Introducing

While the attention of the world is on the current refugee crisis in the Middle East, Turkey and Europe, we need to look at the causes of this mass exodus of people. Here we examine some of the underlying reasons for the problems in Syria that contributed to the struggle in that country, which in turn led to war.

In May 2013 The Guardian carried an article by Dr Nafeez Ahmed, Director of the Institute for Policy Research & Development, that highlighted three key contributors to Syria’s difficulties. These were peak oil, climate change and pipeline geopolitics (http://www.theguardian.com/environment/earth-insight/2013/may/13/1). In the sections below, we look briefly at the issue of Syria’s drought, and then present data and charts relating to Syria’s peak in oil production and the financial consequences of this.

Drought

In The Guardian article, Ahmed wrote:

“[Syria had suffered] an intensifying and increasingly regular drought cycle ... from 2010 to 2011, the price of wheat doubled - fuelled by a combination of extreme weather events linked to climate change, oil price spikes and intensified speculation on
food commodities - impacting on Syrian wheat imports. Once self-sufficient in wheat, Syria has become increasingly dependent on increasingly costly grain imports, which rose by 1m tonnes in 2011-12, then rose again by nearly 30% to about 4m in 2012-13. The drought ravaged Syria’s farmlands, led to several crop failures, and drove hundreds of thousands of people from predominantly Sunni rural areas into coastal cities traditionally dominated by the Alawite minority. ... Assad’s inability to maintain subsidies due to rapidly declining oil revenues worsened the situation. The food price hikes triggered the protests that evolved into armed rebellion, in response to Assad’s indiscriminate violence against demonstrators. The rural town of Dara’a, hit by five prior years of drought and water scarcity with little relief from the government, was a focal point for the 2011 protests.”

In terms of the influence of climate change on this drought we note that in March 2015 a group of researchers led by climatologist Colin Kelley of the University of California published a study in the Proceedings of the National Academy of Sciences with the title “Climate change in the Fertile Crescent and implications of the recent Syrian drought”. This study concluded that:

“There is evidence that the 2007 - 2010 drought contributed to the conflict in Syria. It was the worst drought in the instrumental record, causing widespread crop failure and a mass migration of farming families to urban centers. Century-long observed trends in precipitation, temperature, and sea-level pressure, supported by climate model results, strongly suggest that anthropogenic forcing has increased the probability of severe and persistent droughts in this region, and made the occurrence of a 3-year drought as severe as that of 2007 - 2010 2 to 3 times more likely than by natural variability alone. ... As water became scarce, crops failed and cattle died on a huge scale. As many as 1.5 million Syrians, out of a population of just over 20 million, moved from the countryside to the outskirts of already overflowing cities.” (see link at: http://www.historicalclimatology.com/blog/is-climate-change-behind-the-syrian-civil-war)
Peak Oil

In the remainder of the paper we analyse the extent to which peak oil contributed to a deterioration in the finances of the Syrian government, such that it was forced to introduce unpopular policies (tax increases, removal of fuel subsidies, increasing cost of cement etc.) which contributed to the country’s unrest.

Oil production, exports and consumption

First we look at the country’s oil production, exports and consumption. These data are shown in Figure 1.
From Figure 1, we see several tipping points

- 1996: Peak oil production
- 2001: Crude oil exports start to drop sharply, albeit cushioned by rising oil prices
- 2006: Petroleum imports begin to increase at higher rate
- 2008: Increasing petroleum consumption approaches level of declining oil production
- 2011 Arab spring reaches Syria in March
- 2011 International oil companies suspend operations. Oil embargo http://www.sanctionswiki.org/Syria
- 2012: Oil production falls precipitously as government loses control over Eastern oil fields.
- 2014: Oil production has completely collapsed

In examining the fall in oil production, it is helpful to look at the location of Syria’s oil & gas fields compared to the areas under IS control. This is provided by a map in the original web posting taken from a ‘Business Insider, Australia’ briefing by Pamela Engel, July 1 2015 (at: http://www.businessinsider.com.au/map-of-syria-shows-what-isis-is-truly-fighting-for-2015-6), and where the original map is from Canada-based Syria conflict observer @KaryBDamoid. As the map shows, it would seem that the advances of ISIS across Iraq and Syria have often focused specifically on areas containing oil and gas fields; as the Business Insider briefing notes:

“Extortion and taxation count for most of ISIS’ funding, but oil revenues are still significant - The New York Times reports that in 2014, ISIS brought in $US 100 million from oil alone.”

Oil reserves

Next we look at the evolution over time of Syria’s oil reserves, noting the usual critical difference between the public-domain current-date data for proved (‘1P’) reserves, and the oil industry’s backdated data for proved-plus-probable (‘2P’) reserves. This evolution of both classes of reserves is shown in Figure 2.

As can be seen, Figure 2 shows that the industry-data 2P reserves reached some 5 Gb by 1990, and then were rapidly drawn down subsequently, falling to about 2.5 Gb by 2010. By contrast, the public-
domain 1P reserves data (except for a short anomaly in the OGJ/EIA data) show that Syria’s reported proved reserves rose fairly steadily from about 1960, reaching the same ~2.5 Gb by 2010 as indicated by the 2P data.

Figure 3 sets out the explanation for the evolution of the 2P reserves data. The Figure plots cumulative ‘2P’ discovery and cumulative production, and hence the derivation of the 2P reserves by subtraction. As the Figure shows, Syria has experienced two main phases of oil discovery: that of its largest field, Souedie, in 1959; and subsequently a discovery phase, mostly in the mid-1980s to the early-1990s, of smaller...
fields, of total volume perhaps half as much again as Soudie. (For additional data, and background on the underlying petroleum geology and oil prospectivity of Syria, see Chapter 67 of Campbell, 2013). Little oil has been discovered in the country subsequently.

By contrast, as Figure 3 shows, Syria’s production of oil rose rapidly, such that, as already mentioned, its 2P reserves have been drawn down substantially since about 1992. On these data of oil discovered and that produced, it is no surprise that Syrian production peaked in 1996. In terms of the country’s potential for future production, Laherrère has estimated Syria’s ultimately recoverable resource (URR) of conventional oil, based on past and potential future discovery, to be 8 Gb. This

Figure 3: Syrian Cumulative discovery, cumulative production, and remaining 2P reserves

Source: Jean Laherrère’s website: http://www.aspofrance.org/

Notes:
- cum disc O+C Gb: Oil industry 2P data of cumulative discovery of oil and condensate, in Gb.
- cum prod O+C Gb: Cumulative production of oil and condensate, in Gb.
- 2P: Hence proved-plus-probable (‘2P’) remaining reserves, by subtraction.
compares to current cumulative production plus remaining 2P (proved-plus-probable probable) reserves being ~7.5 Gb. Laherrère’s production projection on the basis of this 8 Gb of ultimate recovery is depicted in the following graph:

Of course the projected production shown in this figure is now theoretical, as no-one can currently predict the future of Syria.

Figure 4: Jean Laherrère’s 2009 production profile for Syria
Notes:
• smooth cor. discovery: Industry data on oil discovery, smoothed.
• prod: Actual production.
• U = 8 Gb: Reasonable projection of production, to fit actual past production and an assumed ultimately recoverable resource for the country of conventional oil.
IMF Reports

Now we turn to examining the financial aspects of Syria’s peak in oil production. This section mainly uses IMF data. The last IMF Article IV consultation staff report, for 2009, (http://www.imf.org/external/np/sec/pn/2010/pn1042.htm) was published in March 2010. Since then no IMF assessment has been made due to the political/security situation. And as a result of a two-year long lag of preparing national accounts, lack of data and other discrepancies, many calculations are estimates or projections. The earliest IMF report available on the internet is from October 2005 with data going back to 2000.

Revenue

Government revenue was 21% of GDP in 2010. The following graph shows oil revenue compared to other revenue and total expenditure.

Figure 5: Syrian government revenue by source
This figure shows oil-related revenue is in decline or stagnating since 2001. Its share of total revenue dropped from 45% in 2000 to 25% in 2010. Despite this, total revenue grew on average by 9.4% pa. This was achieved by increasing income tax and other indirect taxes, definitely not popular policies. Transfers from public enterprises (PE) also contributed to revenue growth. These PEs dominate the energy and financial sectors, play a privileged role in supply chains such as in cotton and cereals and hold monopolies in all utilities, oil and sugar refining, production of cement, fertilizers and mineral water. However, the PE surplus is not net of capital expenditure which comes under the big item “development expenditure” (Fig 7). Most PEs are loss making except those in the telecommunication sector.

However, expenditure grew faster at 10.8%. This difference resulted in a budget deficit of 17% of expenditure in 2010.

Figure 6 looks at the make-up of the government’s revenue from oil.

![Figure 6: Composition of Syrian government oil revenue](https://en.wikipedia.org/wiki/Syrian_Petroleum_Company)
Expenditure

Now we look at how the government spent its money. Government expenditure was 25.9% of GDP in 2010, with the evolution of the spending pattern being shown in Figure 7.

![Figure 7: Syria government expenditure, 2000 to 2010](image)

Expenditure grew by an average of 10.8% pa; salaries by 16% pa.
Figure 8: Defence expenditure consumed all oil related revenue in 2007
Oil balance

The oil balance is defined as: oil exports – oil imports – repatriation of oil company profits.

The graph shows that the value of net oil exports after 2007 was practically zero. Due to transfers of international oil company profits the zero point of the oil balance was passed 1 year earlier, in 2006, after which it was negative between 1 and 1.5 US$ bn pa.

Figure 9: Syria’s oil balance
Current account balance

In Figure 10, we start with the oil balance calculated in Fig 9 (blue line) and add the (positive) export balance from services, income and transfers. The trade balance of goods is negative and has to be deducted (hatched area) to arrive at the current account balance (red line). We see that the declining shape of the oil balance results in a similarly declining current account curve.

Figure 10: Current account and oil balances
Inflation

Inflation largely moved with oil prices up to 2008. The cumulative inflation over the period 2000-2010 was 54%.

Figure 11: Syria’s average CPI

Data: IMF Article IV Consultation reports and EIA
Population
Per capita oil production peaked in 1993 at 15.2 barrels and had dropped to half of that by 2007.

Figure 12: Syria’s population development (age structure in background)
http://esa.un.org/unpd/wpp/DVD/
Fuel Subsidies

The IMF praised the reduction of fuel subsidies as a reform, but this was certainly not popular.

<table>
<thead>
<tr>
<th>Energy Subsidy Reforms</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price Adjustments</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gas Oil (Diesel)</td>
<td>7.3 to 25 SP/liter</td>
<td>25 to 20 SP/liter</td>
</tr>
<tr>
<td>Fuel Oil</td>
<td>6 to 9 SP/liter</td>
<td>...</td>
</tr>
<tr>
<td>Kerosene</td>
<td>22.7 to 40 SP/liter</td>
<td>...</td>
</tr>
<tr>
<td>Gasoline</td>
<td>36 to 40 SP/liter</td>
<td>...</td>
</tr>
<tr>
<td>Compensatory Measures</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public wage increase</td>
<td>25%</td>
<td>...</td>
</tr>
<tr>
<td>Diesel coupons</td>
<td>1000 liters per household at 9 SP/liter</td>
<td>...</td>
</tr>
<tr>
<td>Cash Transfers</td>
<td>...</td>
<td>10,000 SP for eligible households</td>
</tr>
</tbody>
</table>

Figure 13: Increase in fuel prices 2008-09

In 2008, fuel prices were lifted, saving around 7% of GDP. In order to offset these higher prices, public wages were increased and coupons introduced which allowed each household to buy 1,000 litres of diesel at a lower price. This costed 4.5% of GDP. In 2009, the diesel coupons were replaced by targeted cash transfers based on income, asset ownership and utility bills.

<table>
<thead>
<tr>
<th>Energy Subsidies, as % of GDP</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total subsidy</td>
<td>12.9</td>
<td>4.9</td>
</tr>
<tr>
<td>Price subsidy (extrabudgetary)</td>
<td>8.3</td>
<td>-1.3</td>
</tr>
<tr>
<td>Budgetary compensatory measures</td>
<td>4.5</td>
<td>6.2</td>
</tr>
</tbody>
</table>

Figure 14: Energy subsidies as percent of GDP

The fuel subsidy reform in 2009 meant that the population had to save 8% of GDP.
Summary

There are many reasons for the disintegration of Syria and the tragic exodus of refugees. This article shows how Syria’s declining oil production and increasing oil consumption impacted negatively on the government budget, lead to tax increases and reduction of subsidies. These factors contributed to the population’s dissatisfaction which sparked the Arab Spring in Syria.

It is absolutely necessary that the world wakes up to the problem of peaking oil production in geo-strategically important areas, otherwise there will be more surprises. If countries with a high per-capita oil consumption could finally embark on a transition away from oil this would reduce future conflicts and wars.

Further Reading

Syria’s Economy and the Transition Paradigm
Samer Abboud, Ferdinand Arslanian, 2009
https://ojs.st-andrews.ac.uk/index.php/syria/article/download/713/617

Related posts:


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31/5/2011 Sudan’s Nile blend in decline – why we should be concerned
http://crudeoilpeak.info/sudan-nile-blend-in-decline-why-we-should-be-concerned

Reference
