiscal 1972, is not included. Since inflation rates are subject to change, it was decided to omit this factor so that the cost profile (1961-1972) would be in terms comparable with the estimated cost profile for 1973-1981.

Recurrent Expenditure for 1973^{1/}
(Estimates)

	(1) Revised Cost ^{2/} 1.1.72 to 31.12.73 (Current Prices)	(2) Actual Expenditure 1972 (Constant Prices) ^{4/}	(3) Estimated Exp iture 1973 (Constant Prices)
A. Personal Emolument	263 473	89 161	174 312
1. Independent Assessment Team	-	-	6 000 ^{3/}
B. Other Charges			
1. Wages	119 993	49 993	70 000
2. Gratuities	6 646	1 903	4 743
3. T&T incl. subsistence	90 396	41 356	49 040
4. Shipping hire	250 208	88 208	162 000
5. Vehicle hire	38 898	18 898	20 000
6. Insecticides	189 568	69 568	120 000
7. Anti-malarials	13 245	5 245	8 000
8. OBM and canoe maintenance	6 061	2 761	3 300
9. Office expenses	5 417	2 417	3 000
10. Printing	4 477	2 177	2 300
11. Library & stationery	3 072	1 272	1 800
12. Training materials	1 116	416	700
13. Laboratory stores	3 520	1 520	2 000
14. Clothing and equipment	13 913	5 913	8 000
15. Utilities and telephone	5 425	2 925	2 500
16. Rent	279	8	271
17. Office furniture	200	84	116
18. Housing allowance	131	131	0
Total other charges	752 565	294 795	457 770
GRAND TOTAL	1 016 038	383 956	638 082

^{1/} From 1972 prices for all years are constant. Only the inflation, which was 7% during fiscal 1972, is not included. Since inflation rates are subject to change, it was decided to omit this factor so that the cost profile (1961-1972) would be in terms comparable with the estimated cost profile for 1973-1981.

^{2/} Source: Government Malariologist, BSIP.

^{3/} Source: Senior Regional Malaria Adviser, WPRO.

^{4/} Obtained by subtracting actual expenditure 1972 from col. 1.

II. ESTIMATED RECURRENT EXPENDITURES FROM 1973

(in A\$ at Constant Prices)

I T E M	1973	1974	1975	1976	1977	1978	1979	1980	1981
1. Personal Emolument	A\$180,312	A\$137,000	A\$137,000	A\$137,000	A\$137,000	A\$109,600	A\$102,750	A\$ 30,000	A\$ 30,000
2. Other charges -									
(1) Wages	70,000	62,000	49,600 ^{1/}	46,500 ^{5/}	31,000 ^{9/}	18,600 ^{35/ 76}	18,600	6,000	6,000
(2) Gratuities	4,743	4,000	4,000	4,000	4,000	3,000	3,000	400	400
(3) T & T incl. subsistence	49,040	46,000	46,000	46,000	46,000	36,800 ^{15/ 17}	34,500 ^{23/ 23/}	4,600	4,600
(4) Shipping hire	162,000	133,000	116,400 ^{2/}	99,750 ^{6/}	66,500 ^{10/}	48,000 ^{12/ 18}	48,000	10,000	10,000
(5) Vehicle hire	20,000	18,000	18,000	18,000	14,400 ^{13/ 13}	9,000 ^{19/}	9,000	1,800	1,800
(6) Insecticides	120,000	69,000	55,200 ^{3/}	51,750 ^{7/}	34,500 ^{11/}	20,700 ^{18/ 20}	20,700	3,500	3,500
(7) Anti-malarials	8,000	9,500	9,500	9,500	9,500	7,000	5,000	500	0
(8) O&M and canoe maintenance	3,300	2,600	2,600	2,600	2,600	2,080 ^{21/ 21/}	2,080	200	200
(9) Office expenses	3,000	2,000	2,000	2,000	2,000	2,000	2,000	300	300
(10) Printing	2,300	1,900	1,900	1,900	1,900	1,900	500	200	200
(11) Library and stationery	1,800	2,000	2,000	2,000	2,000	2,000	2,000	200	200
(12) Training materials	700	850	850	850	680 ^{14/ 14}	680	680	100	100
(13) Laboratory stores	2,000	1,800	1,800	1,800	1,800	1,800	1,800	900	900
(14) Clothing and equipment	8,000	9,000	7,200 ^{4/}	6,750 ^{8/}	4,500 ^{12/ 12}	4,000	3,500	900	900
(15) Utilities and telephone	2,500	2,000	2,000	2,000	2,000	2,000	2,000	1,000	1,000
(16) Rent	271	150	150	150	150	150	150	0	0
(17) Office furniture	116	100	100	100	100	100	100	100	100
Total other charges	457,770	363,900	319,300	295,650	223,630	159,810	153,610	30,700	30,200
GRAND TOTAL	A\$638,082	A\$500,900	A\$456,300	A\$432,650	A\$360,630	A\$269,410	A\$256,360	A\$60,700	A\$60,200

Source: W.H.O. Malaria Adviser to B.S.I.P.
He also provided the calculations
in the footnotes.

NOTE: For footnotes please see next page.

✓ 1/ Wages
 \$62,000 -
 (62,000 x
 0.2) =
 49,600

✓ 2/ Shipping Hire
 \$133,000 -
 (133,000 x
 0.2) =
 116,400

✓ 3/ Insecticides
 \$69,000 -
 (69,000 x
 0.2) =
 55,200

✓ 4/ Clothing Hire
 \$9,000 -
 (9,000 x
 0.2) =
 7,200

✓ 5/ Wages
 \$62,000 -
 (62,000 x
 0.25) =
 46,500

✓ 6/ Shipping Hire
 \$133,000 -
 (133,000 x
 0.25) =
 99,750

✓ 7/ Insecticides
 \$69,000 -
 (69,000 x
 0.25) =
 51,750

✓ 8/ Clothing
 \$9,000 -
 (9,000 x
 0.25) =
 6,750

✓ 9/ Wages
 \$62,000
 x 50
 100
 = 31,000

✓ 10/ Shipping Hire
 \$133,000
 50
 100
 = 66,500

✓ 11/ Insecticides
 \$69,000
 x 50
 100
 = 34,500

✓ 12/ Clothing
 \$9,000
 x 50
 100
 = 4,500

✓ 13/ Vehicle Hire
 \$18,000 -
 (18,000 x
 0.2) =
 14,400

✓ 14/ Training Materials
 \$850.00
 (850.00 x 0.2
 = 680.00

✓ 15/ PE
 \$137,000 -
 (137,000 x
 0.2) =
 109,600

✓ 16/ Wages
 \$62,000
 x 30
 100
 = 66,500
 18,600

✓ 17/ T & T
 \$46,000 -
 (46,000 x
 0.2) =
 36,800

✓ 18/ Shipping Hire
 5 'T' class
 ships for
 surveillance
 \$40 x 20 days
 x 12 months x
 5 = 48,000

✓ 19/ Vehicle Hire
 \$18,000
 x 50
 100
 = 9,000

✓ 20/ Insecticides
 idea
 \$69,000
 x 30
 100
 = 20,700

✓ 21/ OHM
 \$2,600 -
 (2,600 x
 0.2) =
 2,080

✓ 22/ PE
 \$137,000 -
 (137,000 x
 0.25) =
 102,750

✓ 23/ T & T
 \$46,000
 (46,000 x
 0.25) =
 = 34,500

III. TOTAL (Capital and Recurrent)
in A\$ at Constant Prices

Account	Y E A R								
	73	74	75	76	77	78	79	80	81
Capital	12,700	18,300	15,000	15,000	15,000	15,000	8,000	8,000	4,000
Recurrent	638,082	500,900	456,300	432,650	360,630	269,410	256,360	60,700	60,200
Total	650,782	519,200	471,300	447,650	375,630	284,410	264,360	68,700	64,200

Grand Total 1973-1981 = A\$ 3,146,232.00

Technical Disadvantages of a Control Programme

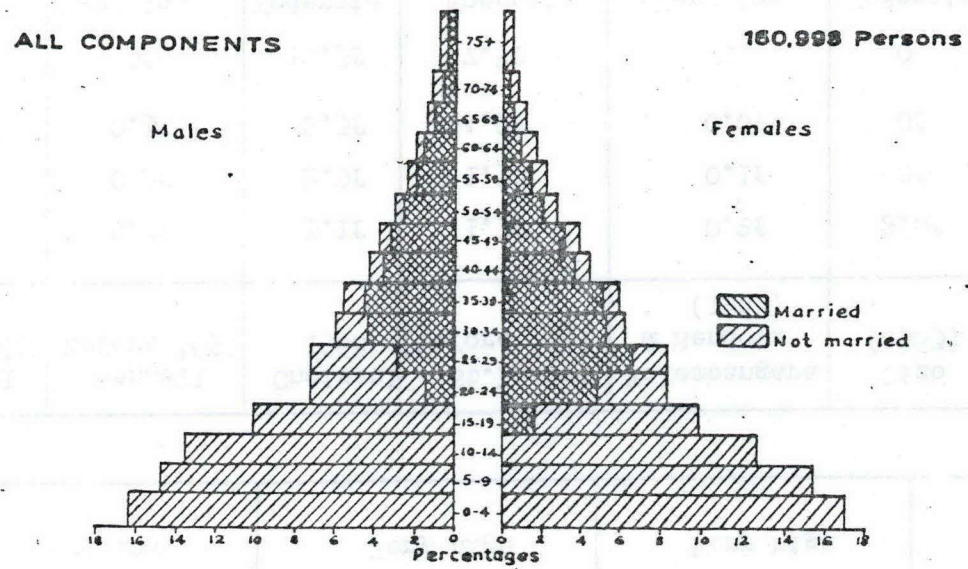
1. Possible DDT resistance developing with the need for altering to a more expensive, perhaps prohibitive, alternative method of control.
2. Resistance of parasites to chloroquine (already present in the Western Pacific Region).
3. Nuisance value of bedbugs, and increasing refusals invalidating the programme.
4. Massive increase in malaria in uncontrolled areas affecting all ages due to loss of tolerance, particularly with Options 3 and 4.

Political and Economic Disadvantages of a Control Programme

1. Annual recurrent costs with probable annual inflation at about 6%.
2. Probable political opposition.
3. Increased hospitalization of malaria cases (in 1961 this accounted for 7.4% of total admissions).
4. Tourist industry would probably regress.

Graph No. 3

POPULATION STRUCTURES 1970 British Solomon Islands Protectorate



DEENSITY OF ANOPHELINES IN UNSPRAYED AREA

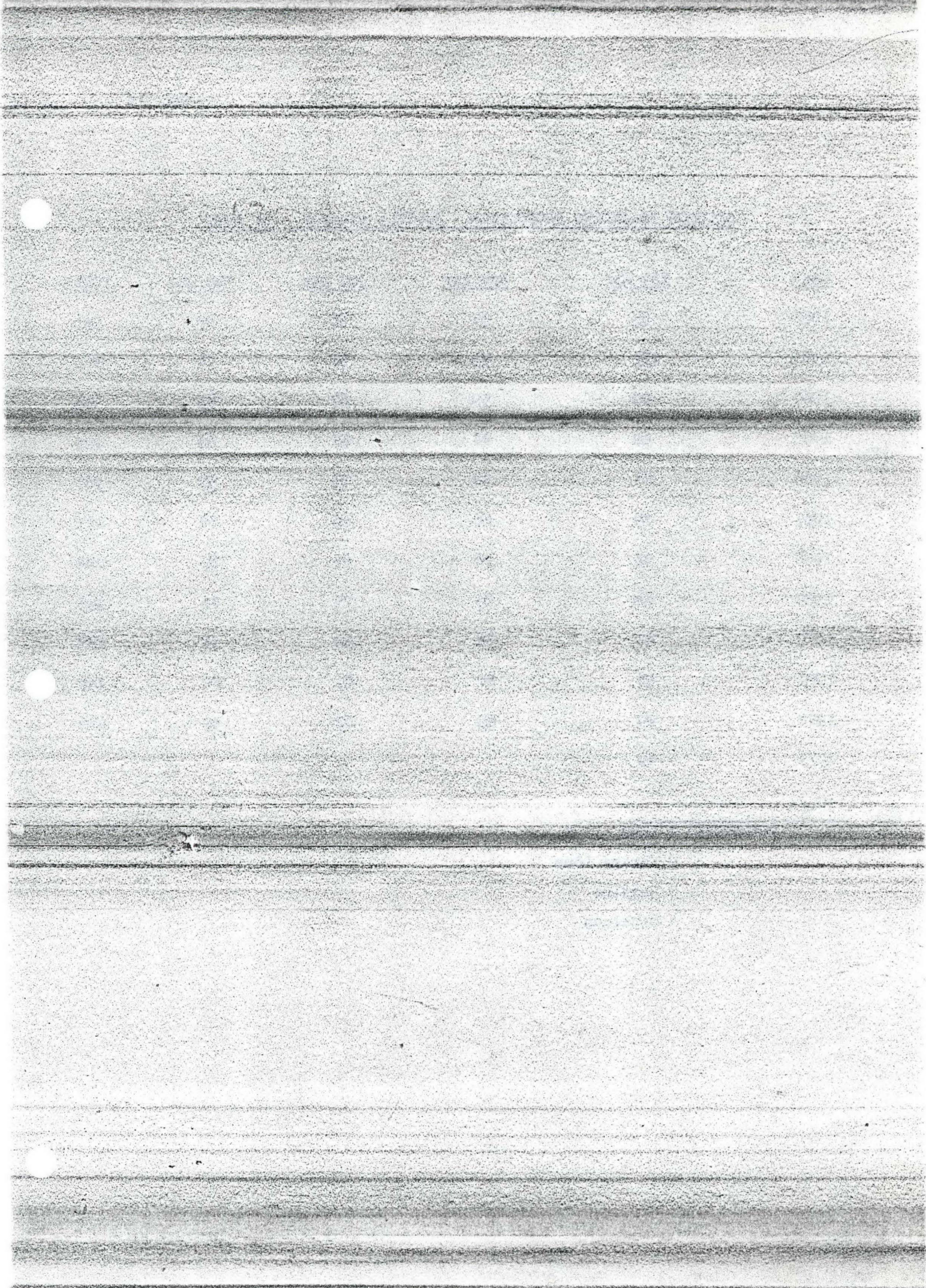
Guadalcanal

	Bush (before July 1963)		Koli (coast) (before May 1963)			Ilu Farm (plain) (before May 1963)			Weather coast (before March 1963)		Savo (before Feb. 1963)
OM	0.6f	2.0p	50f	Ok	Op	26f	4k	41p	Of	Ok	33f
IM	Of	1.3p	47f	3k	Op	22f	Ok	66p	Of	1k	57f
IS	Of	5p	81f	Ok	1p	30f	Ok	95p	Of	3k	162f
IS	Very low		Very high			Very high			Very low		Very high

Nggela (before '69)	Russell (before '69)	Rennell (before '69)	Choiseul 1968	St. Isabel (before '69)	Kolombangara & Rendova (1963)	Gizo (1963)	Malenta (before '69)	Santa Cruz (before '69)	San Cristobal (before '69)
4.7f	4.2f	0.3f	3.1f	1.3f	0.2f	2.0f	1.5f	1.3f	1.6f
7.3f	5.6f	0.2f	2.9f	1.3f	0.1f	Of	0.5f	1.5f	1.1f
3.0f	1.5f	0.3f	2.3f	1.0f	0.0f	Of	0.3f	0.7f	0.7f
8.9f	1.8f	Of	10.3f	7.8f	0	0	6.8f	2.9f	6.8f
High	High	Very low	Moderate	Moderate	Very low	Moderate	Moderate	Moderate	Moderate

Key:

- OM = Outdoor man-biting
- IM = Indoor man-biting
- IS = Indoor resting
- f = faranti
- p = punctulatus
- k = koliensis

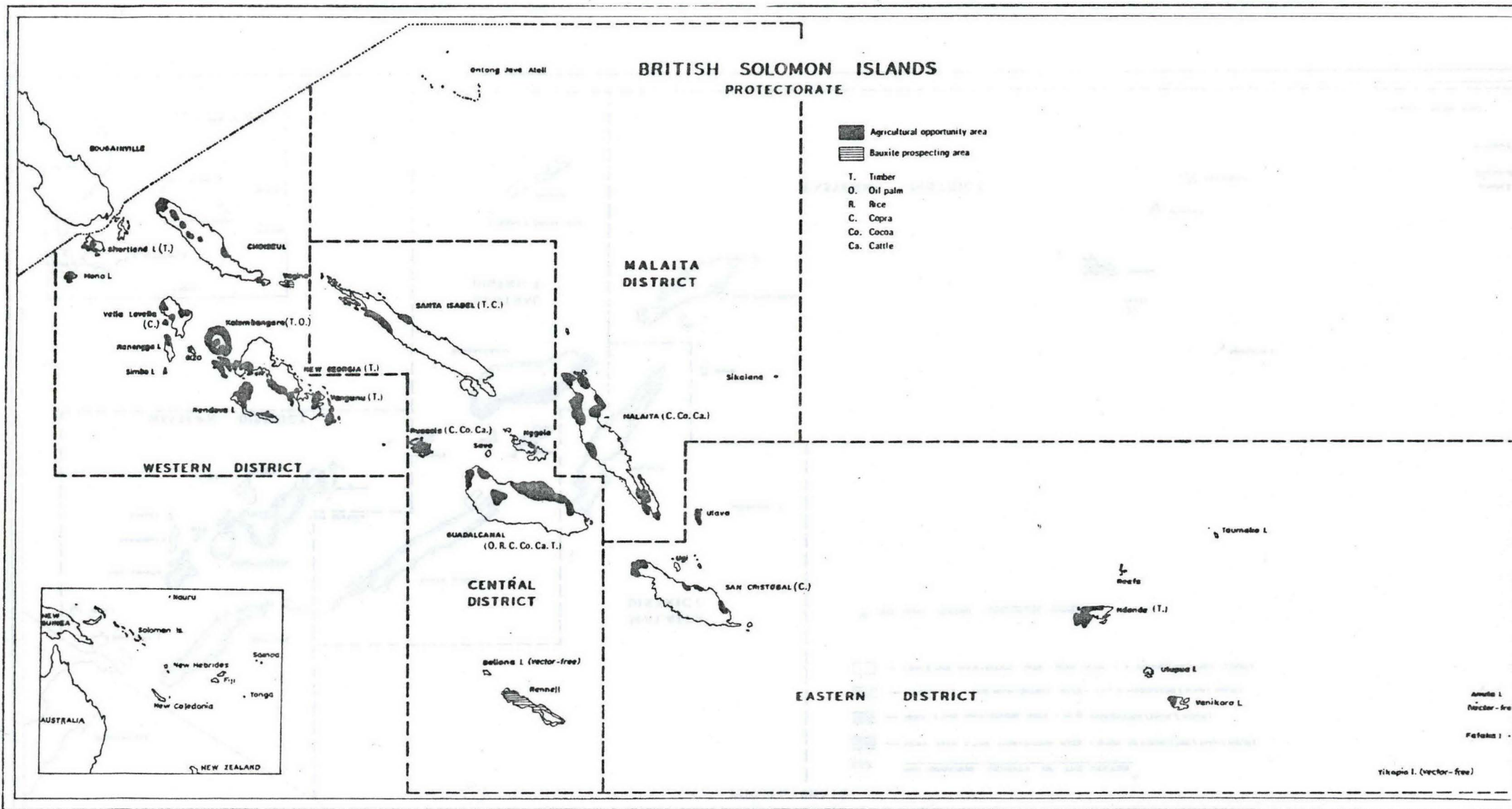


SOLOMON ISLANDERS PRODUCTION - RUSSELL ISLANDS - in TONS*

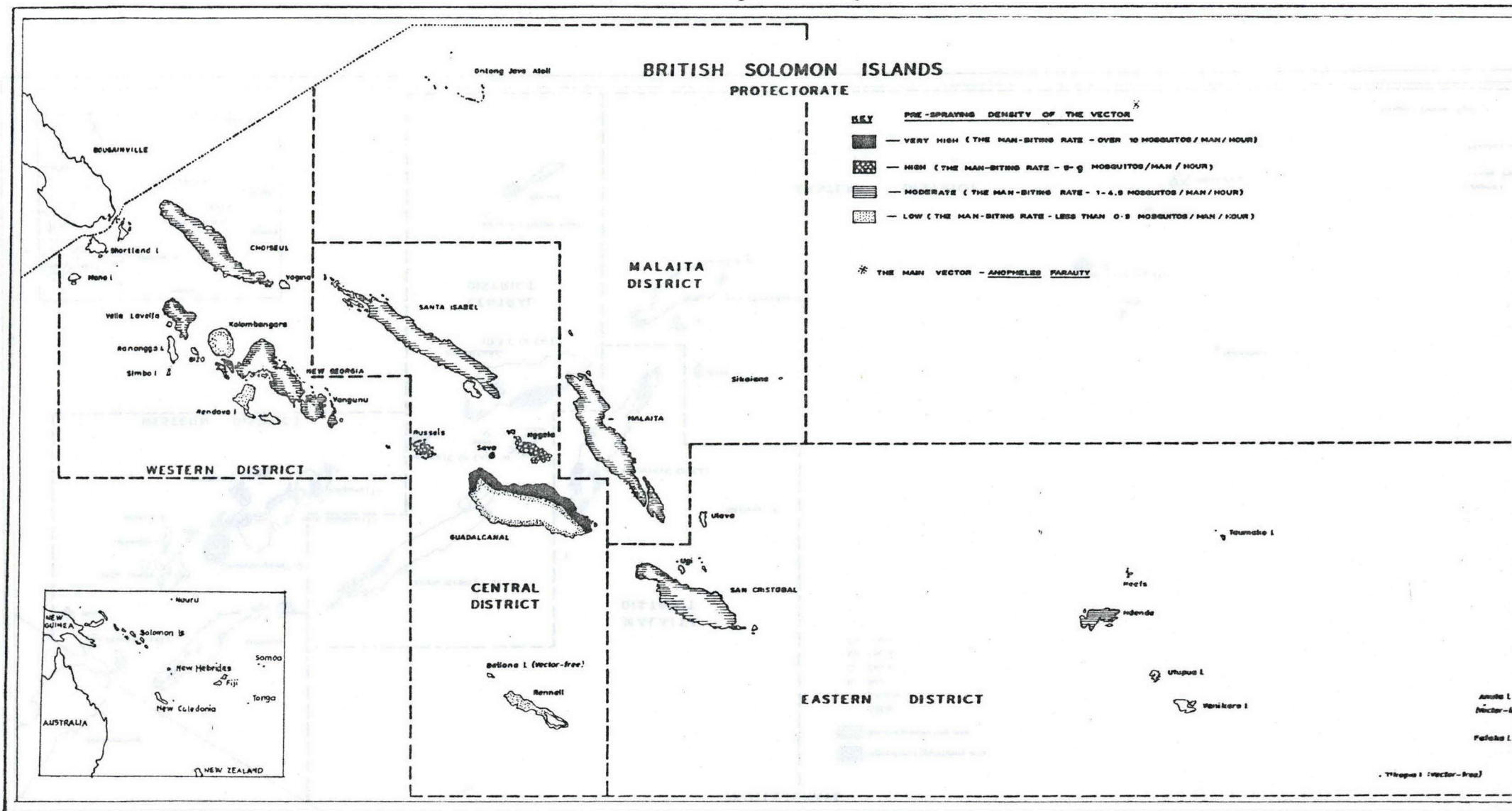
<u>Year</u>	<u>1st Qtr</u>	<u>2nd Qtr</u>	<u>3rd Qtr</u>	<u>4th Qtr</u>	<u>TOTAL</u>
1962	55	57	56	97	265
1963	111	35	50	74	270
1964	96	59	67	83	305
1965	52	44	67	66	229
1966	84	58	73	52	267
1967	79	66	66	66	277
1968	58	78	64	89	289
1969	64	83	75	71	293
1970	85	78	50	75	288
1971	58	67	81	84	290
1972	99	69	62	59	289
1973	49				

*Includes: 1 Loun
2 Karama Loun
3 Sagelua
4 Maraloun

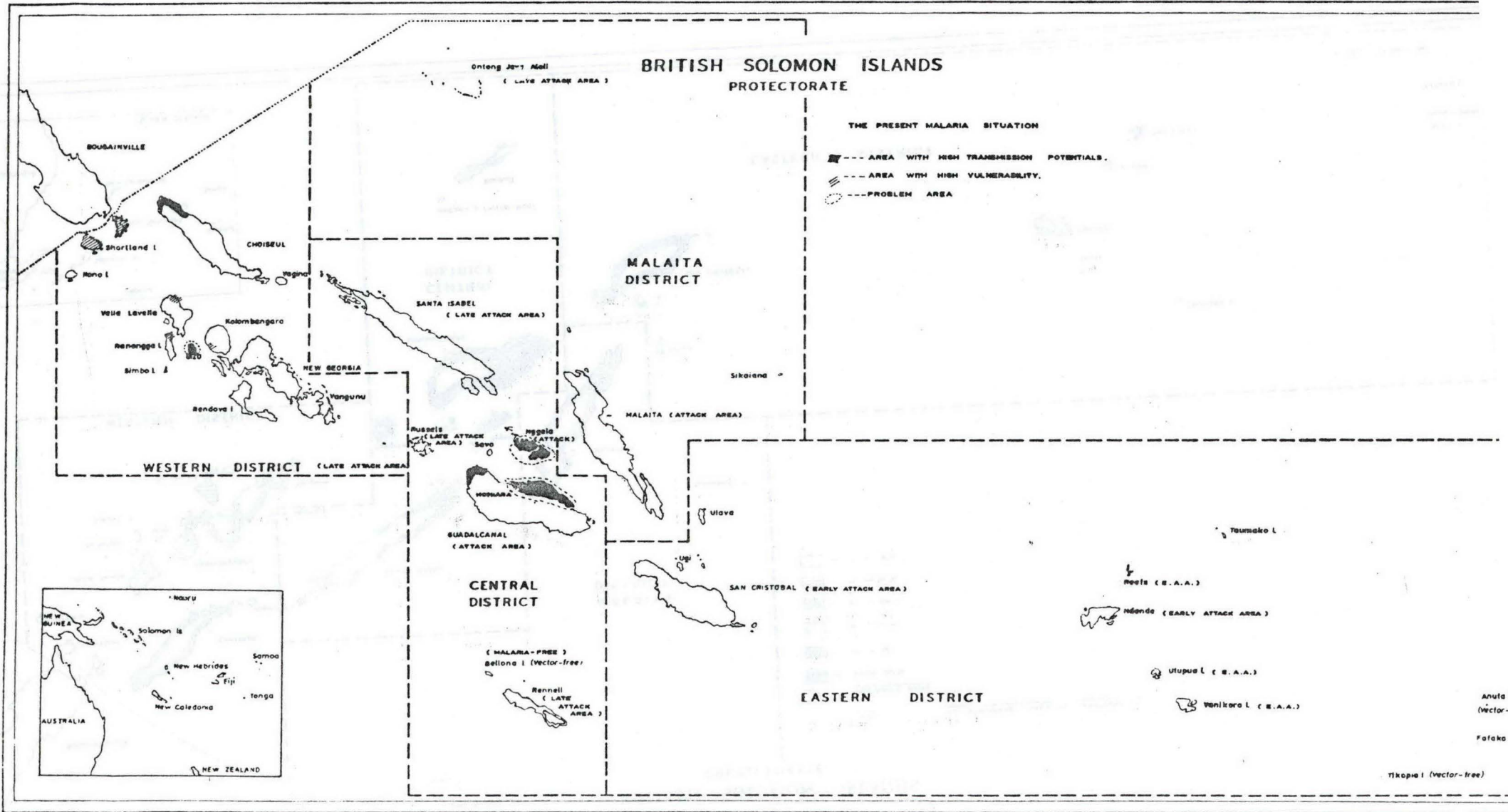
Map 1 - Economic Map



Map 2 showing - Density of A. Faranti, BSIP



Map 4 - Areas with High Transmission Potentials. B S I P 1973



Map 3 - Pre-spraying Parasite Rates, BSIP

