Food Research Collaboration

Should the UK be concerned about sugar?

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Summary

This paper has been produced to contribute to public debate about sugar, the ill-health consequences of which have rightly been highlighted in recent years. This and an accompanying paper seek to dovetail these public health concerns with other issues arising from and associated with the sugar industries. Sugar is a commodity with a long and troubled social history: slavery, colonialism, unequal trade relations, bad working conditions, heavy land use, pollution and other forms of environmental damage. On the other hand, it is a large employer, an economic lifeline for some small countries and many growers, and a considerable concern for the fair trade movement. The paper supports the public health concerns about unnecessary and rising consumption of sugar through processed foods and soft drinks, but mainly explores how these concerns can be squared with other interests championed by civil society organisations. It asks whether a progressive route can be charted through a potential minefield of conflicting interests. The paper provides a digest of facts and figures on the UK, EU and world sugar trade. It concludes that sugar raises long-term questions for UK food policy, whether the sugar is produced in the UK as beet or imported from cane. It suggests that in a world of squeezed resources and food security concerns, the sugar trade warrants more attention from UK policy makers, particularly with regard to how the transition to a low sugar consumption food system could be managed. We see opportunities for joint work by civil society organisations and academics on that process. We confirm that a better food system would begin to wean the world off massive sugar production and consumption. As this process begins, more, and urgent, attention should be given to alternative land use, employment and revenue generation for primary producers who are locked into the production of this, often unnecessary, food commodity.

1. Introduction

The Fairtrade report, "Sugar Crash: How EU reform is endangering the livelihoods of small farmers" (1) has highlighted the tensions over the current sugar cane trade and the implications for poor overseas producers arising from changes to EU policy on sugar beet. This Fairtrade report was published after the present briefing paper on sugar had been proposed at a meeting of academics, public health and Fairtrade representatives[1] in London in September 2014, hosted by the Food Research Collaboration (FRC). At the FRC meeting, concerns were raised about how the public health case for sugar reduction could be squared with the livelihoods of producers in poorer nations. Was the new sugar régime taking sufficient note of either the public health champions wanting a reduction of sugar in diets to tackle obesity or the employment considerations being championed by development and fair trade civil

[1] See the Acknowledgements at the end of this paper for a full list of the project team participants.

society organisations? Could a case for reform be charted which united social movements which otherwise might compete for limited policy attention?

This paper explains the background to this policy area. It takes a wide look at the world of sugar and sweeteners. The sweetening of the UK's and the world's diet is no longer just a competition between European beet, cane from Least Developed Countries exporting under Everything but Arms and American cane[2]. The market for artificial sweeteners now adds to the potential sources of sugary taste available to food and drink manufacturers.

This briefing paper is one of two FRC papers on sugar; the second looks more closely at the environmental and social impacts of sugar production. The FRC hopes that the publication of both papers helps to inform debate on the UK's role as a significant importer of cane sugar, not just a producer, as we progress further into the 21st century. We are mindful, too, that with the Transatlantic Trade and Investment Partnership (TTIP) being negotiated at the EU level with the USA, maize-derived High Fructose Corn Syrup (HFCS) might also increase its presence in the UK. This will add to the concerns of advocates of public health, the environment and social justice. Pending TTIP's conclusion, this paper focuses on the tensions between cane and beet production.

We hope this paper extends the debate and fairly represents all parties. The threats from changes to the UK, EU and global sugar trades are real and immediate: to cane producers if sugar prices collapse and markets are lost; to the UK if the incidence of NCDs continues to increase at current rates; to cane workers if civil rights continue to be ignored; and to UK land use if beet production continues to be planted on soils which might produce more beneficial crops. Excepting UK land use, the parallels with tobacco are striking; happily, the eventual successes in tobacco control offer potential encouragement. This is not an easy debate but a process of negotiation between all parties is needed. A path between social, moral and self-interested conscience needs to be established.

2. The problem

UK and EU sugar consumption is a determinant of living standards for many in poor overseas nations: a large number of smallholders obtain their livelihoods from sugar cane production. The problem is that the sector currently faces a number of extreme challenges. The EU sugar sector has been heavily regulated for decades to the benefit of the poorest country suppliers and this is due to change in 2017 as EU sugar beet and isoglucose[3] production quotas expire. This will likely lead to an increase in sugar production within the EU, often subsidised, with a resultant price fall and market displacement for third country suppliers.

In addition, obesity, overweight and dental decay are real and increasing problems in the UK and worldwide, with overweight and obesity predicted to cost the NHS £9.7 billion per year by 2050, with wider costs to society and business projected to reach £49.9 billion per year (2). There are initiatives at work in the UK to encourage consumers to reduce per capita sugar consumption.

Lastly, as a result of EU policy change, the market may become more open to alternative sweeteners in the future; these not only exacerbate the problem for poorer suppliers but may also exacerbate public health impacts if sugar prices fall and/or if the production of alternative sweeteners expands.

[2] This latter is important in world markets rather than EU markets.

[3] Isoglucose or high fructose corn syrup (HFCS) is a sweetener made from corn (in the US) or wheat (in the EU), very similar to sucrose (table sugar) and honey in composition, sweetness, calories and metabolism. High fructose corn syrups are sold principally in two formulations - 42 percent and 55 percent fructose-with the balance made up of primarily glucose and higher sugars (http://corn.org/products/sweeteners/, Corn Refiners Association)

Figure 1: Statement of the sugar problem

At the heart of the problem is the following:

"For many of us, sugar cane is not just some incidental crop that can be easily replaced. It is a primary agricultural export, at the very core of our economies and a principal source of income for huge segments of our populations – in Fiji's case, 200-thousand people or more than 20 per cent of all Fijians. In some ACP countries, sugar exports account for more than one quarter of GDP and 85 per cent of total agricultural exports.

…….. So for Fiji and many other ACP countries, a healthy market for our sugar spells a healthy economy and higher living standards, while a poor market spells the opposite[4]*"*

In the face of this high dependency, CAP reform is going to have a significant impact:

"The major impacts [of this reform] are the sharp decline and severe volatility in price arising from the expanded production of sugar from EU beet growers in a market that is already over-supplied. This entails placing the heavily subsidised beet farmers in sharp and unfair competition with ACP producers, especially small cane farmers……

This opening-up by the premature removal of quotas as a market management tool, to benefit a few highly efficient, low cost commercial operators, is adverse to the 'development' aspect in which ACP sugar farming is undertaken. It's the livelihood of millions that depends on cane sugar cultivation and production that is being threatened. This is unfair[5]*"*

The result will be reduced imports of sugar from those who so desperately need the EU market:

"(One of) the impacts that can be expected when quotas expire (is that) raw sugar imports from high-cost third countries decline very substantially. ……. When it is assumed that an increasing share of the sweetener market is taken by isoglucose …… raw sugar imports from high-cost third countries decline even more than when there is no isoglucose interaction[6] (3)".

And to compound these difficulties, it is becoming more evident that populations the world over need to reduce sugar intake:

"Added sugar is a completely unnecessary part of our diets, contributing to obesity, type II diabetes and tooth decay. We strongly urge the WHO to recommend reducing sugar intakes to below 5% daily calories, as this will have the biggest impact on our health[7]*"*

[4] Commodore Josaia Voreqe Bainimarama, CF (Mil), OStJ, MSD, jssc, psc, Prime Minister and Minister for Finance, Strategic Planning, National Development and Statistics, Public Service, Peoples Charter for Change and Progress, Information, i-Taukei Affairs, Provincial Development, Sugar Industry, Lands and Mineral Resources, Speech At The Opening Of The 13th ACP Ministerial Conference On Sugar, 14th October 2013 (available at: http://www.acp.int/sites/acpsec.waw.be/files/Bainimarama_speech.pdf

[5] Ambassador Gomes, Secretary General Designate of the African, Caribbean and Pacific Group of States, quoted in, Fairtrade Foundation, 2015, *Sugar Crash How EU Reform is Endangering the Livelihoods of Small Farmers*, A Fairtrade Foundation Report, February 2015, p. 21, available at: http://www.fairtrade.org.uk/~/media/fairtradeuk/what%20is%20fairtrade/documents/policy%20and%20research%20documents/policy%20reports/faitrade%20foundation%20sugar%20crash%20report.ashx

[6] Text in brackets added by authors.

[7] Chairman of Action on Sugar, Professor Graham MacGregor, quoted in World Health Organisation Calls For Action On Sugar, Consensus Action on Sugar and Health, http://www.actiononsugar.org, 5th March 2014, accessed 8 January 2015

The overall impact of these three forces will be a dramatic reduction in income to developing country suppliers.

This paper examines these issues in more depth, looking at why they are of concern to the UK and suggests the avenues that further research may take in order to alleviate the potential fallout from policy change.

3. Britain, sugar and the Commonwealth

The UK has a long history of importing sugar from Commonwealth countries: those party to the 1951 Commonwealth Sugar Agreement (CSA) included Australia, South Africa, the British West Indies, Mauritius, Fiji, the East African territories and British Honduras (4). Except for the latter two, these territories were heavily dependent on the production of raw sugar and had a common interest in preventing a repetition of the very low prices that had been observed in export markets in the inter-war years.

Following Britain's joining the EEC in 1973, there was a change in the Common Market Organisation for sugar whereby a preferential import programme was agreed with traditional developing country suppliers, the ACP countries. This ACP Sugar Protocol, as it became known, stemmed from the 1975 Lomé Convention and translated the British CSA into an EU agreement on trade with ACP states. This allowed for preferential access to the EU market for 1.3 million tonnes of raw sugar imported at a rate close to an inflated EU domestic price for raw sugar. Such preferential access has remained a part of the EU market policy through various modifications to the regime over the past few decades.

Sugar preferential access has, over the years, affected the investments made in capital, land and human resources in ACP countries (5). The earnings generated by the Protocol have been a major source of foreign currency, have contributed to governments' budgets and to the balance of trade, and in many cases have represented a financial transfer larger than development assistance. There are cases where these earnings have played a role in the modernisation of the sugar industry or as a source of capital for investment in alternative activities.

The potential case for the UK to remain concerned at the plight of sugar cane industries in far-off lands is three pronged:

1. British conscience: The British were responsible for establishing large-scale sugar plantations in the West Indies in the 17th century and this made sugar affordable for the masses (6). Profits from the sugar trade helped to build the British Empire and necessitated expansion of the Atlantic slave trade to work the plantations. Almost 1 million African slaves were brought to the Caribbean to work on the plantations under notoriously brutal conditions. Many of the ACP countries remain highly dependent on the sugar industry for food security and the eradication of poverty. The UK/EU has a moral duty to continue to support imports from these poor nations.

2. Maintenance of cane refining capacity in the UK: Tate and Lyle Sugars refine only sugars and syrups from cane sugar and is one of only a few companies in Europe that does this. It is the view of Tate and Lyle as well as ESRA (7) (the European Sugar Refineries Association) that changes to be introduced in the EU sugar regime in 2017 threaten the long-term future of the cane refining sector in the EU.

Across the EU the cane refining sector supports 5,000 manufacturing jobs, allows for consumer choice and contributes to food security, as cane refiners produce a staple food product from a different raw material to other EU producers (8). Recent high world and regional prices have encouraged some cane producing countries to divert exports of raw sugar away from EU markets. In future, if cane refiners are unable to

acquire raw material at competitive prices and maintain a viable economic throughput, their future demise will simultaneously impact ACP/LDC supplying countries as there will no longer be a market for raw cane sugar in the EU.

3. EU's role in smallholder sugar development: The EU has provided a market for smallholder cane producers for generations. Countries such as Malawi, Zambia and Swaziland have all developed their sugar cane industries with export to the EU in mind, sometimes with the help of the EC. Removing that market without mitigating the impact will have serious consequences for LDCs exporting under the Everything But Arms Initiative (see Section 4) as well as for longer established ACP exporters such as Jamaica.

4. A brief history of EU sugar policy towards third countries

The EU sugar market has for several decades been heavily regulated. Up to 2006, this was done through a system of production quotas, import quotas and duties, export refunds and intervention buying. The result of this intervention was higher EU sugar prices compared with world prices. In addition to the Sugar Protocol, from 2001 under an Everything But Arms (EBA) Initiative, quota-free duty-free access was granted to the EU market for all goods except arms produced in the Least Developed Countries (LDCs)[8]. This policy encouraged production of sugar for export[9].

The EU sugar regime to 2006 was criticized both internally and externally for the distortions it caused to the market. The inflated EU sugar price encouraged production in areas in the EU not suited to beet growing. The resultant domestic oversupply created unstable world markets as large quantities of subsidized sugar were released onto the world market, suppressing world prices for white sugar. The EU then subsidized exports to this unsustainable market to cover the difference between EU and world prices.

There was also fear in the EU that under the EBA Initiative there could be an influx of LDC sugar if domestic prices remained high. This, and a ruling by the WTO that the EU was unfairly cross-subsidising exports of sugar, led to a process to reform the policy over the period 2006 to 2010.

Reforms at this time included a sizeable reduction in EU production quota with many beet sugar processors closing (41% reduction in the number of factories 2006-2010 (9)) and a dramatic reduction in the EU sugar support price of 36% from €631.90 per tonne to €404.40 per tonne by 2009/10. As a result of these changes, the EU became a net importer of sugar.

Additionally, in 2007 the EU gave notice that it would end the Sugar Protocol from 1 October 2009. Instead, the EU introduced Economic Partnership Agreements (EPAs), regional trade agreements between the EU and six groups of ACP countries. The transition period for this was to last from 2008 to 2015 where, under the final arrangement, all ACP sugar would be duty-free and quota-free but still subject to an EPA safeguard clause[10], [11].

[8] For sugar, a transition period meant that quotas were maintained on exports of sugar under the EBA agreement until October 2009

[9] Juxtaposed with the most recent CAP reform, which will remove demand for LDC sugar, the issue of policy incoherence is highlighted.

[10] Safeguard clause applies to ACP non-least developed countries (Bangladesh, Cambodia, Laos, Nepal).
ACP-LDC countries with quota-free, duty-free access are: Benin, Democratic Republic of Congo, Ethiopia, Madagascar, Malawi, Mozambique, Senegal, Sierra Leone, Sudan, Tanzania, Togo and Zambia, see Commission Regulation (EC) No 828/2009, at:
http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32009R0828&from=en

The impact for previous Sugar Protocol countries of the policy change initiated in 2006 was expected to be drastic, caused largely by,

1. the 36% reduction in price received compared with prices offered under the Sugar Protocol; and,

2. following the end of the Sugar Protocol, 67 ACP (EPA/EBA) countries were to benefit from preferential access to the EU market rather than the 19 signatories to the Protocol (10). Competition for EU market access would increase.

The EU did attempt to support those countries that had previously been a part of the Protocol via its Accompanying Measures for Sugar Protocol Countries (AMSP) (EC Reg. 266/2006) programme. An evaluation for the EC (11) of this programme found that within the 18 Sugar Protocol countries, four country groups could be identified, differing according to their reaction to the CAP reform. This varied from production expansion to withdrawal and demonstrates that in terms of country response to further market challenges, cane supplying countries cannot be treated as one homogenous group: the needs and responses of each supplying country differ according to their current supply base and cost conditions.

5. World, EU and UK production and prices for sugar

The majority of sugar produced globally originates from sugar cane. World production stood at 1,877 million tonnes in 2013 of which 57% came from just two countries, Brazil and India. By contrast, world production of beet stood at 250 million tonnes in the same year with the EU responsible for 43% of this total and 16% coming from the Russian Federation. Comparing these sums, 88% of world sugar production is from sugar cane, 12% from sugar beet.

Table 1: World production of sugar cane 2013 (12)

	2013	
	Production (thousand tonnes)	% of world production
Brazil	739,267	39
India	341,200	18
China, mainland	125,536	7
Thailand	100,096	5
Pakistan	63,749	3
Mexico	61,182	3
Total (world)	**1,877,105**	**100**

[11] The EU also has a concessionary CXL agreement with Australia, Brazil and Cuba, introduced when Finland joined the EU in 1995. These countries are subject to an import quota and a reduced duty of €98 per tonne for raw cane sugar (See EC Reg. No. 891/2009).

Table 2: World production of sugar beet 2013 (12)

	2013	
	Production (thousand tonnes)	% of world production
Russian Federation	39,321	16
France	33,613	13
United States of America	29,767	12
Germany	22,828	9
Turkey	16,483	6
China, mainland	12,056	5
European Union	107,816	43
UK (13)	8	.003
Total (world)	250,191	100

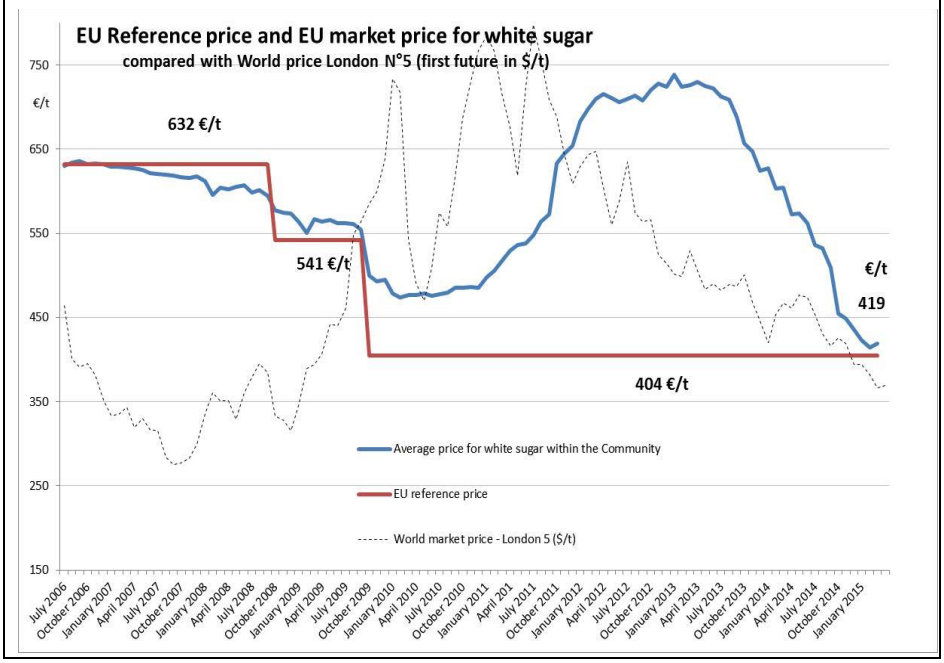
The EU is a net importer of sugar. 79% of imports into the EU were from countries with EPA-EBA agreements in 2014-2015 (14). Remaining imports were from Central America, Colombia and Peru (6%), Brazil (4%), Balkans (7%) and the remaining 4% from "Others". This shows the significance of imports from the ACP and Least Developed Countries in overall EU imports.

World sugar prices are notoriously volatile; this is influenced by a whole variety of factors operating in producing and consuming countries that, can be summarised as (15):

- Government policies that intervene in sugar markets in many countries;
- Production cycles in Asia, particularly in India, that cause large periodic swings in trade between imports and exports
- The actions of Brazil, the leading sugar producer and dominant global trading nation, a country that has attained the status of a "price setter" on the world market with international sugar prices usually correlated with its relatively low production costs. The size of the annual sugar cane crop in Brazil, together with its allocation between ethanol and sugar production, are key factors underlying the projection of international sugar prices.

Figure 2 shows world prices peaking at around $795 in 2011. This was caused by large global sugar deficits in the previous two years and adverse weather in a number of countries. World sugar stocks fell to their lowest level in 20 years in 2010-11, leading to higher but also more volatile market prices (14). Prices have since declined to a low in early 2015 of less than $400 per tonne and a Euro price of €419, only slightly above the reference price of €404.

Figure 2: EU Reference price and EU market price for white sugar compared with World price London N°5 (first future in $/t) (16)



Maybe in reaction to this, ten of the EU28 have chosen to adopt a new voluntary Coupled Support payment measure under new CAP reforms. This will allow them to direct between €169 million and a €179 million per year to support their sugar beet farmers between 2015 and 2020 (17). This is concerning for developing country suppliers who will lose out not only from price falls but also from market loss when competing with subsidised EU producers.

6. Importance of sugar exports to producing countries

Sugar is an important export for a number of developing country suppliers. The UK alone takes 100% of the EU exports of some cane producing nations: in 2010 and 2011 these were Fiji, Belize, Lao, Cambodia and, in 2010, Sudan. It is useful here then to reflect on what these exports mean in economic and social terms for the countries supplying the UK.

Table 3: Production and export of sugar from key UK suppliers (18)

	Production ('000 tonnes)				Export of raw centrifugal sugar	
	Sugar Cane		Raw centrifugal sugar		Volume ('000 tonnes)	Value ('000 US$)
	2011	2012	2011	2012	2011	2011
Fiji	2,115	1,546	166	157	122[12]	70,889
Barbados	259	278	25	27	23	10,593
Belize	844	1,070	99	115	83	41,371
Guyana	3,196	2,709	235	218	253	155,675
Zimbabwe	3,058	3,700	372	501	88	37,935
Jamaica	1,518	1,475	138	131	111	53,000
Malawi	2,500	2,800	305	315	268	191,947

[12] There is a discrepancy here between the volume of exports to the UK reported by Fiji in FAO Stat and the volume of imports to the UK from Fiji reported.

Table 4: Exports of raw sugar as percentage of total agricultural exports, 2011 (18)

	Total agricultural products ('000 US$)	Raw centrifugal sugar ('000 US$)	Sugar as % of total agricultural exports
Guyana	379,851	155,675	40.98%
Fiji	268,015	70,889	26.45%
Belize	162,413	41,371	25.47%
Jamaica	295,655	53,000	17.93%
Malawi	1,144,870	191,947	16.77%
Barbados	90,700	10,593	11.68%
Zimbabwe	1,150,401	37,935	3.3%

For Guyana, sugar exports contribute approximately 41% of all agricultural exports by value and for Fiji and Belize sugar contributes more than a quarter of all agricultural exports by value. For Jamaica, Malawi and Barbados, sugar exports are a significant contributor to agricultural export earnings.

The sugar sector is also an important contributor to GDP in these nations. As Table 5 shows, in Guyana sugar contributes 6% of GDP, 3.4% in Malawi, 2.8% in Belize. This is not an insignificant crop.

Table 5: % of GDP from sugar exports for selected EU suppliers (12, 18)

	GDP (current US$'000)	2011 raw centrifugal sugar exports ('000 US$)	Sugar exports as % of GDP
Guyana	2,576,602	155,675	6.04%
Fiji	3,646,423	70,889	1.94%
Belize	1,487,005	41,371	2.78%
Jamaica	14,433,926	53,000	0.37%
Malawi	5,627,898	191,947	3.41%
Barbados	4,368,900	10,593	0.24%
Zimbabwe	10,956,226	37,935	0.35%

Data on employment and social gains from sugar cane production by country is not easily located and would be difficult to calculate without primary research. Much of the sugar in ACP countries is produced from smallholdings and by contract farming where household labour is not recorded. In larger scale operations some very large organisations employ staff in the various countries in which they operate so employment data is available on a per company rather than per country basis. However, two examples of the contribution that sugar cane production can make to communities are given in the boxes below:

Vietnamese conglomerate Hoang Anh Gia Lai, said Thursday that a sugarcane plant in its industrial complex in the southern Laotian province of Attapeu went on stream January 16.

Besides the sugarcane plant, which can process 7,000 tons of sugarcane per day, a 30 MW thermal electricity plant, fuelled by bagasse -- or sugarcane waste -- has also started generating power.

The factory, which employs more than 4,000 employees, has 12,000 hectares of sugarcane plantations in Attapeu and contracts with local farmers growing the crop on a further 4,000 hectares.

Nguyen Quang Anh, director of the complex, said the group has helped local farmers by providing new techniques, modern equipment, and sugarcane seeds, which will help them raise their annual revenues on their land by more than 16 times to roughly $5000-6000, he added. (19)

The sugar industry is an important socio-economic factor in Belize, providing significant employment, foreign exchange earnings, and rural stability. Poverty levels of around 30% of the population in the sugar belt are relatively low due to the incomes and employment generated by the sugar industry, which also finances housing, education, health and recreational activities through a welfare fund. (20)

One only has to look back to the opening quote of the paper from the Fijian Prime Minister to understand how important sugar is for that one country alone.

7. Threats to sugar cane supplying countries

Export revenue from sugar is the result of price commanded for sugar as well as the quantities sold. Both these factors are currently under threat as a result of EU policy reform, public health encouraged consumption change and competition from alternative sweeteners.

7.1 The public health challenge

WHO statistics for the European region show that over 50% of people are overweight or obese and over 20% of people are obese. One in three 11-year olds is overweight and obese[13]. In the UK the picture is worse with two thirds of adults overweight or obese in 2012 (21). In addition, PHE reports that almost one-third of five-year-olds in the UK had tooth decay in 2012. On this basis, PHE report that,

"The case for a reduction in the nation's sugar intake is clear. It is likely to bring about a reduction in the risk of calorie imbalance, weight gain and obesity and the associated health, well-being and dental health problems".

The report goes on to list the potential savings to the NHS of a reduction in sugar consumption:

"Reducing sugar consumption, particularly in the most disadvantaged groups in society, is also likely to improve health equality, have a positive impact on the nation's mental health and wellbeing, and save costs to the NHS and local authorities by reducing social care costs. The most recent estimates are that excess body weight and poor dental health costs the NHS alone £4.7 billion and £3.4 billion a year respectively. The social care costs of these conditions, which will fall to local authorities, are difficult to estimate, but are likely to be significant. NHS costs attributable to overweight and obesity are projected to reach £9.7 billion by 2050, with wider costs to society estimated to reach £49.9 billion per year".

These costs are vast. The NHS in England has a budget of around £100 billion for 2015 (22): already more than 8% of this is taken by diet related illness and the projections to 2050 are frightening.

In 1991, COMA (the Committee on Medical Aspects of Food Policy), recommended that non-milk extrinsic sugars[14] should contribute no more than 10% of total dietary energy. This was based on evidence that sugar intake is associated with greater dental caries (23). However, SACN reports National Diet and Nutrition Survey data for the period 2008/09 to 2011/12 that show that percentage daily intake from

[13] See WHO regional office for Europe, http://www.euro.who.int/en/health-topics/noncommunicable-diseases/obesity/data-and-statistics/infographic-1-in-3-11-year-olds-is-overweight-or-obese-download

[14] Non-milk extrinsic sugars include sugars added to foods, e.g. sucrose, glucose and fructose, and sugars naturally present in fruit juices, e.g. glucose and fructose (see SACN 2014)

NMES exceeded the recommended amount across all age groups, being highest in the age 11-18 group (15.4%) and age 4-10 group (14.7%).

Based on the fact that reducing sugar intake will lower the incidence of dental caries and the over-consumption of energy that currently leads to weight gain, the SACN draft report proposes that the recommendation for sugar intake in the UK should be set at a population average of around 5% of dietary energy for those aged 2 years and above. The report bases this on the need to limit free sugars[15] to no more than 10% of total energy intake at an individual level, so necessitating a population average for free sugars intake of around 5% of total energy. This 5% of total energy intake per day is also proposed in the WHO (2014) draft guideline on sugar intake (24) which suggests that sugar intake should contribute less than 10% of daily energy intake but that 5% would provide more health benefits.

In the UK there is also support for a reduction in sugar in the diet from Action on Sugar[16], a group of specialists concerned with sugar and its effects on health. The group works to achieve a consensus with the food industry and Government over the harmful effects of a high sugar diet, and to bring about a reduction in the amount of sugar in processed foods. The group is supported by 23 specialist advisors.

PHE (21) is also looking to the future to see what approaches might be adopted to encourage consumers to reduce their sugar intake including further development of social marketing, education and training for health professionals so they can effectively support healthier behaviour and regulating the advertising of sugary foods.

Of course, if the EU reform holds prices for sugar in the EU at low levels, following strict economic principles, there is always the chance that consumption may increase. A lower sugar price will make it economically more viable to incorporate calorific sweeteners into processed products, potentially increasing the overall sugar content of foods (25). Innovation to incorporate sugar into a greater range of foods may also be encouraged.

An expansion of HFCS production in the EU could also undermine efforts to change consumer behaviour. The Alliance for Natural Health Europe claims that it is harder for the body to break down HFCS because of its molecular structure, hence an increased likelihood of resultant obesity (26). Euractiv (27) quote Jeppesen, a Danish researcher on obesity and diabetes at Arhus University, as saying that the use of HFCS has led to a "genuine obesity epidemic in the US since it was introduced. We have tested it on rats, and this type of sugar increases the risk of getting fatty liver disease and diabetes". He claims that HFCS primarily consists of fructose which has already been degraded and therefore goes straight into the blood. Though HFCS today can be found in small limits in cakes, Jeppesen claims that it can become very dangerous, if for example, it is used in beverages where the liquid is consumed in large amounts.

Impacts of these effects on cane supplying countries depend on a number of related consequences. Firstly, if sugar prices fall and isoglucose production expands, making this too a cheaper product, manufacturers may be more inclined to increase use in processed products and overall consumption could increase, or not fall to the levels identified by WHO/SACN as being beneficial to health. Secondly, demand will be affected by whether or not PHE and others are successful in persuading consumers to reduce consumption of sugars. These are fairly new initiatives so positive outcomes are yet to be seen.

[15] The SACN report proposes that the UK adopts the definition of 'free sugars' in place of 'non-milk extrinsic sugars'. Free sugars are defined as all monosaccharides and disaccharides added to foods by the manufacturer, cook or consumer, plus sugars naturally present in honey, syrups and unsweetened fruit juices. This term is more easily recognized outside the UK.

[16] see http://www.actiononsugar.org

Lastly, the extent of potential consumption reduction is unknown and the effects on overall demand not calculated. If consumption were to fall to 5% of total energy intake, what effect would this have on total demand for sugar? Published data have not been identified for this paper and a request for such information from Public Health England brought the following response[17]:

> PHE has not looked at a change in the volume of sugar consumed within the UK or a change in the volume of sugar used in products likely to be observed if SACN were to advise reducing the recommendation for sugars to 5%. It is very hard to predict a change in the volume of sugar consumed as it takes years to deliver a significant reduction on a population scale. For example, Government work to drive a reduction in the nation's salt intakes through public health messaging and working with manufacturers, has resulted in a 15% reduction over 10 years. (28)

This is a good reason for not attempting the calculation but some rough estimates might be useful. Using data from the NDNS for sugar consumption by age group and multiplying through by population data from the Office for National Statistics shows that for the period 2008-2012, sugar consumption in the UK amounted to around 1.3 m tonnes per annum[18]. Using the % of total energy data from the NDNS for each age group and reducing this so that sugar represents 10% and 5% of total energy intake lowers this 1.3 m tonnes to 1.1m tonnes and 548 thousand tonnes respectively.

These are very generalised estimates and do not match the figures given by DEFRA for total new supply[19] over the same period (see Table 6) which averaged 2 m tonnes per annum. Reducing this to 10% and 5% of total energy intake results in consumption figures of 1.7m and 800 thousand tonnes respectively.

Table 6: Total UK sugar balance (refined basis, thousand tonnes, unless otherwise specified) (29, 30)

	2008	2009	2010	2011	2012
Production	1,192	1,280	995	1,315	1,144
Net imports	806	801	820	920	798
Total new supply	1,998	2,081	1,814	2,235	1,943

Looking at these ballpark figures, both the NDNS data and the DEFRA data, the suggestion is that with a 10% energy intake, sugar consumption could fall by around 0.2-0.3 m tonnes annually. At a level of 5% energy intake from sugar, consumption could fall by 0.75-1.2 m tonnes annually. Considering UK imports from outside the EU stood at 0.65 m tonnes in 2012 and averaged 0.94 m tonnes over the 2008-2012 period, a reduction in sugar intakes in the UK to WHO/SACN levels could impact severely on demand for sugar from poorer countries.

7.2 Price and market impact of sugar reform

In order to encourage a more sustainable and competitive agricultural industry in the EU towards 2020, 2013 saw further reform of the Common Agricultural Policy introduced, including change to the sugar regime. The main element of this is the removal of EU production quotas on sugar beet and isoglucose which will take effect from 30th September 2017. This change and the resultant impact for cane

[17] Private correspondence with Elizabeth Harper, Correspondence and Public Enquiries Officer, Public Health England, 24th February 2015

[18] This is done by totalling consumption for each of five NDNS age categories using the data given for grams consumed per day multiplied by average population data for the UK for the period 2008-2012. The percentage intake from sugar is then reduced to 10% and 5% for each age category and total consumption for the UK taken from the sum of the totals for each age category.

[19] Private communication with DEFRA, 11 November 2014: total new supply can be used as a proxy for consumption.

supplying countries have yet to be observed but several organisations have calculated predictions as to the likely market effects.

The EC (31) predicts that from 2016 to 2020, the EU will marginally increase production of beet by 1% to 115.1 million tonnes and its production of sugar by 4.3% to 16.8 million tonnes. Consumption of sugar will remain fairly constant around 17.2 million tonnes but overall consumption of sweeteners will increase due to an increase in the consumption of isoglucose. By 2020 the latter will show an increase in production of 2.4 times the quantities produced in 2016 (0.7 million tonnes) and consumption will increase from 0.7 million tonnes in 2016 to 1.6 million tonnes in 2020, increasing its overall share in sweetener use from 3.6% to 8.5% by 2020.

In 2014, the EC also predicted a reduction in the EU price of sugar from €496/tonne in 2016 to €415 per tonne in 2020, a difference of 19%. The data in Figure 2 shows this low level has already been reached. This represents a 42% fall in price from €720 in October 2013 to €419 in March 2015. This is more than a threat, rather a disaster for poor cane supplying countries.

The EC predicts that over its forecast period of 2014-2024, the EU will become self-sufficient in sugar and even an occasional net exporter. Imports are expected to fall from 2.7 m tonnes in 2016 to 1.91 m tonnes by 2020. The report (32) does suggest that opportunities will still exist for certain periods in the year when EU production cannot cover domestic demand and in certain regions, as beet production is concentrated in the northwest of Europe. However, it does not take account of the Voluntary Coupled Support subsidies that will allow the continuation of higher cost production in the EU and again lessen demand for imports from traditional cane suppliers.

Figures from DEFRA (33) also suggest that abolition of the beet quota will lower EU sugar prices by up to 20% potentially causing some developing country suppliers to become uncompetitive on EU markets. Again, the data in Figure 2 suggest this price point has already been reached.

A more detailed analysis of the likely impact of CAP reform on the sugar sector is given in the 2014 JRC report, "EU Sugar Policy: A Sweet Transition After 2015?" (2). The analysis here uses a partial equilibrium mathematical model (CAPRI) to compare two scenarios in 2020: in the reference case, quotas remain in place, in the alternative scenario, quotas are eliminated in 2015 and predictions given for market impacts assuming a zero, 10% and 20% substitution effect from isoglucose.

With quotas in place, there are effectively two markets in place for sugar in the EU, the white sugar market for food use, (supplied by domestic production under quota and by imports) and the market for out-of-quota sugar (used for industrial purposes or exported). The EU price of the first category of sugar has tended to be higher than the world price of sugar because of the protection received while sugar falling in the latter category has tended to follow the world price.

According to the JRC report, when subsidies are removed, these prices will tend to merge, with the price of white sugar falling and the price of industrial sugar rising. Production of beet is predicted to increase in the EU after subsidy removal as regions previously producing out-of-quota sugar increase production beyond the decline in production of those areas previously producing only to quota. In addition, sugar previously used for industrial purposes or exported is now diverted to the domestic market, hence pushing up domestic supply of white sugar.

The report predicts that human consumption of sugar will rise marginally following a price reduction, but the existence and extent of this increase will depend on the degree to which isoglucose substitutes for sugar in the sweetener market. This is tested in the alternative scenarios presented by the JRC. Matthews (34) suggests that the market share of isoglucose at 10% is the most likely in 2020 and, given this, the increase in EU sugar consumption in the model is seen to be reversed.

The outcome for cane supplying countries is not good in any of the scenarios. With increased domestic supply of white sugar and potentially reduced demand, sugar imports decline. The report suggests that in the standard scenario with no isoglucose substitution, imports from high-cost countries will fall by 43% and from low-cost countries by 4%.

As Matthews (op. cit.) concludes, the three main factors determining EU sugar production and price post-2017 will be the overall supply response of EU production; the share of isoglucose in the EU market when isoglucose quotas are removed and the responsiveness of export supply from preferential exporters to changes in EU market price.

Finally, DFID (35) has examined the likely impact on developing countries of EU sugar policy reform. They estimate that removal of production quotas will lead to a reduction in raw sugar prices in the EU by about €100 per tonne by 2020 relative to the level of prices that would be expected if quotas were to continue. This would amount to a loss of revenue of €170 million to the ACP/LDC supplier group based on supply levels to the EU in the period 2008/09-2010/11 (1.67 m tonnes per year).

International sugar grower and processor organisations hoped that CAP reform would not happen until the end of the 2019/2020 marketing year. Prior to 2013, CIBE, CEFS, EFFAT and the ACP group wrote,

> "The Single CMO for sugar provides a buffer for the EU against world market volatility. The abolition of the flexible tools to manage supplies to the internal market (i.e. to withdraw sugar in situations of surplus or to release sugar/allow additional imports in situations of deficit) would increase EU market volatility and damage the EU's ability to secure access to a reliable and predictable sugar supply. Any permanent increase in imports should be strongly opposed. This would undermine ACP/LDC preferences and damage the coherence between the EU's agricultural, development and trade policies" (36)

The counterfactual view came from the CIUS, the European Sugar Users association, which supported the reforms. In April 2013 they wrote:

> "The position of the European Parliament adopted in March, aimed at extending sugar and isoglucose quotas until 2020, is a wrong signal for Europe. Furthermore, it is de facto a request for a blank extension to quota without any clear end date, as 2020 is yet another CAP reform year. This position conflicts with the over-riding objective of promoting jobs and economic growth in Europe. The European Parliament should facilitate, not hinder, expansion of production and export of high value added products made in Europe. Restricting beet sugar production in Europe to 80% of European demand and applying conditions that have artificially raised prices for this important ingredient to more than twice the EU reference and world market prices, undermines European competitiveness throughout the food supply chain.
>
> While we still see no solid justification for any extension beyond 2015 we welcome that the Council has acknowledged the need for change and are glad that the compromise date of 2017 proposed by the Council is earlier than the one proposed by Parliament" (37)

7.3 Market competition from alternative sweeteners

After September 2017, restrictions on the production of isoglucose in the EU will also terminate and the market will be open to increased output. Under the current EU sugar regime, production of isoglucose in Europe has been capped at 700

thousand tonnes[20], and isoglucose consumption makes up less than 5% of the total EU sweeteners market. This compares with the beet sugar production quota of 13 million tonnes annually.

Forecasts as to the share that this product will take in the EU sweetener market post-2017 vary because of uncertainties regarding future prices of cereals, the production of sugar beet after quota abolition and the uptake of isoglucose by food processors; the latter will be influenced by the consumer acceptance of this alternative sweetener in food products.

DFID (35) comment that EU isoglucose production capacity is currently very limited but costs are competitive with the sugar sector and could improve with increases in the scale of production. The report advises that isoglucose production could expand "significantly" in the absence of quotas.

The AAF (European Starch Industry Association) predicts that isoglucose could take up to 20% of the EU market for sweeteners in the longer term (38). This could seriously impact on the demand for raw sugar from traditional preferential suppliers to the EU market.

Whilst the AAF predicts a 3 million tonne output of isoglucose in future, the EC (39) predicts output to reach 2.3 million tonnes by 2024, just above expected consumption of 2.2 million tonnes. This would represent an 11.6% share of the sweetener market.

Even at 11%, the share of the sweetener market contributed by isoglucose is nothing like that in the US where HFCS makes up 34% of per capita caloric sweetener consumption (40). JRC (2) finds it difficult to predict the evolution of isoglucose in EU markets but do not expect this to reach levels observed in the US. They explain that isoglucose is not a substitute for pure sugar in direct consumption but can substitute for sugar to varying degrees in processed foods such as baked goods, confectionery and ice cream. However, in soft drinks, its substitutability is high, but then the consumption of soft drinks in the EU is much lower than in the US. Because of this uncertainty, in their model described earlier, they perform sensitivity analysis on the substitution effect looking at impacts for the sugar sector if isoglucose takes a 10% or 20% share of the EU sweetener market. Either way, increased use of isoglucose in the EU processed food market could lessen the demand for imported raw sugar.

Isoglucose is not the only competitor on the EU sweeteners market. MECAS/ISO (41) lay out the different major sweetener categories and types. The first division is between caloric and non-caloric sweeteners. Caloric includes sucrose (sugar), HFCS, glucose, dextrose and crystalline fructose. Non-caloric sweeteners are subdivided into Natural and Synthetic. Synthetic sweeteners include, for example, Saccharin, Sucralose, Neotame and Aspartame. Natural non-caloric sweeteners divide into Low potency and High potency. The latter includes the newer Stevia sweetener, Luo Han Guo (from monk fruit) and the Sweet Proteins Brazzein and Thaumatin. The low potency natural non-caloric sweeteners include Erythritol, Isomalt, Lactitol, Mannitol and Sorbitol. In general, the non-caloric sweeteners are intensely sweet and therefore only minute quantities are required for sweetening foods.

Different sweeteners have different uses according to their properties so the picture regarding their ability to replace sugar in different foods is difficult to predict. However, MECAS report CCM International 2011 data that show whereas the price per unit of sweetness for sucrose stood at US$1,115 per tonne, the equivalent value for sucralose was $17 and for aspartame only $78. However, these High Intensity

[20] Nine EU countries hold isoglucose production quota: Hungary holds the largest at 250 thousand tonnes, followed by Belgium at 114 thousand tonnes, Bulgaria 89 thousand, Slovakia 68 thousand, Germany 57 thousand, Spain 54 thousand, Poland 43 thousand, Italy 32 thousand and Portugal 12 thousand. The UK does not produce isoglucose. (Source: EC Reg 1308/2013, Annex XII)

Sweeteners (HIS) are not perfect substitutes for sugar in all products, which may limit their usage, although some non-diet foodstuffs are using a blend of sugar and HIS.

MECAS does however predict that the relatively recent Natural HISs, Stevia and Luo Han Guo, may show significant growth in coming years albeit at the expense of other HISs rather than sugar. Stevia, or Steviol glycosides, is derived from the Stevia plant and is around 250-450 times sweeter than sugar (42). Within the EU it can be labelled as "naturally-sourced". Agritrade (43) report that "the major stevia suppliers are now focusing on cutting sugar by half in mainstream soft drinks" and other manufacturers are looking to reduce sugar use by 30% in products such as yoghurt and ice cream.

Competition with ACP supplying countries will depend on the extent to which substitutions in the food industry become possible as well as on the relative price of sugar on world markets and the price of cereals used in the production of isoglucose.

8. Potential impact of threats to price and demand on sugar supplying nations

The threats outlined in Section 7 could have serious consequences for third country sugar producers. DFID analysis (35) predicts different outcomes of the change in EU policy for four country groupings based on their cane cost base and current market opportunities. The countries selected are those that have supplied the EU market in recent years. The matrix is reproduced below as Table 7.

Table 7: Costs (average 2008/09-2010/11) vs. market access matrix (35)

	Alternative markets	No/limited alternative markets
High cost (US$400 per tonne)	Benin Cote d'Ivoire Dominican Republic Jamaica Kenya Madagascar Sierra Leone	Barbados Belize Mauritius Guyana Fiji
Low cost (<US$400 per tonne)	Cambodia Ethiopia Malawi Sudan Tanzania Zambia Zimbabwe	Swaziland Mozambique Laos

The authors suggest that the extent to which a country is affected by EU policy change is determined by the current level of exposure of the industry to the EU market and access to alternative markets as well as their industry's cost structure. On this basis, those countries potentially most affected are those in the top right hand cell, Barbados, Belize, Mauritius, Guyana and Fiji: the report advises that these countries would need to lower their production costs in order to remain viable in the long run.

In this analysis, impacts are mainly due to changes in the world price because, following EU reform, EU prices are expected to follow world prices more closely. The study estimates that if quotas are abolished[21], 35 times more people would be

[21] The study predates the 2013 decision on the expiry of production quotas.

put into poverty when world prices are low compared to the status quo (i.e. with quotas in place) with high world prices. The report states that this is equivalent to around 6.7 million people or over 3% of the expected levels of poverty in the 22 ACP countries in 2020. The countries that face the most challenges in remaining viable (Barbados, Belize, Guyana, Fiji, Madagascar and Jamaica) together provide employment for over 400,000 people either directly or indirectly.

Case studies of potential impact of and response to EU reform are given for Malawi, Mozambique, Mauritius and Guyana. For Malawi and Mozambique, with competitive sugar industries, sugar is predicted to continue to expand after EU reform but this reform will lead to an increased poverty percentage in both countries. This is because the revenue from EU sales would fall with the expiry of quotas. While sugar is not an important contributor to GDP in these countries, it does play a role in the livelihoods of household in sugar-producing areas through employment and income from cane production. Household welfare will be affected as sugar companies, under greater pressure to cut costs, reduce wages and cut back on social services. In addition, returns from cane production will fall and although this will still remain a more lucrative crop compared with other crops, this would have a negative effect on household incomes.

In Guyana, sugar is a significant part of the national and local economy. The report states that the industry is uncompetitive by global standards, with relatively low cane yields and sucrose content compared to other industries. The industry also suffers from low cane throughputs as a result of reduced cane supply, and hence inflated fixed costs of production for the industry. The DFID analysis shows further EU reform would have a substantial negative impact on the sugar industry's revenue and a rise in the poverty headcount. The sugar sector also provides an important role in providing social services to cane households, such as education, health care, pensions and sports facilities. These services could be negatively affected by reform and increased exposure to world prices.

The Fairtrade Foundation (1) has responded to dramatic sugar price reductions in the 2013/14 harvesting year of 30% by warning that: "In countries such as Belize, Guyana, Fiji, Malawi, Swaziland and Zambia, among others, there are few other options for farmers who have relied on exporting sugar to the EU. If these farmers are squeezed out of the EU market and not given additional support to boost their productivity or diversify into other crops, as many as 200,000 people could be pushed into poverty" (Jon Walker, Sugar Product Manager, Fairtrade Foundation).

Adams (44) describes the potential harm that EU reform could have on cane producers in Jamaica. He refers to an interview with George Callaghan, chief executive of the Sugar Industry Authority in Jamaica, where Mr Callaghan predicts that the current price farmers receive for cane (£390 per tonne) will fall by 40% in 12 months, well below the break-even point. There are very few alternatives for the 165 thousand people employed directly and indirectly in cane in Jamaica. Sugar cane is the only crop that can survive hurricanes and other storms that affect the island.

These are the types of negative impact that could result from a reduction in the world sugar price following EU reform but also if prices were to fall following a global-wide recognition of the link between sugar intake and inflated rates of NCD incidence.

In terms of adjusting to the reforms, the DFID report suggests three main strategy categories:

- Cost-reduction measures by improving technical performance, economies of scale and optimisation of the use of milling capacity;
- Diversification within the sugar sector through value-adding activities, for example, by introducing electricity cogeneration and/or ethanol production;

- Diversification of sales into different markets by supplying domestic and regional markets rather than focusing solely on exports to the EU, or by changing the type of sugar, e.g. increasing the proportion of refined sugar produced.

9. What are the policy options for the UK?

Sugar is a very complicated business. There is a long history of policy and resultant distortions in the EU and UK markets, there are output fluctuations as growers respond to prices and crops respond to the weather, there are changing tastes and differing tastes around the globe and many thousands of producers and processors at home and overseas dependent on the crop for livelihoods.

EU policy is being semi-liberalised. Duties on cane imports beyond preferential agreements will remain and production support for EU farmers will be available. The market will not be entirely transparent. Cane processors in the UK and EU will continue to face competition in international markets for input supply. Isoglucose production may extend and the product be found as a replacement in a variety of food and beverage products. Total per capita calorie consumption may increase or health campaigns may win. There are many uncertainties going forward.

We need to decide on priorities. If the prime one for the UK is healthier diets in the face of a global obesity epidemic, we need to reduce sugar intake. The efforts of PHE and research by SACN to encourage a reduction in UK sugar consumption are referred to in section 7.1 above. Consumer policies to encourage a reduction in sugar intake are well summarised by WCRF (45). Government could also pressurise industry to consider further reformulation of their food products. These could lead to a reduced demand for sugar from both beet and cane and thereby help to achieve the public health objective.

But how do we in the UK achieve this goal whilst supporting poor country sugar suppliers?

I. Produce less sugar?

If UK beet output were to fall (putting aside for a moment discussion on how this could be achieved), this would reduce overall domestic sugar supply and maybe increase our reliance on and demand for sugar imports. As Table 8 shows, beet accounts for "only" approximately 3% of total UK crop production value:

Table 8: Production and value of sugar beet and refined sugar in the UK (29)

	Area of beet ('000 hectares)	Value of production – sugar beet (£mill)	Value of production - all crops (£ mill)	Sugar beet as % of value of UK crop production	Production of refined sugar ('000 tonnes)
2010	118	197	6673	2.95	995
2011	113	251	8211	3.06	1315
2012	120	227	8054	2.82	1144
2013	117	266	8371	3.18	1320

However, there is some regional variation in this with UK production concentrated mainly in the East Midlands and the East of the country where sugar beet accounts for 4% and 8.5% of total crop value (see Table 9).

Table 9: Value of sugar beet production by region of England and as percentage of total crop output (£ million current prices) (46)

	2012			2013		
	Sugar beet output	Total crop output	Sugar as % of total crop output	Sugar beet output	Total crop output	Sugar as % of total crop output
North East	0	201	0.00%	0	210	0.00%
North West	0	356	0.00%	0	395	0.00%
Yorkshire	16	922	1.74%	19	947	2.01%
East Midlands	52	1,465	3.55%	61	1,458	4.18%
West Midlands	6	807	0.74%	7	836	0.84%
East	151	2,049	7.37%	177	2,083	8.50%
South East	1	1,227	0.08%	1	1,236	0.08%
South West	1	818	0.12%	1	878	0.11%
Total	227	7,845	2.89%	266	8,043	3.31%

Also, British Sugar (the sole UK producer of sugar from sugar beet) is a significant regional employer, employing over 900 permanent staff in the East of England and East Midlands and being supplied by around 3,600 farmers each year. Any alterations in UK beet production therefore have repercussions amongst growers and processors.

In addition, the agronomy of sugar beet cultivation needs consideration, "… sugar beet is a valuable rotational crop, one of the few spring crop options that provides a good return for growers while, importantly, offering excellent opportunities for weed control (particularly herbicide resistant black grass)"[22]. Nature must also be considered: according to the RSPB (47), more than 200 thousand pink-footed geese spend the winter in the UK (compared with only 50 thousand in the 1960s) and these birds feed in arable farmland on post-harvest cereal stubbles, sugar beet tops and winter wheat crops, particularly in north Norfolk and the Broads where sugar beet production in the UK is concentrated.

Even if in a hypothetical world these issues were ameliorated, a reduction in UK beet production would most likely lead to any gap in supply being filled by cheap, subsidised, EU imports rather than sugar supplies from poorer countries.

II. Import less sugar and encourage diversification?

If EU policy change does lead to a reduced need for imported sugar, this might encourage exporters to look to alternative world or regional markets. For some, this would be more feasible than for others, where surrounding countries produce sufficient sugar themselves. Would countries such as Belize and Fiji that currently send all sugar exports to the EU be able to maintain an export trade? This needs further analysis.

Alternatively, demise of the EU market for cane could encourage countries to diversify production. Markets for alternative products might offer more lucrative futures. What might these products be? What support would countries need to adjust? Can parallels be drawn with reductions in tobacco consumption in the West and resultant impacts on producing nations? (see the literature on this, for example, Vargas and Campos 2005 (48), FAO 2003 (49) and ICRISAT 2011 (50). Also note the parallels in the literature between Big Food and Big Tobacco, Moodie et al (51), Brownell and Warner (52)).

[22] Private communication with Dr Debbie Sparkes, Associate Professor in Agronomy, University of Nottingham, 26th November 2014

If diversification is the way forward then a sense of urgency needs to be injected into policy making and investment in sugar producing nations so that they are ready for the reforms that will take effect in 2017. EU prices have already crashed to levels that were predicted for 2020. ACP and LDC farmers and their communities in some countries are facing declines in income and loss of livelihoods. Efforts need to be strengthened to mitigate the forthcoming impacts of policy change over the next two years.

There are, of course, arguments that encouraging cane producing countries to produce other crops is no bad thing. The environmental and social issues surrounding cane production are laid out in the sister paper to this one and are well explained in The Food Ethics Council 2009 publication (53), "Sugar: A bitter pill?".

Maybe research could identify "good" and "bad" sugar. Fairtrade state that "British consumers and companies choosing Fairtrade sugar sent more than £5 million in Fairtrade premium back to sugar cane smallholders last year…… This is used for projects ranging from improving farming techniques to investing in schools – helping thousands of farmers and their families in countries from Belize to Zambia to take control of their own lives and destinies and improving their communities and their environment" (54). Maybe we just need to concentrate our reduced consumption on home-produced sugar beet and (organic) Fairtrade cane.

III. Diversify our use of sugar?

Sugar beet can be used to produce biofuel, ethanol, and in the UK at present the use of beet for ethanol is as important as the alternative crop, wheat. According to the HGCA (55), competition between the two crops for the production of ethanol may intensify following the expiry of sugar production quotas in 2017 if beet prices fall. According to the CGB (56), beet production for ethanol is more highly profitable than wheat production on a per hectare basis.

The potential to direct more sugar beet to the production of biofuels in order to maintain the market for imported cane sugar would need to be investigated further.

10. What are the implications for CSOs?

Sugar has always posed troublesome questions for political economy, let alone specific food politics. Once the slave triangle – North Europe, Africa, Caribbean/ America – was established, sugar became a source of fabulous wealth to slavers, carriers, planters and importers. The wealth and fine buildings of many UK (and north European) cities are physical reminders of this murky past. It has also led to a fine resolve by many civil society and religious organisations to support those populations left working in this post-colonial industry. The fair trade movement is one expression of such concerns. Through fair trade chocolate and now sugar itself, attempts have been made to educate the British (and European) consumer into 'better' consumption.

To the public health analyst, however, this is worthy but no longer the full picture. The health consequences of excess sugar consumption pose not just a health threat but an economic burden from healthcare costs associated with both hidden (processor added) and deliberate (consumer added) sugar intake.

To the environmentalist, as the accompanying FRC paper on sugar outlines, sugar poses a particular threat. Cane production can be a significant source of pollution and ecosystems damage. Yet, as we showed above, here in the UK, there can be a positive benefit from beet production, as is illustrated by the rise in pink-footed geese in East Anglia, and even a tourist trade attracted by the birds.

How can this diversity of interests be squared? Or must these interests slug it out in policy arenas? The FRC project team which requested the present briefing paper thinks not. It must be possible to chart a public interest policy position on sugar.

One starting point should surely be global food security. In a world of squeezed resources, rising environmental impact from food production and consumption, growing population, diminishing land use available for food production per capita, yet a world of rising expectations and affluence (albeit unequally distributed), how could optimum public health goals best be met? The FRC's first publication was the Square Meal report (57), produced by a consortium of civil society organisations and the Centre for Food Policy. It asked: what would the UK food system look like if it was designed to meet health, ecosystems support and socio-ethical considerations? The answer is: quite different. More extensive systems of production. Healthier consumption patterns. Less meat and dairy. More horticulture - to provide sorely needed rise in vegetables, fruit and nuts. And, surely within this picture, it would mean less sugar production, too. Economically, this also requires more money to be earned by primary producers. The remarkable fact about efficient modern food systems is that the proportion of what consumers spend on food that trickles down to growers is small. Sugar illustrates this unequal distribution. Adams (op. cit.) reports Jamaican cane cutters as receiving about £12 a day (2,000 Jamaican dollars) during the harvest season. Richardson (58) reports wages of $50 a month for fieldworkers in Mozambique.

A number of directions for further discussion and research now emerge in which academics and civil society could combine forces. These include better modelling of:

i. options for UK land use and food production if they were to meet diet-related health goals. What other crops could be grown to replace beet?

ii. the impact on employment from reduced sugar production in the UK, the European mainland, Africa and the Caribbean.

iii. alternative livelihoods for growers and workers in the sugar trades. This needs addressing urgently.

iv. health gains and healthcare savings from reduced sugar production and consumption.

v. demands for the next round of Common Agricultural Policy reforms, asking how the UK government and EU could bridge commitments to climate change, biodiversity, water conservation and public health, while improving consumer information.

The FRC believes that the pursuit of questions and data such as the above – all premised on asking what the ideal mix of land use, ecosystems, human physiological needs, and economic possibilities might be – will help academics and civil society provide advice to policy makers and create a shared framework of understanding across diverse interests. Rather than assuming the current mix as inevitable, we propose that society should ask what is the ideal for, say 2030 or 2050, and how could we retrofit present conditions to deliver those goals. We see this as a transition from today's unsustainable food system to one where sustainable diets are provided through sustainable food systems. Sugar today illustrates the antithesis of this. So it must surely be a test case for the transition.

We see this as a task which is, of course, complex but it is also necessary and overdue. Fertile lands are being used to produce a crop which adds to ill-health. This is ecological public health folly. It is unlikely to be righted, however, unless the issues raised in this briefing paper are also faced: trade, international inequalities, agronomic choices about land use, and employment. The fragility of the political economy of sugar coincides with the massive evidence of sugar's harmful effects on health, environment and social justice. It is time that bigger picture was addressed fair and square.

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Schoen, V., Lang, T., 2015, Should the UK be Concerned About Sugar? 9th June 2015. Food Research Collaboration Policy Brief

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