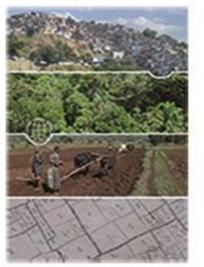


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Agriculture under conflict – Satellite Earth Observation to measure Impact on Food Security

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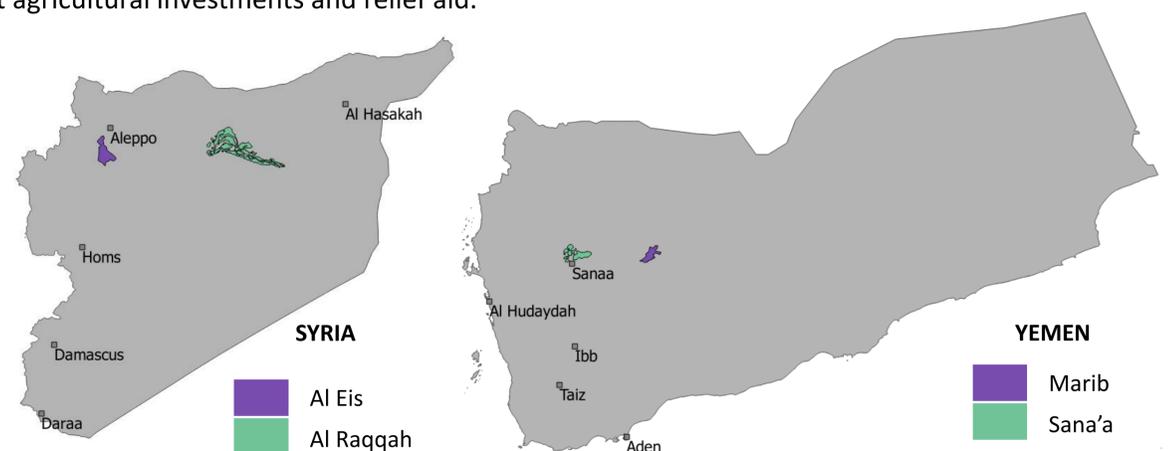
INTRODUCTION

To respond timely to emerging famine, reliable and consistent information related to agricultural production is needed but difficult to obtain in areas under conflict. **Earth Observation** has proven to be very useful; not only to determine changes in agricultural production over time and to identify areas where food security has become critical, but also to plan post-conflict agricultural investments and relief aid.

MATERIALS & METHOD

The FAO recently launched the Water Productivity through Open access of Remotely sensed derived data (WaPOR) portal. WaPOR allows to monitor status, changes and trends in agricultural production, (irrigated) water consumption, and water productivity in areas under conflict from 2009 onwards.

This study uses the continental level I WaPOR 1.0 data which is available for Northern and sub-Saharan Africa and the Near East from 2009 until present. WaPOR level I data has relatively large pixels of 250m that do not allow interpretation of patterns or analysis of individual fields, but do show the general agricultural trends in irrigation schemes. The Above Ground Biomass Production is used as proxy indicator of agricultural production and Actual Evapotranspiration is used as an indicator of water consumption. Net Biomass Water Productivity indicates water use efficiency. Precipitation provides context to annual variations.



Al Eis and Al Raqqah irrigation scheme in Syria (left) and Marib irrigation scheme and irrigated land near Sana'a in Yemen (right)

This analysis focused on irrigated agriculture in Syria and Yemen. It assesses the status, changes and trends in agricultural production, (irrigated) water consumption, and water productivity before and during conflict. Water productivity as measure of the water use efficiency is expressed as a function of annual biomass production and actual evapotranspiration, taking into account rainfall.

RESULTS

The following figures show the biomass production (AGBP, y-axis) and the actual evapotranspiration (AET, water consumption, x-axis) for irrigated land in the selected study areas Syria and Yemen. The size of the bubble refers to the precipitation (PCP). Considerable variation in irrigation performance was observed.

The conflict in Syria started in 2011. The analysis focused on irrigated land around Al Raqqah and Al Eis. In Al Raqqah agricultural production varied greatly from year to year. Agricultural production in the irrigated land serviced by Bir Al Hashim pumping station was reduced in 2013, with other areas following in 2016 and 2017. In Al Eis agricultural production was reduced by half and water consumption was significantly lower in 2014, 2016 and 2017. In both irrigation schemes the biomass production in 2015 was at pre-conflict levels which we could not explain.

In Sana'a most water is pumped from ground water aquifers, which requires scarce and expensive fuel. Since 2014 the WaPOR data show water productivity increased as the biomass production was maintained at the existing level while the water consumption decreased. In Ma'rib irrigation scheme the irrigation water is obtained from a dam. It is a relatively secure area in Yemen where the irrigated land expanded considerably since 2013, resulting in proportionally increased biomass production and water consumption and hence no changes in water productivity.

CONCLUSION

Unfortunately limited information is available from the ground to interpret and explain the observed trends. For example, satellite observations of reduced production and lower water consumption in an irrigation scheme do not tell whether these changes are the result of damage to the irrigation infrastructure, safety issues preventing access to the fields, lack of labour, or no access to market. Nevertheless, the analysis based on satellite derived data did show that the response of agriculture on conflict varies greatly between, but also within countries, and over time.

ACKNOWLEDGEMENT

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