

Syrian Arab Republic: Continued conflict and drought conditions worsen 2014 crop production prospects

Highlights:

- Current forecasts indicate a severe reduction in cereal crop production in 2014 due to the impact of conflict and drought conditions.
- Food price inflation remains significantly high, but some declines were recorded in late 2013.
- Livelihoods have suffered immensely following the conflict resulting in deaths and destruction and about 6.5 million Internally Displaced Persons (IDPs) together with about 2.7 million more registered refugees in near-by countries of the region.
- Continued and strengthened assistance is required for food and the agricultural sector to support livelihoods.

Following the update of 28 March 2014 on concerns about drought conditions in the Syrian Arab Republic, FAO has been closely monitoring the situation in cooperation with national authorities. Analysis based on satellite imagery together with field reports indicate that vast areas in the northwest of the country received well below-average rainfall during January and February 2014, which coincides with crucial periods of crop germination and establishment stages (Figure 1). Consequently, large swaths of cropping areas in Aleppo, Hama, Idleb, Homs and Dar'a governorates were affected by drought conditions (Figure 2). Despite some resumption of rains in March and April, the below-average cumulative rainfall is

expected to affect yields, particularly the rainfed barley and wheat crops.

Figure 1: Crop calendar

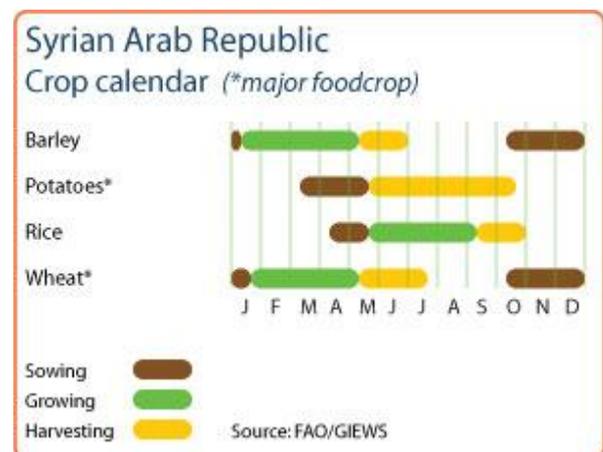
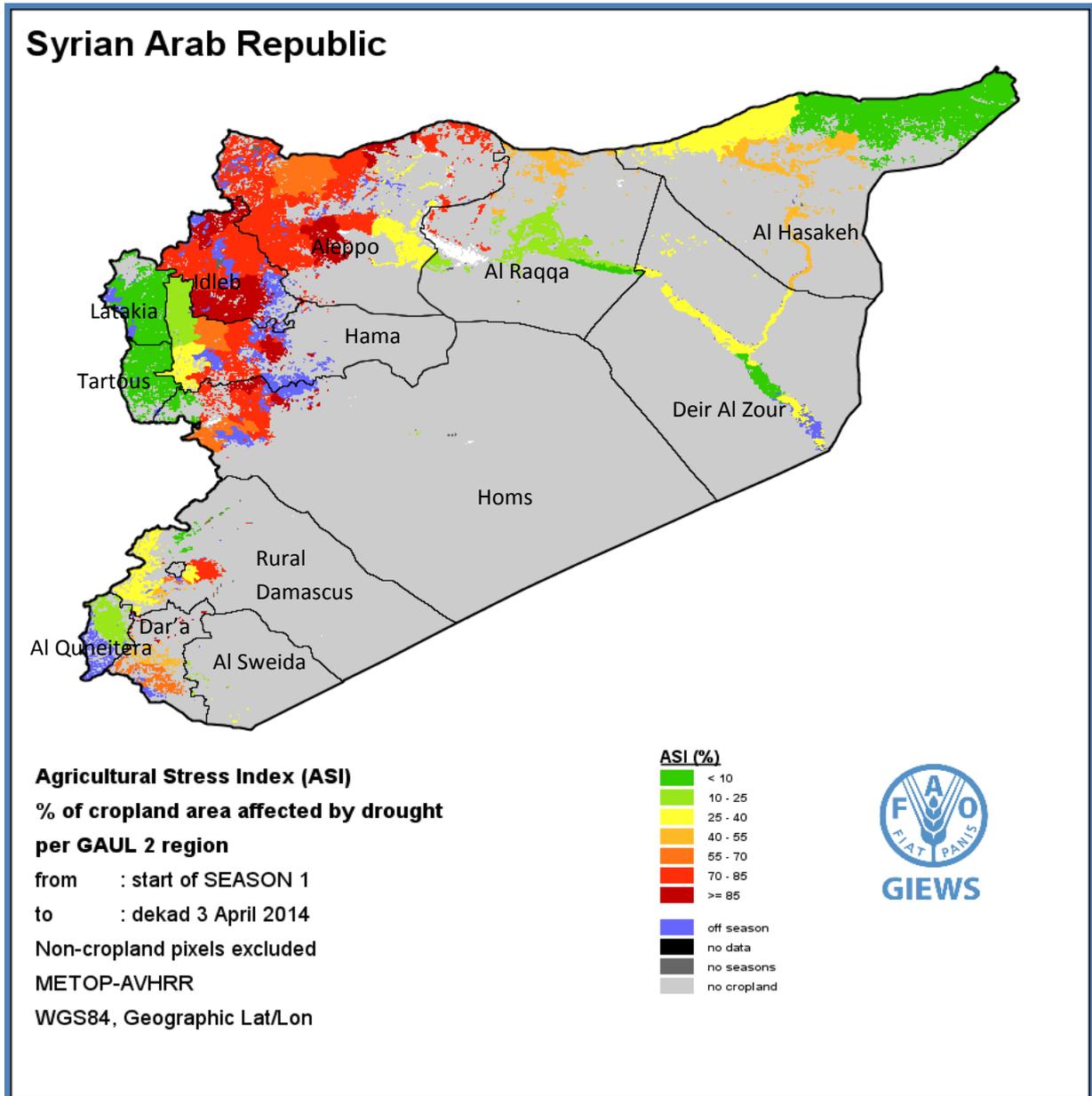


Figure 2: Agricultural Stress Index for the current crop season



Note: The **Agriculture Stress Index (ASI)** is an FAO indicator that highlights anomalous vegetation growth and potential drought in arable land during a given cropping season. ASI integrates the Vegetation Health Index (VHI) in two dimensions that are critical to assess a drought event in agriculture: temporal and spatial. ASI assesses the temporal intensity and duration of dry periods and calculates the percentage of arable land affected by drought (pixels with a VHI value below 35 percent – identified as a critical level in previous studies to assess the extent of the drought). The whole administrative area is classified according to the percentage of arable area affected by drought conditions.

Disclaimer: The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Reduced plantings for wheat and barley

Recent estimates by the Syrian Ministry of Agriculture and Agrarian Reform (MAAR), (Table 1) indicate a large reduction in winter cereal cropped area in 2013/14, the bulk of which is normally carried out between October and December (Figure 1). In addition, planted area estimates in 2013/14 are about 21 percent lower than the planned level at the start of the season. The poor seasonal rains compounded the effect of other production constraints that are associated with the ongoing events in the affected governorates. Reduced availability and high input prices, damage or destruction of farm equipment, including irrigation pumps, abandoned land and power shortages have negatively impacted farming activities. The below normal rains, therefore, aggravated the already precarious situation.

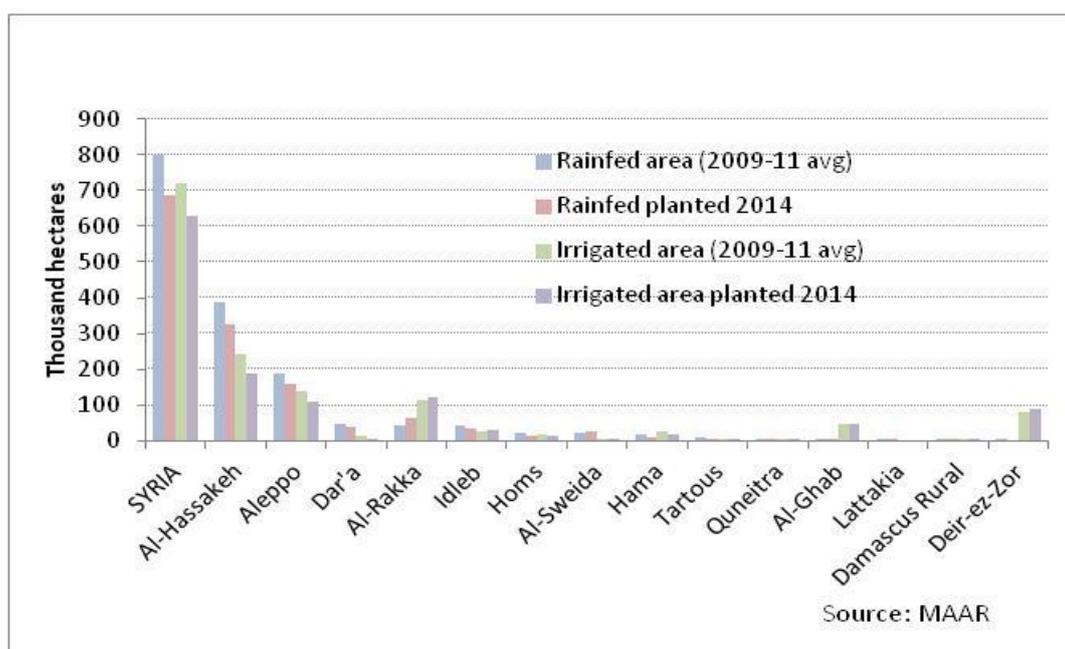
The total wheat planted area is estimated to have declined by about 15 percent relative to the recent average (Table 1), with the largest absolute decrease recorded in the key-producing governorate of Al-Hassakeh. Despite the overall reduction at the national level, increases were recorded in some areas including Al-Raqqa, Al-Sweida and Deir-ez-Zor. However, these governorates do not constitute the major growing regions (Figure 3).

Table 1: Estimates/forecast of wheat and barley area harvested

	Average 2007-2011	2011	2012	2013	2014 (MAAR forecast)
Wheat and Barley	2 923	2 814	2 716	2 675	2 506
Wheat	1 542	1 521	1 603	1 374	1 313
Barley	1 381	1 293	1 113	1 257	1 194

Source: MAAR.

Figure 3: Wheat - actual and historical planted area

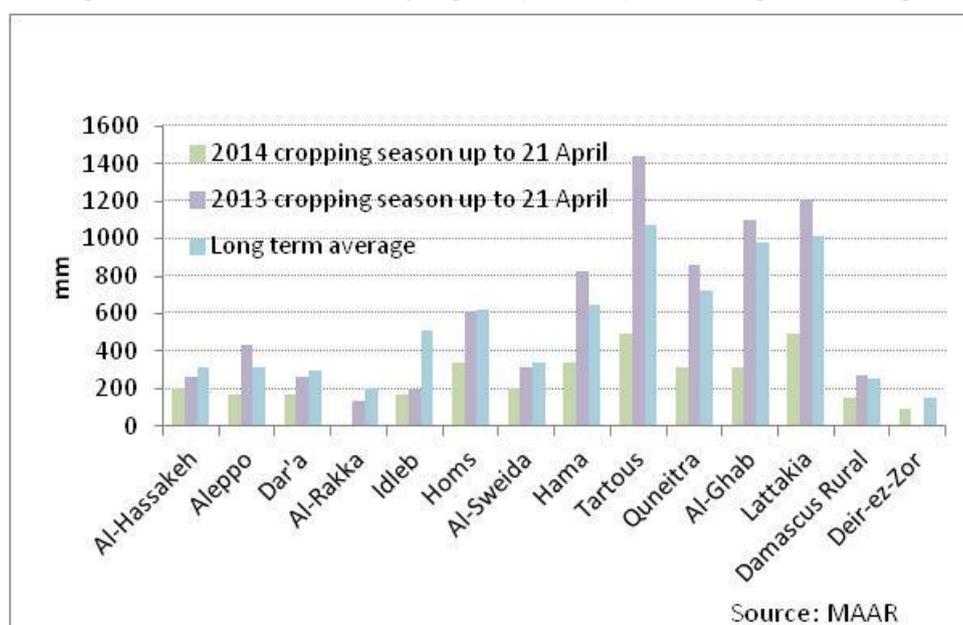


Significant rainfall deficits exacerbate poor crop prospects in 2014

In the 2013/14 cropping season the cumulative rainfall during October to April was well below last year and the long-term average. Some areas experienced significant rainfall deficits ranging from 55 to 85 percent (Figure 4) and the governorates of Quonaitra, Al-Ghab, Tartus, Lattakia and Idleb were put at a “warning” phase by MAAR, as cumulative rainfall was 50 percent below the average.

Despite beneficial rains in March and April in parts of the drought-affected main crop producing areas, remotely-sensed data indicates that vast areas in the northwest continue to remain in a state of significant moisture deficit.

Figure 4: Cumulative rainfall by region up to 21 April and long-term average



Poor harvest is forecast in 2014

Harvesting of 2014 winter grains is expected to start in the forthcoming weeks. The most recent production forecast by MAAR, based on the planted area and applying average yields, indicates that a total of 2.95 million tonnes of wheat will be harvested (about 2.3 million tonnes from irrigated fields and 0.63 million tonnes from rainfed areas). At this level, production is slightly lower than the previous five-year average of 3.2 million tonnes.

Although MAAR’s estimates indicate a slight decrease in the yield per hectare, FAO’s yield calculations, based on the Agricultural Stress Index (ASI), indicate a much lower yield level of 1.5 tonnes/ha (nearly 38 percent lower than MAAR’s estimate of 2.4 tonnes/ha). Accordingly, based on the FAO model, wheat production is forecast at about 1.97 million tonnes, 18 percent below last year’s poor crop and 38 percent below the five-year average (2009-13). A detailed description of model results and methodology is presented in the Annex.

Table 2: Cereal production

Cereal production				
	2009-2013 average	2013 CFSAM	2014 FAO f'cast	change 2014/2013
	000 tonnes			percent
Wheat	3,177	2,400	1,969	-18
Barley	797	993	346	-65
Others	141	88	88	0
Total	4,116	3,481	2,403	-31

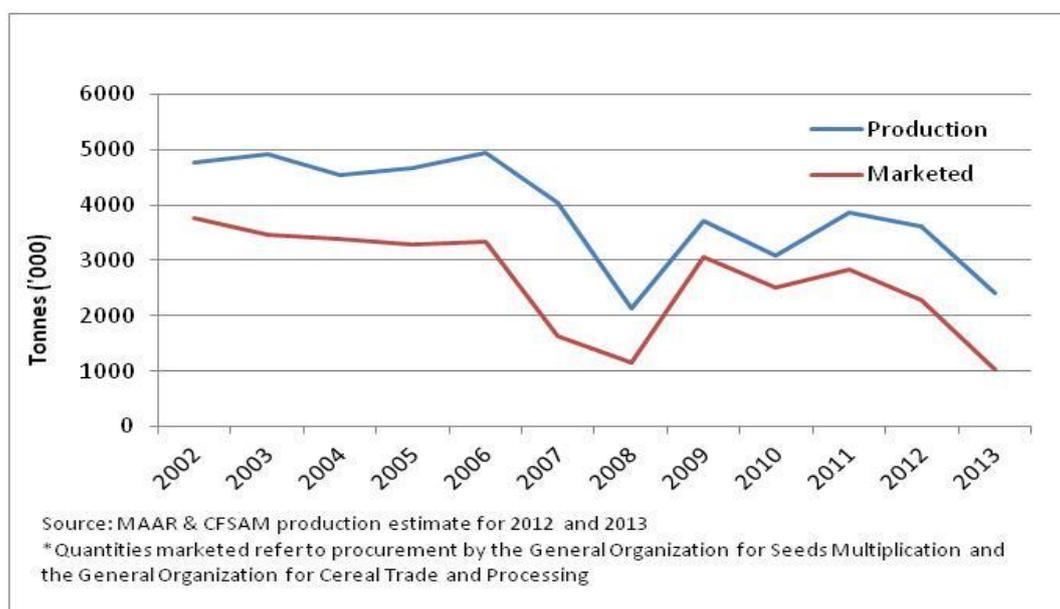
Note: percentage change calculated from unrounded data.
Source: FAO/GIEWS Country Cereal Balance Sheets

Cereal imports expected to increase in the 2014/15 marketing year (July/June)

The Syrian Arab Republic relies significantly on food imports, which normally account for a large share of the total domestic utilization. Based on the projected cereal production in 2014, cereal imports are expected to increase in the 2014/15 marketing year (July/June). The latest available data indicates that cereal imports between July 2013 and February 2014 amounted to about 1.3 million tonnes, of which around 890 000 tonnes was wheat.

On the other hand, the annual quantity of domestic wheat marketed through the General Organization for Seeds (GOSM) and the General Organization for Cereal Trade and Processing (GOCTP) has decreased from an estimated 2.8 million tonnes in 2011 to 1 million tonnes in 2013 (Figure 5). This reduction is mainly attributed to lower harvests and logistics difficulties, associated with transport and storage facilities, following the escalation of the conflict.

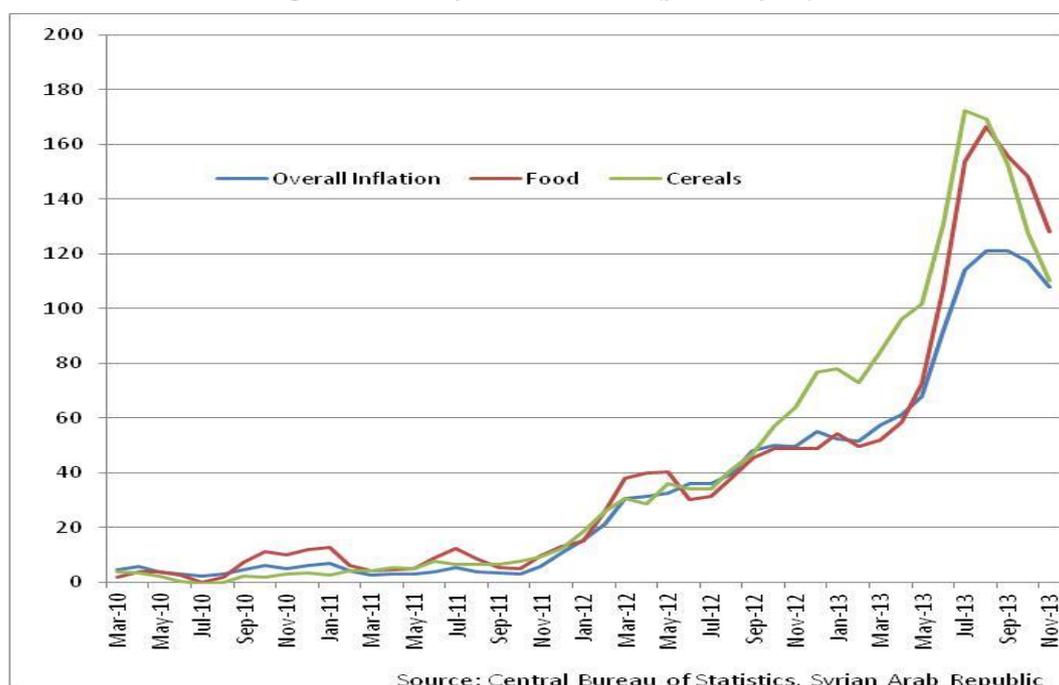
Figure 5: Wheat production and quantities marketed through GOSM and GOCTP*



Inflation rate remains high, but some declines were recorded at the end of 2013

The inflation rates for cereal and food prices declined at the end of 2013, but still remain significantly high, with the annual inflation rate in November 2013 (latest available data) estimated at 108 percent, compared to the peak of 166 percent in August 2013 (Figure 6). The lower rates can be partially attributed to the more subdued increases in the exchange rate during the second half of 2013. Shortages of food items, however, continue to exert upward pressure on prices. With the expected below normal cereal harvest and the subsequent widening gap between local production and domestic requirements, pressure on food inflation is likely to remain high over the coming months.

Figure 6: Monthly rate of inflation (year-on-year)



Food security conditions continue to deteriorate

As of December 2013, the number of Internally Displaced Persons (IDPs) reached 6.5 million from 4.25 million in July 2013. Households' capacity to access food has deteriorated sharply and is expected to deteriorate further, as a result of high levels of unemployment, reduced income generating opportunities, high inflation, depreciation of the local currency, disruptions in the supply chain and an overall contraction in the economy by 18–20 percent between 2012 and 2013. In response, WFP launched a Revised Emergency Operation in January 2014 aimed at providing assistance to an additional 250 000 beneficiaries bringing the total to 4.25 million beneficiaries in the country with a total cost of about USD 915 million.

About 2.7 million registered Syrian refugees in the region

As of early May 2014, almost 2.7 million refugees were registered in the region covering Egypt, Iraq, Jordan, Lebanon and Turkey. Although WFP continues to provide food assistance to vulnerable Syrian populations in the region, resources in host communities remain under strain. WFP assistance in neighbouring countries has been scaled up to reach more than 2.5 million beneficiaries by December 2014, more than three times the 795 000 individuals assisted as of June 2013.

Safeguarding livelihoods

FAO's assistance focuses on safeguarding and supporting livelihoods by protecting, restoring and improving food and agricultural systems of vulnerable affected households. Since the beginning of the conflict in 2011, FAO has been providing support to the most vulnerable affected rural and peri-urban families in order to mitigate the consequences of the ongoing conflict on their food security and livelihoods. During the 2013/14 winter cropping season, FAO assisted nearly 29 000 farming families (in Idleb, Aleppo, Al Hasakeh and Hama governorates) through the distribution of wheat and barley seeds. In addition, support to the livestock sector, in the form of feed and veterinary assistance, continues to be provided.

Under the Syria Humanitarian Assistance Response Plan (SHARP) for 2014, FAO is appealing for USD 43.6 million to assist 135 000 households (about 945 000 people), to sustain households' capacity in own food production (cereal and livestock), while also boosting livelihoods' diversification. Currently, FAO is preparing to support the next winter cereal campaign, targeting 50 000 vulnerable small-scale farming households (approximately 350 000 people) living in conflict-affected areas. This assistance is expected to cover the targeted families' needs for 12 months together with a small surplus to sell. An estimated USD 20 million is required for this assistance with funds required by July 2014 in order to provide the assistance not later than October 2014, the start of the next cropping season. Complementary activities are aimed at supporting animal production and health as well as livelihoods' diversification, mainly through backyard food production (poultry and vegetables).

Despite the potential of agriculture to address some of the mounting food availability constraints, the sector has largely been underfunded during the last three years of conflict, with current funding standing at only 3.8 percent of the requirement for 2014. Insufficient support during 2014 would exacerbate the already fragile food security and further reduce the productive capacity of affected vulnerable smallholders, both in the Syrian Arab Republic and in neighbouring countries.

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FAO Model-Based Forecast of the 2014 Syrian Arab Republic's Wheat and Barley Production

The FAO model-based, which utilizes the percentage of agricultural area affected by drought¹ and the area cultivated estimated by the Syrian Ministry of Agriculture and Agrarian Reform (MAAR), forecast wheat production at about 1.9 million tonnes, 51 percent below the previous 10 year-average (2003-12 Statistics from the Government of the Syrian Arab Republic, FAOSTAT). Similarly, barley production is forecast at about 346 000 tonnes, 55 percent below the previous 10 year-average. If the average area harvested in the previous 10 years was used instead of the current estimates by MAAR, projections of the wheat crop would amount to about 2.3 million tonnes, while barley would amount to 387 000 tonnes.

Table 1. Estimation of Syrian wheat production using remote sensing observations

Scenarios	Wheat					
2014	Yield (t/ha)	Standard Error of Estimation (SEE)	Area (ha)	Production (t)	Variation % Avg (03-12)	Variation % (2012)
Scenario 1: Area cultivated estimated by Ministry of Agriculture	1.50	±0.32	1312535	1968803	-51	-48
Scenario 2: 2008-2012 Average Area Harvested	1.50	±0.32	1529248	2293872	-43	-39
Reference data						
2003-2012 Average	2.40		1663205	3991691		
2012	2.34		1602814	3750585		
2008	1.44		1485900	2139696		

Table 2. Estimation of Syrian barley production using remote sensing observations

Scenarios	Barley					
2014	Yield (t/ha)	Standard Error of Estimation (SEE)	Area (ha)	Production (t)	Variation % Avg (03-12)	Variation % (2012)
Scenario 1: Area cultivated estimated by Ministry of Agriculture	0.29	±0.18	1193755	346189	-55	-52
Scenario 2: 2008-2012 Average Area Harvested	0.29	±0.18	1335106	387181	-49	-47
Reference data						
2003-2012 Average	0.58		1321665	766566		
2012	0.64		1132875	725040		
2008	0.18		1433200	257976		

¹ To calculate the area affected by drought in the agricultural zones, the **Agriculture Stress Index (ASI)** is used. ASI is an index based on the integration of the Vegetation Health Index (VHI) in two dimensions that are critical in the assessment of a drought event in agriculture: temporal and spatial. The first step of the ASI calculation is a temporal averaging of the VHI, assessing the intensity and duration of dry periods occurring during the crop cycle at pixel level. The second step determines the spatial extent of drought events by calculating the percentage of pixels in arable areas which possess a VHI value below 35 percent (this value was identified as a critical threshold in assessing the extent of drought in previous research). Finally, each administrative area is classified according to its percentage of affected area to facilitate the quick interpretation of results by analysts.

Crop Yield Model Development

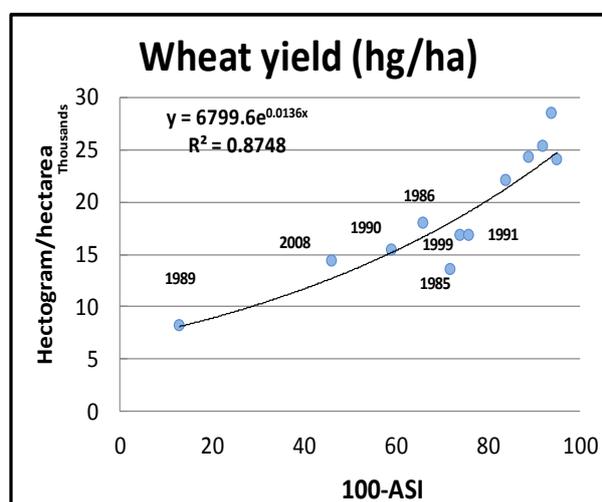
Crop production statistics

The Syrian Arab Republic's crop statistics (1985-2012) in FAOSTAT was utilized to develop the crop yield model. The Agricultural Stress Index (ASI) that represents the total agricultural area affected by drought at the national level is the predictive variable².

Crop yield model

The model utilizes 28 pairs of data. When the independent variable (ASI) equals a value higher than 95, the yield outcome shows a vertical variation that could not be explained by water stress, which would then be replaced by its respective average value. This reduces the degrees of freedom (n). The final model has an exponential relation between wheat yield and transformed-ASI (Figure 1).

Figure 1: Wheat yield model in which ASI explains 87% of the yield variation

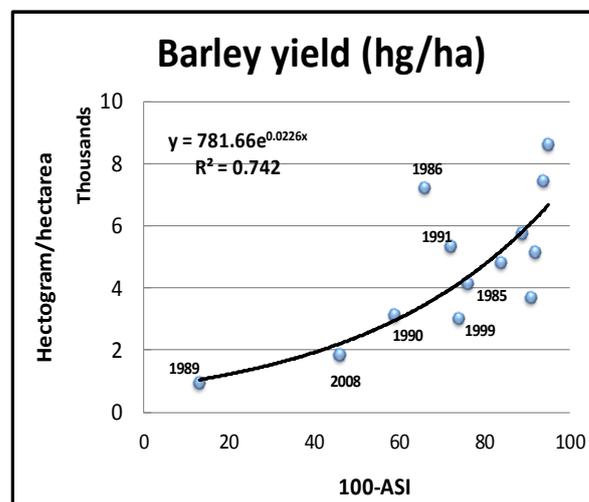


The barley yield model (Figure 2) proceeds in similar fashion. Regression results indicate that the ASI explained about 87 percent of the wheat yield variation and 74 percent of barley yield variation.

Production estimates

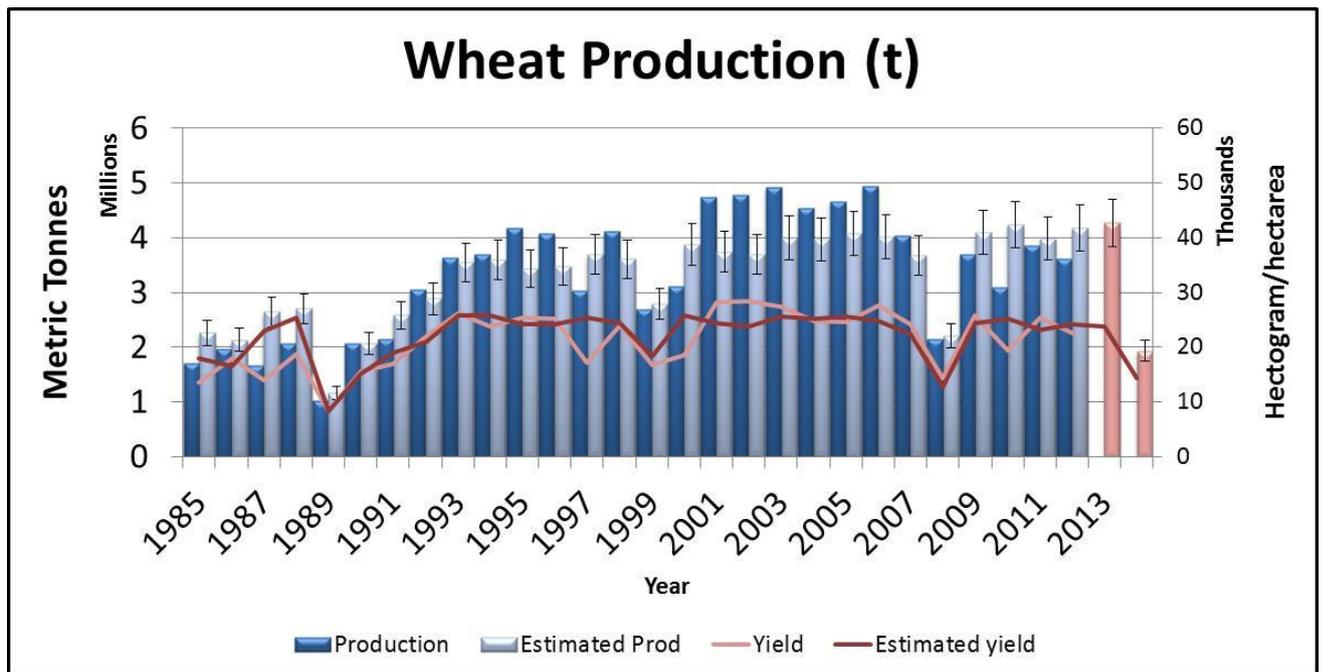
To estimate the 2014 crop production, estimates of cultivated area for each crop by the MAAR were used, with an unknown standard error for the area estimates. The upper and lower bound of the production estimates were calculated using the standard error of crop yield estimation. To estimate the 2013 production we used the area planted with each crop estimated by the FAO/WFP Crop and Food Security Assessment Mission (CFSAM, 2013). We also use the 2008-12 average of area harvested to produce an alternative scenario of production.

Figure 2: Barley yield model in which ASI explains 74% of the yield variation



² The independent variable was transformed as (100-ASI) and that could be interpreted as the agricultural area not affected by drought.

Figure 3: Model estimates of wheat production and yield



Estimates are based on the FAO-model and area estimated by MAAR. Production estimates show the 10 percent error bar.

Figure 3 presents wheat production estimates for 2013 and 2014 (pink bars). The 2014 estimate is based on the value of ASI until the second dekad of April 2014. The final estimation will be calculated when the crop cycle finishes. The estimated production includes an error bar of 10 percent. Figure 4A and 4B shows the wheat and barley yield (tonnes/hectare), three years affected by drought, 1989, 2008 and the partial results of 2014, are marked and compared to the corresponding ASI maps.

Note the impacts of the different drought years in the governorates. During 1989 and 2008 Al-Hasakeh, normally the most productive governorate, was severely affected; however during 2014 only its sub-districts of Ra's al-'Ayn and Darbasiyah are moderately affected. Al-Hasakeh contributes about 40 percent of the total area planted to wheat (Figure 4C); up to April dekad 2, crops reach about 60-70 percent of the crop cycle (Figure 4D).

Figure 4A: Wheat and barley yield estimates based on ASI
 Figure 4B: Maps of ASI value for 1989, 2008 and partial value up to 2nd dekad of April 2014

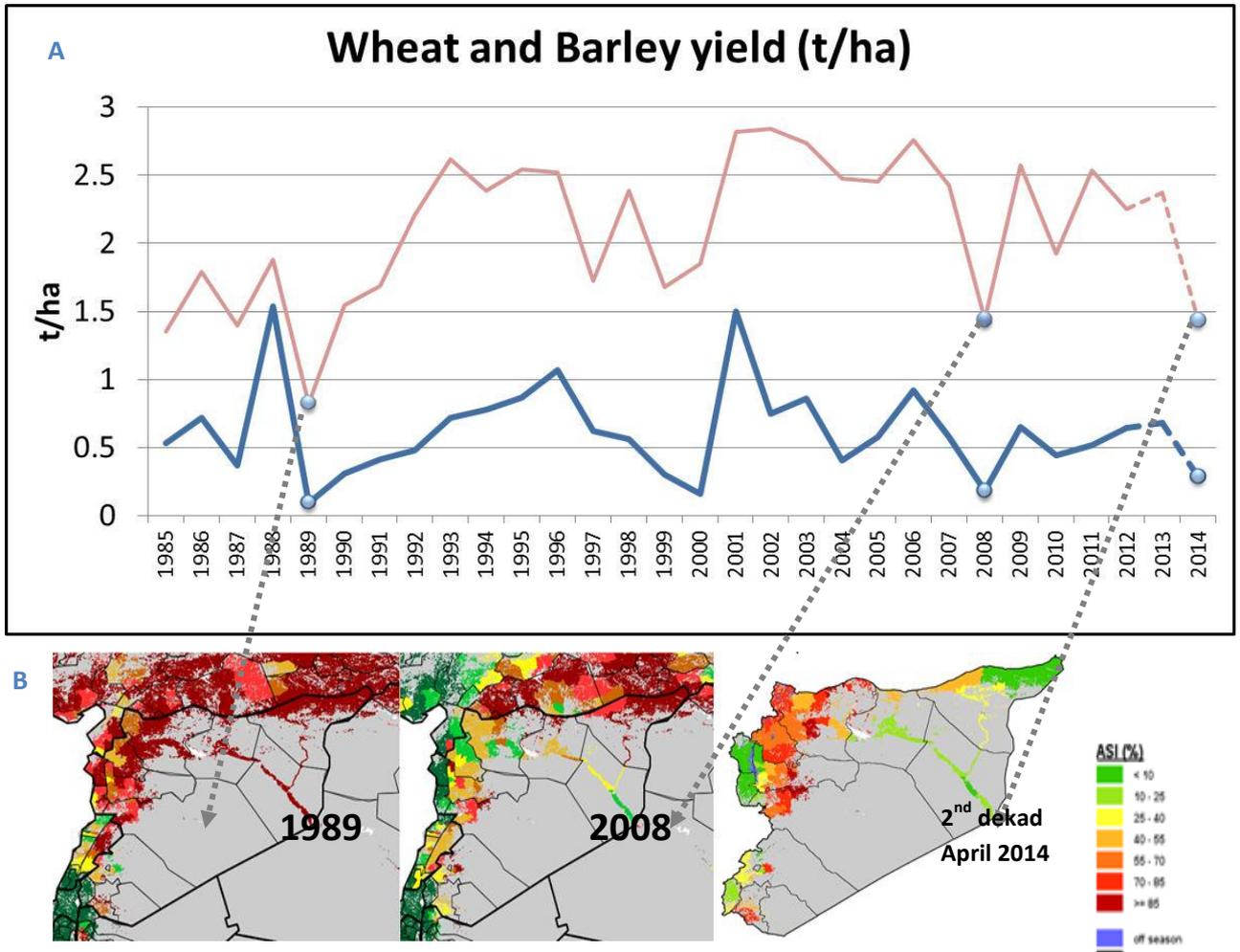
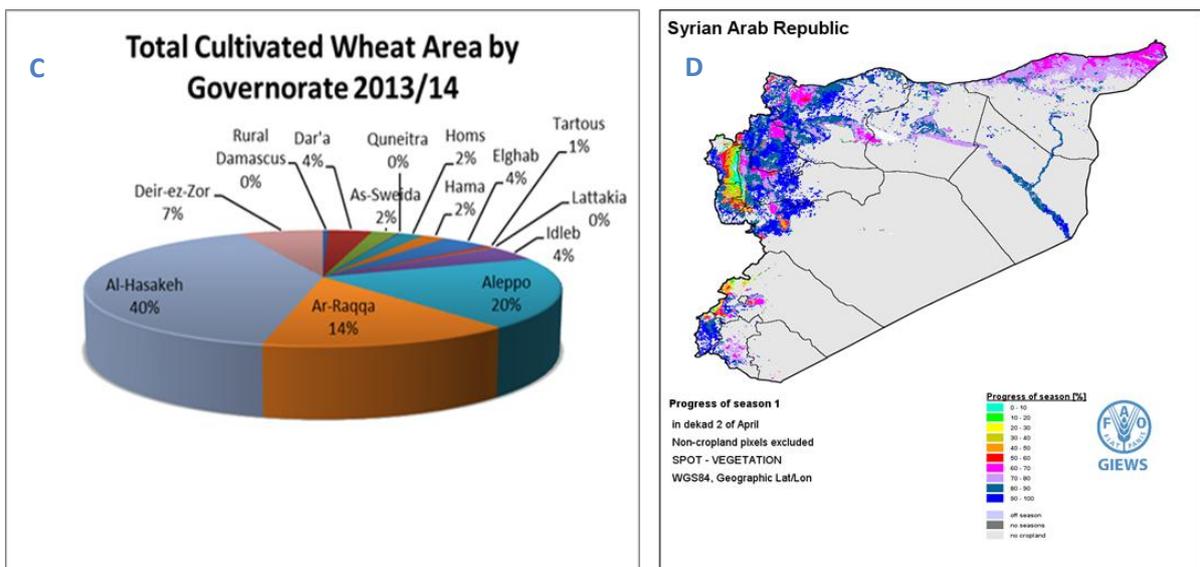


Figure 4C: Total cultivated wheat area by governorate
 Figure 4D: Progress of season expressed in percentage



Annex - Disclaimer

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