**MCNA RS Analysis 2022 – DRAFT 3**

**Target indicators –** (to be addressed through the analysis outlined below)

* Food Consumption Score
* Household Hunger Scale
* % of households with the head of household unemployed and seeking work
* % HH with debt value > 505,000 IQD
* % of households with debt value > 90,000 IQD per household member
* What was the main source of food in the past 7 days?

**Analysis 1 – Overlaying HH data against major water bodies.**

The idea is to check if the scenarios for the target indicators (mentioned above) are any different for the HHs close to the waterbodies in contrast to the HHs which are far/beyond a certain distance (the distance in meters/kms will be decided later). This should provide better understanding on the role of water bodies in the livelihoods of the target population as well as strong rational for the preservation of existing water bodies.

Research questions –

>> is there any substantial change in the Food Consumption Score (by sub-indicators) of the HHs at a certain proximity to a water body than the HHs at a certain distance?

>> is there any substantial change in the Household Hunger Scale (by sub-indicators) of the HHs at a certain proximity to a water body than the HHs at a certain distance?

>> does the HHs close to waterbody have lower rate of unemployed/job seeking head of HH compared to the HHs far from water body?

>> is the ‘% HH with debt value > 505,000 IQD’ lower in the areas which are close to waterbody compared to those which are far?

>> is the ‘% of households with debt value > 90,000 IQD’ per household member relatively lower in the areas which are close to waterbody compared to those which are far?

>> is there a substantial difference in the main source of food for the HHs close to and far from water bodies?

Compared timeline: 2022 – 2018 (MCNA data covers this period)

Methodology:

Water mask (as vector) >> creating buffers around water bodies which defines ‘HHs close to water body’ and ‘HHs far from water body’ >> Spatial join of HH to the buffer regions >> % HH calculation for each indicator and sub indicator.

* Water Mask – For the years 2018, 2019, 2020 proposing to use [‘JRC Yearly Water Classification History, v1.3’](https://developers.google.com/earth-engine/datasets/catalog/JRC_GSW1_3_YearlyHistory?hl=en). For the years 2021 and 2022 (as JRC data is not available) – water will be classified from sentinel-2 (10m) composites (October – October timeline to match JRC timeline) through thresholding (analyst defined) on Modified Normalized Difference Water Index (MNDWI). The accuracy of the classification will be tested against the composites as no complete reliable source/product is available to use as reference.

Estimated time: 1 week.

**Analysis 2 -- NDVI comparison 2018 - 2022**

For this analysis a crop mask covering Iraq will be used as AOI, which will be procured from UNOSAT. Then change in NDVI (between two consecutive years) will be classified into "substantial loss", "Stable" and "Substantial increase" categories (based on analyst' observation and judgement). Then will check if the HHs in the ‘substantial loss’ areas are more (negatively) affected in terms of the target indicators than the HHs located in the stable (NDVI) category. Also, if the HHs falling in the ‘substantial increase' areas are positively impacted or not will be checked. This analysis should reflect the dependency of the target population on agriculture.

Research questions:

1. For the HHs falling in the ‘substantial loss (NDVI)’ area if there are negative changes in the target indicators?
2. For the HHs falling in the ‘substantial increase (NDVI)’ area if there are positive changes in the target indicators?
3. For the HH falling in the ‘Stable (NDVI)’ area if there are any changes in the target indicators?

Compared timeline: 2018 - 2022

Methodology:

Sentinel-2 (10m) data will be used for this analysis. Crop mask procured from UNOSAT will be used as AOI. Year to year NDVI (yearly NDVI composites) change within the mask only will be assessed to delineate the areas with ‘Substantial Loss’, ‘Stable’ and ‘Substantial increase’.

For the yearly NDVI layer – maximum NDVI composites will be created. The analysis can be aggregated/normalized by hexagons (of a suitable size) if it makes the final outputs more audience friendly.

After the NDVI change classification/categorization (each consecutive years), next step will be to overlay relevant year’ HH data for the target indicators.

Workflow – for overlay:

NDVI change categorized (as vector) >> Spatial join of relevant year’ (compared years for the NDVI change calculation) HH data to NDVI change categorized vector >> quantifying and exploring the change in the target indicators over the respective period.

Estimated time: 1 week

**Additional analysis: (will be conducted if the NDVI change and the target indicators exhibit any link. The following analysis aims to serve as a support to the already observed links/relationships.)**

Annual precipitation analysis (2018 - 2022): The aim is to check if the areas with relatively higher precipitation are having a better scenario for the target indicators (mentioned at the start) in comparison to the areas with less precipitation.

Research questions:

* Do the HHs in relatively higher precipitation receiving areas have better situation in terms of the target indicators?
* Do the HHs in significantly less precipitation receiving areas have poor situation in terms of the target indicators?

Methodology: This analysis will follow hydrological year cycle (oct - oct comparison) and the years 2018 - 2022 will be considered. The data source will be CHIRPS (5.5km). The data will be aggregated annually.

Note: CHIRPS covers until 31.07.2022

Estimated time: 1 week