Osewe I., Coman C., Hălălișan A.-F., Osewe E., Abrudan I.V., Popa B., 2026. Shocks, strategies and socio-economic determinants of rural households coping mechanisms: Case study of Kakamega Forest, Kenya.

SI 1 Household questionnaire

Section 1: Income and wealth of the households

1. How much money do you make from your source(s) of income monthly (Ksh)?
   0 – 5000 □ 5001- 10000 □ 10001- 20000 □ 20001- 30000 □ 30001- 40000 □ 400001 – 50000 □ 50001- 60000 □ > 60001 □
2. Do you own a piece of land?
   Yes □ No □
   a. If yes what is the size of the piece of land (acre)?
   <1 □ 1-3 □ 4-5 □ 6-10 □ >10 □
3. Do you own any livestock?
   Yes □ No □
   a. If yes how many livestock do you own?

Cow	Goat	Sheep	Poultry (chicken, goose, duck)	Other

4. Type of wall materials
   Mud □ Iron sheets □ Stones □ Bricks □ Blocks □ Other □

Section 2: Shocks and safety nets

5. Type of idiosyncratic shock experienced.
   Death □ Unemployment □ Illness □ Loss of property □ Wedding or another costly social event □ Wildlife predation on livestock/crops □ Outbreak of human and livestock diseases □
6. Type of covariate shocks experienced.
   Flooding □ Economic distress □

Shock	How did you cope with the shock?
Death	
Unemployment	
Illness	
Loss of property	
Wedding or other costly social events	
Wildlife predation on livestock/crops	
Economic distress	
Flooding	
Outbreak of human and livestock diseases	

Coping codes.

a) Harvest more forest products.
b) Harvest more wild products not in the forest.
c) Harvest more agricultural products.
d) Spend cash savings.
e) Sell assets (land, livestock, etc.).
f) Do extra casual labour work.
g) Assistance from friends and relatives.
h) Assistance from NGO, community org., religious org. or similar.
i) Get loan from money lender, credit association, bank etc..
j) Tried to reduce household spending.
k) Did nothing in particular.
l) Spent savings / retirement money.
m) Reduced number of meals taken.
n) Borrowed against future earnings.
o) Sold food that would otherwise be used for household consumption.

p) Rented out land.
q) Started new business.
r) Changed to different type of livestock.
s) Other, specify:
t) Harvested premature crops.
u) Changed cropping patterns or types of crops planted.

Section 3: Demographic Information
7. Age _____
8. Level of education
No formal education □ Primary education □ Secondary education □ College/tertiary education □ University (Bachelor/ Master/PhD) □
9. Head of the household
Male □ Female □
10. Do you belong to any forest user group?
Yes □ No □

SI 2: Household socio-economic profile

Attributes	Category	Respondent percentage
Income	0-5000	40.2
	5001-10000	25.2
	10001-20000	18.5
	20001-30000	7.1
	30001-40000	5.5
	40001-50000	2.9
	50001-60000	0.2
	>60000	0.4
Land ownership	Yes	81.5
	No	18.5
Livestock ownership	Yes	84.3
	No	15.7
Average livestock	Cows	3
	Goats	1
	Sheep	1
If yes (land ownership)	<1	218 (count)
	1-3	101(count)
	4-5	45(count)
	6-10	11(count)
	>11	3(count)
Level of education	No formal education	8.2
	Primary education	48.1
	Secondary education	30.5
	College/tertiary education	9.7
	University education	3.5
Head of household	Male	75.9
	Female	24.1
Belong to a CFA	Yes	39.7
	No	60.3
Age categories	18-26 years	12.1
	27-35 years	21.4
	36-48 years	36.9
	>49 years	29.6
Size of households	1-3	6
	4-7	60.9
	8-11	26.9
	>11	6.2

SI 3: Stratification of shocks across socio-economic factors

%	Rich (84)	Middle (105)	Poor (264)	F value and Significance	CFA member (180)	CFA non-members (273)	χ2 and significance	Male household head (344)	Female household head (109)	χ2 and Significance
Death	44.0	41.0	34.8	1.4 > 0.05	37.2	38.5	0.07 > 0.05	38.1	37.6	0.01 > 0.05
Illness (c)	52.4	37.1	53.8	4.37 < 0.01	43.9	53.5	3.99 < 0.046	48	55.1	1.66 > 0.05
Unemployment (ab)	13.1	35.2	32.6	7.02 < 0.001	24.4	33.0	3.78 = 0.05	28.2	34	1.31 > 0.05
Loss of property	21.4	22.9	12.9	3.51 > 0.05	17.8	17.1	0.21 > 0.05	17.2	15.6	0.14 > 0.05
Wedding and other costly events	8.3	6.7	4.5	0.95 > 0.05	4.4	6.6	0.93 > 0.05	6.4	3.7	1.14 > 0.05
Wildlife predation (c)	22.6	27.6	15.5	3.8 < 0.05	31.7	11.7	27.34 < 0.05	19.8	19.3	0.01 > 0.05
Flooding	1.2	6.7	4.2	1.74 > 0.05	3.9	4.4	0.07 > 0.05	2	11	16.59 < 0.001
Outbreak of animal diseases (b)	23.8	14.3	11.0	4.38 < 0.05	22.2	8.8	16.13 < 0.05	16.9	5.5	8.8 < 0.05
Economic distress (c)	82.1	71.4	82.6	3.09 < 0.05	72.8	84.6	9.47 < 0.05	79.4	81.7	0.27 > 0.05

a represents a significant difference between rich and middle household, ***b*** represents a significant difference between rich and the poor households, and ***c*** represents a significant difference between the middle and the poor households.

SI 4: Shocks and their coping strategies

	Forest harvest				Consumption reduction				Productive asset sale			
	β	std error	sig	Exp(β)	β	std error	sig	Exp(β)	β	std error	sig	Exp(β)
Death	0.302	0.123	0.014	1.35	-0.238	0.176	0.178	0.79	0.258	0.147	0.79	1.2
Illness	0.627	0.125	<0.001	1.87	0.085	0.162	0.599	1.09	0.342	0.144	0.018	1.41
Unemployment	0.937	0.125	<0.001	1.55	0.605	0.17	<0.001	1.83	0.255	0.159	0.12	1.29
Loss of property	0.491	0.143	0.001	1.63	0.082	0.216	0.703	1.09	0.326	0.171	0.056	1.39
Wedding and other costly events	0.435	0.231	0.059	1.55	-0.746	0.457	0.103	0.47	0.341	0.261	0.19	1.41
Wildlife predation	0.618	0.134	<0.001	1.86	-0.1	0.21	0.63	0.9	0.268	0.167	0.11	1.31
Flooding	0.877	0.19	<0.001	2.4	0.187	0.35	0.592	1.21	0.249	0.332	0.45	1.29
Outbreak of animal diseases	0.068	0.182	0.708	1.07	-0.068	0.254	0.788	0.93	0.918	0.161	<0.001	2.5
Economic outbreak	0.391	0.157	0.013	1.48	1.429	0.331	<0.001	4.18	1.05	0.238	<0.001	2.86
Intercept	-1.9	0.218	<0.001	0.15	-2.404	0.3778	<0.001	0.09	-2.353	0.283	<0.001	0.1
Goodness of fit (Pearson chi square)			0.942				1.005				0.937	
Omnibus test (likelihood ratio chi-square)			<0.001				<0.001				<0.001	

	Assistance strategy				Costly strategy				Non costly strategy			
	β	std error	sig	Exp(β)	β	std error	sig	Exp(β)	β	std error	sig	Exp(β)
Death	1.205	0.113	<0.001	3.34	0.624	0.208	0.003	1.87	0.144	0.076	0.058	1.155
Illness	0.51	0.109	<0.001	1.66	0.544	0.214	0.011	1.72	0.277	0.073	<0.001	1.32
Unemployment	0.24	0.119	0.043	1.27	0.187	0.232	0.418	1.21	0.361	0.078	<0.001	1.44
Loss of property	0.058	0.14	0.68	1.06	0.501	0.238	0.036	1.65	0.391	0.087	<0.001	1.48
Wedding and other costly events	0.237	0.24	0.32	1.27	0.513	0.399	0.198	1.67	0.483	0.13	<0.001	1.62
Wildlife predation	-0.034	0.147	0.82	0.97	-0.021	0.274	0.939	0.98	0.574	0.08	<0.001	1.78
Flooding	0.4	0.211	0.059	1.49	-0.85	0.717	0.236	0.43	0.427	0.148	0.004	1.53
Outbreak of animal diseases	0.435	0.139	0.002	1.55	-0.453	0.354	0.2	0.64	0.43	0.093	<0.001	1.54
Economic distress	0.162	0.13	0.213	1.18	-0.109	0.25	0.664	0.664	0.298	0.1	0.002	1.35
Intercept	-1.395	0.184	<0.001	0.25	-2.127	0.349	<0.001	0.12	-0.324	0.124	0.009	0.723
Goodness of fit (Pearson chi square)			0.791				0.941				0.708	
			<0.001				0.002				<0.001	

SI 5: Socio-economic factors influence choice of coping strategy

	Forest harvest				Consumption reduction				Productive asset sale			
	β	std error	sig	Exp(β)	β	std error	sig	Exp(β)	β	std error	sig	Exp(β)
Belong to a CFA(Yes)	-0.435	0.404	0.28	0.65	-0.734	0.511	0.15	0.48	0.546	0.421	0.19	1.72
Gender of the HH(Male)	-0.377	0.167	0.02	0.69	-0.16	0.21	0.45	0.85	-0.712	0.206	0.001	0.49
Size of the household	0.115	0.032	<0.001	1.12	0.043	0.04	0.28	1.04	0.029	0.048	0.54	1.03
Wealth category (Rich)	-0.969	0.603	0.12	0.38	-0.083	0.986	0.007	0.93	-19.897	6610	0.998	2.30E-09
Wealth category (Middle)	0.84	0.541	0.12	2.32	-0.88	0.701	0.21	0.42	0.135	0.584	0.82	1.14
Wealth category (Rich)*Size of the household	0.057	0.064	0.37	1.06	-0.264	0.115	0.02	0.77	0.067	0.064	0.3	1.07
Wealth category (Middle)*Size of the household	-0.11	0.061	0.07	0.9	0.001	0.069	0.9	1.01	-0.017	0.062	0.78	0.98
Belong to a CFA(Yes)*Size of the household	0.003	0.048	0.95	1.003	0.028	0.063	0.66	1.03	0.002	0.052	0.97	1
Wealth category (Rich)*Gender of the HH(Male)	0.393	0.447	0.38	1.48	0.607	0.788	0.44	1.84	20.7	6610	0.998	9.70E+10
Wealth category (Middle)*Gender of the HH(Male)	-0.343	0.33	0.3	0.71	0.74	0.492	0.13	2.1	0.724	0.371	0.5	2.06
Wealth category (Rich)*Belong to a CFA(Yes)	0.442	0.357	0.22	1.56	0.961	0.569	0.09	2.61	-0.76	0.35	0.03	0.47
Wealth category (Middle)*Belong to a CFA(Yes)	0.393	0.327	0.23	1.48	0.651	0.388	0.09	1.92	-0.06	0.331	0.87	0.94
Belong to CFA (Yes)*Gender of the household head (Male)	0.334	0.38	0.38	1.40	0.568	0.523	0.28	1.77	-0.157	0.427	0.71	0.86
Belong to CFA (Yes)*Size of the households	-0.037	0.063	0.56	0.96	-0.002	0.75	0.98	0.99	0.031	0.07	0.66	1.03
Gender of the household head (Male)* Size of the household	-0.112	0.072	0.12	0.89	-0.19	0.092	0.038	0.83	0.116	0.091	0.2	1.12
Negative binomial	0.168	0.124							8.36E-14	4.81E-14		
Intercept	-0.829	0.282	0.003	0.44	-0.93	0.342	0.007	0.39	-0.984	0.387	0.01	0.37
Omnibus test			<0.001				0.009				<0.001	
Goodness of fit (Deviance)			0.959				0.915				0.916	
Goodness of fit (Chi-Square)												

	Assistance strategy				Costly strategy				Non-costly strategy			
	β	std error	sig	Exp(β)	β	std error	sig	Exp(β)	β	std error	sig	Exp(β)
Belong to a CFA(Yes)	-0.22	0.339	0.52	0.8	-0.87	0.74	0.24	0.42	-0.055	0.226	0.81	0.95
Gender of the HH(Male)	0.04	0.16	0.8	1.04	0.137	0.365	0.71	1.15	-0.56	0.105	0.6	0.95
Size of the household	-0.012	0.031	0.7	0.988	-0.022	0.065	0.74	0.98	0.085	0.019	<0.001	1.09
Wealth category (Rich)	-0.391	0.478	0.41	0.68	2.784	0.793	<0.001	16.18	0.106	0.325	0.75	1.11
Wealth category (Middle)	-0.156	0.491	0.75	0.86	0.534	0.931	0.57	1.71	0.648	0.32	0.04	1.91
Wealth category (Rich)*Size of the household	0.094	0.056	0.05	1.1	-0.156	0.107	0.15	0.86	-0.044	0.034	0.2	0.96
Wealth category (Middle)*Size of the household	0.047	0.054	0.39	1.05	-0.043	0.1	0.67	0.96	-0.085	0.035	0.02	0.92
Belong to a CFA(Yes)*Size of the household	-0.013	0.045	0.78	0.99	0.031	0.094	0.74	1.03	-0.021	0.028	0.44	0.98
Wealth category (Rich)*Gender of the HH(Male)	-0.232	0.343	0.5	0.79	-1.03	0.523	0.05	0.36	0.43	0.25	0.09	1.54
Wealth category (Middle)*Gender of the HH(Male)	-0.346	0.315	0.27	0.71	0.288	0.657	0.66	1.33	-0.19	0.204	0.35	0.83
Wealth category (Rich)*Belong to a CFA(Yes)	0.146	0.294	0.62	1.16	-0.684	0.627	0.28	0.51	0.286	0.184	0.12	1.33
Wealth category (Middle)*Belong to a CFA(Yes)	0.075	0.292	0.8	1.08	0.387	0.55	0.48	1.48	0.357	0.184	0.5	1.43
Belong to CFA (Yes)*Gender of the household head (Male)	0.595	0.364	0.10	1.81	-1.061	0.614	0.08	0.35	-0.097	0.291	0.73	0.91
Belong to CFA (Yes)*Size of the households	-0.016	0.06	0.78	0.98	0.058	0.109	0.6	1.06	-0.036	0.049	0.45	0.96
Gender of the household head (Male)* Size of the household	-0.054	0.074	0.47	0.95	0.059	0.124	0.63	1.06	-0.036	0.057	0.53	0.97
Negative binomial	0.107	0.092							7.48E-08	3.24E-08		
Intercept	-0.036	0.258	0.89	0.96	-1.634	0.558	0.003	0.2	0.021	0.173	0.9	1.02
Omnibus test			0.05				<0.001				<0.001	
Goodness of fit (Deviance)			0.938				0.655					
Goodness of fit (Chi-Square)							0.943				0.925	

SI 6. Correlation matrix of the shocks, coping strategies and the socio-economic modifiers.

Shock type	Predominant coping strategy		Socio-economic modifiers
Death	Assistance, Forest Harvest, and costly	Positive correlation	Rich*household size, Rich*Male HH.
Unemployment	Non-costly, Consumption reduction, and forest harvest	Negative correlation	Rich*Household size, Rich*HH(Male), and Rich*CFA(Yes)
Illness	Non-costly, assistance, productive asset sale.	Positive correlation	Poor*HH(Female), Poor*CFA(No), CFA(No)*HH(Female)
Loss of property	Non-costly, and Forest harvest,	Negative correlation	Poor*Household size, Poor*HH(Male), Poor*CFA(Yes)
Wedding or another costly social event	Non-costly	Negative correlation	Poor*Household size, Poor*HH(Female), and CFA (No)*HH(Female)
Wildlife predation	Non-costly, Forest harvest	Positive correlation	CFA (Yes)*Household size, Middle*CFA(Yes), and CFA (Yes)*HH(Male)
Flooding	Non-costly, forest harvest	Negative correlation	Rich*HH(Male), Rich*CFA(Yes), and HH(Male)*Household size
Outbreak of human and livestock diseases	Non-costly, assistance, and productive asset sale	Positive correlation	Rich*HH(Male), Rich*CFA(Yes), and CFA (Yes)*HH(Male)
Economic distress	Non-costly, consumption reduction and forest harvest	Negative correlation	CFA (Yes)*Household size, CFA (Yes)*HH(Male), and