Research Terms of Reference

Area-Based Risk Assessment (ABRA) in the North and East of Sri Lanka LKA2301

Sri Lanka

28/09/2023



1. Executive Summary

Country of	Sri Lanka										
intervention											
Type of Emergency	Х	Natural disaster		Con	flict		Other (specify)				
Type of Crisis		Sudden onset		Slov	v onset		Protracted				
Mandating Body/	Burea	au for Humanitarian Assistance	nce (BHA)								
Agency											
IMPACT Project	IMPA	IMPACT: 08BBD CBO									
Code	ACTE	ACTED:08FOM									
Overall Research											
Timeframe (from	15/09	/2023 to 31/05/2024									
research design to											
final outputs / M&E)	4 Dil				C. Declinsing and and		<i>t</i> '				
Timofromo	1. Pill	ot training: NA			6. Preliminary pre	senta					
	2 64	ort collect date:			7 Outputs cost fo	r voli	dation:				
(for first cycle if more	2. 318										
than 1)	25/08	1/2023			29/03/2024						
,	3 Da	ta collected:			8 Outputs publick	nod.					
	10/11	/2023			27/05/2024						
	10/11	12020			21100/2024						
	4 Da	ta analysed [.]			9 Final presentat	ion [.]					
	08/12	/2023			31/05/2024						
					•••						
	5. Da	ta sent for validation:									
	08/12	/2023									
Number of	Х	Single assessment (one cyc	le)								
assessments		Multi assessment (more thar	n or	ie cyc	cle)						
Humanitarian	Miles	tone	Deadline (can be	e tent	ative)						
milestones	х	Donor plan/strategy			31/05/2024						
Specify what will the		Inter-cluster plan/strategy			//						
assessment inform		Cluster plan/strategy			//						
e.g. The shelter cluster		NGO platform plan/strategy			//						
will use this data to	x	Other (Specify): ACTED acti	vitie	s	Q1-Q3 2024						
		as per AGORA project		-							

draft its Revised Flash							
Appeal;							
Audience Type &	Audie	ence type	Dissemination				
Dissemination	□ Stra	ategic	хĢ	General Product Mailing (e.g. mail to NGO			
Specify who will the	x Pro	grammatic	imatic consortium; HCT partie				
assessment inform	x Ope	rational	x Cluster Mailing (Education, Shelter and WASH)				
and how you will	лоро		and	d presentation of findings at next cluster meeting			
disseminate to inform		ner, Specity]	хF	Presentation of findings (e.g. ACTED, Donor,			
the audience			ext	ternal actors)			
			хV	Vebsite Dissemination (Relief Web & REACH			
			Re	source Centre)			
Stakeholder		Yes	Х	No			
mapping Has a							
detailed stakeholder							
mapping been							
conducted during							
research design to							
identify all actors that							
could contribute to							
and/or benefit from							
the research?							
	T			haten eta aritkia tha tanan t Divisional			
General Objective		evelop a localized understanding of the	risk	notspots within the target Divisional			
	Secre	etariats (DS), by analyzing hazard-exp	osure	e and vulnerability of the affected community			
	and th	heir livelihoods at Grama Niladhari Div	ision	is (GN) level to inform local community s			
	Disas	ster Risk Reduction (DRR) priorities an	d res	silience building activities.			
	Asse	ssment focus: Identify GNs the most	st at risk for multiple hazards, which are likely to				
	dispro	oportionally impact on agricultural and	fishe	ery livelihoods at each of the four selected			
	DS						
Specific	1) to a	analyse and map main natural and ant	hrop	oogenic hazards as well as exposed			
Objective(s)	popul	ation and livelihoods at DS level					
	2) to (understand community`s vulnerabilities	ities and identify GNs with the highest vulnerability				
	level						
	3) to i	identify GNs with the highest risk for m	ultip	le hazards to prioritize them for the			
	Liveli	hood Resilience Assessment (LRA)					
Research	1. F	RQ for SO1:					
Questions	1	.1. What are the main natural hazard	s aff	ecting the local community and what are			
		their characteristics1?					
	1	.2. What are the main anthropogenic	haz	ards affecting the local community and what			
		are their characteristics?					
	1	.3. What are the climatic characterist	ics o	f the target areas and how climatic variables			
		might change due to the climate of	han	ge?To what extent the population and			
		communities livelihoods are expo	used to the key hazards?				
	2. F	RQs for SO2:					
	2	2.1. What are the main vulnerability ch	haracteristics of the community contributing to the				
		risk?		scenerate of the commany contributing to the			
	1						

¹ By characteristics means hazard location, intensity or magnitude, frequency and probability.

				-								
		2.2. What are the coping capacities that the community is lacking that contribute to the										
		risk? Which coping med	chani	sms ha	ave	they already pu	t in p	blace?				
		2.5. what are the adaptation capacities that the community is lacking that contribute to the risk? Which adaptation mechanisms have they stready put in place?										
		the risk? which adaptation mechanisms have they already put in place?										
	3	PO for SO3										
	0.	3.1 What are the key hazar	1. What are the key hazards and community vulnerabilities that account for risk at									
		the GND level?										
		3.2. What GNs are defined	as the	e most	atı	risk for multiple l	naza	rds and why?				
Geographic	8 Di	visional Secretariats (DS) wit	hin 4	district	s ir	Sri Lanka		· .				
Coverage		- Kilinochchi district:	Poon	akari a	nd	Karachchi DS						
		 Batticaloa district: K 	iran a	and We	ella	walai DS						
		- Ampara district: Ade	dalac	hchana	ai a	nd Mahaoya DS						
		 Vavuniya district: Vavuniya district: Vavuniya 	avuni	ya Nor	th a	and Vavuniya So	buth	DS				
Secondary data	ABF	A resources:	-1 [:]	:			10					
sources		 Disaster Risk Reduing National Adaptation 	Ction Plan	IN SII L of Sri	.ani Lar	ka, UNDRR, 20	19					
		- National Disaster M	anaq	ement	Pla	in, Sri Lanka 20	22-2	030				
		- Hazard Profiles of S	Sri La	nka								
		- Disaster Information	ו Mar	nageme	ent	System, Sri Lan	ka					
		- Geospatial datasets	:Lan	dsat, N t Sonii	IOL	Sentinel 2, Sentinel 2, S	Sent	inel 5P, Copernicus				
		- Statistics websites	of tar	aet DS	s:		piore					
		 Resource 	Profil	e Sri La	ank	а						
		Population	/GNE	D_Repo	orts	/2020/Ampara.p	df					
		Population	/GNE	D_Repo	orts	/2020/Batticaloa	.pdf	r.				
		 Population Population 	/GNL /GNF)_Rep	orts. orts	/2020/Killinochci /2020/Vavuniva	n.pd pdf	Ť				
		Census and statistics de	partr	nent re	nor	ts including Cer	.pui isus	of Agriculture/Paddy				
		statistics/Highland Crops	s/Live	stock	Sta	tistics/Fisheries	and	Aquatic Resorces				
Population(s)		IDPs in camp				IDPs in informal sites						
Select all that apply		IDPs in host communities				IDPs [Other, Specify]						
		Refugees in camp				Refugees in informal sites						
		Refugees in host commun	ities			Refugees [Other, Specify]						
		Host communities			Х	General popul	ation	1				
Data collection	x	Satellite remote sensing				Semi-structure	d (C	Dualitative)				
tool(s)	~	Catoline Fornote conoling										
	х	Secondary data collection	Secondary data collection									
Data management	х	IMPACT				UNHCR						
platform(s)												
Expected ouput		Situation overview #:	×	Repo	ort #	*: 8(1 per DS)		Profile #:				
type(s)	Х	Presentation (Preliminary	Х	Prese	enta	ation (Final) #:		Factsheet #:				
		findings) #: 8 (1 per DS)		8 (1	ber	DS)						
		Interactive dashboard #:_		Web	map	o #:	×	Map 40: (at least 5 per				
								DS)				
								- Flood and				
								inundation				
	1			- Droug								

				 Epidemics Cyclones Water scarcity Population vulnerabilities Final risk maps 						
Access	х	Public (available on REACH resource center a	ind other huma	nitarian platforms)						
		Restricted (bilateral dissemination only upon a on REACH or other platforms)	greed dissemir	nation list, no publication						
Visibility Specify	AGO	RA								
which logos should be	Donor: BHA									
on outputs	Coor	Coordination Framework: NA								
	Partr	ers: ACTED, CEFE Net								

2. Rationale

2.1 Background

Following the onset of the economic crisis in 2022, national and local government resources and capacities are strained. Compounding crises, including the Covid-19 pandemic and the ongoing economic crisis, have largely consumed funds for investing in disaster risk management (DRM) actions while at the same time have contributed to increased hardships for communities. They have led to a significant economic downturn, hyperinflation, and job losses, leaving already vulnerable communities even more marginalized. During the peak of the economic crisis, livelihoods were disrupted across the country, and over 5 million people needed assistance.²

Over 40% of the population, including much of the rural poor, in Sri Lanka is involved in the agriculture and fishery sectors due to the country's prime geographic location and climate. However, with increasingly unpredictable weather and climatic variations due to climate change, the island nation and its populations are hazard prone. 96% of disasters in Sri Lanka are caused by hazards such as droughts, floods, landslides, cyclones and coastal erosion. The climate crisis increases the frequency and severity of these hazards.

As such, climate and disaster risks pose a considerable threat to key economic sectors of Sri Lanka and, as a result, to vulnerable populations. A global assessment on DRR indicates that disaster risks and impacts disproportionately affected the most vulnerable and marginalized due to underlying vulnerabilities.³ Within the Sri Lankan context, marginalized groups in rural areas are often solely dependent on natural resources for their livelihoods, and following disasters, households' suffer drastic loss of assets and financial capital, diminishing their capacities to recover.⁴ Recurrent crises intensify this, leave limited room for recovery and exacerbate existing vulnerabilities.

The need for enhancing community resilience is reinforced by the lessons learnt from the Sri Lankan experience in Disaster Risk Reduction (DRR) during past two decades. Even though communities have shown high resilience in the face of disasters traditionally, the efforts of the government and the civil society in community-based DRR have in the past focused only on preparedness, immediate lifesaving responses, and recovery from disasters or crises. Accordingly, targeted DRR efforts that address both natural and anthropogenic hazards and their impacts, must be promoted to ensure their sustained resilience to external shocks and stresses, thus addressing chronic vulnerabilities. However, **data on the specific**

² UNOCHA (2022) Humanitarian Needs and Priorities

³ UNDRR (2022) Global Assessment Report on Disaster Risk Reduction

⁴ UNDRR (2019) Disaster Risk Reduction in Sri Lanka

vulnerabilities faced by communities at the local level as well as granular hazard and risk mapping is largely missing, which makes it difficult to understand the intersecting vulnerabilities and risks caused by different crises.⁵

Built on ACTED and IMPACT's joint venture, <u>AGORA</u>, the action will develop a robust area-based understanding of vulnerabilities as well as external risks and hazards threatening communities and their livelihoods; support marginalized communities identify and implement DRR solutions by bolstering resilience of their livelihoods while fostering sustainable synergies between local actors to scale up and replicate the locally-identified solutions.

The Area-based Risk Assessment will serve as a fundamental source of information and robust evidence on existing and future risks, main hazards and vulnerabilities at the local level. It will support identification and prioritization of GNs with the highest level of risk for the following participatory DRR solutions workshops with local community and risk reduction programmes and activities implementation.

2.2 Intended impact

The research aims to inform DRR planning and resilience building efforts undertaken by local community, CBOs, local and national-level authorities and other relevant stakeholders. Assessment findings will support identification of the local solutions and priorities for disaster risk reduction and inform livelihood resilience building activities across 4 districts in the North (Kilinochchi and Vavuniya districts), and in the East (Batticaloa and Ampara districts).

The Area-based Risk Assessment aims to provide a comprehensive picture of natural and anthropogenic hazards, exposure and vulnerability profile at GN level to support the upcoming ACTED and IMPACT activities as of the project's framework.

ABRA findings will be utilized to inform the selection process of GNs based on risk assessment estimates, and after it will inform disaster risk reduction participatory planning by local authorities, communities, CBOs and international/development organizations. It will inform capacity building activities on DRR for the most at risk communities through livelihood counselling session for Community-based organizations (CBO) and households conducted by <u>CEFE Net</u>.

For CBOs, the research will guide the discussions to devise DRR solutions and action points to integrate into annual development planning activities.

For international actors (INGOs, UN agencies), research products will serve as a detailed situational overview on climatic risks in the target areas to prioritize and contextualize their DRR activities accordingly.

For donors, the products may assist in shaping calls for the future proposals and guiding programmatic goals and identification of advocacy points.

3. Methodology

3.1 Methodology overview

Area-based Risk Assessment

The Area-based Risk Assessment (ABRA) aims to fill the information gaps about the prevalence and severity of both natural and anthropogenic risks in eight selected Divisional Secretary's Divisions (DS): Poonakari and Karachchi (Kilinochchi district), Kiran and Wellawalai (Batticaloa district), Addalachchanai and Mahaoya (Ampara district), Vavuniya North and Vavuniya South (Vavuniya district) (Fig1.).

Assessment will be conducted through collecting, processing, and utilizing secondary, openly available geospatial data on predominant hazards, exposure and available secondary statistical data on vulnerability, including susceptibility, coping capacity and adaptive capacity components.

Methodological approach used for this ABRA was adapted from the <u>World Risk Index</u>, using multi-hazard risk equation, where risk is a multiplication of hazard, vulnerability and quantification of the exposed elements-at-risk (Fig.1).

⁵ UNDRR (2019) Disaster Risk Reduction in Sri Lanka



Figure 1. Multi-hazard Risk equation for area-based risk assessment.

In this assessment, we will analyze hazards, exposure, vulnerability, risk, and resilience across the region, based on the following definitions:

- **Hazard:** A process, phenomenon or human activity that may cause loss of life, injury or other health impacts, property damage, social and economic disruption or environmental degradation (<u>UNGA, 2016)</u>.
- Vulnerability: The conditions determined by physical, social, economic and environmental factors or processes which increase the susceptibility of an individual, a community, assets or systems to the impacts of hazards (<u>UNGA</u>, <u>2016</u>). Components of vulnerability include susceptibility, which is the likelihood of suffering harm from one of the assessed hazards; coping capacity, the capacities to reduce negative consequences; and adaptive capacity, the capacities to develop and maintain long-term strategies to ensure social resilience to hazards and shocks.
- **Exposure:** The situation of people, infrastructure, housing, production capacities and other tangible human assets located in hazard-prone areas (UNGA, 2016).
- Risk: The potential loss of life, injury, or destroyed or damaged assets which could occur to a system, society or a community in a specific period of time, determined probabilistically as a function of hazard, exposure, vulnerability and capacity (<u>UNGA, 2016</u>).

Openly available remote sensing imageries will be used to conduct geospatial analysis of hazards, exposure and some vulnerability indicators. See Table 1 in Section 3.3 for an overview of such data sources. Due to the level of granularity specified in the research design, it is only possible to use global geospatial datasets that possess resolution of 1km and less. For the secondary data review, hazard data from the last decades as well as the future predictions will be considered, as it is important to analyse environmental and climatic trends, in particular over a longer period to understand changes and patterns over time.

For some hazards (e.g., elephant attacks), data will be obtained from the local statistics websites or requested from the local authorities, and this will be conducted in parallel with geospatial analysis. Data for vulnerability analysis and vulnerability index calculation will be acquired from relevant openly available reports, documents, local statistics or census, or will be requested from various state structures, including:

- Department of Planning (DoP)
- Department of Development (DoD)
- Department of Agriculture (DoA)
- Department of Agrarian Development (DAD)
- Department of Fisheries and Aquatic Resources (DFAR)
- District Disaster Management Centre (DDMC)
- Department of Census and Statistics
- Resource Profile Sri Lanka
- Department of Animal Production and Health

Relevant local actors will be consulted throughout the assessment (hazard identification, risk indicators verification and weighting) and after the ABRA (findings dissemination) to ensure the research is aligned with the local context and reflects the key hazards and risks experienced by the local community. These consultation meetings will be organized and conducted by Acted with the participation of IMPACT field officers and GIS officer⁶.

The timeframe for ABRA research cycle is 15th September – 31st May 2024.

Key steps in the ABRA:

- 1. Engagement with local authorities and local communities in the assessed area: Feedback will be gathered from local authorities on the planned methodology, hazards and vulnerability indicators, verification of GNs the most at risk.
- 2. Secondary data review: Secondary data, such as previous environmental and risk assessments, weather and climate reports, and water management and DRR reports will be part of the ABRA and will be utilized to understand the current hazards and vulnerabilities situation in targeted DSs.
- 3. **Hazards identification, risk and vulnerability indices:** natural and anthropogenic hazards relevant to DSs will be identified, along with indices that will be developed to rank areas in terms of "high" and "low" risks. Indices for vulnerability within the population will be identified and developed with relevant demographic variables and other statistical data sources.
- 4. Data processing: The remotely-sensed data will be processed to represent the spatial distribution and other characteristics of the hazards, to determine the exposure to the population and agricultural lands. Vulnerability index will be calculated based on identified indices on susceptibility, lack of coping and adaptive capacities. The final step will be the risk calculation based on the formula Risk=Hazard x Exposure x Vulnerability (Fig.1)
- 5. **Report production:** Analysed data will be assembled in a report to contextualize and explain the hazard, risk, and vulnerability components of the study.

3.2 Population of interest

Geographical area assessed: The Area-based Risk Assessment (ABRA) will be conducted in eight selected Divisional Secretary's Divisions (DS): 1) Poonakari and 2) Karachchi (Kilinochchi district); 3) Kiran and 4) Wellawalai (Batticaloa district); 5) Addalachchanai and 6) Mahaoya (Ampara district); 7) Vavuniya North and 8) Vavuniya South (Vavuniya district) (Fig 2.). These divisions were selected based on the technical consultations with Districts authorities using the predefined selection criteria, including the impact of hazards, level of access to the Division in a disaster situation, population density, presence of DRR-related projects implemented by other stakeholders, existence of CBOs or GN Disaster Management Community based organizations, etc.

Figure 2. Selected DS for Area-based Risk Assessment.

⁶ Acted has obtained the approval from the Disaster Management Center to conduct the project in selected districts and they have also received permission letters from each district secretary to implement the project in divisional secretariats under their purview. Along with these approval letters, a request letter from the Acted project manager will also be submitted when these consultation meetings are arranged.



Population assessed: The population of interest in this study is a local community.

Unit of measurement: GN level - admin 4

3.3 Secondary data review

The following sources will be used throughout all research cycle:

- Disaster Risk Reduction in Sri Lanka, UNDRR, 2019
- National Adaptation Plan of Sri Lanka, 2016-2025
- National Disaster Management Plan, Sri Lanka 2022-2030
- NEOP_National Emergency Operation Plan, Sri Lanka, 2017
- Hazard Profiles of Sri Lanka
- Sri Lanka National Report on Disaster Risk, Poverty and Human Development Relationship 2009
- Sri Lanka: disaster management reference handbook 2021
- Sri Lanka's livestock sector and climate change -Source SLYCAN Trust
- Land degradation in Sri Lanka, disaggregated by administrative units -UN
- Land Degradation Neutrality Targets for Sri Lanka Ministry of Mahaweli Development and Environment Democratic Socialist Republic of Sri Lanka
- Hazard definition and classification review (Technical Report)
- Source United Nations Office for Disaster Risk Reduction International Science Council
- WORLD METEOROLOGICAL ORGANIZATION Tropical Cyclone Programme

Hazard and exposure identification:

IMPACT will use remote sensing data to assess multi-hazard exposure at GN level, and, upon the availability of relevant secondary data sources on vulnerabilities, will develop an integrated risk index at GNs level. Hazard and exposure data will be used as a first step at Area-based Risk Assessment. This data includes satellite imagery (e.g., MODIS, Sentinel, or Landsat 8/9 imagery available through USGS Earth Explorer and Google Earth Engine services), global exposure datasets (e.g., population datasets, such as the GHS Population Grid). Data sources that are available will be compiled and analysed to provide the appropriate information at the sub-regional level. Such data sources are listed in **Table 1.** Calculations do not alter the original data and are derived from scripts in Google Earth Engine, establishing minimum, maximum, mean, and other values from the data itself. These are validated as needed and are stored in a repository for access. Geospatial Hazard and exposure data will be collected at DS level and during the analysis stage computed at GN level.

For some hazards (e.g., elephant attacks), data will be obtained from the local statistics websites or requested from the local authorities at GN level, and this will be conducted in parallel with geospatial analysis.

Vulnerability indicators identification at GN level:

Data for vulnerability analysis and vulnerability index calculation⁷ will be acquired from relevant openly available reports, documents, local statistics or census, or will be requested from various state structures, including:

- Department of Planning (DoP)
- Department of Development (DoD)
- Department of Agriculture (DoA)
- Department of Agrarian Development (DAD)
- Department of Fisheries and Aquatic Resources (DFAR)
- District Disaster Management Centre (DDMC)
- Department of Census and Statistics
- Resource Profile Sri Lanka

Key stakeholders will be consulted during (hazard identification, risk indicators verification and weighting) and after the ABRA (findings dissemination) to ensure the research is aligned with the local context and reflects the key hazards and risks experienced by the local community.

The timeframe for ABRA data collection is 25th September – 10th November 2023

Secondary source	Short description	Area	Hazard/
			Exposure type
	Hazard		
Climate Data Online	Archive of global historical weather and climate data,	Global	Tropical cyclone
	like wind speed, precipitation		
Giovanni NASA	Includes meteorological datasets for temperature,	Global	Climate change
	precipitation, soil, moisture, atmospheric chemistry,		variables, Flood
	precipitation, evaporation rate		
The Visible Infrared	VIIRS instrument collects visible and infrared images	Global	Flood
Imaging Radiometer	and global observations of the land, atmosphere,		
Suite (VIIRS)	cryosphere and oceans.		
<u>WorldClim</u>	Historical and future projected climate datasets,	Global	Climate change
	Precipitation, temperature and bio-climate indicators		variables
Global Forest Watch	Forest cover, forest loss, forest gain, deforestation	Global	Land degradation

Table 1. List of data sources to be utilised

⁷ Vulnerability Index is calculated by adding the values of Susceptibility indicators, Indicators of lack of Coping Capacity and Lack of Adapting Capacity (V=S+LCC+LAC) and is calculated at GN level.

Land Cover	Land use data, agricultural land (exposed assets)	Global	Land
Copernicus Global			degradation/land
Land Service			use
Landsat-8	Dataset that is used to monitor vegetation and crop	Global	Drought, Land
	condition (normalized difference vegetation index (NDVI		degradation
	for drought and land degradation analysis)		
MODIS	Dataset that is used to monitor vegetation and crop	Global	Drought, Land
	condition (normalized difference vegetation index (NDVI		degradation
	for drought and land degradation analysis)		
Landsat 8	Dataset that is used to monitor vegetation and crop	Global	Water pollution
	condition (normalized difference vegetation index (NDVI	DS, GN level	(aquatic weeds)
	for identified aquatic weeds polluted water bodies)		
Defense	Available data of land mines from relevant institution	DS, GN level	Explosive
Ministry/Regional	and authorities		remnants of war
Forces/INGO(MAG)			(ERW) - mines
Wildlife	Records of elephant attacks with impact, damages the	DS, GN level	Human-Animal
Department/Disaster	event caused		conflict/interaction
Management Center			(Elephant attacks)
	Exposure		· · · · · ·
ESRI land cover	Land use and land cover data, 10m resolution land	Global	Exposure of
	cover raster Sentinel based)		agriculture lands
GHS population raster	Geospatial data on population distributions,	Global	Population
	demographic		density
Sri Lanka Census	Statistics records of population numbers per GN	DS, GN level	Population
(updated records			density
requested)			-

3.4 Primary Data Collection

No primary data collection tools will be used during this study.

Data Processing & Analysis

Geospatial data will be processed and analysed within each section of the Area-Based Risk Assessment, namely Hazard, Exposure and Vulnerability sections (see Table 2). It must be noted that these are the proposed methods, and they may need to be adjusted based on available techniques and the suitability of different methods.

Section name	Process / Analysis
Exposed population: Population density	Population raster of the target areas (GN) will be extracted from the <u>GHS population</u> <u>raster</u> or other available sources and overlapped with hazard extend (Flood, tropical cyclone, etc)
Exposed assets: agricultural/pastoral lands, fishery reservoirs	Agricultural lands and fishery reservoirs will be extracted from <u>Copernicus Global Land</u> <u>Cover</u> layer and overlapped with hazard extend (drought, land degradation, etc)

Table 2: Summary of data processing and analysis

Climate change and meteorology trends	Data from <u>Giovanni NASA</u> on area-averaged climatic trends or from specific weather stations from RP5 data will be used to create graphs of long-term precipitation, temperature, soil moisture and wind speed trends, plus predominant wind directions to analyse tropical storm hazard.
Water Pollution (aquatic weeds)	Data from Lanst 8 for identification the aquatic weeds ⁸ pollution of the area using the NDVI technics. NDVI calculation provide data for identification based on Raster pixel value.
Human-Animal conflict/interaction (Elephant/monkey attacks)	Data from Wildlife Department, Disaster management centre and other relevant local authorities to create situation map analysis.
Explosive remnants of war (ERW)/ Mines risk	Mines risk will be analyzed with available data from Mine Action Stakeholders, including NGOs and defense ministry and local authorities of the area
Drought Risk	The drought severity index will be calculated based on accumulated vegetation condition index (CVI) in Google Earth Engine for dry seasons over a long time period. VCI will be calculated by using satellite derived vegetation health data (MODIS EVI), based on UN-Spider methodology. To identify drought exposure, analysis should be run for agricultural areas, masked out using Copernicus land cover data. To calculate the drought risk, drought index value will be multiplied with exposure and drought vulnerability index (reliance on agriculture, access to water, etc.)
Land degradation	Determine percentage of change over time using <u>ESA-CCI-LC</u> from 2001 to 2023, <u>MODIS</u> data products, and the Harmonized World Soil Database (HWSD), Version 1.2,23 to determine a binary indicator (degraded/not degraded), according to the "One Out, All Out" (10AO) standard. Risk is determined by overlaying with agricultural land and vulnerability indicators.
Flood risk	Flood extents and inundation depths over the several years (upon availability) will be derived from remote sensing data (<u>VIIRs</u> , analysis by UNOSAT) and multiplied by the population density dataset to get an estimate of exposure. To calculate the flood risk, flood hazard value will be multiplied with exposure and flood vulnerability index (population with disabilities, access to boats, etc.)
Vulnerability index	Vulnerability index will be calculated based on indicators values obtained at GN level from local actors for Susceptibility, Lack of Coping and Lack of Adaptive Capacity. Each hazard has a unique set of vulnerability indicators that determine the risk. All indicators' values will be normalized, weighted and calculated with a formula V=S+LCC+LAC at GN level per each hazard.
Multi-hazard Exposure	Based on the existing data, natural hazard risk will be calculated (based on zonal statistics of proximity/frequency of natural hazard occurrence). Technological multi-hazard risk will be calculated based on the proximity of hazardous objects, industrial waste, and frequency of failures in the past. These will include demographic data from the ABA interviews, identifying vulnerable populations (e.g.: households with IDPs,

⁸ Aquatic weeds like Azolla, Eichhornia crassipes, Hydrilla verticillata, Lemna, Limnocharis flava, Pistia, Salvinia molesta, Typha, and Vallisneria will be considered for the analysis

	households with three or more children, disabled head of household, etc.) and will consider factors such as distance from nearest medical facility or emergency services, to develop the multi-hazard ranking list.
Multi-hazard Risk	Risk for multiple hazards affecting GNs will be calculated by adding risk indices of each hazard (flood risk index, drought risk index, etc).

3.5 Limitations

Lack of available secondary data at divisional and Grama Niladhari levels, lack of capacity and willingness of local authorities to timely provide required data could be potential limitations. These could have an adverse impact on the availability and quality of data which is supposed to collect from local authorities and may delay the data collection as well. Based on the context, there will be limitations related to spatial and temporal resolution, availability of updated satellite images, and spatial accuracy in project implementation areas. These limitations can indeed impact the analysis and should be carefully considered. It is important to ensure that the spatial and temporal resolution of the data is sufficient to capture the desired patterns and changes. Additionally, the availability of updated satellite images are crucial for accurate analysis. Maintaining spatial accuracy is also important to ensure reliable results.

3. Key ethical considerations and related risks

The proposed research design meets / does not meet the following criteria:

The proposed research design	Yes/ No	Details if no (including mitigation)
Has been coordinated with relevant stakeholders to avoid unnecessary duplication of data collection efforts?	Yes	
Respects respondents, their rights and dignity (specifically by: seeking informed consent, designing length of survey/ discussion while being considerate of participants' time, ensuring accurate reporting of information provided) ?	Yes	
Does not expose data collectors to any risks as a direct result of participation in data collection?	Yes	
Does not expose respondents / their communities to any risks as a direct result of participation in data collection?	Yes	
Does not involve collecting information on specific topics which may be stressful and/ or re-traumatising for research participants (both respondents and data collectors)?	Yes	
Does not involve data collection with minors i.e. anyone less than 18 years old?	Yes	
Does not involve data collection with other vulnerable groups e.g. persons with disabilities, victims/ survivors of protection incidents, etc.?	Yes	

	Follows	IMPACT	SOPs	for	management	of	personally	Yes
ide	identifiable information?							

4. Roles and responsibilities

Task Description	Responsible	Accountable	Consulted	Informed
Research design	Assessment Officer, GIS Officer	Research Specialist	IMPACT HQ Research Design and Data Unit (RDDU), IMPACT HQ DRR SAO, HQ GIS&RS Unit, local actors, ACTED	Country Coordinator BHA, local actors, CEFE Net
Supervising data collection	Assessment Officer, GIS Officer, Field Officers	Research Specialist	IMPACT HQ Research Design and Data Unit (RDDU), local actors, ACTED	Local actors, Country Coordinator
Data processing (checking, cleaning)	GIS Officer	Research Specialist	IMPACT HQ Research Design and Data Unit (RDDU), , HQ GIS&RS Unit	Country Coordinator
Data analysis	GIS Officer	Research Specialist	IMPACT HQ Research Design and Data Unit (RDDU), HQ GIS&RS Unit, HQ DRR SAO	Country Coordinator, ACTED
Output production	Assessment Officer, GIS Officer	Research Specialist	IMPACT HQ Reporting Unit	Country Coordinator
Output translation	Outsource translator	Assessment Officer	Research Manager, Field Officer	Country Coordinator
Dissemination	Assessment Officer, GIS Officer, Research Specialist, Field Officer	Country Coordinator	HQ Research department HQ Communication department	BHA, ACTED, CEFE Net, local actors, local community, local and national NGOs,

				INGOs, CBOs,
				UN agencies.
Monitoring & Evaluation	Assessment Officer,	Country	HQ Research	BHA, IMPACT
	Research Specialist	Coordinator	department	HQ MEAL
				Officer
Lessons learned	Assessment Officer,	Country	HQ Research	Country
	Research Specialist	Coordinator	department	Coordinator,
				BHA, AGORA
				Unit,
				Communication
				department

5. Data Analysis Plan

Please refer to the Hazard Analysis Framework: <u>AGORA_LKA2301_DAP_ABRA_October2023.xlsx</u>

6. Monitoring & Evaluation Plan

IMPACT Objective	External M&E Indicator	Internal M&E Indicator	Focal point	Tool	Will indicator be tracked?				
Humanitarian stakeholders are accessing IMPACT products		# of downloads of x product from Resource Center	Country request to HQ		x Yes				
	Number of humanitarian	# of downloads of x product from Relief Web	Country request to HQ		□ Yes				
	organisations accessing IMPACT services/products	# of downloads of x product from Country level platforms	Country team		□ Yes				
	Number of individuals accessing IMPACT	# of page clicks on x product from REACH global newsletter	Country request to HQ	User_log	x Yes				
	services/products	# of page clicks on x product from country newsletter, sendingBlue, bit.ly	Country team		□ Yes				
		# of visits to x webmap/x dashboard	Country request to HQ		□ Yes				
IMPACT activities contribute to better		# references in HPC documents (HNO, SRP, Flash appeals, Cluster/sector strategies)			NA				
program implementation and coordination of the humanitarian response	Number of humanitarian organisations utilizing IMPACT services/products	# references in single agency documents	Country team	Reference_I og	WFP, UNICEF, FAO strategies and annual planning				
Humanitarian	Humanitarian actors use	Perceived relevance of IMPACT country-programs Perceived usefulness and influence of IMPACT	-	Usage Feed					
stakeholders are	evidence/products as a	outputs	Country	back and					
using IMPACT	basis for decision making,	Recommendations to strengthen IMPACT programs	team	Usage_Surv					
products	aiu pianining anu uenvery	Perceived capacity of IMPACT statt Perceived guality of outputs/programs	-	ey tempiate	Usage survey to be conducted following the				

Area-based Risk Assessment in in the North and East of Sri Lanka

	Number of humanitarian documents (HNO, HRP, cluster/agency strategic plans, etc.) directly informed by IMPACT products	Recommendations to strengthen IMPACT programs			release of ABRA outputs and final presentation, targeting project partners (Acted, CEFE Net, local authorities, CBOs
Humanitarian stakeholders are engaged in IMPACT programs throughout the research cycle	Number and/or percentage of humanitarian organizations directly	# of organisations providing resources (i.e.staff, vehicles, meeting space, budget, etc.) for activity implementation			x Yes
	contributing to IMPACT programs (providing	# of organisations/clusters inputting in research design and joint analysis	Country team	Engagement _log	x Yes
	resources, participating to presentations, etc.)	# of organisations/clusters attending briefings on findings;			x Yes

ANNEX 1: VULNERABILITY INDICATORS

	Vulnerability -Indicators												
Drought													
	Susceptibility		Coping Capacity		Adapting Capacity								
1.	% of Population living below the poverty line	1.	Distance from main water source	1.	Number of HHs owning drought insurance								
2.	% of Population/HHs depending on agriculture and inland fisheries activity	2. 3.	Density of irrigation channels Capacity of and distance to reservoirs and ground water	2.	Availability of local policies and plans on drought management								
			sources (dug wells/ agro- wells/ tube wells) used for cultivation	3.	Number of HHs using drought-resistant crop								
				4.	Number of HHs practicing rainwater cultivation								
	Flood												
1.	% of Population/HHs depending on agriculture	1.	Distance to safe location/emergency shelter	1.	Number of HHs owning flood insurance								
2.	% of Population living in informal settlements/ temporary houses and unfinished houses	2.	Availability of Local flood contingency plan	2.	Number of people covered with/Presence of early warning systems.								
3.	% of population with disability	3.	Number of boats per GN for evacuation and transportation	3.	Share of population/children with vaccination against Waterborne diseases								
4.	Number of recorded episodes of Waterborne diseases due to the flood												
	H	Human E	lephant (monkey) conflict										
1.	% of Population/HHs depending on agriculture	1.	Distance to healthcare facility/ hospital	1.	Percentage of restored forests and ponds for elephant habitat per GN								
2.	Number of people staying in famer lands(chena) over the night.	2.	Length of fence protecting from elephants per GN	2.	Number of people/HHs owning life insurance								
				3.	% of national park to the whole area of GN								
		Tr	ropical cyclone (TC)										

1.	% of people living below the poverty line	1.	Distance to hospital	1.	HHs depending on agriculture and/or fishery.								
2	% of Population/HHs	2.	Distance sate location/emergency shelter	2.	Presence of early warning systems								
	depending on agriculture/or		location, onlogonoy onellor		eyeteme.								
	fisheries			3.	Presence of relocation plans								
3.	% of Population living in												
	informal settlements/												
	temporary houses and unfinished houses												
Epidemics (Human;/ Livestock)													
Epidemics (Human)													
1.	% of population without access	1.	Distance to healthcare	1.	Number of people practicing								
	to in-house toilet		facility/hospital		rainwater collection for drinking purposes								
2.	% of population without access	2.	Number of hospital										
	to safe drinking water		1000 people										
		2	⁰ / of popula vacainated from										
		J.	sickness/ vaccinated from										
			coverage per GN										
	Ері	idemics	(Livestock (Dairy and poultry))									
1.	% of HH depending on	1.	% of livestock vaccinated	1.	GoSL livestock welfare								
	livestock		against diseases		policies								
		2.	% of cattle keepers without	2.	Frequency of Zoonotic								
			access to animal welfare		control and availability of								
			services		vaccines for animal welfare								
	Wa	ater sup	ply failure (water pollution)										
1.	% of HH depending on fishery	1.	% of HH with walking	1.	Number of Government								
2	% of HH without access to pipe		distance (less then 30min) to the improved and clean		of water piping and								
2.	water		water source		reservoirs, rainwater								
					collection, chlorination								
3.	% of HH without access to	2.	Density /number of water		campaigns								
	distance		and their capacity per 1000										
			people										
	Expl	osive re	mnants of war (ERW) - Mine	es									
1.	% of HH depending on	1.	Distance to healthcare	1.	Access to mine risk								
	agriculture, bee and wood		facility/hospital		education activities								

collection, etc. in areas where there is landmine contamination	 Number of hospital beds/medical doctors per 1000 people 	2. Availability of Mine cleaning projects/activities
	Land Degradation	
1. % of HH depending on agriculture	 % of area under the deforestation practices 	 No.of families to access to land deeds, No. HH tension over land ownership and usage, No.of HH of understanding government land management policy No.of HH access to education activities about land degradation and deforestation

ANNEX 2: ABRA WORK PLAN

		2023													2024															
Activity			Octo	ober			1	Vovemb	er			Dece	mber			Jan	uary			Feb	ruary			N	larch					Responsibility
, and the second s	25-29/09	1st week	2nd week	3rd week	4th week	1st week	2nd week	3rd week	4th week	5th week	1st week	2nd week	3rd week	4th week	Apri	I May	June	incoportaionincy												
Area Based Risk Assessment	ent																													
Draft TOR ABRA																										1				IMPACT
Share ABRA TOR with Acted																				() 										IMPACT
Feedback from Acted																														Acted
Share the DAP for Acted review																														IMPACT
feedback from Acted																														Acted
Share the table of indicators for input from govt officials																														Acted SPOs & IMPACT Fos (Nilanga and Upu to follow up)
Submit ABRA TOR and DAP to HQ for validation																														IMPACT
ToR and DAP validated						-																								IMPACT
Finalize data collection for ABRA																														IMPACT
ABRA preliminary findings																														IMPACT
HQ validation of ABRA preliminary findings																														IMPACT
Presenting ABRA preliminary findings to local officials for verification																														Acted SPOs/IMPACT Fos
Finalize GN divisions and clusters																														Acted/IMPACT team
ABRA final report																												0		IMPACT