Annex 17: Potential confounding data

This data was collected to identify potential confounding data.

Fuels for cooking, lighting, heating, boiling water, brewing, animal feed, and any other use

Table 1 – Type of Fuel Used (General)

Data was measured across all four rounds for the fuel which the woman generally used. The fuel reported by the woman is this question is for that used on a day to day basis – it does not reflect the fuel used on the day of monitoring. *Kenya*

In Kenya, low levels of fuelwood were used in round 4. Much of the fuel is 'twigs and scrub' and non-agri residues (wood shavings) that are the cheapest option. Two households adopted LPG. Wood and other residues were important second cooking fuel in Round 4, while charcoal use is less. One solar cooker was in use. *Nepal*

Total dependence was reported on biomass for cooking, wood being the most important, and this does not change across all the rounds. Lighting is split between kerosene and grid electricity. The changes between R1 and R2 suggest four more homes started using electricity and in R4, three homes reported solar PV. Fuel for preparing food to sell not tabulated as only one household reported this. *Sudan*

By round 4, there is an almost complete switch to LPG as the main cooking fuel, whilst the preferred second fuel has moved from wood to charcoal. For selling, results were somewhat difficult to interpret due to variable levels of reporting, particularly the low number in Round 3. Relatively little use of LPG for this purpose. Some biomass or charcoal will have been used for cooking at market. For lighting (main fuel) there is a reduction in use of kerosene and the increase in use of 'other' fuel, eleven households using car battery and one the local electric grid

Table 1 (Kenya): Type	e of Fuel U	sed (Ge	eneral)					
	Roun	d 1	Roun	d 2	Roun	d 3	Roun	d 4
	n	%	n	%	n	%	n	%
Cooking (1 st)								
- wood	19	73.1	19	73.1	20	76.9	13	50.0
 agg residues 	3	11.5	1	3.8	1	3.8	1	3.8
- other residues	0	0	0	0	2	7.7	6	23.1
- charcoal	2	7.7	3	11.5	1	3.8	1	3.8
- lpg	0	0	0	0	2	7.7	1	3.8
- other	2	7.7	3	11.5	0	0	4	15.4
Totals	26	100	26	100	26	100	26	100
Cooking (2 nd)								
- wood	2	7.7	6	25	3	12.5	11	44
- dung	2	7.7	1	4.2	1	4.2	0	0
- agg residues	4	15.4	3	12.5	1	12.5	3	12.0
- other residues	1	3.8	0	0	2	8.3	4	16.0
- charcoal	14	53.8	14	58.3	14	58.3	4	16.0
- kerosene	2	7.7	0	0	1	4.2	0	0
- lpg	0	0	0	0	0	0	1	4.0
- other	1	3.8	0	0	0	0	2	8.0
Totals	26	100	24	100	24	100	25	100
Selling (1 st)								
- wood	2		5		6		5	
- other residues	0		0		1		0	
- charcoal	1		0		1		0	
- other	1		0		0		1	
Totals	4		5		8		6	
Lighting (1 st)								

- kerosene	25	96.2	26	100	25	96.2	26	100
- grid electricity	0	0	0	0	0	0	0	0
- charcoal	1	3.8	0	Ő	1	3.8	0	Ő
Totals	26	100	26	100	26	100	26	100
Table 1 (Nepal): Type						1.00	1 = 0	
	Roun		Roun	d 2	Roun	d 3	Roun	d 4
	n	<u>%</u>	n	%	n	%	n	%
Cooking (1 st)		70	+ "	/0	l	70	+ "	70
- wood	31	100	31	100	31	100	31	100
Totals	31	100	31	100	31	100	31	100
Cooking (2 nd)								
- agg residues	31	100	31	100	25	100	30	100
Totals	31	100	31	100	25	100	30	100
Lighting (1 st)								
- keroséne	17	54.8	13	41.9	13	41.9	10	32.3
- solar PV	0	0	0	0	0	0	3	9.7
 grid electricity 	14	45.2	18	58.1	18	58.1	18	58.1
Totals	31	100	31	100	31	100	31	100
Table 1 (Sudan): Type	of Fuel U	sed (Ge	eneral)					
	Roun		Roun		Roun	d 3	Roun	d 4
	n	%	n	%	n	%	n	%
Cooking (1 st)								
- wood	17	60.7	14	50.0	0	0	0	0
 agg residues 	1	3.6	1	3.6	0	0	0	0
- charcoal	10	35.7	11	39.3	3	10.7	1	3.6
- lpg	0	0	2	7.1	25	89.3	27	96.4
Totals	28	100	28	100	28	100	28	100
Cooking (2 nd)								
- wood	11	39.3	10	37.0	3	11.1	4	15.4
- dung	1	3.6	1	3.7	1	3.7	0	0
- charcoal	16	57.1	15	55.6	22	81.5	22	84.6
- lpg	0	0	1	3.7	0	0	0	0
- solar cooker	0	0	0	0	1 27	3.7	0	0
	28	100	27	100	27	100	26	100
Selling (1 st) - wood	14	70.0	11	78.6	4		8	53.3
	14	5.0	0	78.0 0			0	0
 agg residues charcoal 	4	20.0	3	21.4	0 0		3	20.0
- kerosene	1	5.0	0	0	0		0	20.0
- lpg	0	0	0	0	3		1	6.7
- solar cooker	0	0	0	0	1*		3*	20.0
Totals	20	100	14	100	8	M!	15	100
Lighting (1 st)	~~~				Ť			
- Agg residues	0	0	1	3.7	0	0	0	0
- kerosene	21	75.0	20	74.1	17	60.7	10	35.7
- grid electricity	1	3.6	1	3.7	2	7.1	1	3.6
- batteries	0	0	0	0	1	3.6	0	0
- wax candle	0	0	1	3.7	2	7.1	0	0
- other (local grid)	6	21.4	4	14.8	4	14.3	17	60.7
- miscode	0	0	0	0	2	7.1	0	0
Totals	28	100	27	100	28	100	28	100

Table 2 – Type of Fuel Used (for cooking each meal during monitoring24 hrs)

Kenya

Many households did not cook a fourth meal during the day, so the numbers recorded for this measure are low. A few households record that 'other cooking' was done.

Nepal

Wood is the dominant fuel across all four rounds. In the fourth round there appears to be less food cooking, although a few more households were involved in brewing. The Adult Male Equivalent (AME) mean values assess the number of people for whom cooking was done. This is a factor which could be expected to change pollution levels. See table of association with pollution and exposure.

Sudan

The marked switch to LPG seen in the general fuel use question is confirmed in the 24-hour monitoring period, although there is some continued use of biomass. A very striking observation is that, whereas in Round 1 and 2 quite a few (between one-third and one-half) of homes reported using a second fuel (and this was mainly charcoal, wood, residues), after the intervention very few homes reported using a second fuel for these meals. There was very little change in the numbers (%) who reported other uses of the stove during the 24-hour monitoring period. Although homes reporting other uses of the stove had slightly higher levels of PM, room CO and woman CO, these were non-significant (t-test; Mann-Whitney)

Table 2 (Kenya) – Type	of Fuel U	sed(24h	r moni	toring)				
	Roun		Rou		Roun	d 3	Roun	d 4
	n	%	n	%	n	%	n	%
Meal 1 (1 st fuel)								
- no cooking	0	0	0	0	1	3.8	0	0
- wood	16	64.0	19	73.1	19	73.1	14	53.8
 agric residues 	3	12.0	3	11.5	0	0	2	7.7
- Other residues	0	0	1	3.8	2	7.7	5	19.2
- charcoal	3	12.0	2	7.7	1	3.8	1	3.8
- lpg	0	0	0	0	2	7.7	2	7.7
- other	3	12.0	1	3.8	1	3.8	2	7.7
Totals	25	100	26	100	26	100	26	100
Meal 2 (1 st fuel)								
- no cooking	0	0	0	0	0	0	1	3.8
- wood	15	62.5	20	76.9	20	76.9	13	50.0
 agric residues 	3	12.5	1	3.8	0	0	3	11.5
- other residues	0	0	0	0	3	11.5	3	11.5
- charcoal	3	12.5	3	11.5	1	3.8	1	3.8
- lpg	0	0	0	0	1	3.8	2	7.7
- other	3	12.5	2	7.7	1	3.8	3	11.5
Totals	24	100	26	100	26	100	26	100
Meal 3 (1 st fuel)								
- no cooking	0	0	2	7.7	0	0	0	0
- wood	17	68.0	20	76.9	21	80.8	13	50.0
 agric residues 	3	12.0	1	3.8	0	0	3	11.5
- other residues	0	0	1	3.8	2	7.7	4	15.4
- charcoal	2	8.0	2	7.7	1	3.8	1	3.8
- lpg	0	0	0	0	2	7.7	2	7.7
- other	3	12.0	0	0	0	0	3	11.5
Totals	25	100	26	100	26	100	26	100
Meal 4 (1 st fuel)								
- no cooking	1	5.3	11	47.8	5		10	40.0
- wood	12	63.2	10	43.5	8		9	36.0

agria rasiduas	2	10.5	0	0	0		1	4.0
 agric residues other residues 	2 0	0	0	4.3	0 0		1 3	4.0 12.0
	2	10.5	0		1		0	0
- charcoal			0	0	0		0	0
- lpg	0 2	0	-	-			2	-
- other		10.5	1	4.3	0			8.0
Totals	19!	100!	23	100	14	M!	25	100
Other cooking in 24 hrs?	0		47	70.0			00	00.5
No	2		17	73.9	11		23	88.5
Yes	6		6	26.1	5		3	11.5
Totals	8	M!	23	100	16	M!	26	100
Table 2 (Nepal) – Type of F			monito	ring)				
	Round	1	Round	2	Roun	d 3	Rour	nd 4
	n	%	n	%	n	%	n	%
Meal 1 (1 st fuel)								
- no cooking	0	0	1	3.2	0	0	0	0
- wood	31	100	30	96.8	31	100	31	100
Totals	31	100	31	100	31	100	31	100
Meal 2 (1 st fuel)	0.	100	01	100				
- no cooking	6	19.4	3	9.7	4	12.9	5	16.7
- wood	25	80.6	28	90.3	27	87.1	25	83.3
	25 31	100	20 31	100	31	100	25 31	100
Totals Meal 3 (1 st fuel)	31	100	31	100	31	100	31	100
				40.0	~	0.7		40.0
- no cooking	1	3.2	4	12.9	3	9.7	4	13.3
- wood	30	96.8	27	87.1	38	90.3	26	86.7
Totals	31	100	31	100	31	100	30	100
Meal 4 (1 st fuel)	_							
- no cooking	7	22.6	16	51.6	15	48.4	23	76.7
- wood	24	77.4	15	48.4	16	51.6	7	23.3
Totals	31	100	31	100	31	100	30	100
Other cooking in 24 hrs?								
No	26	83.9	26	83.9	31	100	23	74.2
Yes	5	16.1	5	16.1	0	0	8	25.8
Totals	31	100	31	100	31	100	31	100
Table 2 (Sudan) – Type of	Fuel Us	ed(24h	r monita	oring)				
	Round	1	Roun	d 2	Round	3	Round	4
	n	%	n	%	n	%	n	%
Meal 1 (1 st fuel)		70				70		70
- no cooking	0	0	5	19.2	4	14.8	7	25.0
- wood	19	67.9	9	34.6	0	0	0	0
- agric residues	1	3.6	0	0	0	Ő	0	Ŏ
- Other residues	0	0	0	Ŏ	0	0	2	7.1
- charcoal	8	28.6	10	38.5	5	18.5	1	3.6
- lpg	0	0	2	7.7	18	66.7	18	64.3
Totals	28	100	2 26	100	27	100	28	100
Meal 1 (2 nd fuel)	20	100	20	100	21	100	20	100
	0		0		0		0	
- no cooking	3		0		0		0	
- wood			1		0		0	
- agric residues	0		1		0		0	
- Other residues	1		2		0		1	
- charcoal	10		5		0		0	
- lpg	0		0		1		0	
Totals	14		9		1		1	
$\mathbf{M}_{\mathbf{r}} = \mathbf{I} \mathbf{O} \left(\mathbf{A}_{\mathbf{s}}^{\mathbf{s}} \mathbf{f}_{\mathbf{r}} = \mathbf{I} \right)$						44.0		44.0
Meal 2 (1 st fuel)	0	0	0	0	4	14.8	4	14.3
- no cooking	18	64.3	13	50.0	0	0	0	0
- wood	1	3.6	0	0	0	0	0	0
- agric residues	2	7.1	3	11.5	1	3.7	1	3.6
- other residues	7	25.0	9	34.6	1	3.7	3	10.7
- charcoal	0	0	1	3.8	21	77.8	20	71.4
		1					L	
- lpg		4.00	00	400				
	28	100	26	100	27	100	28	100
- lpg Totals		100		100		100		100
- lpg Totals Meal 2 (2 nd fuel)	0	100	0	100	1	100	0	100
- lpg Totals		100		100		100		100

- agric residues	0		0		1		2	
- other residues	8		8		1		0	
- charcoal	0		1		0		1	
- lpg								
Totals	9		16		3		5	
Meal 3 (1 st fuel)								
- no cooking	0	0	1	3.7	2	7.4	2	7.1
- wood	5	20.8	11	40.7	1	3.7	0	0
- agric residues	1	4.2	0	0	0	0	0	0
- other residues	2	8.3	3	11.1	2	7.4	2	7.1
- charcoal	16	66.7	10	37.0	2	7.4	2	7.1
- lpg	0	0	2	7.4	20	74.1	22	78.6
Totals	24	100	27	100	27	100	28	100
Meal 3 (2 nd fuel)								
- no cooking	0		0		0		0	
- wood	0		0		0		1	
- agric residues	0		1		0		0	
- charcoal	2		7		0		0	
Totals	2		8		0		1	
Meal 4 (1 st fuel)								
- no cooking	0		0		0		27	
- wood	0		1		0		0	
- agric residues	0		0		0		0	
- other residues	0		0		0		0	
- charcoal	0		0		0		0	
- lpg	0		0		0		1	
Totals	0		1		0		28	
Meal 4 (2 nd fuel)								
- no cooking	0		0		0		0	
- wood	0		0		0		0	
- other residue	0		1		0		0	
- agric residues	0		0		0		0	
- charcoal	0		0		0		0	
Totals	0		1		0		0	
			1	1		1	1	
Other cooking in 24 hrs?								
No	18	64.3	17	63.0	18	66.7	18	64.3
Yes	10	35.7	10	37.0	9	33.3	10	35.7
Totals	28	100	27	100	27	100	28	100

Gathering of fuel, scarcity and dampness

Kenya

Scarcity was one of the reasons for fuel purchase, and this varied over the different rounds.

Nepal

A reduction in those reporting scarcity was recorded over the rounds. Use of green fuel seems to show a seasonal change. Use of green fuel before interventions (R1 and 2) is similar to afterwards (R3 and 4). Dampness is inconsistent and does not relate to use of green fuel.

Sudan

It appears that less fuel is gathered after the intervention. The main 'reason for buying fuel' after the intervention (LPG) remains scarcity of supply. Unsurprisingly, there are few responses to adequacy of supply. Use of green fuel is consistent with some continued use of biomass after the intervention. Dryness is not an issue for those who switched completely to LPG and so the question is omitted –about one-third, while the seasonal patterns remain for the rest.

	Roun	d 1	Roun	d 2	Roun	d 3	Roun	d 4
	n	%	n	%	n	%	n	%
Is fuel gathered								
- mostly gathered	5	20.0	6	23.1	5	19.2	5	20.4
- all gathered	4	16.0	3	11.5	8	30.8	4	15.4
- mostly bought	12	48.0	10	38.5	8	30.8	9	34.6
- all bought	4	16.0	7	26.9	5	19.2	8	30.8
Totals	25	100	26	100	26	100	26	100
If fuel bought, why?			-		-			
- scarcity	18	75.0	14	58.3	12	46.2	9	36.0
- faster than gather	1	4.2	3	12.5	1	3.8	2	8.0
- cleaner	0	0	0	0	1	3.8	1	4.0
- other	5	20.8	7	29.2	12	46.2	13	52.0
Totals	24	100	24	100	26	100	25	100
How adequate supplies?								
- very scarce	3		3		5		3	
- rather scarce	5		7		3		5	
- just enough	5		6		8		5	
- plentiful	3		3		3		0	
Totals	16		19		19		13	
How often use green fuel?								
- n/a	4	17.4	2	8.0	1	4.2	10	38.5
- never	1	4.3	3	12.0	8	33.3	7	26.9
- occasionally	16	69.6	18	72.0	10	41.7	9	34.6
- usually	2	8.7	2	8.0	5	20.8	0	0
Totals	23	100	25	100	24	24	26	100
How dry is main fuel?								
- n/a	1	3.8	1	3.8	1	3.8	5	19.2
- very dry	9	34.6	10	38.5	10	38.5	6	23.1
- dry	9	34.6	11	43.3	12	46.2	12	46.2
- damp	4	15.4	2	7.7	2	7.7	0	0
- wet	1	3.8	0	0	0	0	0	0
- green	2	7.7	1	3.8	1	3.8	3	11.5
Totals	26	100	26	100	26	100	26	100
Table 3 Nepal – Gatherii	ng of fue	l, scarcit	y and o	dampnes	SS			
E.	Roun		Round 2		Round 3		Round 4	
	n	%	n	%	n	%	n	%
Is fuel gathered								

- all gathered	28	90.3			17	54.8	31	100
- mostly gathered	3	9.7			14	45.2	0	0
- mostly bought	0	0			0	0	0	0
- all bought	0	0			0	0	0	0
Totals	31	100			31	100	31	100
If fuel bought, why?								
- scarcity	21	77.8	31	100	30	96.8	30	96.8
-other	6	22.2	0	0	0	0	0	0
- 6 (?)	0		0		1	3.2	1	3.2
Totals	27	100	31	100	31	100	31	100
How adequate supplies?								
- very scarce	9	29.0	8	25.8	5	16.1	1	3.2
- rather scarce	16	51.6	8	25.8	15	48.4	3	9.7
- just enough	6	19.4	14	45.2	11	35.5	26	83.9
- plentiful	0	0	1	3.2	0	0	1	1
Totals	31	100	31	100	31	100	31	100
How often use green fuel?		•			•		•	
- n/a	0	0	1	3.2	0	0	0	0
- never	9 22	29.0 71.0	17 12	54.8 38.7	5 26	16.1 83.9	26 5	83.9 16.1
- occasionally		-					5	16.1
- usually Totals	0 31	0 100	1 31	3.2 100	0 31	0 100	0 31	100
How dry is main fuel?	31	100	31	100	31	100	31	100
- very dry	3	9.7	1	3.2	4	12.9	0	0
- dry	12	38.7	22	71.0	4 25	80.6	21	67.7
- damp	13	41.9	8	25.8	2	6.5	9	29.0
- wet	1	3.2	0	0	0	0.0	1	3.2
- green	2	6.5	0	ů 0	0	Ŏ	0	0
Totals	31	100	31	100	31	100	31	100
Table 3 Sudan – Gathering							_	
	Round		Rou		Rou	nd 3	Rou	nd 4
	n	. %	n	%	n	%	n	%
Is fuel gathered?		70		70		70		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
- all gathered	1	3.8	1	3.7	0	0	0	0
- mostly gathered	0	0	0	0	0	0	0	0
- mostly bought	5	19.2	6	22.2	1	4.2	1	3.7
- all bought	20	76.9	16	59.3	22	91.7	25	92.6
- code 5	0	0	0	0	0	0	1	3.7
- 99	0	0	4	14.8	1	4.2	0	0
Totals	26	100	27	100	24	100	27	100
If fuel bought, why?								
- scarcity	27	100	23	85.2	17	60.7	13	46.4
- faster than gathering	0	0	0	0	5	17.9	6	21.4
- cleaner	0	0	0	0	4	14.3	8	28.6
- other	0 27	0	4 27	14.8	2 28	7.1	1 28	3.6
Totals How adequate supplies?	21	100	21	100	28	100	28	100
	1		2		0		0	
 very scarce rather scarce 	2		0		0 0		0	
- just enough	1		1		1		0	
- code 9	0		0		0		1	
Totals	4		3		1		1	
How often use green fuel?					- · ·			
- n/a	2	7.4	1	3.7	8	28.6	13	48.1
- never	4	14.8	14	51.9	7	25.0	5	18.5
- occasionally	17	63.0	10	37.0	12	42.9	9	33.3
- usually	4	14.8	2	7.4	1	3.6	0	0
Totals	27	100	27	100	28	100	27	100
How dry is main fuel?								
- n/a	0	0	1	3.7	7	25.9	11	40.7
- very dry	0	0	13	48.1	1	3.7	6	22.2
- dry	16	57.1	10	37.0	9	33.3	10	37.0
- damp	11	39.3	3	11.1	9	33.3	0	0
- wet	1	3.6	0	0	1	3.7	0	0
Totals	28	100	27	100	27	100	27	100

Table 2 (K	enya): Total cost o	f fuel		
	Round 1		Round 3	Sig.
Mean	95% CI	Mean	95% CI	p-value*
323.52	248.01-399.03	312.02	239.34-384.70	0.777
Median	IQR [@]	Median	IQR [@]	p-value ⁺
295.00	170.00-445.00	330.00	135.00-485.00	0.849
	Round 2		Round 4	Sig.
Mean	95% CI	Mean	95% CI	p-value*
301.08	238.34-363.81	190.38	148.39-232.38	0.004
Median	IQR [@]	Median	IQR [@]	p-value⁺
297.50	182.00-430.00	175.00	137.50-246.25	0.003
Table 4 (N	epal): Total cost of	fuel		
	Round 1		Round 3	Sig.
Mean	95% CI	Mean	95% CI	p-value*
91.74	76.76-106.73	55.54	48.00-63.10	<0.0005
Median	IQR [@]	Median	IQR [@]	p-value⁺
80.00	60.00-120.00	57.00	40.00-70.00	<0.0005
	Round 2		Round 4	Sig.
Mean	95% CI	Mean	95% CI	p-value*
90.81	70.59-111.03	78.06	68.91-87.22	0.265
Median	IQR [@]	Median	IQR [@]	p-value⁺
80.00	40.00-120.00	80.00	50.00-100.00	0.546
Table 4 (S	udan): Total cost o	f fuel		
	Round 1		Round 3	Sig.
Mean	95% CI	Mean	95% CI	p-value*
1382.53	1192.68-1572.39	789.07	651.27-926.86	<0.0005
Median	IQR [@]	Median	IQR [@]	p-value⁺
1370.00	1046.00-1732.50	681.00	508.50-969.50	<0.0005
	Round 2		Round 4	Sig.
Mean	95% CI	Mean	95% CI	p-value*
1299.75	969.25-1630.25	969.35	830.32-1108.38	0.057
Median	IQR [@]	Median	IQR [@]	p-value⁺
1205.00 [@] latar avert	792.50-1597.50	893.65	726.25-1088.75	0.062

[@]Inter-quartile range *Paired t-test (parametric) ⁺Wilcoxon Signed Ranks Test (non-parametric)

Table 5: Smoking status

Kenya

No smoking was reported by any of the cooks involved in this study, and the level of reporting of others in the kitchen was also very low.

Nepal

There appears to be a reduction in smoking across the rounds.

Sudan

Only two / three woman smoke, but at least half of homes report others smoking in the kitchen, albeit 'occasionally' for most. See separate analysis of pollution and exposure levels in smokers.

Table 5 (Kenya): Smoking	status	6						
	Roun		Rour	nd 2	Roun	id 3	Roun	d 4
	n	%	n	%	n	%	n	%
Do you smoke?								
- No	18	100	26	100	23	100	26	100
- Yes	0	0	0	0	0	0	0	0
Totals	18	100	26	100	23	100	26	100
Others smoke in kitchen?								
- no	9		18	81.8	20	90.9	23	88.5
- occasionally	1		1	4.5	1	4.5	1	3.8
- regularly	3		3	13.6	1	4.5	2	7.7
Totals	13		22	100	22	100	26	100
Table 5 (Nepal): Smoking					1			
	Roun		Roun	d 2	Roun	d 3	Roun	d 4
	n	%	n	%	n	%	n	%
Do you smoke?								
- yes	3	11.1	4	12.9	0	0	0	0
- no	24	88.9	27	87.1	31	100	31	100
Totals	27	100	31	100	31	100	31	100
Others smoke in kitchen?			_			_		
- no	9	?	7	22.6	16	51.6	22	71.0
- occasionally	6	?	21	67.7	15	48.4	9	29.0
- regularly	2	?	3	9.7	0	0	0	0
Totals	17	M!	31	100	31	100	31	100
Table 5 (Sudan): Smoking				1.0		1.0		1.4
	Roun		Rour		Roun		Roun	
	n	%	n	%	n	%	n	%
Do you smoke?							_	
- yes	2	7.1	3	11.5	2	7.7	3	10.7
- no	26	92.9	23	88.5	24	92.3	25	89.3
Totals	28	100	26	100	26	100	28	100
Others smoke in kitchen?								
- no	12	42.9	9	37.5	12	46.2	13	54.2
- occasionally	14	50.0	13	54.2	12	46.2	10	41.7
- regularly	2	7.1	2	8.3	2	7.7	1	4.2
Totals	28	100	24	100	26	100	24	100

Table 6 – Features of kitchen and house

Kenya

Note the change in number of windows. It can be seen that about 70% of homes have hood/flue based on extraction data. Shape codes allow the volume of the kitchen to be calculated.

Nepal

Changes recorded in kitchen type, windows and roof type are due to interpretation. Permanent ventilation inconsistencies in R1 and R2 are due to way dimensions interpreted.

Sudan

There is a gradual change across rounds in kitchen type (enclosed/semi-open) and an increase in the number of households with the kitchen as part of the main living area. Changes in roof type are reported, whilst permanent ventilation unchanged. There was essentially no change in type of walls for kitchen but the number of windows has increased.

Table 6 (Kenya) – Features	s of kitch	en and h	ouse					
	Round	1	Roun	d 2	Roun		Roun	d 4
	n	%	n	%	n	%	n	%
Type of kitchen								
- enclosed	23	88.5	25	96.2	25	96.2	25	96.2
- semi-open	3	11.5	1	3.8	1	3.8	1	3.8
Totals	26	100	26	100	26	100	26	100
Type of kitchen building								
- separate building	17	65.4	16	64.0	16	61.5	16	63.1
- sep/attached	4	15.4	3	12.0	4	15.4	2	7.7
- part of main liv area	5	19.2	6	24.0	6	23.1	8	30.8
Totals	26	100	25	100	26	100	26	100
Type of roof								
- iron sheets	21	80.8	21	80.8	22	84.6	23	88.5
- thatch	4	15.4	4	15.4	3	11.5	3	11.5
- tiles	1	3.8	1	3.8	1	3.8	0	0
Totals	26	100	26	100	26	100	26	100
Permanent ventilation	20	100		100		100		100
- none	24	100	24	100	26	100	26	100
Totals	24	100	24	100	26	100	26	100
Type of walls	27	100	24	100	20	100	20	100
- mud	25	96.2	25	96.2	25	96.2	25	96.2
- soil/ cement blocks	1	3.8	1	3.8	1	3.8	1	3.8
Totals	26	100	26	100	26	100	26	100
	20	100	20	100	20	100	20	100
Number of windows	4.4	44.0	10	40.0	2		2	44.5
- 0 - 1	11	44.0	10 12	40.0 48.0	2	7.7 42.3	3 12	11.5
•	11	44.0					. –	46.2
- 2+	3	12.0	3	12.0	13	50.0	11	42.3
Totals	25	100	25	100	26	100	26	100
Door status					~			
- open most time	21	84.0	20	80.0	21	80.8	25	96.2
 closed most time 	4	16.0	5	20.0	5	19.2	1	3.8
Totals	25	100	25	100	26	100	26	100
Stove alight at night?								
- yes	3	13.08	1	3.8	1	4.0	0	0
- no	20	7.0	25	96.2	24	96.0	26	100
Totals	23	100	26	100	25	100	26	100
Any smoke extraction?								
- yes	0	0	0	0	18	69.2	19	73.1
- no	25	100	25	100	8	30.8	7	26.9
Totals	25	100	25	100	26	100	26	100
Shape code for kitchen								
- A	3	12.0	3	12.0	3	12.5	3	12.5
- B	9	36.0	9	36.0	8	33.3	9	37.5
- C	0	0	0	0	1	4.2	1	4.2
- D	13	52.0	13	52.0	12	50.0	10	41.7
- 5	0	0	0	0	0	0	1	4.2
Totals	25	100	25	100	24	100	24	100

Table 6 (Nepal)– Features	Roun		Roun	d 2	Roun	43	Round	4
	n	<u>%</u>	n	u 2 %	n	<u> </u>	n	- %
Type of kitchen		70		70	- "	70		70
- enclosed	3	9.7	1	3.2	2	6.5	0	0
- semi-open (see note)	28	90.3	30	96.8	29	93.5	31	100
Totals	31	100	30	100	31	100	31	100
	31	100	31	100	31	100	31	100
Type of kitchen building							•	
- separate building	1	3.2	1	3.2	0	0	0	0
- part of main liv area	30	96.8	30	96.8	31	100	31	100
Totals	31	100	31	100		100		100
Type of roof (see note)								
- Mud or dung	0		0		0		4	
- iron sheets	1		0		0		0	
- thatch	0		0		1		0	
- other (wood tiles)	30		31		30		27	
Totals	31	100	31	100	31	100	31	100
Permanent ventilation								
- None	4	12.9	1	3.2	0	0	0	0
- Small holes (<10 cm)	11	35.5	26	83.9	0	0	2	6.5
- Large holes (>10 cm)	15	48.4	2	6.5	31	100	29	93.5
- No roof, very open roof	1	3.2	2	6.5	0	0	0	0
Totals	31	100	31	100	31	100	31	100
Type of walls			-				-	
- stone	31	100	31	100	30	96.8	31	100
- other	0	0	0	0	1	3.2	0	0
Totals	31	100	31	100	31	100	31	100
Number of windows			•				•	
- 0	0	0	0	0	0	0	0	0
- 1	27	87.1	14	45.2	30	96.8	30	96.8
- 2+	4	12.9	17	54.8	1	3.2	1	3.2
Totals	31	12.3	31	100	31	100	31	100
	31	100	31	100	31	100	31	100
Door status	27	90.0	22	71.0	30	06.0	31	100
- open most time			22	-		96.8	-	
- closed most time	3	10.0	9	29.0	1	3.2	0	0
Totals	30	100	31	100	31	100	31	100
Stove alight at night?								
- yes	9	29.0	4	12.9	3	9.7	No	
- no	22	71.0	23	74.2	28	90.3	Data	
- code 3	0	0	4	12.9	0	0		
Totals	31	100	31	100	31	100	31	100
Any smoke extraction?								
- yes	0	0	0	0	31	100	31	100
- no	31	100	31	100	0	0	0	0
Totals	31	100	31	100	31	100	31	100
Shape code for kitchen								
- A	29		31		31		31	
- B	2		0		0		0	
Totals	31		31		31		31	1

Table 6 (Sudan)– Feature	s of kitcl	hen and	house	;				
	Round		Roun		Roun	d 3	Roun	d 4
	n	%	n	%	n	%	n	%
Type of kitchen								
- enclosed	19	67.9	20	71.4	21	75.0	22	78.6
- semi-open	9	32.1	8	28.6	7	25.0	6	21.4
Totals	28	100	28	100	28	100	28	100
Type of kitchen building								
- separate building	24	85.7	23	82.1	22	78.6	19	67.9
- sep/attached	4	14.3	4	14.3	4	14.3	5	17.9
- part of main liv area	0 0	0	1	3.6	2	7.1	4	14.3
Totals	28	100	28	100	28	100	28	100
Type of roof	20	100			20	100	20	100
- mud or dung	2	7.1	3	10.7	6	21.4	5	17.9
- ferro-cement	0	0	1	3.6	1	3.6	0	0
- thatch	24	85.7	23	82.1	21	75.0	22	78.6
- other	24	7.1	1	3.6	0	0	1	3.6
Totals	28	100	28	100	28	100	28	100
	20	100	20	100	20	100	20	100
Permanent ventilation - None	25	00.0	25	00.0	20	00.0	27	00.4
	25	92.6	25	92.6	26	92.9	27	96.4
- Small holes <10cm	1	3.7	1	3.7	1	3.6	1	3.6
- No roof/v open roof	1	3.7	1	3.7	1	3.6	0	0
Totals	27	100	27	100	28	100	28	100
Type of walls								
- mud	11	39.3	10	35.7	10	35.7	11	39.3
- soil/ cement blocks	0	0	1	3.6	1	3.6	0	0
- wattle	3	10.7	5	17.9	4	14.3	4	14.3
- other (thatch, plastic)	14	50.0	12	42.9	12	42.9	12	42.9
- code 8	0	0	0	0	1	3.6	1	3.6
Totals	28	100	28	100	28	100	28	100
Number of windows								
- 0	15	53.6	12	42.9	9	33.3	9	33.3
- 1	3	10.7	5	17.9	6	22.2	6	22.2
- 2+	10	35.7	11	39.2	12	44.4	12	44.4
Totals	28	100	28	100	27	100	27	100
Door status								
 open most time 	27	96.4	25	89.3	24	88.9	26	96.3
 closed most time 	1	3.6	3	10.7	3	11.1	1	3.7
Totals	28	100	28	100	27	100	27	100
Stove alight at night?								
- yes	0	0	0	0	0	0	0	0
- no	28	100	25	100	27	100	27	100
Totals	28	100	25	100	27	100	27	100
Any smoke extraction?								
- yes	0	0	0	0	0	0	0	0
- no	28	100	28	100	28	100	28	100
Totals	28	100	28	100	28	100	28	100
Shape code for kitchen								
- A	9	32.1	11	39.3	10	35.7	9	32.1
- A - B	9	32.1	9	32.1	9	32.1	11	39.3
- C	9	32.1	8	28.6	9	32.1	8	28.6
- C - D	1	3.6	0	0	0	0	0	0
Totals	28	100	28	100	28	100	28	100

Table 7: Season, Temperature and Rainfall

One aspect that was not measured during this study was the amount of wind. In Gatlang, when the wind blew, it adversely affected the efficacy of the smoke hood.

Kenya

General rainfall reflects season variation, but note that Round 4 is very dry 24 hour monitoring rainfall is consistent with general rainfall, Round 4 again very dry

Nepal

Adult Male Equivalent (AME) of those for whom food was cooked shows some reduction across the rounds. There is a weak (marginally significant) +ve correlation (Spearman rho = 0.183; p=0.042) between PM3.5 and AME [but this is not independent of the effect of the intervention]. Both general rainfall, and 24-hour rainfall show that Round 4 was wetter.

Sudan

There is a reduction in AME across rounds. Post-intervention rounds were a little cooler and recent rainfall reflects season variation, although Round 1 (wet) was drier than Round 3 (wet). 24 hour monitoring rainfall is consistent with general rainfall.

Table 7 (Kenya): Season	, Temp	erature a	nd Rai	nfall				
	Round 1		Round 2		Round 3		Round 4	
	n	Mean SD	n	Mean SD	n	Mean SD	n	Mean SD
Meals cooked - AME Total		17.3		16.7		18.5		15.4
mean (sd)	25	6.92	25	8.84	24	15.11	25	6.65
Temperature (minimum)		23.1		23.1		22.9		22.9
mean (sd)	25	1.61	25	2.18	24	0.92	25	0.83
Temperature (maximum)		28.6		27.7		28.0		28.0
mean (sd)	25	1.67	25	2.38	24	2.38	25	1.23
Rainfall (general)								
 heavy all the time 	5	19.2	0	0	6	23.1	0	0
- rain sometimes	11	42.3	7	26.9	12	26.2	1	3.8
 few showers 	9	34.6	9	34.6	5	34.6	2	7.7
- very dry	1	3.8	10	38.5	3	38.5	23	88.5
Totals	26	100	26	100	26	100	26	100
Rainfall (24hr monitoring)								
 heavy all the time 	2	7.7	0	0	6	23.1	0	0
 rain sometimes 	8	30.8	8	30.8	11	42.3	0	0
- few showers	12	46.2	6	23.1	7	26.9	2	7.7
- very dry	4	15.4	12	46.2	2	7.7	24	92.3
Totals	26	100	26	100	26	100	26	100
Table 7 (Nepal): Season,								
	Round 1		Round 2		Round 3		Round 4	
	n	Mean SD	n	Mean SD	n	Mean SD	n	Mean SD
Meals cooked - AME Total	31	13.3	31	16.3	31	12.5	31	11.0
mean (sd)		5.33		7.14		4.78		4.64
Temperature (minimum)	31	2.7	31	10.6	31	3.3	31	4.7
mean (sd)		2.35		3.96		2.88		0.94
Temperature (maximum)	31	13.7	31	23.4	31	16.2	31	28.1
mean (sd)		5.17		2.95		2.45		3.10
Rainfall (general)								
- heavy all the time	1	3.2	4	12.9	2	6.5	0	0
- rain sometimes	4	12.9	0	0	3	9.7	26	83.9
- few showers	3	9.7	4	12.9	1	3.2	5	16.1
	23	74.2	23	74.2	25	80.6	0	0
- very dry							-	
Totals	31	100	31	100	31	100	31	100

Rainfall (24hr monitoring)										
- heavy all the time	1	3.2	6	19.4	4	12.9	1	3.2		
- rain sometimes	2	6.5	0	0	0	9	20	64.5		
- few showers	2	6.5	5	16.1	3	9.7	9	29.0		
- very dry	26	83.9	20	64.5	23	74.2	1	3.2		
- code 5	0	0	0	0	1	3.2	0	0		
Totals	31	100	31	100	31	100	31	100		
Rainfall (24hr monitoring)										
- rain heavy/sometimes	3	9.7	6	19.4	4	13.3	21	67.8		
- few showers/very dry	28	90.3	25	80.6	26	86.7	10	32.2		
Totals	31	100	31	100	30	100	31	100		
Table 7 (Sudan): Season, Temperature and Rainfall										
	Round 1		Round 2		Round 3		Round 4			
	Wet		Dry		Wet		Dry			
	n	Mean	n	Mean	n	Mean	n	Mean		
		SD		SD		SD		SD		
Meals cooked - AME Total	28	15.7	27	14.5	28	13.5	27	11.0		
mean (sd)		6.83		7.67		6.38		6.71		
Temperature (minimum)	28	23.9	27	23.9	28	23.7	27	20.1		
mean (sd)		2.66		2.71		2.00		2.38		
Temperature (maximum)	28	38.3	27	38.3	28	34.4	27	37.1		
mean (sd)		2.03		2.06		3.71		2.63		
Rainfall (general)										
- heavy all the time	1	3.6	0	0	1	3.7	0	0		
- rain sometimes	0	0	0	0	5	18.5	0	0		
- few showers	2	7.1	0	0	7	25.9	0	0		
- very dry	25	89.3	28	100	13	48.1	28	100		
- code 5	0	0	0	0	1	3.7	0	0		
Totals	28	100	28	100	27	100	28	100		
Rainfall (24hr monitoring)	20	100	20	100		100	20	100		
- heavy all the time	0	0	0	0	0	0	0	0		
- rain sometimes	1	3.6	0	0	7	28.0	0	0		
- few showers	2	7.1	0	0	8	32.0	0	0		
- very dry	25	89.3	28	100	9	36.0	28	100		
- code 5	0	0	0	0	1	4.0	0	0		
Totals	28	100	28	100	25	100	28	100		