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COSTING OF MALARIA ERADICATION PROGRAMMES

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The total cost of global malaria eradication programmes during 1958 was estimated at about 118.4 million dollars, 62.3% of which was covered by national budgets and the remaining 37.1% by the international, bi-lateral and multilateral organizations.

The total cost of eradication in the Eastern Mediterranean Region in 1959 amounts to about 7.8 million dollars, of which 86% is paid by the governments and the remaining 14% by the international, bilateral and multilateral organizations.

These latter figures, however, refer only to the cost of eradication programmes which are under implementation in the six countries of Iran, Iraq, Israel, Jordan, Lebanon and the UAR (Syrian Province) and covers only 14% of the total population under risk in the Region.

This shows the magnitude of the problem in front of us, and the capital investment that would be involved. It also clearly illustrates the importance which at this stage should be accorded to careful planning and to a proper estimation of cost, using the most effective and economical methods.

Method of Estimation of Cost

In order to estimate the costing of the different activities of a programme, it is necessary to define what percentage of supplies, equipment or personnel have been used for these different activities. At this stage, in countries where malaria eradication programmes currently exist, it has been possible to make a cost estimation of the attack phase as well as the surveillance activities. In most of the eradication programmes of this Region, separation of activities is rather difficult, as in some programmes surveillance starts from the beginning of the attack phase and in others surveillance will be established one or two years before discontinuation of spraying takes place. A recent estimation, however, was made in Iran which shows that the per capita cost of surveillance per year is around 27 US cents, and total operational cost around 40 US cents per capita. To this latter, the cost of imported equipment and supplies should be added.

Methods of Estimating Cost when Planning Malaria Eradication Programmes

In general, the estimation of cost covers three different categories:

1. Personnel
2. Procurement of insecticides, spraying and laboratory equipment, anti-malaria drugs and transport, which in this Region is usually done from abroad, and
3. Other local operational costs.

1. Personnel

When preparing the estimation of cost, personnel are usually divided into two different groups:

- a. Those with permanent status staying in the programme all the year round, and
- b. Those who are recruited temporarily and for seasonal activities of the programme.

In each of these categories, the number of personnel together with the duration of employment should be calculated. In the case of permanent personnel this will be twelve months, and in the case of the seasonal personnel it will equal the period of their training prior to commencement of the programme plus the duration of their services. This multiplied by their respective salaries and wages would give the total cost of personnel for the particular year. To this should be added estimated amount of per diems and other allowances.

2. Cost of Imported Equipment and Supplies

a. Insecticides

Estimation of the cost of insecticide is based on the number of population involved, square metres of surfaces to be sprayed per capita, amount of insecticide per square metre, and the unit cost of the insecticide to be used. In this estimation, the formulation of the insecticide and the percentage of its active ingredient should be borne in mind.

b. Transport

Estimation of number and cost of transport necessary for implementation of malaria eradication programmes is dependent upon the number and size of spraying squads. It is also dependent on availability of passable roads and their conditions. In some countries where transmission is seasonal and where a cold winter exists, there is usually a very short time available for total coverage of areas under spraying. This factor greatly influences the number and cost of transportation necessary for the programme. A depreciation cost equal to 25% per annum of the total cost of transport, should be added to the yearly capital outlay.

c. Spraying Equipment

The amount of spraying equipment is dependent on the number of spraymen in the programme. To this estimation a 20 - 25% reserve should be added. A depreciation value of 30%, which is a fair estimation in this region, should also be added to the general costing of the programme.

d. Local Operational Costs

Under this item a great variety of expenses are involved, the principal ones being:

- (i) Repairs to transport
Naturally this is at the minimum during the first year and gradually increases in subsequent years. An estimation for this item varies greatly from one programme to the next, depending upon prevailing conditions, as well as on the type of vehicles involved. In most of the eradication programmes, repair facilities have been established exclusively for malaria eradication motor transport, which in most cases has increased the cost of repair although it has rendered appreciable assistance in expediting the repair work.
- (ii) Cost of gasoline and oil
This also depends largely on the extent to which the motor transport is used and also the type of vehicles involved.
- (iii) Rental of offices, printing, postage and Utility Costs
To estimate this, the organization of the programme should be well defined; its headquarters as well as provincial and district offices and their particular requirements should be estimated and a costing should be made relative to the usual prevailing charges in the country.

To all the above costing a contingency of 10% of cost is usually added.

Cost of Surveillance Operations

(i) Personnel

In the surveillance operation most of the personnel used have permanent status and work in the programme all year round, although in some areas, during the winter months or during the hot summer, surveillance activities will have to be stopped. The estimation of cost for personnel will follow the same pattern as indicated in the spraying programme.

(ii) Transport

In most of the eradication programmes in this Region, the great majority of vehicles are used jointly by surveillance and spraying. Usually estimation of number of vehicles required for the programme is based on the requirement of transport for surveillance. In case additional transport for spraying is required, hiring of public transport is the most economic practice.

(iii) Microscopes

The number of microscopes is estimated and based on the number of laboratory technicians necessary for the programmes. This is also calculated on the basis of examining 30 - 40 blood slides per day by each technician. In addition to this number of microscopes, and for the purpose of checking of blood slides,

a number of additional microscopes are usually provided for the programme

(iv) Anti-malaria Drugs

The estimation of amount of anti-malaria drugs is based on the monthly requirement of these drugs for fever cases detected and for the treatment of positive cases. It is estimated that in the areas under pre-discontinuation of spraying or under consolidation phase, an average of 15 - 20% of population will constitute the number of fever cases per year. This number by the dosage required for each age group will give the amount of anti-malarial drugs for fever cases. For treatment of positive cases (0.5 to 1%) total fever cases can be used as the basis of estimation.

(v) Other Local Operational Costs

The same pattern as indicated in the spraying should be used here also.

Total Cost

Based on this plan, which is called yearly plan of action, the total estimated cost of the programme can be estimated, based on the years of duration, extent and type of activities involved in each year.

Factors producing economy in the costs

1. Selection of the right type of insecticides

From the costing standpoint, the insecticide of choice would be the one which can, when used at proper dosage, provide an effective residual effect long enough to cover the whole duration of the transmission seasons, and at the same time its cost be the least.

In the selection of insecticides, the important fact to be considered will be to avoid such insecticides which require repeated applications. As the cost of labour, and other operational costs, including depreciation of transport and equipment in the control programmes, amount to 40% of the total cost of the spraying programme while the cost of the insecticide alone constitutes the other 60%. The operational cost in the malaria eradication programmes is expected to be even higher as a greater concentration of effort is being exercised for a total insecticidal coverage and for the evaluation of the spraying programme. Therefore, it is evident that as far as possible, and in order to effect major savings in the spraying programme, the selection of the insecticide should be ruled by its residual effectiveness to last throughout the malaria transmission season.

As far as the quantity of insecticides is concerned, it is of the utmost importance that an estimation be made during the preparatory phase and during the geographical reconnaissance leading to the obtaining of a factual estimation of the per capita square metres to be sprayed. The variation in this, vis-a-vis the great number of population involved would clearly represent its importance.

2. Transportation

The large number of vehicles involved in the malaria eradication programmes necessitate a proper investigation into the ways and means

of effecting economy in their initial, operational and maintenance cost.

. Four wheel drive vehicles although well adapted to the conditions in malaria operations, are expensive pieces of equipment, and therefore their use should be limited to where they are absolutely required. A saving of around 15 - 20% in the initial and operational cost of transport can be expected in every such substitution.

. Standardization of motor transport would also contribute a great deal of economy in maintenance and repair work of the transport.

3. Equipment

A proper maintenance and supervision in the use of various equipments, is a major factor in the long life of these items and consequently affecting the cost and resulting in economy.

4. Personnel

Saving in personnel cost occurs when a good organization exists in which personnel are properly trained, posted and well supervised.