

# Supplementary Materials: Integrated Flood Risk Assessment of Rural Communities in the Oti River Basin, West Africa

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**Table S1.** Questionnaire used in the Community-based Disaster Risk Index, modified from Bollin et al. [12].

1. Hazard				
	Experienced hazard			
<b>1.1</b>	<b>(H1) Occurrence</b>			
	How often did an emergency with this hazard happen in the past 30 years			
	0–1 Times	Low		
	2–3 Times	Medium		
	> 3 Times	High		
<b>1.2</b>	<b>(H3) Intensity</b>			
	What was the intensity of the worst event in the last 30 years?			
	No persons killed, only damages to houses and infrastructure	Low		
	Few persons killed, destruction of some houses and infrastructure	Medium		
	More than few persons killed, destruction of many houses and infrastructure	High		

2. EXPOSURE				
	<b>STRUCTURES</b>			
<b>2.1</b>	<b>(E1) number of housing units.</b>			
	Total number of housing units			
	< 10,000	Low		
	10.000–100.000	Medium		
	> 100.000	High		
<b>2.2</b>	<b>(E2) lifelines</b>			
	% of homes with piped drinking			
	< 20%	Low		
	20%–50%	Medium		
	> 50%	High		
<b>2.2</b>	<b>Economy</b>			
	<b>(E3) average income per capita/year</b>			
	< \$1022	Low		
	\$1022–\$4015	Medium		

	> \$4015/capita/year	High		
<b>2.3 (E4) Resident population</b>	<b>Population</b>			
	Total number of population living in the commune			
	< 50,000	Low		
	50,000–500,000	Medium		
	> 500,000	High		

<b>3. VULNERABILITY</b>				
<b>3.1 Physical/demographic</b>				
<b>(V1) Density</b>	How many people per km <sup>2</sup> live in the			
	< 100	Low		
	100–500	Medium		
	> 500	High		
	<b>(v2) Demographic pressure</b>			
Population growth rate	< 2%	Low		
	2–4%	Medium		
	> 4%	High		
	<b>(V3) Flood-prone areas</b>			
% of the total area prone to flood	< 10%	Low		
	10–30%	Medium		
	> 30%	High		
	<b>(V4) Access to basic services</b>			
Rate of access to safe drinking water	> 50%	Low		
	20–50%	Medium		
	< 20%	High		
	<b>3.2 Social</b>			
<b>(V5) Poverty level</b>	Percent of population below poverty level (\$1/DAY)			
	< 10%	Low		
	10–30%	Medium		
	> 30%	High		
	<b>(V6) Literacy</b>			
Percentage of adult population able to read and write	> 70%	Low		

	40–70%	Medium		
	< 40	High		
	<b>(V7) Attitude</b>			
	What priority does the general population give the protection against a flood hazard			
	High priority. Protection against a hazard	Low		
	Concerned, but only if a disaster has hit.	Medium		
	Not concerned. Other issues (food, work)	High		
	<b>(V8) Decentralization</b>			
	What is the portion of self-generated revenues of the total available			
	> 50%	Low		
	20–50%	Medium		
	< 20%	High		
	<b>(V9) Community participation</b>			
	% voter turnout on last commune			
	> 70%	Low		
	50–70%	Medium		
	< 20%	High		
<b>3.3</b>	<b>Economic</b>			
	<b>(V10) Local resource base</b>			
	<b>Does the community have a budget</b>		<b>Yes/no</b>	
	Enough to help the most affected		Low	
	Insufficient		High	
	<b>(V11) Diversification</b>			
	Source of livelihood comes from one, two or three			
	Mix of 3 sectors		Low	
	Mix of 2 sectors		Medium	
	More than 80% in 1 sector		High	
	<b>(V12) Small business</b>			
	Percentage of businesses with fewer than 20 employees			
	< 50%	Low		
	50–80%	Medium		
	> 80%	High		
	<b>(V13) Accessibility</b>			
	How often in the last 5 years was the commune isolated through interruption of access roads for more than 2 days			
	0- time	Low		
	1–5 times	Medium		
	> 5 times	High		
<b>3.4</b>	<b>Environmental</b>			

	<b>(V14) Area under forest</b>			
	How much of the total territory of the commune is covered with forest?			
	> 30%	Low		
	10–30%	Medium		
	< 10%	High		

<b>4. CAPACITIES AND MANAGEMENT</b>				
<b>4.1</b>	<b>Physical planning and engineering</b>			
	<b>(C1) Landuse planning</b>		<b>Their enforcement is</b>	<b>Evaluation</b>
	Does a land use plan or zoning regulations exists that keeps local production and housing out of hazardous areas?	<b>YES/NO</b> <b>If YES, explain</b>	Low	Low
			High	High
	<b>(C2) Preventive measures</b>		<b>Expected effect on damage</b>	
	Do flood exposure-limiting mechanisms/structures exist (dykes, retaining walls, dams, barrages, rock fall barriers, terraces, drainage)?	<b>YES/NO</b> <b>If YES, explain</b>	Low	Low
			Medium/high	Medium/high
	<b>(C3) Environmental management</b>		<b>Number of activities and project</b>	
	Are there activities to promote and enforce conservation of natural resources in risk areas (e.g. protection of water reserves, natural resources, desertification control techniques, reforestation)	<b>YES/NO</b> <b>If YES, explain</b>	Few	Low
			Some	Medium
			Many	High
<b>4.2</b>	<b>Societal measures</b>			
	<b>(C4) Public awareness</b>		<b>Frequency</b>	
	Are the public awareness programs executed?	<b>YES/NO</b> <b>If YES, what are these programmes</b>	Once	Low
			sometimes	Medium
			regular	High
	<b>(C5) School curriculum</b>		<b>The topics are taught at</b>	
	Are risk, disaster, environment and development topics part of taught lessons at school?	<b>YES/NO</b> <b>If YES, explain</b>	One grade only	Low
	<b>(C6) Public participation</b>		<b>It is composed of</b>	
	Is the public represented as member in the risk management/ emergency committee?	<b>YES/NO</b> <b>If YES, explain</b>	Only level 1	Low
			Level 2	Medium
			Level 3 of the society	High
	Level 1: administration (mayor's office, planning department)			
	Level 2: relevant response institutions (police, fire brigade, education, emergence health)			

	Level 3: the public (business, civil society, NGO'S)			
	<b>(C7) Access to national emergency fund</b>		<b>How fast can it be released/ received</b>	
	Is there access to a national/ district emergency fund?	<b>YES/NO</b> <b>If YES, explain</b>	> 7days	Low
			3–5 days	Medium
			< 3 days	High
	<b>(C8) Access to international emergency funds</b>		<b>Access to funds is:</b>	
	Is there access to international emergency funds?	<b>YES/NO</b> <b>If YES, explain</b>	Difficult	Low
			Easy	High
	<b>(C9) Insurance market</b>		Use	
	Is disaster risk insurance coverage for buildings available?	<b>YES/NO</b> <b>If YES, explain</b>	Not common	Low
			Common	High
	<b>4.3 Management and institutional measure</b>			
	<b>(C10) Risk management</b>		<b>Meeting frequency:</b>	
	Does a community risk management or emergency committee exist, that deals with prevention, mitigation, Preparedness and response?	<b>YES/NO</b> <b>If YES, explain</b>	Only during Emergency	Low
			Once a year	Medium
			At least quarterly	High
	<b>(C11) Risk map</b>		<b>The map is available at</b>	
	Does a risk map exist?	<b>YES/NO</b> <b>If YES, explain</b>	Only level1	Low
			Also at level 2	Medium
			Also at level 3	High
	Level 1: administration (mayor's office, planning department)			
	Level 2: relevant response institutions (police, fire brigade, education, emergence health)			
	Level 3: the public (business, civil society, NGO'S)			
	<b>(C12) Emergency plan</b>		<b>Availability of maps at different levels:</b>	
	Is there a worked out and circulated emergency plan?	<b>YES/NO</b> <b>If YES, explain</b>	One	Low
			Few	Medium
			many	High
	<b>(C13) Early warning system</b>		Does it work	
	Is an early warning system in place?	<b>YES/NO</b> <b>If YES, explain</b>	Low	Low
			Medium	Medium
			High	High
	<b>(C14) Institutional capacity building</b>			

	Do local institutions (administration, police, fire brigade, hospitals, building sector) receive training on risk management?	<b>YES/NO</b> <b>If YES, explain</b>	Sometimes	Low
			Often	Medium
			Constant	High
<b>(C15) Communication</b>				
	Is there coordination with national level risk management organizations (national committees, government etc.)?	<b>YES/NO</b> <b>If YES, explain</b>	Sometimes	Low
			Often	Medium
			constant	High