Situation Assessment for Support to Sustainable Rural Livelihoods in the Districts of Angoche, Moma and Pebane

Quantitative Survey Findings

Mozambique, September 2008

The study was done by Co-Arq Lda. The team was led by Leila Oliveira (Leila.de.oliveira@gmail.com), who designed the study, carried out the analyses and wrote the report. Maria João Nazareth and Carlos Aragão, independent consultants of Co-Arq Lda, supervised the field work together with José da Silva, from CARE.

Revision of questionnaires was done by Simon Nortfolk and Michaela Cosijin, from Terra Firma Lda.

The logistic organization was done by José da Silva. Twenty field researchers collected field data and 1,544 households spared their valuable time to answer our questions.

Disclaimer:

This report was prepared by independent consultants. Responsibility for the contents and presentation of findings and recommendations rests with the assessment team.
The views and opinions expressed in this report do not necessarily correspond to the views of CARE Mozambique or WWF.

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Background

CARE and World Wildlife Fund (WWF) are embarking on a partnership to implement a three year livelihoods programme, as part of an ongoing WWF/GoM initiative to create and develop a formal national Marine Reserve in the Primeiras and Segundas Archipelago and the surrounding coastal areas.

The Primeiras and Segundas form an island archipelago within the East African Marine Eco-region (EAME), which stretches over 7,000km from the northern tip of the Horn of Africa to Sodwana Bay on the coast of South Africa. This ecoregion largely operates as single unit. The biodiversity in the marine and coastal areas is high, with a large prevalence of ecological endemism (i.e. 60 to 70% of species are only found in this eco-region). The Primeiras and Segundas archipelago has been identified as 1 of 2 ecologically outstanding areas in Mozambique within the EAME1. The central objective of the partnership between CARE/WWF is to target the more vulnerable families in this area, provide them with assistance in diversifying their livelihoods and make local ecosystems more productive.

The overall programme goal is "to increase the livelihood security of coastal inhabitants of Angoche, Moma and Pebane Districts, with simultaneous increases in overall ecosystem productivity and reductions in resource overuse and exhaustion" (CARE/WWF, 2008).

The programme incorporates five main objectives:

1. To improve the quality and quantity of foodstuffs produced by the population while maintaining or improving ecosystem productivity;

2. To improve marketing and stimulate the development of marketing associations, so that producers realize more value for their products;

3. To improve forest resource management, thereby increasing forest ecosystem productivity;

4. To improve coastal management, thereby increasing marine ecosystem productivity; and

5. To develop and disseminate evidence based learning that strengthens programming and institutional learning, and supports advocacy to serve the communities' interests

In order to assist and guide the overall targeting and learning approach of the project, CARE and WWF hired two groups of consultants. The first group developed an extended review of indicators and background history of the area. This group also carried out field visits and conducted formal qualitative research. The second group, which this report details, carried out a detailed household survey, which will form a baseline for monitoring and evaluation of the impact of the programme and help to refine some of the qualitative findings in this report.

This report contains the findings of the household survey conducted in the proposed project area. It comprises the following sections:

1. Methods
2. Baseline and Situation Analyses
3. Livelihood Groups Analyses
4. Chronic Vulnerability to Food Insecurity
5. Acute Vulnerability to Food Insecurity
6. Conclusions and Programmatic Recommendations

Although some review of current indicators are discussed in this report the vast majority of analyses are based on the primary data collected through closed-end interviews of 1,544 households. Therefore, the qualitative report should be an integral piece for the holistic understanding of the area.

Section 1: Methods

Sampling

The sampling method for this survey was based on Population Proportion to Size (PPS), where population of survey sites (i.e. communities), were the basis for random selection.

Table 1: Sample Stratification

Coast	Population	% Pop	Sampling	# villages rounded up
Pebane	41,823	0.384	5.91	6
Moma	29,285	0.269	4.14	5
Angoche	37,853	0.347	5.35	6
Total	108,961	1.000	15.4	17

Water Body	Population	% Pop	Sampling	# villages rounded up
Pebane	11,851	0.149	2.29	3
Moma	55,922	0.703	10.83	11
Angoche	11,754	0.148	2.28	3
Total	79,527	1.000	15.4	17

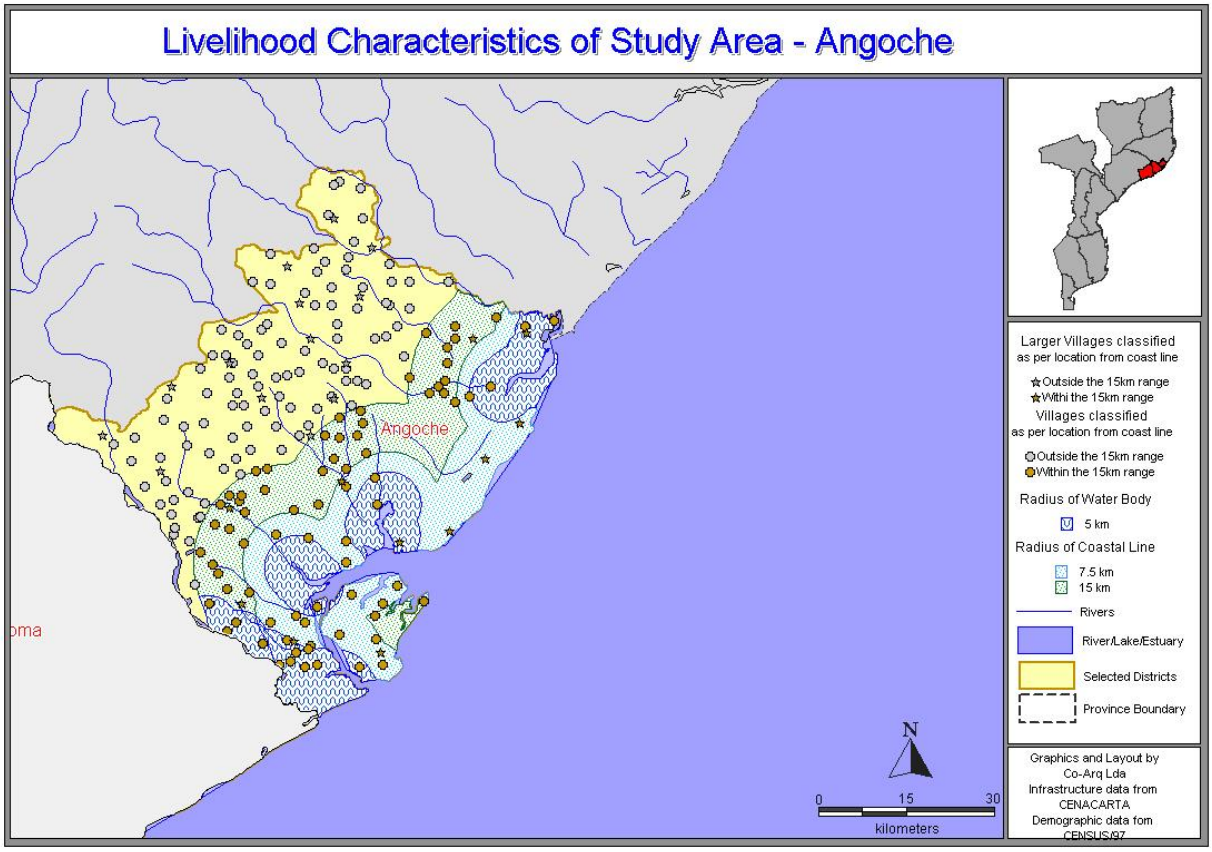
Urbana	Population	% Pop	Sampling	# villages rounded up
Vila de Pebane	8,940	0.081	1.24	2
Vila de Moma	16,252	0.147	2.26	3
Cidade de Angoche	85,703	0.773	11.90	12
Total	110,895	1.000	15.4	17

As there was an attempt to build statistically valid findings in the livelihood areas, an independent sample was done for each area. The three livelihood areas were:

1. Coastal areas, starting at the coastal line and extending 15 kms west
2. Fresh water areas, starting at fresh water zones and extending 10 kms outwards, not exceeding 15 kms from coast line
3. Urban areas, including the three district capitals

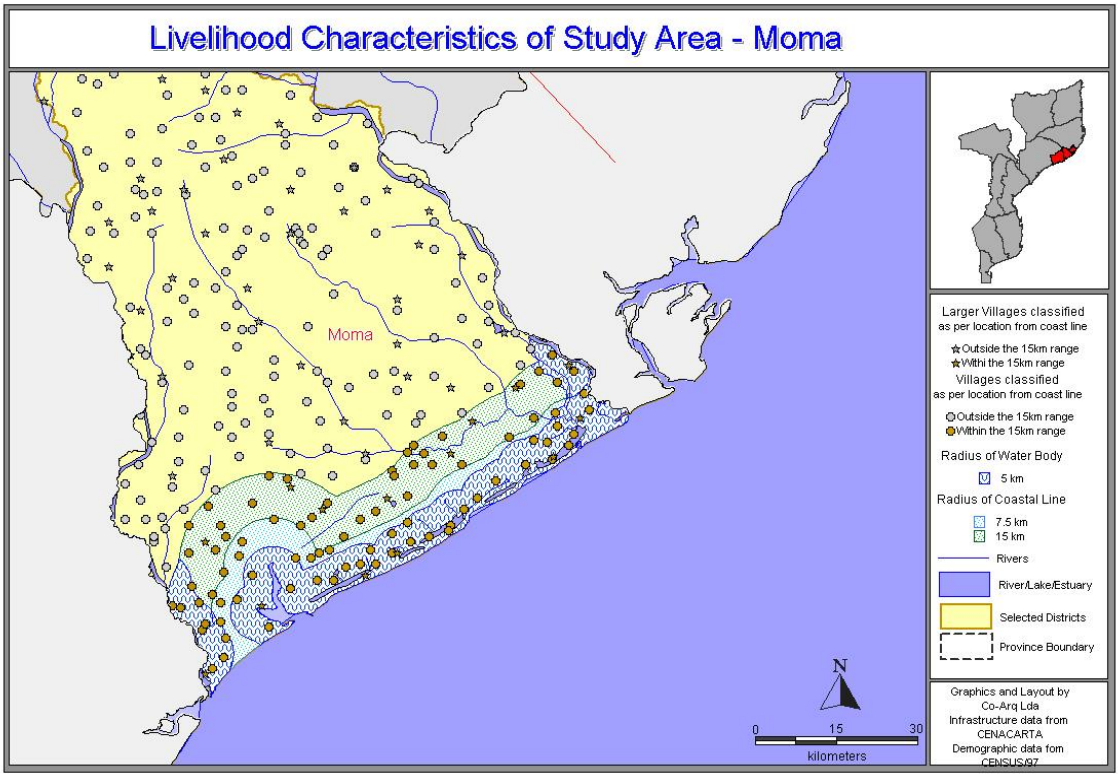
The selection of these livelihood areas was based on results from the qualitative study carried out for the same purpose. In order to ensure that results could be valid at livelihood area level, the sample size was 544 households per area.

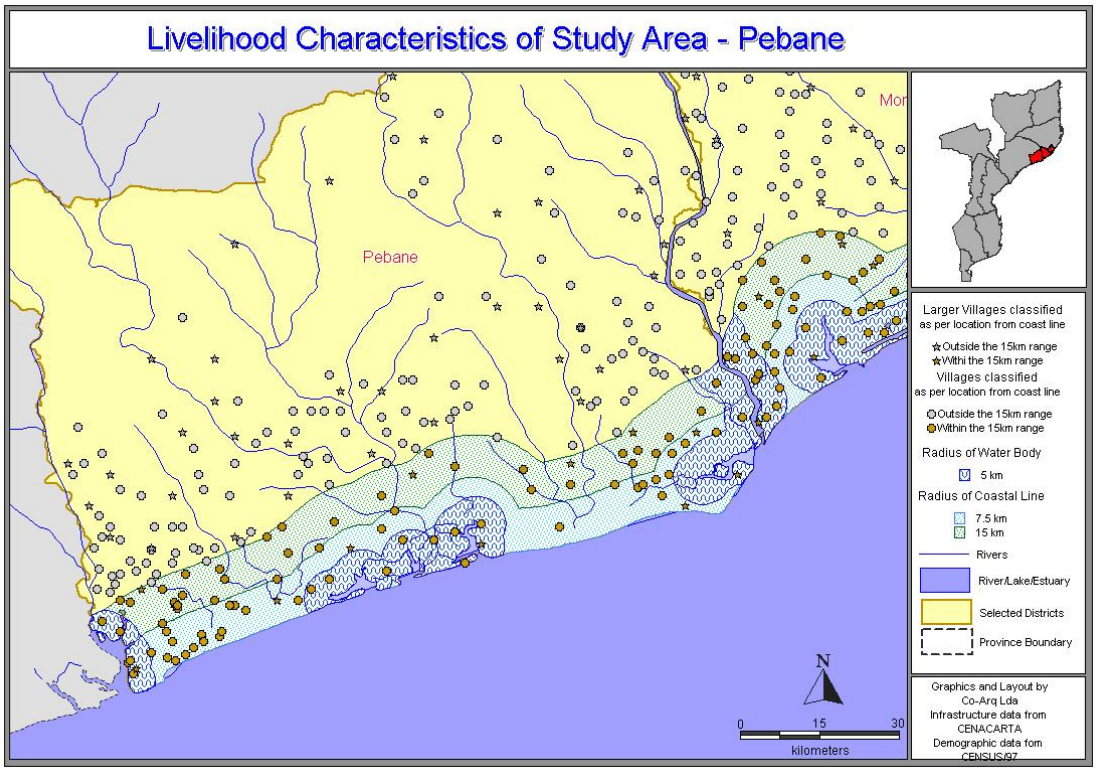
In order to ensure a true representation, the sample was classified based on the populations of zones within the livelihood area. For the coastal areas, villages were classified as those closer than 7.5km and those between 7.5



and 15 km. For the fresh water areas, villages were classified as 5 kms and 10 kms buffers from fresh water.

The use of Geographic Information Systems (GIS) was crucial for the sampling. Figures 1 to 3 illustrate the sampling scheme.





One weakness of the sampling is that only villages surveyed by the 1997 CENSUS were included in the sample group. Although the CENSUS affirms that it surveyed all villages, conglomerations of households, which are not classified as villages, were not segregated. As such, it is believed that some smaller villages may not have been included in the sample group.

In total, 1,544 households were surveyed, reaching 94.6% of the target numbers. Minor divergences in the field of desired and actual numbers of interviews also called for weighting of the sample.

Given that the data collected was isolated for each domain, a second weighting had to be applied when analyzing data as an aggregated average.

Box 1: Sample Size calculation
Assuming:
Z = 1.96 (assume 2-sided test with $\alpha = .05$)
D = maximum tolerable error of 6%
P = expected population proportion is 0.50; (*this is the most conservative estimate)*
d = design effect is 2 *(most conservative estimate)*

Sample size:
$n \geq d[Z^2 (P) (1-P) / D^2] * i$
$n \geq 2 [1.96^2 (0.50) (1-0.50) / 0.06^2]$
$n \geq 534$ per área
$n \geq 1,761$ for the 3 areas

The selection of households in the field followed a classified random approach. The community was stratified into smaller sections, usually following headship patterns. Each community had between 5 and 8 sub-areas. The areas were numbered and randomly selected. The team would go to the selected sub-area and identify the center of that area. A pen was spun, indicating the direction of sample. Every household was selected in that direction until the desired number of 32 households (8 per enumerator) was achieved.

Field Issues

The survey had 5 teams spread across the 3 districts. Each team was composed of four people: 3 enumerators and a team leader, who was also an enumerator. In total, 20 enumerators carried out the fieldwork during 10 days.

All enumerators were trained for 3 full days. Training issues included review of questionnaires and auxiliary tools, sampling, logistic and administrative matters. One field test experience was also included in the training. Regional supervisors were also trained during the sessions. There were two regional supervisors and both had the responsibility to give technical and logistical support.

Field Tools

The enumerators used one questionnaire at household level. The tool was based on the Mozambican and Swaziland VAC tools. Modifications were made mainly to the fishing section and coping strategies. Enumerators were instructed to only interview the head or spouse of the head of the household.

In order to further support the fieldwork, auxiliary tools, such as random tables and sampling tools were included in the package. A detailed field manual, which discussed every question, was also developed and used as a field tool. These tools are also included in annex 1.

Data Entry

Six trained data entry clerks carried out single data entry in Maputo. The database for data entry was developed in ACCESS. An interface was developed to facilitate data entry. All data entry clerks were trained in the database for data entry during a whole day. Data entry lasted for 10 days.

Prior to input in the database, two "data cleaners" reviewed each questionnaire. The data cleaners had the responsibility to code answers correctly (i.e. 888 for n/a; 999 for missing). In order to ensure quality of data, a random quality check was carried out for data entered. In total 50 questionnaires were checked against entered data and the rate of errors was less than 1%.

Data Analysis

All the analyses were done in SPSS. ANOVAS was the most important statistical test used to evaluate the validity of the difference between groups.

Development of key Indicators

This section highlights the methods used to develop key composite indicators.

Production: Requirements met from personal production

In order to calculate the percentage of requirements met from own production two main variables had to be developed (i) Calorific Requirements and (ii) Calorific Production.

a. Calorific Requirements

Each household was given an adult equivalent ratio as per table 2. The total daily calorific need from staples and pulses of an adult male was defined as 2,000 kcal as per FAO guidelines. The monthly calorific intake was calculated as:

Table 2: Calorific Requirement per member

Age	Adult Equivalent		Daily Calories	
	Male	Female	Male	Female
less tha 2 yrs	0.33	0.21	693	441
2 to 5 yrs	0.54	0.53	1,134	1,113
6 to 14 yrs	0.83	0.75	1,743	1,575
15 to 17 yrs	1.00	0.79	2,100	1,659
18 to 24 yrs	1.01	0.74	2,121	1,554
25 to 59 yrs	1.00	0.73	2,100	1,533
60 yrs and older	1.00	0.73	2,100	1,533

Source: FAO 1978

$$C_R = \Sigma(A_e * 2{,}000) * 30$$

Where, C_R is the monthly household caloric requirement
A_e Adult equivalent ratio
2,000 is the calories to be taken from staples, pulses and beans
30 is the mean number of days in a month

b. Production

In order to calculate harvest figures and calorific value of the harvest, production data was collected. Given the nature of production in Nampula, where households produce the vast majority of their staple crops during the rainy season, which lasts from November through April, production figures were only gathered for that season. Even though this might not capture small amounts of production done through out the year, it facilitates the fieldwork and ensures greater reliability of production data. Furthermore, this method also ensured that no field calculations had to be carried out neither by enumerators nor by households.

Furthermore, in order to ensure better accuracy of staple production data, households could give production figures in any measures they wish. The production data was normalized into kilograms as per table 3.

Table 3: Kilogram equivalent of production of key commodities by different measurements

Measure	Kilograms equivalent															
	Maize		Rice		Sorghum		Millet		Peanuts		Nhemba Beans		Jugo Beans		Boer Beans	
	Cob	Grain	With casque	Without casque	Cob	Grain	With casque	Without casque	With casque	Without casque	With casque	Without casque	With casque	Without casque	With casque	Without casque
100kg Bag	67.1	100.0	63.0	100.0	79.7	99.7	54.7	95.7	58.7	90.4	53.9	94.6	75.6	99.4	51.2	89.8
90kg Bag	60.4	90.0	56.7	90.0	71.8	89.7	49.2	86.1	52.8	81.4	48.5	85.2	68.0	89.5	46.1	80.8
80kg Bag	53.7	80.0	50.4	80.0	63.8	79.7	43.7	76.5	47.0	72.3	43.2	75.7	60.5	79.5	41.0	71.9
50kg Bag	33.6	50.0	31.5	50.0	39.9	49.8	27.3	47.8	29.4	45.2	27.0	47.3	37.8	49.7	25.6	44.9
25kg Bag	16.8	25.0	15.8	25.0	19.9	24.9	13.7	23.9	14.7	22.6	13.5	23.7	18.9	24.9	12.8	22.5
20L Bin	11.7	17.5	12.3	19.5	14.0	17.4	9.6	16.7	10.3	15.8	9.4	16.6	13.2	17.4	9.0	15.7
5L Bin	2.9	4.4	3.1	4.9	3.5	4.4	2.4	4.2	2.9	4.5	2.4	4.1	3.3	4.4	2.2	3.9

The calorific value of one kilogram of each of the main staple crops was used to calculate the total caloric value of production as per table 4.

Table 4: Kcal from 1 kgs of mains commodities

Product	Kcal from 1 kilo
Maize	3,630
Rice	3,520
Sorghum	3,550
Millet	3,320
Peanuts	5,700
Nhemba Beans	3,390
Jugo Beans	3,670
Boer Beans	3,400

$$C_P = \Sigma\,(Kg_C * Kcal_C)$$

Where, CP is the annual household calorific production
Kg_C is the kilograms produced for each Crop

$Kcal_C$ is the calorific value of 1 kilogram for each Crop

c. Number of months of personal production

The total household calorific production was divided by the household's monthly calorific requirement. The result was the total number of months that the households could eat a basic diet from their own production as per formula 1.

$$Req = C_P / C_R$$

Where, CP is the annual household calorific production
Kg_C is the kilograms produced for each Crop

$Kcal_C$ is the calorific value of 1 kilogram for each Crop

Shock Index

Shock= disruption/stress

To assess the exposure of households to shocks, respondents were asked whether they had experienced any shock over the past 6 months that had depleted their ability to access food, retain assets or access income in the way they were used to in the previous six months. The households identified as many shocks as they had suffered but were asked to further isolate the 4 most important shocks. Furthermore, in case of experience of shock, the respondent was requested to assess its impact on household income, assets, and food access status.

Indexes of Shocks: Multiplication of Weighted Severity of shock and magnitude from shock
Where,
Severity is the sum of the weighted type of impact of shock: on production weights 1, on income sources weights 2, on assets weight 3,
Magnitude was the recuperation of the household: total recovery receives a coefficient of 0.33, partial recovery a coefficient of 0.66, and minimal or no recovery a coefficient of 0.99

In order to assess the impact of shocks, severity and magnitude indices have been developed and are briefly explained in box 1. Although the severity of shocks is measured as the mean impact of shocks felt by households (including households that did not

suffer any shocks and therefore will score a zero in this index), the magnitude scale is only focusing on households that suffered the shocks.

Coping Strategy Index

Through a process of weighting the coping mechanisms reported, an index has been estimated at household level (CSI or Coping Strategy Index) to measure the HH capacity to react to the shock faced and which could also be considered to assess and monitor the severity and evolution of shocks.

In this case weighting is based simply on the degree of severity of the mechanism. For dietary activities, the severity was multiplied by the frequency of adoption of such behaviour during the previous month. In addition, it is important to consider that weights were based on previous experiences of the Mozambique SETSAN done in 2006. The weights adopted for the construction of the CSI are the following:

Table 5: Weights for coping strategies

coping strategy	weight	coping strategy	weight
Changed diet to cheaper and less preferred food	1	Borrowed money from relatives or friends	2.5
Borrowed food	1	Reduced expenditures on health	3
Diminished food quantities for all members	1.5	Sold agricultural materials	3
Adults ate less to spare food for children	1.5	Sold construction material	3
Reduced the number of meals	1.5	Sold small animals	3
Consumed larger quantities of hunger food	2	Sold household furniture	3
Spent days without eating	2	Gave land on rent	3
Exchanged agricultural products	2	Changed house	3
Worked for food	2	Sent children to work for other households	3
Worked for more hours / Intensified work	2	Consumed seed reserves	3.5
Harvested crops before time	2	Some household member migrated for more than 6 months	3.5
Purchased food on credit	2.5	Borrowed money from moneylenders	3.5
Some household members migrated temporarily	2.5	Spent savings	3.5
Reduced expenditures on education	2.5	Sold bigger animals	4
Withdrew children from school	2.5		

Dietary Diversity Indicator

There are usually two widely used methods of deriving a dietary adequacy score: (i) to count the different food groups eaten to construct a simple dietary diversity count; (ii) to sum the weighted value of the different food groups eaten to construct a weighted dietary diversity count.

We chose to opt for the weighted dietary intake, which has been widely used in Mozambique, and takes into consideration the relative nutritional value of food items and their usual portion size. Table 6 illustrates the weights given to each food group based on previous studies carried out[1].

In order to transform the continuous variable of the weighted dietary diversity indices into significant meaning for decision makers, it was necessary to develop categories for the diet. The cut-offs used in this study were the same as used by the SETSAN in their baseline study (2006). Table 6 illustrates the cut offs for the development of the adequacy ranges.

Table 6: Weights for dietary items

Food Group	Weight
Red Meats	4
Chickens	4
Pork	4
Liver	4
CSB	3
Beans	3
Pulses	3
Seeds	3
Eggs	3
Fish	3
Cereals	2
Maufactured Cereals	2
Cassava	1.5
English Potato	1.5
Sweet Potato	1.5
Vegetables	1
Leaves	1
Fruits	1
Fats	1
Milk	1
Sugar	1
Wild Foods	1
Salt	0

[1] Rose et al, 2002: Mozambican Dietary Adequacy Tool (MDAT)

Table 7: Categories cut-off for weighted dietary diversity

Categories for 24 hours recall	N	% of sample	Cut-off from the continuous range
no consumption	11	0.7%	0
very inadequate	366	22.9%	1 to 5
inadequate	594	37.2%	5.01 to 8.5
adequate	624	39.1%	8.501 to up
Total	**1,595**	**100.0%**	**0 to 27.50**

Livelihood Cluster

Four continuous variables were entered into a two-stage cluster analysis, with distance being calculated log-like, Schwarz's Bayesian Criteria (BIC), noise handling 0%, and maximum memory allocation of 64. The variables included: (i) number of kilos of fish fished in the previous 7 days, (ii) household calorie requirements from own cereal and groundnuts production, (iii) household planted cassava area equal to or greater than 1 hectare, (iv) household received income from fishing sales, and (v) household received income from informal commerce. Naturally, 6 clusters were created.

Chronic Vulnerability to Food Insecurity

Chronic vulnerability to food insecurity is the long-term inability of households to meet their food needs. For the purposes of this study, chronic vulnerability to food insecurity was given by the function between the five capitals, where:

$$CV = 1 - (((P_C + F_C) * 2) + H_C + N_C + S_C)$$

Where, CV=Chronic Vulnerability
P_C=Physical Capacity Index (including non-productive assets and housing conditions)
F_C=Financial Capacity Index (including productive assets and livestock)
H_C=Human Capacity Index (including education level of head and spouse and dependency ratio)
N_C=Natural Capacity Index (including ownership of low-lying land and fruit trees)
S_C=Social Capacity Index (including participation in associations)

The indexes were built as following.

a. **Physical:**

Sum of three indexes:

(i) Index 1: Weighted sum of non-productive assets, as illustrated in table 8
(ii) Index 2: Weighted sum of living conditions, including roof and walls of main house, as illustrated in table 8
(iii) Index 3: Sanitation levels, with weights given as illustrated in table 8

Table 8 illustrates weights for the sum of assets and living condition.

Table 8: Weights for physical assets

Non Productive Assets	Assigned Weight	Living Conditions	Assigned Weight	Sanitation	Assigned Weight
Chair	0.05	cement	1.00	Non-improved latrine	0.50
Radio	0.10	clay	0.40	Septic tank	1.00
Table	0.15	caniço	0.30	Improved latrine	0.80
Bed	0.15	plastic	0.50	None/bush7beach	0.10
Cups and plates of glass	0.25	ceramic	1.00		
Watch	0.30	zinc	0.80		
Lamp	0.30	stone	0.50		
Mats	0.40	clay brick	0.50		
Cellphone	0.50	palha/capim	0.20		
Stove	0.75				
Television	1.00				

Weights based on price and frequency of assets as per SETSAN 2006 Guidance

b. <u>Financial: Sum of three indexes:</u>

Sum of two indexes:

(i) Index 1: Weighted sum of productive assets: weights given as illustrated in table 9.

(ii) Index 2: Weighted sum of number of animals: weights given as illustrated in table 9.

Table 9: Weights for financial assets

Productive Asset	Assigned Weight	Type of Livestock	Assigned Weight
Catana	0.05	Cows	1.00
Axe	0.05	Goats	0.30
Foice	0.05	Ducks	0.10
Pestle	0.10	Pigs	0.30
Spear gun fishing equipment	0.30	Donkeys	0.50
Fishing - net	0.40	Chickens	0.10
Fishing rod	0.30		
Bicycle	0.40		
Cart (cow, donkey, push)	0.65		
Sewing machine	0.70		
Harrow for fields	0.80		
Canoe	0.85		
Moma canoe	0.70		
Floating raft	0.60		
Motorbike	0.90		
Tractor	1.00		

c. Human:

Sum of two indexes:

(i) Highest level of education (head or spouse): done by an indexation of the highest grade attained by either head or spouse.

(ii) Dependency ratio: done by an indexation of the number of dependents per independents.

d. Natural:

Sum of two indexes:

(iii) Number of fields in low-lying areas: done by an indexation of the number of fields in low-lying areas.

(iv) Number of fruit trees: done by an indexation of the total number of fruit trees

e. Social:

Sum of one index:

(v) Participation in associations: done by an indexation of the number of associations that the household was part.

Shock Impact Index

$$S_I = \Sigma ((I_F * 1) + (I_I * 2) + (I_A * 3)) * R$$

Where, S_I*=Shock Impact Index*

I_I *= Shock Impacted Food Stocks/Production*

I_I *= Shock Impacted Income Generation*

I_A*=Shock Impact Asset retention*

R=Recovery level, where no recovery valued 1 partial recovery valued 0.66 and full recovery valued 0.33

Section 2: Baseline & Situation Analyses

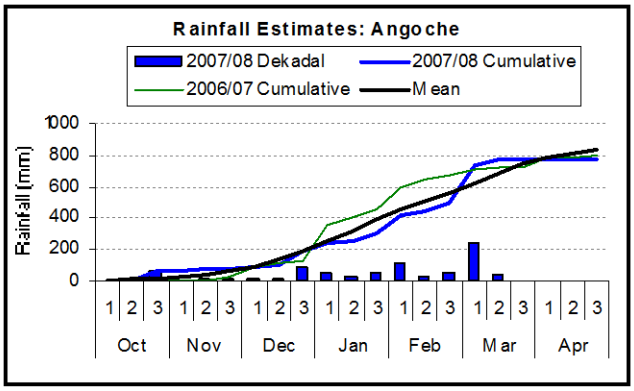
This section of the report discusses the indicator rates for food security by livelihood area and for the whole region. Although this section attempts to identify key differences and issues within the livelihood areas, it does not attempt to quantify or rank the areas in terms of vulnerability to food insecurity. This task will be fulfilled in Section 4: Vulnerability to Food Insecurity.

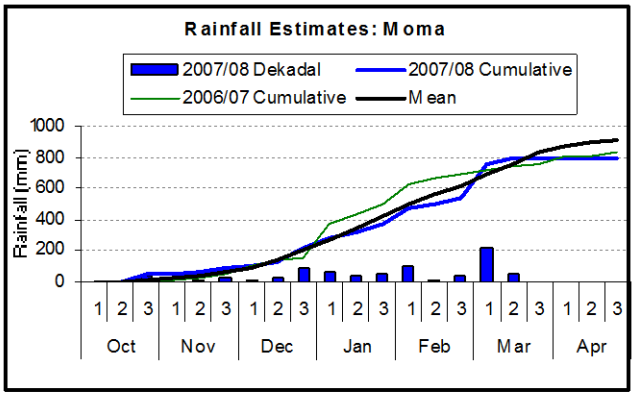
For an accurate and responsible measurement of the impact of interventions, this section will discuss innumerous indicators, including the ones identified in the project's Logical Framework and standard food security indicators. Given the nature of a baseline and situation analyses, much of the texts and analyses are descriptive.

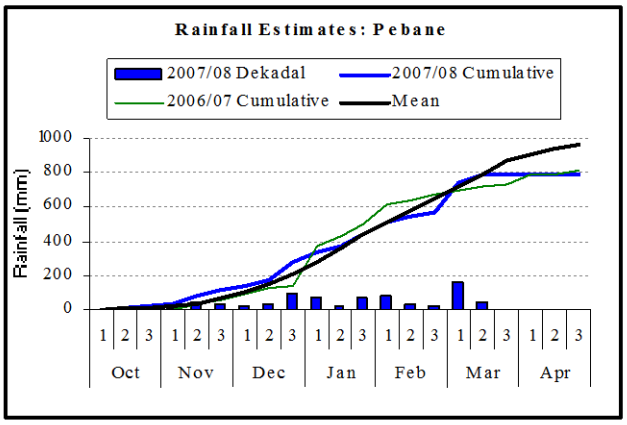
Current Situation

Before descriptive results for the baseline and situation analyses are given, it is necessary to identify whether the characteristics presented in this report reflect a "normal year" or a "stressful year". A normal year does not mean that the area did not suffer any stress, such as cyclones or lack of rain. A normal year means that the stresses felt by the communities in that given year include pressures that are usually felt by the communities. If cyclones hit the areas constantly, the existence of a cyclone may not mean that the area is experiencing a stressful year. On the other hand, if three consecutive cyclones have hit the area and created more destruction than in previous years, the area may be experiencing a stressful year. For the purposes of this baseline, the year was not considered stressful because the rain-fed agriculture has not declined by more than 10%.

Graph 1 to 3: Rainfall Estimates







a. Rainfall Patterns

Rainfall estimations were made based on RFE (Rainfall Estimates) satellite images, and highlights 2007/08 cumulative rainfall trends against the 2006/07 seasons and the long-term trend, which is based on a 15 years average.

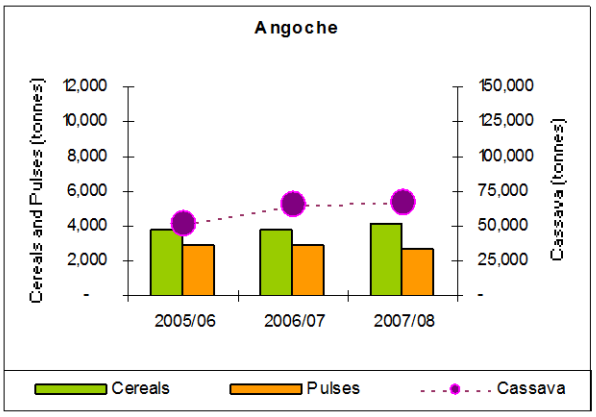
Angoche

During 2007/08 seasons a false early start of rains was observed in the third week of October, where rains were above long-term averages. From the second week of November, the stabilized rainfall started, ensuring that the sowing period started. In general, the cumulative rainfall observed during 2007/08 season was bellow the normal but well distributed.

Graph 4 to 6: Production of key commodities

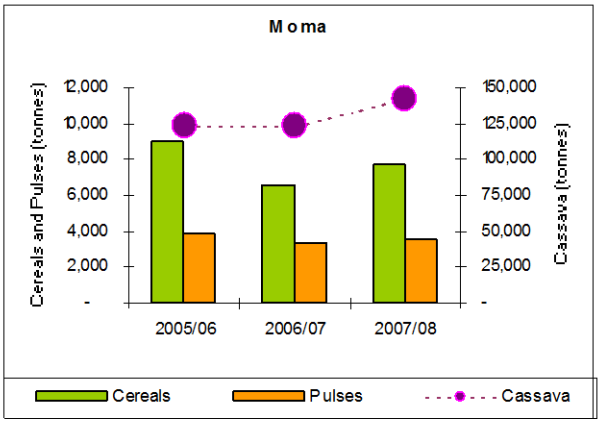
Moma

Moma's rainfall pattern was similar to Angoche. During 2007/08 seasons a false early start of rains was observed in the third week of October, where rains were above long-term averages. From the second week of November, the stabilized rainfall started, ensuring that the sowing period started. In general, the cumulative rainfall observed during 2007/08 season was normal and well distributed.



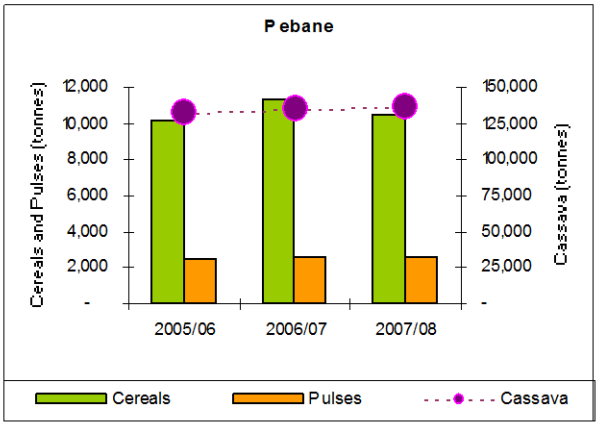
Pebane

The 2007/08 cumulative rainfall was near the average and bellow the average mainly in the critical crop development period. The rain started in November, the normal period for the beginning of planting/sowing. The rain was well distributed during the season.



2. Production Patterns

Given the direct relationship between rain-fed agriculture and rainfall patterns, one would expect production to be similar to 2006/07. As it is shown in graphs 4 to 6, the production levels in the three districts have been stable since 2005/06. Cassava harvests have slightly increased but cereal production has been stable.



An over-simplistic food balance sheet, calculated specially for this study to compare the population requirement and district production is presented in table 10 and is illustrated graphically. The balance sheet shows that Moma and Angoche have the greatest production per capita. If it is assumed that cassava fulfills 50% of the nutritional requirements, cereals 10% and pulses 20%, then it is possible to affirm that Moma and Pebane produce enough cereals and cassava for its own consumption. Given that production is greater than needs in these districts, especially for Pebane, cassava and cereals are likely to be exported to local markets, such as Nampula and Angoche.

On the other hand, Angoche (probably because of its large urban population) does not produce enough cereals and tubers to fulfill its needs.

Table 10: Simulation of Food Balance Sheet

Food Balance Sheet - 2007/08

	Angoche	Moma	Pebane
Population (Census 2007)	277,412	329,181	135,275
Requirements			
Cereal Requirement (10%)	5,778	6,856	2,817
Cassava Requirements (50%)	87,385	103,692	42,612
Pulse Requirement (20%)	9,321	11,060	4,545
Production			
Cereal Production	4,150	7,732	10,493
Cassava Production	66,974	141,786	137,000
Pulse Production	2,705	3,491	2,591
Balance			
Cereal	(1,628)	876	7,676
Cassava	(20,411)	38,094	94,388
Pulse	(6,616)	(7,570)	(1,954)

Demography and Human Resources

Demography

The distribution of members within households was similar to the normal pyramid of developing countries, as displayed in graph 7. On average, each household had 4.73 members, with 2.84 dependents[2] and 1.79 being independents[3]. The average dependency ratio was 2.32 dependents per independents. 9.2% of the households did not have any independent members. The total number of members, and the dependency ratio was larger in the urban area but did not vary between the two rural areas. Table 11 illustrates the findings.

Graph 7: Population Pyramid

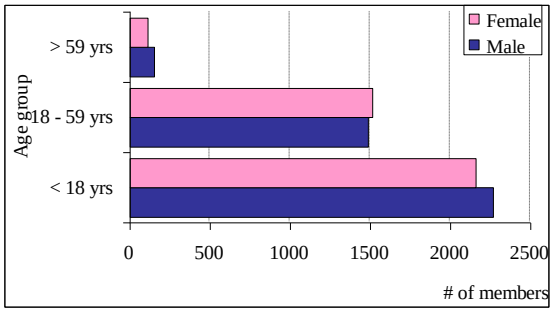


Table 11 : Number of members

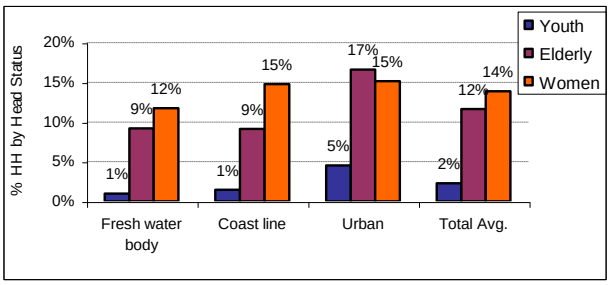
Domain for data analyses	# of members	# of dependents (1)	# of Independents (2)	Dependency Ratio (Dep / Ind)
Fresh Water	4.63	2.84	1.79	2.21
Coast Line	4.57	2.79	1.78	2.20
Urban	4.99	3.02	1.97	2.57
Average	4.73	2.88	1.85	2.32

(1) up to 17 yrs, and older than 59yrs
(2) 18 to 59yrs

Head Status

On average only 2% of households were headed by youths younger than 18 years. The proportion of households headed by youths was significantly higher in the urban areas, where the rate was fivefold larger than in the other areas. The percentage of households headed by the elderly

Graph 8: Household Head Status



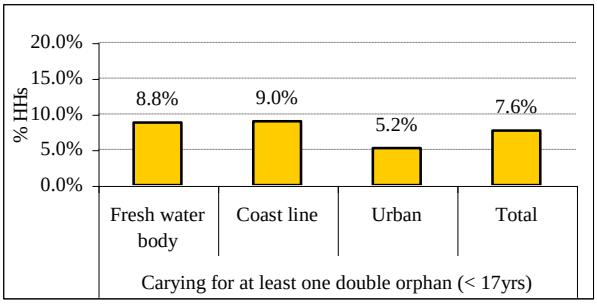
[2] Dependents are defined as members younger than 18 years or older than 59 years
[3] Independents are defined as members between 18 and 59 years

was also higher in this area, with 17% of households being headed by someone older than 59 years. The distribution of women headed households was evenly distributed between the three areas. Graph 8 illustrates results.

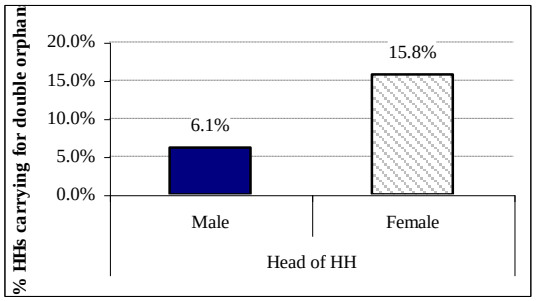
Caring for Orphans

On average, 7.6% of the households (CI 6.4-8.9%) cared for at least one double-orphaned child. The proportion of households caring for double-orphaned children in urban areas was significantly lower ($p<0.05$) than in rural areas, with only 5.2% of households (CI 3.3-7.1%) caring for double-orphaned children. This difference might characterize the cultural habit that many Mozambicans have once they realize they are going to pass away: they return to their rural homes. As such, many orphans might stay in these areas and do not return to the urban areas. Graph 9 illustrates findings.

Graph 9: Housheolds caring for double-orphaned children



Graph 10: % Households caring for orphans by headship status

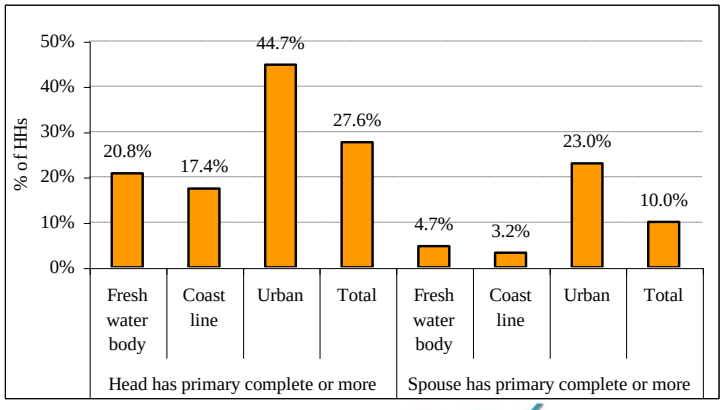


Women headed households tended to take in more double-orphaned children than male-headed households. In reality the difference was not only significant ($p<0.001$), but it was also large, with the rate of households carrying for double-orphaned children doubling among women headed households (15.8%, CI 11.0-20.6%). Graph 10 illustrates the findings. No significant difference on the proportion of households caring for orphans was found amongst the elderly group.

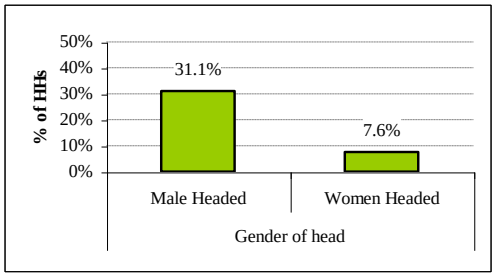
Education Level

The level of education was extremely low in the study area as it is elsewhere in Mozambique. Only 27.6% (CI 25.5-29.8%) of the heads of households have finished primary school. Although a much higher proportion of household heads have finished primary school in the urban area, this only added up to half of the households. There was no significant difference between the two rural zones. The level of the spouse's education – always defined as a woman for this study - was significantly lower than the head's level ($p<0.001$), and represented as little as 10% of them. In rural areas, the spouse's education level was also significantly lower than the urban areas, and less than 5% of the head spouses have finished primary education. Graph 11 illustrates the findings.

Graph 11: Education level of household by areas



Graph 12: % of HH heads that have completed primary school by gender of head



When comparing the level of education of the head by gender status, it becomes obvious that the relationship between education level and headship status is only true because the heads are usually male. The underlying cause of difference in education level depends on the gender of the head. As graph 12 illustrates, the proportion of male headed households that completed primary school is more than three times larger than women headed households ($p<0.001$).

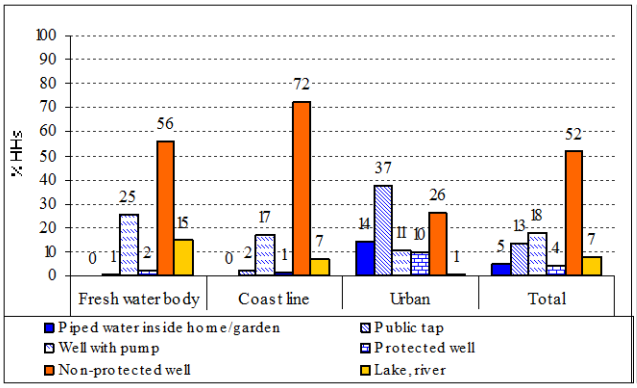
Water and Sanitation

The water and sanitation conditions presented a great danger for the food security of households. As it has been widely proved, water and sanitation play a crucial role in the nutritional condition of children. A child may eat enough nutrients, minerals and calories but, if he has frequent episodes of diarrhea, he will lose most of his nutritional intake and will become a malnourished child. The importance of a healthy environment therefore can not be ignored.

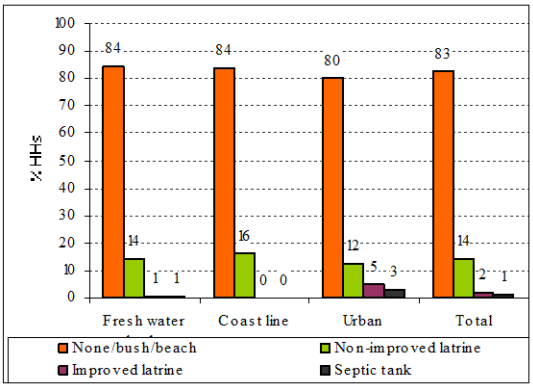
In general, as seen in graph 13, the vast majority of households, accounting for as much as 83% of the population, defecated and urinated in open spaces, such as beaches and bushes. Less than 3% of households used some kind of improved sanitation, such as improved latrines. This lack of access to improved sanitation was also seen in the urban areas, where the high population density may worsen the effect of lack of sanitation and public health issues.

Safe sources of water were also a major issue in the target areas, mainly along the coastline, where the vast majority of the population (79%) relied either on non-protected wells or on lake/river water. However a small improvement was seen in the fresh water area, where 71% of the households are still dependent on non-protected wells or lake/river to gather their water. Graph 14 illustrates the access to water by livelihood areas.

Graph 13: Main source of water during wet season



Graph 14: Main source of sanitation

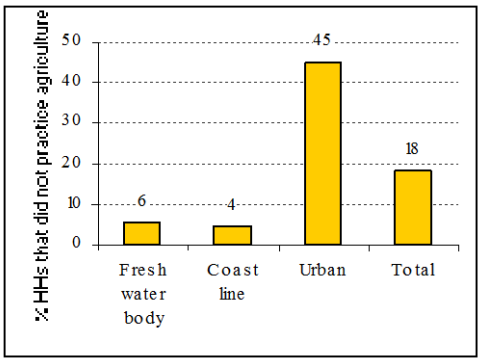


The sources of water only changed slightly from rainy season to dry season. The only visible difference was in the amount of households that relied on non-protected wells, which decreased from 52% in the dry season to 47% in the wet season. In the wet season, 3 extra percentage points of households relied on protected wells (21%).

Area Planted

In total, 18% of the households did not plant anything. The vast majority of these were in the urban areas, where almost half of the households did not plant anything. The distribution of agriculturalists in the rural areas was similar, with around 95% of households planting something. Graph 15 illustrates the findings.

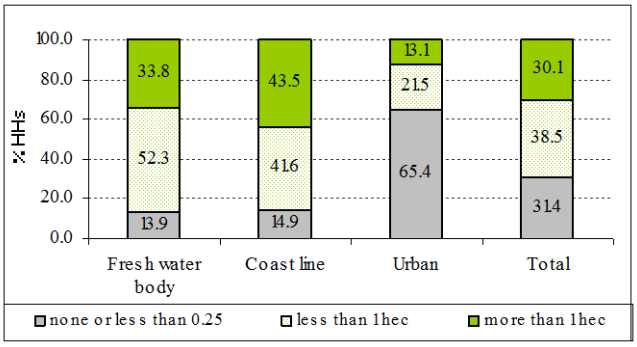
Graph 15: % HHs that did not practice agriculture during 2007/08



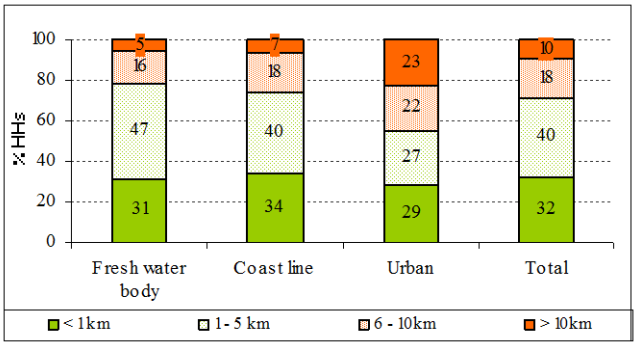
Medium to large-scale agriculturalists, or those who plant more than 1 hectare, constituted 30% of the population. Their presence was more often found in the coastal area, where 43% of the households planted more than 1 hectare. This group only constituted 13% of the urban areas. Subsistence agriculturalists and non-agriculturalists accounted for less than 15% of the population in the rural areas. On the other hand, they accounted for 65% of the population in the urban area. Graph 16 illustrates the findings.

Access to land for agriculture was an issue. On average, only 1/3 of the households had to walk less than 1 kilometer to access their largest field. In the urban area, almost half of the households that practiced agriculture had to walk further than 5 kilometers to reach their fields. Between 20 to 25% of the households in the rural areas, also had to walk further than 5 kilometers. Graph 17 illustrates the results.

Graph 16: % HHs by total area planted



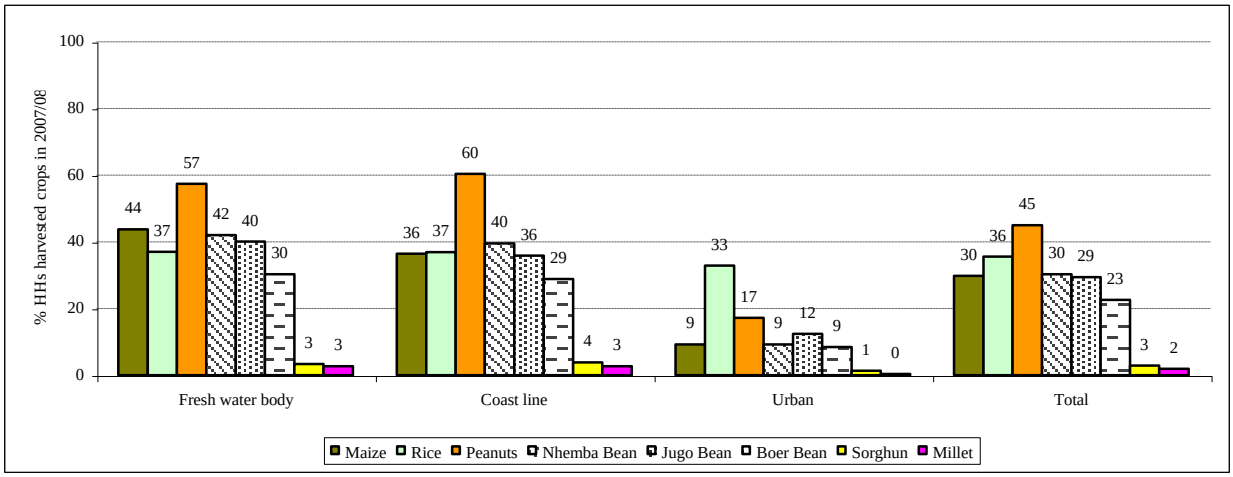
Graph 17: % of HHs by distance to their main field



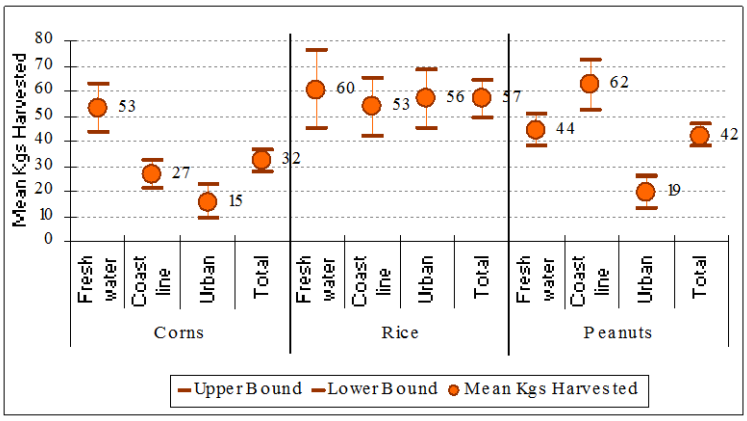
Cereal and Staple Production

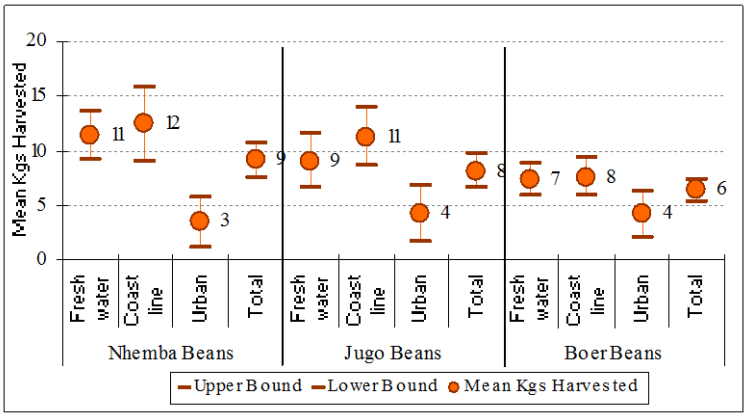
The volume of main staple cultures, such as cereals, beans and pulses, were recorded in the survey. In general, the main crops planted included maize, rice, peanuts and beans. There was little difference in crop production between the two rural areas. Peanuts were the predominant crop, with around 60% of households in rural areas harvesting it. All the other crops had a similar coverage, with 40% of households harvesting it. The crop pattern in the urban area was significantly different from that found in the rural areas. Although agriculture was not a predominant activity in the urban area, rice was the most common crop harvested, with 33% of households harvesting it. Sorghum and millet were rare crops, and less than 5% of the households in any area harvested them. Graph 18 illustrates the findings.

Graph 18: % of HHs that harvested crops by type



Graph 19 and 20: Mean number of kilograms harvested of key cereal and pulse crops



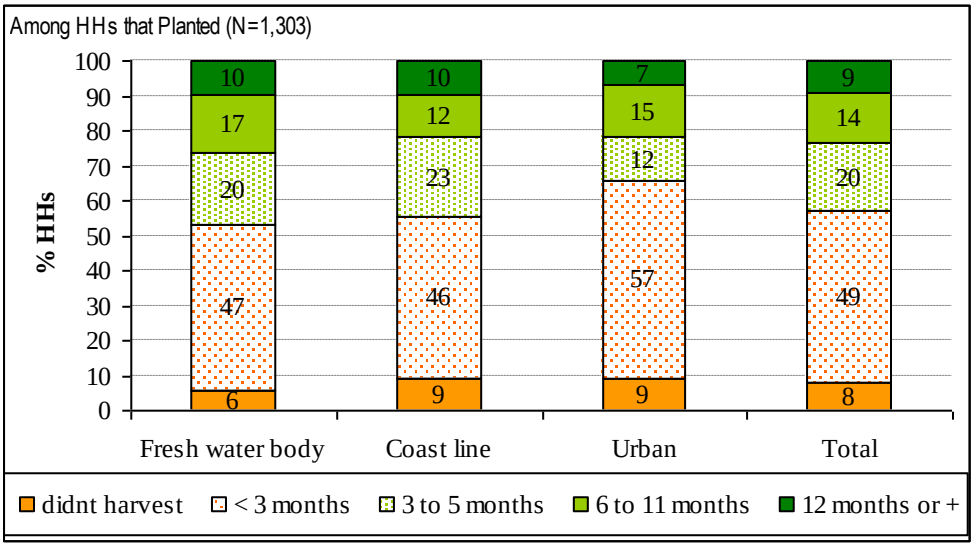


The amount of kilograms harvested for these key staple crops show more variation. Larger amount of maize was harvested in the fresh water, with households harvesting on average 53 kilos from the 2007/08 harvest. Households in the coastal line area harvested on average 27 kilos, while the urban area harvested 15 kilos. The harvest of rice was more evenly distributed with households harvesting around 57 kilos from the 2007/08 season. Peanuts were more harvested in the coastline, with households harvesting on average 62 kilos. The production of beans was similar in the two rural areas, with households harvesting between 7 and 12 kilos of each type of beans. Graph 19 and 20 illustrate the findings.

The harvests from the main staple crops were transformed into calories as per FAO guidelines. The quantity of calories produced from the main staple crops was subtracted from the calorific requirements of the household (see Section 1 Methods: 1.1). Based on this relationship, the number of months relying on staples from own production was calculated.

Among households who planted, the majority of households harvested only enough to last them less than 3 months. In the rural areas around 55% of households either didn't harvest anything or their production only lasted enough for two months of their calorific requirements. Among urban households, this rate reached 66%. Less than 10% of the households harvested enough to last them a whole year. Graph 21 illustrates the findings.

Graph 21: % of HHs by time that their own 2007/08 production lasted



Cassava

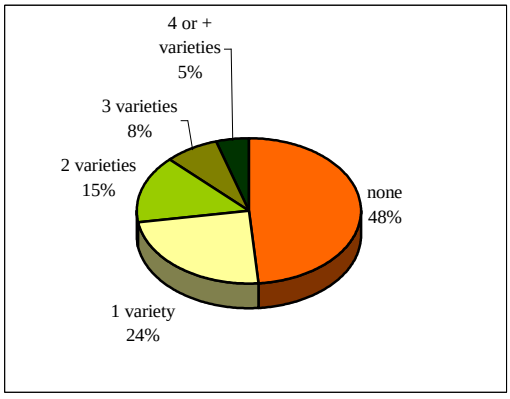
Cassava was also an important crop in the study area. Around 90% of households had cassava fields in the rural areas. Fewer than 20% of households planted small fields of cassava. The majority of them planted fields of between 0.25 to 1 hectare. In the urban areas, cassava plantation was significantly lower, and only around 40% of households planted cassava. Table 13 illustrates the findings.

Table 12: % of HHs by area planted with cassava during 2007/08

Livelihood Area	N	Area of Cassava planted			
		none	less than 0.25 hec	between 0.25 and 1 hec	more than 1 hec
Fresh water body	543	8.3	13.4	66.1	12.2
Coast line	544	10.8	19.1	54.4	15.6
Urban	544	59.9	16.4	19.5	4.2
Total	1,631	26.4	16.3	46.7	10.7

Other crops

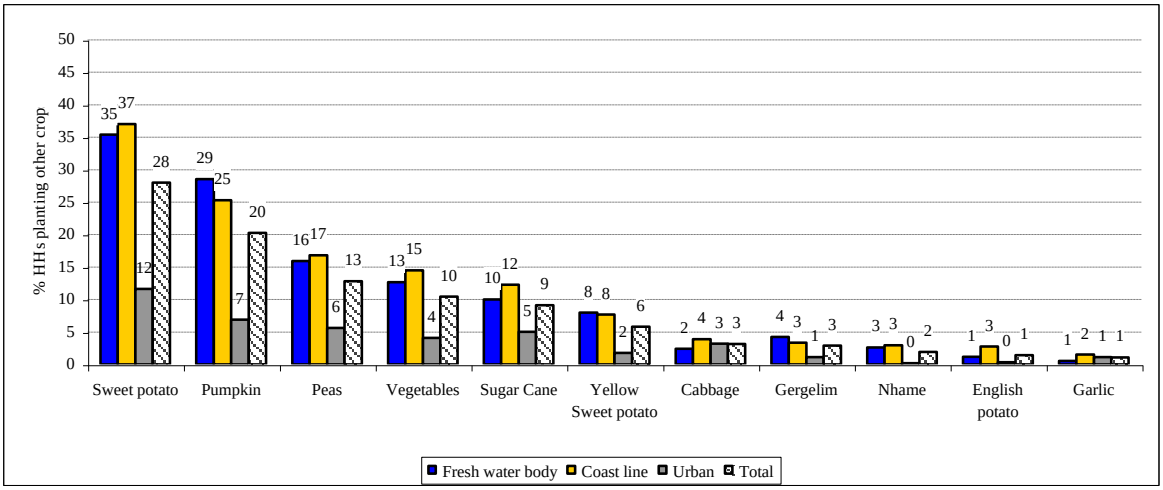
Graph 22: % of HHs by number of varieties of crops planted during 2007/08



In general, very few households planted non-staple varieties, such as vegetables and sweet potatoes in the study area. 48% of households did not plant any varieties other than the staple crops. Almost 25% of households planted only one further crop. Less than 15% of households planted 3 or more varieties. Graph 22 illustrates the findings.

Sweet potato was the most common non-staple crop planted by households, and almost 40% of households in the rural areas planted it. Pumpkin was also an important crop. Peas and vegetables were less common, and less than 20% of households planted any of these. Households in the urban areas planted little variety of crops. Graph 23 illustrates the findings.

Graph 23: % of HHs planting other crops by type of crops



Use of technologies

The use of improved technologies among households that carry out agricultural activities was low. Only half of the households use ploughing or organic leaves in their fields. The use of organic fertilizer was even lower with only 1/3 of households using it. Only 30% of the households planted legumes or vegetables between main agricultural seasons. Furthermore, barely 1/6 of households planted disease resistant cassava. Table 14 details the use of each technique by livelihood areas. Usually, households within the rural areas use more techniques, such as ploughed fields, organic leaves and cassava resistant variations. Nevertheless, more households in urban areas produced seeds of fruit trees.

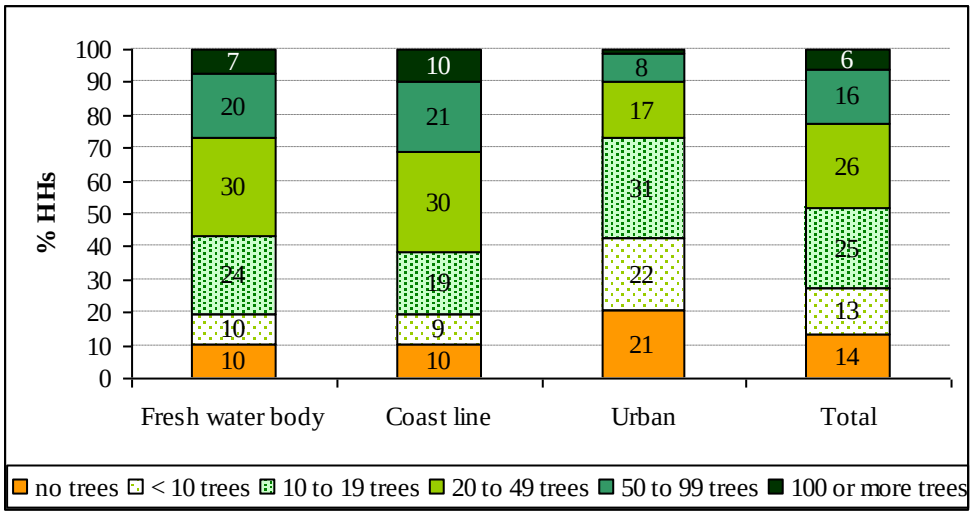
Table 13: % of HHs using agricultural technologies by type

Indicator	Livelihood Area	N	Mean	95% Confidence	
				Lower Bound	Upper Bound
Use of dips and hills	fresh water body	518	55.4%	51.1%	59.7%
	coast line	530	53.8%	49.5%	58.0%
	Urban	318	33.2%	28.0%	38.4%
	Total	1,366	49.6%	47.0%	52.3%
Use of organic leaves	fresh water body	517	51.5%	47.2%	55.8%
	coast line	529	45.8%	41.5%	50.0%
	Urban	312	33.9%	28.6%	39.2%
	Total	1,358	45.2%	42.6%	47.9%
Use of organic fertilizer	fresh water body	517	30.5%	26.6%	34.5%
	coast line	529	24.5%	20.9%	28.2%
	Urban	312	23.0%	18.3%	27.6%
	Total	1,358	26.5%	24.1%	28.8%
Plant legumes between rainy seassons	fresh water body	517	31.4%	27.4%	35.5%
	coast line	527	35.6%	31.5%	39.7%
	Urban	313	20.1%	15.6%	24.5%
	Total	1,357	30.4%	28.0%	32.9%
Plant medicinal plants	fresh water body	517	0.5%	-0.1%	1.2%
	coast line	529	0.8%	0.0%	1.5%
	Urban	313	1.5%	0.2%	2.9%
	Total	1,359	0.9%	0.4%	1.4%
Produce seeds of woody plants	fresh water body	517	0.6%	-0.1%	1.3%
	coast line	528	1.4%	0.4%	2.4%
	Urban	312	1.7%	0.3%	3.1%
	Total	1,357	1.2%	0.6%	1.7%
Produce seeds of fruit trees	fresh water body	517	3.9%	2.2%	5.5%
	coast line	528	3.6%	2.0%	5.2%
	Urban	312	6.2%	3.5%	8.9%
	Total	1,357	4.3%	3.2%	5.4%
Has trees for civil construction	fresh water body	522	0.4%	-0.1%	0.9%
	coast line	535	0.4%	-0.1%	0.9%
	Urban	329	1.4%	0.1%	2.6%
	Total	1,385	0.6%	0.2%	1.0%
Produce seeds of natural pesticides	fresh water body	516	2.5%	1.2%	3.9%
	coast line	528	1.4%	0.4%	2.4%
	Urban	313	1.2%	0.0%	2.4%
	Total	1,357	1.8%	1.1%	2.5%
Plant cassava tolerant to pests	fresh water body	516	15.8%	12.6%	19.0%
	coast line	528	20.1%	16.6%	23.5%
	Urban	312	9.8%	6.5%	13.1%
	Total	1,356	16.1%	14.1%	18.0%

Fruit trees

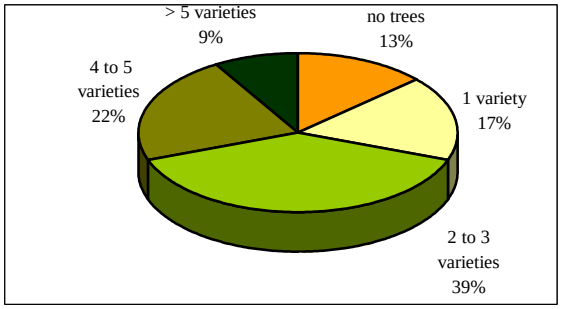
Less than 15% of households did not own any fruit trees. Even though the existence of fruit trees was common in all areas, their presence was more intense in the rural areas, where around 90% of households owned at least one fruit tree. Furthermore, few households owned less than 10 trees in the rural areas. Around 80% of households in the rural area owned more than 10 trees. Intensity of trees was less common in the urban area, where less than 60% of households owned more than 10 trees. Graph 24 illustrates findings.

Graph 24: % of HHs by number of trees owned

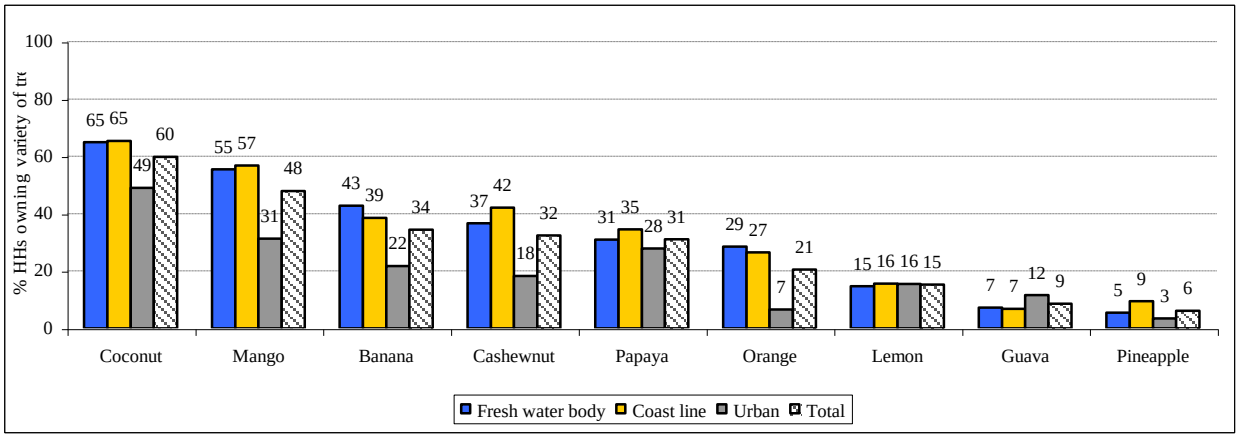


Graph 25: % of HHs by number of varieties of trees owned

Not only were the quantities of trees substantial, but also the variety of trees. Around 30% of households owned at least 4 types of fruit trees. Graph 25 illustrates the findings. The most common trees owned were coconut and mango trees, which were owned by 65% and 60% of households in rural areas respectively. Cashew nut trees and banana trees were also frequently owned. There was practically no difference between rural areas in terms of variety owned. As expected, households living in urban areas owned less fruit trees. Graph 26 illustrates the findings.



Graph 26: % of HHs owning trees by species of trees



Fishery

Graph 27: % of HHs that practiced fishing in previous 6 months

Even though fishing has been highlighted to be a major source of income in the target areas, it appears that it only reaches the households who are very close to the coastline or to rivers. The survey included households up to 15 kilometers from the coastline and as such, fishing was not frequently found. It is estimated that, for the whole area, 28.8% of households fish. In the rural areas, this rate increased to almost 35%. In accordance with the MoA, "Along the coast, the economy is dominated by fishing, including high value species (tuna, prawns, calamari, etc). However, the impact of the ocean on the economy only extends a few kilometers inland: beyond this, agriculture dominates the economy." Graph 27 illustrates the findings.

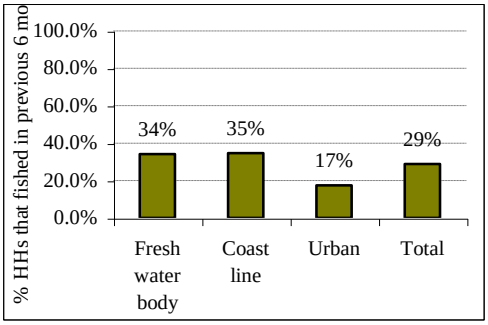


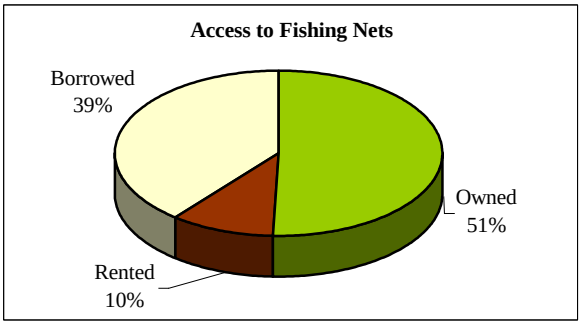
Table 14: % of HHs that use techniques for fishing

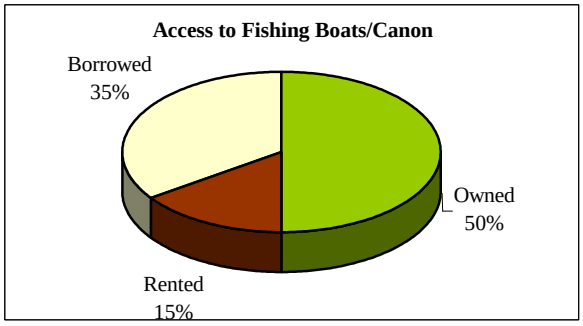
Technique	Livelihood Area	N	% HHs using techniques (only for HHs that fished)	95% Confidence Lower Bound	95% Confidence Upper Bound
Use Nets	Fresh water body	186	74.7%	68.4%	81.1%
	Coast line	189	77.2%	71.2%	83.3%
	Urban	95	60.8%	50.8%	70.8%
	Total	469	72.9%	68.9%	77.0%
Use Boats	Fresh water body	186	80.6%	74.9%	86.4%
	Coast line	189	78.8%	73.0%	84.7%
	Urban	95	81.0%	73.0%	89.1%
	Total	469	80.0%	76.4%	83.6%
Fish in fresh water	Fresh water body	186	48.2%	40.9%	55.4%
	Coast line	189	40.4%	33.3%	47.5%
	Urban	95	43.6%	33.5%	53.8%
	Total	469	44.2%	39.6%	48.7%

Most of the households which practiced fishing used nets and boats. Nets and boats were used by almost 80% of the fishermen in the rural areas. Fresh water fishing was less frequent and was found only in the areas adjacent to fresh water. Table 15 illustrates findings.

Half of the households using nets or boats owned them. 39% of households using nets borrowed them and only 11% rented the nets. Half of the fishermen also owned a boat/canoe. However, 15% of the fishermen had to rent boats. There were no difference between the rural areas in terms of access to nets and boats. However, households living in urban areas tended to rent nets and boats more than rural households. Graph 28 and 29 illustrate the findings.

Graph 28: % of HHs that access fishing nets by type of arrangement
Graph 29: % of HHs that access boats/canoes by type of arrangement



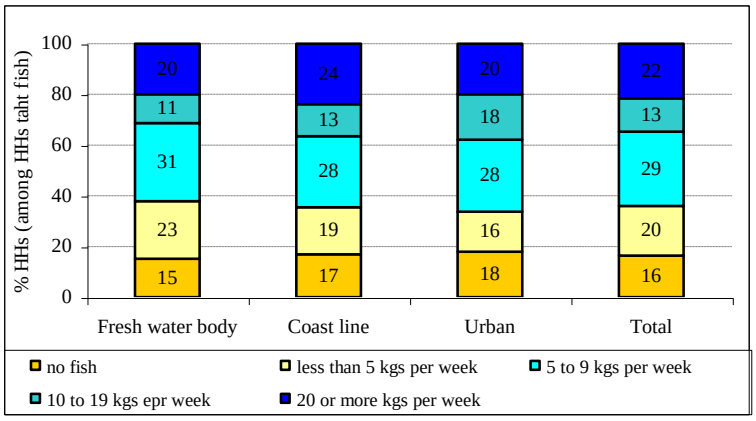


On average, fishermen households fished 16.7 kilograms of fish per week. The large confidence intervals displayed in table 16 show that there was large divergence in the amount of fish caught by households. When the amount of kilos of fish was segregated into intervals, it was confirmed that there is a great variability in the amount of fish caught by households that usually fish. While 16% of households that fish did not catch anything in the week preceding the survey, 22% of households captured more than 20 kgs that week. There was no difference between the livelihood areas. Graph 30 illustrates the findings.

Table 15: Mean number of kilos fished in previous 7 days

Livelihood Area	N	Mean number of Kgs fished (among HHs who fished)	95% Confidence Lower Bound	95% Confidence Upper Bound
Fresh water body	186	13.1	9.7	16.5
Coast line	189	19.6	11.6	27.6
Urban	95	17.9	8.5	27.2
Total	469	16.7	12.7	20.6

Graph 30: % of HHs by amount of kilos fished in previous 7 days



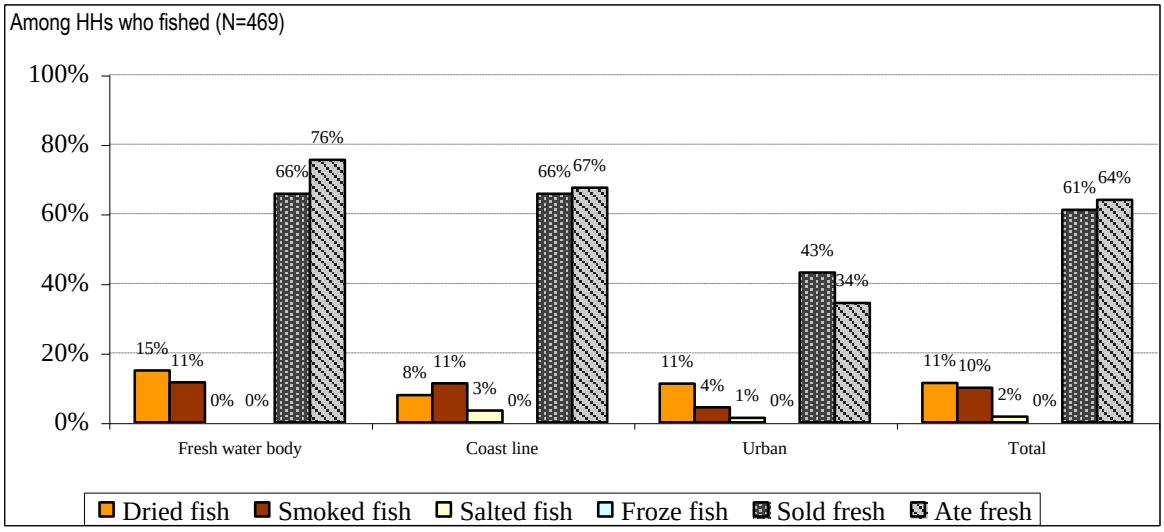
The catching of fish seemed to depend on the use of nets and boats. Households using nets, boats or nets and boats, fished usually three times more than households not using these techniques. The difference was significant between all techniques ($p<0.05$). Table 17 illustrates the findings.

Table 16: Mean number of kilos fished in previous 7 days By type of technology used

Techniques for Fishing	N	Mean	95% Confidence	
			Lower Bound	Upper Bound
No nets	127	6.6	4.6	8.5
With nets	342	20.4	15.1	25.8
No boats	94	5.3	3.6	7.1
With boats	375	19.5	14.6	24.4
No nets and boats together	152	6.9	5.1	8.6
Nets and boats together	310	21.3	15.4	27.1
Total	462	16.5	12.5	20.5

The vast majority of households either ate their fish fresh or sold it fresh. Only 20.3% of households did some form of fish processing, including drying, salting and freezing. Less than 15% of the households dried or smoked fish in all areas. Fish salting or freezing was almost inexistent. Graph 31 illustrates the findings.

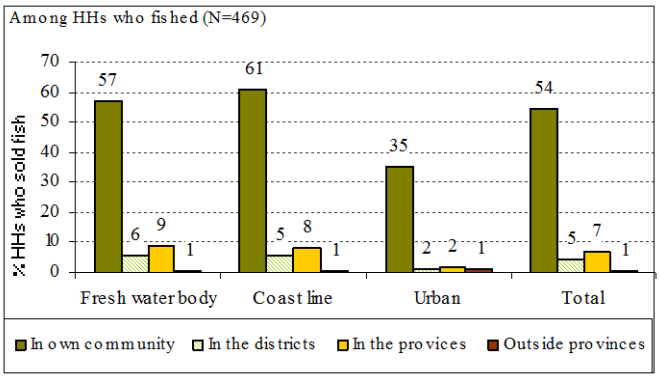
Graph 31: % of HHs processing fish by type of technique

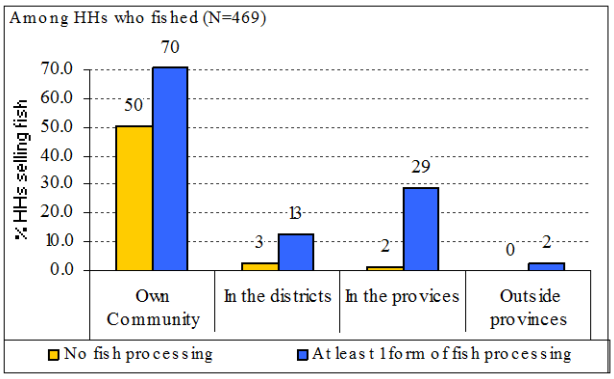


On average, a little more than half of the households who fished sold their catches. The vast majority of the households who sold fish, did so within their own community, probably because transporting fresh fish is difficult. Less than 10% of the people who fished sold their fish in areas outside their district. A significant difference in the proportion of households selling fish was found when comparing households who process their products with households that do not process ($p<0.01$). The difference on sales in areas outside the districts was between fourfold and tenfold greater among households who processed their fish. Graph 32 and 33 illustrate the findings.

Graph 32: % of HHs who sold fish in previous month

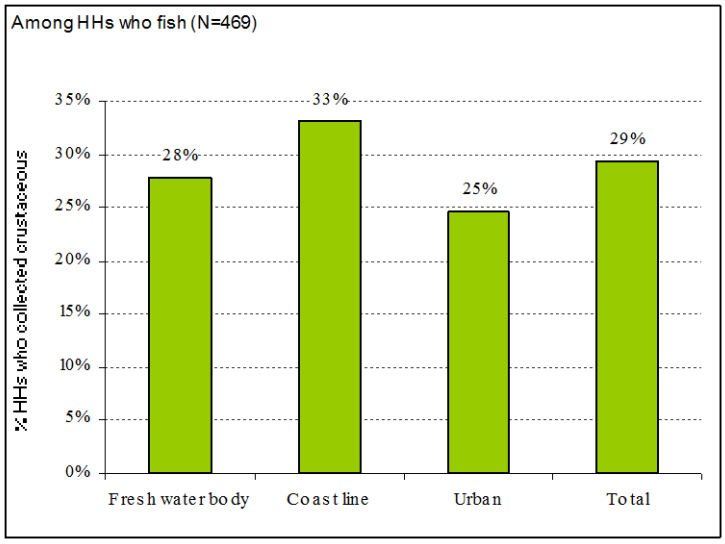
Graph 33: % of HHs who sold fish in previous month by processing techniques





The collection of crustaceans was not significant in the whole area and only 10% of total households collected them. However, among households that fished, 30% of them also collected crustaceous. Less than 2% of households that didn't fish collected crustaceans. Households living along the coastline tended to collect more crustaceans than households living in the other areas. Graph 34 illustrates the findings.

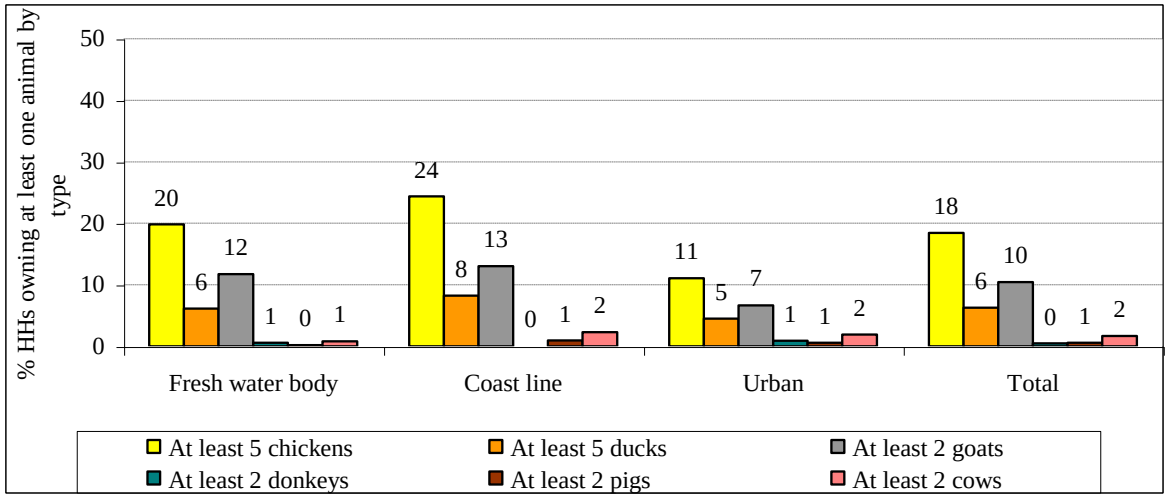
Graph 34: % of HHs who collected crustaceans



Livestock

Livestock ownership was considerably low: less than ¼ of households owned at least 5 chickens. Less than 15% of households owned two goats or 5 ducks. Although the coastline area showed slightly higher levels in comparison with other areas, the rates were still low. Graph 35 illustrates the findings.

Graph 35: % of HHs owning specific livestock



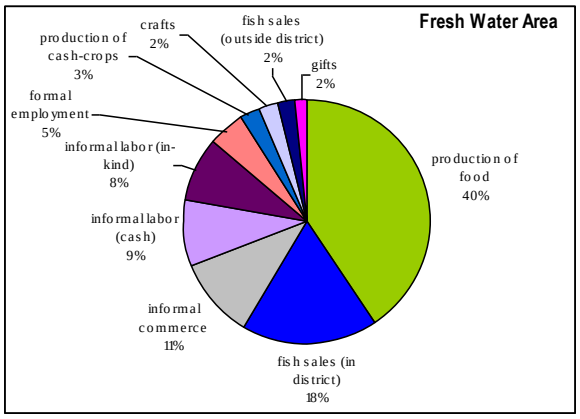
Sources of Income

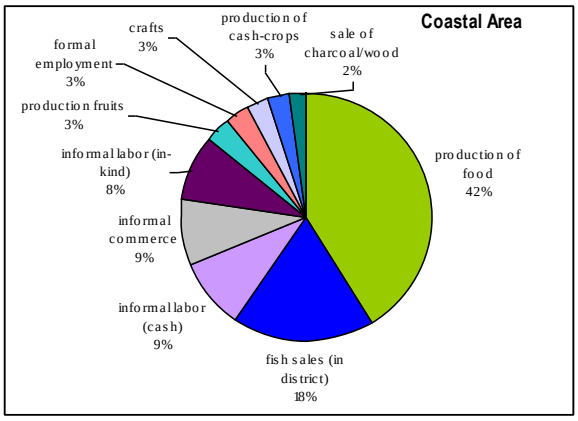
The main income of households in the fresh water and coastline areas was extremely similar. Almost 40% of the households had agriculture as their main source of income. Fish sales in the district were the most important source of income for around 16% of the households. These two sources of income were the only ones identified as the mains source for more than 10% of households. Sale of charcoal/wood and fruit production was only mentioned in the coastal group.

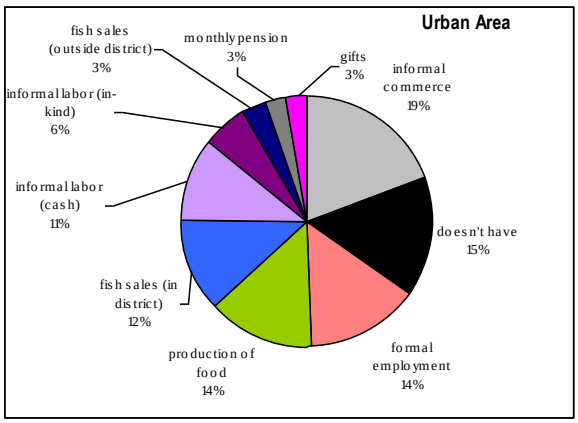
On the other hand, income sources in urban areas were more diverse, and no income source was identified as the main one for more than 17% of the population. Five income types were identified as their main source for more than 10% of the households.

The lack of income source was identified by 13.2% of urban households. On the other hand, no households said that they had no main income sources in the rural areas. Graph xxx illustrates the findings.

Graph 36: % of HHs by main type of income

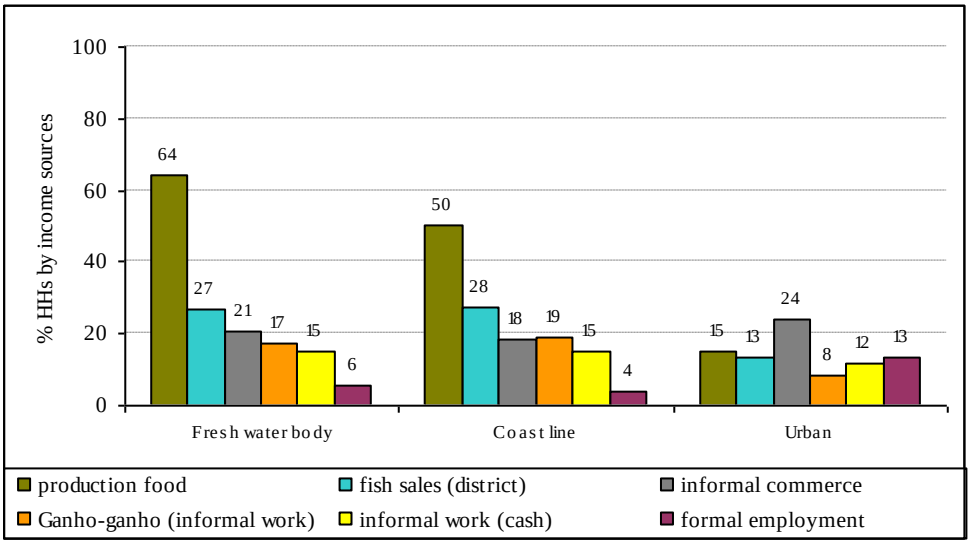






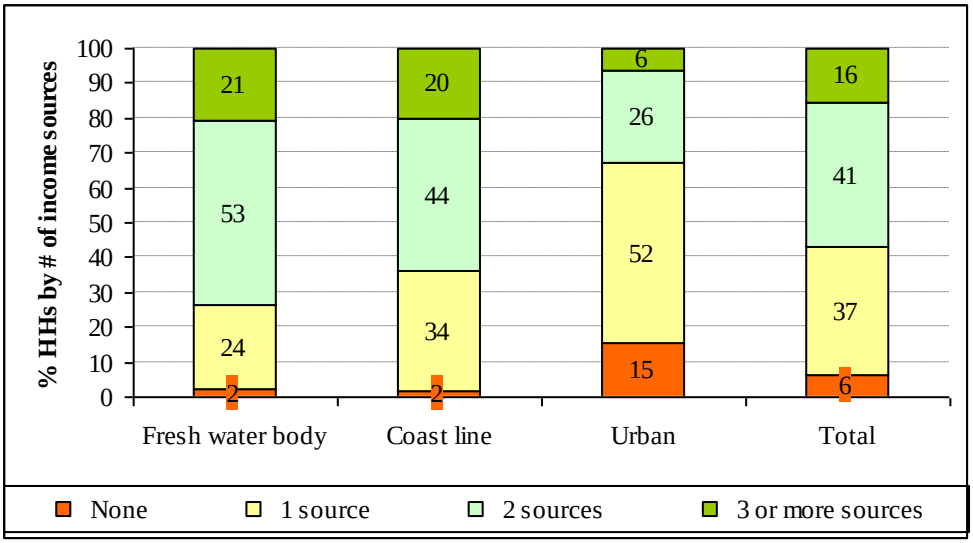
Agricultural production was identified as a source of income for 64% of households in the fresh water area. Half of the households in the coastline area also earned income from agricultural production. Fishing was the next income source, with almost 30% of households earning income from it in the rural areas. The income sources for urban households were significantly different. No income source predominated in the urban areas. Graph 36 illustrates the findings.

Graph 37: % of HHs engaging in income activities by areas



Only 2% of the households in the rural area said that they did not have any income source. This rate was 7 times larger in the urban areas, where 15% of the households said that they don't have any income source except for gifts. In the rural area, less than 1/3 of households only depended on 1 source of income and around 20% of them had 3 or more sources. Graph 37 illustrates the findings.

Graph 38: % of HHs by number of income sources



Remittances – inwards and outwards – were most frequent in the fresh water area. In this area, almost 20% of households received or sent remittances. In the other areas, the level of remittance transfer was significantly lower and households tended to receive more remittances than they sent. This shows that households in the fresh water areas are more mobile. Probably, households from other areas are going to the riverside areas to pursuit better fishing and agriculture opportunities. Table 19 illustrates the findings.

Livelihood Area	N	Remittances		Food/In-kind			
		Received	Transfered	Received	Transfered	Worked for in-kind	Exchanged good
Fresh water body	544	19.0%	18.4%	23.5%	17.1%	23.2%	20.0%
Coast line	544	13.6%	5.4%	17.5%	13.5%	19.1%	11.9%
Urban	541	10.5%	8.4%	14.6%	11.7%	4.4%	2.1%
Total	1,629	14.4%	10.7%	18.5%	14.1%	15.6%	11.4%

Table 17: % of HHs receipt and transfer of funds and items

Associations

In general around 20% of households were part of an association. Households living in rural areas tended to organize slightly more in terms of associations. Less than 5% of households participated in more than 1 association. Table xxx illustrates the findings.

Table 18: % of HHs that were part of an association by type

Livelihood Area	N	% HHs that are part of Associations		
		None	1 Association	2 to 3 Associations
Fresh water body	544	79.0%	17.3%	3.7%
Coast line	543	77.3%	18.4%	4.2%
Urban	541	86.1%	12.8%	1.1%
Total	1,628	80.8%	16.2%	3.0%

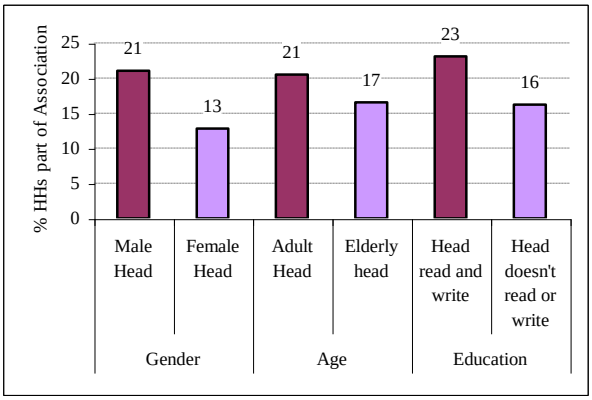
Savings, informal associations and agricultural associations were the most important types in rural areas, with as much as 7% of households being part of one of these organizations. Church was the next most important source, with around 5% of households being part of a church group. Around 2% of households were part of women's groups. Fishing associations was more commonly encountered in the coastline area, however less than 2% of households were part of an association. Table 20 illustrates the results.

Table 19: % of HHs that were part of association by type

Type of Association	Fresh water body	Coast line	Urban	Total
Sample Size (N)	542	545	542	1629
None	79.3%	77.2%	87.1%	81.2%
savings and informal credit	7.9%	3.5%	3.1%	4.8%
agriculture	5.5%	7.0%	0.4%	4.3%
church	5.4%	5.7%	0.7%	3.9%
women group	2.0%	2.4%	3.7%	2.7%
fishing association	0.9%	2.0%	1.1%	1.4%
formal credit	0.7%	2.4%	0.4%	1.2%
sports comittee	0.9%	1.1%	1.3%	1.1%
community development	0.9%	1.8%	0.4%	1.0%
commerce	0.6%	1.1%	0.7%	0.8%
youth commitee	0.2%	0.4%	0.9%	0.5%
community fishing council	0.6%	0.2%	0.2%	0.3%
OVC commitee	0.0%	0.0%	0.7%	0.2%
health commitee	0.0%	0.0%	0.4%	0.1%
parents associations	0.0%	0.0%	0.2%	0.1%

Graph 39: % of HHs part of associations by characteristics of head

Households with usual vulnerability profiles, such as women or elderly headed households, tended to participate less in associations than households without this profile. While 21% of the male-headed households were part of an association, almost half of this rate was found among women headed households. The same pattern – however with less sharpness – was seen when comparing the age and education status of the head of households. Graph 38 illustrates findings.



Credit

On average 15% of households received some form of credit. Credit was taken more often by households living in the rural areas, where 18% of households took some form of credit against 8.8% of households in urban areas. The source of credit in rural areas was predominantly from families and friends, with half of the households assessing credit through these groups. Even though savings and informal credit was the next most common used source, less than 5% of households accessed this source. Table 21 illustrates the findings.

Table 20: % of HHs that received credit in previous 12 months by its source

Source of Credit	Fresh water body	Coast line	Urban	Total
Sample Size (N)	542	545	542	1629
None	81.7%	81.9%	91.2%	84.9%
Family/friends	11.1%	11.7%	3.7%	8.8%
Savings and informal	4.2%	3.7%	1.8%	3.3%
Associations	1.7%	1.7%	0.6%	1.3%
Bank	0.6%	0.7%	1.5%	0.9%
Xitique	0.7%	0.9%	0.7%	0.8%
Agriculture/Livestock projects	0.4%	0.0%	0.6%	0.3%
NGOs	0.6%	0.2%	0.0%	0.2%
Church	0.2%	0.0%	0.4%	0.2%

The use of credit was bi-directional: while almost 39% of households accessed credit to fulfill non-productive needs, such as food and health care, 44% of households accessed it to meet productive purposes, such as to develop a business. This shows that, while some households may be stressing towards basic needs, others are more stable. Table 22 illustrates the findings.

Table 21: % of HHs by use of largest credit received in last 12 months

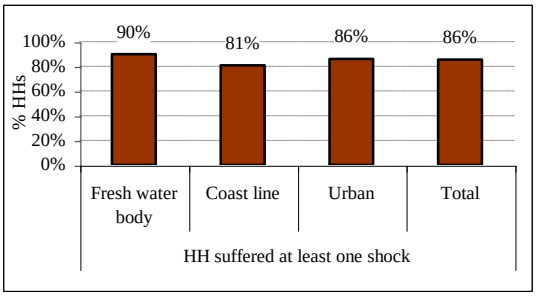
	Use of largest credit	Fresh water body	Coast line	Urban	Total
		100	102	52	254
Productive Purposes	Business	21.0	21.6	15.4	20.1
	Purchase of other assets	15.0	8.8	15.4	12.6
	Purchase of fishing/processing equ.	9.0	6.9	7.7	7.9
	Purchase of agricultural inputs	2.0	1.0	1.9	1.6
	Purchase of animals	1.0	2.9	0.0	1.6
	rent/purchase of land	0.0	1.0	0.0	0.4
	Sub Total	48.0	42.2	40.4	44.1
construction	Fixing of old houses	5.0	8.8	11.5	7.9
	Construction of new houses	8.0	5.9	5.8	6.7
	Other constructions	2.0	0.0	3.8	1.6
	Sub Total	15.0	14.7	21.2	16.1
Non-productive	Food purchase	29.0	27.5	28.8	28.3
	Health care	5.0	9.8	5.8	7.1
	Funeral	2.0	5.9	3.8	3.9
	Lobolo	1.0	0.0	0.0	0.4
	Sub Total	37.0	43.1	38.5	39.8

Shocks

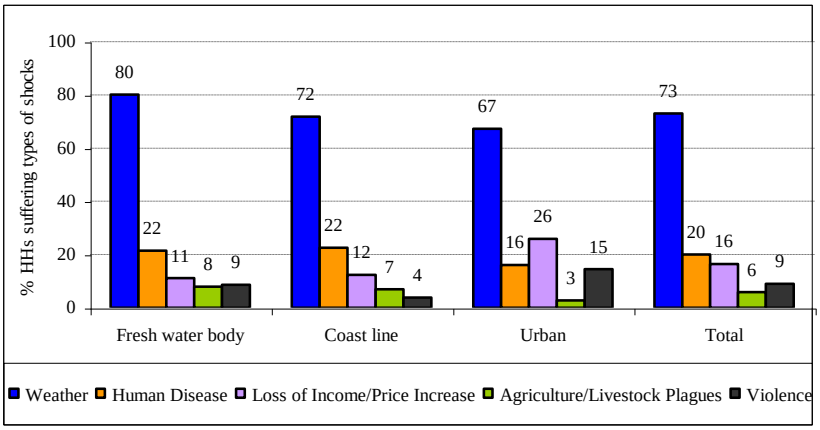
The vast majority of households, between 80 and 90%, suffered from stresses that depleted their ability to access food, retain assets or access income in the way they were used to,in the previous six months. The fresh water area suffered most, with 90% of households suffering from some shock.

The most common shock was weather related, with the Cyclone that occurred in February being the most important factor. The difference between the fresh water area and others is due to a difference in the proportion of households suffering from the cyclone. Human diseases, including acute and chronic illness, were the next most common shocks in rural areas. In urban areas, the increases in prices and income losses were the second most common shock. Graph 39 and 40 illustrates the occurrence of shocks per livelihood area.

Graph 40% of HHs that suffered at least one shock in previous 6 months



Graph 41 % of HHs that suffered specific shocks in previous 6 months



Coping Strategies

In general, people respond to conditions under which they do not have enough to eat, with various means of "coping". Coping is what people have to do when they do not have enough—the more people have to cope, the less food secure they are.

Household decision-makers (usually, though not always, women) organize the resources at their disposal to limit the short-term effects of not having enough to eat. People generally know how much is "enough" and seek the best options for ensuring that they eat enough. People start to change their consumption habits when they anticipate a problem. They don't wait until there is no food.

There are two basic types of coping strategies. One includes the immediate and short-term alteration of consumption patterns. The other includes the longer-term alteration of income earning or food production patterns, and one-off responses such as asset sales. While it is important to understand longer-term livelihood strategies in an emergency, research has shown that the management of short-term consumption strategies is an accurate indicator of acute food security.

Typically, food insecure households employ four types of consumption coping strategies.

1. Households may change their diet. For instance, households might switch food consumption from preferred foods to cheaper, less preferred substitutes.

2. Households can attempt to manage the shortfall by rationing the food available to the household (cutting portion size or decreasing the number of meals, favoring certain household members).

3. If the available food is still inadequate to meet the needs, households can engage in extreme dietary strategies. Household can attempt to increase their food supplies using short-term strategies that are not sustainable over a long period. Typical examples include borrowing, or purchasing on credit. More extreme examples are begging or consuming wild foods, immature crops, or even seed stocks.

4. Furthermore, households can try to reduce the number of people that they have to feed by sending some of them elsewhere (sending the children to the neighbors house when those neighbors are eating) or skipping entire days without eating.

If households are not able to cope based on strategies focusing on dietary change only, they will engage in other types of strategies:

1. Households may decrease their expenses on other activities, such as health and education.

2. Households may look for some loans to fulfill unmet needs

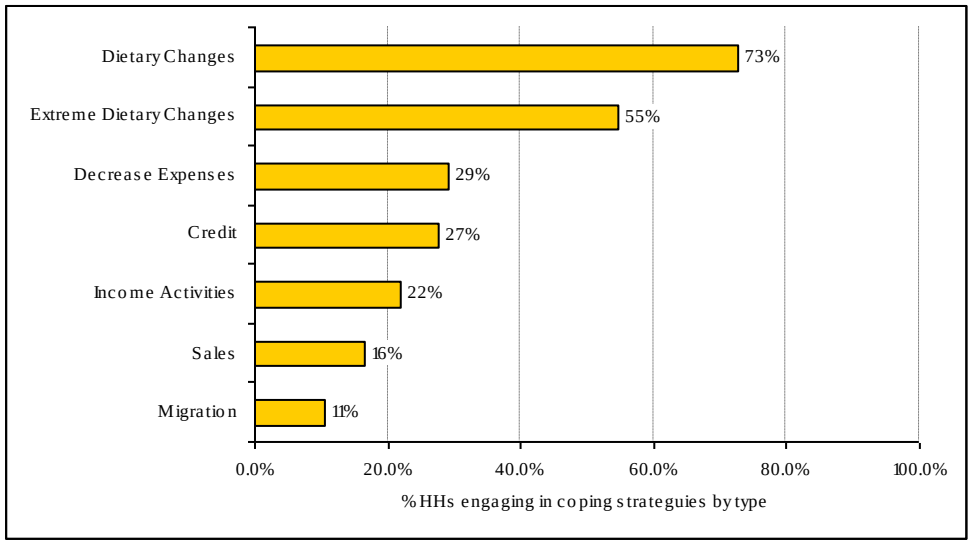
3. Households may engage in other forms of income activities, such as work for food or send children to work.

4. Households may sell some assets to generate income to purchase food. At this stage households are already extremely stressed.

5. Households may carry out unusual migration in search of income.

As it is normally expected, more people engaged in dietary strategies, following extreme dietary changes, such as skipping entire days without eating, eating seed stocks or sending members away. 73% of households engaged in dietary changes, and 55% in extreme dietary changes. Decrease in expenses was done by almost a third of the population. This shows that, although stress levels are moderate to high, most households have been responding mainly with changes in diet. Nevertheless, one third of the households are engaged in livelihood stressful strategies, such as decrease in expenses and increase in credit. Although these activities may not destroy the livelihood capacities, it may result in long term downward spiral development. 13% of households are engaging in livelihood destructive activities such as sale of assets and unusual migration. Graph 41 illustrates the findings.

Graph 42: % of HHs that engaged in coping strategies by nature of strategy



Similar rates of coping strategies were seen between the two rural areas. On the other hand, urban areas tended to engage more in credit strategies, probably because they have greater access to it. Income changing activities were at least threefold higher in rural areas than in urban areas. Graph 42 illustrates the findings and table 23 details each type of activity.

Graph 43: % of HHs that engaged in coping strategies by nature of strategy by areas

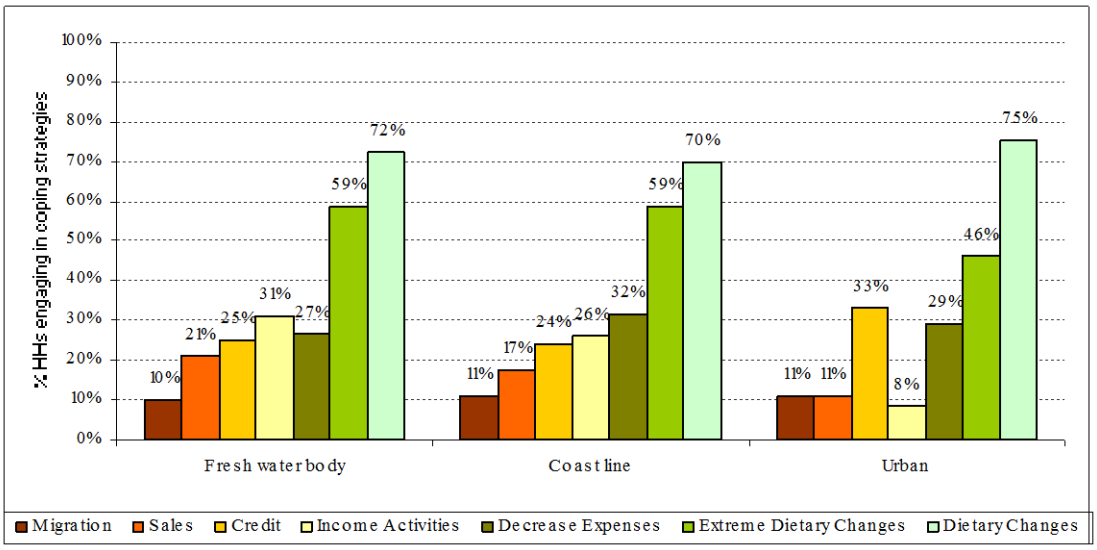


Table 22: % of HHs that engaged in specific coping strategie by areas

Domain for data analyses	Fresh water body	Coast line	Urban	Total
Decreased quantity food	48%	51%	49%	49%
Adult ate less	40%	45%	47%	44%
HH ate less	43%	46%	38%	42%
Ate seeds	29%	33%	24%	28%
Borrowed food	28%	27%	26%	27%
Bought food on credit	24%	23%	33%	26%
Ate more wild food	21%	16%	32%	23%
Borrowed money from family	17%	16%	22%	19%
Decreased expenses in health	18%	22%	15%	18%
Spent savings	17%	11%	19%	16%
Decreased expenses in education	11%	17%	19%	16%
Worked for longer hours	11%	11%	4%	9%
Worked for food	13%	11%	2%	9%
Took child out of school	4%	4%	17%	9%
Harvested green	11%	11%	3%	8%
Sold small animals	15%	8%	2%	8%
HH ate less than 2 meals	8%	6%	10%	8%
Exchanged agriculture products	13%	8%	1%	8%
Migrate temporarily to south	5%	5%	5%	5%
Borrowed money with formal credit	2%	6%	5%	5%
Rented/gave land	3%	5%	4%	4%
Migrate temporarily to North	3%	5%	4%	4%
Migrate temporarily to interior	2%	4%	6%	4%
Migrate temporarily to outside districts	3%	3%	5%	3%
Long-tem migration	1%	2%	6%	3%
Send children to work for other HH	5%	2%	2%	3%
Moved homes	4%	2%	2%	3%
Sold assets	2%	2%	3%	2%
Sold agricultural tools	3%	2%	1%	2%
Sold construction materials	0%	3%	2%	2%
Sold large animals	1%	1%	1%	1%

The coping strategy index, which takes into consideration both frequency and severity of household's coping strategy (see Section1: Methods), shows little difference between the areas. Section 5 on acute food security will discuss shocks and coping strategies in more detail.

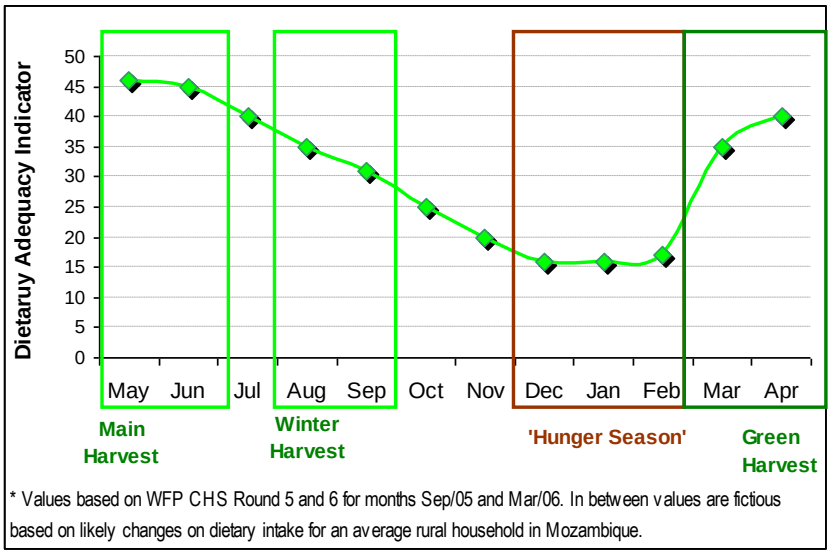
Table 23: Mean Coping Strategy Indicator

Livelihood Area	N	Mean Coping Severity Index	95% Confidence	
			Lower Bound	Upper Bound
Fresh water body	542	0.36	0.34	0.39
Coast line	542	0.36	0.34	0.39
Urban	544	0.37	0.34	0.40
Total	1,628	0.37	0.35	0.38

Dietary Intake

Before results are presented, it should be noted that the figures discussed in this section reflect the dietary intake during the month of August. One may expect that different food consumption patterns would be observed during the lean season or straight after the harvest. Therefore, dietary intake should carefully take into account the likely impact seasonality has on dietary intake.

Diagram 1: Fictitious expected dietary intake quality through year

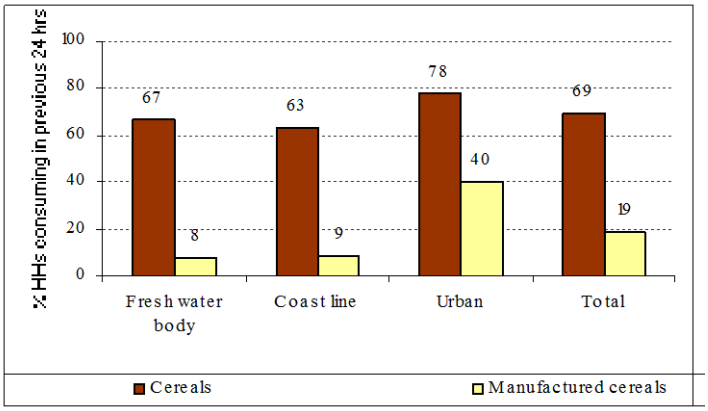


* Values based on WFP CHS Round 5 and 6 for months Sep/05 and Mar/06. In between values are fictious based on likely changes on dietary intake for an average rural household in Mozambique.

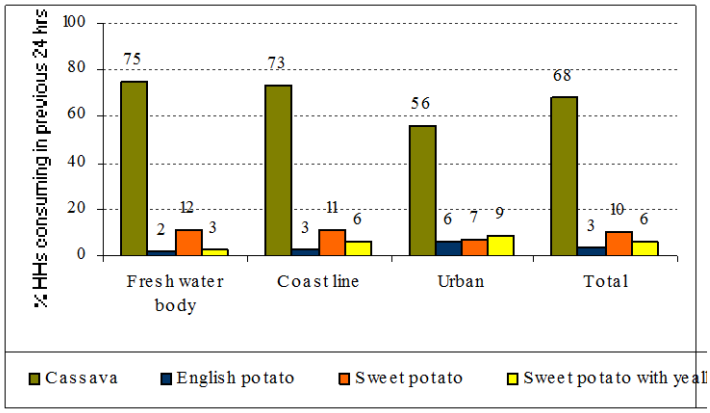
In accordance with the agricultural calendar, although August is not expected to be the worst month, much of the household production is expected to have run out. Diagram 1 illustrates the likely relationship between dietary intake from own production and agricultural calendar in Northern Mozambique.

In general, households ate a low diversified diet with cereals, tubers, and fish, being the most common food items eaten. Around 20-30% of the households ate some vegetables, beans or pulses. Virtually all households consumed salt and more than 30% consumed oils. Graphs 43 to 48 illustrates the intake of food items by households. There was little difference between the three areas.

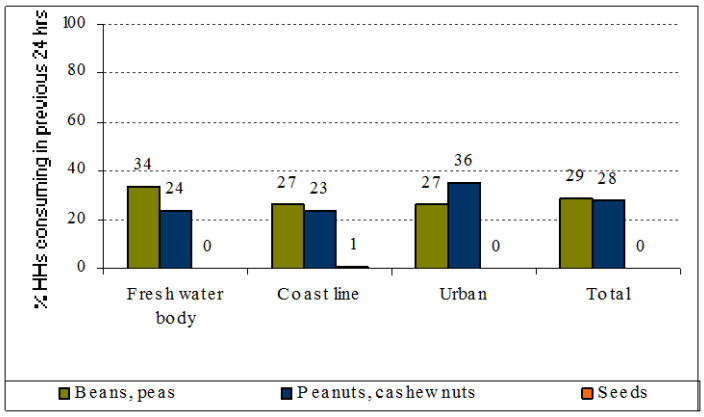
Graph 44: % of HHs consuming cereals by types in previous 24 hrs



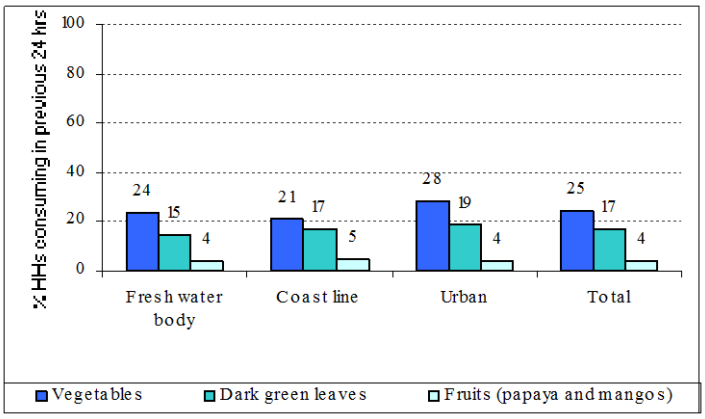
Graph 45: %of HHs consuming tubers by type in previous 24 hrs



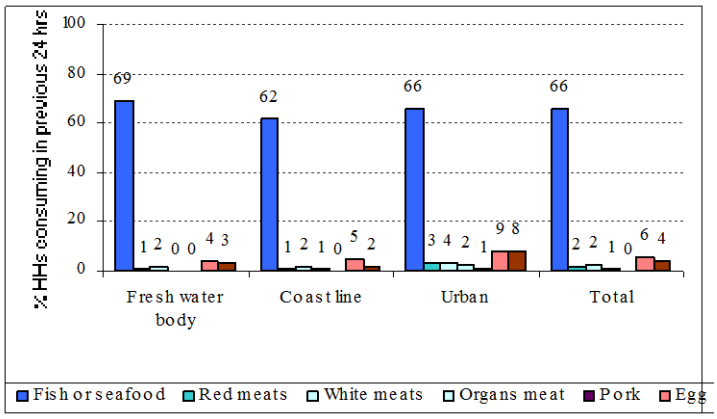
Graph 46: % of HHs consuming pulses by types in previous 24 hrs



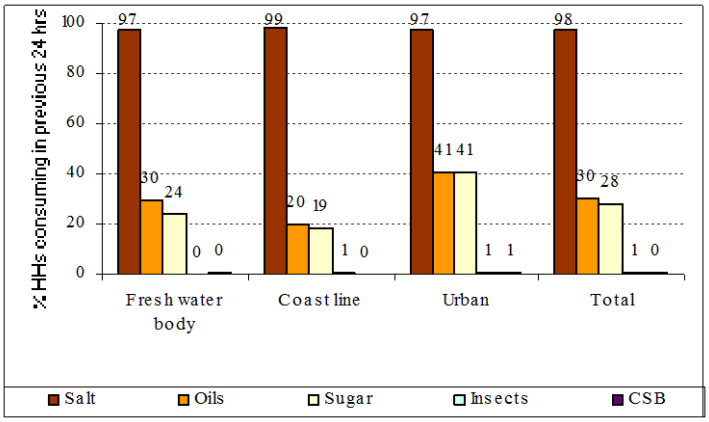
Graph 47: % of HHs consuming vegetables by type in prev. 24 hrs



Graph 48: % of HHs consuming meats by types in previous 24 hrs

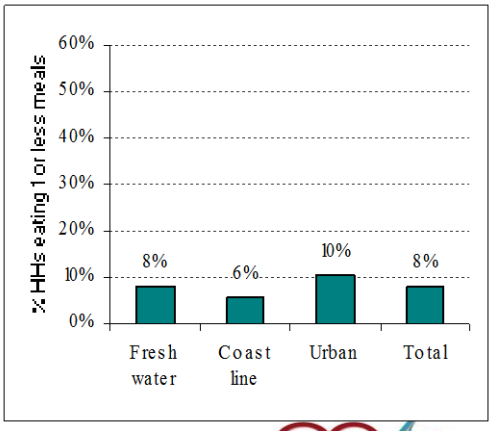


Graph 49: % of HHs consuming others by type in prev. 24 hrs

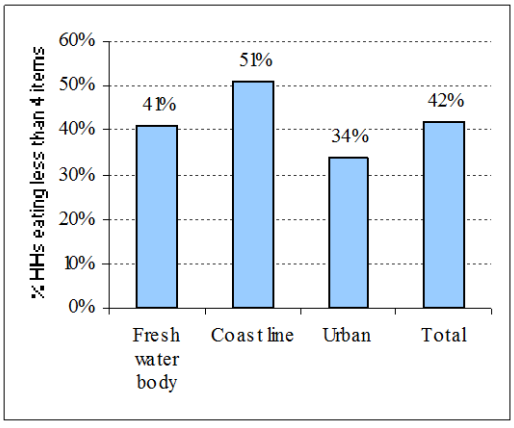


The mean number of meals eaten was 2.2 and did not vary between areas. Only 8% of households ate 1 or less meals in the day before the survey. These rates were slightly higher in urban areas. The coastline had the least amount of households eating 1 or less meals. In general, 42% of households ate 3 or less calorific food items in the day before the survey. The zone with highest level of households eating few items was the coastline. Graph 49 and 50 illustrates the findings.

Graph 50: % of HHs consuming 1 or less meals in previous 24 hrs



Graph 51: % HHs eating less than 4 food items



It was interesting to note that, 64% of households eating 1 or fewer meals had a high coping strategy index, while the same was true only for 27% of households eating 2 or more meals.

The dietary diversity score, created based on the relative weights of food items for the usual quantity digested and their nutritious value (see Section 1: Methods), showed that the two rural areas present the lowest dietary quality. In accordance with SETSAN ranges, 72% of the households in the coastal area have an inadequate diet. Although the level is slightly lower in the fresh water area, it still reaches 61% of the population. A little less than half of the households living in the urban areas are classified as having inadequate diet. A similar amount of households have very inadequate diet in the rural areas, ranging from 26 to 29%. Less than 20% of households have a very inadequate diet in the urban areas.

Table 24: Key dietary indicators outcomes by livelihood areas

Dietary Indicator	Livelihood Area	N	Mean	95% Confidence	
				Lower Bound	Upper Bound
Dietary Score	Fresh water body	535	7.9	7.6	8.2
	Coast line	538	7.2	7.0	7.5
	Urban	524	9.4	9.0	9.7
	Total	1,596	8.2	8.0	8.3
% HHs with Inadequated Dietary Diversity	Fresh water body	535	61.2%	57.0%	65.3%
	Coast line	538	72.3%	68.6%	76.1%
	Urban	524	48.7%	44.4%	53.0%
	Total	1,596	60.8%	58.4%	63.2%
% HHs with Very Inadequated Dietary Diversity	Fresh water body	535	25.8%	22.1%	29.5%
	Coast line	538	29.0%	25.2%	32.9%
	Urban	524	16.5%	13.3%	19.6%
	Total	1,596	23.8%	21.7%	25.9%

Section 3: Livelihood Profiles

Although data has been analyzed and presented by livelihood areas, even within an area, it is expected that there are large variations between households. The need to identify the livelihood patterns of people is crucial for designing effective and sustainable projects. As such, this section focuses on discussing the livelihood groups found in the target area. Key issues linked to food security, such as agricultural production, fishing, and incomes are discussed for each livelihood group. The level of outcome variables, such as dietary intake and coping strategies are also highlighted for each group.

Four continuous variables were entered into a two-stage cluster analysis. The variables included: (i) number of kilos of fish fished in the previous 7 days, (ii) household calorie requirements from own cereal and groundnuts production, (iii) household planted cassava area equal to or greater than 1 hectare, (iv) household received income from fishing sales, and (v) household received income from informal commerce. Naturally 6 clusters were created.

Livelihood Overview

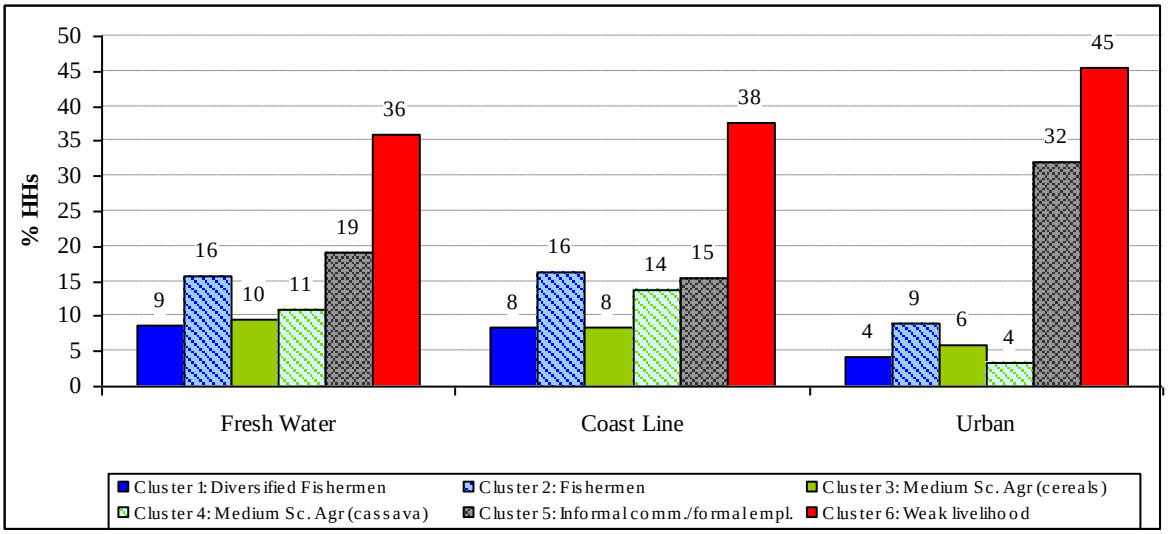
Table 32 illustrates an overview of each livelihood cluster found in the area and their percentage existence.

Table 25: Overview of livelihood cluster

Livelihood Cluster	Label	N	% of Sample	Description
Cluster 1	Diversified Fishermen	113	7.0%	Large scale fishermen, medium agricultural production, large variability of stable income souces, and better off households
Cluster 2	Fishermen	218	13.4%	Small scale subsistence fishermen, little diversificantion on income, little agricultural production and most vulnerable households
Cluster 3	Medium Scale Agriculturalists (no cassava)	128	7.8%	Medium to large scale cereal and groundnuts agriculturalists, no cassava, no fishing, moderate diversification of income, average vulnerable households
Cluster 4	Medium scale Agriculturalists (cassava mainly)	150	9.2%	Medium to large scale cassava agriculturalists, little diversification of income, subsistence fishing, average vulnerable households
Cluster 5	Informal commerce & Formal Employment	366	22.5%	Informal commerce owners and formal employment, high diversification of income, better off households
Cluster 6	Weak livelihood	653	40.1%	Worse-off households in all indicators: little fishing, production, income sources and high vulnerability
Total		1,629		

The distribution of the clusters between the two rural zones was extremely similar, and variations were insignificant. Nevertheless, there was a large difference between the urban and the rural areas. In the urban zones most people (77%) were either in the commercial or the most vulnerable clusters and there were only a few households from other clusters. Graph 72 illustrates the findings.

Graph 52: Distribution of livelihood clusters per Livelihood Areas



Fishing

Fishing has been cited elsewhere as an important source of livelihood in the area. Even though only 30.5% of the households said that they fished or collected crustaceans in the previous week (and only 22.5% of the households said that they earned income through fishing sales), this was an important activity for two clusters.

Table 26 shows the mean number of kilograms that a typical household had fished in the previous week in each cluster. It is possible to note that households in cluster 1 are heavily dependent upon fishing. In average, each household fished 90.4 kilos in the seven days preceding the study. This quantity is 21 times larger than the average of the next cluster and all differences are significant ($p<0.001$).

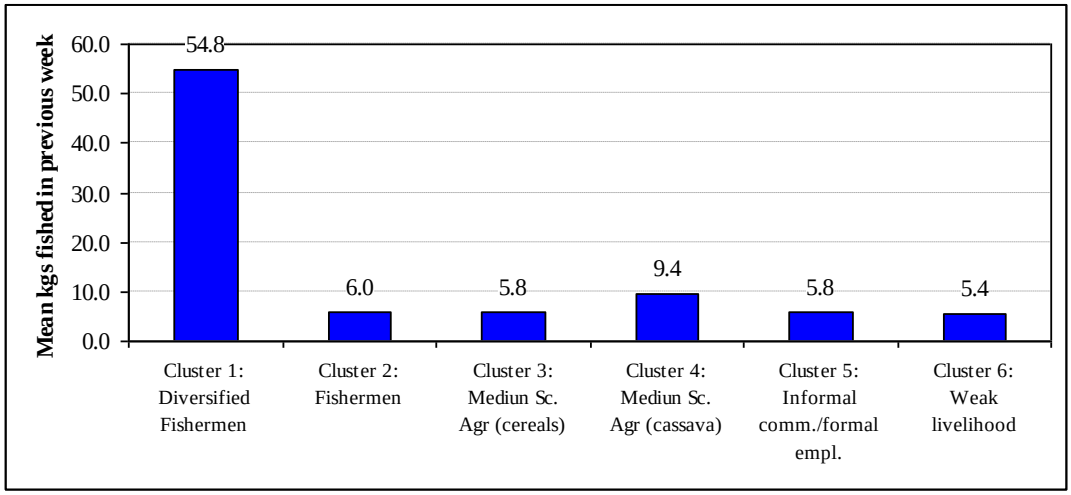
Households in cluster 2 also practice some fishing. In average, each household fished 4.8 kilos in the week preceding the survey. Households in cluster 4 carried out basic subsistence fishing, averaging 3.7 kilos per household. All other households fished very little. In total only 10.6% of households collected crustaceans or other sea products.

Table 26: Mean number of kilos of fish caught in previous week by livelihood cluster

Livelihood Activity	Livelihood Cluster	N	Mean	95% Confidence Lower Bound	95% Confidence Upper Bound
Kilograms of fish captured in previous week	Cluster 1: Diversified Fishermen	116	35.7	29.9	41.5
	Cluster 2: Fishermen	222	4.8	4.1	5.6
	Cluster 3: Agriculturalists (no cassava)	130	0.5	-0.1	1.1
	Cluster 4: Medium scale agriculturalists (cassava mainly)	153	3.7	2.1	5.2
	Cluster 5: Informal commerce	360	0.4	0.2	0.7
	Cluster 6: Weak livelihood	647	0.8	0.5	1.0
	Total	1,629	4.0	3.4	4.6

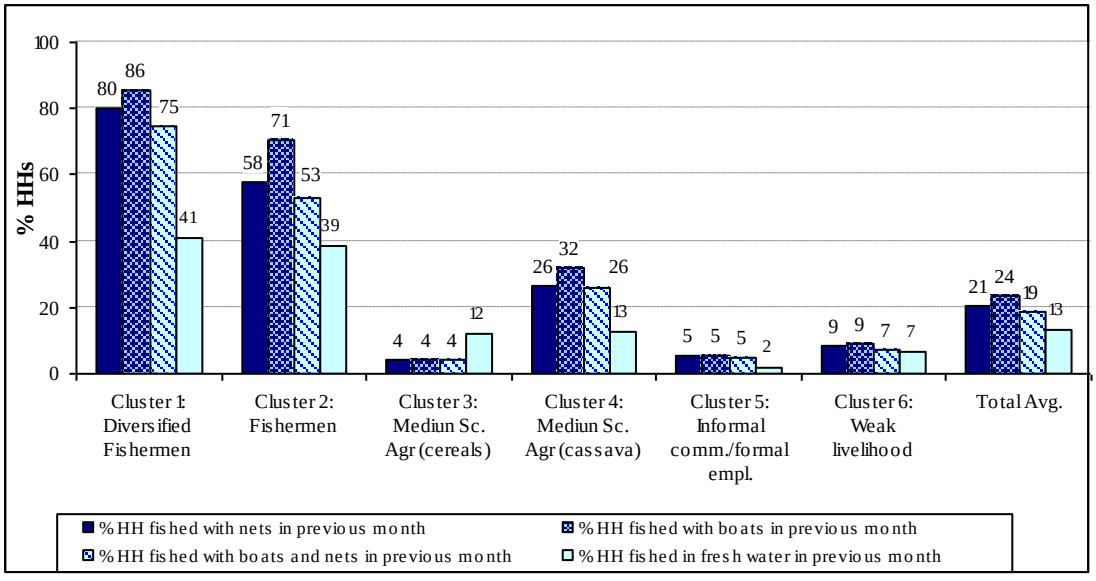
Not only cluster 1 had more households fishing and therefore a greater average number of kilos, but also the households who fished within this group fished more than households within other groups. Graph xxx shows that on average the households who fished in cluster 1, fished 54.8kilos of fish within one week.

Graph 53: Mean number of kilos of fish caught among people that fished in the previous week per livelihood cluster



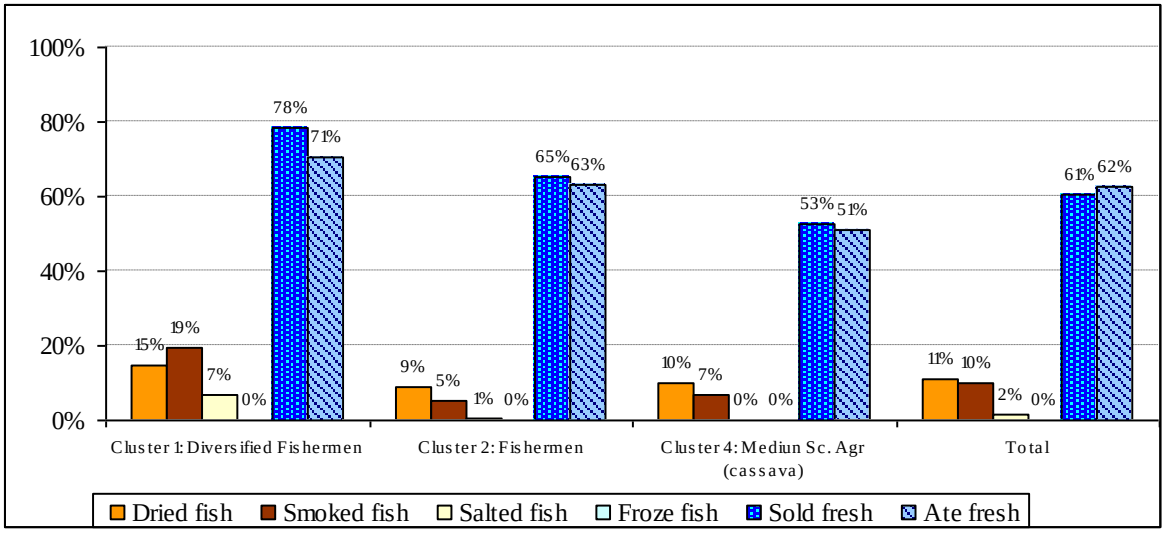
The use of fishing nets and boats was common among the fishermen. Among cluster 1, almost all households used boats (86%) and fishing nets (80%). Some households in cluster 4 also used fishing nets and boats. Almost every household who used nets fished from boats. Graph 51 illustrates the findings.

Graph 54: % of HHs using fishing techniques in the previous month per livelihood cluster



Among households who fished, almost all households either ate or sold the fish fresh. Around 20% of the households among the fishing clusters dried, smoked or salted the fish. Cluster 1 tended to carry out more fish processing, and 41% of them either dried, smoked or salted their fish. The lack of fish processing avoids any storage and long-term sale schemes. Graph 52 illustrates the findings.

Graph 55: % of HHs using fish processing techniques per livelihood cluster



Agricultural Production

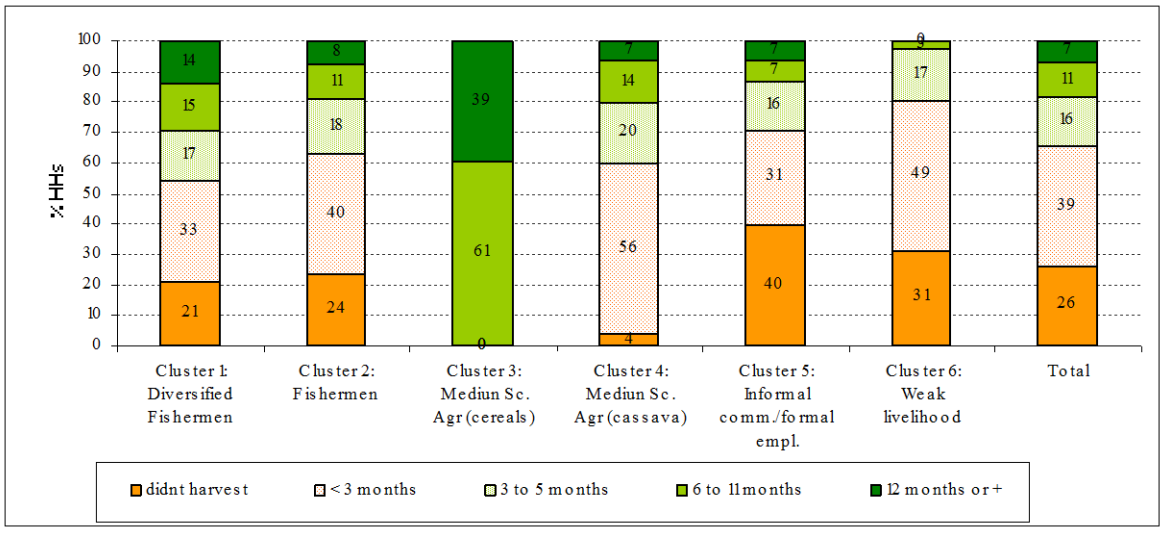
One group differentiates itself from the rest in terms of cereal and groundnut production: Typical households from cluster 3 harvested more cereals than they needed to consume from the 2007/08 season. As such they were classified as medium scale farmers (cereals). Households from cluster 1 harvested enough cereals for almost half a year for their own consumption. Households from clusters 2, 4 and 5 harvested enough to supply themselves with around 3 to 4 months. Cluster 6 harvested little, and produced enough to last less than 2 months. Table 28 illustrate findings.

Table 27: Mean number of moths of food availability from own production by livelihood cluster

Livelihood Activity	Livelihood Cluster	N	Mean	95% Confidence	
				Lower Bound	Upper Bound
Months of food availability from own production	Cluster 1: Diversified Fishermen	116	4.9	3.8	5.9
	Cluster 2: Fishermen	222	3.6	2.9	4.3
	Cluster 3: Agriculturalists (no cassava)	130	12.5	11.7	13.3
	Cluster 4: Medium scale agriculturalists (cassava mainly)	153	4.0	3.2	4.7
	Cluster 5: Informal commerce	360	2.9	2.5	3.4
	Cluster 6: Weak livelihood	647	1.6	1.4	1.7
	Total	1,629	3.5	3.2	3.7

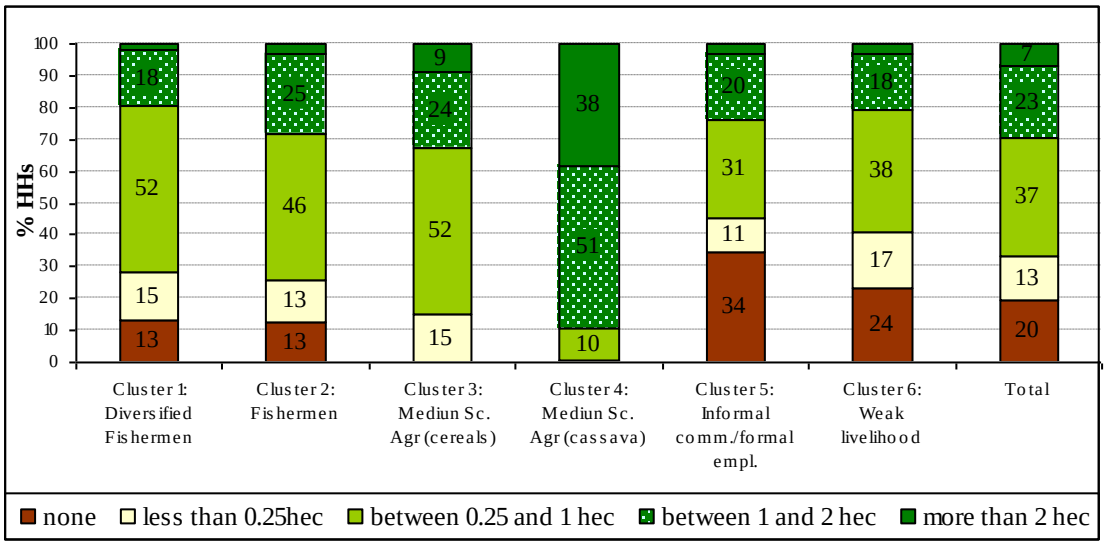
As it can be seen in graph 53, all households in cluster 3 harvested enough to last them at least 6 months of calorific requirements. Furthermore, 40% of the households in cluster 3 harvested enough to last them a whole year.

Graph 56: % of HHs by months of availability from own production per livelihood cluster



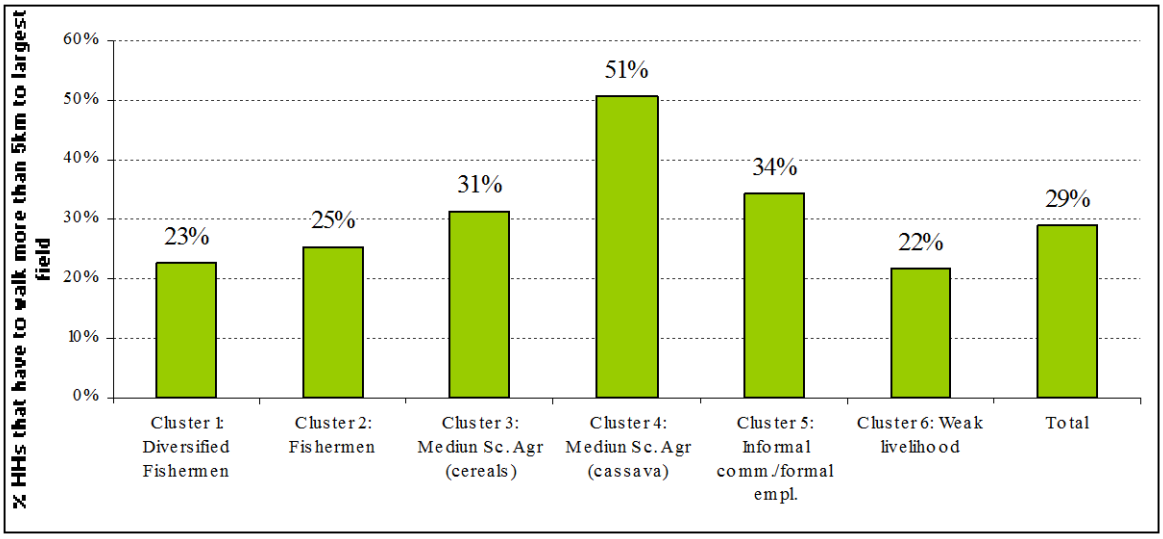
In total, 20% of the households did not harvest anything in the area. These households were found mainly among clusters 5, 6 and to a lesser extent, clusters 1 and 2. Clusters 3 and 4 did not have any household that didn't plant anything. Actually, almost 90% of the households in cluster 4 planted 1 or more hectare. Graph 54 illustrates the findings.

Graph 57: % of HHs by area planted in 2007/08 by livelihood cluster



The distance to the fields seems to be a stress that households have to go through. In general, 29% of the households that planted something had to walk more than 5 km each way to go to their largest field. The access to larger fields was more problematic among cluster 4, where half of the households had to walk more than 5 km to reach their fields. Graph 55 illustrates the findings.

Graph 58: % of HHs that have to walk more than 5kms to arrive at their largest field by livelihood cluster



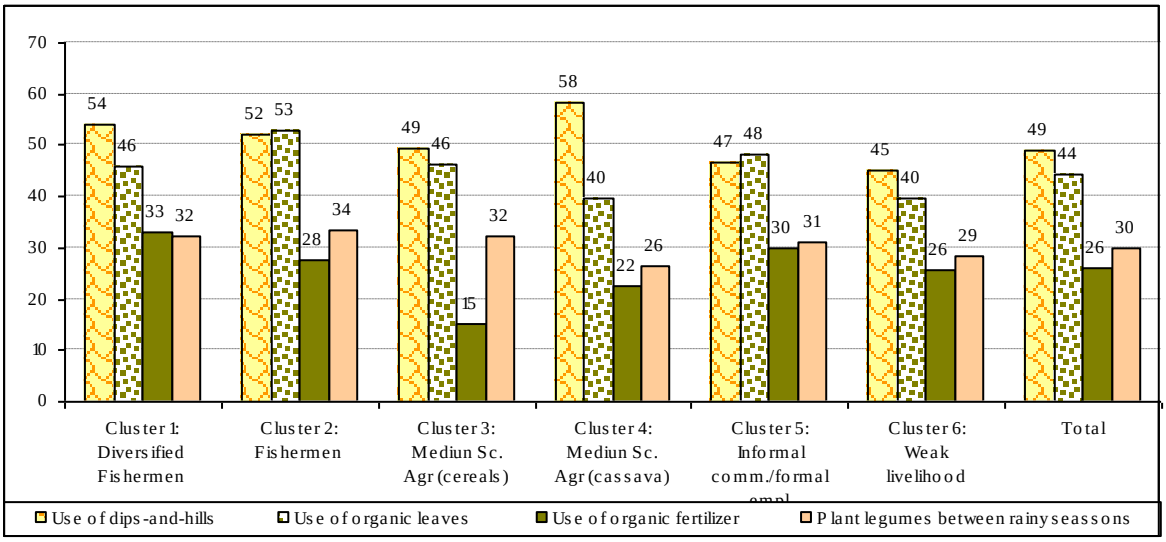
The key cereals harvested by all livelihood clusters were maize and rice, with rice being more important than maize. In average, households from cluster 3 harvested 101kgs of maize and 210kgs of rice. Peanuts were the next most important crop, with harvests averaging 41kgs for the whole area and averaging 146kgs among cluster 3. Table 29 illustrates the findings.

Table 28: Mean number of kilograms harvested per livelihood cluster

Livelihood cluster	(N)	Cereals (Kgs)				Groundnuts (Kgs)			
		Maize	**Rice**	**Sorghun**	**Millet**	**Peanut**	**Bean Nhemba**	**Bean Jugo**	**Bean Boer**
Cluster 1: Diversified Fishermen	113	47	56	1	0	74	18	8	8
Cluster 2: Fishermen	218	37	75	1	0	40	9	7	5
Cluster 3: Mediun Sc. Agr (cereals)	128	101	210	1	5	146	25	16	24
Cluster 4: Mediun Sc. Agr (cassava)	150	40	67	2	2	59	8	17	7
Cluster 5: Informal comm./formal empl.	366	24	39	0	1	36	7	9	6
Cluster 6: Weak livelihood	653	11	27	1	1	15	5	4	3
Total	1,629	29	56	1	1	41	9	8	6

There was little difference in the use of improved technologies for agricultural fields. The use of ploughing was used by 48.9% of the households that practiced agriculture. Among clusters 3 and 4, this proportion increased only by 10 percentage points. The use of organic leaves was below the average or at average for the households in clusters 3 and 4. Graphic 56 illustrate the findings.

Graph 59: % of HHs that use agricultural techniques per livelihood cluster



Cassava Plantation

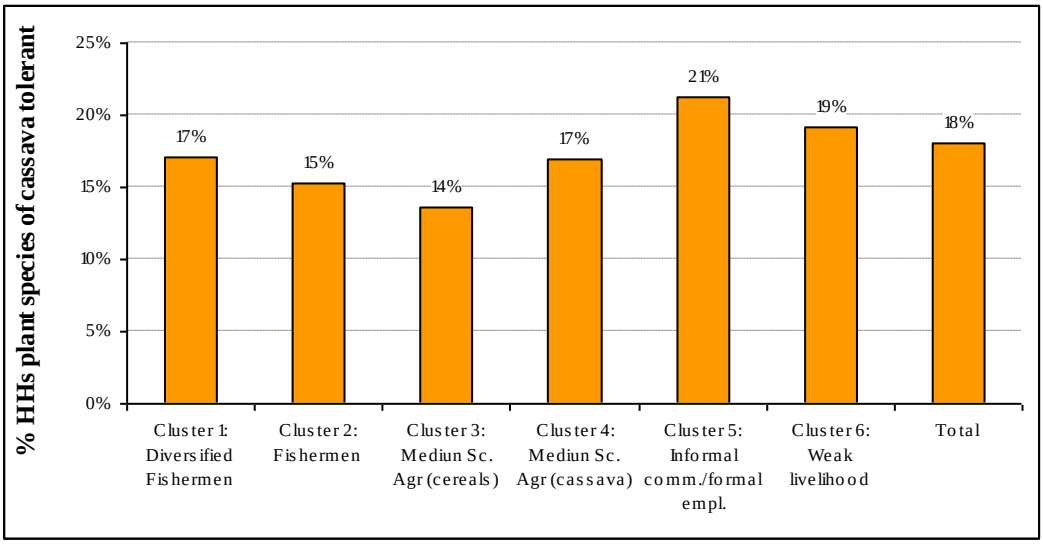
Almost all households who planted more than 1 hectare of cassava were in cluster 4, where 100% of them planted large fields of cassava. A few households from cluster 5 also planted large fields of cassava. Table 30 illustrates the findings.

Table 29: % of HHs that planted more than 1 hec of cassava in 2007/08 per livelihood cluster

Livelihood Activity	Livelihood Cluster	N	Mean	95% Confidence	
				Lower Bound	Upper Bound
Fields of Cassava greater than 1hec.	Cluster 1: Diversified Fishermen	116	1.7%	-0.7%	4.2%
	Cluster 2: Fishermen	222	0.0%	0.0%	0.0%
	Cluster 3: Agriculturalists (no cassava)	130	0.0%	0.0%	0.0%
	Cluster 4: Medium scale agriculturalists (cassava mainly)	153	100.0%	100.0%	100.0%
	Cluster 5: Informal commerce	360	5.3%	3.0%	7.6%
	Cluster 6: Weak livelihood	647	0.0%	0.0%	0.0%
	Total	1,629	10.7%	9.2%	12.2%

Only a limited amount of households used cassava species tolerant to pests. On average, only 18.0% of the households that planted cassava used a tolerant species. It was surprising to note that, among households in the cluster where all households plant more than 1 hectare of cassava (cluster 4), only 17% of households used a tolerant species of cassava. Graph 57 illustrates the findings.

Graph 60: % of HHs that planted species of cassava tolerant to Brow Streak in 2007/08 per livelihood cluster

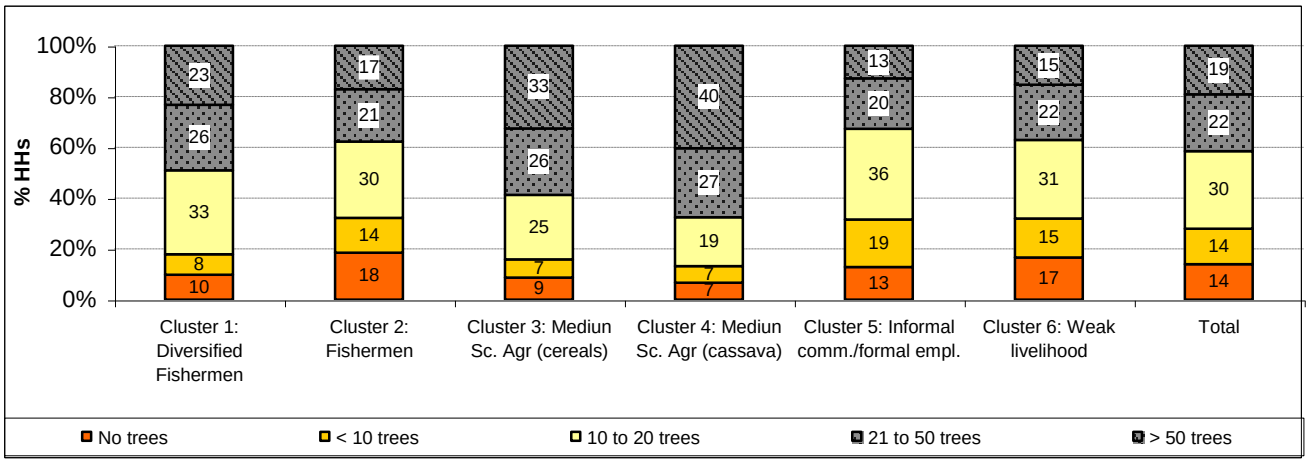


Fruit Trees

Among clusters 3 and 4, more than 85% of households owned at least 10 trees and between 33 and 40% owned more than 50 trees. Clusters 2, 5 and 6 owned the least amount of trees. Graph 58 illustrates the findings.

Although fruit tree ownership was high, households were not asked if these trees were producing. As it is generally known, agricultural diseases have been affecting cashew nuts and coconuts trees.

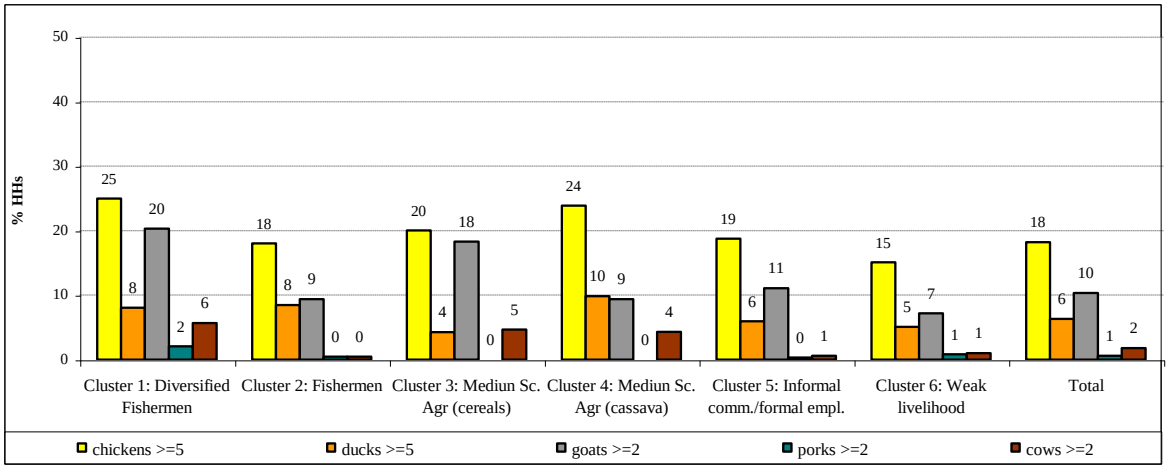
Graph 61: % of HHs that own trees by quantity per livelihood cluster



Livestock

Livestock ownership was relatively low among all groups. The ownership of animals among the clusters varied slightly: clusters 1 and 3 owned the most chickens and goats, with around 20 to 25% of households owning at least 5 chickens or 2 goats. Graph 59 illustrates the findings.

Graph 62: % of HHs that own minimal number of livestock per livelihood cluster



Income Sources

Although in general, almost half of the households of the surveyed area received some form of income from agricultural sales, a significantly higher proportion of households were engaged in agricultural sales in clusters 3 and 4 ($p<0.001$). 14% of the households in cluster 3 also depended on the sale of fruits. Vegetable and cash crop sales were almost inexistent among all clusters, except for clusters 3 and 4, where between 6 and 8% of the households engaged in those activities.

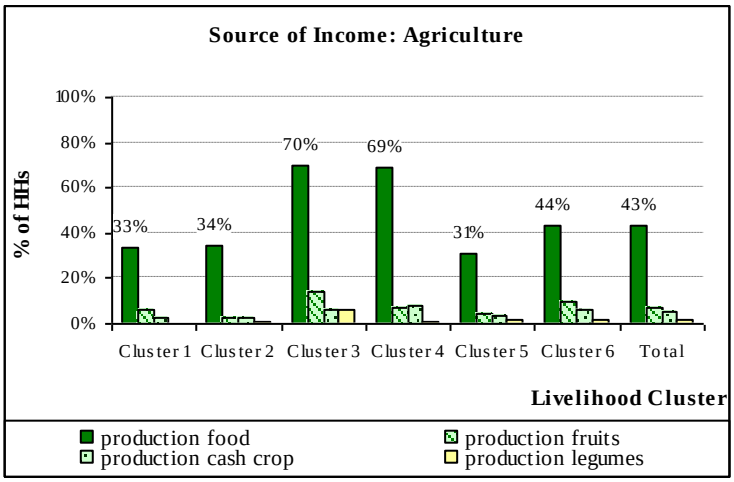
All households from cluster 2 were dependent on the sale of fish. Almost all members of cluster 1 (85%) also received income from the sale of fish. Virtually all sales were conducted within the district.

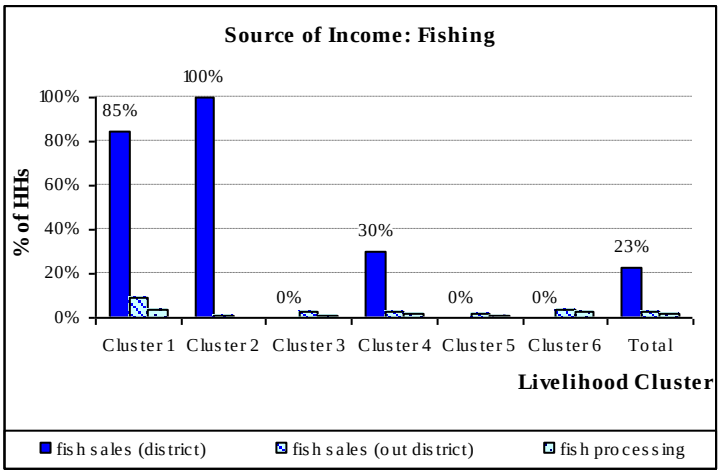
All households from cluster 5 where engaged in informal commerce. Furthermore, households from cluster 1 frequently engaged in informal commerce. Some households from cluster 4 also sold fish within the district. No households in any other clusters sold fish.

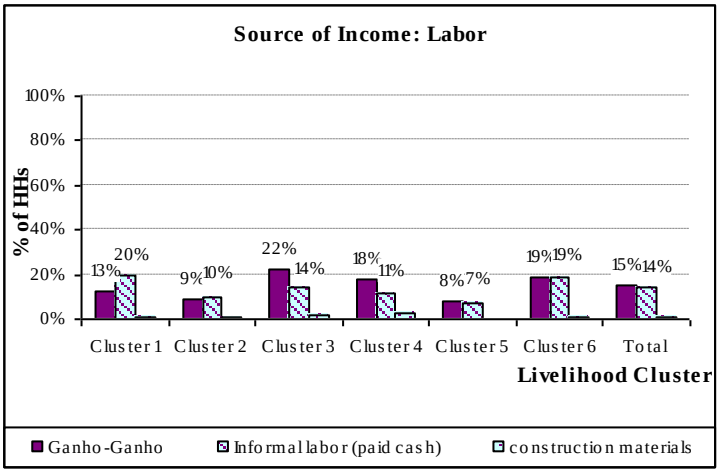
Ganho-ganho (informal employment paid in cash) or informal employment was not common in the area, and only 14-15% of households engaged in those activities. Clusters 3, 4 and 6 were the most involved in ganho-ganho and informal employment. The distribution of these activities between the other clusters was even .

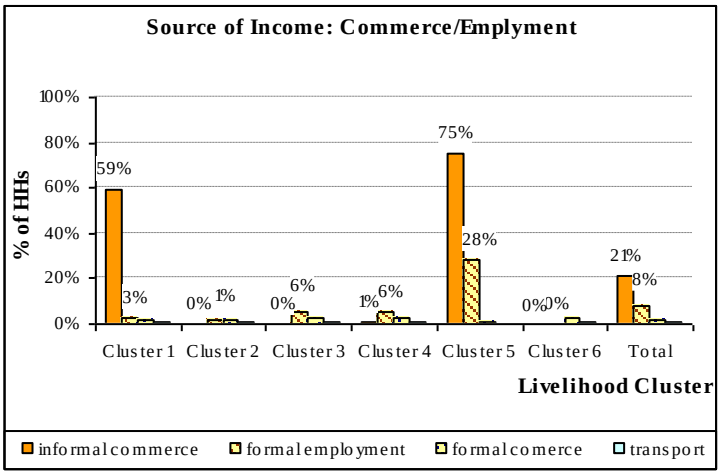
Most of the households in cluster 5 were involved in informal commerce and formal employment. Commerce was also common in cluster 1. All other clusters had little employment or commerce, reaching at most 6% of the households of any cluster. Graphs 60 to 63 illustrate the findings.

Graph 63 to 66: % of HHs engaging in specific type of income activities per livelihood cluster









The number of sources of income and their diversity was also analyzed for the livelihood clusters. A weighted sum of income sources depending on the stability of the source (see Section 1: Methods) showed that Cluster 1 had the highest level of diverse and stable income sources. As such, they can be said to be a highly diversified cluster. Cluster 5 – informal commerce and employment also presented a high level of weighted income. All other clusters scored similarly, with cluster 6 showing the lowest rate. Table 31 illustrates the findings.

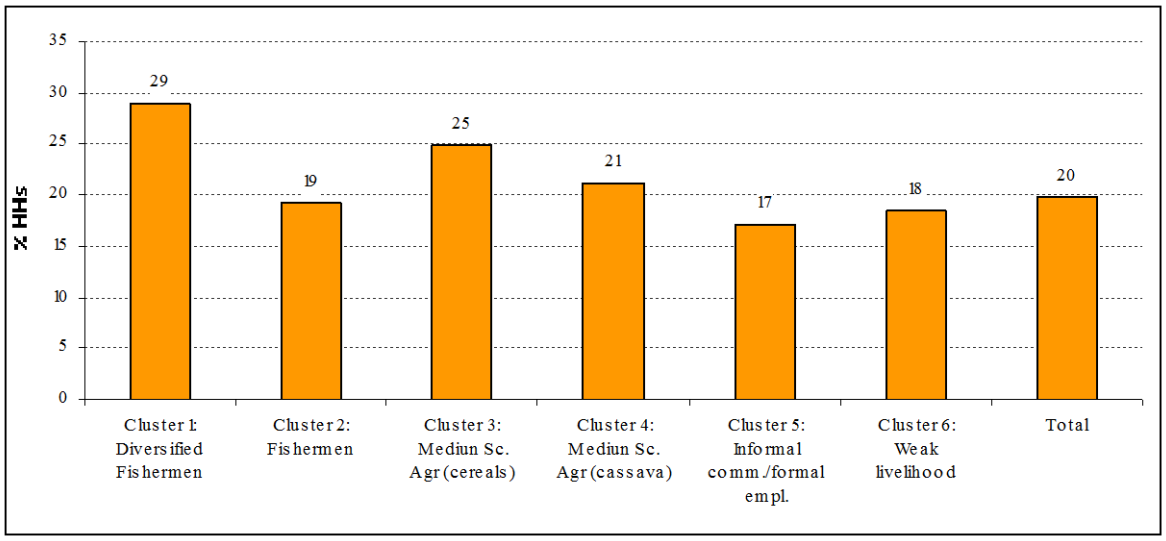
Table 30: Mean sum of weighted income per livelihood cluster

Vulnerability Indicator	Livelihood Cluster	N	Mean	95% Confidence	
				Lower Bound	Upper Bound
Total Sum of Weighted income	Cluster 1: Diversified Fishermen	113	4.3	4.0	4.6
	Cluster 2: Fishermen	218	2.9	2.8	3.1
	Cluster 3: Agriculturalists (no cassava)	128	2.6	2.3	2.8
	Cluster 4: Medium scale agriculturalists (cassava mainly)	150	2.4	2.3	2.6
	Cluster 5: Informal commerce	366	3.2	3.1	3.3
	Cluster 6: Weak livelihood	653	1.8	1.7	1.8
	Total	1,629	2.5	2.5	2.6

Access to Credit

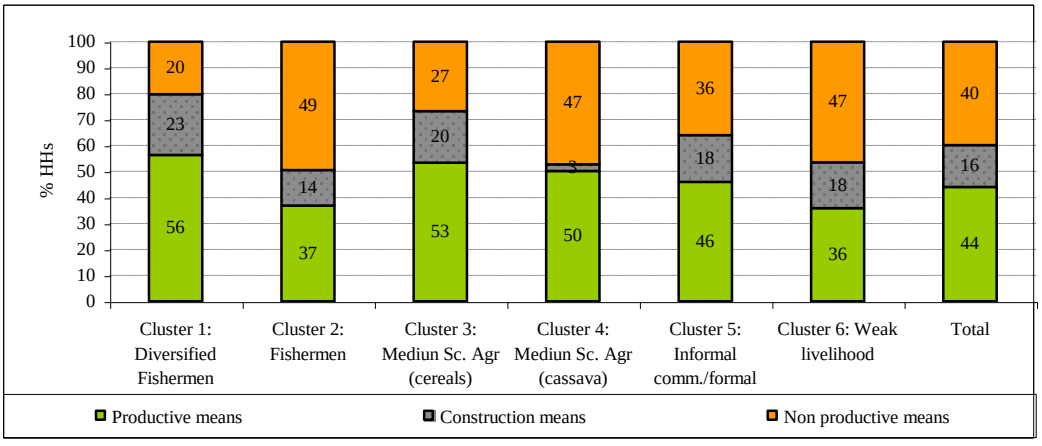
In general, 20% of the households received some form of credit. Even though the difference was not large, cluster 1 tended to access more credits than the other clusters. Clusters 5 and 6 received the least credit. Graph 64 illustrates the findings.

Graph 67: % of HHs that received credit in previous 12 months per livelihood cluster



The use of the credit varied between the clusters. The type of use of credit was grouped into three ranges: productive, construction, and non-productive. On average only 44% of credit was used for productive purposes, such as purchasing agricultural inputs or beginning a business. The level of use of credit for productive purposes was more common in clusters 1, 3 and 4. Clusters 2 and 6 used the least amount of credit for productive goals. Half of the households of these groups spent credit for non-productive ends, such as to purchase food, cover health expenses or pay for funerals. Households from clusters 1 and 3 spent the least on non-productive purposes. Graph 65 illustrates the findings.

Graph 68: % of HHs by main use of largest credit received in the previous 12 months per livelihood cluster (only among HHs that received credit)



Graph 31: % of HHs by source of credit received in previous 12 months by livelihood cluster

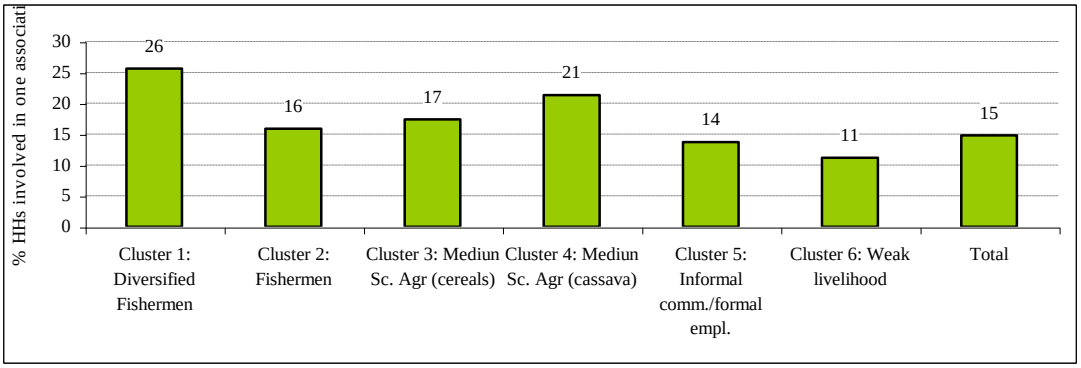
Source of Credit	Cluster 1: Diversified Fishermen	Cluster 2: Fishermen	Cluster 3: Mediun Sc. Agr (cereals)	Cluster 4: Mediun Sc. Agr (cassava)	Cluster 5: Informal comm./formal empl.	Cluster 6: Weak livelihood
Sample Size	111	212	127	147	356	641
Didn't receive credit	75.7	85.4	82.7	78.9	87.1	89.5
Family/friends	14.4	10.4	10.2	14.3	6.5	6.7
Savings and informal	5.4	1.9	3.1	3.4	2.2	2.0
Bank	1.8	0.5	0.0	0.7	2.2	0.5
Associations	1.8	0.5	1.6	1.4	0.6	0.5
Xitique	0.0	1.4	0.8	0.7	0.8	0.5
Agriculture/Livestock proj	0.0	0.0	0.8	0.0	0.3	0.3
NGOs	0.9	0.0	0.0	0.7	0.3	0.0
Church	0.0	0.0	0.8	0.0	0.0	0.0

Families and friends was the main source of credit for all clusters. Cluster 1 had the largest access to savings and informal credit, what shows that this group is better organized than others. Few households of cluster 1, 3 and 4 also assessed credit through associations. Graph xxx illustrates findings.

Associations

The proportion of households engaging in associations was higher among cluster 1, where 26% of the households were part of an association. Households within cluster 6 showed the lowest level of engagement in associations. Graph 66 illustrates findings.

Graph 69: % of HHs that partcipate in at least one association per livelihood cluster



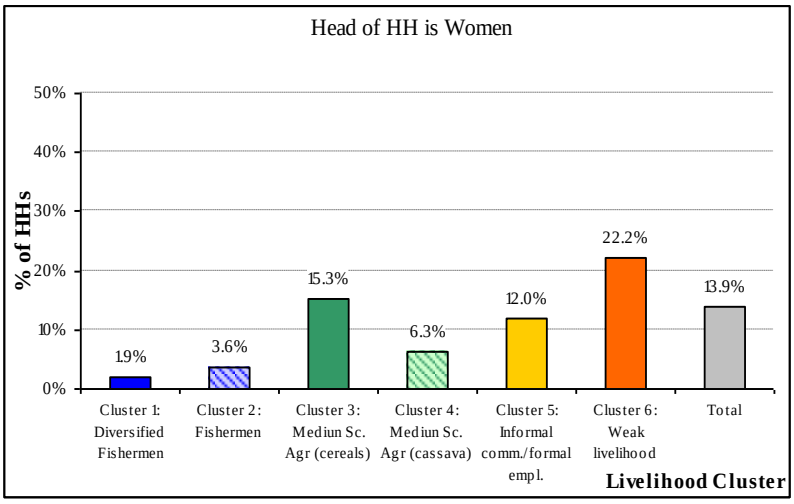
Basic Household Characteristics

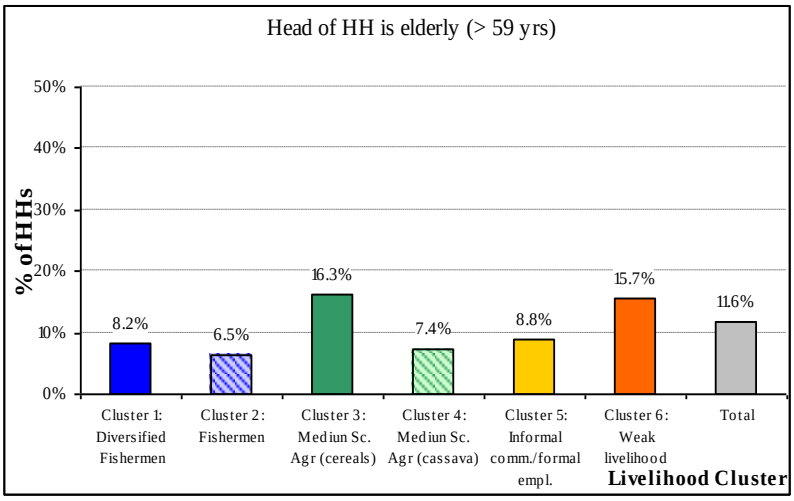
In general there were differences in the basic socio-demographic characteristics of households between groups. More women headed households were found within cluster 6, where women headed ¼ of households. Cluster 3 also presented one of the highest levels of households being headed by women. Women in cluster 1 or cluster 2 headed almost no households. Graph 67 illustrates the findings.

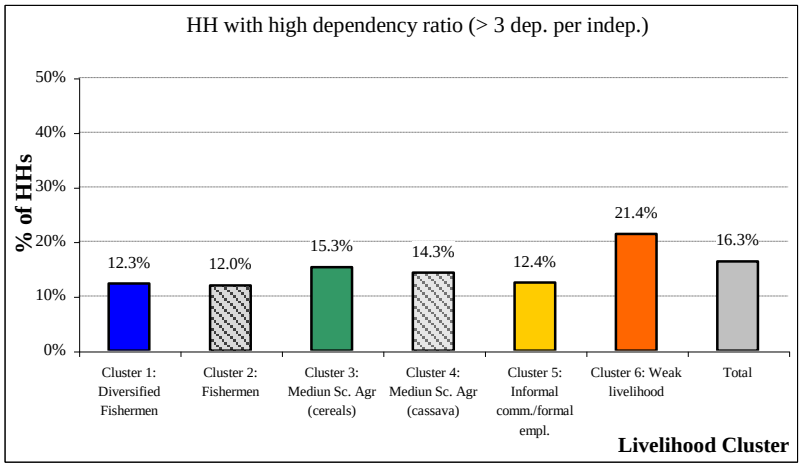
The presence of elderly headed household was also more commonly found within cluster 3 and cluster 6.

The proportion of households where one adult between 18 and 59 years had to take care for at least 4 dependents (or if no adults were found in household) was more common in cluster 6, where almost ¼ of the households had a high dependency ratio. Graph 68 illustrates the findings.

Graph 70 to 72: % of HHs by head status per livelihood cluster



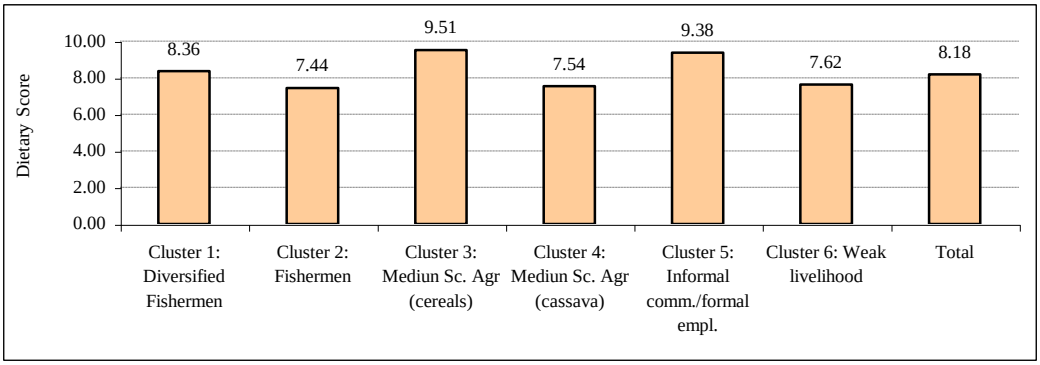




Dietary Intake

Graph 73: Mean dietary diversity score per livelihood cluster

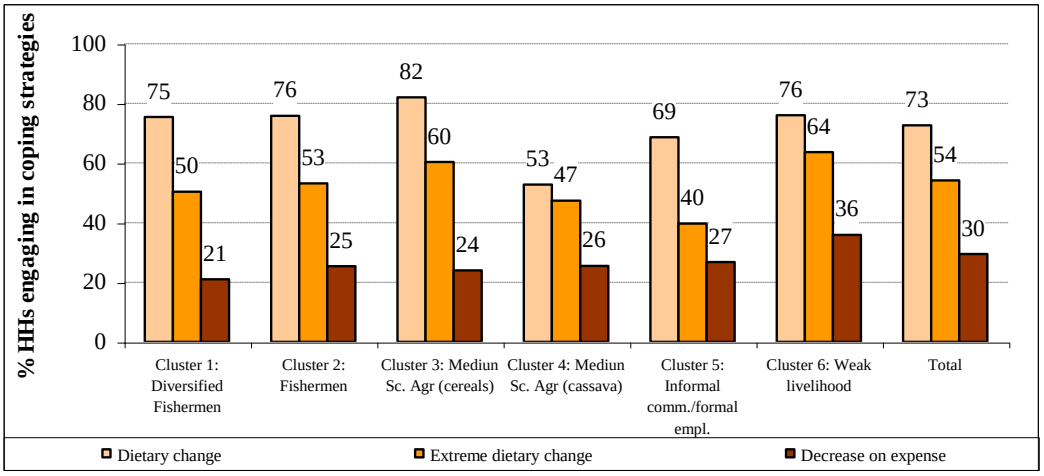
Graph 70 illustrates the dietary score of households (see Section 1: Methods). Clusters 1, 3 and 5 score the highest mean dietary diversity score, while clusters 2, 4 and 6 score the lowest.



Coping Strategies

Although the level of coping strategies should be more correlated with chronic and acute vulnerability to food insecurity, analysis in terms of livelihood cluster show some difference between clusters (see Section 1: Methods for CSI). Cluster 6 shows the highest level of households engaging in extreme coping strategies, with 64% of them engaging in extreme changes of diet, such as skipping days without eating or eating seed reserves. This cluster also had a larger proportion of households engaging in decreases on expense, such as taking children out of school or spending less on health. Clusters 4 and 5 showed the lowest level of overall coping strategies. Graph 71 illustrates the key findings.

Graph 74: % of HHs engaging in coping strategies by nature of its per livelihood cluster



Section 3: Chronic Vulnerability To Food Insecurity

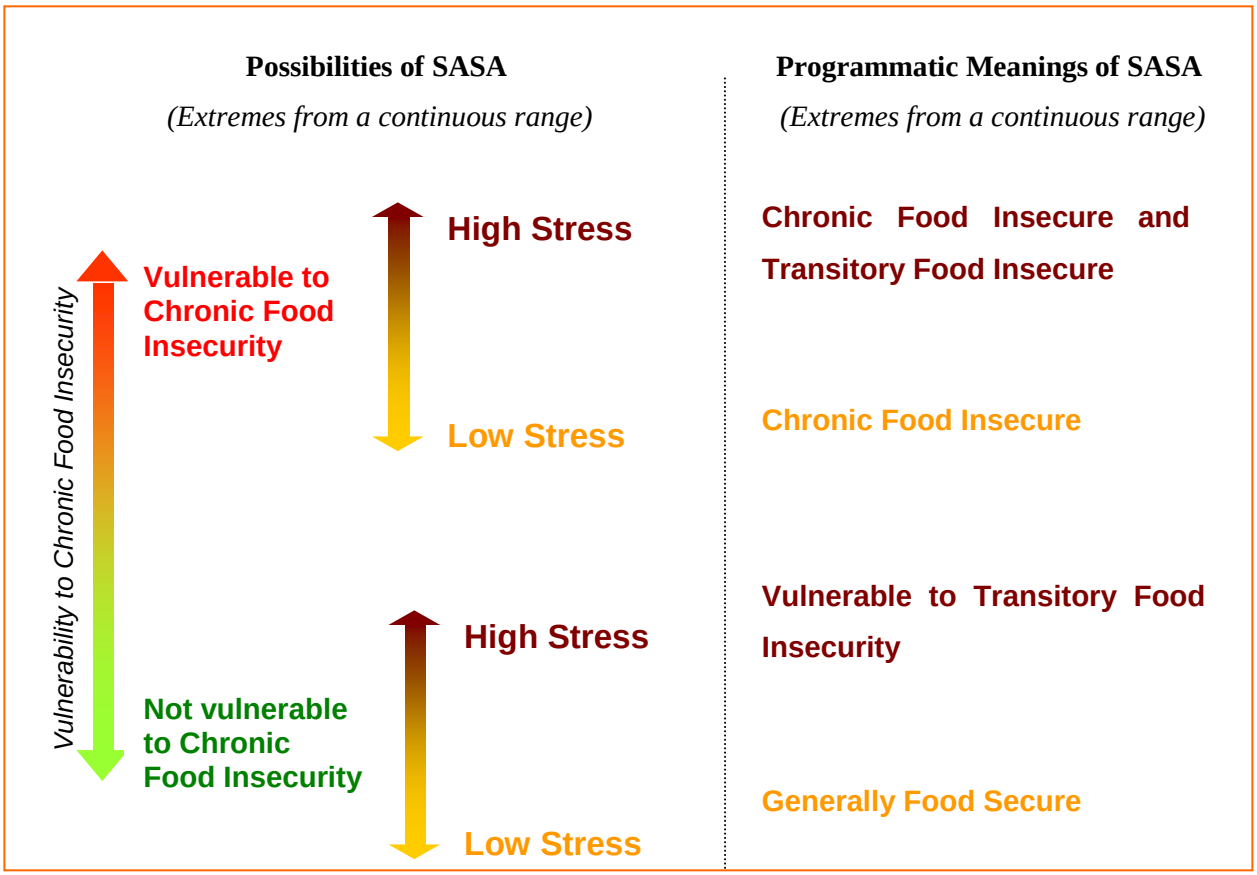
Given the nature of the proposed project, this study will only deal with vulnerability to food insecurity. Although vulnerability to other parameters may be valuable knowledge for project planning and evaluation, the complexity of each parameter calls for specific studies. As such, through out this report, "*vulnerability*" indicates "*vulnerability to food insecurity*".

As it has been widely discussed by the humanitarian community, there are large differences in type and implementation methods of food security activities an NGO should support depending on the nature of the vulnerability of target households and communities.

Households experiencing chronic vulnerability to food insecurity may need long-term interventions, focusing on supporting livelihoods and building safety nets. On the other hand, households experiencing only transitory – or acute – food insecurity may need only some form of temporary relief to avoid the deterioration of their livelihoods. Also, while chronic food insecurity is a stable long-term trend, transitory food insecurity is a volatile trend, which responds to shocks, and as such, it changes constantly. Furthermore, experiencing the same shocks, households already chronically food insecure may suffer more than households that are food secure.

Although outcome variables, such as dietary intake, coping strategies and anthropometric measurements may indicate that a household is food insecure, it does not indicate the type of food insecurity. Given the crucial importance of identifying the type of vulnerability, this study has worked towards isolating households into four groups as shown in diagram 2.

Diagram 2: Concept of Vulnerability to Food Insecurity



The methods for identification of vulnerability are highly debatable and a consensus on best practices is still a vision. The Mozambican Food and Nutrition Council (SETSAN) developed the Food Security Access Situation Analyses (SASA) during the Food Security Baseline (2006). This method is partially replicated in this study. The design was lead by Leila Oliveira (WFP), with assistance from Allessandro D'Mateis (FEWS-Net), Nick Haan (FAO), and Sylvia Montembault (WFP), and findings were presented in the Southern Africa Development Community Forum in Johannesburg in 2006.

The method only deals with households' food access and availability and exclude convergence of information on market functionability, national food security policies and health issues, which also play a major role in food security. Although this method only deals with households' aspects, it includes key concepts of sustainable livelihoods approach and risk analysis, being a strong analytical framework.

Chronic Vulnerability to Food Insecurity

Chronic vulnerability to food insecurity is the long-term inability of households to meet their food needs. For the purposes of this study, chronic vulnerability to food insecurity was given by the function between the five capitals, where:

$$CV = 1 - (((P_C + F_C) * 2) + H_C + N_C + S_C)$$

Where, CV=Chronic Vulnerability
P_C=Physical Capacity Index (including non-productive assets and housing conditions)
F_C=Financial Capacity Index (including productive assets and livestock)
H_C=Human Capacity Index (including education level of head and spouse and dependency ratio)
N_C=Natural Capacity Index (including ownership of low-lying land and fruit trees)
S_C=Social Capacity Index (including participation in associations)

Section 1: Methods section details the specifications for calculation of each of the five capacity indexes.

The method applied in this analysis assumes that households with little livelihood capacity, including their physical, financial, human, social and natural capacities, have little means to develop. It is expected that, if a household has little human, physical, financial, social and natural capacity, it will have chronic and recurring problems in accessing food. In other words, it will be caught in the poverty trap, where its limited livelihood capacity and small safety net make it an easy target for stress, and recurring stresses set back its limited development. Furthermore, a household with little safety net and capacity to mitigate the impact of stresses is likely to suffer more with the same shock.

The relationship between the 5 capitals allowed for a simplistic approximation of the Vulnerability to Chronic Food Insecurity (VCFI).

In accordance with this study and the chosen cut-off level for the chronic food insecurity index, it is estimated that 39.8% of all households in the target areas are chronically food insecure. Obviously, the amount of households chronically food insecure would vary if a different cut-off were chosen. Although any cut-off would be ambiguous, the chosen cut-off level was identical to the SETSAN Baseline Study conducted in 2006.

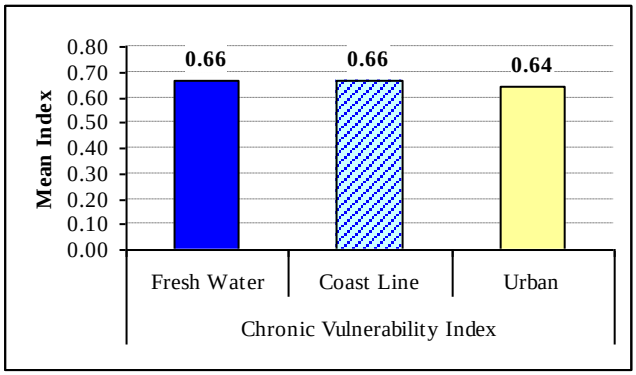
Although percentage values are given based on past National experience it is important to highlight that a standard cut-off has not been developed. Even though the absolute value of the estimated number of households vulnerable to chronic food insecurity may be skewed, the difference on the distribution of vulnerable households between the areas, livelihood clusters, and households' characteristics holds true. The importance of

understanding who are the chronically food insecure and what makes them suffer most, are the important questions that this study answers.

Table 33: Categorization of Chronic Food Insecurity

Livelihood Area	N	% of Sample	Mean Chronic Vulnerability Index	95% Confidence		Range	
				Lower Bound	Upper Bound	Minimun	Maximun
Most vulnerable to CFI	277	17.9%	0.85	0.86	0.84	0.79	0.99
Vulnerable to CFI	339	21.9%	0.74	0.75	0.74	0.70	0.79
Non-vulnerable to CFI	672	43.4%	0.62	0.62	0.62	0.53	0.70
Least vulnerable to CFI	260	16.8%	0.42	0.44	0.41	0.00	0.53
Total	1,548	100.0%	0.66	0.66	0.65	0.00	0.99

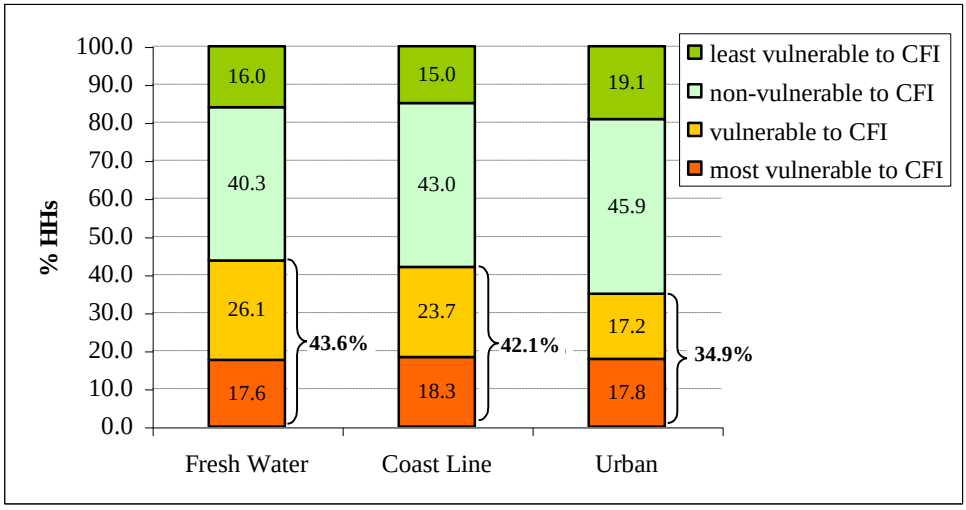
Graph 75: Mean chronic vulnerability Index by livelihood areas



In accordance with the chosen cut-offs, 17.9% of households were identified as highly vulnerable to chronic food insecurity. A further 21.9% were identified as vulnerable to chronic food insecurity, totalling 39.8% of all households being identified as chronically food insecure. 16.8% of households were identified as the least vulnerable to chronic food insecurity.

This section describes the level of Chronic Vulnerability (CV) at various levels of analyses. First, CV will be discussed in terms of their geographic distribution. Following, the level of CV will be discussed per livelihood clusters and later by standard household vulnerability indicators, such as head status. Later the relationship to outcomes will be discussed.

Graph 76: % of HHs by categories of chronic vulnerability per livelihood areas



The index of Chronic Vulnerability (CV) averaged at 0.66 (CI 0.65-0.66) for all the surveyed areas. It was noted that the urban area had a significantly lower index than the rural areas ($p < 0.05$). It seems that, the urban households have acquired greater livelihood capacities through better-paid activities and better access to markets, education and health facilities. This difference was interesting and points to the lack of focus on urban areas. Studies focusing on urban vulnerability have been scattered and in consequence little is currently understood in terms of urban vulnerability in Southern Africa in general and in Mozambique specifically. The need to further understand urban vulnerability has been highlighted by various development

agencies and government bodies and, in response to requests, the Mozambican SETSAN is planning to carry out an urban vulnerability survey in 2008/09.

The distribution of chronic vulnerable households was similar between the 2 rural livelihood areas; where between 42.1% and 43.6% of households were chronically food insecure ($p>0.05$). On the other hand, the urban area showed a slightly lower occurrence of chronic vulnerability, with 34.9% of its households being identified as CV. Graph 73 and table 74 illustrate the findings.

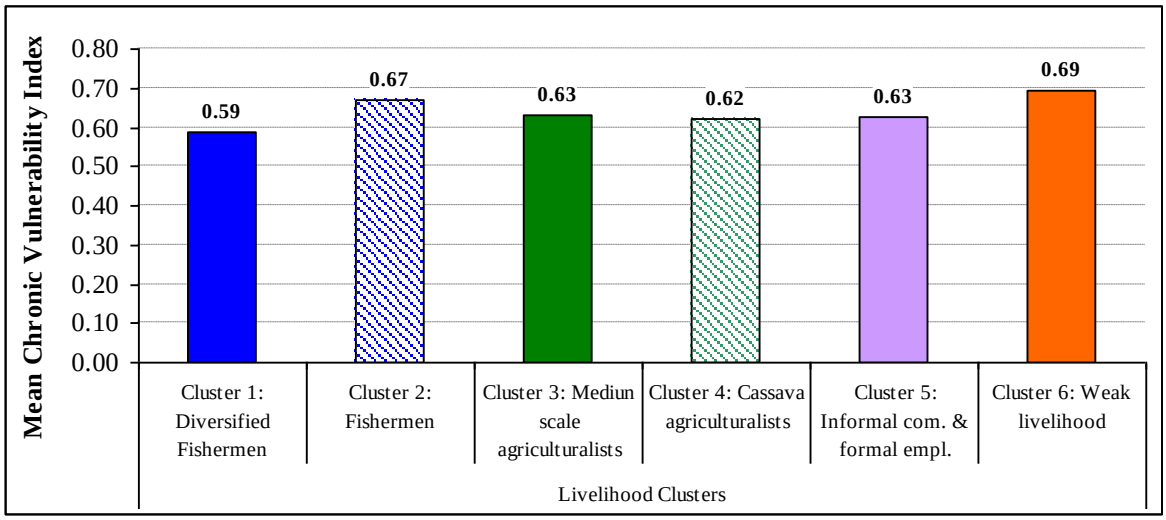
Distribution of Chronic Vulnerability Index (CV) per Livelihood Groups

The livelihood groups presented a more heterogeneous distribution of CV indexes. The *Cluster 1 - diversified Fishermen* presented the lowest level of index, reaching as little as 0.59 (CI 0.55-0.62). This group's level of CV was significantly lower than cluster 2 and cluster 6 groups ($p<0.05$).

Cluster 6 weak livelihood and *Cluster 2 Non diversified fishermen*, presented significantly higher levels of CV than all the other groups ($p<0.001$). The level of CV for these Clusters were considerably larger than the other Clusters, and the mean index of Cluster 6 reached 0.69 (CI 0.68-0.71).

All the other clusters presented similar levels of CV reaching around 0.62, which is somewhat slightly smaller than the overall average. Graph 75 illustrates the findings.

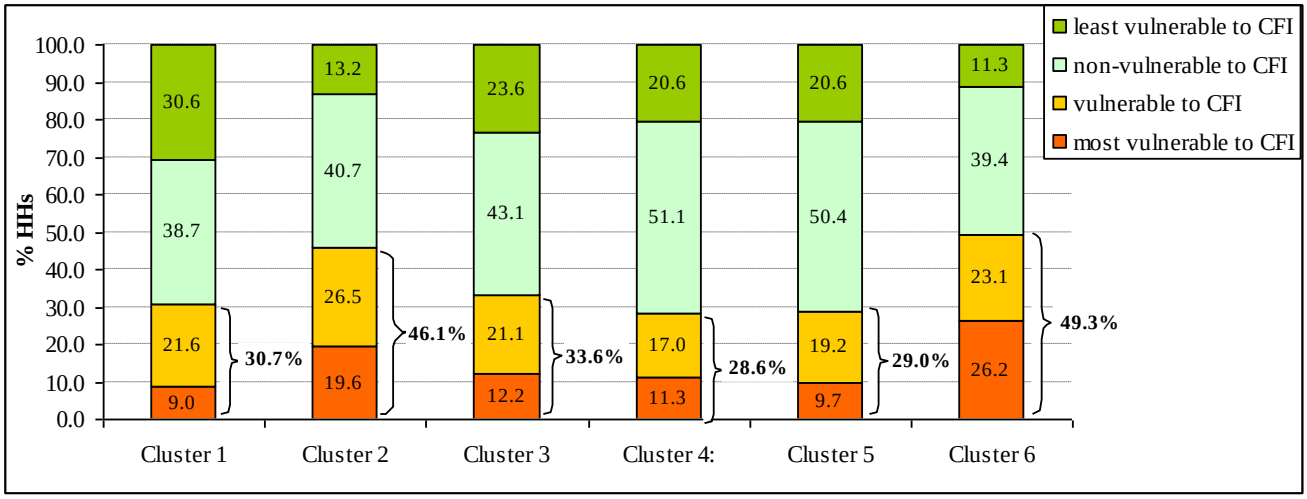
Graph 77: Mean chronic vulnerability Index per livelihood cluster



Among *Cluster 6 – weak livelihood households*, 49.3% of the households were identified as chronically food insecure. This proportion was similar to *Cluster 2 – non diversified fishermen*, where 46.1% of households were chronically food insecure. These groups were at least 12 percentage points higher than the next cluster, which was cluster 3. All the other clusters had on average 30% of households being chronically food insecure.

Clusters 1 and 3, the diversified fishermen and the informal commerce, presented the largest levels of least vulnerable households, with up to 30% of households being the least vulnerable to chronic food insecurity. Graph 76 illustrates the findings.

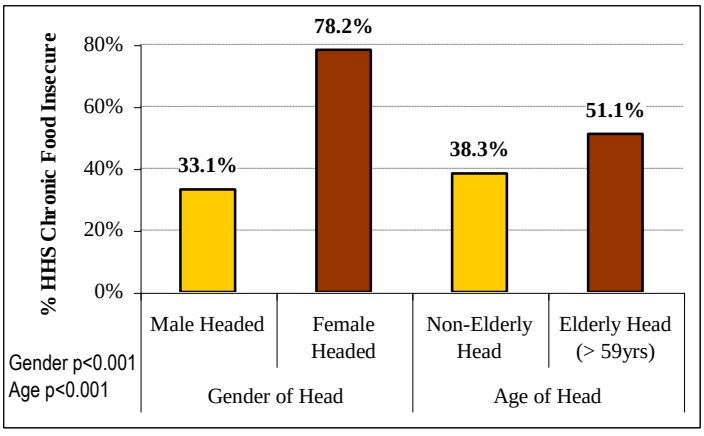
Graph 78: % of HHs by categories of chronic vulnerability per livelihood clusters



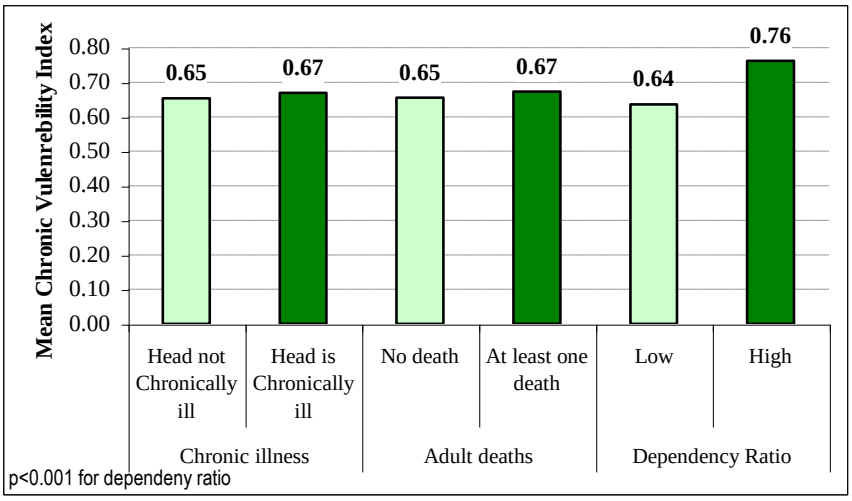
Distribution of CV by Standard Household Vulnerability Indicators

Women headed households were more likely to present high vulnerability to chronic food insecurity. In other words, women headed households tended to have less capital. A surprising level of 78.2% of all women headed households were identified as chronically food insecure against only 33.1% of male headed households. The same pattern, with less distinction, was seen when comparing the age of the head. Graphs 77 to 79 illustrate the findings.

Graph 79: % of HHs identified as highly chronic vulnerability by HH's vulnerability Indicators - I

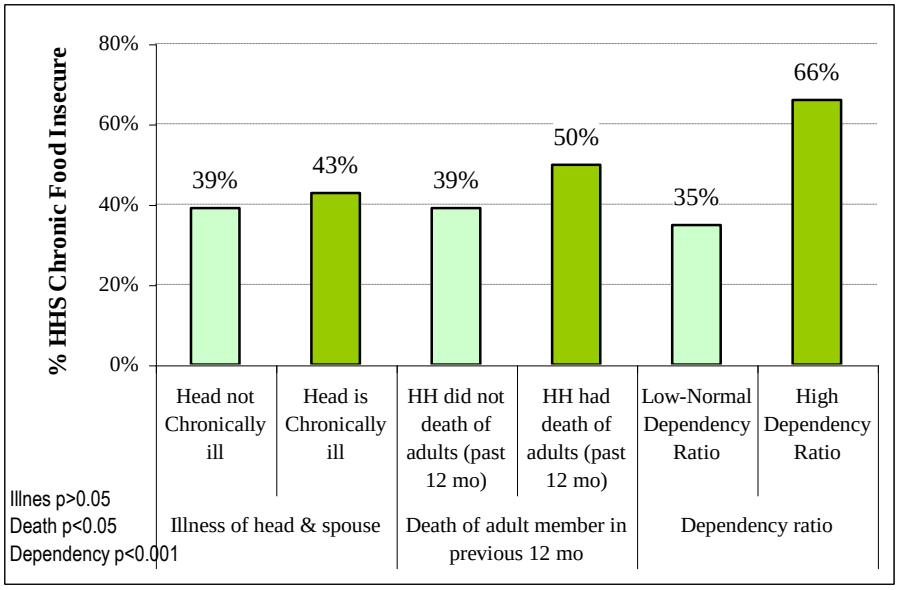


Graph 80: Mean chronic vulnerability index per HH's vulnerability Indicators - II



Small differences on levels of vulnerability to chronic food insecurity were seen in households that were recently impacted by HIV/AIDS. Although many authors have found a relationship between vulnerability levels and HIV/AIDS affected households, the differences are either related to the sudden impact of AIDS on households or to the steady decrease that households have after impact of HIV/AIDS. As such, chronic vulnerability, which is built upon many years, is not expected to change quickly to the impact of AIDS. As such, proxies capturing the current or recent impact of AIDS (current chronic illness and deaths up to 12 months before the survey) do not show any correlation to CV.

Graph 81: Mean chronic vulnerability index per HH's vulnerability Indicators - III



On the other hand analyses relating to dependency ratio, and therefore including deaths that occurred more than 12 months ago, show that households with high dependency ratio have a significantly higher level of chronic vulnerability. Consequently, this study shows that, although the impact of AIDS on chronic vulnerability may not be seen straight after the stroke, households that are affected by HIV/AIDS tend to move downwards with time. Graph 79 illustrates the results.

Outcome measurements of Food Security by VCFI levels

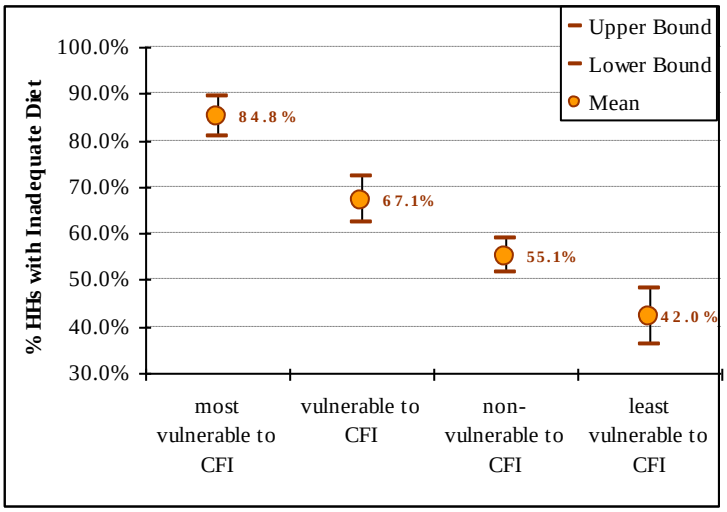
Graph 82 to 84: Outcome variables by HH's chronic vulnerability Status

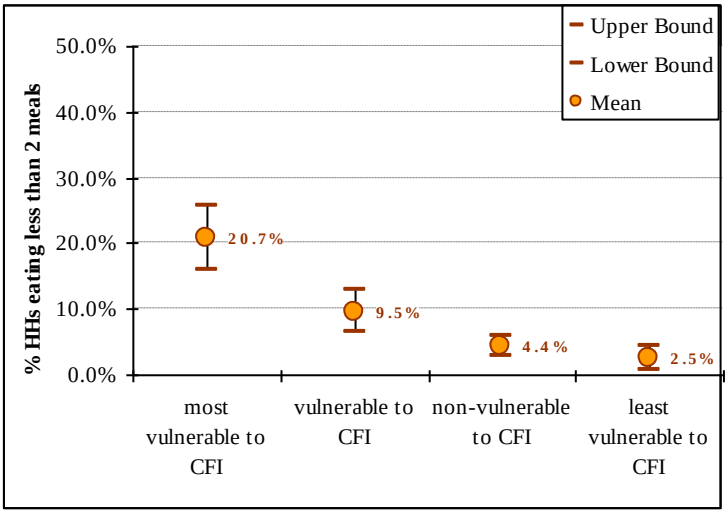
Dietary intake and coping strategies were used to assess the level of food security of households by their vulnerability to chronic food security. Graphs 80 to 82 illustrate findings. Valid differences were found for all outcome variables when comparing households vulnerable to chronic food security and non-vulnerable households ($p<0.001$). In terms of dietary intake, it was noted that around 84.8% of households had inadequate diets when they were chronically food insecure. On the other hand, only 42.0% of households had inadequate diet among the least vulnerable households.

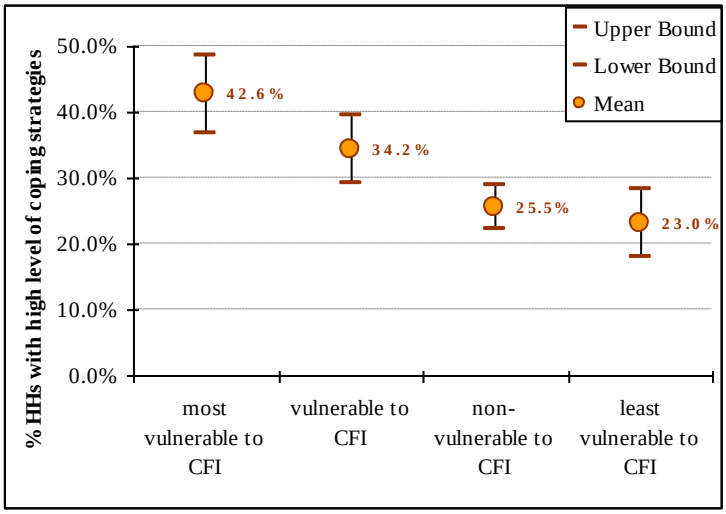
Furthermore, while only 2.5% of the least vulnerable households ate 1 or less meals, 20.7% of households most chronically food insecure ate 1 or less meals.

Chronic food insecure households also engaged in more coping strategies, where 42.6% of them were classified as having high indexes, against 23.0% of least vulnerable.

These differences show that, even without any further stresses, households most chronically food insecure have worse food intake. Furthermore households most chronically food insecure also engage in more coping strategies indifferent of stress time. This might result in a downward spiral of chronic food insecure households.







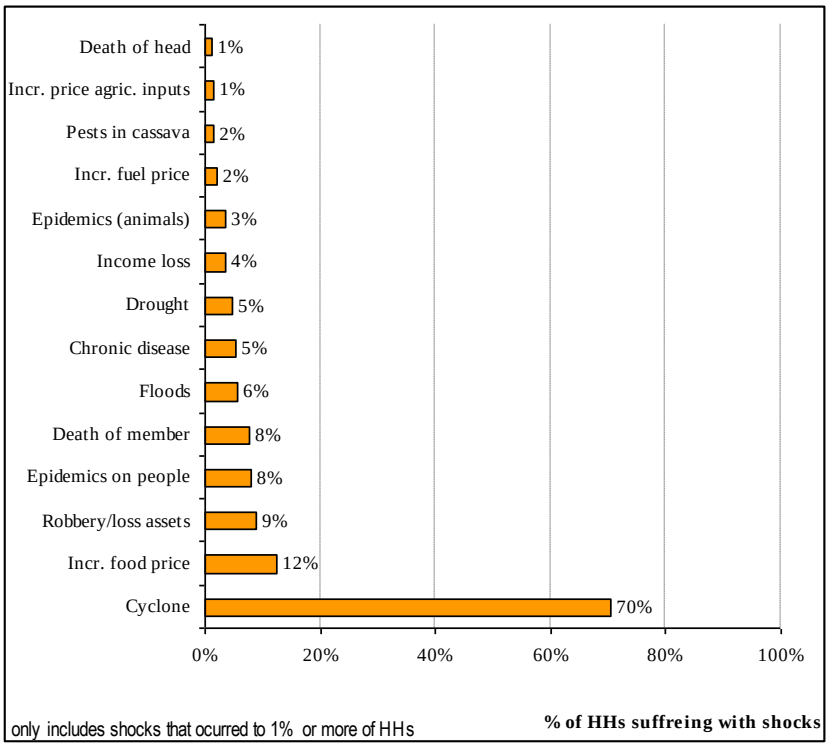
Section 5: Acute Food Insecurity

Acute food insecurity is a highly volatile phenomenon, where the occurrence of stresses plays a vital role in its development. Nevertheless, the level of vulnerability to chronic food insecurity – or the inability of households to appropriately prepare themselves and respond to the cyclical and non-cyclical stresses – make the severity of the impact of these shocks limitless. In other words, a highly chronically vulnerable household, which has weak livelihood capacities, will suffer from stresses more than a household with capacities.

Occurrence of Shocks

In total, 85% of households said that they suffered from an abnormal situation in the previous 6 months (Jan/Feb to Aug/08). The great majority of the households (70.4%) said that they suffered from the cyclone that occurred in February 2008. 12% of the households also said that they suffered from an increase in food prices. Graphs 83 and 84 show the occurrence of each specific shock. Although few households identified agricultural pests as a shock, it is well known that the occurrence of pests in the coconuts, cashew-trees and cassava plants are constant in the areas. However, households may forget to identify these because of their cyclical and long-trend nature.

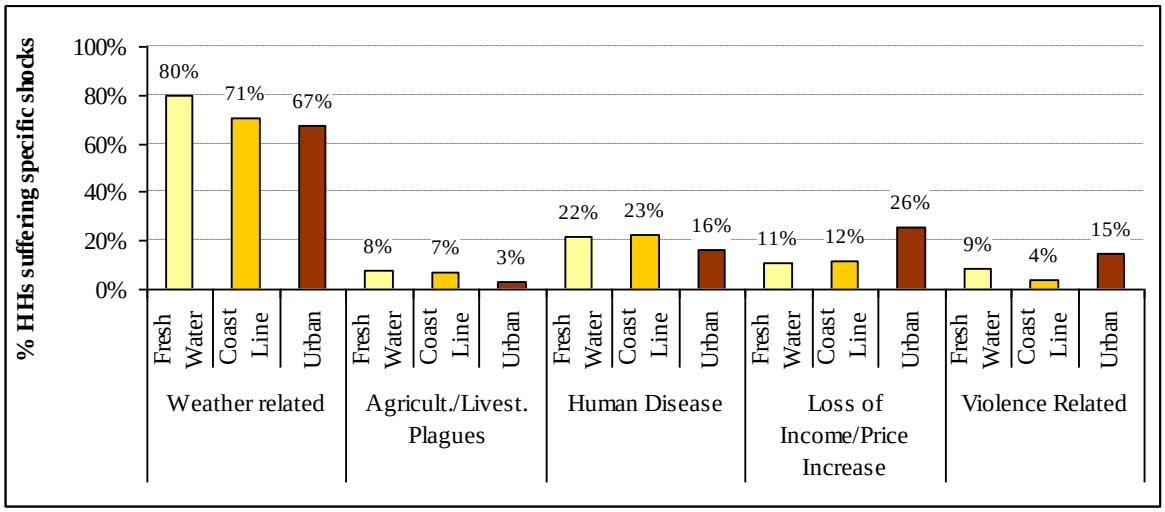
Graph 85: % of HHs experiencing shocks



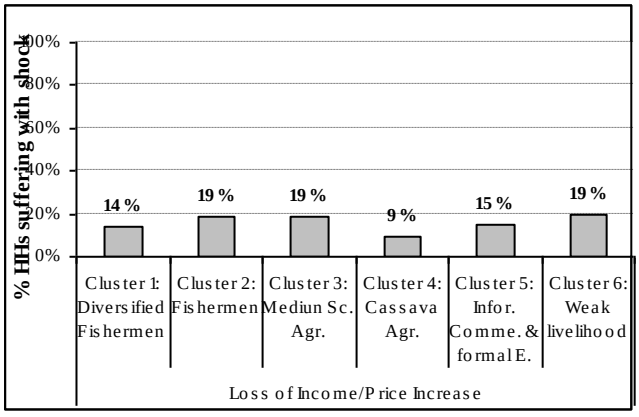
Although all areas had large occurrences of shocks, the communities near fresh water felt the cyclone most. 80% of the households of this area said that the Feb/2008 cyclone created a decrease in their livelihood. This rate decreased to 71% in the coastal line and 67% in the urban areas.

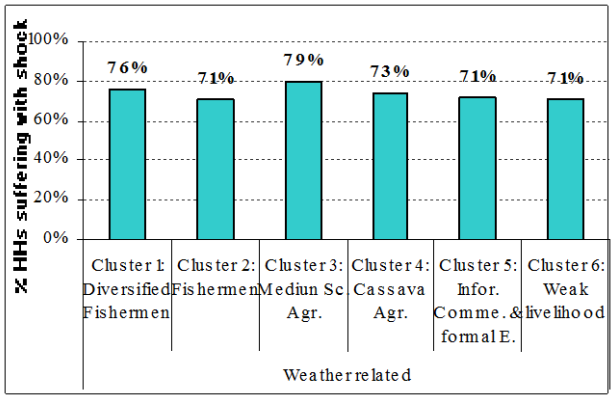
As it would be expected, the increase in food prices and income losses was felt more in the urban areas. Violence also affected many households in the urban areas. Graph 85 illustrates the findings.

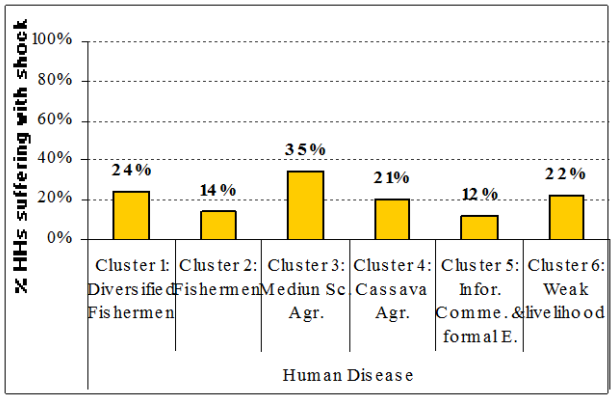
Graph 865: % of HHs experiencing shocks by livelihood area



Graphs 87 to 89: % of HHs experiencing shocks by livelihood clusters







The occurrence of shocks per livelihood cluster was similar for most shocks between most clusters. Cluster 3 – Medium scale agriculturalists was the most different cluster, which suffered significantly more shocks related to weather and human disease than most of the other clusters.

Shock Impact Index

In order to consolidate information on the impacts of shocks, a Shock Impact Index was created. This indicator was calculated based on the occurrence of shocks within the previous 6 months and their impact on the households as follows:

$$S_I = \Sigma ((I_F * 1) + (I_I * 2) + (I_A * 3)) * R$$

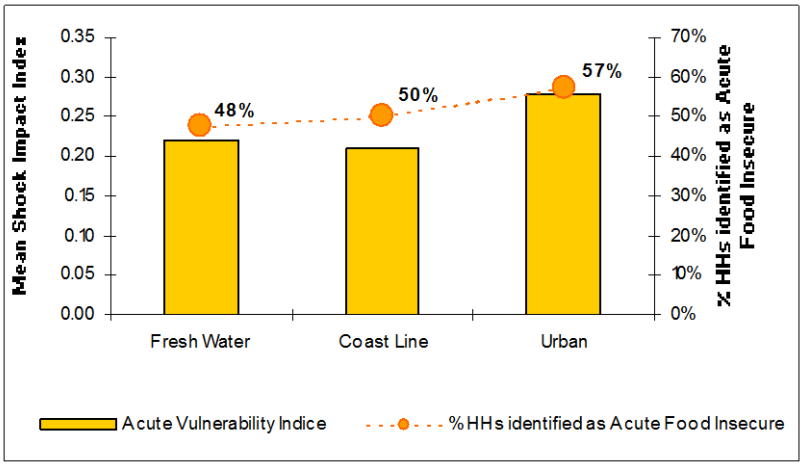
Where, S_I*=Shock Impact Index*
I_I *= Shock Impacted Food Stocks/Production*
I_I *= Shock Impacted Income Generation*
I_A*=Shock Impact Asset retention*
R=Recovery level, were no recover valued 1 partial recovery valued 0.66 and fully recover valued 0.33

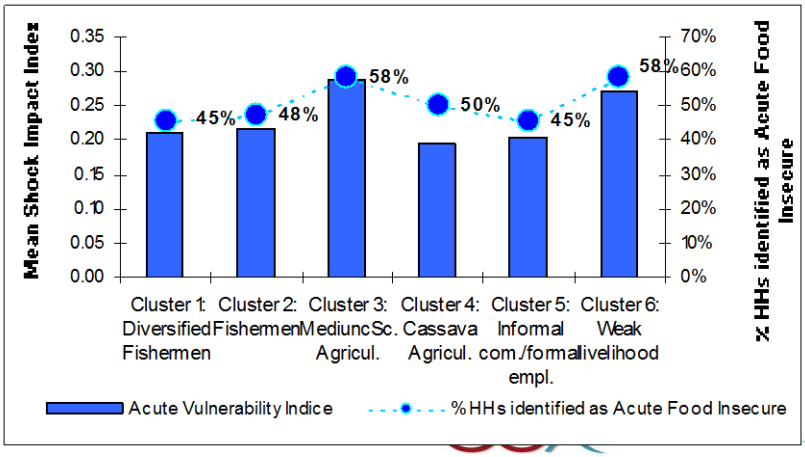
In order to turn the index into a meaningful programmatic indicator, it was recoded into two ranges, each containing about half of the population. Table 34 illustrates the chosen cut off.

Table 34: Categorization of Shock Impact Index

Shock Impact Index	Programmatic Meaning	N	% of Sample	Mean Index	95% Confidence		Range	
					Lower Bound	Upper Bound	Min.	Max.
Low Shock Impact Index	Low Vulnerability to Acute FI	779	47.7%	0.08	0.07	0.08	0.00	0.22
High Shock Impact Index	High Vulnerability to Acute FI	853	52.3%	0.39	0.37	0.40	0.22	1.00
Total		1,632		0.24	0.23	0.25	0.00	1.00

Graphs 90 and 91: % of HHs being classified as acutely food insecure per livelihood areas and clusters





The occurrence of vulnerability to acute FI (VAFI) was greater among the urban and fresh water areas, where more than 90% of households suffered at least one shock and 57% of the households were identified as VAFI. Graph 88 illustrates the findings.

The livelihood clusters 3 and 6 had the most occurrences of acute vulnerability, where 58% of their households fell in this category. All the other clusters presented similar levels of acute food insecurity, ranging from 45 to 50%. Graph 89 illustrates the findings.

Acute and Chronic Vulnerability

Even though it is interesting to understand the acute and chronic vulnerability levels of the target population, the impact of acute vulnerability can only be understood if it is analyzed in terms of the households' chronic vulnerability. The juxtaposition of chronic and acute vulnerability is described in this section.

Even though 60% of the population was identified as having a low vulnerability to chronic food insecurity, half of them, or 29.3% of the total population, suffered from acute vulnerability. As such, only 30.8% of the population was identified as generally food secure. Table 35 illustrates the findings.

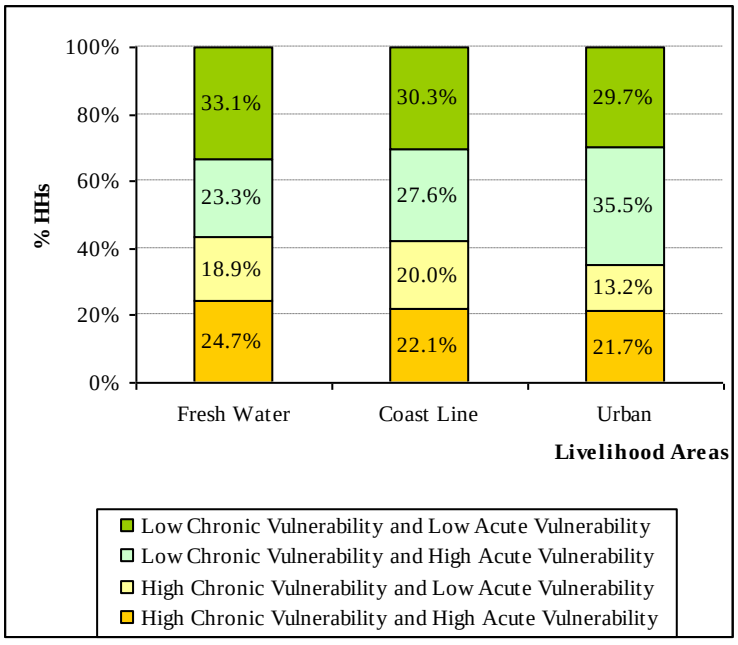
Table 35: % of HHs by Vulnerability Status

Chronic Vulnerability Level	Acute Vulnerability Level	(N)	Valid Percent
Low Chronic Vulnerability to FI	Low Acute Vulnerability	520	30.8%
	High Acute Vulnerability	420	29.3%
High Chronic Vulnerability to FI	Low Acute Vulnerability	230	17.2%
	High Acute Vulnerability	378	22.6%
Total		1,549	

From the 40% of households identified as chronically food insecure, more than half of them, or 22.6% of the total population, were also suffering with acute food insecurity. The impact of shocks on these households should be the greater than the impact of shocks on households not chronically food insecure.

The distribution of levels of composite vulnerability are illustrated in graph 90 and graph 91. In terms of livelihood, one can note that clusters 2, 3 and 6 present the highest levels of chronic and acute food insecurity, with ¼ of their population suffering with both vulnerabilities.

Graph 92: % of HHs by Vulnerability Status per Livelihood Area



Graph 93: % of HHs by Vulnerability Status per Livelihood Cluster

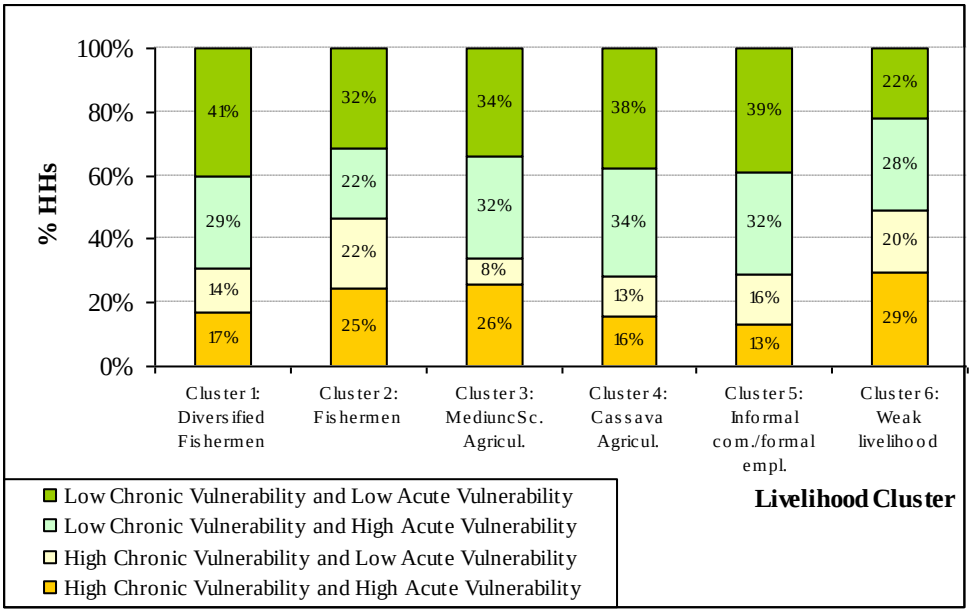


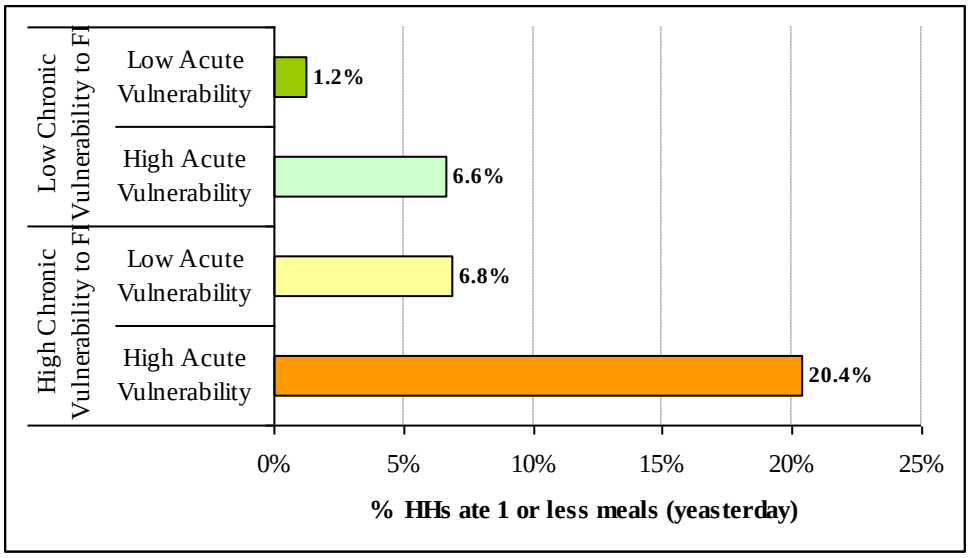
Table 36 illustrates the percentage of households in each parameter of vulnerability by standard household vulnerability indicator. Based on these, one can see that "shocks seek the poor, and keep them poor". There were greater occurrences of women headed households, and elderly headed households among the composite vulnerability category. Households with deaths and chronic illness were also more often found among the most vulnerable households.

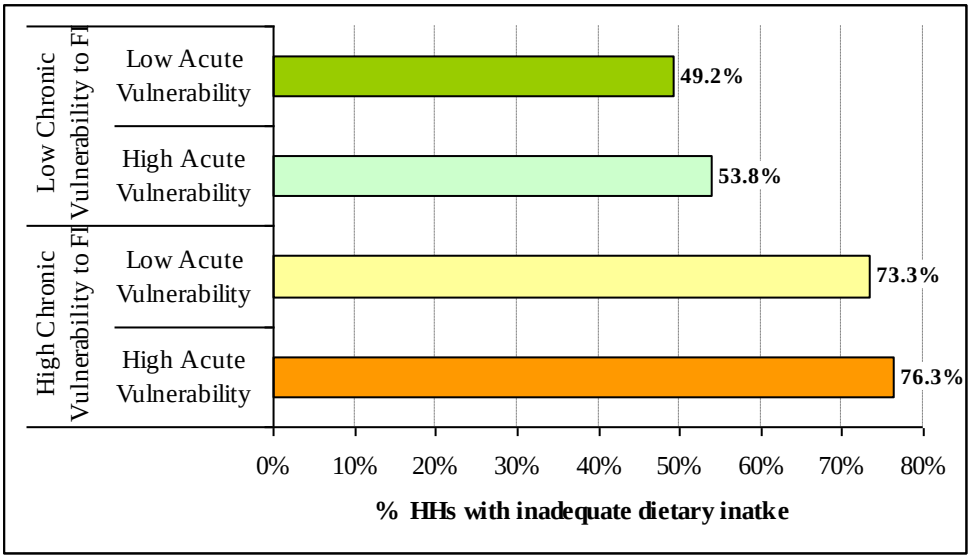
Table 36: % of HHs by Vulnerability Status per HH's demographic characteristics

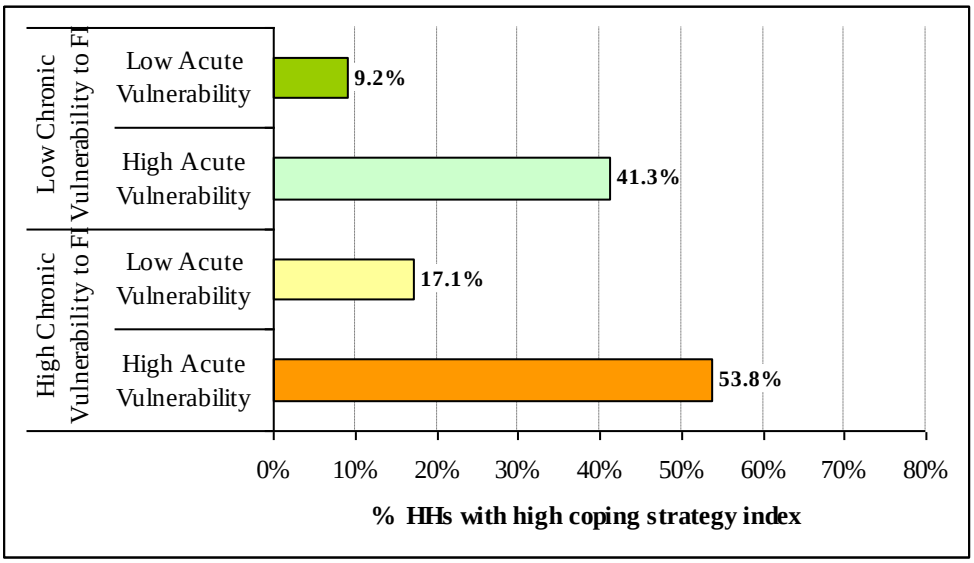
Chronic Vulnerability Level	Acute Vulnerability Level	(N)	% HHs			
			Head of HH is Women	Head of HH is elderly (> 59 yrs)	Head/spouse is cronically ill	Any Adults Deaths
Low Chronic Vulnerability to	Low Acute Vulnerability	507	5.3%	4.1%	6.7%	7.3%
	High Acute Vulnerability	421	14.0%	6.1%	6.3%	11.1%
High Chronic Vulnerability to	Low Acute Vulnerability	236	12.8%	21.5%	6.2%	21.3%
	High Acute Vulnerability	384	16.9%	33.0%	12.5%	30.9%

The impacts of having both chronic and acute vulnerability are illustrated in graphs 92 to 94. As it can be noted, on average only 1.2% of the households generally food secure ate 1 or less meals during the previous day. This proportion increased to 6.6% if the households were suffering only with acute food insecurity. On the other hand, the same percentage of chronically food insecure households ate 1 or less meals even if they didn't suffer with shocks. When a chronically food insecure household suffered also with acute food insecurity, 20.4% of them ate 1 or less meals.

Graphs 94 to 96: Impact on outcomes of chronic and acute vulnerability







A less distinct pattern was seen on the weighted diversity of dietary intake. Given that the diversity is already poor among the chronically food insecure, with more than 70% of the households in these groups eating an inadequate diet even without suffering acute food insecurity, this percentage only increased by a little with acute food insecurity.

As expected, households suffering with acute food insecurity, independent of their chronic food security status, will engage in a lot more coping strategies than households not suffering with acute food insecurity. However, households chronically food insecure will have to engage more in coping strategies than households not chronically food secure.

Section 6: Conclusions & Programmatic Recommendations

1. The 2007/08-year was a normal year, as rainfall and production data show that trends have been maintained. As such, the findings of this study can be used as a baseline. Furthermore, the normality of the situation allows for a closer approximation of livelihoods and vulnerability issues.

2. The urban areas are significantly different from rural areas. Although vulnerability may be more pronounced in urban areas, as shown by various indicators, it calls for specific activities. As such, CARE and WWF may need to design activities tailored to the needs of urban and rural areas.

3. Women headed households tended to present higher prevalence of vulnerability indicators, such as lack of education and low livelihood capacity. Furthermore, already vulnerable households tended to take in more double orphaned children and be less involved in associations, increasing their vulnerability.

4. The lack of improved water and sanitation conditions are an important issue in the area. In total, less than 15% of the population use any improved sanitation. Furthermore, less than 30% of the population in rural areas has access to improved water. This level of inappropriate water and sanitation conditions may endanger any efforts of food security activities. As such, CARE and WWF should also target, either directly or through partnerships, improvements in water and sanitation.

5. Agriculture is a major activity in the target areas, especially in rural livelihoods. Nevertheless, access to land in urban areas is a major issue, and as a result, a large proportion of households do not practice agriculture. Projects for improving livelihoods in urban areas might need to target efforts towards non-agricultural activities.

6. Production patterns were similar in the two rural areas. The only difference lay in the fact that production of peanuts was better along the coastline, while production of maize was better in the fresh water areas.

7. Agricultural production was only sufficient to cover about 1/4 of the annual calorific requirements for most of the households that produced food. This shows that, although most households are engaged in agriculture, their production is not sufficient even for their own consumption. Activities focusing on improving yields should therefore be targeted.

8. The urban area is extremely different from the rural area, and development activities should be tailored to the urban context. Nevertheless, the high levels of vulnerability of urban areas call for action.

9. Cassava was a major crop. However, the brown streak disease, which has been affecting the area, endangers the food security of many households. Tolerant variations of cassava are still rare in the area, and further incentives should be given to improve access to these variations.

10. The lack of diversification of crops, mainly towards vegetables and vitamin A rich foods, calls for activities supporting home gardens. Furthermore, the lack of use of technologies for improved crops also calls for the need of agricultural projects that focus on capacity building.

11. Although many households are said to own fruit trees, almost none of them sold fruit as a means to generate income. The sale of fish outside the district was also not common. As such, stronger linkages with markets should be supported to improve the livelihood conditions.

12. Fishing is a major activity for households living in great proximity to the coastline or rivers. However, it does not extend to more than a few kilometers inland. As such, activities focusing on fishing will only assist households living in those areas. The majority of households living in the surveyed area do not

fish. Nevertheless, the high frequency of use of fishing nets and boats show that, households that practice fishing tend to do it at a medium to large scale.

13. Although environmental conservation is a key focus of the CARE and WWF project, convincing households not to use nets and boats might be challenging. This lays in the fact that households using nets, boats or nets and boats, fished usually three times more than households not using these techniques.

14. The lack of fish processing in the area will cause further difficulties for environmental conservation. If households are expected not to fish during certain seasons, they will have to reserve some of their catches. As such, fishing processing is indispensable for environmental conservation and the project should support this activity.

15. The lack of fish processing also impacts sales. A significant difference in the proportion of households selling fish was found when comparing households who process their products with households that do not process. As such, in order to support livelihood activities focusing on fish processing are also crucial.

16. Livestock was rare in the study area. The lack of chickens, as the result of new castle disease, calls for external assistance. The relative low cost of keeping chickens and their nutritional and income values call for incentives. Livestock could be an option for fishermen when the fishing season is closed.

17. The vast majority of households in rural areas depended on agriculture and, to some extent, one more source of income. The low diversification of income makes households highly vulnerable to weather shocks.

18. Analyses on remittances show that households in the fresh water areas are more mobile. Probably, households from other areas are going to the riverside areas to pursue better fishing and agricultural opportunities. Activities done in this area will probably benefit households from other areas. Nevertheless, development activities focusing on mobile members might have to be tailored to allow for short-term finalization but ensuring long-term impacts.

19. The rare existence of associations is a major weakness for the development of the area. Not only does it affect households directly, but it may also slow down the process of starting up the project, as activities could take advantage of existing community associations. Furthermore, the undesirable linkages between households' vulnerability profiles and participation in associations (where households with vulnerable profiles tend to participate less in associations) might make poverty alleviation projects difficult to target the most vulnerable households.

20. The lack of access to credit, mainly those not related to family, might make the ability of households to break the poverty chain difficult. As such, activities could support the set up of informal credit schemes focusing on productive activities.

21. The moderate to high level of households engaging in moderate and heavily destructive coping strategies show that, even though this year was a "normal year", households' chronic vulnerability are already fragile and, with the occurrence of any shock, they have to engage in destructive coping strategies. Furthermore, the high levels of inadequate and very inadequate diet show that, even in normal years, households in the study areas have high chronic vulnerability. This means that development activities must focus on building strong livelihoods that can absorb the impact of cyclical shocks.

22. The lack of possibilities for coping strategies focusing on diversifying or intensifying income sources in urban areas probably makes them access more credit. The use of credit for non-productive means may destroy the potential long-term development of a chronically vulnerable household.

23. The lack of difference in the coping strategy index between the areas shows that a vulnerability target has to be considered at micro-level rather than at a geographical level. Section 3: Livelihood Clusters and Section 4: Vulnerability to Food Insecurity should therefore assist in the design and targeting of development activities more than in Section 2.

24. The disparity between ownership of trees and intake of fruits calls for further clarification. Either the trees are not producing because of the season, and there is little diversification in fruit production among the species planted, or diseases are depleting the trees capacities. Independent of the reason, project activities should support further development of fruit trees and modern technologies to prevent diseases.

25. Livelihood clusters tended to segregate households better than livelihood areas. In reality, livelihood clusters were almost evenly distributed within the livelihood areas. This shows that project activities should be diversified and tailored for livelihood clusters rather than areas.

26. Conclusions by Clusters:

    a. Cluster 1: Large-scale fishermen compose this cluster and households in this cluster are among the less chronically vulnerable households. This cluster makes up 7.0% of the population in the target area. This shows that fishing is a stable and good source of livelihood. However, this cluster may also be responsible for much of the degradation of marine resources. Furthermore, the apparent low price of fish in the areas (as more than 60% of households ate fish in the 24 hrs previous to the survey) shows that households from cluster 1 are not able to sell their catches further than their own communities and as such are not able to gain enough income from their catches. In order to decrease their impact and improve their livelihoods, fish processing techniques should be supported, as this would allow them to store and sell fish at better prices and also decrease their fishing activities during the closed season.

    b. The relatively high proportion of households from this cluster involved in associations should be considered as an advantage for programmatic implementation. The fact that most households from this cluster also produce moderate levels of cereals, means that activities to decrease their impact on marine resources should also focus on improving their agricultural production.

    c. Cluster 2: Medium-scale fishermen are found in this cluster. Households in the cluster base their livelihood mainly on fishing. They make up 13.4% of the target population. However, they do not fish large quantities of fish and do not produce much agriculture. They also do not have a varied network of sources of income. As such, this group is among the most chronically food insecure. Project activities should focus on supporting sustainable fishing activities for this cluster, while supporting the diversification of income for this cluster. If activities are to target the most vulnerable, this group should be specially targeted. Although activities should focus on long-term development and chronic food security, their actual vulnerability to both chronically and acute food security call for a mix of short term and long-term interventions. A household in this group will have difficulty in breaking the poverty chain without some form of "start-up incentive".

    d. Cluster 3: Staple producers are the major characteristic of this group. The large areas planted and harvested ensure that this cluster is one of the most chronically food secure groups. However, this group uses almost no basic technology for their agricultural fields. Activities

should support the capacity building of households in terms of agricultural knowledge. Linkages with markets should also support this group.

e. Cluster 4: Cassava producers are the major characteristic of this group. This cluster is very similar to cluster 3 in terms of their outcomes and vulnerability indicators. Nevertheless, the greatest misunderstanding remains as to why agriculturalists do not diversify their production and include cereals and tubers. Qualitative studies should allow for a clarification of this question. Either access to land is a major difference for the two clusters, or knowledge also plays a role. This group also uses almost no basic technology for their agricultural fields. As it has been widely acknowledged, brown streak cassava disease endangers this cluster as very few households in this cluster – as in any other – use cassava resistant species. Agricultural fairs should support the subsidised sale of resistant variations. Activities should also support the capacity building of households in terms of agricultural knowledge. Linkages with markets should also support this group.

f. Cluster 5: Commerce owners and formal employers are the basic livelihood of this cluster. Their access to a steady source of income allows them to be among the most food secure households. Although this group is more often found in the urban area, they also represent a large portion of households in rural areas. The fact that these households are not involved in associations, neither do they have large agricultural fields or carry out much fishing, but are the most food secure households calls for attention. Informal commerce and employment seems to be a stable livelihood source and should therefore be supported. Activities focusing on diversification of income should therefore be targeted at all groups in the area. This group could probably benefit from capacity building activities focusing on business management.

g. Cluster 6: Weak livelihoods. This cluster, together with cluster 2, is among the most vulnerable. Households from these clusters do not have a strong livelihood pattern, and many do not have any sources of income. Few households from this cluster are in associations. This cluster has a disproportional amount of female-headed households, elderly headed households and high dependency ratio. Given the characteristics of these households, their high vulnerability and low capacities, project activities for them should focus on diversifying their sources of income, while ensuring that their human capacity is also supported. Given the high chronic and acute vulnerability of this cluster, short-term interventions and long term development activities should be targeted at them.

27. Households headed by women and the elderly presented the highest vulnerability levels. These groups were also less present in associations. As such, activities targeted at them should be innovative. Working through existing associations may not reach the most vulnerable households.

28. Small differences in levels of vulnerability to chronic food insecurity were seen in households that were recently impacted by HIV/AIDS. This study shows that, although the impact of AIDS on chronic vulnerability may not be seen straight after the diagnosis, households that are affected by HIV/AIDS tend to move downwards with time. As such, long-term activities should focus on households that have been affected by HIV/AIDS even though there may not be chronically ill members in the household.

29. Although all clusters have suffered similar shocks, with cyclones being the most important, the impacts of shocks differed significantly. Agricultural clusters, especially the cereals and staple producers suffered most with the cyclone. The households included in cluster 3- did not suffer as much as cluster 2, what shows that planting cassava may allow households to mitigate weather and cyclone shocks better.

30. Households experiencing chronic and acute vulnerability – these being more often found in clusters 2 and 6 – show worrying levels of outcome indicators, such as dietary intake and coping strategies.

Nevertheless, households experiencing acute food insecurity but being chronically food secure also decreases their outcome levels. This means that, even though relief activities should focus on households most vulnerable, short term interventions may be necessary even for chronically food secure households in order to avoid livelihood depletion during very stressful times.