APPENDIX 1

ESTIMATING FUTURE COSTS FROM SCRATCH

There are two approaches to predicting future costs. One is to use the cost calculations from other similar interventions: Chapter 2 describes how to measure the cost of an existing intervention and Chapter 4 indicates how this can be used to predict the costs of other similar interventions (the "adaptation" approach). The alternative approach, when there are no comparable costing data on which to base the estimates, is to derive estimates from scratch, using predictions about the likely quantities and prices of required inputs (the "ingredients" approach). This latter approach is described in this appendix.

The ingredients approach involves translating a general description of the intervention into specific resource requirements, itemizing in detail the amount and type of staff, the number and type of vehicles etc. For each item an appropriate price is identified and the cost calculated by multiplying the quantity by the price and summing over all items.

There are three advantages to the ingredients approach:

- it is tailormade to the intervention and so may be more accurate: the nature of the intervention is defined as precisely as possible and from that the resources required and the likely prices;
- it is more feasible to derive estimates for a longer timeframe since estimates are not constrained by the limited availability of real data;
- it does not require cost data on comparable interventions.

The major disadvantage of the ingredients approach is that it requires a good understanding of the technical content of the intervention and a realistic assessment of inevitable "losses" that occur even in well-managed programmes. As with the "adaptation" approach, it is important to define the boundaries clearly and in terms of the additional resources and effects above those already existing, and to distinguish between financial and economic costs.

QUANTITIES

If the quantities of inputs required to implement the intervention have not been documented, the following procedure may be helpful.

Take the objective of the intervention and translate it into planned outputs in terms of specific tasks. Quantify this information. Do this for each year in the life of the project or for at least 10 years.

The example that will be used throughout appendix 1 considers an intervention designed to reduce malaria incidence through insecticide spraying. It is estimated that about 3000 houses in 5 villages will need to be sprayed twice a year. The example is indicated by ☞.

Convert this information on planned outputs into input requirements.

Use and elaborate on the input categories described in Chapter 2. Do this separately for each year in the expected life of the project. Include inputs which may not have to be paid for. Keep separate those resources requiring foreign exchange from those purchased in domestic currency, and capital costs separate from recurrent costs.

Use the following procedure as a guide to this process.

Calculate the supplies required to achieve the outputs identified.

☞ It is estimated that each house requires about 500g insecticide for each spray cycle. Wastage during transportation is estimated at 5%. The total amount of insecticide required each year is therefore (3000 x 0.5) x 2 x 1.05 = 3150 kgs.

Where an intervention uses a lot of capital equipment it may be easier to start with the amount of equipment required to achieve the objective. For instance, with an intervention designed to level extensive areas where pools of water form, start by estimating how many tractors, or how much time of a tractor is required.

Calculate the numbers of field-level workers required to achieve the outputs identified.

☞ It is estimated that on average a team of three sprayers can spray about 10 houses a day. So (3000/10) x 3 x 2 = 1800 man days of labour are required every year. This will take the form of 10 teams of 3 men each working two cycles of 30 days each.

For a land-levelling intervention, calculate the amount of manpower required to operate the tractors.

Calculate the supervisory and management requirements based on the number of field-level staff.

☞ It is considered necessary to have a supervisor for every 3 teams of 3 sprayers; 3 supervisors working for 2 cycles of 30 days are therefore required.

Calculate the capital requirements (vehicles, equipment, buildings) to enable the staff to function adequately.

☞ Each supervisor requires a motorbike (3 motorbikes) and two jeeps would be adequate for transporting the sprayers. A small truck is necessary to transport the insecticide. Each sprayman will require a spraytank and protective clothing (30 sets) and each team will require a bucket to mix the insecticide (10 buckets). A storeroom of 4 by 5 meters would be adequate for insecticide storage.

Calculate the costs of operating these capital items in order to achieve the outputs of the intervention.

☞ Each motorbike needs 5 litres of fuel a week, the jeeps 30 liters and the truck 10 litres. One litre of oil is required for every 200 litres of fuel. Each spraytank needs a new spray nozzle each sprayround.

It is very important not to neglect the recurrent cost implications of capital investments. These recurrent items are complements to capital inputs which will not function adequately without them. Inadequate funding for these recurrent costs is likely to jeopardize the effectiveness of the whole intervention.

For each category of input indicate how reliable the estimate is likely to be. If there is considerable uncertainty about the quantities, provide information in ranges of values.

In estimating the quantities required, it is often helpful to draw on information from other, similar projects. Be careful not to design an "ideal" intervention. Make sure that the various losses that occur even in the best run projects are taken into account - some inevitable time loss, the unavoidable wastage of supplies (for instance, insecticide spillage and storage losses), drop-outs from training programmes and so on. Previous experience with other similar interventions can provide a useful guide.

PRICES

Collect information on the current prices of those resources quantified above (specify the year, which should be as recent as possible and the same for all inputs).

Make sure that freight charges are included.

Check that these prices reflect the opportunity cost of resources and, if not, use shadow prices. These are required if the market price does not reflect opportunity cost (e.g. unskilled labour) or if there is no market price (e.g. volunteer labour).

Try to predict whether (independently of inflation) the price of any of the inputs is likely to change over time.

☞ If government salaries are particularly low they may increase faster than other input prices. If the intervention will require a substantial proportion of a particular resource, the intervention itself might cause the value of the input to increase. If this is the case, the price to be used may be different from the current price and may need to be different in different years of the project.

COSTS

Calculate the costs by multiplying the quantities of inputs by their price for each year separately. If possible, identify who is likely to fund what.

The following table shows how to calculate costs for a single year.

INPUTS	QUANTITIES *Q*	PRICES *P*	TOTAL COST *Q x P*
Recurrent			
Personnel			
Supplies			
Operating costs:			
vehicles			
equipment			
buildings			
Other operating expenditures			
Capital			
Vehicles			
Equipment			
Buildings			
Total			

Note that the same price is used to calculate costs in all years (unless a price is likely to change independently of inflation). The calculations are therefore in terms of constant prices.
There may be some short-cuts to detailing separately all the inputs required. If there are good data on the relationship between some inputs and others or between the quantities of some and the cost of others, use this information. It may, for instance, be known that the average annual cost of running a jeep amounts to about US$2000.

Prepare a table that summarizes the costs over the life of the intervention.

INPUTS	COSTS			
	Year 1	Year 2	Year 3	Year 4
Recurrent				
Personnel				
Supplies				
Operating costs:				
vehicles				
equipment				
building				
Other operating expenditures				
Capital				
Vehicles				
Equipment				
Buildings				
Total				

Because of "time preference", i.e. the costs of resources consumed in the present are given greater weight than those consumed in the future, the total figures for each year cannot simply be summed to obtain a single figure. The "present value" of all the costs incurred after the first year must be calculated before they can be summed.

The simplest way of obtaining present values is to multiply each year's cost by the discount factor for the chosen discount rate and each year from the present value table in Appendix 3. Once all the costs have been converted into their present value, they are added together. Guidance on choice of discount rate is provided in Appendix 2.

To convert the economic costs calculated above into financial costs, simply use market prices instead of economic prices. The costs can then be expressed in terms of prices for the year in which they will be incurred by applying the estimated rate of inflation.