

Research Terms of Reference

WFP Climate and Livelihoods Assessment

LB2103

Libya

April 2021

Version 1

IMPACT Shaping practices
Influencing policies
Impacting lives

1. Executive Summary

Country of intervention	Libya				
Type of Emergency	<input type="checkbox"/>	Natural disaster	<input checked="" type="checkbox"/>	Conflict	
Type of Crisis	<input type="checkbox"/>	Sudden onset	<input type="checkbox"/>	Slow onset	<input checked="" type="checkbox"/> Protracted
Mandating Body/ Agency	WFP				
Project Code	14APT 1P3				
Overall Research Timeframe (from research design to final outputs / M&E)	01/03/2021 to 30/07/2021				
Research Timeframe Add planned deadlines (for first cycle if more than 1)	1. Start collect data: 16/05/2021		5. Preliminary presentation: 27/05/2021		
	2. Data collected: 27/06/2021		6. Outputs sent for validation: 25/07/2021		
	3. Data analysed: 11/07/2021		7. Outputs published: 29/07/2021		
	4. Data sent for validation: 12/07/2021		8. Final presentation: 29/07/2021		
Number of assessments	<input checked="" type="checkbox"/>	Single assessment (one cycle)			
	<input type="checkbox"/>	Multi assessment (more than one cycle) [Describe here the frequency of the cycle]			
Humanitarian milestones Specify what will the assessment inform and when e.g. The shelter cluster will use this data to draft its Revised Flash Appeal;	Milestone		Deadline		
	<input checked="" type="checkbox"/>	Donor plan/strategy	First quarter 2022		
	<input type="checkbox"/>	Inter-cluster plan/strategy	_ _ / _ _ / _ _ _ _		
	<input type="checkbox"/>	Cluster plan/strategy	_ _ / _ _ / _ _ _ _		
	<input type="checkbox"/>	NGO platform plan/strategy	_ _ / _ _ / _ _ _ _		
	<input type="checkbox"/>	Other (Specify):	_ _ / _ _ / _ _ _ _		
Audience Type & Dissemination Specify who will the assessment inform and how you will disseminate to inform the audience	Audience type		Dissemination		
	<input checked="" type="checkbox"/> Strategic		<input checked="" type="checkbox"/> General Product Mailing (e.g. mail to NGO consortium; HCT participants; Donors)		
	<input checked="" type="checkbox"/> Programmatic		<input type="checkbox"/> Cluster Mailing (Education, Shelter and WASH) and presentation of findings at next cluster meeting		
	<input type="checkbox"/> Operational		<input checked="" type="checkbox"/> Presentation of findings (e.g. at HCT meeting; Cluster meeting)		
	<input type="checkbox"/> [Other, Specify]		<input checked="" type="checkbox"/> Website Dissemination (Relief Web & REACH Resource Centre)		

		<input type="checkbox"/> [Other, Specify]
Detailed dissemination plan required	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
General Objective	This climate and livelihoods assessment aims to better understand the impact of climate change on livelihoods and communities in Libya. The assessment will cover all population groups living in or transiting through the country. The findings will feed directly into WFP's Country Strategic Plan which begins in January 2022 and which aims to better support the adaptation and sustainability of these livelihoods. This in turn will also support the resilience of populations to future shocks. In addition, it is hoped that this assessment will engage multiple government and non-governmental stakeholders, facilitating dialogue on climate change within Libya.	
Specific Objective(s)	<ol style="list-style-type: none"> 1. Identify and map geographic areas in which communities largely engage in relatively similar climate-dependent livelihood activities (livelihood zone) in Libya. 2. Assess households' climate resilience¹ based on selected social, economic, institutional, physical and ecological variables. 3. Understand past and future impacts of climate change on livelihoods and food security in Libya. 	
Research Questions	<p>1. Mapping livelihoods :</p> <p>1.1. What are the geographic, environmental and socio-economic characteristics that determine and explain patterns² of different livelihoods across Libya?</p> <p>1.2. Which other factors can determine and explain patterns of different livelihoods across Libya?</p> <p>1.3. What are the main livelihood activities in each livelihood zone³?</p> <p>1.4. Which livelihood activities are the most climate sensitive?</p> <p>2. Assessing livelihood zones' climate resilience:</p> <p>2.1. What are households' perception of how climate has been changing in the past years in their area and affecting their livelihoods?</p> <p>2.2. What are the different social, economic, institutional, physical and ecological factors that determine households' ability to cope with climate change?</p> <p>3. Looking at past and future meteorological data:</p> <p>3.1. What are the main characteristics of past climate trends across different livelihood zones?</p>	

¹ According to GIZ ([Assessing and Monitoring Climate Resilience: From Theoretical Considerations to Practically Applicable Tools. A Discussion paper](#), 2014), climate resilience refers to "the ability of a SES (social-ecological system) to deal with climatic shocks and stresses. This ability depends on the capacities to absorb, adapt to and transform in the face of stresses threatening the system. Hence, it does not only include the responsive capacity to already known threats but also considers innovation, learning and anticipation to be prepared for projected impacts of a changing climate."

² The main unit of analysis will be livelihood zones, rather than administrative boundaries, in order to focus on the communities living in each administrative area and what they do for a living.

³ According to the [International Labour Organization](#) (ILO), a livelihood refers to capabilities, material and social resources and activities required for a means of living. Livelihood zones are broad geographic areas where communities engage in relatively similar livelihood activities (e.g. paddy farming, livestock rearing, or factory work).

	3.2. What are the consequences of future climate shocks on livelihoods and food security in the identified livelihood zones?			
Geographic Coverage	The assessment covers all three regions of Libya: the West, the East and the South.			
Secondary data sources	<ul style="list-style-type: none"> E. Lisa F. Schipper & Lara Langston. A comparative overview of resilience measurement frameworks. Analysing indicators and approaches. July 2015, ODI Working paper 422. FAO. Land Cover Classification System, 2000 FAO. Atlas of natural resources for agricultural use in Libya, 2009 FAO. The impact of the crisis on agriculture in Libya, 2018 GIZ. Assessing and Monitoring Climate Resilience: From Theoretical Considerations to Practically Applicable Tools. A Discussion paper, 2014. WFP. The CLEAR approach. The Consolidated Livelihoods Exercise for Analyzing Resilience, 2016 Willem Heemskerk & Esther Koopmanschap. Agribusiness development in Libya. A fact-finding mission, 2012 			
Population(s) <i>Select all that apply</i>	<input type="checkbox"/>	IDPs in camp	<input type="checkbox"/>	IDPs in informal sites
	<input checked="" type="checkbox"/>	IDPs in host communities	<input checked="" type="checkbox"/>	IDPs
	<input type="checkbox"/>	Refugees in camp	<input type="checkbox"/>	Refugees in informal sites
	<input checked="" type="checkbox"/>	Refugees in host communities	<input checked="" type="checkbox"/>	Refugees
	<input checked="" type="checkbox"/>	Host communities	<input checked="" type="checkbox"/>	Migrants in host communities
Stratification <i>Select type(s) and enter number of strata</i>	<input checked="" type="checkbox"/>	Geographical #: 3 regions of Libya (West, East, South) Population size per strata is known? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (Only estimations exist)	<input type="checkbox"/> Group #: ____ Population size per strata is known? <input type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> Livelihood zone #: tbd⁴ Population size per strata is known? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (Only estimations exist)
Data collection tool(s)	<input type="checkbox"/>	Structured (Quantitative)		<input checked="" type="checkbox"/> Semi-structured (Qualitative)
	Sampling method			Data collection method
Semi-structured data collection tool (s) # 1 <i>(Experts KIIs)</i>	<input checked="" type="checkbox"/> Purposive <input checked="" type="checkbox"/> Snowballing <input type="checkbox"/> [Other, Specify]			<input checked="" type="checkbox"/> Key informant interview (Target #): 30⁵ <input type="checkbox"/> Individual interview (Target #): ____ <input type="checkbox"/> Focus group discussion (Target #): ____ <input type="checkbox"/> [Other, Specify] (Target #): ____
Semi-structured data collection tool (s) # 2 <i>(Local stakeholders workshop)</i>	<input checked="" type="checkbox"/> Purposive <input checked="" type="checkbox"/> Snowballing <input type="checkbox"/> [Other, Specify]			<input type="checkbox"/> Key informant interview (Target #): ____ <input type="checkbox"/> Individual interview (Target #): ____ <input type="checkbox"/> Focus group discussion (Target #): ____ <input checked="" type="checkbox"/> Workshop (Target #): 3⁶
Semi-structured data collection tool (s) # 4	<input checked="" type="checkbox"/> Purposive <input type="checkbox"/> Snowballing			<input type="checkbox"/> Key informant interview (Target #): ____ <input type="checkbox"/> Individual interview (Target #): ____

⁴ The number of livelihood zones will be determined in the first step of the assessment. It will most probably be between 20 and 30.

⁵ These include the scoping interviews and the experts interviews that will be conducted in the third step of the assessment. A total of approximately ten KIIs will be conducted in each region of Libya (East, West, South).

⁶ One workshop per region: one in Tripoli, one in Sebha and one in Benghazi.

(Focus group discussion per livelihood zone)	<input type="checkbox"/> [Other, Specify]		X Focus group discussion (Target #): tbd⁷ <input type="checkbox"/> [Other, Specify] (Target #): _ _ _ _ _	
Target level of precision if probability sampling	_ _ % level of confidence – N/A		_ _ +/- % margin of error – N/A	
Data management platform(s)	X	IMPACT	<input type="checkbox"/>	UNHCR
	<input type="checkbox"/>	[Other, Specify]		
Expected output type(s)	<input type="checkbox"/>	Situation overview #: _ _	X	Report #: 1
	<input type="checkbox"/>	Profile #: _ _	<input type="checkbox"/>	
	X	Presentation (Preliminary findings) #: 1	X	Presentation (Final) #: _ _
	<input type="checkbox"/>	Factsheet #: _ _	<input type="checkbox"/>	
	<input type="checkbox"/>	Interactive dashboard #: _	<input type="checkbox"/>	Webmap #: _ _
	<input type="checkbox"/>	Map #: 1	X	
	<input type="checkbox"/>	[Other, Specify] #: _ _		
Access	X	Public (available on REACH resource center and other humanitarian platforms)		
	<input type="checkbox"/>	Restricted (bilateral dissemination only upon agreed dissemination list, no publication on REACH or other platforms)		
Visibility Specify which logos should be on outputs	WFP, REACH			

2. Rationale

2.1. Rationale

Climate change is a long-term change in the average weather patterns that have come to define Earth's local, regional and global climates⁸. According to the fifth assessment report by the Intergovernmental Panel on Climate Change (IPCC), climate change has altered precipitation patterns, led to rising sea levels, shifts in temperature, and melting sea caps, among others. Temperature increases are projected to be higher in Africa than the global average. Additionally, precipitation in North Africa is projected to decrease annually at a more rapid rate than in the rest of Africa. In Libya, these trends, as well as rise in sea levels and increased incidence of extreme weather events has sparked concerns of reduced agricultural productivity, depleting water resources, increased food insecurity, and the safety of coastal communities⁹.

Though there have been studies in Libya focused on the impact of seawater intrusion on agriculture¹⁰, desertification of agriculture land¹¹, sand dune risk assessment¹², the impact of the armed conflict on the agriculture sector¹³ and farmer communities' risk perceptions of climate change¹⁴, there has been no effort to map the various livelihood zones and the resilience of the communities in these zones to current and future climate shocks across Libya.

Libya can be broadly classified in two major climate zones: 1) desert or arid areas which represent the largest area of the country (more than 95% of total surface area) but have very low population densities, and 2) Mediterranean areas that

⁷ The number of FGD will depend on the first step of the assessment which is the livelihood zones mapping. We will do one FGD per zone. As we have the budget to do 30 FGDs, the latter will not exceed this number.

⁸ NASA, [What is Climate Change](#), 2021.

⁹ United Nations Economic and Social Commission for Western Asia (ESCWA) et al. 2017. Arab Climate Change Assessment Report: Snapshot of Key Findings. Beirut, E/ESCWA/SDPD/2017/RICCAR/Booklet.1.

¹⁰ A.M.S. Gejam P. H. S. Riad, M.A. Gad, K. A. Rashed and N. A. Hassan. [Climate Change and Sea Level Rise Impacts on Seawater Intrusion at Jefara Plain, Libya](#). Nat Sci 2016;14(3): 75-81]. 1

¹¹ Bashir Nwer, Azalarib Ali & Hamdi Zurqani. [Soil Salinity Mapping Model Developed Using RS and GIS in Libya](#), 2013

¹² Biswajeet Pradhan, Ahmed Ali Alazhari Moneir & Ratiranjan Jena. [Sand dune risk assessment in Sabha region, Libya using Landsat 8, MODIS, and Google Earth Engine images](#), *Geomatics, Natural Hazards and Risk*, 9:1, 1280-1305, 2018.

¹³ WFP. [Libya: Agriculture and Livelihood Needs Assessment Report: Study of the Fezzan Region](#), March 2020.

¹⁴ Serkan Ilseven & Fidan Aslanova (ed.), [Attitude and risk perception of climate change in farming communities in Tripoli](#), *Chimica Oggi*, 2019.

concentrate the vast majority of urban areas and crop land. The livelihoods in these main climate zones differ quite significantly. The desert and arid areas are exposed to warmer temperature and decrease in rainfall provoking longer and more severe droughts. While Mediterranean areas will be affected by floods, decrease in rainfall and dust/sand storms affecting urban areas and rural peripheries. Several flash flooding episodes have for instance been recorded in the last ten years, causing important damage to infrastructure and farmland vital for livelihoods, as well as the displacement of thousands of individuals.

Understanding these subnational dynamics, how these intersect with livelihoods and food security, and their perspectives in changing climate is the information gap that this project proposes to address. This assessment precisely seeks to investigate livelihood zones' climate resilience across Libya, by addressing communities' perception of climate change and its impact on their livelihoods which is a precondition for understanding their strategies to absorb, adapt and transform in the face of stresses and shocks. The aim is eventually to better understand how climate change and climate risks affect livelihoods and food security in each livelihood zone in order to inform strategic decision-making and programming. This will be done through reviewing historical meteorological data that has been collected by different organizations and units – including the Libyan National Meteorological Center which has been active since the 1950s¹⁵ – as well as analyzing model-based projections of future climate conditions.

IMPACT has conducted previous disaster risk reduction and climate change adaptation related assessments in more than five countries, notably using secondary data and geospatial analysis methods. By combining profiles with a background in environmental science/GIS and computer science, IMPACT is well equipped to manipulate, analyze and visualize raw raster or tabular data. IMPACT has also solid experience with typical data formats used to distribute climate datasets like netCDF, HDF, GRIB, ASCII and others. Besides climate-specific data formats, the data unit is skilled in processing earth observation data, with projects on automated detection of urban growth, land cover and floods in its portfolio.

3. Methodology

3.1. Methodology overview

3.1.1. Summary

The assessment will cover all 22 mantikas of Libya and take into consideration all population groups living in or transiting through the country. The assessment will be facilitated by the REACH team in Tunisia. The full research cycle will be coordinated by REACH from drafting the ToR, to the development of the research design, the collection of data, data analysis and dissemination phase. The assessment will use a qualitative data collection approach. Data collection will occur over the course of six weeks from 16th of May to 27th of June. There will be three distinct qualitative data collection components; all of them will use open-question tools: thirty key informant interviews, three local stakeholders workshops and one focus group discussion per livelihood zone. This approach will be supplemented with existing qualitative and quantitative data from the secondary data review.

The **first step** of the project will be to divide Libya into different areas of similar livelihoods, independent from the current administrative boundaries. During the **second step**, the level of climate resilience of the livelihood zones is assessed. Finally, the **third step** contains a quantitative analysis of existing historical and future climate data which will be translated into what it means in terms of impacts on livelihoods and food security.

3.1.2. Key definitions

- Climate change:

Climate change refers to a long-term shift in global or regional climate patterns which is attributed directly or indirectly to human activity or to natural variability, and which makes weather patterns less predictable. Climate change induces **stresses**

¹⁵ Although the country still presents considerable gaps in data coverage, particularly in the desert interior where most parts lack of weather stations. See Ali Salem Eddenjal, [Dust/Sand Storms over Libya: Spatial Distribution, Frequency and Seasonality](#), 2015.

which refer to the alteration of temperature, rainfall levels and wind, and causes **shocks** which are “external short-term deviations from long-term trends, deviations that have substantial negative effects on people’s current state of well-being, level of assets, livelihoods, or safety, or their ability to withstand future shocks”¹⁶ (e.g. floods, droughts, storms, etc.)

- Climate resilience:

According to GIZ, climate resilience refers to “the ability of a SES (social-ecological system) to deal with climatic shocks and stresses. This ability depends on the capacities to absorb, adapt to and transform in the face of stresses threatening the system. Hence, it does not only include the responsive capacity to already known threats but also considers innovation, learning and anticipation to be prepared for projected impacts of a changing climate.”¹⁷

- Absorptive capacity:

“Ability of a system to prepare for, mitigate or recover from the impacts of negative events using predetermined coping responses in order to preserve and restore essential basic structures and functions.”¹⁸

- Adaptive capacity:

“Ability of a system to adjust, modify or change its characteristics and actions in order to better respond to existing and anticipated future climatic shocks and stresses and to take advantage of opportunities.”¹⁹

- Transformative capacity:

“Ability of a system to fundamentally change its characteristics and actions when the existing conditions become untenable in the face of climatic shocks and stresses.”²⁰

- Social-ecological system:

According to GIZ²¹, “our environment is constituted by social-ecological systems (SES), which encompass five main dimensions: a social, ecological, economic, physical and an institutional dimension.” The social dimension refers to characteristics such as health, education and food security. It also encompasses the prevalence of social networks due to their important role in dealing with climate stresses and shocks. The ecological dimension addresses the diversity and state of the natural environment upon which human beings depend. The economic dimension comprises the economic activities within a SES as well as the availability and distribution of financial assets and other endowments. The physical dimension mainly focuses on infrastructures such as housing, transport, communication networks or health facilities. Their operability during and after the occurrence of extreme events and in the face of slow onset hazards has a great influence on the overall climate resilience of the SES. Finally, the institutional dimension encompasses effective governance and institutions, effective awareness raising and information sharing as well as participation on various levels.

- Livelihood:

According to the International Labour Organization (ILO), a livelihood refers to capabilities, material and social resources and activities required for a means of living.²²

¹⁶ Mengistu Asmamaw, Seid Tiku Mereta & Argaw Ambelu. [Exploring households' resilience to climate change-induced shocks using Climate Resilience Index in Dinki watershed, central highlands of Ethiopia](#), July 2019

¹⁷ GIZ. [Assessing and Monitoring Climate Resilience: From Theoretical Considerations to Practically Applicable Tools. A Discussion paper](#), 2014.

¹⁸ Bén  , C., Wood, R.G., Newsham, A. & Davies, M., 2012. Resilience: New Utopia or New Tyranny? Reflection About the Potentials and Limits of the Concept of Resilience in Relation to Vulnerability Reduction Programmes, IDS Working Papers, No. 405, available at <https://www.ids.ac.uk/files/dmfile/Wp405.pdf>

¹⁹ *ibid.*

²⁰ *ibid.*

²¹ GIZ. [Assessing and Monitoring Climate Resilience: From Theoretical Considerations to Practically Applicable Tools. A Discussion paper](#), 2014.

²² ILO. [Livelihood services](#).

- Food insecurity:

According to the Food and Agriculture Organization, “a person is food insecure when they lack regular access to enough safe and nutritious food for normal growth and development and an active and healthy life. This may be due to unavailability of food and/or lack of resources to obtain food.”²³

3.2. Population of interest

3.2.1. Geographical area assessed

This project will cover all 22 mantikas of Libya as a first attempt to delineate the different livelihood zones at country level and to assess the impacts of climate change on livelihoods and food security. These livelihood zones will therefore not follow existing administrative boundaries. REACH also intends to focus data collection to present indicative results of the resilience of each livelihood zone to current and future weather patterns.

3.2.2. Population assessed

This assessment will take into consideration all population groups living in or transiting through Libya regardless of their legal status. This will therefore include the Libyan population, composed of non-displaced, IDPs and returnees living in host communities, as well as the migrant population. As the primary focus is on livelihoods, we will not make any distinction between these different population groups assuming that they share the same main livelihood activities identified in each livelihood zone.

3.2.3. Unit of measurement

Institutional actor KIIs will be conducted at an organization level. Experts KIIs and local stakeholders workshops will produce data that can be aggregated to produce national level findings. Eventually, FGDs will produce unique finding for each livelihood zone.

3.3. Secondary data review

A secondary data review (SDR) was carried out with the aim of compiling the findings of relevant studies, articles, documents and similar assessments conducted on climate change, livelihoods and food security in Libya and other countries. Firstly, secondary sources will aid understanding the context, the key definitions, identifying information gaps, defining the research questions and the overall methodology, choosing the indicators and variables, and especially setting the livelihood zone map. Secondly, food and nutrition status and the use of coping strategies will also be informed by secondary data sources. Thirdly, open-data sources will inform the third step of the assessment which aims to collect historical climate data in order to produce future climate predictions. Finally, at the analysis and output production stages, these secondary sources will be contrasted with findings from primary data collection and used for triangulation purposes.

The main secondary literature consulted for this assessment are:

- E. Lisa F. Schipper & Lara Langston, [A comparative overview of resilience measurement frameworks. Analysing indicators and approaches](#), July 2015, ODI Working paper 422.
- FAO. [The impact of the crisis on agriculture in Libya](#), 2018
- GIZ. [Assessing and Monitoring Climate Resilience: From Theoretical Considerations to Practically Applicable Tools. A Discussion paper](#), 2014.
- Mengistu Asmamaw, Seid Tiku Mereta & Argaw Ambelu. [Exploring households' resilience to climate change-induced shocks using Climate Resilience Index in Dinki watershed, central highlands of Ethiopia](#), July 2019
- REACH. [2017 Multi-sector Needs Assessment](#), September 2017
- REACH. [2018 Multi-sector Needs Assessment](#), February 2019
- REACH. [2020 Multi-sector Needs Assessment \(Libyan population\)](#), March 2021

²³ FAO. [Hunger and Food Insecurity](#).

- REACH. [Multi-sector Needs Assessment. Refugees and Migrants: Key Findings](#), February 2021
- UNDP. [Disaster resilience measurements: Stocktaking of ongoing efforts in developing systems for measuring resilience](#), 2014
- USAID. [Climate change risk profile Libya](#), 2017
- WFP. [The CLEAR approach. The Consolidated Livelihoods Exercise for Analyzing Resilience](#), 2016
- WFP. [Impact of climate related shocks and stresses on nutrition and food security in selected areas of rural Bangladesh](#), 2015
- WFP. [Fezzan Agriculture and Livelihood needs assessment](#), 2020
- WFP. [Libya mVAM bulletin no4 \(April-May 2020\)](#), 2020
- Willem Heemskerk & Esther Koopmanschap. [Agribusiness development in Libya. A fact-finding mission](#), 2012

The main secondary data sources for livelihood zoning are:

- Association of American Geographers. [A New Map of Standardized Terrestrial Ecosystems of Africa](#), 2013
- EarthStat. [Cropland and Pasture Area in 2000](#)
- EU Science Hub. [Travel Time to Major Cities: A Global Map of Accessibility](#)
- FAO. [Irrigated Areas of The World](#)
- FAO. [Land Cover Classification System](#), 2000
- FAO. [Atlas of natural resources for agricultural use in Libya](#), 2009
- USGS. [GFSAD30](#)
- USGS. [SRTM](#)
- [World Atlas of Desertification](#)

3.4. Primary Data Collection

All qualitative data collection activities will be managed remotely by the REACH assessment team in Tunis, and supervised in Libya by REACH field managers and officers who will lead the primary data collection along with the partner civil society organizations (CSOs) Al-Junub for sustainable development and climate change, the Libyan Humanitarian Relief Agency (LIBAID) and Al-Kufrah Organization for Charity. Interviews and group discussions will be conducted through written questionnaires, transcribed in Arabic and translated in English by the data collection teams. A purposive and snowballing sampling method will be used for the Key Informant Interviews (KIIs) and the workshops, and a purposive sampling method will be used for the Focus Group Discussions (FGDs).

FGDs and workshops will take place face-to-face in order to facilitate rich and active discussion amongst participants. However, if COVID-19 regulations do not allow for in-person workshops and FGDs in certain areas, they will take place at hadrezmanaa.org, REACH's asynchronous discussion platform where a series of polls and discussions can be held, supported by digital media (pictures, maps, ...). FGDs and workshops would thus take place over the span of a few days.

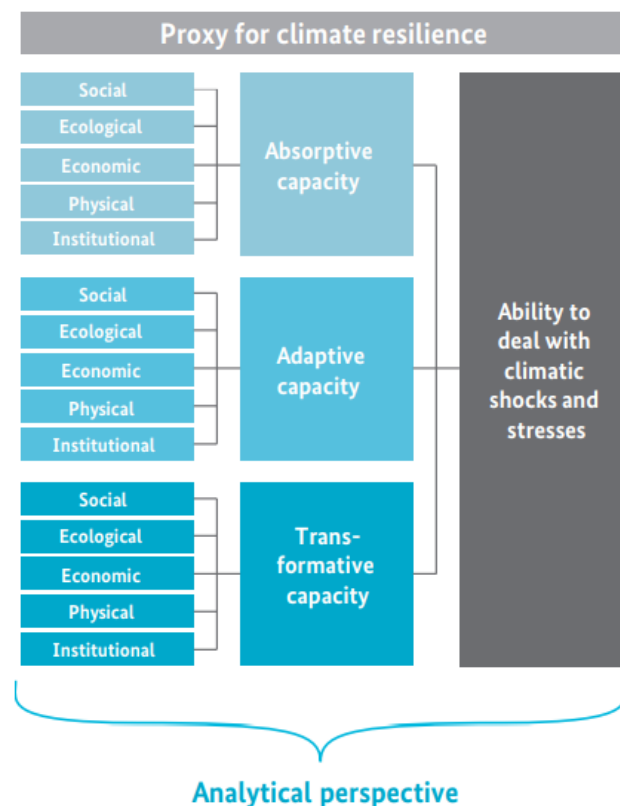
The assessment will be divided into three steps:

1. Mapping the livelihood zones:

This oversimplified mapping of livelihoods will be based on a set of geographical, environmental, socio-economic and agricultural factors, all dependent on the available data on these factors through the secondary data analysis. The scoping Key Informant interviews (KIIs) conducted during this phase as well as the three workshops with local stakeholders, one in each region (Tripoli, Sebha and Benghazi), will help improve the final map. Given the goal of the assessment is to analyze the impact of climate change on livelihoods, a preference to agricultural or climate-sensitive livelihoods will be given in the typology. Especially with high dependency of households on income from jobs in the public/private sector for some mantikas (Sirte, Benghazi, Tripoli, among others) in Libya, the final livelihood zoning map may not always represent the most prevalent livelihood in the area. These climate-related livelihoods will be identified by experts and local stakeholders during the KIIs and workshops.

2. Assessing the climate resilience of the livelihood zones:

To this end, a minimum of fifteen variables will be compiled to create an overall climate resilience index. The set of variables will cover all combinations of capacities and dimensions as illustrated in the climate resilience matrix below.



Source: GIZ. *Assessing and Monitoring Climate Resilience: From Theoretical Considerations to Practically Applicable Tools. A Discussion paper*, 2014.

Three primary core indicators will be used as outlined in the Consolidated Livelihood Exercise for Analyzing Resilience²⁴ (food insecurity, climate sensitivity of food or income, livelihood diversity) to which additional variables will be added as specified in other previously published researches on measuring climate resilience²⁵. Though some of the required data to inform indicators (especially food insecurity) can be sourced from past IMPACT assessments in Libya and other secondary data sources (WFP mVAM), additional primary data collection to inform the other variables will take place in the form of focus group discussions (FGDs). One FGD per livelihood zone will be conducted. Administrative areas within the identified livelihood zone that are not well represented in the past REACH assessment or WFP mVAM might lack essential information on food security and alternative sources of income. This information gap has to be addressed in the FGDs if necessary.

3. Looking at past and future meteorological data:

Starting from analyzing past trends in rainfall or extreme weather events, a climatic baseline is obtained. Future predictions (using different scenarios) from global or regional circulation models are used to assess the exposure to climatic stresses: length and frequency of drought periods, changing rainfall patterns and others. The secondary data review will inform which data sources are fit for purpose. As projections generated by different models often disagree, expert knowledge will also be used to interpret these projections and identify those which seem most plausible based on the local context and the latest

²⁴ WFP. [The CLEAR approach. The Consolidated Livelihoods Exercise for Analyzing Resilience](#), December 2016.

²⁵ GIZ. [Assessing and Monitoring Climate Resilience: From Theoretical Considerations to Practically Applicable Tools. A Discussion paper](#), 2014.

science. Once climate information – both historical and projected – has been collected, we will translate it into what it means in terms of impacts on livelihoods and food security. This process of translating will be based on expert KIs knowledge and interpretation of climate science.

3.4.1. Key Informant interviews

Method

KIs with climate, water and agriculture related stakeholders and experts. KIs will be used to scope the assessment, triangulate information collected on climate change impact on livelihoods and food security, and frame contextual data on current and future climate patterns. They are aimed to fill information gaps identified during the secondary data review on technical details like the spatial distribution of certain crop types, irrigation systems and soil management practices.

Sampling

Key informants will be identified purposively, on the basis of their specific knowledge of the agriculture sector, weather patterns and climate change impact on livelihoods and food security in Libya, or their contextual knowledge. An initial round of KIs will be identified using WFP/REACH's and partners' existing networks, followed by a snowball approach to allow for larger coverage.

Tools

A specific set of open-ended questions is compiled for different profiles on Word documents. The questionnaires were designed based on the SDR and the Libyan context.

3.4.2. Local stakeholders workshops

Method

Three workshops will be held during the third week of April, one in each of the following cities: Tripoli, Sebha and Benghazi to cover the three regions of Libya. The workshop itself consists of different exercises:

- Verifying temporary livelihood maps
- Filling information gaps on crop types, livelihood activities and others in a participatory mapping exercise
- Assessing which climate-dependent livelihoods are characterising for the livelihood zone

Sampling

The participants will be identified during the scoping phase by snowballing from the existing list of stakeholders/experts provided by WFP.

Tools

A preliminary version outlining the different open-ended questions and topics covered during the workshop can be found in the Data Analysis Plan.

3.4.3. Focus group discussions per livelihood zone

Method

This qualitative component of the assessment will aim to 1) contextualise and better understand the livelihood zone map; 2) identify the community's perception of the impact of climate change and main challenges and needs faced; 3) identify livelihood diversity in each livelihood zone; 4) identify and gain a better understanding of the community-level factors (social, economic, physical, institutional and environmental) increasing climate resilience.

The analysis used the framework developed through the World Bank Resilience Monitoring & Evaluation (ReM&E) project²⁶ to assess how much projects contribute to developing the following three types of capacities:

- absorptive capacity: the ability to survive climate shocks;
- adaptive capacity: the ability to adjust in anticipation of climate shocks, without radically changing livelihood systems;
- transformative capacity: the ability to prevent the impact of climate shocks through major transformation of livelihood systems.

Sampling

A purposive sampling approach will be employed to select participants for the FGDs. Participants will be selected based on:

- Their main livelihood activity: the group ideally consists of people relying on the different main activities identified in that livelihood zone.
- Their gender: in order to capture possible differences in climate resilience strategies as several studies have highlighted the differences between male and female perceptions and knowledge of climate change²⁷. According to the WFP, the proportion of women involved in agriculture has increased since 2011 in Libya. They represented 67% of the workforce in the agriculture sector in rural areas in Libya in 2012²⁸. Moreover, women play key roles in maintaining all four pillars of food security: as food producers and agricultural entrepreneurs (availability); food providers who dedicate their own time, income and decision-making to maintain food and nutritional security of their households and communities (access and utilization); and "managers" of the stability of food supplies in times of economic hardship (stability)²⁹.

Each FGD group will consist of six to eight participants. The number of FGDs will depend on the final number of livelihood zones.

Tools

The historic trends and social-ecological system dynamics of the different livelihood zones during the last few years will be explored using "resilience-of-what?", "resilience-to-what?" and "resilience-with-what?" open-ended questions. "Resilience-of-what" involves identification of major constituents and spatio-temporal characterization of the area under investigation. The question "resilience-to-what" explores the major disturbances of the socio-ecological system. Whereas the "resilience-with-what" searches for possible assets and livelihood options that contribute to building the absorptive, adaptive and transformative capacities."³⁰

As we do not know yet which will be the main climate-dependent livelihoods in each livelihood zone, our main focus in the FGD is agricultural (see preliminary list of variables in Annex 1). However, based on the inputs from the scoping interviews, the livelihood zoning and the workshop, the variables and FGD questionnaire will be updated to better represent the different livelihoods.

3.5. Data Processing & Analysis

3.5.1 Livelihood Zoning

²⁶ World Bank, [Operational Guidance for Monitoring and Evaluation \(M&E\) in Climate and Disaster Resilience-Building Operations](#), December 2017; World Bank, [Accelerating Climate-Resilient and Low-Carbon Development: Second progress Report on the Implementation of the Africa Climate Business Plan](#), November 2017.

²⁷ Serkan Ilseven & Fidan Aslanova (ed.). [Attitude and risk perception of climate change in farming communities in Tripoli](#), *Chimica Oggi*, 2019.; Titus Kisauzi & al. [Gender dimensions of farmers' perceptions and knowledge on climate change in Teso Sub-Region, Eastern Uganda](#), *African Crop Science Journal*, vol.20, 2012.

²⁸ Willem Heemskerk & Esther Koopmanschap. [Agribusiness development in Libya. A fact-finding mission](#), 2012

²⁹ UN Women Watch. [Overview: Food Security](#), 2012.

³⁰ Mengistu Asmamaw, Seid Tiku Mereta & Argaw Ambelu. [Exploring households' resilience to climate change-induced shocks using Climate Resilience Index in Dinki watershed, central highlands of Ethiopia](#), July 2019

Method

The livelihood zoning map will be produced in two iterations: a first secondary data-based mapping and a second expert-based improvement. The full cycle is schematically presented in Annex 2. Based on secondary data sources about the physical environment (soil databases, land cover maps, climate data, etc.) a livelihood zoning can be executed. Dividing Libya into these different terrestrial ecosystems is primarily based on segregating the areas where human activity takes from uninhabitable desert areas. In-land aquatic ecosystems are also very sparse and can be easily extracted. The remaining area is then further disaggregated based elevation/topography and climate properties: lowland arid areas, sporadically wet but arid wadis, flat highlands with rain-fed agriculture, etc.

Land cover information from different sources are further compared to distinguish artificial surfaces (villages & cities), rangelands (semi-arid grasslands where the main activity is livestock grazing) and cropland. Additional own processing is applied to delineate croplands since most cropland data sources are for global analytical purposes, resulting in inaccuracies at the scale of Libyan livelihood zones. The different techniques applied are:

- Creating a multi-year maximal NDVI (Normalized Difference Vegetation Index) composite: for each image in a series of multi-temporal Sentinel-2 satellite imagery, the NDVI is calculated (using band 3 and 8). On a pixel-by-pixel basis, the image collection is reduced to a single image by only keeping the pixel with maximal NDVI-value³¹. This image acts as a total vegetation mask for Libya. Especially in the arid (south of Jabal Nefusa and Jabal Al Akhdar) regions of Libya, areas of high NDVI correspond with croplands (apart from smaller forested parcels around oases).
- An image collection of Landsat NDVI-timeseries is compiled, after which a harmonic regression model is fitted to the data³². The parameters of that harmonic model can then be plotted in HSV-colorspace where the hue corresponds to the phase and saturation corresponds to the amplitude of the sinusoid. This allows for detection of areas where an increase in NDVI is taking place at different times throughout the year as well as (white) areas of low saturation where there is no significant annual fluctuation in NDVI. In the North-Eastern and -Western semi-arid areas of Libya (Jfara plain, Jabal Nefusa, Jabal Al Akhdar), this approach allows for segmentation between (evergreen, mediterranean) forest and agricultural parcels. This is then used to compliment and correct the secondary data sources mentioned earlier.
- The last NDVI-based feature to segment areas of active agriculture is the correlation and covariance of NDVI-pixel values and recent rainfall. Pixels showing high correlation/covariance are again more likely to be cropland. The opposite case, where pixels show negative trend between NDVI and precipitation is also valid for heavily irrigated parcels.

A first livelihood zoning based on these environmental criteria will be produced for the workshops. During the latter, experts/researchers/etc will provide more context and details. One of the goals of the workshop is to improve and correct this livelihood map with more information on the distribution of common livelihood activities, crop types, irrigation systems and others. After the workshop, this feedback will be taken into account to create a second, improved and final version of the livelihood zones.

Tools

Multi-source data aggregation will be done in ArcGIS Pro, supported by a python-based automation procedure. This way, the map-making process can be parametrized and different version of the map can be easily created.

The data processing behind the NDVI-based segmentation of cropland is done using Google Earth Engine. The results can be easily exported and integrated in ArcGIS Pro.

3.5.2. KIIs, workshops and FGDs data analysis

³¹ Maxwell S.K. et al., 2012, [Identification of "ever-cropped" land \(1984-2010\) using Landsat annual maximum NDVI image composites: Southwestern Kansas case study](#), Remote Sensing Of Environment 121 (2012), 186-195

³² Wilson B. et al., 2018, [Harmonic regression of Landsat time series for modelling attributes from national forest inventory data](#), ISPRS Journal of Photogrammetry and Remote Sensing 137 (2018), 29 - 46

The data collection, carried out by Al-Junub CSO, LIBAID, Al-Kufrah Organization for Charity and REACH field officers across Libya will be supervised by our field officers who report to our field managers. Data processing will be carried out by the Senior GIS officer and the Junior Assessment Officer.

To contextualize qualitative data collection and verify submitted data, an oral debriefing will be organised with the enumerators after conducting the KIIs, workshops and FGDs. The enumerator debriefing will also facilitate follow-ups during data cleaning.

The data collection team will be asked to write in Arabic, the language of the respondents, to minimise the risk of missing information in the translation process. Text entries will then be translated by the Tunis project officer during the cleaning phase.

All qualitative components to the assessment will be managed, filed, and analysed using NVivo, including the SDR, based on a mixed deductive and inductive approach. Qualitative data analysis will be carried out following IMPACT's [Minimum Standards Checklist for Semi-Structured \(Qualitative\) Data Processing and Analysis](#). Throughout data collection, the assessment team will prepare a data saturation and analysis grid. Prior to data analysis, the discussion points identified in the grid will be used to formulate an initial codebook in NVivo containing concepts relevant to the research objectives.

KIIs, workshops and FGDs will be recorded (if in person) and subsequently transcribed in the respective interview guideline in Word that is formatted according to a template that will enable autocoding in NVivo in order to facilitate the qualitative data analysis. Transcripts will be uploaded, classified and autocoded, using the autocoding function in NVivo following formatting styles. Next, autocoded segments will be manually reviewed, and coded more precisely to reflect on themes and perceptions to help identify patterns. During the coding phase, coding structures will be elaborated and modified as necessary, hence the codes used for analysis may differ from those in the preliminary codebook.

Data will be triangulated and verified by cross-checking data collected in the different methods with one another.

3.5.3. Historic and future climate data analysis

The potential impact of current and future climate shocks is assessed by analyzing historic and future climate data. Combined with the resilience score, the vulnerability of different livelihood zones to climate change can be assessed, informing strategic (food security) decision-making and programming.

The table below summarizes the main outputs of the climate data analysis. The spatio-temporal variability in temperature and rainfall patterns are at the key components of this phase, as in most CLEAR assessments³³. To be relevant in Libyan context, additional information will gathered (where available) on dust storms, water stress and drought frequency and duration.

Output	Specifics
Impact of sea level rise under different scenarios (area effected + secondary effects)	Damage and coastal erosion
	Sea water intrusion and ground water pollution
Rainfall	Average rainfall in mm/year during past 30 years
	Change in annual precipitation
	Change in seasonality
Change in temperature	Historical temperature profile and seasonality
	Change in mean temperature

³³ Assessments using WFP's [CLEAR approach](#) have been carried out in several countries, including Lebanon, [Sri Lanka](#), Cambodia, [Timor-Leste](#), [Laos](#) and [Vietnam](#).

	Change in seasonality
Change in length or onset of natural growing season	
Frequency/magnitude of extreme weather events (including heat waves, duration of dry-periods, etc.):	Historical data
	Extreme climate indices from GCM
Frequency/duration of drought	Based on Drought Risk Index, Standardized Precipitation Index, or Palmer Drought Severity Index
Frequency/magnitude of dust storms (based on expert interviews and secondary data)	Limited observations and previous research available.
Floods	Very limited data at the moment. Either need to find better data sources or expert knowledge.
Water stress	Current water stress maps by combining quantitative sources (area of cropland, water usage estimations, annual recharge of aquifers) and expert knowledge
	Estimated future change in water demand

4. Roles and responsibilities

Table 2: Description of roles and responsibilities

Task Description	Responsible	Accountable	Consulted	Informed
Research design	Junior Assessment Officer/Senior GIS Officer	Senior Assessment Officer	Impact HQ – Research Design and Data Unit (RDDU)	REACH Libya Country Coordinator
Supervising data collection	Junior Assessment Officer	Senior GIS Officer	Senior Assessment Officer	REACH Libya Country Coordinator
Data processing (checking, cleaning)	Junior Assessment Officer	Senior GIS Officer	Senior Assessment Officer/Impact HQ RDDU	REACH Libya Country Coordinator/Impact HQ RDDU
Data analysis	Junior Assessment Officer/Senior GIS Officer	Senior GIS Officer	Donor/Impact HQ RDDU	REACH Libya Country Coordinator/Impact HQ RDDU
Output production	Junior Assessment Officer	Senior Assessment Officer	Donor/Impact HQ Research Reporting Unit (RRU)	REACH Libya Country Coordinator
Dissemination	Junior Assessment Officer	Senior Assessment Officer	Donor/Impact HQ RRU	REACH Libya Country Coordinator

Monitoring & Evaluation	Junior Assessment Officer	Senior Assessment Officer	Donor/Impact HQ RDDU	REACH Libya Country Coordinator
Lessons learned	Junior Assessment Officer/Senior GIS Officer	Senior Assessment Officer	Impact HQ RDDU	REACH Libya Country Coordinator

Responsible: the person(s) who executes the task

Accountable: the person who validates the completion of the task and is accountable of the final output or milestone

Consulted: the person(s) who must be consulted when the task is implemented

Informed: the person(s) who need to be informed when the task is completed

Data Analysis Plan

1. LOCAL STAKEHOLDERS WORKSHOP

<i>Research Questions</i>	SUB Q#	Data collection method	Sub-research question group	Sub-research Question	Questionnaire QUESTION	Probes	Key disaggregations
					Introduction: presentation of ACTED/REACH		
					Agenda and goals of the workshop		
					CLEAR Analysis: examples of other countries		
					Presentation summarizing main effects of climate change on Libya		
BREAK							
<i>After introduction to the assessment, the same set of questions are iterated over each livelihood zone in the region (East, West or South). A detailed large map of the livelihood zones and a list of possible activity types will be provided.</i>							

Research Questions	SUB Q#	Data collection method	Sub-research question group	Sub-research Question	Questionnaire QUESTION	Probes	Key disaggregations
What are the main livelihood activities in each livelihood zone?	C.1.1.	<i>Workshop</i>			Can you describe all the job types and sectors of people working in this area (indicate livelihood zone on map)?	Go over the list of possible activities: which are very important for the livelihood zone? How do people in this livelihood zone generally try to make an income?	
		<i>Workshop</i>			How are the main livelihoods you just defined different from the other livelihood zones in the region?	Is there a specific kind of agriculture? Do people in this area have specific problems (that other areas don't have) generating a sufficient income? Think about difference in water sources, electricity, access to fuel, soil management, transport, etc.	
What are the geographic, environmental and socio-economic characteristics that determine and explain patterns of different livelihoods across Libya?		<i>Workshop</i>		How are the different agricultural production systems distributed across Libya?	Which different agricultural production systems exist in Libya?	Can you describe the relative importance of livestock rearing vs. crop production vs. fishing? Which are the main types in this livelihood zone? Is it more/less/different from other livelihood zones?	
		<i>Workshop</i>		How are the different agricultural production systems distributed across Libya?	For households relying on agriculture, is that generally the main source of income?	Do people rely 100% on agriculture for their livelihood? Or will a typical household combine it with a job in another sector?	
					Is the yield (crop, meat, etc.) for own consumption or is it sold at a nearby market?		

		Workshop		What are the main crop types when relying on crop production in each livelihood zone?	For crop production: can you specify for each of the main crop types when they are planted, growing and harvested every year?		
					Could you highlight on the map where the main crop types are exactly grown and how they are distributed within the livelihood zone?		
Which livelihood activities are the most climate sensitive?		Workshop			Of all the dominant livelihood activities, which rely on the climate or the environment?	Which activities depend on the weather? If there are more and longer droughts, heat waves, less rainfall, desertification, ... will it impact their work?	
Which livelihood activities are the most climate sensitive?		Workshop		What is the impact of climate change on these livelihoods?	What are the water resources of the livelihood zone? Please indicate the different sources within the livelihood zone on the map.	Where do people get water from? Man-Made River, local wells near the surface, deeper wells, rain? Are people generally relying on electricity to pump up water?	
					Are the water resources of the livelihood zone sufficient for all activities (drinking, agriculture, industries, etc.)? Please indicate the problems within the livelihood zone on the map.	In which periods of the year does the water supply not meet the demand?	
		Workshop		What is the impact of climate change on these livelihoods?	What will be the effect of increasing temperature, more frequent and longer droughts, desertification, etc. on the agricultural activities?		
		Workshop		What are the main crop types when relying on crop production	For the climate-dependent non-agricultural livelihoods, how would you explain how climate change could have an impact?		

				in each livelihood zone?			
Which other factors can determine and explain patterns of different livelihoods across Libya?		Workshop			How would you explain why the climate-sensitive non-agricultural activities are taking place in this livelihood zone?		
Which livelihood activities are the most climate sensitive?		Workshop		Regarding pressure on other environmental services?	Looking at the main climate-dependent activities, do they face any other environmental constraints? Please indicate the different issues on the map.	Are any of the following preventing people active in these kinds of jobs in this livelihood zone from generating their livelihoods: dust & sand storms, flooding, sea level rise, decreasing soil quality, droughts, extreme temperatures, desertification?	
What are the different social, economic, institutional, physical and ecological factors that determine households' ability to cope with climate change?		Workshop			For the main climate-dependent agricultural livelihoods, which strategies may local communities apply to face the challenges of climate change?	Which changes have to be made in order to meet increasing temperatures, drought periods and water needs? Does the government or any other authority already provide the community with support, information or guidance?	
		Workshop			For the other climate-dependent livelihoods, which strategies may local communities apply to face the challenges of climate change?	Which changes have to be made in order to meet increasing temperatures, drought periods and water needs? Does the government or any other authority already provide the community with support, information or guidance?	

2. FOCUS GROUP DISCUSSIONS

Research Questions	SUBQ #	Data collection method	Sub-research Question	Questionnaire QUESTION	Prompts/Probes	Key disaggregations
Metadata	B.1.1.	FGD	Facilitator name	Facilitator name	N/A	
		FGD	Date of FGD	Date of FGD	N/A	
		FGD	Note taker name	Note taker name	N/A	
		FGD	Livelihood zone name	Livelihood zone name	N/A	
		FGD	Consent	Do you consent to participate in this FGD?		
		FGD	Biodata	Gender of participant Main livelihood of participant		
Presentation of the assessment		FGD		A map of the livelihood zone where the FGD is taking place will be shown to the participants.		
Which livelihood activities are the most climate sensitive?		FGD	What are the main livelihood activities that households engage in to meet their needs in each livelihood zone in normal times?	How do your households access food on a day-to-day basis?		
				What type of water sources do farmer communities use in your livelihood zone?	(Prompts) Rainfalls, groundwater sources, surface sources, treated wastewater	
What are households' perception of how climate has been changing in the past		FGD		What are top three stressors and shocks that have affected household's ability to rely on traditional livelihood activities in the past years?	(Prompts) Longer dry periods and droughts, floods, high temperatures, sand and dust storms, soil erosion, saline intrusion, desertification.	

years and affecting their livelihoods?				Have major stressors and shocks affected agricultural activities in the livelihood zone? If yes, how so?	(Prompts) Compare harvest of different years, compare hectares planted in the area, main crops affected by climate change.	
				Have major stressors and shocks affected non-agricultural livelihoods in the area? If yes, how so?	(Prompts) Impacts on sale of rain-fed agriculture? Floods destroying assets?	
				Have major stressors and shocks affected infrastructures in your livelihood zone? If yes, how so?	(Prompts) Electricity, water	
What are the different social, economic, institutional, physical and ecological factors that determine households' ability to cope with climate change?		FGD	1. Which social factors can determine households' ability to cope with climate change?	(Adaptive) Do households in the area rely on family networks, neighbors, friends and associations or cooperatives to share resources and receive support when facing food or resource shortages?	(Probes) Any other networks? (Prompts) Borrowing money or food, sending children to live with relatives, access to food aid from NGOs/INGOs, etc.	
				(Transformative) Have members of your communities migrated permanently because of the negative impacts of climate shocks on their livelihoods?	(Probes) What are the barriers to migration? (Prompts) To another village, to urban areas, abroad.	
			2. Which economic factors can determine households' ability to cope with climate change?	(Absorptive) Do people in the livelihood zone have enough savings or assets (e.g. house, vehicle, land, equipment, cash money, etc.) they could sell to overcome the negative impact of climate shocks (short extreme events: e.g. one-year drought, floods, sand/dust storms, etc.)?	(Prompts) Overcome a year of crop failure, rebuild property after a sudden flood, etc.	

				(Adaptive) Do people in your area have access to financial services and insurance? If it is common, what kind of financial services and insurance are available for farmers?	(Probes) How does access to these services affect farmers' ability to cope with climate shocks? (Prompts) Change type of crops grown, insurance for livestock in case of death, sharing resources through saving cooperatives, etc.	
				(Transformative) What other activities can households rely on, apart from the one prescribed by the livelihood zone when their main livelihood is affected by a shock (short extreme events: e.g. one year drought, floods, sand/dust storms, etc.)?	(Probes) Any changes in the past years?	
			3. Which institutional factors can determine households' ability to cope with climate change?	(Absorptive) Do you have access to meteorological information and advice for agricultural communities in your livelihood zone in case of droughts, extreme temperatures, floods?	(Probes) What kind of information and advice? From whom? Frequency? Relevance for communities?	
				(Adaptive) Does the government or agricultural associations or any other entities provide farmer communities with information, training or awareness raising sessions on how to adapt current practices to a changing environment?	(Probes) What type of training, details, frequency, efficiency?	

				(Transformative) Are you aware of the existence of laws or coordination mechanisms explicitly addressing climate change and climate resilience?	(Probes) What are the impacts of these on households' resilience (land policy, etc.)?	
			4. Which physical factors can determine households' ability to cope with climate change?	(Adaptive) Could you give an estimation of the average amount of hours without electricity in your area? How do these shortcuts impact agricultural activities and other livelihoods?	(Prompts) Impact on irrigation, storage, etc.	
				(Transformative) Do people in your area have access to infrastructures and equipment preventing the negative impacts of climate shocks on their livelihoods?	(Prompts) Flow-through dams for floods, houses on stilt, concrete walls resistant to storms, etc.	
			5. Which ecological factors can determine households' ability to cope with climate change?	(Adaptive) Do households in the livelihood zone use crop diversification strategies?	(Prompts) Crop rotation, agroforestry, intercropping, introducing drought-resistant seed varieties, etc.	
				(Transformative) Do households in the livelihood zone have access to low water use irrigation systems?	(Probes) Is it common for households to monitor the amount of water they use? Do they share this information or report to anyone? (Prompts) Micro spray, drip emitters, drip lines, etc.	

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	Number of humanitarian organisations accessing IMPACT services/products Number of individuals accessing IMPACT services/products	# of downloads of x product from Resource Center	Country request to HQ	User_log	X Yes
		# of downloads of x product from Relief Web	Country request to HQ		X Yes
		# of downloads of x product from Country level platforms	Country team		X Yes
		# of page clicks on x product from REACH global newsletter	Country request to HQ		<input type="checkbox"/> Yes
		# of page clicks on x product from country newsletter, sendingBlue, bit.ly	Country team		<input type="checkbox"/> Yes
		# of visits to x webmap/x dashboard	Country request to HQ		<input type="checkbox"/> Yes
IMPACT activities contribute to better program implementation and coordination of the humanitarian response	Number of humanitarian organisations utilizing IMPACT services/products	# references in HPC documents (HNO, SRP, Flash appeals, Cluster/sector strategies)	Country team	Reference_log	WFP COUNTRY STRATEGY PLAN 2022
		# references in single agency documents			
Humanitarian stakeholders are using IMPACT products	Humanitarian actors use IMPACT evidence/products as a basis for decision making, aid planning and delivery	Perceived relevance of IMPACT country-programs	Country team	Usage_Feed back and Usage_Survey template	[Outline here the usage survey to be implemented for this research cycle E.g. Usage survey to be conducted in November 2017, following the release of x outputs, targeting at least 10 partners E.g. Usage survey to be conducted at the end of the
		Perceived usefulness and influence of IMPACT outputs			
		Recommendations to strengthen IMPACT programs			
	Number of humanitarian documents (HNO, HRP, cluster/agency strategic	Perceived capacity of IMPACT staff			
		Perceived quality of outputs/programs			

	plans, etc.) directly informed by IMPACT products	Recommendations to strengthen IMPACT programs			<i>research cycle related to all outputs, targeting at least 20 partners]</i> <i>WFP Country Strategy Plan 2022</i> <i>Livelihoods working group</i>
Humanitarian stakeholders are engaged in IMPACT programs throughout the research cycle	Number and/or percentage of humanitarian organizations directly contributing to IMPACT programs (<i>providing resources, participating to presentations, etc.</i>)	# of organisations providing resources (i.e.staff, vehicles, meeting space, budget, etc.) for activity implementation	Country team	Engagement_log	X Yes
		# of organisations/clusters inputting in research design and joint analysis			X Yes
		# of organisations/clusters attending briefings on findings;			X Yes

ANNEX 1: CLIMATE RESILIENCE INDEX

Dimensions	Capacities	Variables
SOCIAL	<i>Absorptive</i>	Food insecurity
	<i>Adaptive</i>	Social safety net
	<i>Transformative</i>	Migration from rural to urban areas
ECONOMIC	<i>Absorptive</i>	Assets and savings
	<i>Adaptive</i>	Access to financial services and insurance
	<i>Transformative</i>	Livelihood diversity
PHYSICAL	<i>Absorptive</i>	Access to markets
	<i>Adaptive</i>	Access to stable electricity
	<i>Transformative</i>	Access to sustainable infrastructures
INSTITUTIONAL	<i>Absorptive</i>	Access to meteorological information
	<i>Adaptive</i>	Access to public awareness raising sessions and trainings
	<i>Transformative</i>	Laws and coordination mechanisms addressing climate change and resilience
ECOLOGICAL	<i>Absorptive</i>	Climate sensitivity of crops
	<i>Adaptive</i>	Crop diversity
	<i>Transformative</i>	Access to low water use irrigation systems

ANNEX 2: LIVELIHOOD ZONING DATA PROCESSING

