



March 2014

Will drought worsen the impact of conflict on food insecurity?

Special Focus Syria

- Large rainfall deficits in the 2013-2014 season will have a major impact on Syria's next cereal harvest. With three quarters of the rainfall season gone, it is unlikely that there will be a significant recovery in this agricultural season. This is part of a wider regional pattern of dry conditions across the Middle East.
- Drought conditions will further compound the impacts of civil war on the agricultural sector – major deterioration of Syria's irrigated capacity, confirmed by satellite imagery, will cause lasting damage to national cereal production.
- The cereal production outlook for the current season is pessimistic; accounting for the effect of conflict and dry weather, wheat production is expected to be between the record lows of 1.7 to 2.0 million tonnes. This will further increase import requirements to meet Syria's wheat needs which last year stood at 5.1 million tonnes.
- Additional factors will further strain Syria's food security situation: an unfavourable regional crop production scenario, increased import dependence and likely market price increases against the backdrop of a gloomy macro-economic situation.

A very dry 2013/2014 rainfall season is affecting Syria and parts of the wider Middle East

Syria's rainfall season extends from October to April, with a cropping season following from mid-November until the harvest in May. Ground rainfall data reveals that cumulative rainfall from September to mid-February has been less than half of the long term average, in agreement with

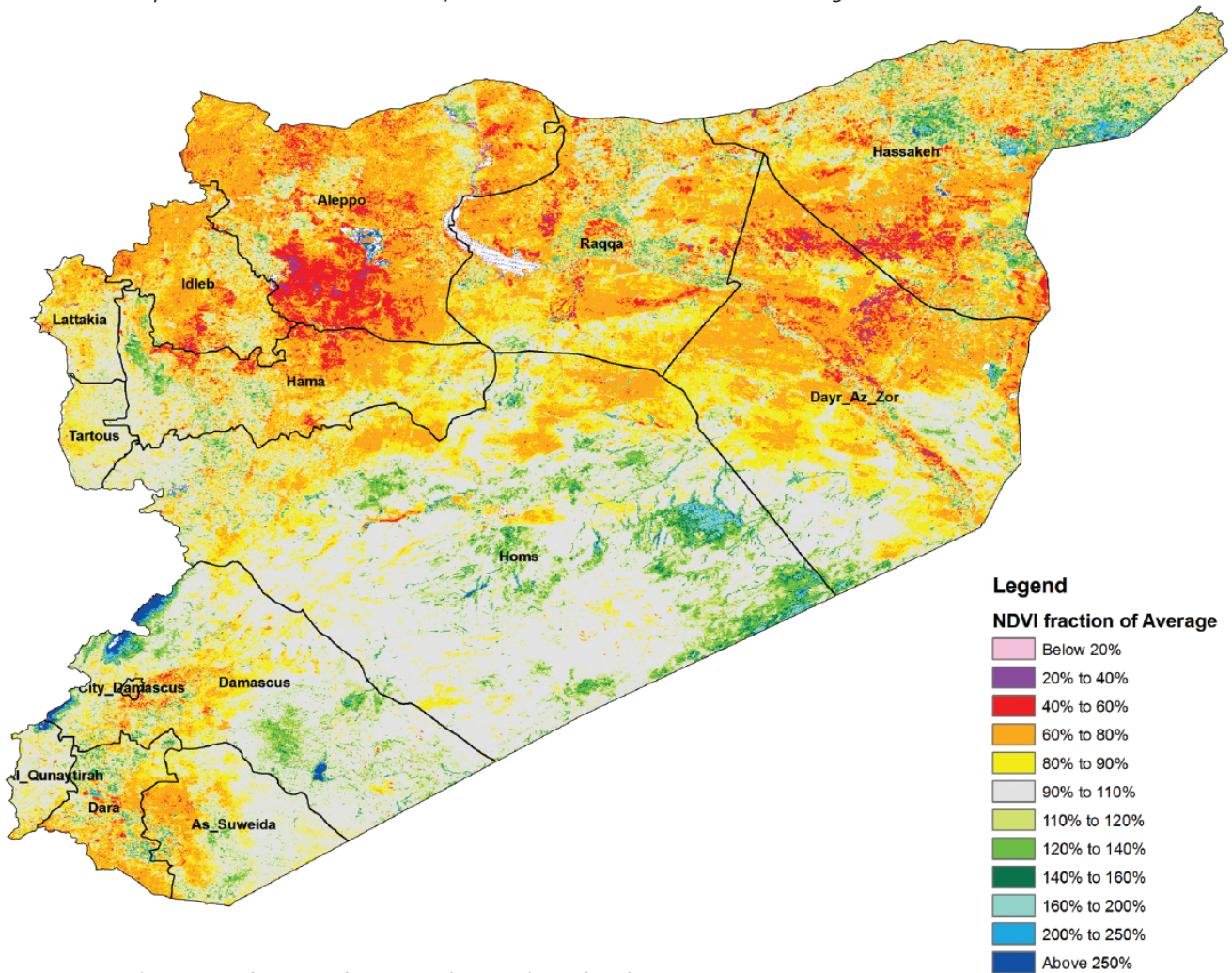
satellite derived information. There are only two months left in the rainfall season (mid-March to mid-May), which typically provide less than 30% of the seasonal total in the areas where wheat, the national staple food crop, is grown.



Figure 1. Syria satellite vegetation data for early March 2014, expressed as a proportion of a long term average (2000-2012)

Syria, vegetation conditions relative to average, 18 February-5 March 2014

Warm tones depict below normal conditions, while cool tones denote above average conditions



Source: MODIS/NASA Data (MOD13Q1), processed at WFP/OSZA(VAM).

Lack of rainfall led to extensive delays in crop and pasture development.

The resulting major deficits in crop water supply led to delays in the wheat crop development that will push its critical stages to drier and hotter parts of the year. It is now unlikely that a significant recovery is possible in the affected areas. This is part of a wider pattern of drier than average conditions which has dominated across the western Middle East from southern Turkey to western Syria, Lebanon and Jordan. Concerns regarding cereal

production in Syria, Turkey and Northern Iraq have recently surfaced.¹

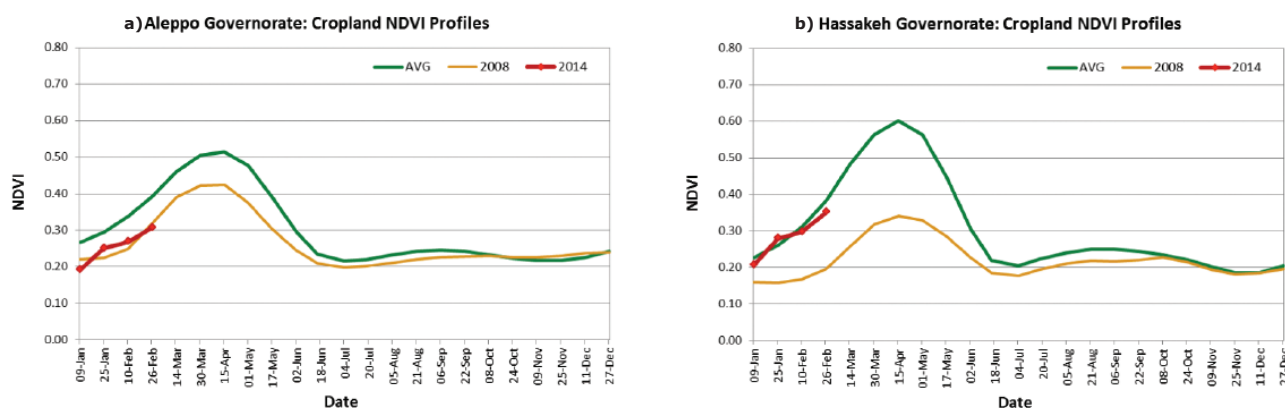
The extent of the situation is revealed by satellite data which measures amount and vigour of vegetation cover (known as NDVI). Figure 1 shows the situation in early March compared with the average situation in the past few years (between 2000 and 2012). The extent of yellow, orange, and red areas on the map reveals clearly the negative

1. <http://www.pecad.fas.usda.gov/highlights/2014/01/Turkey/>
<http://www.reuters.com/article/2014/03/07/us-climate-drought-middleeast-idUSBREA2611P20140307>

impacts on vegetation development due to the dry conditions since the last quarter of 2013. The northwest of the country, in particular the Aleppo, Idleb and Hama governorates are the most affected, with poor conditions extending also to Raqqa, southern Hassakeh, Quneitra and areas of Deir Ez Zor away from the Euphrates River.²

A more detailed perspective can be had by tracking the evolution of the current season for specific areas. Figure 2 shows temporal profiles of vegetation index for Hassakeh and Aleppo, two Governorates that account for just over half of Syria's wheat production. The data in the plots refers only to the cropland areas of each region, to facilitate a more reliable crop condition monitoring.

Figure 2. Seasonal cropland vegetation development for the average, 2008 and 2014 seasons: Aleppo (a) and Hassakeh (b) governorates which account for 52% of the wheat production in Syria



Source: MODIS/NASA Data (MOD13Q1), GAUL (FAO), GlobCover (ESA), processed at WFP/OSZA(VAM).

Some wheat production areas experience conditions similar to the large drought of 2008.

In these profiles, the current season NDVI (2013-2014) is plotted together with the average NDVI profile and that of 2008, a major drought year in Syria that resulted in massive drops in cereal production (see Fig 3a).

Overall, most Governorates show poor crop development, with Aleppo, Idleb, Hama, Homs and Dara facing conditions very similar to those of 2008; Hassakeh, Deir-es-Zor and Raqqa are the only ones with near average conditions. The worst affected Governorates account for close to 50% of the Syrian

wheat production – this signals potentially important impacts on staple crop production for the current year. Other cereals in particular barley which is mostly rainfed will also be significantly affected.

Other sectors that will suffer as a result of serious problems of water and pasture availability are the livestock and pastoral livelihoods in the steppe regions of Syria. Even in the Governorates where cropland NDVI remains at average levels (e.g. Fig 2b), strong below average vegetation patterns are noted in the steppe and grassland areas.

Cereal production prospects – drought will compound conflict impacts

Recent trends and conflict impact

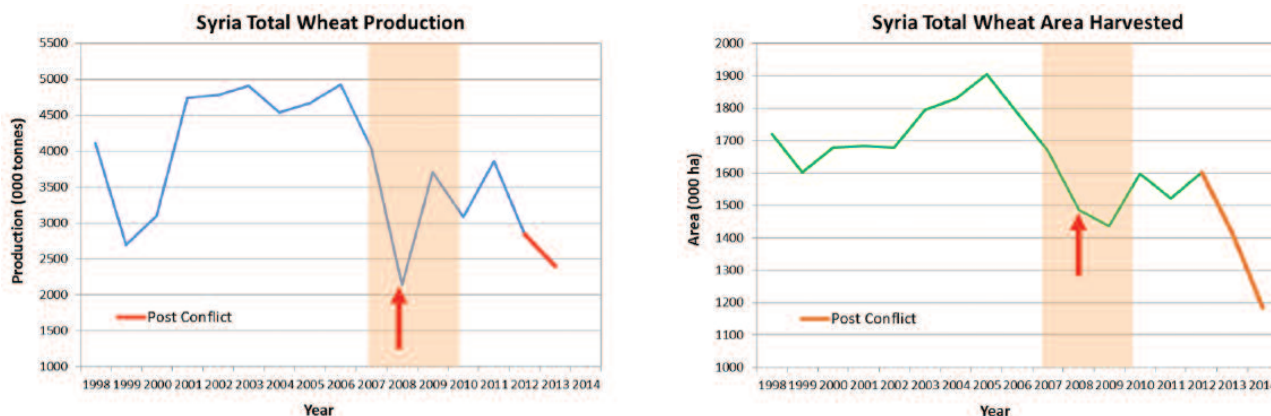
During the decade preceding the conflict, drought had been the main event causing significant losses to the national wheat and barley production (e.g.

1999-2000 and 2008-2009). Since 2012, the civil war has had a marked impact on the Syrian cereal production capacity.

2. See also: <http://www.fao.org/WAICENT/faoinfo/economic/qiews/english/shortnews/Syria28032014.pdf>

Figure 3. Syrian wheat production (1998-2013) and area harvested (1998-2014)

Post-conflict values highlighted in thicker contrasting lines. Harvested area for 2014 estimated from adjusted Government declared area planted. Note steep post-conflict decline in area and production in spite of a very favourable rainfall season in 2012-13. Also indicated, the late 2000s drier period (shaded) and the major 2008 major drought (arrow).



Source: Syria Ministry of Agriculture Crop Production Statistics, processed at WFP/OSZA(VAM).

Conflict has had a major negative effect on Syria's staple crop production. Current weather conditions will enhance this further - the coming harvest is expected to hit a record low.

After a partial recovery from the impacts of the 2008 drought (see major drop in production in Fig 3), from 2012 onwards conflict led to a strong reduction in area harvested³ and total production: harvested area is now much smaller than the previous minimum (after the 2008 drought) while wheat production has approached values last seen in drought years (1999 and 2008).

These changes can be directly attributed to conflict: rainfall in the past two seasons has been favourable, while the irrigated sector has been extensively affected (see box below); conflict has caused power failures, damage to irrigation infrastructure (pumps, canals), low availability and high cost of fuel, lack of spare parts for machinery, destruction of tractors, scarcity of qualified personnel as well as lack of security preventing normal agricultural activities. These factors came at a time when the irrigated sector had assumed a share of about 80% of the national wheat production.

Wheat production scenarios

According to recently released Government figures for the current season, wheat planted area is 1.28 million hectares; based on pre-conflict data, the area to be harvested next May is estimated at 1.18 million ha – these are the lowest values in 15

years, representing a drop of 16% relative to last year and of 30% off the pre-conflict average. Based on this harvested area figure, two scenarios for wheat production are developed:

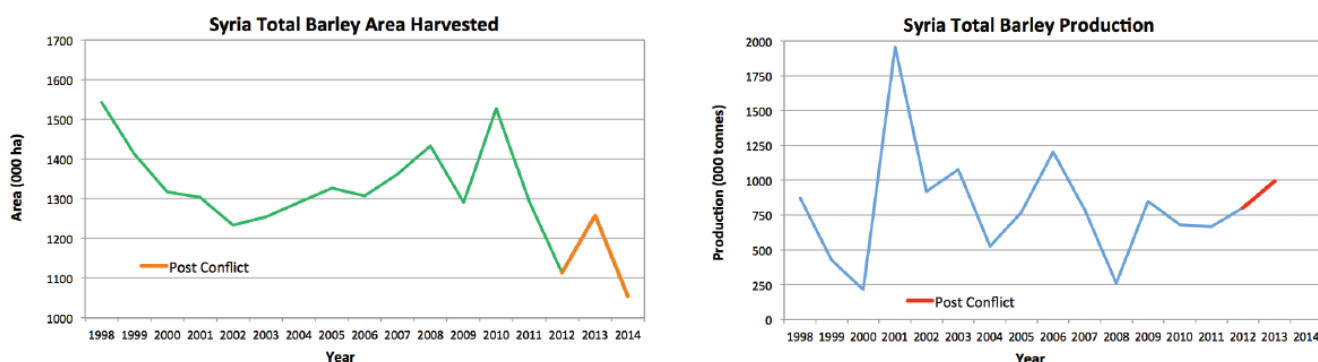
- An upper bound for wheat production is calculated assuming optimistically that the current dryness will have minor impacts on wheat yields; therefore using a value for the wheat yield similar to last season, wheat production would be about **2.0 million tonnes** (a fall of 17% relative to last year's production).
- A lower bound is calculated assuming the wheat yields will be similar to those of the 2008 drought; this may sound too pessimistic, as the current rainfall season is better, but on the other hand the 2008 wheat yields had not been affected by major conflict. This will lead to a total wheat production of about **1.7 million tonnes** (a fall of 29% relative to last year's production and about half of the pre-conflict levels).

These are moderately conservative bounds – a further reduction in harvested area is possible as drought tends to enhance area losses, while the crop yields we used do not account for possible drought and conflict interactions.

3. Area harvested for 2014 is estimated from Government figures for area planted, adjusted for typical losses estimated from pre-conflict data.

Figure 4. Syrian barley area planted (1998-2014) and production (1998-2013)

Post-conflict values highlighted in darker shades. Harvested area for 2014 estimated from adjustment of Government assessed area planted. Note partial post-conflict recovery in area and production due to a switch from irrigated wheat and very favourable 2013 rainfall.



Source: Syria Ministry of Agriculture Crop Production Statistics, processed at WFP/OSZA(VAM).

Conflict effects are less marked for rainfed barley production, but seasonal dryness may hit it harder.

Barley production

Historically, barley production (used for animal feed) shows more marked fluctuations (as it is mostly rainfed) but the impact of the 2008 drought is still clearly evident.

The conflict led to a large drop in harvested area, followed by a recovery last year; this was mostly due to conflict forcing farmers to switch from irrigated wheat to rainfed barley (FAO-WFP, CFSAM 2013). Last year's favourable rainfall led to record yields and as a result barley production increased back to the levels of the mid-2000s.

This favourable scenario for barley production is unlikely to be maintained this year: recent Government figures estimate barley planted area in the current season to be 1.19 million hectares, the lowest value in 15 years. We estimate the area to be harvested (next May) at 1.06 million ha, by adjusting the planted area based on pre-conflict data – this represents a drop of 16% relative to last year and is 21% off the pre-conflict average.

Barley is likely to endure a significant yield reduction as it is mostly a rainfed crop. Yields are extremely variable making choice of bounds more difficult – assuming an upper bound of 0.71tonnes/ha (2012 yield, post-conflict season

with normal rainfall) and a lower bound of 0.46 tonnes/ha (average yield within the 2007-2009 dry period, pre-conflict), barley production is expected to be between 0.5 and 0.75 million tonnes/ha, in line with pre-conflict average production, but a sizeable drop from last year.

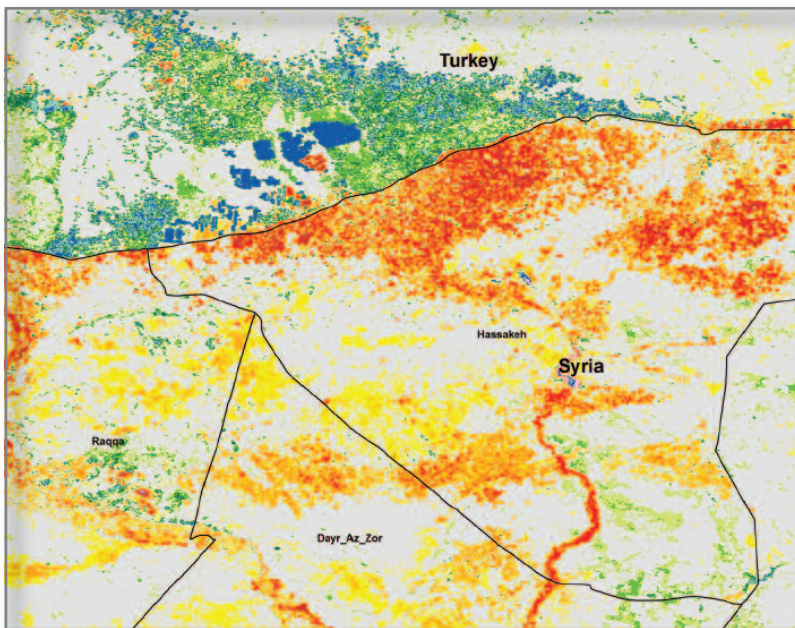
These cereal production prospects have to be judged against a backdrop of possible production deficits in the neighbouring countries (Turkey, Iraq and Lebanon).

Outlook for the medium term future

The crippling of irrigation capacity (see evidence in box next page) will have long lasting effects on Syria's agricultural production. As conflict affects the most productive agricultural sector, low agricultural production levels will become a permanent feature – current winter wheat production is likely to remain at about half of the pre-conflict levels and remain exposed to inter-annual variations in rainfall; the agricultural production from the summer growing season has already been very severely reduced. This situation will not change while conflict lasts and its resolution will take considerable time if an when peace is restored to Syria.

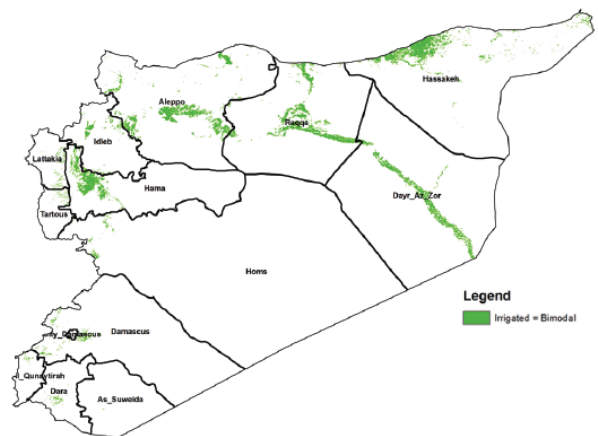
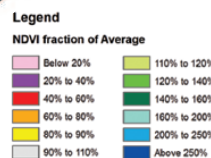
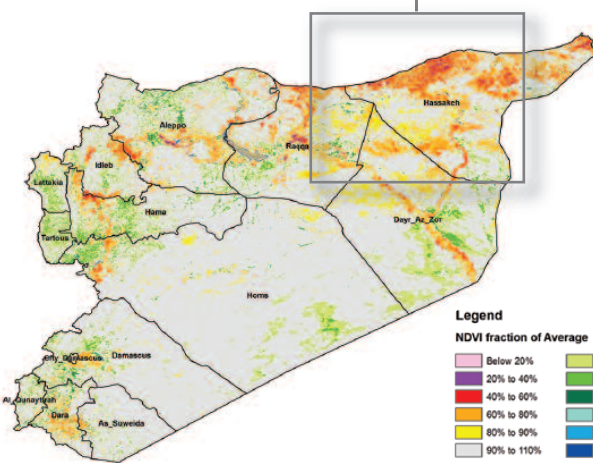
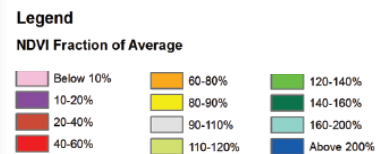
Figure 5. Conflict impacts on Syria’s irrigated sector clearly visible in satellite vegetation data

Syria-Turkish border: cross border contrast in vegetation conditions, 14 to 29 September 2013



In the 10 years preceding the conflict, the irrigated sector increased steadily in importance and by 2012 accounted for over 80% of the national wheat production.

Analysis of vegetation index imagery for the Summer of 2013 confirms that the Syrian irrigated sector is facing severe problems – the Summer growing season (mostly cotton, sugar and pulses) depends entirely on irrigation water supply. Problems in irrigation capacity caused severe constraints to the growth and development of the Summer crops and this is easily identified in satellite vegetation imagery by comparison to a pre-conflict baseline.



Syria: vegetation conditions relative to average, 14 to september 2013

Syria: irrigated (double cropping) areas

Contrasting NDVI anomalies in irrigated croplands across the Syria-Turkey borders in September 2013. While on the Turkish side crops display above average conditions, on the Syrian side the situation is much worse and crops are in markedly below average condition. This reflects problems in irrigated capacity since climatic conditions are similar across the border. The lower left inset shows the same information but across the whole Syria – the lower right inset shows the distribution of irrigated crop land in the country; most irrigated cropland is affected.

Fig 5 shows a comparison of NDVI for September 2013 with the pre-conflict average for the same period: The contrast in vegetation condition that exactly mirrors the international border between Turkey and Syria is a clear sign that the irrigated capacity in the country has undergone a severe reduction after conflict. The smaller maps also show that the problems are generalized across the country.

Source: MODIS/NASA Data (MOD13Q1), GAUL (FAO), processed at WFP/OSZA(VAM).

Conflict impact on Syria's irrigation capacity is extensive enough to be clearly revealed in Satellite imagery of vegetation cover.

Cereal price prospects: recent respite is unlikely to last long

The prospects of a further reduction in domestic cereal production caused by the current drought-like conditions will lead to increased import requirements. Reportedly,⁴ the impact of the civil war on production has led the country to import about 2.4 million tonnes of wheat to bridge the supply gap in 2013 (1.9million tonnes had arrived by mid-March). Imports during pre-conflict non drought years averaged about 0.3 million tonnes, spiking to 1.7million during major drought periods.

The increased dependency of the country on cereal imports will put more pressure on food prices. Both wheat flour and bread prices have experienced major increases since the conflict started, with a peak in late 2013 (Fig. 6). Recently wheat flour prices and bread sold through private shops have decreased noticeably. This decrease is due to a combination of several factors:

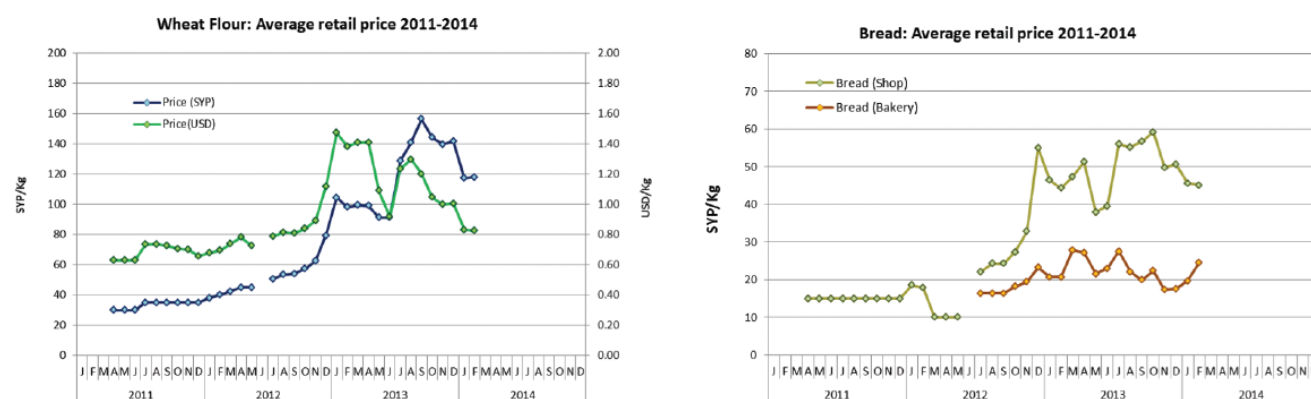
- Government support to bakeries has positively contributed to a decrease in prices of subsidized bread starting from Nov-Dec 2013, particularly in

easy to reach locations in southern governorates (Sweida, Daraa), Homs, Hamma, Tartous and Latakia.

- The government's decision to ban the sales of subsidized bread to various shops in government controlled areas over concerns of speculative sales.
- Reduced purchasing power due to depletion of income and livelihood sources leading households to opt for bread from public bakeries which is relatively cheaper and affordable.
- Substantial pick-up in humanitarian assistance including food distributions and arrival in country of imported wheat as well as a substantial increase in cross-border trade of basic commodities between Turkey and rebel-held areas in late 2013 to early 2014.
- The slowdown in the depreciation of the Syrian pound in late 2013 and early 2014.⁵

Figure 6. Average retail prices for wheat flour (in Syrian pounds and US dollars) and bread (shop and state bakery)

Note sharp increase from early 2012 onwards. Wheat flour prices have recently decreased but may be again under pressure later in the year.



Source: WFP/OSZA(VAM) Food and Commodity Prices Data Store.

Market prices have recently dropped off the historical highs of late 2013. Poor staple crop production may reverse this tendency.

4. See <http://www.reuters.com/article/2014/01/06/syria-wheat-idUSL6N0KF04920140106>

5. See <http://country.eiu.com/article.aspx?articleid=1701622954&Country=Syria&topic=Economy>

It is also worth noting that both parties in the conflict felt the need to ensure availability and accessibility of the main staple food items for civilians. This has been an established practice based on many agreements signed between government and the opposition.

However, the poor prospects for the coming Syrian cereal harvest outlined above, is likely to

reverse the recent downward trends recorded in wheat flour and bread prices. A continued unfavourable regional weather pattern may restrict regional crop supply, which in turn will reduce regional cereal procurement and increase import prices, putting further pressure on domestic cereal prices.

Food security prospects for the next months

Low production scenarios combined with the ongoing conflict, will further strain Syria's already fragile food security situation. The main implications are:

- An increased dependence on imports at a time when Syria's import capacity is severely diminished by the collapse of the real economic growth (-18.7% a year) and international reserves (-87%) from 2011 (the beginning of the war) to 2013.⁶
- Reduced reliance of rural households on their own production and an increased reliance on markets

for staple food supply across all households.

- Increased household exposure to an already highly volatile and erratic food price patterns as well as strained food availability on markets.
- Decreased water and grazing resources for households dependent on livestock; possible distress livestock sales with longer term impacts on their resource base.
- Possible increase in the size of refugee and displaced population beyond the current 9 million.

6. See http://country.eiu.com/FileHandler.ashx?issue_id=1751639559&mode=pdf

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