Calculating the costs of (integrated) monitoring

In order to price programme need to analyse direct and indirect costs

Direct costs = staff salary, use of outsourced or contracted certified laboratory, ship charter

Indirect costs = items that cannot be attributed to a single activity

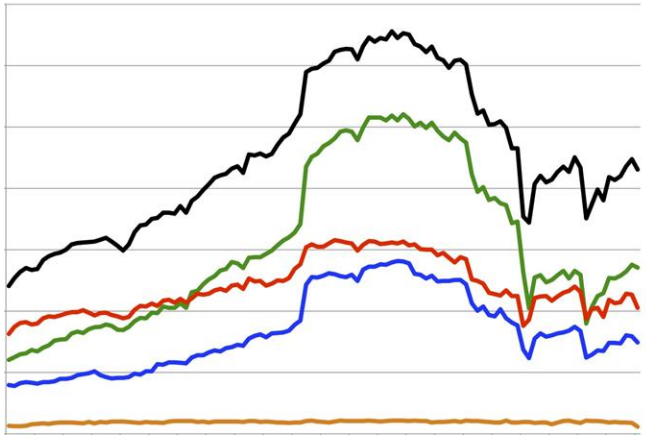
Indirect costs often occur at a different time to the activity, e.g. purchase of equipment that is spread over years

Calculate direct cost unit prices for each part of operation

Sampling

Analysis

Data handling



Reporting

Direct costs

Calculate proportion of year on each operation, e.g. 0.006 person/year. Need some knowledge for this.

An option for charging salary is to assume that "working year" is e.g. 200 days and then scale up to 365. Example: If operation takes 1 day = 0.005 of 200, but then charge as 0.005 of 365

365 - 104 (weekends) - 15 (public holidays) - 25 (leave) – x (training) = 210-220 days

Direct costs

Outsourced or contracted services

Find prices from previous year

Deduct possible rebate if large number of samples

Adjust for inflation if relevant

Do not forget Value Added Tax (VAT) if outsourcing

Major indirect cost categories (overheads)

Facility costs
Office equipment costs (including storage)
Indirect staff costs
IT costs
Operational costs
Transport and subsistence (away from home)
Management and administration
Marketing and development costs

Indirect costs

Facility costs

Establishment of facilities, permanent equipment

Normally the costs are distributed evenly in budgets during the operational period of the programme, or lifetime of the item. Vessel acquisition cost is expensive.

Office equipment costs including storage

Annual costs, maintenance/repair.

Indirect costs

Indirect staff costs

Training, canteen…

IT costs

maintenance and operation,
data storage

Operational costs

heating, electricity, telephone

Indirect costs

Transport and subsistence (away from home)

Per diem, etc.

Management and administration

Most easily assessed as person/years

Marketing and development costs

Not relevant everywhere

Example of the approach

Sampling: (estimate of person time used per station, for each visit)

- Water chemistry, primary productivity, phyto and zoo plankton, hydrography
- Sediment
- Hazardous substances
- Heavy metals
- Benthos samples (e.g. 10 per station)
- Imposex per station
- Macrophytes (depth distribution - hard/mixed/soft substrate) - 3 prices
- Servicing automated monitoring stations

Example of the approach

Analysis: (costs per sample)

- Water chemistry (specified programme a, specified programme b etc.)
- Heavy metals in sediment
- Hazardous substances in water
- Hazardous substances in sediment
- Sediment (Dry matter)
- Sediment (ΣN and ΣP)
- Sediment (Sulphide)
- Sediment (flux and metabolism)

Example of the approach

Biological samples: (costs per sample)

Phytoplankton (species and carbon)
Meso-zooplankton (species and carbon)
Meso-zooplankton and microzooplankton (species and carbon)
Benthos (species and biomass)
Benthos (filtrators per area)
Macrophytes, macroalgae, zostera (intensive per transect on hard/mixed and soft bottom) – 3 prices
Macrophyte distribution (depth and area) air surveillance per area

Example of the approach

Biological samples: (costs per sample) continued

Primary production per profile
Heavy metals in mussels
Heavy metals in in fish
Hazardous substances in mussels
Hazardous substances in fish
Hazardous substances in sediments , antifouling substances

Modelling: (do not forget cost if needed)

e.g. Operation of hydrography model per model area

Example of the approach

Data management: (estimate of person time used)

Programming
Calculations
Quality assurance
May need to work in sub-divisions, e.g. per sampling area

Reporting: (estimate of man time used)

Programming
Type areas (per area)
Intensive marine stations (per station)
Representative areas (per area)
Hazardous substances and heavy metals per area

Water chemistry sampling example (labour cost = €50,000 per year)

Sample type	Person time (year)	Number of samples	Frequency/ year	Total
1	0.006	2	5	3000
2	0.006	2	11	6600
3	0.006	100	12	360000
4	0.006	15	14	63000
5	0.006	2	15	9000
6	0.006	2	17	10200
7	0.006	6	18	32400
8	0.006	5	20	30000
9	0.006	12	24	86400
10	0.006	4	26	31200
11	0.006	13	32	124800
12	0.006	3	35	31500
13	0.006	1	36	10800
14	0.006	2	52	31200
			Total	830,100

Benthic biological sampling example, each sample has 10 replicate sub-samples in cost (labour cost = €50,000 per year)

Sample type	Person time (year)	Number of samples	Frequency/ year	Total
1	0.007	261	1	913500
2	0.007	25	2	175000
3	0.007	1	10	35000
			Total	1123500

Example of external laboratory analysis costs (VAT = 20%)

Price	Number of samples	Frequency per year	Total
120	2	5	1200
120	2	11	2640
120	100	12	144000
120	15	14	25200
120	2	15	3600
120	2	17	4080
120	6	18	12960
120	5	20	12000
		Total	205680
		VAT	41136
		TOTAL	246816

Sum of all direct costs

	Annual programme cost	
	Costs	VAT
Sampling		
Water chemistry	830,100	
Benthos	1123500	
…		
Total sampling		
Analysis		
Water chemistry	205,680	41,136

Sediment

…

Total sampling

Summary

Divide analysis into indirect and direct costs

For indirect costs, make full list of categories and carry out research on each

For direct costs, break to phases of the programme where person-power and/or direct contract costs can be assessed. Calculate per phase (not forgetting tax)