

Annex 3 Table 1

Costs and impacts considered for inclusion in the CBA. Those included are indicated in **bold typeface**, with those selected for the (i) societal and (ii) household perspectives indicated in the respective columns. All other costs and impacts were considered, and while these potentially could be included in future CBA analyses, it was judged that one or more components of the information required were unavailable at this time. Information has been used from the current study, and /or external sources – in many cases a mixture of these sources was used.

Costs

Type	Specific costs	Discount applied?	Perspective		Information sources			
			Societal	Household	Study questionnaire		External	
					Section	Questions	Source*	Details
Investment	Planning and supervision	N/A as initial costs	Y				Project documents & Trust proposals*	Management costs in funding sources
	Marketing		Y				Project documents & Trust proposals	Funding lines for marketing
	Hardware/materials		Y	Y	IN	IN23-IN31**		
	House alterations		Y	Y	IN	IN32-IN34 **		
	Education and instruction		Y				Project documents & Trust proposals	Community workshops, promotion, training workshops
	Transportation		Y				Project documents & Trust proposals	Funding lines for transport
	Communications		Y				Project documents & Trust proposals	Funding lines for transport
	Financing mechanism		Y				Project documents & Trust proposals*	Revolving finance budget lines
Recurrent	Fuel costs, where used	Y	Y	Y	Sections FL & PN	Costs of fuel	N/A	N/A
	Operating materials	Y	Y	Y		FL7-FL11 FL17-FL19 PN2-PN3 PN5-PN7		
	Premises storage/rental	Y	Y			N/A		
	Maintenance and repair	Y	Y	Y		IN54, IN57, IN58**		
	Monitoring and regulation	Y	Y				Project documents & Trust proposals	Percentage of set-up management costs
	Education and instructions	Y	Y?					Percentage of set-up management costs
	Interest repayments on loan	Y	Y	Y			Project reports	Monthly reporting from revolving finance documents

* The major donor for this project was DFID but Trust funding was kindly provided by several Trusts to provide seed capital for the revolving funds

** Where more than one intervention was installed, the sum of all the instalments was calculated

Impacts

Type	Specific impacts		Discount applied?	Perspective		Information sources				
	Area	Potential impact		Soc	H/hold	Study		External		
						Type	Section/Questions	Type	Details	
Directly related to health	Health	Reduced ALRI incidence**	Not applicable	Yes	Yes	Exposure and fuel change	Change in room CO	Estimates of personal exposure change derived from Phase I study data on relationship between room and personal measures	Estimates of health effects	Incidence rate for countries [Rudan, WHO] Exposure-response data from Guatemala RCT [JMcC/PC]; Meta-analysis [Desai et al]
		Reduced COPD incidence	Not applicable	Yes	Yes		Estimates of health effects		Incidence rate for countries [WHO]; Meta-analysis [Desai et al]	
		Reduced respiratory symptoms*	Outcome not included	No	No	Prevalence	Sections A-C, WH: Cough, phlegm, wheeze	Valuation required	May be some pointers to valuing any symptom reductions, but more work needed.	
		Reduced burns to child**	Outcome not included	No	No	Rates and impact	Change in incidence of burns, but need specific data. Must allow for age change.	Rates	Incidence rates from other studies (Guatemala) may be useful, but cannot use estimates of impacts as different intervention and setting	
		Reduced prevalence of LBW**		No	No	Exposure and fuel change	Change in room CO Change in breath CO HH Questions FL	Prevalence estimates and Review	Systematic review and meta-analysis (Pope et al, in progress) could be used, but estimates of impact on costs not available	
		Reduced incidence of stillbirth**		No	No					
	Headaches*	No		No	Rates	Period prevalence and frequency/severity	Valuation required	May be some pointers to valuing any symptom reductions, but more work needed		
	Health expenditure	Reduced expenditure for respiratory health problems	Discount at 3%	Y	Y	Costs	Treatment sought (visits and costs), but for whole family	Costs	Health service uptake and costs, from WHO Global Study [Ref]	
	Health-related income	Income accrued due to avoided illness	Discount at 3%	Y	Y	N/A		Costs	Value of working days using per capita GNI, WHO Global Study [Hutton]	
		Income accrued due to extended productive years of life	Not included	Y?	Y?	N/A				

Type	Specific impacts		Discount applied?	Perspective		Information sources			
	Area	Potential impact		Soc	H/hold	Study		External	
						Type	Section/Questions	Type	Details
Direct impacts not related to health	Time impacts	Reduced fuel collection time	Discount at 3%	Y	Y	Time	Section FL	Valuation	Value of working days using per capita GNI, WHO Global Study [Hutton]
		Reduced cooking time		Y	Y	Time	Section CK		
	Household environment	Lighting (not changed?)							
		Cleaner utensils and home environment*		Y	Y	Reported benefits	Section WM	N/A	
	Fuel costs	Savings in cost of fuel where paid for		Y	Y	Costs	Section FL	N/A	
Indirect impacts related to the environment	Local	Reduced environmental damage due to pressure of wood fuel supply	Y	Y	Y?	Local knowledge	See 'External/details'	Estimate?	Considered too uncertain
	Global	GHG emissions	Y	Y		N/A		Estimate	Use a standard price per tonne of carbon saved, for type of intervention

Annex 3 Table 2: Summary of Health benefits

(A) KENYA

Assumption	CO exposure predicted (ppm)			Percent that post-intervention is of pre-intervention
	Before intervention	After intervention	Difference	
Actual	6.29	1.76		27.9
Assumed*	5.0	1.76		

* Assumed for ALRI calculations on basis of RESPIRE, as exposure-response does not have data above 5.0

2. Coverage assumptions

This is project to increase over the period of the analysis from XX% to 25% for the study area (Rasuwa District)

3. Acute lower respiratory infections

(a) RESPIRE method (using incidence of 0.32 episodes/child/year)

Year of analysis	Coverage (%)	Cases averted	Cost savings (US\$)	
			Societal	Household
1	2.3	21	147.1	85.5
2	4.8	45	315.3	183.3
3	7.3	68	476.5	277.0
4	9.8	91	637.6	370.7
5	12.4	115	805.8	468.4
6	14.9	138	967.0	562.1
7	17.4	162	1135.2	659.9
8	19.9	185	1296.3	753.6
9	22.5	209	1464.5	851.3
10	25.0	232	1625.7	945.0

(b) Desai method (using incidence of 0.32 episodes/child/year)

Year	Coverage (%)	Ventilation factor**	Cases			Cost savings (US\$)	
			Counterfactual	Post-intervention	Averted	Societal	Household
1	2.3	0.984	1668	1656	12	84.1	48.9
2	4.8	0.965	1668	1641	27	189.2	110.0
3	7.3	0.947	1668	1627	41	287.3	167.0
4	9.8	0.929	1668	1613	55	385.4	224.0
5	12.4	0.911	1668	1598	70	490.5	285.1
6	14.9	0.893	1668	1583	85	595.6	346.2
7	17.4	0.875	1668	1568	100	700.7	407.3
8	19.9	0.856	1668	1551	117	819.8	476.6
9	22.5	0.838	1668	1535	133	931.9	541.8
10	25.0	0.820	1668	1519	149	1044.1	606.9

** calculated as (using proportions) $VF = (1 - \text{coverage}) + [\text{coverage} \times (1 - \text{reduction in exposure})]$

4. COPD

Desai method Incidence rates: males = 1.52 per 1000 per year; females 0.64 per 1000 per year.

Year	Coverage (%)	Ventilation factor**	Cases			Cost savings (US\$)	
			Counterfactual	Post-intervention	Averted	Societal	Household
1	2.3	0.984	8.97	8.90	0.07	9.7	8.1
2	4.8	0.965	8.97	8.82	0.15	20.7	17.3
3	7.3	0.947	8.97	8.74	0.23	31.7	26.6
4	9.8	0.929	8.97	8.66	0.31	42.8	35.8
5	12.4	0.911	8.97	8.58	0.39	53.8	45.0
6	14.9	0.893	8.97	8.49	0.48	66.2	55.4
7	17.4	0.875	8.97	8.41	0.56	77.3	64.7
8	19.9	0.856	8.97	8.32	0.65	89.7	75.1
9	22.5	0.838	8.97	8.23	0.74	102.1	85.5
10	25.0	0.820	8.97	8.14	0.83	114.5	95.1

** calculated as (using proportions) $VF = (1 - \text{coverage}) + [\text{coverage} \times (1 - \text{reduction in exposure})]$

B: NEPAL

1. Exposure reduction

Assumption	CO exposure predicted (ppm)			Percent that post-intervention is of pre-intervention
	Before intervention	After intervention	Difference	
Actual	5.77	0.7	5.07	12.2%
Assumed*	5.0	1.0	4.0	20.0%

* Assumed for calculations on basis that exposure below 1.0 seems very unlikely and also that RESPIRE exposure-response does not have data above 5.0 and is very imprecise below 1.0

2. Coverage assumptions

This is project to increase over the period of the analysis from XX% to 25% for the study area (Rasuwa District)

3. Acute lower respiratory infections

(a) RESPIRE method (using incidence of 0.5 episodes/child/year)

Year of analysis	Coverage (%)	Cases averted	Cost savings (US\$)	
			Societal	Household
1	5.17	65	445.7	255.7
2	7.38	93	637.7	365.9
3	9.58	120	822.8	472.1
4	11.78	148	1014.8	582.3
5	13.98	175	1199.9	688.5
6	16.19	203	1391.9	798.7
7	18.39	231	1583.9	908.9
8	20.59	258	1769.0	1015.1
9	22.80	286	1961.0	1125.3
10	25.00	314	2153.0	1235.4

(b) Desai method (using incidence of 0.5 episodes/child/year)

Year	Coverage (%)	Ventilation factor**	Cases			Cost savings (US\$)	
			Counterfactual	Post-intervention	Averted	Societal	Household
1	5.17	0.959	1441	1414	27	185.1	106.2
2	7.38	0.941	1441	1401	40	274.3	157.4
3	9.58	0.923	1441	1389	52	356.5	204.6
4	11.78	0.906	1441	1377	64	438.8	251.8
5	13.98	0.888	1441	1364	77	528.0	303.0
6	16.19	0.870	1441	1350	91	624.0	358.0
7	18.39	0.853	1441	1337	104	713.1	409.2
8	20.59	0.835	1441	1324	117	802.2	460.3
9	22.80	0.818	1441	1310	131	898.2	515.4
10	25.00	0.800	1441	1296	145	994.2	570.5

** calculated as (using proportions) $VF = (1 - coverage) + [coverage \times (1 - reduction \text{ in exposure})]$

4. COPD

Desai method Incidence rates: males = 1.58 per 1000 per year; females 1.36 per 1000 per year.

Year	Coverage (%)	Ventilation factor**	Cases			Cost savings (US\$)	
			Counterfactual	Post-intervention	Averted	Societal	Household
1	5.17	0.959	11.66	11.46	0.20	29.1	23.5
2	7.38	0.941	11.66	11.36	0.30	43.6	35.2
3	9.58	0.923	11.66	11.26	0.40	58.1	46.9
4	11.78	0.906	11.66	11.17	0.49	71.2	57.5
5	13.98	0.888	11.66	11.07	0.59	85.7	69.2
6	16.19	0.870	11.66	10.97	0.69	100.2	80.9
7	18.39	0.853	11.66	10.87	0.79	114.7	92.7
8	20.59	0.835	11.66	10.76	0.90	130.7	105.6
9	22.80	0.818	11.66	10.66	1.00	145.3	117.3
10	25.00	0.800	11.66	10.55	1.11	161.2	130.2

** calculated as (using proportions) $VF = (1 - coverage) + [coverage \times (1 - reduction \text{ in exposure})]$

C: SUDAN

1. Exposure reduction

CO exposure predicted (ppm)				Percent that post-intervention is of pre-intervention
Assumption	Before intervention	After intervention	Difference	
Actual				
Assumed*	3.65	2.19		60.0%

* Assumed for calculation on basis that CO is used as a proxy for particulates – so equivalent proxy levels of CO for change in level of particulates has been calculated

2. Coverage assumptions

This is projected to increase over the period of the analysis from 9.3% to 25% for the study area (Kassala District)

3. Acute lower respiratory infections

(a) RESPIRE method (using incidence of 0.29 episodes/child/year)

Year of analysis	Coverage (%)	Cases averted	Cost savings (US\$)	
			Societal	Household
1	9.3	51	582.2	212.2
2	11.1	61	696.4	253.8
3	12.8	71	810.5	295.4
4	14.5	80	913.3	332.9
5	16.3	90	1027.4	374.5
6	18.0	100	1141.6	416.1
7	19.8	109	1244.3	453.5
8	21.5	119	1358.5	495.2
9	23.3	129	1472.7	536.8
10	25.0	138	1575.4	574.2

(b) Desai method (using incidence of 0.29 episodes/child/year)

Year	Coverage (%)	Ventilation factor**	Cases			Cost savings (US\$)	
			Counterfactual	Post-intervention	Averted	Societal	Household
1	9.3	0.963	1802	1771	30	342.5	124.8
2	11.1	0.956	1802	1766	36	411.0	149.8
3	12.8	0.949	1802	1760	42	479.5	174.8
4	14.5	0.942	1802	1754	48	548.0	199.7
5	16.3	0.935	1802	1748	54	616.5	224.7
6	18.0	0.928	1802	1742	60	685.0	249.7
7	19.8	0.921	1802	1736	66	753.5	274.6
8	21.5	0.914	1802	1730	72	821.9	299.6
9	23.3	0.907	1802	1723	79	901.9	328.7
10	25.0	0.900	1802	1717	85	970.4	353.7

** calculated as (using proportions) $VF = (1 - \text{coverage}) + [\text{coverage} \times (1 - \text{reduction in exposure})]$

4. COPD

Desai method Incidence rates: males = 1.42 per 1000 per year; females 0.59 per 1000 per year.

Year	Coverage (%)	Ventilation factor**	Cases			Cost savings (US\$)	
			Counterfactual	Post-intervention	Averted	Societal	Household
1	9.3	0.963	12.45	12.23	0.22	26.4	16.9
2	11.1	0.956	12.45	12.18	0.27	32.3	20.7
3	12.8	0.949	12.45	12.14	0.31	37.1	23.8
4	14.5	0.942	12.45	12.10	0.35	41.9	26.9
5	16.3	0.935	12.45	12.05	0.40	47.9	30.7
6	18.0	0.928	12.45	12.01	0.44	52.7	33.8
7	19.8	0.921	12.45	11.97	0.48	57.5	36.8
8	21.5	0.914	12.45	11.92	0.53	63.5	40.7
9	23.3	0.907	12.45	11.88	0.57	68.3	43.7
10	25.0	0.900	12.45	11.83	0.62	74.2	47.6

** calculated as (using proportions) $VF = (1 - \text{coverage}) + [\text{coverage} \times (1 - \text{reduction in exposure})]$