Biogas Users' Survey - 2008

General Findings

Netherlands

Development

Organisation

Prakash C. Ghimire

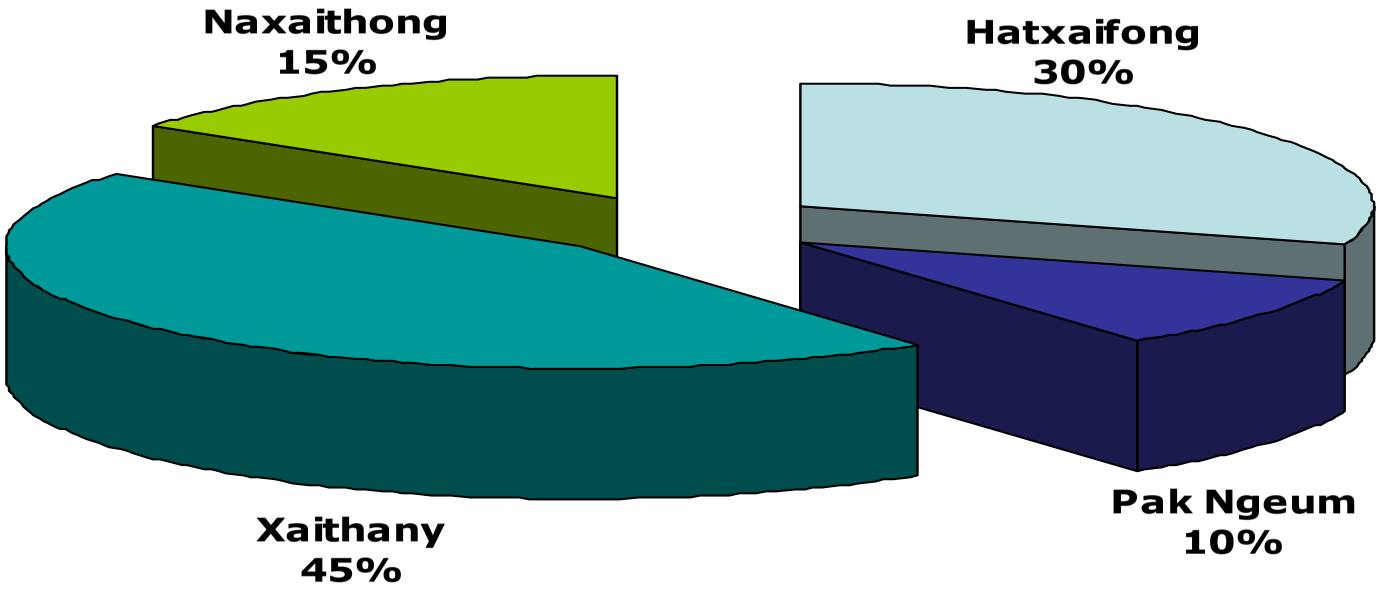
February 2007

SNV

Connecting People's Capacities

Overview of Biogas Plants Visited

Total No. of Plants Surveyed – 20



SNV

Connecting People's Capacities

Socio-economic data

Total population in 20 hhs: 102 persons;
Male-48 persons (47%), Female-54 persons (53%)
Family Size: Average 5.1 persons (min-3 persons, max-9 persons)
Literacy rate: Average 92% (male – 96%; female – 88%)

Average Land Holding

Arable Land: Average 2.75 ha (min-0 ha, max-11 ha)
Non-arable Land: Average 0.38 (min-0 ha, max-4 ha)
Total land holding: Average: 3.13 ha (min-0.1 ha, max-11 ha)

Cattle Holding

Cow/Oxen:Average-13.0 (min-0, max-42)

Buffalo:Average-1 (min-0, max-13)

Pig: Average-9 (min-0, max-75)

Only one household has Goat (5 nos).

Chicken: Average-41 (min-0, max-120)

Income/Expenditure

Particulars	Minimum per year in US$	Maximum per year in US$	Average per year in US$
Income	1160.0	14038.2	5722.2
Expenditure	912.0	7200.0	2868.0
Surplus	-40.0	12363.2	2854.2

Age of Biogas Plants (Months of Installation)

8 months - 1 No.
6 months - 8 Nos.
3 months - 2 Nos.
7 months - 3 Nos.
5 months -1 No.
2 months - 5 Nos.

Cost of Installation

Size of plant	Average cost in US$	Minimum Cost in US$	Maximum Cost in US$
4	359	350	380
6	410	410	410
8	450	450	450

Average time required for construction of plant: 16.4 days
Maximum: 40 days (because of ground-water problem)
Minimum: 10 days

SNV

Connecting People's Capacities

Information on Feeding

Average Size of Biogas Plants: 4.3 cum

Required quantity of dung to be feed: 35 kg/day/plant

Available quantity of feeding: 105 kg of dung/day/household

Actual quantity of dung feed daily:

25.45 kg/day (73% of the required quantity)

25.45 kg/day (24% of the total production)

All the 20 households produce required quantity of dung however, on an average the plants are under-fed

Information on Feeding (contd..)

Feeding Rate	% of plants
less than 50% feeding	5%
51-60% feeding	0%
61-70% feeding	40%
71-90% feeding	30%
More than 90% feeding	25%

Information on Gas Production

Required average quantity of dung to be feed: 35 kg/plant/day

Theoretical quantity of gas production based upon plant size:
1.4 cum/plant/day

Available average quantity of feeding (dung produced):
105 kg/day/household

Actual quantity of dung fed into the plant (loading rate):
25.45 kg/plant/day

Theoretical quantity of gas production based upon actual feeding:
1.01cum/day/plant

Actual quantity of gas being produced based upon stove burning hour:
0.98 cum/day/plant

Efficiency of biogas plants based upon their storage capacity: 70%

Efficiency of biogas plants based upon feeding and burning hour: 97%

Average actual burning hours of stove: 2.8 hour/day/household

Anticipated burning hour as per family requirements:
3.1 hours/day/household

SNV

Connecting People's Capacities

Frequency of Operational Activities

Activities	Daily	Once in a week	Once in two weeks	As and when Needed	Never
Plant Feeding	19	1	-	-	-
Use of Main valve	4	1	-	13	2
Checking leakages	-	4	1	2	13
Use of Water drain	5	5	1	1	8
Cleaning of outlet/ overflow opening	2	9	2	3	4
Maintaining compost pits	6	1	1	1	11
Oiling of gas tap	-	-	-	3	17
Cleaning of gas stove	10	4	1	3	2
Cleaning of gas lamp	-	-	-	-	4

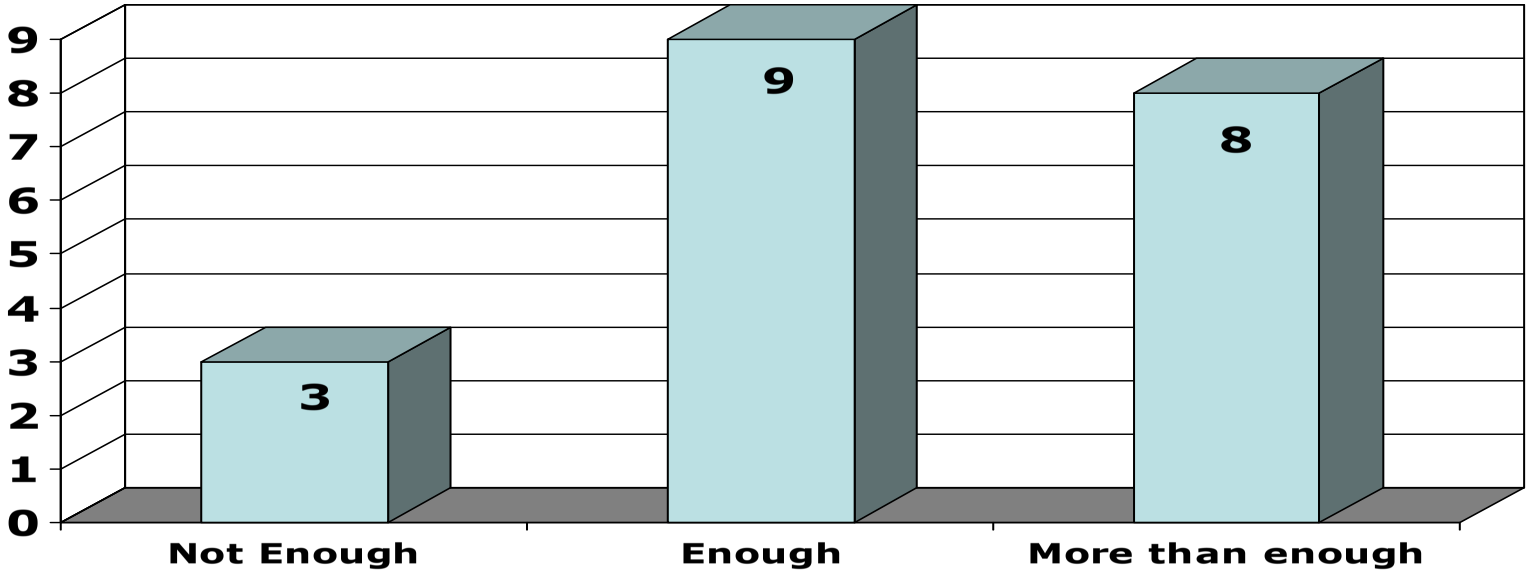
SNV

Connecting People's Capacities

Common Problems Reported

Common Problems Reported	% of plants
Leakage of Gas through pipe joints	20%
Less gas production than anticipated	15%
Leakages in outlet tank (slurry hardens)	10%
Faulty pressure gauge	10%
Problems with breakage of lamps	10%
Broken/damaged pipelines	5%
Leakage through gas tap	5%

Sufficiency of biogas



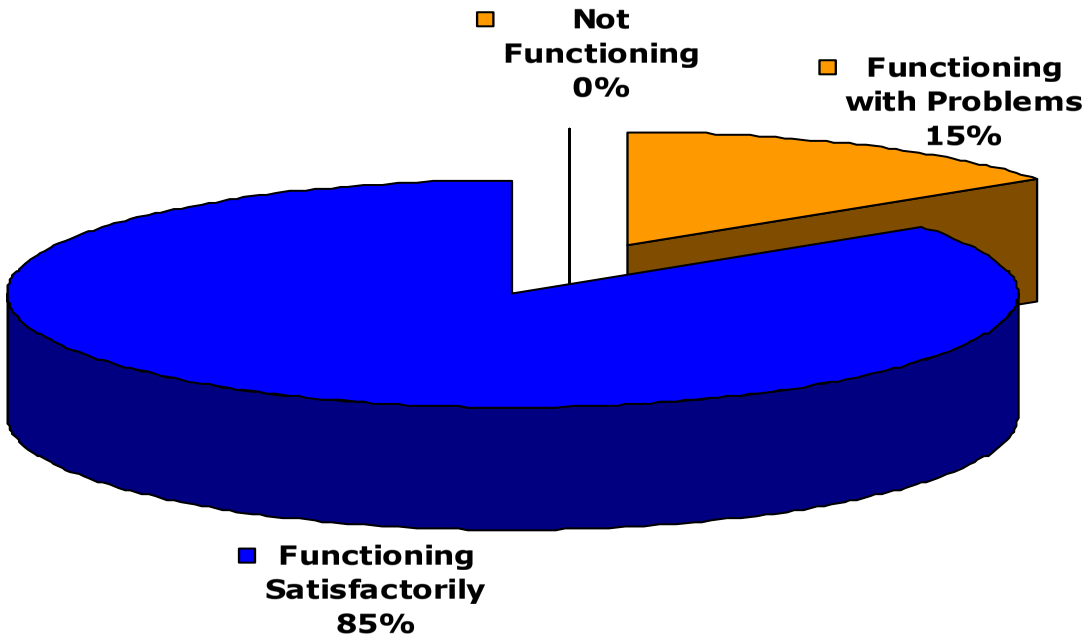
Reasons for Less gas as responded by users

- Less gas production due to defective construction
- The size of the plant is small
- Less gas due to leakages

SNV

Connecting People's Capacities

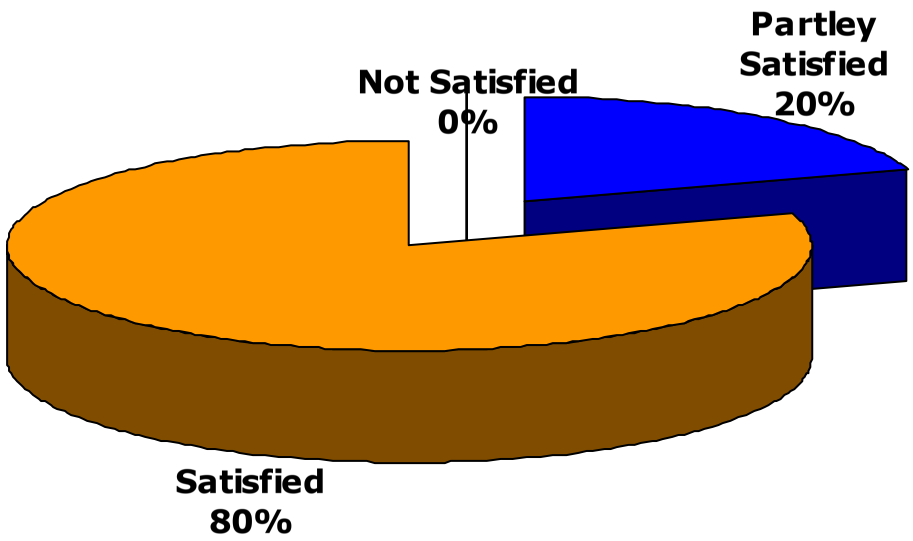
Functioning of Biogas Plants



SNV

Connecting People's Capacities

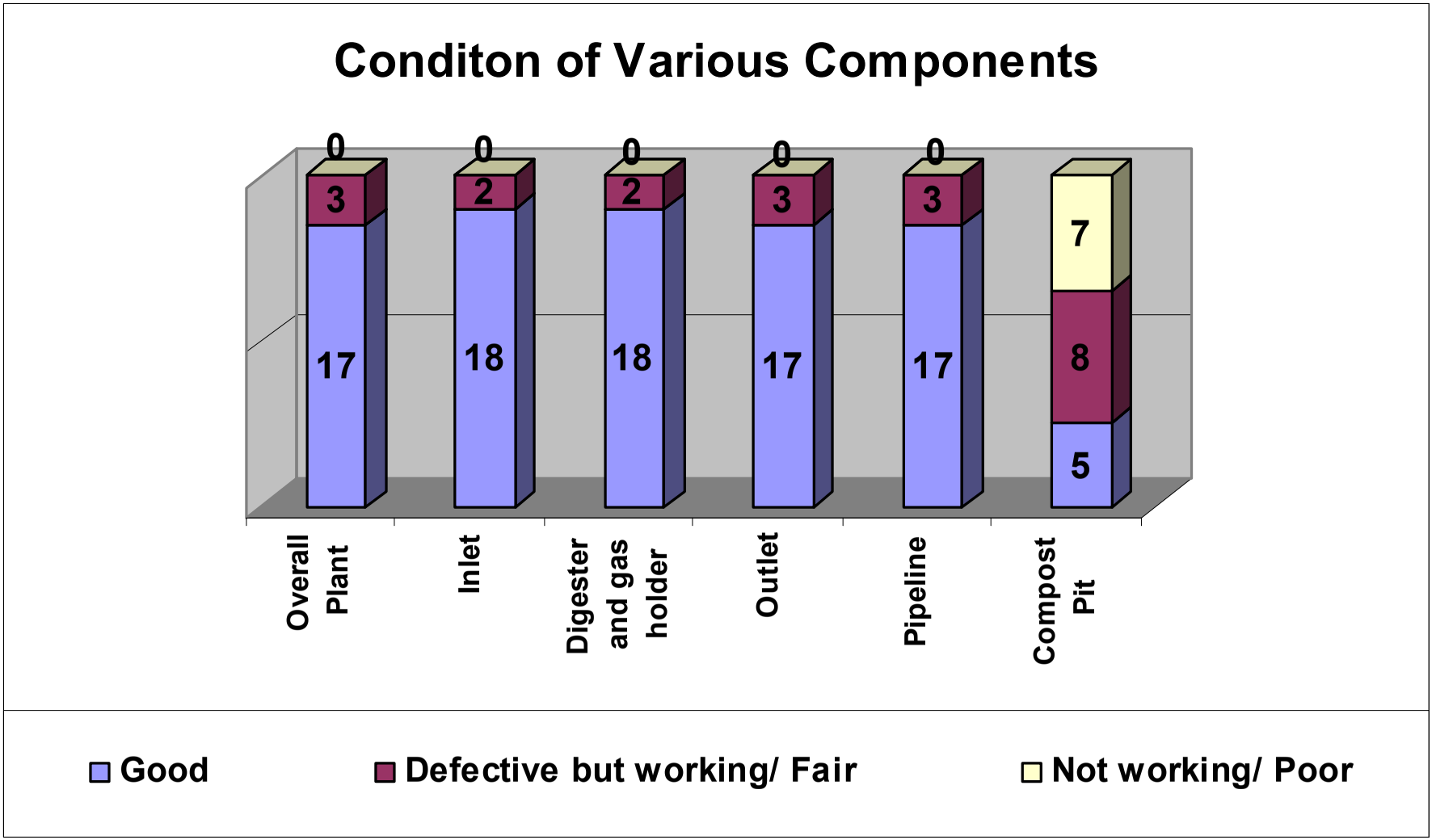
Level of users' satisfaction



SNV

Connecting People's Capacities

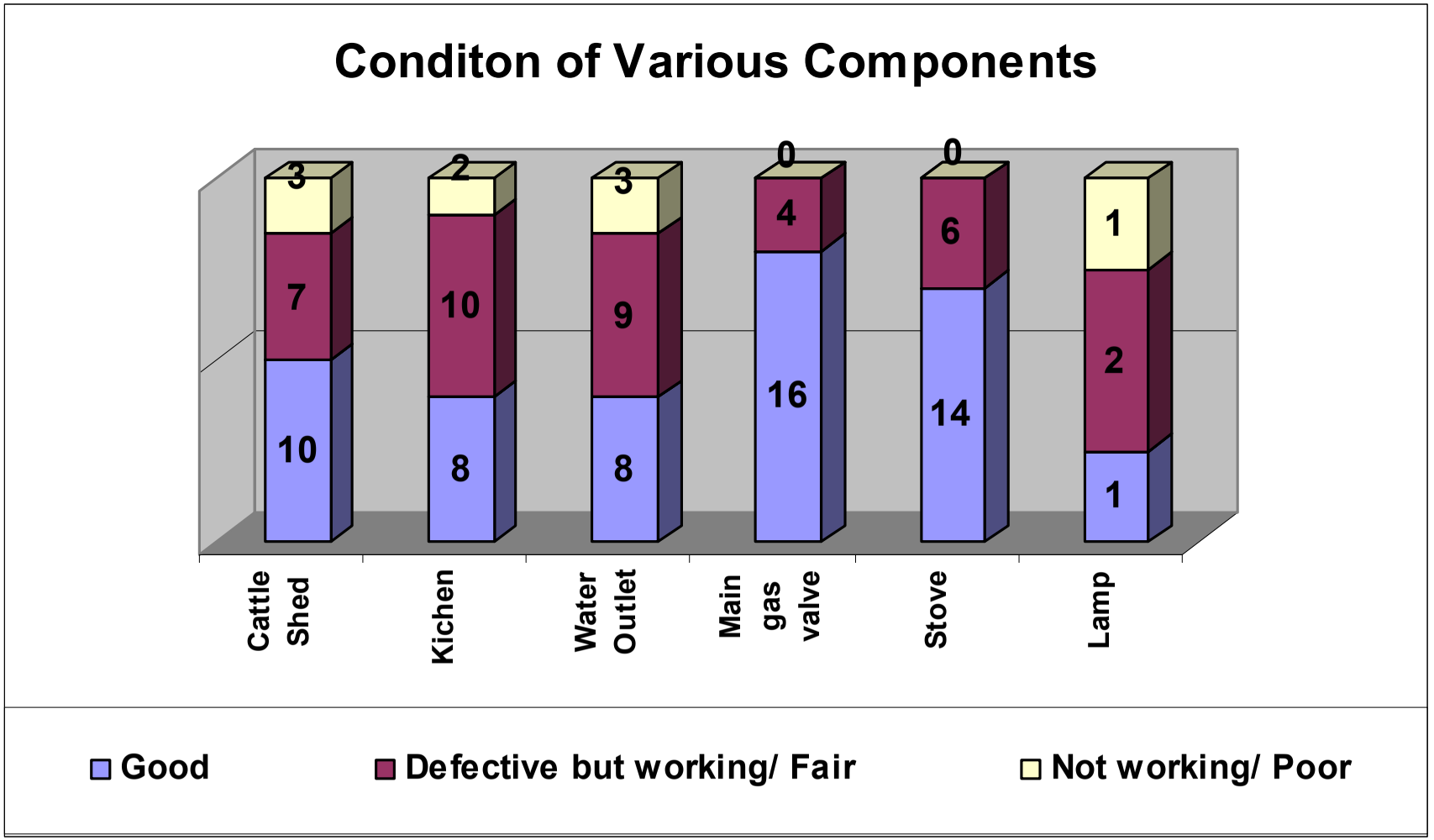
Physical Conditions of Plant and Components



SNV

Connecting People's Capacities

Physical Conditions various Components



SNV

Connecting People's Capacities

Use of fuel sources and Saving

Fuel Sources	Before (day/hh)	After (kg/day/hh)	Saving (kg/day/hh)
Firewood	3.15 kg	0.93 kg	2.22 kg
Charcoal	1.35 kg	0.42 kg	0.93 kg
LPG	0.03 kg	0.02 kg	0.01 kg
Electricity	0.46 kWh	0.24 kWh	0.22 kWh

Financial Saving

Fuel Source	Quantity saved/ day/hh	Unit	Cost per unit	Financial saving/ day/hh (kip)	Financial saving/ year/hh (kip)	Financial saving/ year/hh (US$)
Fuel wood	2.22	Kg	600	1332.00	486180.00	48.62
Charcoal	0.93	Kg	1000	930.00	339450.00	33.94
LPG	0.01	Kg	11250	112.50	41062.50	4.11
Electricity	0.22	kWh	250	55.00	20075.00	2.00
Total				2429.50	886767.50	88.67

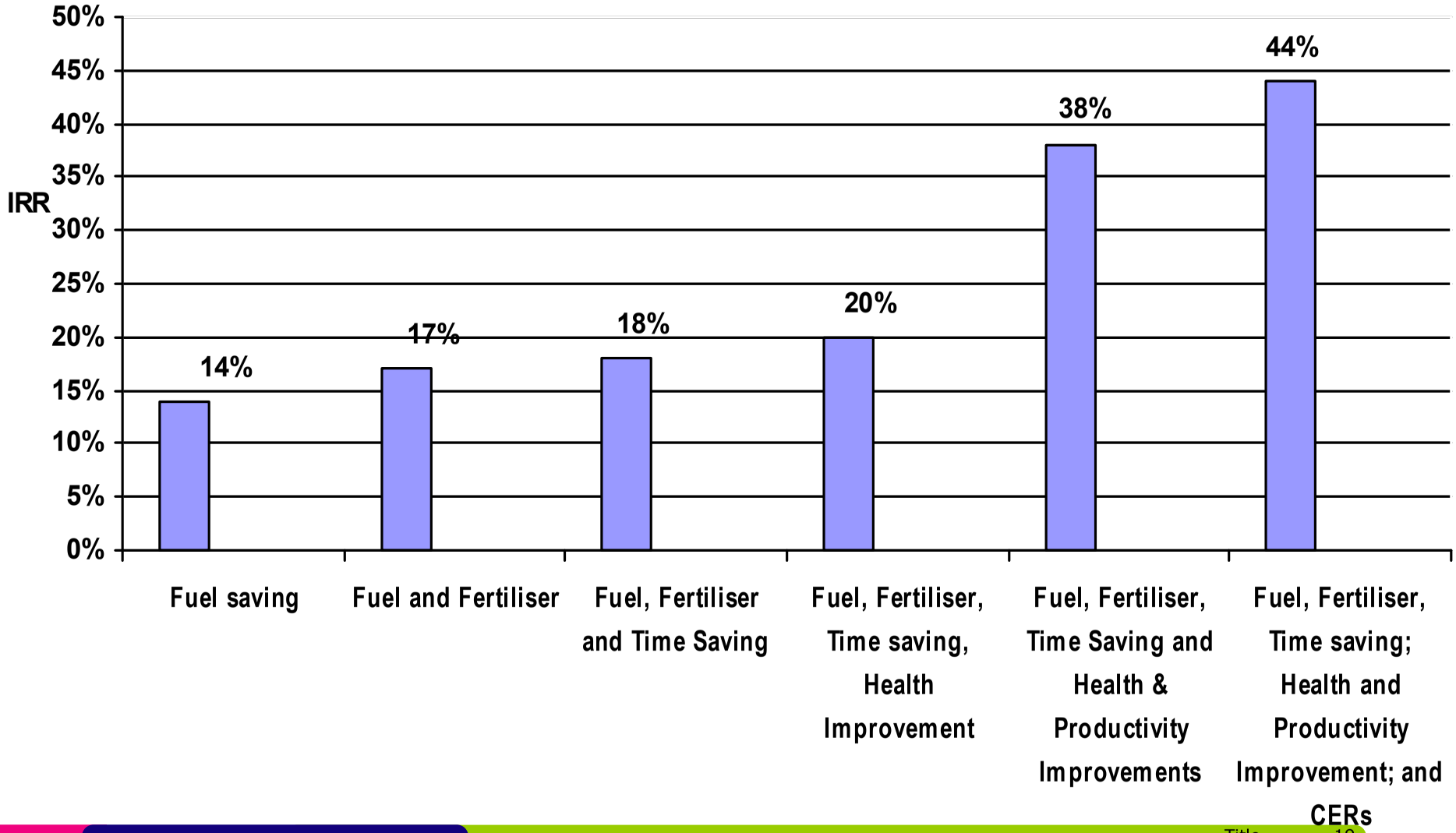
Time Saving

Activity	Average time saving/min/day
Cooking of Meal	52
Collection of Water	(5)
Plant Feeding	(12)
Collection of Fuel	32
Cleaning of cooking vessels	25
Caring of Cattle	(3)
Average time saving	**89 minutes (1 hour 29 minutes)**

SNV

Connecting People's Capacities

IRR of 4 cum biogas plant



SNV

Connecting People's Capacities

Benefits as responded by users

- Easy, fast and comfortable cooking (can be used any time, easy to ignite and burn, no need of constant caring while cooking, no smoke) (12 respondents)
- Saves time and money (no need to purchase charcoal) (5 respondents)
- Liberation from collecting firewood from jungle (saves time and efforts) (5 respondents)
- Time saving – children get time to study (5 respondents)
- Clean surrounding/good environmental condition (4 respondents)
- Good organic fertilizer (4 respondents)
- Easy to clean cooking utensils (3 respondents)
- A very reliable energy source (2 respondents)
- Improvements in health and hygiene (2 respondents)
- Reduces bad smell in and around the houses (2 respondents)
- Proper use of waste materials (dung) (2 respondents)
- Cattle stable remains clean (2 respondents)
- Kitchen remains clean (2 respondents)
- Saves chemical fertiliser (1 respondent)
- Clean and healthy energy source (1 respondent)

Note: Some users had more than one answer

Demerits as Responded by the users

- Increased incidences of mosquitoes and worms (4 respondents)
- Difficult to drain water from water outlet (3 respondents)
- Lamps are very problematic (2 respondents)
- Opening and closing of main valve is difficult during rainy season (1 respondent)
- Food cooked in biogas is less tasty (1 respondent)
- Problem when gas finishes while cooking (1 respondent)

No demerits (12 respondents)

Note: Some users had more than one answer

Recommendations as responded by users

- Diversify the end use applications (Provide gas lamps, biogas cooker, run engine) (6 respondents)
- Ask the mason to provide regular after-sale-services (should visit the plant when problems encountered) (4 users)
- Promote bioslurry as it is good fertiliser (3 users)
- Improve the quality of construction (2 respondents)
- Instruct the mason to build compost pits too (2 respondents)
- Improve the skills of masons(2 respondents)
- Provide training to users on use of biogas and bioslurry (2 respondents)
- Develop ways to use biogas for milling machines (2 users)
- Provide subsidy to install lamp and other appliances (1 respondent)
- Lamp is not necessary, it is problematic, do not install it (1 respondent)
- Identify the reasons if less gas production in my plant (1 respondent)
- Develop mechanisms for bottling of biogas so that it can be transported (1 respondent)

Note: Some users had more than one answer

SNV

Connecting People's Capacities