COLEACP

REVIEW OF FOOD MILES, CARBON, AND AFRICAN HORTICULTURE: ENVIRONMENTAL AND DEVELOPMENTAL ISSUES

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Definitions

Air miles/ Air food kilometres: the distance food travels via air in transport between the farm and the consumer

Contraction and Convergence: a proposed global framework for reducing greenhouse gas emissions to combat climate change. Conceived by the Global Commons Institute in the early 1990's, the Contraction and Convergence strategy consists of reducing overall emissions of greenhouse gases to a safe level, 'Contraction', where the global emissions are reduced because every country brings emissions per capita to a level which is equal for all countries, 'Convergence'.

Due diligence defence: is a legal defence whereby the EU food business (importer or retailer) is able to demonstrate in court that they have taken all reasonable precautions and exercised due diligence in trying to avoid breaking the legal requirements. This defence is important for EU food businesses in terms of determining negligence and responsibility for insurance purposes. Fully documented food safety management systems with evidence of compliance in the form of detailed records and independent verification form a strong due diligence defence hence the interest by EU importers and retailers in

Ecological Space: extends the concept of individualised (per capita) rights to natural resources such as energy, food, land and clean air and water to global public goods - such as carbon emissions. In theory, everyone should have equal opportunities to access a sustainable level of global public goods.

Food miles/food kilometres: the distance food travels from farm to consumer including the distance travelled between farm, processor and retailer

GlobalGAP: Formally EurepGAP (GAP standing for Good Agricultural Practice), GlobalGAP is a pre-farmgate private standard which is now the most widely implemented farm certification scheme worldwide. Most European retailers for agricultural products now demand evidence of certification as a prerequisite for doing business.

Radiative Forcing Index: a multiplier which accounts for the change in climate caused by other non-CO2 emissions from aircraft, and also the altitude at which the emissions were released.

Glossary

CO2: Carbon Dioxide
CO2e: Carbon Dioxide Equivalent
DEFRA: Department for the Environment, Food, and Rural Affairs, UK
DFID: Department for International Development, UK
FFV: Fresh Fruit and Vegetables
GHG: Green House Gases
IPCC: Intergovernmental Panel on Climate Change
IWRM: Integrated Water Resource Management
KFC: Kenyan Flower Council
LCA: Life-Cycle Analysis
SSA: sub-Saharan Africa
SSG: Small-scale Growers
RFI: Radiative Forcing Index
WTO: World Trade Organisation

Introduction

Since the 1970s, trade between sub-Saharan Africa (SSA) and the UK has been growing and been explicitly supported by successive UK governments. Potential consumer reaction to the current 'food miles' debate has raised concerns that the UK government's 'trade not aid' and 'making markets work for the poor' agenda for SSA are in danger of being undermined by concern over the climate change impacts of aviation.

In the UK in 2007 the term 'food miles' has become well known and is widely used – with an estimated 40 per cent of UK adults interested in having more information available to them on how far food has travelled, and an alleged one-fifth using country of origin labelling to make buying decisions[1]. However the proportion of consumers whose buying habits have or might change in light of this knowledge is unknown and is clear that surveys of consumer concerns are poor indicators of green purchasing preferences[2].

A highly visible part of the food miles debate is airfreight. Aviation is the fastest growing emitter of greenhouse gases (GHGs), admittedly from a low base, and is challenging the UK's ability to stabilise its emissions in line with the UK's stated targets for reducing by 60 per cent emissions by 2050. Although currently less than 1.6 per cent of the global emissions, and an estimated 6.3 per cent in the UK[3], scenarios indicate that aviation's emissions could quadruple globally by 2050 and double in the UK over the same period.

There are a number of campaigning platforms that either directly or indirectly raise consumer awareness of both aviation and food. The purposes of these campaigns vary widely but combined have increased consumer awareness of the term food-miles and influenced perceptions of the effects of food miles. This is particularly true for air-freight miles which have become emblematic in the food miles debate. Examples of recent and ongoing campaign trends are:

- Consumer health
    - 'Five-a-day' UK government fresh fruit and vegetable campaign
    - Campaign to eat seasonal food[4]
- UK farming:
    - Local food is best[5]
- Tourism
    - Growth of budget airlines
    - Responsible tourism
    - Sustainable Tourism
- UK aviation
    - Air noise pollution
    - Airport expansion
- Transport:
    - Impacts of local transport
    - Climate impacts of air transport
- Food miles campaigns[6]

However within these trends and campaigns a number of paradoxes are emerging. That is to say, facts that limit the validity of the food miles idea - demonstrating that it is an over simplification when looking at total effects of the food system on climate change. Paradoxes relevant to air-freighted FFV include:

- Complementarities of UK and SSA produce on supermarket shelves i.e.. ensuring year-round availability through seasonal growth in an appropriate location / country
- Importance of other "ignored" sectors in the climate change debate [Figure 1]
- Relatively small proportion of UK food transport emissions associated with imports by air – 10 per cent for all food by air (CO2 only) [Figure 2].
- Very small proportion of UK emissions associated with FFV imported by air – 0.2 per cent of UK GHG emissions[7]
- Shopping miles: Each year, the average UK adult travels about 135 miles by car to shop for food, an estimated three million unnecessary shopping miles per day[8]
- Feed miles: locally reared livestock can have a far higher environmental impact than indicated by food miles alone. The import of animal feed from countries such as Brazil, and the growth method of these feed stocks are not included in food miles calculations.
- Seed miles: so far not a consumer issue. However many seeds and young plants originate from Holland, Germany, Italy, Spain and then sent to the UK to be grown on [9]
- Emissions Allocations: who is responsible for the emissions at various points along the supply chain - the producer, the consumer, the retailer/food processor? Moreover the majority of flown FFV is carried in the bellyhold of passenger planes. How are allocations for this form of transport calculated? What methodologies are used?

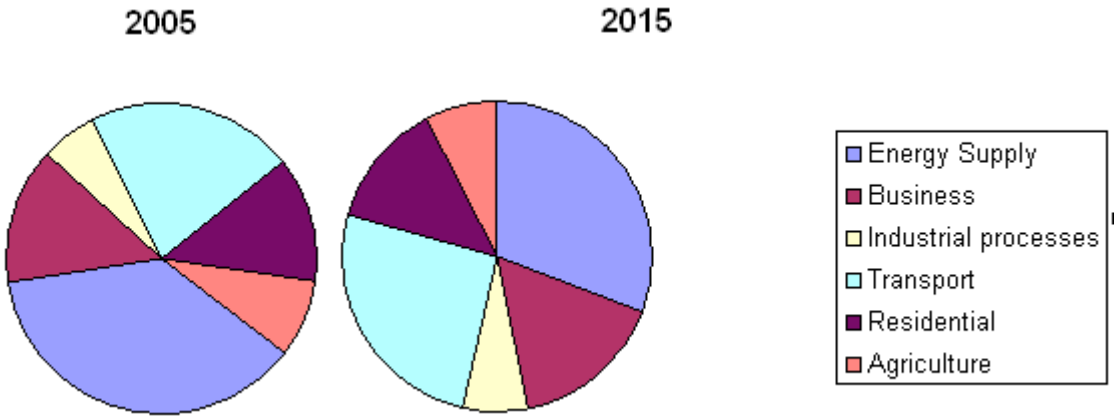

Figure 1: UK greenhouse gas emissions by source (million tonnes carbon equivalent)[10]

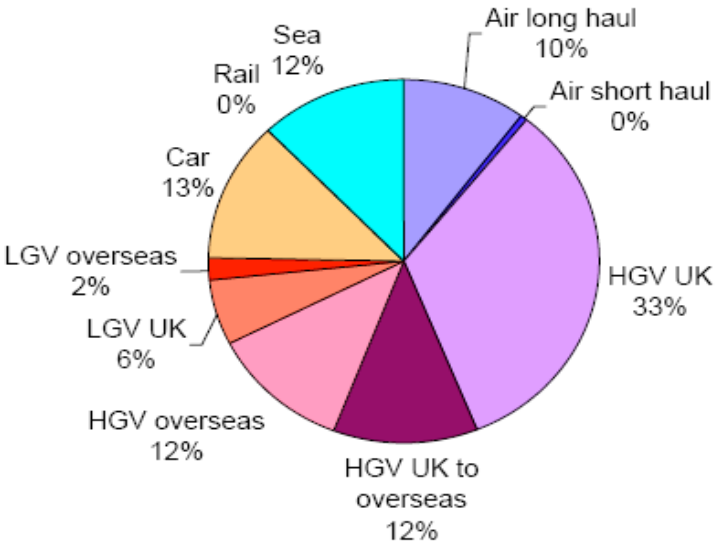

Figure 2: CO2 emissions associated with UK food transport (2002)[11]

These paradoxes should not leave exporters of fresh produce from developing countries complacent – there is still a strong awareness of food-miles as a concept in UK consumer perceptions. Rather they demonstrate that aviation and imported food and all their uses, including production systems and supply chains, are interconnected issues.

Outside of the consumer eye, the food miles debate is already being incorporated into a larger carbon footprint and carbon labelling agenda, where the entire 'carbon lifecycle' of a product is considered - from seed to plate. Within this emerging carbon debate, arguments that highlight development opportunities as well as global environmental issues are gaining traction in some sectors of the UK, for instance the DFID and DEFRA joint position on food miles[12]. What is certain is that decisions made in the UK over procurement and consumption – by government, business and consumers – have the potential to affect many rural livelihoods in SSA countries currently reliant on air freight for market access. It is therefore important to be aware of and engaged in the debate.

The objectives of this report are to inform current and forthcoming debate on food miles and carbon footprint in the UK and Africa, as well as propose an engagement strategy for African producers. Chapters 1 and 2 summarise relevant environmental data and developmental benefits trade of horticultural produce with the UK has for Sub Saharan Africa. The intention is to provide key contextual data rather than a detailed analysis of environmental and socio-economic impacts of production to producing countries. Chapter 3 is an overview of UK stakeholder positioning within the food miles and carbon debates, including perspectives from government, private sector, consumers, retailers, and NGOs. Interviews have also been conducted with the major retailers in order to ascertain possible future trends within the debate.

Chapter 4 concludes with a proposed engagement strategy for COLEACP-PIP, with the intention of maximising their impact on the food miles and carbon debates for the benefit of trade of African produce with the UK.

Chapter 1 Environmental impacts of FFV trade between Africa and the UK

This section looks at key factors in fresh fruit and vegetable trade that have an environmental impact, with a focus on emissions of greenhouse gases and climate change.

Greenhouse Gas Emissions

Air Freight

Aviation is associated with a heavy environmental impact – through carbon emissions and radiative forcing. Aviation emissions are increasing at over four per cent per annum while the technology to reduce these emissions is only increasing at a rate of one to two per cent[13]. Aviation is responsible for 1.6 per cent of CO2 emissions globally[14] and in the UK, the world's largest aviation hub, the estimate is 6.3 per cent of national emissions[15]. These figures could be multiplied by two to four times when including other global warming effects of high altitude emissions[16] (see below).

Aviation is at the vanguard of the "climate change dialogue" in the UK and air freight is inextricably linked with that dialogue Some widely used statements used in this climate change dialogue that identify aviation and more specifically air freight as a threat, and their popular justifications follow:

1. **Aviation is the UK's fastest growing GHG emitting sector, threatening the UK's ability to stabilise emissions**

Between 1990 and 2000 the UK's annual CO_2 emissions decreased by 8% while emissions from aviation increased by 90%[17]. Dedicated cargo planes are responsible for an estimated 5 per cent of the UK's total aviation emissions (domestic and international), and passenger flights for 90 per cent[18]. Freight, especially high-value low-weight fresh produce, is also carried by passenger flights in the bellyhold.

A recent DEFRA report stated that 80 per cent of cargo is currently carried as belly freight on passenger planes, but that there has been a trend towards more use of air freighters11 (see section on *Emissions Attribution* below for further details). However, another study found the number to be lower at 60 per cent, while also noting that more food freight is now carried on dedicated freighters, because this allows easier handling of pre-packed containers and foodstuffs with special storage requirements such as refrigeration or modified atmosphere[22].

It is estimated that by 2050, all UK sectors will need to reduce their carbon emissions by 90% in order to conform to the national projected contraction and convergence profile (currently set at 450ppmv). The significance of this trend for a growing aviation sector is that because there will not be any likely technological solution before 2050, by 2050 aviation emissions could exceed the UK's entire permitted carbon emissions under this projected contraction and convergence profile18. It is important to put this statement in context; currently no other sectors of the UK economy are on track to reduce their emissions by 90%, but many are declining in carbon significance.

2. **Air freight has the highest global warming potential of all modes of food transport**

According to DEFRA, air-freighting produces up to ten times product weight in CO_2 emissions or eighty times more than if sea-freighted[19]. Plus, according to the Intergovernmental Panel on Climate Change (IPCC), CO_2 emissions from aircraft represent just a third of a flight's global warming potential, when "radiative forcing" is factored in (see detailed focus in Box 1)[20]. Recently, AEA Technology (a leading energy and environment consultancy) recommended that the UK government use

'air-food-km' as one of four indicators for evaluating the impacts of food transportation on sustainability[21].

3. Air freight is the highest carbon emitting element of horticulture imports into Europe from non-EU countries

A recent report which analyses eight available research studies indicates that airfreight is the highest carbon emitting element associated with the supply chains of imported FFV into Europe from non-EU countries18. The 1.5% of all imported fruits and vegetables that are air transported for the UK food industry in 2005 produced half of all emissions from fruit and vegetable transportation from farm-gate to retailer (not including consumer travel – it is reduced to an estimated two-fifths when the consumer drive is added to the equation). This represents an estimated 0.2% of total UK GHG emissions, contributing the same as food imported by road and sea, despite great difference in volumes[22].

Box 1: Radiative forcing by aircraft

Aviation emissions are discussed in terms of tonnes of carbon, carbon dioxide and carbon dioxide equivalent. Carbon dioxide can be calculated by multiplying carbon emissions by 44/12. Some calculations apply the IPCC Radiative Forcing Index (RFI) – a multiplier (2.7) – which accounts for the change in climate caused by other non-CO2 emissions from aircraft, and also the altitude at which the emissions were released. These are expressed as carbon dioxide equivalents or CO2e. The index equates the climate impact of these other emissions with the effect a similar quantity of carbon dioxide:

Mechanism	Contribution to Global Warming
NOx (via ozone changes)	47%
NOx (via methane changes)	-29%
Contrails	41%
Stratospheric H2O	4%
Sulfate aerosol	-6%
Soot	6%

(-ve represents cooling effect)

There is considerable uncertainty regarding the radiative forcing induced by aircraft. Some argue that a single figure for RFI is inappropriate, while others consider that the radiative forcing induced by aircraft is likely to be higher than reflected in the IPCC's current RFI for aircraft.

Source: Wangler, 2006. Sub-Saharan African horticultural exports to the UK and climate change: a literature review http://www.agrifoodstandards.net/resources/global/fresh_insights_2_sub_saharan_african_horticultural_exports_to_the_uk_and_climate_change (last accessed on August 01 2007)

Aviation in Perspective

In the UK, passenger flights account for 90 per cent of carbon emissions from air transport (28Mt/year) with international freight accounting for 5 per cent18. The UK is a global leader in aviation, directly employing over 180,000 people in the UK[23]. Aviation ranks alongside telecommunications as one of the two great drivers of our ever more interconnected global world economy. However it is an industry that is expected to experience only incremental improvements in technology to reduce GHG emissions for the foreseeable future. The new generation of aircraft now on the drawing board will still be in service in another 40 years' time. And that has important environmental implications[24].

Aviation and air freight are neatly conflated by campaigners [on all sides] under a "food miles" banner with prompts to 'buy local'. In the eyes of some UK

consumers/citizens, aviation is emblematic of the excesses of unsustainable consumption. UK consumers are increasingly cognisant of the three arguments above, and these are routinely quoted throughout the media from various environmental groups to TV chefs and the farm press.

With this rise in public and media awareness in the airfreight debate, there a need to ensure the wider context and perspective are clearly expressed in order to ensure genuine sustainable development:

The proportion of UK GHG emissions attributable to African air-freight is very low

DEFRA estimates the total contribution of UK agricultural sector as a whole to GHG emissions is 7%[25]. However several other estimates place this at 15%22 and another study of the EU as a whole puts it at 31%[26]. Production of nitrogen-based fertilisers for the agricultural sector alone is responsible for 1.5% of UK emissions - and this does not include the emissions due to the use of farming methods which result in nitrogen depletion in the soil that account for a further 4%22. There is also embedded carbon in farm machinery and farming fuel use.

[Figure for the total food system should come first, then FFV]. The FFV sector as a whole is responsible for 2.5 per cent of UK GHG emissions, and the emissions related to the transport of FFV is approximately one quarter of the whole sector – equating to 0.55 per cent of UK GHG emissions22. Air-freight is responsible for 8 per cent of the entire FFV sector emissions (or one third of FFV transport) Therefore airfreight of FFV is approximately 0.2 per cent of total UK GHG emissions.

Further, within the air-freight sector, produce coming from Africa is no more than 50% of total airfreight[27] [see Figure 3], so the total airfreight component of African FFV is a maximum of 0.1% of UK total GHG emissions.

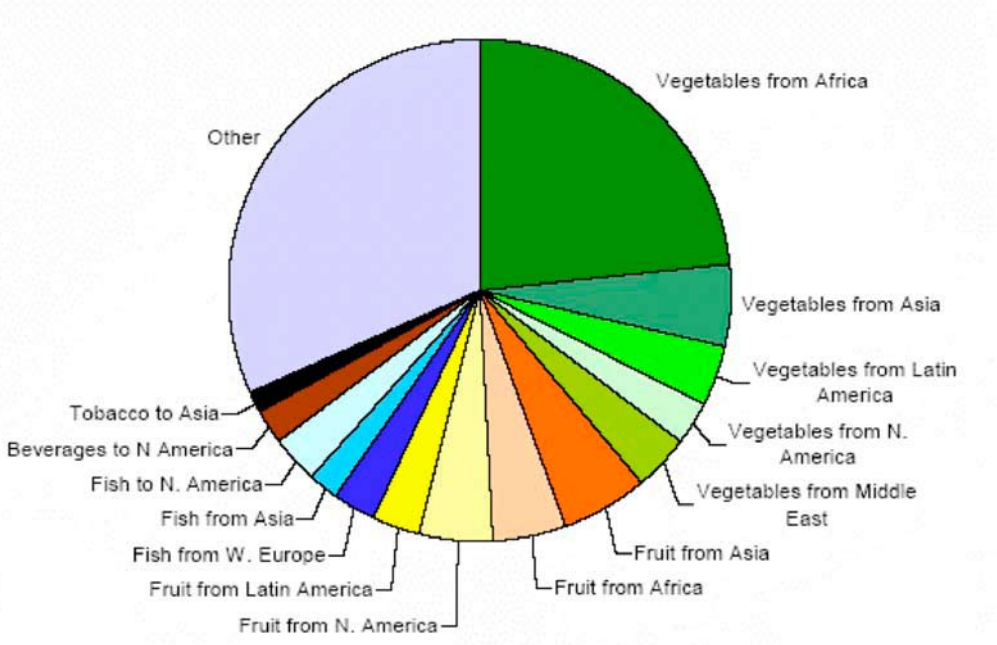

Figure 3: Split of air imports to the UK by food type and source / destination[28]

Indeed, depending on the allocation of aviation-based carbon emissions in a future IPCC ruling – between developing countries with 'carbon space' to invest and destination countries for flights, these estimates could be closer to absolute zero.

Additionally, the above calculations assume that the allocation of emissions responsibility in air-freight is placed proportionately on dedicated cargo plane produce. As already stated, the reality is that the majority of FFV air-cargo is held in the belly-hold of passenger flights. This is discussed further in the methodologies section below.

By contrast, food related car travel is 0.38% of UK emissions; hence air transport of all African FFV (0.1%) is equivalent to one quarter of the emissions of total UK consumer supermarket trips. One could speculate that better distribution logistics and more environmentally aware consumers could in itself significantly contribute to offsetting the African air-freight element. The figure below demonstrates the dominance of car use in food vehicle kilometres and Heavy Goods Vehicles in CO2 emissions for UK food transport.

Figure E1. UK food vehicle-kilometres by transport mode (2002)

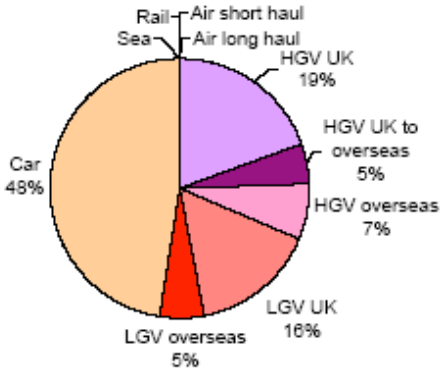

Figure E2. CO_2 emissions associated with UK food transport (2002)

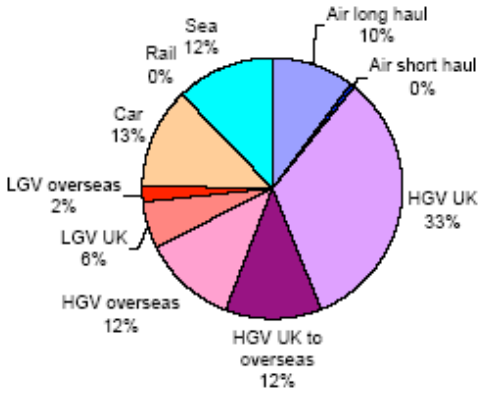

Figure 4: UK food vehicle-kilometres by transport mode (left), CO2 emissions associated with UK food transport (right)11

Imports versus glasshouse production

Glasshouse production is often used as a comparison to air-freighted produce, and there are a number of studies that show air-freighted produce to be associated with a lower emissions rate, for example an unpublished University of Cranfield study in flowers which calculated that flowers produced in Dutch heated glasshouses have six times the global warming potential than those air-freighted from Kenya[29]. Conversely there are studies showing the exact opposite for other produce, and even for the same product depending on growing conditions and data used. What is certain is that emissions data is thin on the ground and the methodology used to determine which product is "better for the environment" is very significant in determining the outcomes (see section on methodologies).

Growth

A recent DEFRA report finds that there is potential for further growth in the African FFV airborne trade. And, absolute volumes are increasing[30]. Yet the percentage share of flown FFV imports to the UK from Africa has remained fairly constant at around nine per cent of FFV imports by volume. Indeed, since this trade is currently focused on a few high-value commodities with limited market demand, expansion of significance is unlikely. Yet, the marginal benefit of small increases in this trade cannot be underestimated for the economic development of rural Africa; and vice versa, the marginal cost of small *decreases* in this trade are thus far higher.

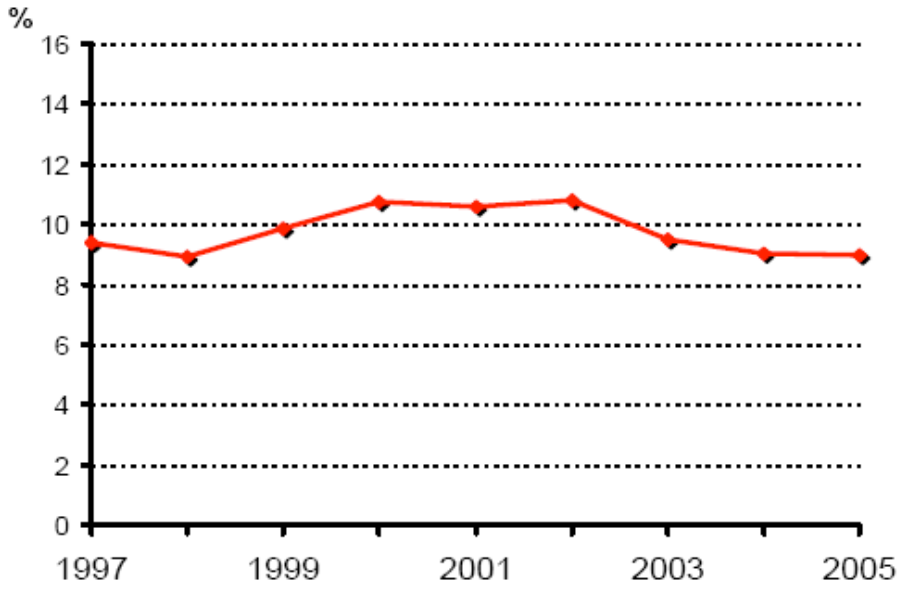

Figure 5: Air freight's share of fruit and vegetables imported to the UK from African countries – Source: DEFRA

The cut flower market is booming and is likely to continue to grow strongly over the next few years. However the ratio of carbon 'costs' to economic benefits in the cut-flower industry (using the carbon pricing model laid out in the Stern report) should remain the same. That is, the carbon cost will be approximately 4 per cent trade value of flowers to the UK for Africa as a whole (10 per cent of *Kenyan flower* trade value)30.

Carbon Lifecycle Hotspots

It is envisaged that in the medium term, the air-freight (and food-miles) debate will become a part of the wider debate around a particular product's carbon-lifecycle and total carbon footprint. As mentioned above, the transport element of the carbon lifecycle is often very significant, particularly for air-freight.

The use of tools such as life cycle analysis (LCA), energy analysis, ecological footprint and carbon footprint analysis is becoming an important aspect of the sustainable development policy process and the provision of product-related environmental information for consumers and policy-makers. These analyses provide a measure of the energy and resource efficiency and the carbon emissions associated with the production and distribution of products and the options available during each stage of the supply chain.

Due to the complexity of FFV supply networks, the consumer, as well as policy-maker, is often unaware of the environmental impact associated with the various supply chain options and the extent to which this impact can vary between seemingly identical produce. This information, which is essential for informed purchasing decisions and policy development, can be provided in part by energy and carbon footprint analyses.

The importance of measurement methodologies and allocation

Measurement of greenhouse gas emissions for each part of a product lifecycle is a very inexact science. Estimation is a very difficult process and can be costly. The three key areas of dispute concern (a) what to include, (b) accuracy of data, and (c) attribution of emissions.

What to include

There is the problem of what to include in the data set used for a lifecycle assessment. For example which gases should be included and how their proportionate effect on global warming can be normalised across a single measurement scale. The UK Climate Change Bill is based on CO2 reduction. However for industries such as aviation and agriculture (particularly pre-farm gate), there are other substantially important gases that many argue need to be included in any 'carbon labelling' scheme. As mentioned above, nitrous oxide is a significant contributor in agriculture, along with methane for livestock farming. In aviation there are numerous gases other than C02 that are also highly significant , as is the altitude of the aircraft (see box on Radiative Forcing Index and CO2e).

An example of controversy over which data (gas types etc) to include in a lifecycle analysis is the contested New Zealand dairy study. It originally concluded that UK dairy had a 50% higher global warming potential than New Zealand dairy imported to the UK market[31]. A review of this by one of the top GHG inventory experts in New Zealand has since stated that taking other gases into consideration the figure is more likely to be around 18%.[32] Again one could speculate that a pro-active UK farmer could reduce his emissions by 18% and close the gap.

The level of detail on a per case basis can also be important, but then can also be misleading if extrapolated. For example the LCA performed as part of the Cranfield study on Dutch and Kenyan flowers, among other factors, takes into consideration the fact that Kenya produces a significant amount of its electricity through geothermal power. This has the effect of reducing the C02 emissions attributable to power used in Kenyan flower production. Similarly the type of energy used in heated glasshouse production can be very significant – in the Cranfield case it was highly carbon emitting gas burners. One could speculate that a flower farmer using air-freight in a country with no geothermal production compared to a careful farmer using geothermal (or other 'green' energy and/or energy conserving mechanisms) could switch the result around in favour of the glasshouse production. Therefore the Cranfield study should be taken in its own unique context.

There is a danger that any new standard emerging for carbon lifecycle analysis will make generalised assumptions about farm types and production systems. Forthcoming work from the University of Bangor finds that there is inherent variation at the farm level, within a country and between seasons, which leads to different levels of environmental impact. This is illustrated by fieldwork that finds variation of emissions levels by lettuce growers within a country is greater than that of between different countries[33].

> "The on-going work of The Carbon trusts is trying to get an agreed method – but it is not as inclusive as we would like to see as it avoids variability in the environment (ie it assumes all farms and locations are the same – and they are not)."[33]

Additionally the study finds that it is only when the system boundary of the LCA includes all phases of the food chain that accurate estimates of impact can be obtained - again, the methodological question of what to include.

Data accuracy

The margin of error in data used can be very high. This is related to the point above on what to include when calculating a particular measurement. However a slight difference in assumptions can have a large impact on the outcome.

Taking a single calculation in the far more complex glasshouse vs air-freight debate as an example: in its discussion on heated glasshousing the Soil Association in their

recent green paper on air-freight quote the Cranfield flower study as an example of flown goods being better environmentally than heated glasshousing but also state that "other research found organic tomatoes grown in heated greenhouses in the UK emit four times less CO_2 than air freighted organic tomatoes grown outdoors in Kenya"[34]. Looking into the 2006 study quoted, the energy consumption for airfreight is assumed as 103MJ/kg of tomatoes[35]. A LCA study into green beans study from Kenya to the UK uses a figure provided by DEFRA, which equates to 58MJ/kg for Kenya-UK airfreight[36]. This figure too has been questioned for accuracy and could infact be 205MJ/kg[37]! Although based on different crops, this illustrates the importance of underlying data measurement and assumptions. In the Soil Association tomato example, using the 58MJ/kg figure, the Kenyan production of tomatoes is reduced from 4 times to 1.5 times the energy used in the heated glasshouse equivalent – a significant margin of error.

Emissions attribution

There is also the question of *attribution* of responsibility for emissions. Cross-boundary emissions, including emissions from aircraft, are currently not included in national inventories, are not part of the EU Emissions Trading Scheme (ETS), or a binding part of the Kyoto Protocol. They are therefore not dealt with consistently or coherently. In addition, the allocation of the carbon was considered a problematic area. Whose are these emissions? Exporter or importer? Producer or consumer? There is also a question of attribution of emissions for cargo flown in the bellyhold of passenger planes. Whoever ends up picking up the bill for emissions will be a significant factor in influencing policy and market responses. The majority of participants at a recent carbon labelling forum[38] where strongly in favour of allocation lying with the consumer, as it is the consumer that drives demand and must ultimately change their behaviour to reduce overall greenhouse gas emissions.

Comparison with Other Sectors

In the IT sector GHG emissions are as high as those in passenger aviation. To quote a recent article in the UK Guardian:

> "New research shows that computers generate an estimated 35 million tons of the gas each year – the equivalent of one million typical flights to and from the UK. And Gartner, the international information technology research company, estimates that globally the IT industry accounts for around 2 per cent of carbon dioxide emissions – much the same as aviation."[39]

Box 1: Comparing Airfreight to other Activities

The following comparisons again are based on DEFRA's emission factors and all incorporate the IPCC's RFI of 2.7.

City Break in Barcelona
A return flight from London to Barcelona compares with 420 packs of air-freighted Kenyan green beans (250g)

Week in the Big Apple
A return flight from Liverpool to New York compares with 1,200 packs of air-freighted Kenyan green beans (250g)

The school run
A 250g pack of air-freighted Kenyan beans compares with 12 school runs in the car

Using your laptop
A 250g pack of air-freighted Kenyan beans compares with using a large laptop every week day for a month

Sea-Freighting compared to Air-Freighting
A 250g pack of air-freighted Kenyan beans compares with 177 250g packs of sea-shipped Kenyan beans (beans are not usually sea-shipped - this has been used to illustrate the difference)

Source: Wangler Z (2006) Sub-Saharan African horticultural exports to the UK and climate change: a literature review http://www.agrifoodstandards.net/resources/global/fresh_insights_2_sub_saharan_african_horticultural_exports_to_the_uk_and_climate_change (last accessed on August 01 2007)

What industry sectors use air freight?

At a global level, refrigerated food accounts for nine per cent by weight of air freight. This varies across markets, accounting for a 54 per cent share from Latin America into north America but only two per cent from Asia to the EU[40]. Future forecasts by MergeGlobal indicate that refrigerated foods will account for a shrinking share of new traffic to 2010, as apparel, telecommunications equipment and textiles are expected to grow[41]. There are three sectors that dominate UK airfreight, comprising 40 per cent of total airfreight by value in 1996. Any call for reduction in food air-freight should bear in mind that agriculture only constitutes 0.1 per cent by value of the 'airfreight problem'. Indeed this should also be taken into consideration in the debate as to whether FFV cargo in the bellyhold of passenger planes acts as a driver for further flights.

Sector	%
Banking and finance	15.7
Air transport services	11.9
Insurance and pension funds	11.2
Post	4.5
Oil and gas extraction	1.7
Agriculture	0.1
Others	54.9

Figure 6: UK Air freight by sector 1996 [by purchase at basic prices] [42]

There are two further key messages regarding aviation emissions attribution. Firstly, how the emissions are divided between goods flown in the bellyhold of a passenger plane. Secondly, the idea of the 'right to emit' for countries with a very low level of emissions per capita. These are discussed below.

Passenger plane bellyhold versus dedicated cargo planes

A recent DEFRA report stated that 80 per cent of cargo is currently carried as belly freight on passenger planes, but that there has been a trend towards more use of air freighters11. However, another study found the number to be lower at 60 per cent[22]. The allocation of emissions between passengers and freight is not defined and airfreight calculations usually assume all of the plane's emissions are divided proportionally between the cargo only.

The role of bellyhold freight in the economics of passenger flights is still unclear. There is no firm evidence or consensus that by UK consumers not eating imported FFV, fewer planes will fly today or into the future. FFV imports are growing by an estimated 6 per cent per annum over 1996-2004. Passenger volumes inbound and outbound from the UK are currently growing by 4-6 per cent per annum[43] [44]. Dedicated freight is increasing by an estimated 6 per cent per annum[45]. Anecdotal evidence suggests that expanding flower exports from a country are a key initial driver for other exports, including FFV. The relationship (be it symbiotic, complementary or competitive) between passenger flights and freight flights is unclear in the context of FFV exports from SSA to the UK. Research on the incentives to increase passenger and freight flights is needed.

Ecological Space

'Ecological space' extends the concept of individualised (per capita) rights to natural resources such as energy, food, land and clean air and water to global public goods - such as carbon emissions. In theory, everyone should have equal opportunities to access a sustainable level of global public goods. Ecological space usefully focuses on the productive use of natural resources, not on their consumption, bringing both the onus and opportunities from global public goods decisions to bear at a local level.

The concept of "equitable ecological space" translates well into "per capita carbon dioxide emissions" and the "per capita right to emit carbon dioxide", as recognised under the UNFCCC Kyoto Protocol. While the Kyoto Protocol explicitly recognises the need for both equity in emissions and non-restrictive economic development for developing countries in order to achieve a sustainable low-carbon future, these are not fully operationalised components.

That is, there is current global inequality in the distribution of ecological space utilisation through carbon emissions and there is no sanction to redress this balance or mechanism for compensation for 'under-use'.

The global per capita average carbon emissions is 3.6 tonnes. The UK average is 9.2 tonnes; the African average is 1 tonne – although this is itself heavily weighted towards oil-rich countries such as Libya. Further, the gap between the highest and lowest emitters (including many African nations) is increasing.

Under current calculations the earth's capacity to absorb carbon is approximately 2.2 tonnes of CO2 per capita annually[46]. This represents the estimated absorption capacity of natural carbon sinks, both land and sea. Currently these sinks are absorbing roughly half of the anthropogenic emissions. Yet this per capita space is falling because of the projected warmer climate accelerating decay of carbon in soils and leading to large release of CO2 coupled with projected population increases.

There is a strong relationship between the level of industrial economic development of a country and its carbon emissions. To this end, without intervention from developed countries in transferring cleaner technology to African countries, it is likely that future ecological space utilisation in Africa will be far higher.

Export horticulture is one of the few genuine opportunities for developing countries to use their excess ecological space in ways that directly and indirectly benefit rural areas. Indeed, experience shows African horticulture export to be a 'trade-not-aid' champion. It provides significant social benefits, and there are few alternatives that can inject the money, capital and skills that export horticulture brings to a national economy and particularly a rural economy. Furthermore, there is projected future growth in export horticulture from existing and emerging producer countries in Africa (because of tourism, economic development and more socially conscious procurement patterns in all industries).

Neither ecological space nor country level (per capita) use of offsetting have been considered in recent debates convened by BSI on the carbon issue.

At present, emissions from aviation are not included in the national calculations because there is no agreed methodology for allocation[24]. Some advocate a 50-50 split between departure and arrival countries.[47] Others suggest using final destinations of passenger/cargo to avoid presenting a misleading picture, owing to transit issues, entrepots and locations of hub airports.[24] If the carbon emissions from importing fresh fruit and vegetables (FFV) from Africa to the UK were allocated:

- entirely to the UK's emissions budget, they would add an extra 0.1% per cent of total emissions for the UK. Per capita emissions would rise to 9.22 tonnes (512 per cent of natural carbon sink capacity)
- entirely to Kenya's emissions budget, they would account for an extra 4.8 per cent of total emissions for Kenya. Per capita emissions would rise to 0.42 tonnes (23 per cent of natural carbon sink capacity)

The UK is in ecological debt but Kenya is in ecological credit, and therefore should be offered an opportunity to invest their carbon credit as they see fit - either in industiralisation, selling as an offset or in air-freighting export horticulture.

Water

It is important to recognise at an early stage the importance of water resource management for a sustainable future for all livelihoods within the scope of a water resource (including those not directly related to the FFV export industry). From the perspective of the FFV export industry, this is relevant not only in their direct interests of continued water supply for production but also potential for ethical buyers to be procuring from a fairly managed water supply base.
A widely recognised and comprehensive, participatory planning and implementation tool for managing and developing water resources is Integrated Water Resource Management (IWRM). IWRM is defined by the Technical Committee of the Global Water Partnership as "a process which promotes the coordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems". An IWRM approach is an open, flexible process, bringing together decision-makers across the various sectors that impact water resources, and bringing all stakeholders to the table to set policy and make sound, balanced decisions in response to specific water challenges faced. More information is available at www.iwrm.org .

Trading Water – Virtual Water

As part of a water resource management strategy, it can be useful to keep track of the volume of water imported and exported through trade of produce that uses water during the production process. Every year the UK uses 189 million cubic metres of African water virtually, as a result of the import of green beans produced there[48]. The trade of fresh fruit and vegetables (FFVs) does not appear to account for this water use either in terms of price or environmental sustainability in producing countries.

What is Virtual Water?

Globally, 70 per cent of all freshwater is used in agriculture, arguably making water the most critical component of food production. Despite this, recent discussions on critical water issues have been noticeably absent from this food and trade debate. The withdrawal of groundwater at rates greater than nature's ability to renew it is widely documented in many parts of the Middle East, India, Mexico, China, the former Soviet Union and the United States. Moreover, 60 per cent of the world's accessible freshwater supply is found in just nine countries, illustrating water's uneven distribution across the globe.

This hidden (virtual) trade of water can be seen in large grain imports into the Middle East and North Africa region, which augments water scarcity. Since 1972 the region has withdrawn more water from its rivers and aquifers every year than is being replenished. Virtual water constitutes the total volume of water involved in the sustainable production of the crop. Virtual water studies have highlighted food security benefits for regions such as Southern Africa, as well as food trade in Japan. The relative comparative advantages of countries have been used to explain why virtual water trade takes place. However not 'accounting' for this movement of virtual water, whilst potentially beneficial in traditional economic trade terms, could lead to longer term sustainability issues – a type of environmental subsidy.

How important is virtual water?

Virtual Water is not currently a term on the lips of a UK supermarket looking to source produce. However areas of water scarcity and insecurity are bound to influence decisions on investment in a supply base. The concept of virtual water is a useful tool to identify water trade and can act as an indicator of water scarcity. Water scarcity and water resource management will become increasingly important, particularly as we see the increased effects of climate change. It is not inconceivable that in the longer term virtual water will be traded in the same way as carbon is beginning to be traded today.

Box 2: LCA Case Study – Green bean production in Kenya and the UK: a comparison

When considering a particular food product, one supply chain could have low energy consumption but make a large contribution to nitrate pollution while another supply chain for the same product consumes a large amount of energy but does not result in significant levels of nitrate pollution. . Interpreting and making decisions based upon 51 criteria is extremely difficult and can involve 'trading off' or substituting one environmental burden for another or transferring pollution from one place to another. For this reason many studies consider one or two key environmental indicators, for example, primary energy use and greenhouse gas (GHG) emissions. It is now accepted that climate change is taking place and that it is caused by human activity. In terms of priorities it is acknowledged as being the main environmental challenge that we face. There is also a direct link between energy use and GHG emissions, particularly when energy is derived from fossil fuels. For this reason, the common unit used in this particular study is energy. Using energy as a unit also has the advantage of facilitating a comparison in costs and future costs with rising energy prices.

The energy consumption of bean cultivation per unit output in Kenya and Europe (in terms of MJ/kg) are very similar. The energy consumed in green bean production is 0.8–1.4 MJ/kg of product in Europe and 0.7–1.7 MJ/kg in Kenya. The reason for this is that although yields are higher in Europe (see below), more energy is consumed in the form of diesel for machinery and to manufacture and supply synthetic fertiliser. In the four European production systems, for example, fertiliser application rates are on average 218 kg/hectare and are as high as 321 kg/hectare. In Kenya the recommended rate is 80-120 kg/hectare, with many of the smaller farms applying less than 80 kg/hectare due to high fertiliser costs.

When packaging and distribution are included, however, the difference in energy consumption becomes considerable. Energy use is 12–13 times greater when beans are sourced in Kenya rather than the UK. The difference between sourcing in the UK and in Kenya is 57–59 MJ per kilogram of beans.

Energy consumption of green bean production, packaging and transportation (MJ/kg)

	UK	**Kenya**
Cultivation	0.82 - 1.38	0.69 - 1.72
Packaging	3.92	3.92
Transport		57.90
Total	**4.74 - 5.30**	**62.51 - 63.54**

Green bean yields in Kenya and Europe are summarised in the table below. On average the yield in Europe is 1.8 times that in Kenya. The highest average yield in Kenya is lower than the minimum average yield in Europe.

Yields for green bean production in Kenya and Europe (kg/hectare)

	Min	**Max**	**Average**
Kenya	2,900	7,400	5,150
Europe	8,000	12,000	9,405

In the UK, average yields are very similar to those in the three European countries listed above. Between 1995 and 2005 the average yield for green bean production in the UK was 10.4 tonnes per hectare and ranged from 8.2 to 12.1 tonnes per hectare.

Importing Kenyan green beans by sea

Currently no green beans are exported from Kenya to the UK by ship. However, there is evidence that European importers are beginning to consider the shift from air to sea freight due to the increasing cost of air freight distribution.1 It has been reported that one importer is now transporting beans from Egypt and asparagus from South America, which used to be flown into Europe, by ship.

Developments in modified atmosphere packaging and modified atmosphere container systems are making shipping of fresh produce over longer distances with longer transit times more viable.

A modal shift from air to sea could result in a significant reduction in energy consumption and carbon emissions. The journey by ship from Mombassa to Southampton is 6,041 Nautical Miles and takes 21 days at 12 nautical miles per hour and 11.5 days at 22 nautical miles per hour. This requires 1.7 MJ per kilogram of beans (excluding the energy costs associated with modified atmosphere containers, packaging, and increased refrigeration time), which is 56 MJ/kg less than air freight transport of beans from Kenya to the UK.

Source: Jones, A (2007) - A Lifecycle Analysis of UK Supermarket imported green beans from Kenya
http://www.agrifoodstandards.net/resources/global/fresh_insights_4_a_lifecycle_anaylis_of_uk_supermaket_imported_green_beans_from_kenya
(Last accessed August 06 2007)

Chapter 2 The Development Benefits of FFV Export

The food miles and carbon labelling debates contain those voices that argue export of FFV by air from Africa is justified for developmental reasons. Ratifying this depends on taking a more nuanced look at the costs and benefits of the FFV trade in order to demonstrate the development linkage is both real and improving over time.

While it remains difficult to separate discretely environmental and economic development aspects associated with any trade, this section will review those arguments primarily concerning the economic development benefits. 'Economic development' here refers to sustainable improvement in a range of indicators that define living standards, including per capita income, better education and health. In developing countries, economic development is interlinked with economic growth and 'progress' (measured in primary school enrolment, child mortality rate etc), but remains contentious owing to the persistence of negative indicators, including income disparities and poverty.

First a summary of the affects of agricultural trade on poverty reduction is given. This is followed by looking at specific opportunities export FFV has for African economies and rural livelihoods. Employment trends in FFV are analysed along with the spillover implications within the rural economy and into other sectors. Finally labour standards and some of the factors which can cause exclusion from the export FFV sector are discussed.

Agricultural trade and poverty reduction

> More than 94 per cent of vegetables produced in Kenya are consumed here locally. But the value of the 5 per cent which we export is almost equivalent to the 94 per cent. So the foreign earnings that we get from the export of these beans go very far to promote and to get the Kenyan economy growing.
>
> Timothy Mwangi, Kenya Horticultural Development Programme KHDP.[49]

Agricultural trade has a strong poverty alleviation impact owing to the participation of the rural poor in production. There is a widely held view that suggests that trade in agricultural products has a greater impact on poverty than trade in non-agricultural commodities. Not only are horticultural products generally high-value, but trade in these commodities tends to generate a flow of wealth directly to farmers[50]. It is this view that has engendered a shift in the focus of development policy in the UK towards agriculture in general. Furthermore, transport by air is particularly suited to high value, low weight/bulk perishable or time sensitive products, making it an important element of the supply chain for horticultural goods between developed and developing countries alike[51].

Indeed there is nowhere where the UK consumer is more directly connected to rural Africa than through export FFV. A recent study for Marks and Spencer concludes that there is a business case for all UK retail and branded manufacturing companies to address sustainability:

> "As citizens, it is likely that the majority of us harbour concerns about the environment and social equity; however, as consumers the evidence suggests that many of us base the majority of purchasing decisions on price. There are signs of movement towards convergence of the values and behaviours of the citizens and the consumer. Companies will need to

respond to this convergence by integrating sustainability into their ways of doing business."[52]

In addition, agriculture offers one of the few options for African nations to trade competitively with developed countries. The high labour requirements for agriculture coupled with the lower land costs and longer cultivation periods in developing countries have enabled a growing share of world trade of FFV – total exports of fresh and processed fruit and vegetable products from developing countries grew from 17%–22% over 1980–2001 – despite a significant price decrease over the same period[53]. In addition to production comparative advantages, much African agriculture employs rural poor – where unemployment rates are often high. As such, it can be considered a 'pioneer' traded product. Kenya is a good example of how local economic development follows export horticulture development. Kenya was the first SSA country to develop systems in which high-value horticulture is exported to the UK. According to UNCTAD, currently the UK is the principal market for Kenyan horticultural export, taking a 34 per cent share of total exports, followed by the Netherlands on 31 per cent and France 15 per cent. Germany takes 5 per cent, with imports declining steadily since the early '90s[54]. This business is perceived as a success, and a number of other countries have followed and are now competing[55].

Trade stimulates changes to national, regional and local economies. As the structure of opportunities change for all involved in trade, so prices shift for local goods that can be produced more cheaply elsewhere, and the values associated with skilled labour often increase. The net benefit for the country and for particular industry will depend on how strong, large and efficient these are in relation to competitors. The risk being that many sectors will be out-competed by more efficient competitor countries – that one sector will benefit, but others, particularly those associated with rural dwellers [e.g. local agriculture] will be negatively impacted.

At a household level, trade may affect the poor in more direct ways via changing access to markets, commodity prices, employment opportunities and wages. The impact on producer-consumer households depends upon the extent to which they participate in markets affected by price changes and the composition of their income and consumption. The impact here will depend upon sources of income, distribution costs from border to rural areas, the extent to which markets are created or destroyed (e.g. for off-farm labour or grain) and the extent to which households can respond to the adverse impacts (e.g. risk) or positive opportunities (e.g. employment) presented to them. Another channel through which trade can affect poverty is through the impact on productivity arising from the availability of inputs, improved capital goods and the general transfer of technology. Lastly, changes in government revenue and spending are another important channel via which trade affects poverty.

The FFV trade is itself opportunistic. It is taking advantage of cheap air freight space owing to the seasonal demand of the of flower trade, and tourism. In 2006, tourism from the UK to SSA increased by 17%[56], while FFV trade increased by 6%[57].

Finance flows into rural Africa from the FFV trade. An estimated £200 million is injected into rural economies in Africa through FFV trade with the UK alone[58]. The portion of this that reaches the rural farmers can have a strong pro-poor impact in rural areas. It provides a range of new opportunities for farmers, including investment in farm upgrading and school fees. Importantly, it lowers the threshold for other business start-ups, such as a range of business services that are often under-provided in rural Africa. Additionally estimates of the scale of the impact can be multiplied by 3-5 times if taking into account purchasing power parity and rural multipliers.

High-value FFV trades provide serious benefits for local innovation. Commodity agricultural products such as tea and coffee tend not to offer significant opportunities for innovation in the producer countries. Yet twin spurs exist for local benefits in relation to horticulture. First, competition between retailers rests increasingly on innovation and product differentiation. Second, the high cost of airfreight is increasingly shifting post-harvest production processes such as. packaging to the producer countries[59].

High-value FFV trades provide opportunities to upgrade agricultural production skills. Since the erosion of government-led agricultural support services, farmer skills have been under-invested in. High-value trades associated with exacting private voluntary standards have strong benefit transfers in upgrading agricultural production skills[60]. Indeed, in the face of apparently eroding financial margins, it appears farmers value this skills transfer particularly highly[61].

The FFV trade helps positively change the structure of opportunities facing rural farmers. Over 60% of people in sub-Saharan Africa are dependent on agriculture. The FFV trade provides opportunities to trade out of poverty. With greater trade, farmers and exporters have more flexibility to buy from or sell to who they want[62].

Following an ecological space argument, air freight of product to the UK could be deemed an efficient SSA is a relatively efficient "investment" by the UK in allocating its emissions to support over a million African livelihoods. One might ask what the development benefits of the other 99.9 per cent of emissions are[63].

Employment in FFV

Direct formal employment benefits are large. Over 100,000 rural Africans are employed in the FFV export sector in SSA, roughly split 50/50 between small-scale farmers and employees on larger farms[64]. McCulloch and Ota[65] identify separate constituencies of beneficiaries in rural areas and urban areas and smallholders and employees along the supply chain, and find poverty alleviation benefits associated with the horticultural trade.

Indirect employment benefits are large. An estimated 100-120,000 employed in support services for these producers and employees[66]. These might be in the informal sector.

The development of high value agriculture in general is likely to improve outcomes for rural communities. It increases the size of the pie and through multiplier benefits, it creates growth. For instance every £1 of agricultural income generates another £1.5 for other businesses in Zambia[67] and £1.64 in Kenya[68].

The FFV trade provides seasonal, unskilled employment opportunities which in many developing countries are taken by women[69].

Livelihoods benefits are large. In total, there are an estimated 1–1.5 million people whose livelihoods depend on the supply chain linking production on African soil and consumption in the UK[70].

Spillover Costs and Benefits of FFV

Benefits go beyond financial ones with farmers particularly valuing upgrading of skills and learning new systems management. Trade and private voluntary standards bring a range of benefits - producing for exacting suppliers, such as the UK markets, means learning new procedures and complying with a range of standards that are often absent from local markets[71]. These new skills have improved productivity for smallholders and large farms alike and will be reverse transferable to the other aspects of their production. Plus, skills exist in the wider economy. Graffham et al [72] report the number of skilled agricultural technicians has risen in Kenya meaning that best practice is more widely disseminated and productivity and efficiency throughout the agricultural sector (i.e. on non-GlobalGAP crops) in Kenya has increased. Also, closer supply chain relationships between exporter and producer are ensuring streamlined and more efficient trade systems.

An illustrative example of 'soft' technology transfer through GlobalGAP (formally known as EurepGAP) in Kenya. Farmers who had attained GlobalGAP certification were clearly reaping benefits from adoption of good agricultural practice, record keeping and improved hygiene. Yields were generally higher and input costs reduced as the growing process was better managed. Many farmers said that they were using GlobalGAP records to understand their financial viability and run their farms more commercially. Proper handling of pesticides and improved food safety and hygiene had health benefits on farm, and in addition most farmers said that they had transferred hygiene messages to the homestead with obvious positive implications for family health[73]. Extension style services offered in Madagascar include training in composting[74].

Significant financial benefits. An average Kenyan farmer formally supplying UK supermarkets makes £200 per annum[75]. Crucially it is a significant part of the total household financial income – up to 50% in Madagascar, and is considerably higher [both net and gross] than the alternative[76].

Studies are showing the potential for market driven poverty alleviation through these export horticulture supply chains when the enabling environment is supported. In Madagascar, thousands of SSG benefit owing to improved access to inputs, credit, extension services, technology adoption, and from productivity spillover effects on other crops and enhanced income stability[77].

Labour productivity increases bring spillover benefits. These can include development of a range of more efficient business services.

Trade and private voluntary standards bring a range of costs. Suppliers have to meet ever-rising private voluntary standards and private standards [including ILO labour standards]. Recent research shows that smallholders are increasingly not participating in high-value horticultural trade[78].

- High financial costs of compliance with private voluntary standards**.** In a recent study, exporters indicate high costs associated with compliance are a key reason for not accessing supply from SSG[79]
- Preference for industrial estate production to reduce transactions costs. There is a persistent concern that the experience in other developing countries of export horticulture being solely produced on industrial estates [e.g. in Cote d'Ivoire] will be replicated in other countries.

The potential development downsides to FFV export trade

Labour standards in export horticulture are often called into question. Accusations have included crowded facilities, no employment contracts, handling dangerous chemicals without proper protective equipment, sexual harassment, no maternity

leave, overcrowded housing, low pay[80]. The Kenyan Flower Council (KFC), formed in 1996 and which now represents 70 percent of Kenya's flower growers, has taken great pains to ensure that its members follow the organisation's Code of Practice[81]. Other labour standards have been introduced as part of various wider standards. For example GlobalGAP, focusing on good agricultural practice, requires use of protective clothing for crop spraying and restricting types of pesticides permitted. The Soil Association has an optional ethical trade certification as part of organic certification, and the Fairtrade brand requires labour standards that fall in line with International labour Organisation (ILO) rules of conduct. However Fairtrade and Organic are relatively niche.

In March 2002 the UK Supermarket Code of Practice was introduced to redress the balance between the big supermarkets and their suppliers, including farmers. Since its introduction it has been strongly criticised for being too weak and there has been evidence that it is not working effectively, such as the recent Competition Commission investigation into supplier abuse by lead UK supermarkets[82]. Studies by the Kenyan Human Right Commission conclude that purchasing practices in global trade chains routinely give unrealistic targets for the predominantly female workers in the horticultural export industry and encourage precarious employment at the export processing zones[83].

Labour rights issues are not restricted to FFV export from Africa, rather are common in all commodity production throughout the world. Within the food-miles debate, labour rights are likely to receive more attention when discussed in context of the 'development benefits' of FFV air-freight. An increased consumer interest in sustainable sourcing from a social and economic (as well as environmental) perspective will potentially improve retailer buying practices and enforcement of labour standards.

This section has outlined the development benefits of FFV export from Africa. Trade should not be seen as a panacea, as there are issues that need close monitoring in order that the poorest people see the benefits. These include labour issues and costs of compliance with strict standards required for export to UK markets. However with these standards also come benefits including knowledge transfer, increased productivity, high value returns, and better health and schooling.
Moreover these benefits are focused on rural economies and have spill over effects helping drive wider rural and urban livelihoods.

Chapter 3 Stakeholder Positioning

UK Government

The UK Department for Environment, Food and Rural Affairs DEFRA, as host of UK policy on sustainable development, sustainable consumption and production, and sustainable farming and food, has led the way on raising the issue of aviation and air freight within the UK government policy. The UK Department for International Development DFID has, however, added a voice of caution, that UK environment policy should not trump the UK's commitments to achieving the Millennium Development Goals.

DEFRA

The UK Government **Sustainable Development Strategy** is supported by 68 national sustainable development indicators. Indicator 3 is "Aviation and shipping emissions**"** measured by refuelling from bunkers at UK airports and ports. Progress on this indicator is marked as "clear deterioration", considering that between 1990 and 2005 emissions from aviation fuel use more than doubled to 35 million tonnes (carbon dioxide equivalent) (DEFRA, 2007)[84].

DEFRA has also developed indicators to measure progress in its **Sustainable Farming and Food Strategy**[85]. Under Outcome 4, which aims at reduced environmental cost of the food chain, is indicator set 4.10: Food transport, published in September 2005. DEFRA commissioned a study on the validity of food miles as an indicator of sustainable development (AEA Technology Environment, 2005). The report actually concluded that the major external cost of transportation was in terms of road congestion, but DEFRA included "**Air food kilometers**" as one of four experimental key indicators for food transport (DEFRA, 2006), with the following rationale:

- Food transport by air, measured in vehicle kilometres, increased by 2 per cent between 2003 and 2004.
- Food transport by air experienced the most rapid growth of any mode over the period 1992 to 2004, with vehicle kilometres more than trebling.
- In 2004 air freight of food accounted for 0.1 per cent of total food transport measured in vehicle kilometres and less than 1 per cent of total food transport measured in tonne kilometres.
- Air freight of food has the highest environmental impact per tonne of any mode, accounting for 13 per cent of CO2 emissions from food transport in 2004.

The other three indicators are Urban food kilometres (proxy for urban road congestion), HGV food kilometres (proxy for infrastructure costs), and CO2 emissions from food transport

It is worth examining the AEA Technology Environment in more detail, to appreciate that it was not blind to environment and development trade-offs. The authors conclude that "A single indicator based on total food kilometers is an inadequate indicator of sustainability". They noted "complex trade-offs between different social, environmental and economic costs and benefits" and concluded that "policies directed at reducing food transport should consider these wider effects, and be integrated with policies and initiatives in other key areas, such as rural development, trade, international development, agriculture, transport and environment. A correctly structured food miles indicator would allow continuous analysis of the trade-off between different environmental, social and economic factors."

DFID

DFID came later into the debate about aviation and 'food miles' when it became clear to the Policy Division that both DEFRA and UK retailers were presenting in air freight as working against the interests of the UK sustainability agendas. As well as supporting research at IIED[86] and the International Trade Centre, a key speech by (then) Secretary of State for International Development Hilary Benn on the eve of Valentines Day 2007[87] set out a more aggressive position by DFID in the air miles debate. Citing data from the Cranfield report, the minister warned against easy conclusions about airfreight and greenhouse gas emissions, and called for consumers to weigh up the costs to the environment, against the rights of far poorer to a decent life.

Joined-up government

At a Food Industry Sustainability Strategy (FISS) meeting in xxx [ref.] it was announced that "both Defra and DFID were working together to establish a joint position based on an analysis of carbon and development impacts and explore how any interdepartmental differences could be resolved. Both departments were pulling together the evidence base available African farmers and their families rely on the fruit and vegetable trade with the on the environmental and developmental impacts of trade and formulate key messages that will give a clearer Government position."[88]

In March 2007, DFID and DEFRA produced a "**Joint Position on Food Miles**" (DFID, 2007)[89] with these key messages:

- Sustainable development is about helping to end poverty as well as caring for our planet. Some of the poorest people on the planet are African farmers who are responsible for very few carbon emissions. Almost a million UK, and depend on their earnings to get their children through school and to care for them when they are sick.
- Food miles alone, or the distance food has travelled is an incomplete way of judging whether the food we eat is sustainable. Research shows that distance travelled is, on its own, not a reliable indicator of the environmental impact of food transport.
- The Government is working towards a global system for pricing carbon that will eventually ensure the price of food and other products fully reflect their impact on the environment.

With a former development minister now in charge at DEFRA, and with a wider trade mandate in a reorganized DFID, it is likely that the drive for joined up national sustainable development policy will be given greater energy.

UK Food Sector

The start of 2007 saw a 'race to the top' in retailer pledges on environmental initiatives. This was partly in response to a rapid change in consumer polling on environmental issues – especially on climate change and 'food miles' – and the need to keep ahead of consumer concerns. Both **Tesco** and **Marks and Spencers** announced that they would **label air-freighted products** and shift emphasis to **locally-produced** food.

Marks and Spencer CEO Stuart Rose launched their £200m, five-year **Plan A** on 15 January 200790, with objectives of becoming carbon neutral by 2012, increasing local food sourcing, and rolling out step-by-step environmental management requirements for suppliers. The company stated that it was looking to minimise the amount of food air freighted as well as label food imported by air as 'flown'. M&S see

this as part of a long-running trend of customers demanding more information about the products they buy.

Tesco CEO Terry Leahy launched[91] their £500 million **eco-plan** on 18 January 2007, with a pledge to reduce the company's carbon footprint and encourage consumers to buy more sustainable products. The eventual target is to have a carbon footprint measure displayed on each of the supermarket's 70,000 items so that shoppers "can be empowered to make informed choices" and in turn to drive a market for low carbon products. Leahy set a target to air freight less than one per cent of its products (with a bias for sourcing from "the poor" within this one per cent), compared to the three per cent currently flown in. Stickers labelling air freighted products "by air" (Figure 6) have been introduced as an interim measure. Other labelled products such as the "low-carbon egg" from Asda are also beginning to appear.

Standards required by retailers from their suppliers are also beginning to reflect these environmental plans. In part this is due to higher standards for food safety involving further restrictions on pesticide use but the retailers claim this has the added benefit of reducing environmental impact[92]. Version 3 of the M&S "Field to Fork" standard came into force from the 1st June. In addition to stricter pesticide standards, it also covers labour standards and sourcing raw materials from the most sustainable sources available. It contains the M&S Farm Environment standard, which has been written in partnership with LEAF (Linking Environment and Farming). In May Waitrose extended its partnership with LEAF to cover *all* its conventional fresh produce as well as flowers, and prepared and frozen produce by 2010.

M&S and Tesco also teamed up with other major UK businesses in The Climate Change Group as part of the "**We're in this Together" campaign**, a major corporate social responsibility scheme which aims to cut CO2 emissions by 25 million tonnes over the next three years.

Figure 6: Thai organic babycorn for sale in Tesco, bearing the 'by air' Tesco.
Photo: www.telegraph.co.uk

Positions were moderated in subsequent months. In March 2007, Leahy spoke of the need to balance 'fair miles' against 'air miles', admitting there would be 'hard choices'. "We all know that transporting a product by air creates far higher carbon emissions than any other form of transport. So we could say, 'let's scrap all imports by air'. Yet some of the poorest people on earth get their goods to market by aeroplane."[93] Tesco also said it was determined to boost trade volumes in agricultural produce with Kenya beyond the current $400 million mark providing hope to worried flower sellers[94];Tesco sources 90 per cent of its cut roses and spread carnations from Kenya.

In June 2007, Stuart Rose reassured Kenyan agricultural suppliers that M&S will not cut imports of fresh produce. 95 M&S sources all of its green beans, and 75 per cent of its imported runner beans from Kenya.

Sainsburys, who along with World Flowers co-commissioned the Cranfield study, picked up the 'Fair Miles' vs Food Miles trade-offs in February 2007 to state that "it is not as simple as avoiding products from far-flung places. It's about gathering information to make an informed carbon choice. Real information is the key now." (J Sainsbury, 2007).[96]

Waitrose reported that "We will use air freight only if all other options are unavailable. We will always use British where we can, if it's in season."[97]

The **British Retail Consortium** lists Food Miles as one of its "Retail Myths."[98] (Box 3)

Box 3: Retail Myths

Food miles - "too much food is transported over long distances from abroad, which makes a big contribution to carbon emissions globally and is all about making big profits through sourcing cheaply"

- Transport is an essential element to ensure high quality, fresh, affordable food.
- Environmental experts, including DEFRA have recognised food miles is a simplistic way to measure the environmental impact of food distribution. More efficient distribution chains, moving large volumes and making full use of vehicles can be less damaging than multiple small volume movements of food over shorter distances, a point made in the Transport 2000 report *Wise Moves*.
- Food miles also ignores the wider consideration of the impact of the whole supply chain. It may be less damaging to the environment to import produce than grow produce under protected conditions e.g. tomatoes from Spain.
- Retailers stock products consumers buy and this includes products not available in the UK that have to be imported, whether that is to satisfy our demand for products out of season or to meet our diverse tastes.
- Air miles only makes up 1% of food tonnes/km, although we recognise this has the highest environmental impact per tonne. Whilst there was a rapid growth in air freighted food in the 90's, this has now levelled off.
- Air freight opens up our high value market to exporters from developing countries, making a contribution to their socio-economic sustainability.
- There is no definition of local food, and customer perception of local will vary with region and product. Retailers already stock large ranges of local produce, even if it is not labelled as such. British produce is extensively sold, particularly when in season - major retailers sell 100% British eggs, 95% carrots and 100% conventional milk.
- Retailers are working closely with local producers to increase dedicated local ranges. The BRC has worked with Defra and the NFU to create a scheme that increases access to major retailers for local producers.
- All retailers continue to improve the efficiency of their distribution, introducing new ways to improve their environmental performance through better use of transport, local hubs, lower emission vehicles and bio-fuels.

Source: British Retail Consortium (2007)

Carbon Labelling in the UK

Carbon labelling is a broad term that covers measuring and possibly displaying a particular products contribution to global warming. The specifics of which gases to include, the methodologies used, and what format any final label will take are the all important details of how the labelling is implemented. The Carbon Trust launched a labelling trial on certain products in March 2007 which had been developed over the previous 18 months. This was extended in July by the same three companies involved in the trial (Walkers, Boots, & Innocent Beverages)[99]

According to the Carbon Trust, this methodology forms the starting point for work currently being undertaken by the Carbon Trust, Defra and the BSI British Standards to develop a standard method for measuring the embodied greenhouse gases in products and services[99]. Major companies including Tesco and Marks & Spencer have now committed to working with the Carbon Trust in developing the standard. Details of how the standard will eventually work are yet unclear. It will take a long time to define a meaningful standard.

According to initial discussions organised by the UKERC at the Carbon Labelling Symposium in May 2007[100] the broad term 'carbon labelling' encompasses two distinct processes. First the actual 'carbon analysis' or methodology carried out at each stage of the product lifecycle to measure emissions (from seed to plate). Second the 'carbon display', which is any labelling put on the final product at point of sale. The presenters expressed the opinion that any carbon product lifecycle analysis performed should include the final stages of the carbon lifecycle of a product, such as the drive to the supermarket and cooking preparation. These can often be significant 'hotspots' in the product lifecycle. It is yet to be formally decided if and when there will be a carbon display on every product on a supermarket shelf and what form this will take. In fact it may transpire that there is never a carbon display on the actual product, but rather carbon hotspots within the product lifecycle would be targeted by upstream buyers, processors, and producers. A handout made available at the Symposium attended by IIED made the following points:

- Carbon labelling would target 10% of UK emissions. This is based on C02 emissions in the food chain. Including other greenhouse gases will increase this figure.
- Strong preference for single UK labelling scheme, with a view for UK as lead in initial voluntary standard to push across EU with possible EU-wide legislation.
- Initial data for each carbon emission activity to be based on a 'reference set' of data. This will consist of guide emissions numbers for particular activities within the product lifecycle chain. For example fertiliser application, transport, power/fuel use. The reference data will be 'biased' towards the higher side of average emissions for a particular activity to encourage producers to start measuring their own contributions.
- Initial product targeting could be based on many different models. Preferences of round table were:
    - components of standard shopping basket
    - products where data available
    - biggest potential for carbon savings
    - where there is supply chain interest/enthusiasm
- Costs were mentioned as a big issue, but the document only mentioned producers, government, or consumers as possible contributors
- Small producer costs and other key policy priorities such as development targets were mentioned as possible conflicts

It is envisaged that important factors for small-scale producers in developing countries, particularly those that rely on air-freight will be:

- what does the Carbon Analysis methodology at each stage entail?
    - what does it include and exclude from a measurement and GHG perspective?
    - how much knowledge will a small producer require to implement it?
    - how much influence can producer organisations, exports, African governments etc have on the design of the process?
    - will there be an alternative model of implementation for small-scale producers?
- what is the 'independent verification' process?
- How much does it cost and how are the costs attributed?
- how are air-freight emissions allocated**?**
    - will there be a possibility for countries with low emissions to offset the transport element with their own credit?
    - will developing countries be given preferential status and if so for how

NGOs

[worth starting by saying that NGOs have not been a leading voice in the debate? And worth also saying that the development voices have been the strongest?]

NGOs have aligned themselves in the debate on air freight and food miles according to their core interests, whether local food, environment, or development. At a recent **Soil Association** conference as part of the Soil Association's consultation on air-freighted food, **Greenpeace**'s senior campaigner Emily Armisted said: "it seems ridiculous to be flying food half-way round the world. Aviation is one of the fastest growing sources of emissions and limiting its growth is crucial to dealing with the very serious threat climate change poses."101

On the other side of the debate, **Actionaid**'s trade campaign head Claire Melamed stated in a recent opinion article that "asking the hard-pressed farmworkers of Kenya, Zambia or Peru to pay the price for reducing our carbon emissions is not an acceptable way to conduct global affairs." She pointed to supermarkets' trading practices as ripe for improvement, for supermarkets to be better global neighbours.[102]

IIED's director Camilla Toulmin has expressed a similar opinion, insisting that the UK should not impose its own carbon footprint on developing countries whose carbon emissions actually stand at a far lower level than the UK's. "In 2005, our concerns were all about making poverty history," she told an audience at debate at London's City Hall. "In 2007, in a bid to go green, we have apparently forgotten all about this. But really we need to hold both issues in our consciousness at the same time. "This whole debate needs to be placed in a broader context of climate change, in which the only fair solution will be an international allocation of carbon points, which would give countries like Ghana a surplus they could then use up in airfreighting product to the west."103.

In between these two positions are environmental groups with a social concern, such as the Food Climate Research Network. Although concerned with increasing use of airfreight and possible over-reliance on carbon heavy transport for long term sustainability of an industry, they see a need to support flourishing industries in developing countries. Yet, there are competing theories on how risky or sustainable export horticulture is. Some argue it can help cascade opportunities, skills and investment into the country[104] and others who view it as a temporary visitor offering little to the local economy other than exploitation and empty promises.

The **National Consumer Council** conducts an annual supermarket survey which rates the top eight food stores on a range of environmental indicators including food transport.

UK Agriculture

The successful 2006 **Farmers Weekly** Food Miles campaign[105] helped to bring the 'food miles' concept higher up the political agenda, and gathering wide political support across UK agriculture and government. The campaign led to a major petition to supermarkets. The campaign has since ended.

Soil Association

At the end of May 2007, the Soil Association launched a one-year consultation on " ways of reducing or eliminating the environmental impact of organic air freight" built around five options for action[106]:
Option 1: Take no action
Option 2: A general ban (introduced over a number of years)
Option 3: A selective ban
Option 4: Labelling air freight
Option 5: Carbon offsetting

The decision by the Soil Association is part of a drive for maintaining the integrity of the organic 'brand' in line with public concerns about the environment (organic consumers now put environmental motivations for purchasing organics above health, for the first time), and the 'industrialisation' of organics.

The announcement of the consultation strongly acknowledged the development context, point to the contribution of Blue Skies to rural economic development in Ghana. Much press focused on the potential outright ban, with headlines such as "Organic ban proposed for air freight products" and "'Organic' label ban planned for air freight food". Soil Association leaders also seemed to take quite a hard line towards Option 2; director Patrick Holden told the BBC Radio 4 Today programme that "This initiative wouldn't have been taken if there wasn't a pretty strong chance that the standards board would eventually decide on a total ban."[107] The Soil Association standards board chair, Anna Bradley, told a recent conference to examine the air-freight issue[108] that the association had received around 50 responses and the vast majority of these wanted some action taken. A *Farmers Weekly* internet poll of 928 votes which ended on 7 June 2007 recorded 87% of votes in favour of the statement that the Soil Association should stop certifying air-freighted food.

An outright ban would bring the Soil Association in line with Abel & Cole organic home delivery service, which has banned air freight from the outset.

However the general feeling from the consultative conference is that an outright ban is unlikely. Present at the conference were UK industry representatives, NGOs and African business and co-operative leaders (see Box 4).

Box 4: Blue Skies Ltd Opinion on AirFreight Labelling

Blue Skies is a producer of fresh cut fruit, exporting mostly to the UK. They work with farmers in Brazil, South Africa, and Ghana. In Ghana 20 per cent of their produce is organic and certified under the Soil Association organic label. The fruit is cut and packaged for air shipment in Ghana, employing approximately two thousand people in total.

"In terms of product labelling, we don't think believe that labelling products with an airfreight sticker is necessarily fair as it doesn't tell the full story. We'd support a label that highlights the positive benefits of the product such as the people it is supporting. This is something we are trying to achieve through 'Caretrace' which we have developed in partnership with Waitrose. You can see this at www.caretrace.com.

As for Carbon labelling, we would favour this over airfreight stickers but we would be concerned about who would bare the costs for getting this analysis done. We have over 100 product lines and are always introducing new ones, to accurately analyse each of these products on a continuous basis would be a huge and costly excersize.

Despite the cost of carbon footprinting, we still consider the continuous monitoring of our emissions to be important and we are commited to reducing these. We carried out a footprint report on our organic pineapple so we could know where we stand in comparison to other products but also to identify where we can improve.

We were also concerned about assumptions being made about seafreighting so we carried out an assessment of this with an independent company. Our concerns are that if we were to seafreight then the value would no-longer be added in the country of origin and that we would be seafreighting whole fruits in refrigerated containers over a period of weeks, which could compromise the quality of our products and would also be energy intensive in itself.

I personally think it's important to put emissions into context. Perhaps it would actually be more sensible to label products according to the average emissions of a 'category' rather than analysing every single product. The difference in emissions between fresh produce might seem big, but when you compare them to meat products you could almost say it's negligable. A recent report from DEFRA identified the most energy intensive products and I think beef came out as contributing 35kg of CO2e per kg and ground coffee contributed 70kg co2e per kg!"

On the 22 October 2007 the UK government urged the Soil Association not to strip air-freighted organic fruit and vegetables of their valuable certification on environmental grounds, arguing that such a ban would be "disastrous" for exporting communities in developing countries.[109] Despite this last-minute plea, on the 25 October 2007 the Soil Association announced that all air freighted organic food will have to meet the Soil Association's own Ethical Trade standards or the Fairtrade Foundation's standards to retain certification[110]. The Soil Association maintains the belief that it is irresponsible for the UK Government and others to support a trade and development strategy that is heavily dependant on fossil fuels and which will further fuel dangerous climate change.

The new air freight standards will also require Soil Association licensees to develop plans for reducing any remaining dependence on air freight. The details of the proposal will be open to further consultation during 2008, and will begin to take effect from January 2009.

Citizens/consumers

Box 5: Food miles fly to top of consumer worry list

Food miles have shot up the consumer agenda, with 40 per cent of adults interested in having more information available to them on how far food has travelled, and 19 per cent already trying to cut down on their own impact by using the country of origin labelling.

The findings, from a survey published by analyst Mintel, have revealed that 53 per cent of British adults believe more needs to be done to promote locally produced food.

The research demonstrates a clear call from consumers for greater transparency regarding retailers' environmental impact. The survey found 71 per cent of British adults recycle as much packaging waste as they can, with 66 per cent calling for retailers to reduce their packaging. Some 60 per cent would like to see a clamp down on fruit and veg packaging.

More than 67 per cent of adults attach some importance to the ethical and environmental policies of the shops they frequent. "Response rates at this level indicate that retailers can expect good levels of receptivity among customers to relevant [ethical and environmental] initiatives," said Mintel.

But more than four in 10 people are "apathetic" to these issues, said Mintel, with Asda, Tesco and Morrisons drawing in the highest proportion of "unconcerned" shoppers. Mintel warns these retailers may find their customers unresponsive to change, emphasising the need for strong communication from retailers to raise awareness.

Source: Freshinfo 2007[1]

There has been a shift back from social to environmental issues in the public consciousness. The term ‘food miles’ has become well known and is widely used. However the proportion of consumers whose buying habits have or might change in light of this knowledge is unknown and is clear that consumer surveys are inaccurate when trying to gauge green preferences[111]. For example, the figure below illustrates that consumers expect produce to be available on shelves 365 days per year – in most cases a contradiction in purchase pattern compared to desire for low food mile products. Indeed although there is clearly increased awareness of the term food miles, there are reports that sales of products labelled air-freight have actually increased[112].

Consumer Intention	Consumer Reality
Buying healthier foods	▪ Buying food on special offer ▪ Buying 'perceived' healthy foods rather than genuine healthy options ▪ Buying what's available or succumbing to 'pester power'
To buy bargains on special offer	▪ Buying premium products as an indulgence Overspending on promotions
Sticking to a shopping list	▪ Buying more items than intended
Like to try new brands	▪ Resistance to try new brands among the growing number of aging consumers
To eat and drink healthy at home and with the family	▪ Increased alcohol consumption in the home
To eat more locally-sourced produce	▪ Consumer spend at supermarkets ever-increasing
To show concern on food miles	▪ **Expecting out of season produce to be available 365 days a year**

Figure 7: Consumer buying behaviours (Source: Deloitte research survey of 77 executives at leading food and beverage businesses) [113]

According to Deloitte the competitive differentiation of the retailers will be a case of marketing 'meaningful merchandising concepts'.

> "We are going to see more focus on local and low food miles produce, perhaps much like today's dedicated organic space. The ability of retailers and their suppliers to combine these different propositions into clear and meaningful value propositions and merchandising concepts will determine who succeeds in creating real differentiation and winning the associated increases in share and margins." [114]

What is clear is that this competitive space is emerging rapidly but is not yet mature. Sales of 'flown' goods have not yet been affected, and currently only two supermarkets label products that are air-freighted. However the direction and strength of marketing in this area in the future may sway a percentage of consumer action, rather than just opinion, down a particular path.

Future Trends

Each of the major UK supermarkets was approached with a questionnaire (see Appendix 1) in order to get there input on their current working practices and future plans with regard to:

- Airfreight and airfreight labelling
- Carbon labelling in general
- Their views on active procurement from developing countries

Total response was good with five major retailers replying. The section will indicate general trends in the above three categories in order to preserve the commercial nature of some of the replies.

Trends were as follows:

Airfreight and Airfreight Labelling

The overwhelming trend for those retailers not already involved in specific labelling of airfreighted products (see section above) is to NOT implement any package labelling for airfreight. Some have begun a transport analysis to indicate what the approximate percentage of emissions from transport - and aviation as a subset of this. This is one part of a first step in decisions pertaining to carbon hotspots and possible future carbon labelling.

Carbon Labelling in general

All of the retailers expressed a commitment to follow the BSI/Carbon Trust standard as it evolved. Some however are more actively involved in both current analysis of 'hotspots' within their supply chains, and in-store carbon footprint (refrigeration, store construction etc). Additionally the degree of involvement in actively contributing to the formulation of the standard varied significantly. Some retailers preferring to wait to see how the standard emerges before committing and others working more closely with the Carbon Trust - possibly with a desire to influence a final outcome. The trend here is that the market leaders are actively involved - whether based on size or socio-economic grouping of customers. Performing detailed carbon analysis throughout all product lifecycles was considered unrealistic (and costly) by a few retailers, and most think there needs to be a lot more 'sound science' behind any methodologies adopted.

Procurement from Developing Countries

Most retailers did not see 'development' per se as a direct issue to customers, although one retailer thinks that customers need more education to help them make pro-development purchases. Some of the retailers are involved in development projects either directly through a not for profit foundation or indirectly through donations to charities involved in food and agriculture. Others see their development commitment as maintaining long term relationships with suppliers.

In terms of more generalised 'pro-poor procurement', the message across the board is that the key criteria for sourcing are quality, availability, and price. For some retailers these are the only criteria, for others they are the most important with country of origin and other social and economic issues as a secondary consideration. One retailer expressed an interest in 'development friendly' products as a potentially useful competitive advantage. When asked about their willingness to work with a 'pro-poor' supplier or exporter, the replies were varied - from "no" to "we do not have enough influence on suppliers" to "possibly".

Chapter 4 Options for Kenyan exporters for strategic engagement

Summary of analysis

Airfreight of fresh fruit and vegetables and flowers connects some of world's poorest producers and workers to some of world's most discerning consumers via powerful branded retailers. This very direct connection can assure higher net benefits for the producer country industry participants when compared to alternatives [e.g. traditional agricultural commodity markets, regional markets and local markets].

Aviation is an important consideration has become a **symbolic** threat in the dialogue on climate change. Airfreight of horticultural produce forms a small part of the aviation's impact. Yet, air-freighted horticultural produce have also become symbolically linked with this dialogue.

It is also at the vanguard of the re-invigorated push for sustainable development, where environmental and development concerns are simultaneous goals.

A response that aims to counter the verity of these symbolic threats needs to be based on available facts to avoid of token gestures that affect trade with the poor nations There needs to be a better appreciation of the trade-offs between economic and social development and environmental impacts, which in turn requires a well-informed debate.

The environment-development issues related to airfreighted trade between Africa and the UK, spelled out in Chapters x and Y, are summarised below, together with the positioning of stakeholders concerned. This is followed by a suggested list of points for action and strategic engagement which African exporters could consider.

Environmental impacts

It is true to say that per kilo transported, airfreight of produce has a higher environmental impact than other modes of transport. Yet its impact is currently not included in IPCC GHG balance sheets by country. However with respect to African horticultural produce, the following should be taken into consideration:

African FFV air freighted to the UK account for a maximum of 0.1 per cent of total UK GHG emissions[115]

In the big picture of the impact of UK food system from field to fork , air freight of horticulture from sub-Saharan Africa, and the associated trade in flowers, is a minor issue.

An estimated 60 to 80 per cent of airfreight produce is carried in the bellyhold of passenger planes

Calculating the emissions associated with FFV is complicated by the majority being transported in the bellyhold of passenger planes, and hence a complementary product with air passengers. There is no clear evidence that cargo act as a primary driver or significant subsidy to passenger flights.

The average Kenyan's carbon footprint is thirty times less than the average Briton

Kenyans are living within the planet's means; current emissions are below the natural global carbon sink levels – whereas the UK's are significantly above. There is justifiable space for a debate on **ecological space**, the concept of individualised (per

capita) rights to consume natural resources such as energy, food, land and clean air and water can be extended to carbon emissions.

Kenya has spare carbon – should it invest in FFV exports?
If the emissions associated with Kenyan FFV export to the UK were allocated entirely to Kenya's emissions budget, they would account for an extra 5 per cent of total emissions for Kenya, still below the natural carbon sink capacity and leaving Kenya with significant 'ecological credit'. The use of ecological space provides a lot more flexibility for Kenya to choose development pathways compared with UK.

Achilles heels for this debate?

1. **Which Gases?:** The UK Climate Change Bill only considers CO2 in emissions targets. Farming and aviation in particular have other gas emissions which contribute significantly to climate change – e.g. Nitrous oxide from fertiliser use, methane from livestock, carbon and nitrogen levels within the soil.

2. **Which environmental issues**: Other environmental resources are important to ensure a sustainable future, particularly water resources for the FFV export industry. The concept of the total water used in production [or 'virtual water'] is an available tool to identify water traded to identify water scarcity. Climate change might increase its significance and it is not inconceivable that virtual water could be traded in the same way as carbon is today.

3. **Different production systems and analysis boundaries:** The variation in farming practices even within the same crop type can have enormously different emissions levels. Choice of 'boundaries' for lifecycle analysis can significantly alter overall results. Following from this, quoting of studies as a general case should be avoided and can lead to over-simplified and incorrect conclusions. For example "flowers produced in heated glasshouses emit more than those flown from overseas" relates to one particular study from the university of Cranfield and should not be taken as a general case.

4. **Data Accuracy**: Methods of estimating emissions data are still very crude and in many cases have a wide margin of error. It is also the case that for a 'full accurate picture' the volume of data needing gathering is enormous, will be highly time consuming, and costly.

Development Impacts

1. Trade can develop, guide and foster development. Trade may affect the poor in more direct ways via changing access to markets, commodity prices, employment opportunities and wages. Agricultural trade has a strong poverty alleviation impact owing to the participation of the rural poor in production. Agriculture offers one of the few options for African nations to trade competitively with developed countries.

2. Over one million rural African livelihoods are supported by the UK FFV trade with SSA. Rural economy and the poor can benefit from the international FFV trade. Over 60% of people in sub-Saharan Africa are dependent on agriculture. Finance flows into poor rural Africa from the FFV trade. High-value FFV trades provide serious benefits for local innovation and 'upgrading'.

3. Benefits accrue across formal and informal sectors - employment and multipliers - and as well across small-scale growers and workers on larger farms.

4. Farmers realise a range of benefits from this trade. Producing for exacting suppliers, such as the UK markets, means learning new procedures and complying with a range of standards that are often absent from local markets which be reverse transferable to the other aspects of their production. In addition, an average Kenyan farmer formally supplying UK supermarkets makes £200 per annum.

5. However, costs exist – compliance is expensive, risks for SSG ARE high. Recent research shows that smallholders are increasingly not participating in high-value horticultural trade

Stakeholder positions

Consumers – Food Miles are now reportedly high in public consciousness. Consumer research shows that the concept of 'food miles' has entered mainstream pubic consciousness, and it is wrong to simplify this cultural shift as the result of a single campaign, despite the success of the Farmers Weekly in raising the political stakes. It is simple, easily understood, and of use by a range of stakeholders with different goals – from UK farmers to supermarkets. The food miles issue has been supported tacitly through the emergence of the environment as an area of competitive difference among supermarkets. Confusion over labelling reportedly persists. Several agencies pushing the concept of sustainable development have added their voices. However, there remains little evidence linking food miles campaigns with reduced consumer demand for SSA FFV. Yet.

Government – There has been some progress towards a more joined up policy between UK domestic agrifood and international development policies, with DEFRA and DFID making a joint statement on the food miles issue. Both DFID and DEFRA recognise that food miles are not a good indicator of sustainability taken in isolation and that sustainable development is about helping to end poverty as well as caring for the planet.

NGOs – There exists division between environmental and developmental view points. However increasingly environmental groups are recognising the importance of inclusion social and developmental issues into their environmental messaging.

Retailers – Currently two leading retailers (Tesco and M&S) are labelling all air-freighted produce. However both have committed to sourcing from developing. Other retailers are currently not labelling produce as air freighted and it is expected that they will not until a new carbon labelling standard emerges.

Points for action

In light of the current status of these converging dialogues in the UK on food, climate change and aviation, this section suggests pathways for engagement that can best promote developing country voices and raise concerns.

The Environment as a Point of Difference

It can be argued that Africa holds a number of crucial environmental comparative advantages – it has carbon "credit", is a low GHG emitter and can produce year-round with low inputs. In the UK, 'the environment' has become a competitive point of difference for the UK retail industry. Yet owing to the direction and focus of the climate change dialogue, Africa's comparative advantages are unrecognised within this competition and dwarfed by local. It must be recognised that the UK "local food" agenda is one part of a valid approach to a sustainable food system. As such, African export agriculture should not declare war on it, rather explore and build-on the

complementarities with SSA produce. Currently, consumer awareness of climate change is high and many are seeking for channels for constructive behaviour change, including through their food consumption choices.

ACTION: Engage in the climate change debate

- **Support change in the supply chain** towards best practice in carbon and water management

Examples of positive interventions include:

- **Engaging with standards setters** and suppliers to ensure that genuine environmental benefits are rewarded. This will include:
    - Engaging in the development of standards setters' methodologies [e.g. to calculate carbon associated with products] are appropriate as applied to African produce and supply chains and will not act as a new trade barrier
    - Working with suppliers to implement carbon management programmes - At the same time actively seek 'hotspots' of carbon emissions within the supply chain and investigate measures to reduce them.
    - Flagging the issue of regressivity of costs of compliance along with attribution of responsibility for those costs.
    - Encourage a best practice code for air-freight – many of the retailers may not know whether cargo is transported in bellyhold of passenger planes or in dedicated cargo planes, how old the aircraft transporting goods are, or whether the plane flies during the day or at night. All of these factors impact the amount of air emissions attributable to FFV. Setting best practice guidelines for airfrieght transport will demonstrate positive action to monitor and reduce carbon hotspots in the transport chain.
- **Engaging on an international political stage** to ensure African comparative advantages can be better leveraged. For instance lobbying for emissions equity that recognises carbon credit and small footprints will help reward best practice in African agriculture.

Development as a point of Difference:

It could easily be argued that if economic development attributes of the trading chain for food products, that Africa would have a comparative advantage. However, this is a complicated issue, and one that requires judicious review of consumer preferences and supply chain indicator development. There are clear developmental benefits from UK consumers 'choosing' to purchase African produce that occur currently as a normal result of trade without any explicit reference to or marketing associated with the origin of the product. Increasingly, the provenance of food products is displayed. However the industry itself has thus far hidden the 'Africa-ness' of FFV from consumers, so it is unrealistic to expect consumers to make pro-development decisions or weigh development against environment. But, our research shows that consumers are becoming more inquisitive over their purchases including potential development impacts in developing countries. Plus, there are positive signals from net UK consumer preferences, with developing country FFV growing – the volume of sales are increasing and the prices are rising faster than the Retail Price Index.

ACTION: Support development of a "development test" for food products sold in the UK

- **Development Friendly Suppliers** –UK food retailers will inevitably see development as a competitive point of difference within the UK retail space. Suppliers in Africa would do well place themselves as 'development friendly' to UK buyers.

- **Demonstrate Development Impacts** - Must ensure that development is demonstrable - Ensure that socio-econ development impacts are optimized – look at business model to improve pro-development outcomes, within commercial reality
- **Include targets for incremental improvements** in any business plan
- **Get Buy In** from a broad range of interest groups and stakeholders along the supply chain.

ACTION: promote 'Brand Africa' to UK consumers

- **Brand African produce** - This avoids needing apologies for long distance haulage (air-freight). Brand African exports and promote UK businesses as partners in development. Africa as a source of clean produce of outstanding quality.
- **Work with UK** agencies, businesses and donors to ensure consistent messaging.

ACTION: engage with/establish forums that aim to improve practical business engagement

- A central belief is that, like the environment 3-5 years ago, development is largely a pre-competitive issue, where cooperation along the supply chain can promote innovation across mainstream markets. This opinion is increasingly voiced by businesses and there exists a need for (and timeliness of) a forum to improve practical business engagement in the MDGs.
- Develop common understanding. Furthermore, the increasingly complex trade-offs between environment and development (climate change, air freight and food miles, embedded water) adds urgency to the need for chain partners to work together on demonstrating that procurement in Africa can work for long term – sustainable – development.
- African voices heard – especially producer organisations. Genuine competitive advantage is not limited to export trade with the EU. Growing the capacity of farmers to compete on is key coupled with raising the ability of farmers to also become more competitive in local and regional markets.

Filling information gaps

There are serious and substantial gaps in information. Moves towards a carbon standard will require filling of these gaps. The sparse information that is available is sometimes commissioned by private companies and not fully in the public domain, but yet quoted in the PR war for or against food-miles. Information pushed in the direction of the general public needs to be carefully considered, openly peer reviewed, and taken within specific context.

Additionally the volume of information, should any carbon standard make a concerted effort to be comprehensive, will be enormous. Data comparisons need to be taken with a pinch of salt with effort made to look at positive ways of reducing carbon 'hotspots' rather than exclusion through standards. A forthcoming study from the RELU programme at the University of Bangor states with respect to the food miles issue:

> "It seems almost impossible that a scientific dataset could be developed which would enable formal testing of the hypothesis that local food is better than non-local food. The difficulties associated with this task relate firstly to difficulties in defining each locality in a spatial explicit manner – which is a necessary step if relevant environmental data are to be collected – and secondly to the sheer volume of data that would be needed to enable all locality-locality comparisons to be made for all relevant variables"

Further research is needed on:
Possible costs of a carbon standard – There is a danger that without sufficient lobbying costs of implementing carbon analysis and complying with a carbon standard will be pushed down to producers. It would be useful to estimate how much these costs would be, and input this information into the carbon standard debate at an early stage.

Further quantifying the development benefits of the export horticulture industry – an important step required in meeting the above mentioned 'development test' is further quantifying what the benefits are, who the winners and losers are, and developing business models so that socio-econ development impacts are optimized. This includes looking at labour standards and the terms of trade negotiated with suppliers - and developing models that allow for their continuous improvement within realistic commercial parameters. Buy into these models from suppliers, development agencies, and government is essential in order to encourage private sector actors to enter the development arena without fear of negative publicity.

Communications strategy for COLEACP-PIP engagement in the above actions – promoting 'branding Africa', a development test, and engaging with business are goals requiring careful planning on how to best engage and who to partner with. A detailed communications strategy is needed.

Timeframe of events

Short Term

- Food miles will continue to be in the public eye and promoted by relevant interest groups e.g. UK farming lobby, certain environmental and local interest groups, retailer labelling of air-freight on certain product lines etc.
- Development issues will become more mainstreamed on the agenda for buyers, consumers, and retailers - potentially providing an offset to food-miles labelling.

Medium Term

- Food miles will become embodied in the carbon lifecycle and carbon labelling debate.
- A UK wide standard will emerge on carbon labelling. Once established will be a market leader in Europe and may act as an EU wide example.
- Eventually this may become part of existing standards such as GlobalGAP, depending on what is required from producers and exporters. Allocation of costs in this will be of key importance.

Long Term

- Increased competition and procurement of horticultural produce from Asia will pose a threat to the African FFV trade. The extent of this threat will depend on factors such as how widespread the commitment to procurement from developing countries, along with any competitive improvements in the African FFV industry.

Notes

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