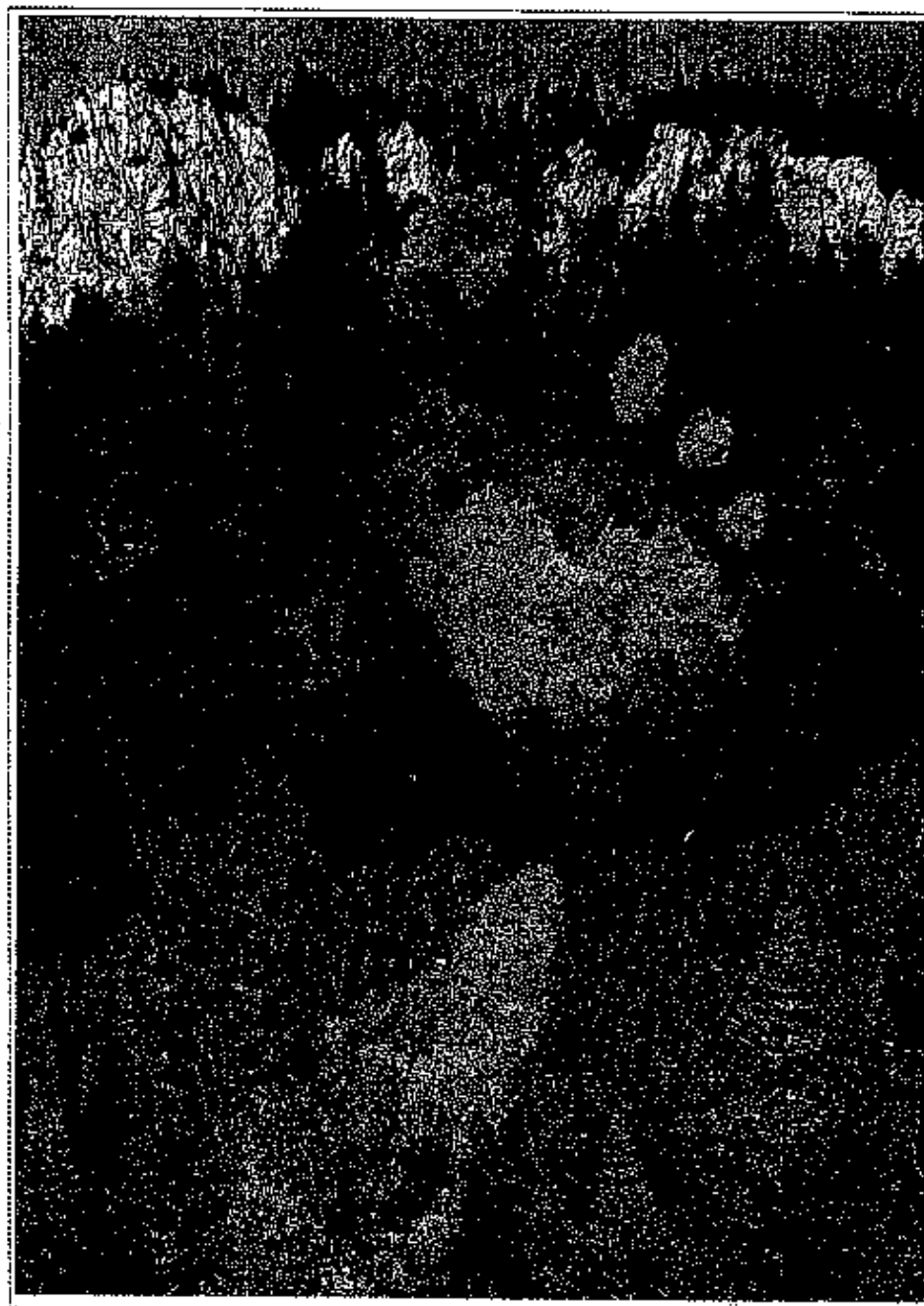


Citizen Action to Lighten Britain's Ecological Footprints



IIED

A report from
the International
Institute for
Environment and
Development to the
UK Department of
the Environment,
February 1995

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IJED

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EXECUTIVE SUMMARY

What is 120 times the size of London? The answer: the land area or *ecological footprint* required to supply London's environmental needs. Avon's footprint has been estimated at 40 times the size of the county, while an area three times the UK's productive forests is more or less permanently taken up in providing wood products for Britain.

Since the 1992 Earth Summit in Rio de Janeiro, the term *ecological footprints* has been increasingly used in British international environmental policy circles to give greater focus to the long-running debate on the UK's overseas environmental impact. The phrase was coined by the Canadian academic William Rees in 1992 to describe the tendency of urban areas to consume the resources (or carrying capacity) of "distant elsewhere". The UK Government included the concept in its 1994 Strategy for Sustainable Development to embrace the "impact of its international economic activity". Environment and development groups have also latched onto the phrase as a useful way of framing the urgent need for Britain's to change its consumption patterns.

This report first describes the intellectual heritage of the idea, and its application in international and British policy making (Section 2). What emerges is that the concern about footprints is part of a broader wave of academic and citizen research and action on the unsustainability and unfairness of current consumption patterns practiced primarily in industrialized countries, such as the UK. Apart from footprints, five other concepts are discussed: ghost acres, environmental space, ecological rucksacks, environmental debt and food miles. These concepts together share a number of common assumptions about both the causes of global environment degradation and the main lines for improvement.

Five common themes emerge: first, that there are global limits (ie the world has limited carrying capacity, in terms of sources of environmental resources and sinks for pollution and wastes); second, that there should be fair shares (eg each global inhabitant has an equal right to this limited capacity); third, that a priority should be placed on meeting needs (ie food security concerns must take precedence over the allocation of land resources to 'luxury' products); fourth, the world should move towards sustainable trade (ie international trade should be based on ecological surpluses, and transport should be minimized); and fifth, that goods and services should incorporate full life cycle costs (eg full social and environmental costs at each stage of the life cycle from extraction through production and consumption to disposal should be internalized into prices).

Although controversial, these ideas have already entered international negotiations on environment and development. Before the Rio Earth Summit, developing countries argued that the industrialized world should ensure that the South has adequate 'environmental space' to meet its development aspirations. Since Rio, roles have reversed somewhat with OECD countries, notably the Netherlands and Norway, pushing forward international discussions on achieving sustainable consumption patterns within the framework of the review of the Agenda 21 action programme monitored by the CSD. Section 2 concludes with a brief review of some of the fault lines that divide the debate, namely: a revival of a

limits to growth controversy, arguments over the desirability of free trade over self-reliance and questions of global equity, redistribution and planning.

Section 3 tests the usefulness of the footprint approach both as an analytical tool and vehicle for communicating distant impacts to the UK citizen through the use of four case studies of commodities produced in developing countries and consumed in the UK: bananas, cotton, forest products and prawns. The banana case describes the social and environmental impacts of banana production in Costa Rica and the launch of the ECO-O.K. initiative to certify and label environmentally friendlier bananas for consumption in the USA and Europe. The base footprint required to sustain Britain's consumption is calculated, and alone amounts to about one half of a percent of the UK land area under permanent pasture. Options for citizen action are then examined at the consumer level and at the political level to influence corporate practice, as well as government aid and trade policies. The cotton case also assesses a base footprint, which results in a land area needed for Britain's cotton needs as equivalent to one-fifth of the UK's cropland. Consumer possibilities to act on cotton products are extremely limited at the moment, and the case study summarizes some positive aid and trade policy options.

The forest case study reviews the main problems and root causes behind deforestation and other forest problems. It then explores the dimensions of one country's footprint on another's forests. About 6.4 million hectares throughout the world appear to be more or less permanently taken up in providing wood products for the UK, approximately three times the UK's own area of productive forest. The final case study on prawns imported from developing countries, focuses on the social and environmental impacts of the rapid expansion of prawn farming during the 1980s. It explores the conclusions of a footprint analysis of prawn production in Colombia, which reveals that the footprint of a semi-intensive prawn farm is between 35 and 190 times the size of the farm itself. But the study also highlights some of the pitfalls of the footprint imagery, the absence of a social component and the intensity of research required.

Building on the insights from these case studies, Section 4 explores in more detail a range of tools for citizen action, including the use of certification techniques in the forest industry, the development of fair trade and environmental labelling and community action, particularly in the context of local Agenda 21s.

The closing section draws a number of conclusions on the methodological lessons learned and options for citizen action. These can be summarized as:

* The footprint term is being used in a variety of different ways, ranging from the precise definition used by Rees (eg the appropriation of carrying capacity by communities in distant elsewhere) to a looser description of Britain's overall environment and development impacts on developing countries.

* Britain's base footprint -- the sum total of areas required to sustain the supply of material consumption to the UK -- can be calculated with relative ease. But this omits wider environmental and social impacts, many of which may be of greater importance and interest to the British citizen.

- * The footprint can be seen as a sophisticated successor to the 1960s notion of ghost acres, but one that perhaps focuses too heavily on the consumption of foreign resources, and not on the driving forces in terms of public policy and corporate practice that shape these patterns of consumption.
- * Carrying out footprint analysis is a time-consuming and research intensive task. Lack of basic information is a fundamental barrier to understanding.
- * There is a risk that footprint analysis could lead to a kind of resource reductionism by seeking to translate complex sustainable development trade offs into land area equivalents.
- * The imagery of footprints is initially compelling. But on reflection, questions are raised: how can we measure the depth of the footprint (eg is the impact caused by a clog or a stiletto?); what is the resilience of the local ecosystem (eg how squashy is the land on which the footprint rests?); and how exclusive is the impact (eg is the image of a shadow not more appropriate?).
- * The use of footprints in the North-South context in the UK has echoes of earlier critiques of Britain's colonial and neo-colonial expropriation of developing country resources. There are tensions between those favouring fair trade and self-reliant solutions.
- * Citizen action to reduce the social and environmental impacts that Britain generates overseas is severely constrained both by a lack of general awareness on the relationships between North-South and by an absence of information on specific products or issues.
- * The four case studies demonstrate that as a consumer, the British citizen faces an extremely limited supply of more socially and environmentally responsible products from developing countries. Political and group action offer more possibilities for promoting change.
- * Environment and development groups are the most trusted source of information on North-South issues, and have started to incorporate the footprint image in the public communications work.
- * Footprint concerns overlap with a range of existing initiatives to promote more sustainable consumption in the UK, notably the use of life cycle approaches in product management and in the EU's eco-label programme.
- * Footprints could be effectively used within Whitehall as an image to raise awareness among officials working on Britain's dependence on external sources of supply.
- * Footprints in the broad sense need to be integrated into current Government efforts to develop national indicators of sustainable development by the end of 1995.
- * Influencing UK aid, trade and corporate policies emerged as one of the most promising avenues for citizen action.

* Partnerships between public, private and civil sectors along the chain from production to consumption also were a common theme in successful initiatives to improve environmental performance in developing countries

* Companies, both producers and retailers, are not providing adequate information to their customers and stakeholders in Britain on their overseas impacts.

* Britain's largest footprint arguably arises from the City of London. There is far too little research and action applied to the impacts of Britain as home to one of the world's leading financial markets. Citizens need to know far more about the impacts of investments made in developing countries by UK pension funds and investment companies.

* The foundations for citizen action need to be built at the local level, within the community. There is great potential for using the footprint image to integrate the external dimension into local Agenda 21 processes.

In conclusion, there is both a growing concern in Britain about our impacts abroad and a desire for practical change. The former may be symbolized as a perception of a "blind trampling foot", whereby we in Britain create a range of social and environmental impacts elsewhere in the world, largely invisible to the UK citizen, and the latter as the "enabling hand". Much more can and needs to be done to assist developing countries establish the sustainable production and trading systems that allow both them and us to benefit from their scarce environmental resources.

1. OBJECTIVES

This report was commissioned by the UK Department of Environment on 31 October 1994, and completed by IIED on 27 February 1995. The report comes at a time of concern that the external dimension to Britain's efforts to promote sustainable development is not being given sufficient priority. The report aims to fulfill a three-fold goal:

- (i) To review what is meant by the term 'ecological footprint' and to outline some of the related concepts currently under discussion in the environment and development field;
- (ii) To set the discussion in a UK context through case studies of some of the ecological footprints generated by UK consumption, production, trade and investment patterns in foreign countries; and
- (iii) To explore how this information could be communicated to the public so that citizens can take positive action which both lighten and reduce Britain's footprints and promote more sustainable development in poor and vulnerable developing countries.

The report is set within the context of the UK Government's new *Going for Green* initiative, launched in February 1995 with the aim of increasing people's awareness of the part that their personal choices can play in delivering sustainable development. It will devise a "green code" to disseminate ideas and introduce programmes in a number of pilot communities. The scope for citizen action is not limited to the role as a consumer. Part of the goal of work on footprints is to raise awareness of the complexities of our lifestyles, and to encourage people to take responsibility for the wider linkages between themselves and the producers and environments in the developing world. Structural action may need to be taken by both governments and business to reform trade and aid policies and redesign supplier arrangements if the consumer is to be able to effectively use the power of the purse for sustainable development in the South.

At IIED, the project was managed by Koy Thomson and coordinated by Nick Robins.

The report was edited by Nick Robins, and the principal authors of the various sections of the report are as follows:

- 2 - Citizens and Footprints: Nick Robins
- 3 - Footprint Case Studies
 - 3.1 Bananas: Bruce Aylward
 - 3.2 Cotton: Camilla Toulmin & Koy Thomson
 - 3.3 Forests: Steve Bass
 - 3.4 Prawns: Nicolette Fox & Ross Hughes

4 - Tools for Mobilizing Citizen Action

4.2 Certification: Steve Bass

4.3 Labelling: Marianne Grieg-Gran

4.4 Community Action: Nick Robins & Chris Church

The report also benefitted from the contributions from a variety of sources, especially those who attended the Consultative Seminar (Annex 3).

The cover image is courtesy of the Bally shoe company.

2. CITIZENS AND FOOTPRINTS: MAKING THE CONCEPTS RELEVANT

2.1 Background: Britain's Ecological Footprint on the Planet

For the last 200 years, questions concerning Britain's impact on far-away environments and peoples have never been far from the surface. As the world's leading imperial and trading power, Britain was able to draw on resources from every corner of the globe to a historically unprecedented degree. Even in the beginning of the nineteenth century, the fictional traveller in Robert Southey's *Letters from England* noted that "all parts of the world are ransacked for the Englishman's table". Nearer to our own time, concerns about the negative impact of British consumption and production patterns were often bound up in a critique of colonialism. For example, George Orwell in his Depression classic *The Road to Wigan Pier* wrote "in order that England may live in comparative comfort, a hundred million Indians must live on the verge of starvation - an evil state of affairs, but you acquiesce in it every time you step in a taxi or eat a plate of strawberries and cream. The alternative is to throw the Empire overboard and reduce England to a cold and unimportant little island where we should all have to work very hard and live mainly on herrings and potatoes".

Orwell's perception of Britain's acute dependence on external sources of supply for its most basic needs has remained a powerful theme, driving calls for greater self-sufficiency in agricultural and timber products. The Empire is gone, but concerns about Britain and other developed countries' impacts on the Earth are growing, and increasingly being seen through a green, environmental lens. In the decade leading up to the 1992 Earth Summit, public perceptions of Britain's contribution to the global environmental crisis broadened to include issues of climate change, ozone depletion and tropical deforestation. As the pioneering *Green Consumer Guide* published in 1988 put it: "Take a bite out of a hamburger, we are told, and we take a bite out of the world's rain forests" (Elkington & Hailes, 1988).

The invisible and unintended consequences of consumption choices here in Britain on far-away peoples have been brought progressively closer to UK citizens through concerted campaigning and media coverage. The Green Consumer Guide was followed by a host of similar 'How to...' manuals covering development, fair trade and ethical concerns (eg Litvinoff, 1990; Wells & Jetter, 1991; ECRA, 1993). A few companies, such as B&Q, have now started to extend life cycle analysis to screen their developing country suppliers for environmental sustainability. But as recent controversy over the Body Shop's 'trade not aid' programme shows, there is a continuing public and professional uncertainty about green claims, particularly those that concern distant impacts in developing countries. There are also more profound arguments that current lifestyles in Britain place an insupportable burden on the planet, which can never be adopted by the poor and aspiring societies of the developing world. As a result, Britain and other developed countries could be seen to have a duty to pioneer new forms of lifestyle and consumption that all of the world's population could enjoy without wrecking the global environment and ruining chances for future generations.

2.2 Not In Their Back Yard

Since the 1992 United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro, otherwise known as the Earth Summit, a new phrase -- 'ecological footprints' -- has been increasingly used in British international environmental policy circles to give greater focus to the long-running debate on the UK's overseas environmental impact. The phrase was coined by the Canadian academic William Rees in 1992 to describe the tendency of urban areas to consume the resources (or carrying capacity) of "distant elsewhere". In Britain, the phrase has achieved wide currency as an umbrella term to cover the external dimension of our efforts to achieve sustainable development. The UK Government thus included the idea in its 1994 Strategy for Sustainable Development to embrace the "impact of its international economic activity". Environment and development groups have also latched onto the phrase as a useful way of framing the urgent need for Britain's to change its consumption patterns. Robin Pellew, Executive Director of WWF UK has aptly described this as the 'Not in Their Back Yard' (NITBY) issue, focusing as it does on ensuring that the lifestyles enjoyed by British citizens are not won at the expense of 'unsustainability' and poverty elsewhere, particularly in the developing world.

The footprint idea has a rich intellectual heritage. It draws on earlier concerns about the limits to unrestrained material consumption and the unfairness of rich countries living off 'ghost acres' in poorer regions. It builds on the central insight of the World Commission on Environment and Development's 1987 report, *Our Common Future* that sustainable development is about meeting needs of present and future generations, and therefore that lifestyles should be designed "within the bounds of the ecological possible and to which all can reasonably aspire" (WCED, 1987). Gro Harlem Brundtland, chair of the WCED and Prime Minister of Norway has been one of many to stress that the current lifestyles of richer countries fail to meet this test: "if seven billion people were to consume as much energy and resources as we do in the West today then we would need 10 worlds, not one to satisfy all our needs".

In the international context, the growing awareness of the footprints created by countries such as Britain are part of a wider post-UNCED debate on changing consumption patterns. The Earth Summit helped to expose the deep imbalances in consumption and pollution between North and South, whereby the 20% of the world's population in the rich 'North' account for 50-90% of consumption and pollution was well-publicized. The disparity between benchmark countries such as the USA and India is even more extreme: the average US citizen consumes 227 times as much gasoline and 115 times as much paper as the average Indian (Parikh et al, 1991).

The resulting Agenda 21 action plan for sustainable development agreed by the governments of the world at the Earth Summit stated that "the major cause of the continued deterioration of the global environment is the unsustainable pattern of consumption and production, particularly in industrialized countries" and called on developed countries to "take the lead in achieving sustainable consumption patterns". This compromise was reached only after tough negotiations between the North and South, where the US famously stated that "the American way of life is not for negotiation".

At Rio, the recognition of the need for the developed world to reform its consumption habits was the geopolitical twin of developed world concerns about the environmental impacts of developing world population growth, subsequently tackled in greater depth at the 1994 International Conference on Population and Development in Cairo. The signing of the Climate Convention at Rio also marked an important precedent for the broader consumption agenda as it embodied a recognition of the need for a limited global resource to be managed fairly for all countries; the exact details of how an equitable climate management mechanism can be established are still hotly contested.

Since Rio, there has been a strange reversal of roles, with the developed world starting to take a more positive view on the benefits to be gained from changing its consumption patterns. The Norwegian Government has championed the issue, hosting two ministerial conferences on sustainable consumption, and preparing elements for an international work programme for the UN. Developing countries, who argued that the industrialized countries should reduce their consumption of the Earth's resources so that they could grow, are now more hesitant, fearful of the impacts of enhanced resource efficiency and conservation for their export-led development strategies.

2.3 Exploring Footprints and Other Concepts

In the early 1990s, a host of new and revived concepts sprung up which conveyed in highly visual terms the burden placed on the global environment by the resource-intensive lifestyles of the developed world. The development of the concept of ecological footprints is thus part of a new wave of analysis and concern about the limits to current lifestyles and the impacts caused by consumption in countries like Britain on other parts of the globe. The following section examines these concepts: *ghost acres*, *ecological footprints*, *environmental space*, *ecological rucksacks*, *environmental debt* and *food miles*. Most of these ideas are, however, new to the average British citizen. The time has now come to see whether these concepts are both analytically sound and used in ways which encourage people in rich countries like the UK to take action to lighten the footprints they are creating in far off places.

2.3.1 Ghost Acres

The Swedish academic Georg Borgstrom invented the phrase 'ghost acres' in his 1965 book, *The Hungry Planet* to describe land required to supply a country's import of food, feed and fish (Borgstrom, 1965). Borgstrom calculated that the UK was using a 'ghost acreage' of 16.6 acres per capita, compared with a domestic area of 13.7 acres per capita: in other words, for every acre used in Britain another was being used overseas. Borgstrom's point was that these ghost acres presented a real constraint on the Earth's capacity to feed a growing world population. His ideas were very much part of the early debates about the links between population, consumption and global carrying capacity, most notably Paul Ehrlich's *The Population Bomb* and the Club of Rome *Limits to Growth* report (Ehrlich, 1968 & Meadows et al, 1972).

In the 1980s, interest in 'ghost acres' began to revive. India's Centre for Science and Environment (CSE) argued in its 1984/5 *State of India's Environment* report that "despite the worldwide process of decolonization, there is today many times more land being used in the developing world to meet the food and other biomass needs of the Western countries than in the 1940s before the process of decolonization began" (CSE, 1984). Anil Agarwal, CSE's Director has subsequently estimated that "the total biomass exported today from developing to industrialized countries may be more than ten times greater than during the much maligned colonial period" (quoted in von Weizsacker, 1994). In Europe, groups such as De Kleine Aarde in the Netherlands and The Ecologist in the UK dusted off and updated Borgstrom's ghost acres assessments. Tracey Clunies-Ross and Nicholas Hildyard's 1992 *The politics of industrial agriculture* argued the following:

"Europe, the US and other countries in the North may produce large surpluses of cereals, meat, milk and other commodities, but they do not do so by relying exclusively on their own land areas. Many depend on exploiting "ghost acres abroad to grow their agricultural inputs and food...The United Kingdom farms two ghost acres abroad for every one farmed at home. In total more than 386,000sq miles of land in the South is exploited in this way (four times the land area of the United Kingdom" (Clunies-Ross & Hildyard, 1992).

The 'ghost acres' idea was extended by the former WCED Secretary General Jim MacNeill and others in the preparations for UNCED to encompass the wider notion of the "shadow ecologies" on which industrialized countries depend for their well-being (MacNeill, Winsemius & Yakushiji, 1991). MacNeill suggests that "if cities like New York and Singapore, or nations like Japan, had to live without their shadow ecologies; even for a short period, their peoples and economies would suffocate" (MacNeill, 1993).

2.3.2 Ecological Footprints

Ecological footprints is a term developed by the Canadian William Rees to describe the tendency of urban regions to appropriate the carrying capacity of "distant elsewhere". Rees builds on the traditional meaning of carrying capacity -- "the population of a given species that can be supported indefinitely in a defined habitat without permanently damaging the ecosystem on which it is dependent" -- to give a new definition more appropriate for assessing the relationships between human society and nature: "the maximum rate of resource consumption and waste discharge that can be sustained indefinitely without progressively impairing the functional integrity and productivity of relevant ecosystems *wherever they may be*" (Rees emphasis in Rees, 1994).

The notion of ecological footprints is based on the simple, but radical observation that "while we are used to thinking of cities as geographically discrete places, most of the land "occupied" by their residents lies far beyond their borders" (Rees, 1992). Looking specifically at the Vancouver-Lower Fraser Valley of British Columbia, Rees found that land area functionally required to support the community (in other words, its ecological footprint) was at least 20 times the land it occupies. This was reached by calculating the region's ecological use of forested and arable land for domestic foods, forest products and fossil energy alone (either for ethanol substitutes or forest sinks for carbon dioxide

emissions). Rees argues that the gap between excess consumption and locally available production of resources can be called the "ecological deficit", analogous to traditional trade deficits measured in financial terms.

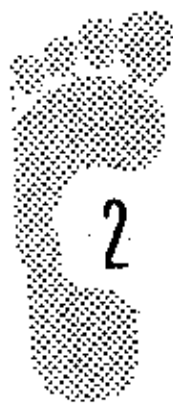
Rees and his team at the Task Force on Planning Healthy and Sustainable Communities at the University of British Columbia have popularized the footprint image through the use of some eye-catching cartoons (Wackernagel, 1994) (Fig. 2.1).

It should perhaps be noted that it is not only the rich industrialized countries which have ghost acres or footprints. The oil rich Arab states, for example, or a country like Thailand, which has famously used neighbouring states as its hinterland, also appropriate the carrying capacities of other countries. The most extreme case might be Brunei.

Rees stressed that such imports of external carrying capacity do not pose a problem if they are drawing on true ecological surpluses. Currently, however, there is little practical understanding of whether trade flows are really based on such surpluses. The footprint idea thus has similar intellectual roots to the notion of countries importing and exporting sustainability, raised in *Blueprint for a Green Economy* (Pearce, Markandya & Barbier, 1989). Rees is a sceptic about the lasting benefits of deregulated commerce at the global level, arguing that "urbanisation and trade have the effect of physically and psychologically distancing urban populations from the ecosystems that sustain them". For him, bioregionalism and self-reliance are the appropriate political expressions of the footprints idea.

Now that the footprints idea has been introduced into the wider UK environmental debate, it is important to recognise the very precise definitions that Rees gives to the terms he uses, based on certain key assumptions about carrying capacity and trade. In particular, it is noteworthy that Rees does not place his concept of footprints explicitly in a North-South context as many in the UK have done. While the focus in the UK on North-South footprints is certainly important, it can obscure the often much greater interdependence between developed states: as Box 2.1 shows below, only three of the seven Dutch ghost acres are in developing countries.

Fig. 2.1



The Ecological Footprint

2.3.3 Environmental Space (Eco-Capacity)

The Netherlands has led the way in developing much greater levels of precision and sophistication in the analysis of the relationships between its consumption patterns and the global environment. The Dutch Government was probably unique in its national report to UNCED in its admission of its country's dependence on external sources of supply for well-being. The report stated that "the Netherlands economy can only sustain its current level by exploiting the "ecoscope" of other countries i.e. the carrying capacity of their environment in all its (interrelated) functions" (VROM, 1991). The report then presented an updated 'ghost acre' assessment, stating that "for every hectare used in the Netherlands for dairy farming two hectares are used in other countries -- mainly developing countries that export animal feed...In the developing countries in question, serious environmental degradation may be the result of the need to set aside ever larger areas for low value cash crops such as animal feed. The report noted that "it is in the very nature of international trade for countries to exploit the global ecoscope" and concluded that it was in the Netherlands's own interests to develop an international trade system that is ecologically sustainable.

Behind this political statement lay detailed research from the Dutch Advisory Council for Research on Nature and Environment (RMNO) and a pathbreaking report from Milieudefensie, the Dutch Friends of the Earth, the first comprehensive strategy for sustainability from an NGO.

A month prior to Rio, RMNO published a wide-ranging research report, *Ecocapacity as a Challenge to Technological Development*, that examined the implications for technological development of the hypothesis that "the biosphere offers society a finite means of support in the form of stocks of natural resources and nature's natural resilience to depletion, pollution and encroachment": these stocks the RMNO team termed 'ecocapacity' (RMNO, 1992). The research team developed sustainability criteria for depletion of key natural resources, pollution and encroachment on natural systems and projected trends in resource consumption and pollution forward to 2040, concluding that consumption reductions varying from 60% cuts for human utilization of biomass to 95% for depositing of cadmium and zinc would be required. But the report recognises that because of limited ecocapacity, the burden of these changes will have to be made by the industrialized world: "space will have to be created for economic growth in developing countries...space that the industrialized countries currently appropriate to themselves".

RMNO concludes that in order to achieve an equal distribution of the global environmental impact per capita of population reductions in environmental impact close to 100% are required in the industrialized countries. This equity scenario is contrasted with a Fortress Europe scenario, where the desired reductions are achieved but current North South imbalances remain unchanged. RMNO have now come out with a comprehensive set of sustainability indicators, based on its ecocapacity analysis for five environmental issues at the national, regional and global levels: climate change, acidification, fossil fuel depletion, fish stocks and national biodiversity (RMNO, 1994)). If we are looking at the UK's footprint abroad, then its impact on other industrialized countries - through, for

example, the export of acidifying emissions to Scandinavia -- should be considered as much as imports of 'ghost acres' from the developing world.

Milieudefensie have perhaps gone furthest in popularising the need for global fair shares in limited environmental resources. In its *Action Plan for a Sustainable Netherlands*, it explored the implications of its notion of environmental space -- effectively, the same idea as RMNO's ecocapacity -- for consumption levels in the Netherlands (Milieudefensie, 1992 & 1994). Milieudefensie defined environmental space as the total amount of pollution, non-renewable resources, agricultural land and forests that can be used globally without impinging on access by future generations to the same resources. The Action Plan argues that each country has a right to the same amount of environmental space per capita, and proposes that a phasing-in period up to 2010 is necessary for an equal division of environmental space. Milieudefensie then modelled the rough implications of these three principles for consumption of energy, water, non-renewable resources, agriculture and food and forest and timber. Milieudefensie then identified the cuts in consumption necessary in the Netherlands to achieve sustainable levels by 2010 (Table 2.1).

TABLE 2.1

The Netherlands' Environmental Space Per Capita	Now	2010	% Reduction
<u>Energy</u> Tonnes of CO2 emissions per year	11	4.3	60
<u>Freshwater</u> Piped water in litres per day	130	80	38
<u>Aluminium</u> Kg per year	10-12	2	80
<u>Agriculture</u> Hectares	0.45	0.25	45
<u>Wood</u> Cubic metres per year	1.1	0.4	65

Source: Milieudefensie, 1992.

Looking in more detail at the application of environmental space to agricultural resources, the report estimates that there is a world average of 0.29 hectares available per inhabitant. Unsustainable agricultural practices and population growth could reduce this area to 0.25 hectares by 2010, although only 0.19 hectares are required for a healthy diet according to

the UN Food and Agriculture Organisation. The report cites "the integration of countries into the world economy, in particular the export pressure which exists as a result of their debt burden" as one factor behind land degradation in the Third World. To fix the environmental space available for agricultural production, Milieudefensie made three key assumptions:

- "Food security must have the highest priority. Only when everyone has enough to eat can other goals (clothing, luxury goods and foodstuffs) lay claim to land for production.
- All agriculture must be sustainable, which means that no more arable land can be lost.
- We must strive towards continental self-sufficiency in food production in order to limit as far as possible the energy loss from transport and to avoid uncertainty and tension."

Currently, each Dutch person takes up 0.45 hectares, due in particular to the amount of cattle fodder that the Dutch import to support a high consumption of meat: at the moment, 55% of the feed that Dutch cows consume is grown outside the Netherlands, resulting in a surplus of nutrients in the Netherlands and an impoverishment of soil elsewhere. To live within its fair share of environmental space, Dutch use of global agricultural land would have to fall by 45% by 2010; this would mean cutting meat consumption from about 180kg per person per annum to about 60kg in the year 2010.

The idea of environmental space is compelling and easily understood. It translates the two conceptual pillars of sustainable development, needs and limits, into concrete targets, giving "an indication of the boundaries within which world production and consumption must lie". Milieudefensie's findings have prompted a national debate in the Netherlands among political parties, industry, trade unions and other groups. Milieudefensie is now touring the Netherlands in a 'greenhouse boat' to communicate with Dutch citizens the twin themes of 'redistributing energy' and 'environmental space'. It has calculated that "the energy that is saved when a Dutchman switches to a low-energy bulb is enough to meet the needs of two inhabitants of Bhutan for one year". For Milieudefensie, a key issue for the future is to break with the 'business as usual' assumption in developed societies of continued consumption growth, and instil in the public a recognition of the Earth's limits and the need for redistribution of environmental space.

A recent report from IUCN Netherlands, *Netherlands and the World Ecology*, tackles the same issues in a more generalised and descriptive way (IUCN Netherlands, 1994), focusing on biodiversity, pollution, the global climate system, agriculture, forest lands, seas and oceans, coastal areas and human settlements (see Box 2.1). The report also maps Dutch imports of timber, the impacts of European Union production beef production policies in West Africa and the global impact of Dutch wetlands' activities in a striking, but somewhat simplistic manner (see Map 2.1).

BOX 2.1: DUTCH AGRICULTURE AND THE WORLD ECOLOGY

The Netherlands was in 1986 the second largest exporter of agricultural goods (in volume) in the world after the USA. To maintain this prominent position, the Netherlands is heavily dependent on agricultural imports: **for every hectare of arable land in the Netherlands used for domestic consumption and export, seven more are cultivated abroad, three of which are in developing countries.** The main agrarian link between the Netherlands and developing countries is related to the livestock industry with its 14 million pigs, 5 million cows and 100 million chickens, all producing vast amounts of manure which in turn heavily pollute soil, ground and surface waters. Most livestock products are exports. Enormous quantities of animal feed have to be imported mainly from the USA and developing countries.

- **Tapioca in Thailand:** Tapioca is the dried and pelleted root of cassava, grown as a cash-crop in north-eastern Thailand. The area in cassava production has increased from 100,000 hectares in 1965 to 1.5 million hectares today. Although cassava has a reputation for using up nutrients and causing deforestation and erosion, it actually gives a reasonable yield on poor soils. Thailand is now the world's largest exporter of cassava, with the EU taking 60% of total Thai exports. Although the current situation is not sustainable, a sudden halt (for example, through an EU import ban) would pose a new threat to the remaining forests.

- **Soybean in Brazil:** Between 1965 and 1985, Brazil went from being a net importer of soybean to one of the largest exporters, with the area devoted to the crop growing from 500,000 to 10 million hectares. This has resulted in an ecological disaster in south and south-east Brazil as forest cover vanished, the land eroded and animal species became extinct. A shift towards mechanization of soy production has also led to unemployment and migration into the Amazon. Heavy use of insecticides has also caused a great loss in biodiversity.

Dutch farmers have also found new production sites (with more hours of sunshine) in the tropics for horticultural products and other crops. In Kenya, millions of flowers are grown by Dutch companies and emigrant farmers, and then exported to Dutch flower auctions. Cheap air transport makes Kenyan flowers competitive. Environmental problems have begun to emerge around Lake Naivasha as a result of increasing production. Due to irrigation, the level of the lake is rapidly declining, causing severe impacts on vegetation and wildlife in the area. The spread of pesticides in flower cultivation is also an important polluting factor.

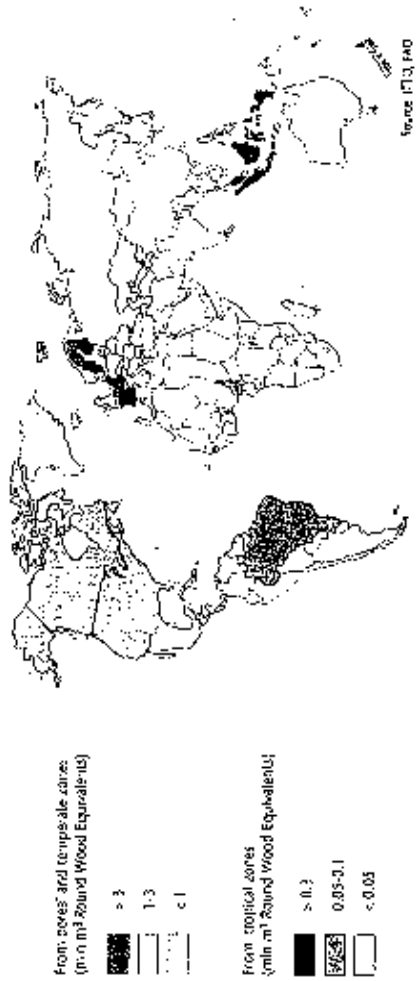
There are no simple solutions to this complex web of interrelationships. The first step towards sustainable production is to create a regional and not a global food economy: production of food closer to the consumer will save a tremendous amount of transport and will make it easier to close cycles to maintain mineral balances and soil fertility.

Extracted from IUCN Netherlands, The Netherlands and the World Ecology, 1994

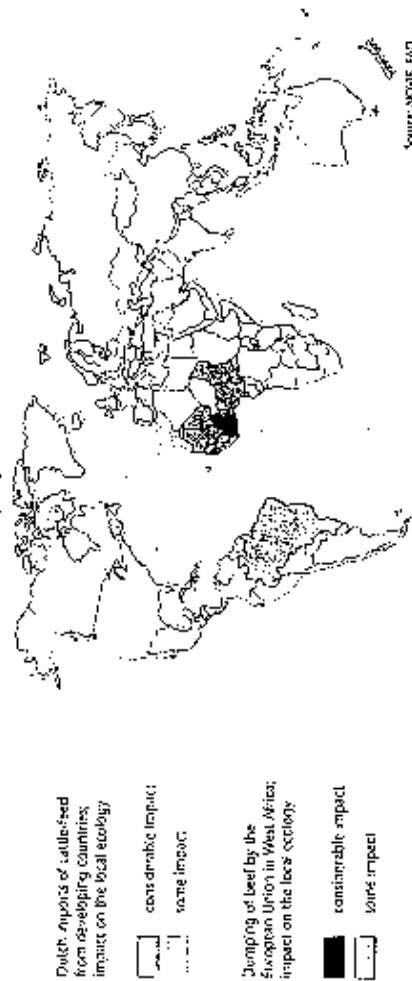
THE NETHERLANDS AND THE WORLD ECOLOGY

Map 2.1

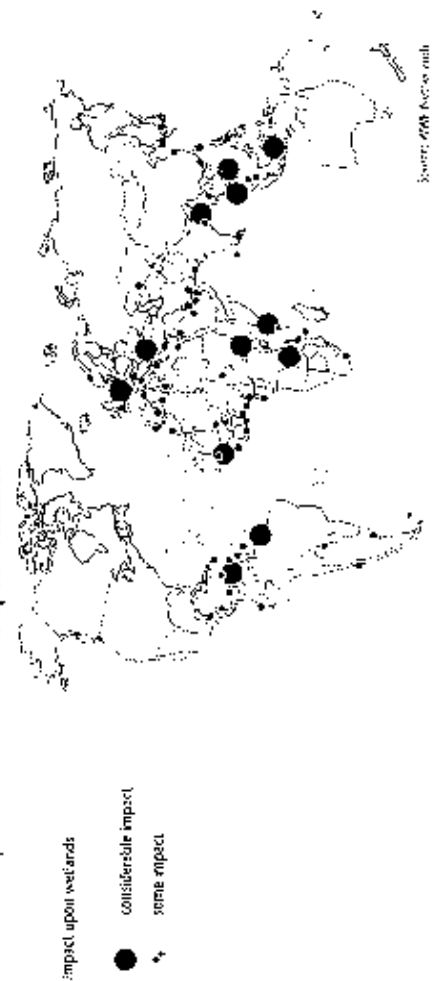
1. Dutch imports of timber from tropical, boreal and temperate zones



2. Dutch live-stock industry: impact on developing countries



3. Global impact of Dutch activities upon Wetlands



A *Sustainable Europe* strategy is now being coordinated by Friends of the Earth Europe, based on contributions from 25 West and East European countries. A preliminary report from the Wuppertal Institute was published in February 1995. This set out the core target as finding "a political, economic and social strategy to limit the use of natural resources, while at the same time providing new chances for job creation, reliable social security and satisfying ways of consuming" (FoE, 1995). The report takes a strong definition of sustainability as "limiting use of the environment to sustainable levels and just and equal access", distinguishing this from "weak sustainability", which makes a trade off between environmental needs and economic cost.

The Wuppertal Institute distinguishes between three levels of environmental space: the global level where energy and non-renewable resources should be shared among all the world's population; the continental level for managing resources such as timber and agricultural products, so that there is no "permanent occupation of foreign land"; and the regional level for managing water resources. The report estimates that on average Europe needs to reduce extraction of natural resources by 80-90%, if overall global reductions of 50% are to be achieved. The report presents a new calculation of 'ghost acres' used abroad by Europe, totalling some 126,840 km², equivalent to the arable land areas of Panama, Venezuela, Colombia and Ecuador together. For 2010, the report sets out a number of assumptions for achieving sustainable agriculture in the European Union, including no import of animal fodder. A reduction of 35% of agricultural area in the EU and an increase of 2000% of protected natural areas are needed to fulfill these assumptions. The report emphasizes the importance of efficiency gains through decoupling growth from environmental impacts, but concludes that these will not be enough. An eventual move to a steady-state economy is therefore required, with environmental space being used as a ceiling for development. The calculations of environmental space are then supplemented with a variety of proposals for indicators, sustainable economic consumption and the good life, values and employment.

2.3.4 *Ecological Rucksacks*

While Rees uses land as a measure of carrying capacity, the Wuppertal Institute has looked at the total mass that each item of consumption carries with it from the cradle to the grave basis, hence the 'rucksack' (Lehmann & Schmidt-Bleek, 1993). The Institute has concluded that "to provide the goods and services enjoyed by an average German, some 50 tons of materials have to be moved somewhere, be it in mining, be it in earth movements for agriculture, be it in construction on buildings or of infrastructure". The Institute has also conducted detailed studies of the material flows associated with German orange juice consumption and the material inputs involved in cotton production.

Looking at German consumption of orange juice, the Institute calculates that every glass of orange juice requires another 22 glasses of water to produce, every ton of orange juice needs 100 kg of fuel and total German consumption occupies 150,000 hectares in Brazil -- three times more than the domestic German fruit growing area (Kranendonk & Bringezu, 1993). Production efficiencies as well as a questioning of the desirability of drinking orange juice by consumers are proposed as ways of lightening the rucksack. Wuppertal's

Friedrich Schmidt-Bleek, who has led the Institute's research work on material intensity and invented the 'rucksack' term has concluded that it is necessary to "reduce the material intensity of our welfare by a factor of 10 or more in the long-run".

2.3.5 *Ecological & Environmental Debt*

The dependence of developed countries on the resources of the Third World is a longstanding phenomenon: some argue that each year the total ecological footprint can be interpreted as accumulating into an ecological debt owed by developed to the developing world. The Latin American and Caribbean Commission on Development and Environment, for example, argued in its preparatory report to UNCED, *Our Common Agenda*, that:

"The industrial revolution was based in large part on the exploitation of non-renewable resources in ways which did not reflect their true costs in terms of conservation needs and environmental consequences. The progress of industrialized countries was thus based on deforestation and, in some countries, the predatory exploitation of natural resources. By thus exploiting nature, the industrialized countries have incurred an *ecological debt with the world*" (IADB & UNDP, 1990).

In Sweden, the concept of *environmental debt* has been developed to describe the environmental burden passed from one generation to the next. It has been defined as "the cost required to restore environmental damage that is restorable, as well as the size of the means required for recurring restoration measures" (Johansson, 1994). Using this definition, the environmental debt for Sweden has been calculated as \$40 billion, and the Swedish Government has committed itself to ensuring that the environmental debt does not increase. This debt, however, does not yet cover costs needed to restore ecosystems in other countries that have been damaged by Sweden's consumption and production patterns.

2.3.6 *Food Miles*

The UK-based SAFE Alliance has taken distance from production to market of agricultural products (or 'food miles') as its indicator of the international environmental impact of British lifestyles: apples 5,000 miles from South Africa, shrimps 13,000 miles from Bangladesh and green beans 4,000 miles from Kenya (SAFE, 1994). Cheap non-renewable fossil fuel energy makes intensive agriculture and long-distance transportation economically viable. But "prices in shops do not reflect the full cradle to grave environmental and social costs". Agricultural production for distant consumption brings increased environmental problems from extra transport use, and encourages over-specialization and the application of intensive industrialized farming methods. The report shows that UK food imports by air more than doubled during the 1980s, leading to extra air pollution costs, and the distance foods are being transported within the UK has increased by over 50% since 1978.

The 'food miles' report outlines what SAFE believes are a number of implications for developing countries of producing food for distant markets. Human, environmental and economic resources are allocated to export production rather for "local needs and self-sufficiency", increasing vulnerability to export fluctuations, and causing health risks for agricultural workers and environmental damage due to the application of inappropriate industrial agriculture methods. The report identifies the main driving forces for increasing food miles are cheap fuel prices that do not internalize environmental costs, monopoly control by transnational corporations in key commodity sectors and large debt burdens. The report recommends that "when buying food that cannot be grown in the region, such as tea or bananas, individuals should buy fair trade products whenever available. When buying food that can be grown in the region ie Europe, individuals should follow a hierarchy of purchasing priorities: locally, nationally and regionally". Governments should also introduce measures to reduce long distance transport of goods, such as increased fuel taxes, as well as introducing labelling of distance travelled for products. Aid and debt-relief for Southern countries should be linked to sustainable development initiatives.

2.3.7 Finding the Common Themes

These six new and revived attempts to grapple with the environmental problems caused by unsustainable consumption and production patterns in the industrialized world share a number of common themes:

- (i) Global limits: the world has limited carrying capacity, in terms of sources of environmental resources and sinks for pollution and wastes.
- (ii) Fair shares: each inhabitant has an equal right to this limited carrying capacity.
- (iii) Meeting Needs: food security concerns must take precedence over the allocation of land resources to 'luxury' products.
- (iv) Sustainable Trade: international trade should be based on ecological surpluses, and transport should be minimized.
- (v) Full Life Cycle Costs: full social and environmental costs at each stage of the life cycle from extraction through production and consumption to disposal should be internalized into prices.

These are controversial and radical themes that challenge many received ideas concerning the sovereign control over natural resources, the need for specialization in resource use through international trade and the acceptability of differences in resource use between nations. Some of these themes have started to come out into the open as footprint and other concepts have moved from the perception of a problem to actual policy making.

2.4 From Perceptions to Policy Making

2.4.1 International Action to Change Consumption Patterns

The Rio Earth Summit

Before Rio, there was much talk about the potential of the developing countries to use their environmental resources as a green bargaining chip to extract better trade and financial terms from the industrialized world. The South Centre, a follow-up organisation to the South Commission led by Julius Nyerere, argued that "UNCED provides the South with an opportunity to exercise considerable leverage and bargaining power" and that two strategic considerations should guide the South's negotiating position:

- (a) "Ensuring that the South has adequate "environmental space" for its future development, and
- (b) Restructuring global economic relations in such a way that the South obtains the required resources, technology and access to markets, enabling it to pursue a development process that is not only environmentally sound but also rapid enough to meet the needs and aspirations of its growing population."

The same theme was highlighted at the Hague Symposium in November 1991, co-chaired by the Dutch Minister of Development Jan Pronk and the Special Adviser to the Administrator of UNDP Mahbubul Haq. The Hague Symposium mirrored the Founex meeting held before the Stockholm Conference on the Human Environment in 1972, and concluded that "the limited carrying capacity of our physical planet raises profound questions about the material lifestyles of the rich, about simpler and less energy-intensive life styles all over the world and about a major redistribution of future development opportunities" (Pronk and Mahbubul-Haq, 1992). The Hague meeting also argued that the proposed Earth Charter -- subsequently demoted to the Rio Declaration on Environment and Development -- should include a "pricing policy for ecological space". In parallel to these international political signals, the European Commission published its proposals for the European Community's Fifth Environmental Action Programme in March 1992, which called for "the equitable distribution and use of resources between nations and regions over the world as a whole" (EC, 1993).

However, as we have already seen the negotiations of the Agenda 21 chapter on Changing Consumption Patterns was fiercely fought over, resulting in a compromise text that called mostly for more research and modest policy changes. For example, governments and research institutes were recommended to "identify balanced patterns of consumption worldwide which the Earth can support in the long term", while "consideration should also be given to the present concepts of economic growth and the need for new concepts of wealth and prosperity which allow higher standards of living through changed lifestyles that are less dependent on the Earth's finite resources and more in harmony with the Earth's carrying capacity". In addition, the Agenda 21 chapter on Science for Sustainable Development devotes a section on enhancing scientific understanding of the Earth's carrying capacity.

Although the Rio Declaration did not contain an explicit reference to environmental space, or the ecological footprint created by industrialized countries in the developing world, Principle 7 states that:

"States shall cooperate in a spirit of global partnership to conserve, protect and restore the health and integrity of the Earth's ecosystem. In view of the different contributions to global environmental degradation, States have common but differentiated responsibilities. Developed countries acknowledge the responsibility that they bear in the international pursuit of sustainable development in view of the pressures their societies place on the global environment and of the technologies and financial resources they command".

The inclusion of consumption issues in both Agenda 21 and the Rio Declaration can be seen as a breakthrough: at UNCED, the issue of changing consumption patterns was for the first time placed on the agenda of multilateral negotiations. Following the Earth Summit, the Dutch and Norwegian governments have pioneered the application of these ideas in international policymaking. The new post-Rio UN Commission on Sustainable Development has also tackled consumption issues at its annual review meetings of Agenda 21. Furthermore, environmental space and footprint ideas have started to enter other policy negotiations, notably trade and agriculture.

The Netherlands and Environmental Space

Environmental space emerges as a key concept within the updated Dutch National Environmental Policy Plan (NEPP 2) (VROM, 1993). The plan states that "environmental space is a useful concept in discussions about changing production and consumption processes in, particularly, the industrialized world". The scope for operationalising the concept will be explored in the implementation of NEPP2, and the Dutch Government is committed to initiating a wide-ranging social debate about the necessity and opportunities for changing to more sustainable consumption patterns".

As well as the ethical need for a fairer distribution of environmental resources, the Dutch Government has stressed that it is in the enlightened self-interest of industrialized countries to rethink their imports from developing countries. As the then Environment Minister Hans Alders said in January 1994: "if we want to maintain our security of supply, we need to be able to effectively manage our one and only common environmental space". The Dutch have also integrated consumption questions into the new bilateral sustainable development contracts signed with Benin, Bhutan and Costa Rica (see Box 2.2).

**BOX 2.2: FOOTPRINTS AND DEVELOPMENT COOPERATION:
THE DUTCH ECOOPERATION INITIATIVE**

The Bilateral Sustainable Development Agreements that the Dutch Government signed in March 1994 with the Governments of Benin, Bhutan and Costa Rica represent an experiment in a new style of development cooperation. They are deliberately designed to break with tradition, and are based on three principles: reciprocity, equity and participation. Dialogue will continue for at least 10 years, and will encompass society as well as governments: in Costa Rica, 160 NGOs are already involved. The agreements challenge the Netherlands to reduce its own use of the global ecosystem and to assist the three partner countries to increase their well-being without destroying the resource base.

The agreements are about learning from each other on the best ways to achieve sustainability: the Netherlands could this gain from Bhutan's Buddhist norms and values. A recent Bhutanese delegation to the Netherlands became very concerned about Dutch lifestyles and the lack of happiness; they also noted the fear in the eyes of Dutch factory farmed pigs. With Costa Rica, the focus has been on the import of bananas, and green consumer moves to choose bananas with reduced pesticides: "what if Costa Rica were to produce only "clean" bananas in the future on the condition that the Dutch flowerbulb growers were to stop using insecticides?", asks Ecooperation, the Dutch NGO established to manage the agreements.

The agreements are intended as a way of putting into practice the agreement in principle by the Dutch government, academics and NGOs that there should be a more equal sharing of the Earth's environmental space. This is not as simple as Benin knocking on the Netherlands' saying, 'we have come to claim our rightful share of environmental space'. The agreements allow a chance, through research, dialogue and exchange to explore the possibilities for change and create support within government and society.

There is no guarantee that the agreements will really influence sustainability. They remain largely symbolic and outside the mainstream of economic and political decision making. But they are unique in trying to do more than green 'business as usual' relationships between North and South.

Ecooperation, The Netherlands

The Oslo Conference on Sustainable Consumption

At the first session of the Commission on Sustainable Development in June 1993, Norway offered to host a meeting on sustainable consumption to follow-up Agenda 21. The resulting Oslo Symposium on Sustainable Consumption held in January 1994 brought together Environment Ministers from a number of countries, together with leading experts to lay out the priorities for action (Box 2.3). One of the issues raised at the meeting was the need to carry out studies "on the effects that consumption and production patterns in

one country has on other countries", identifying global, regional and local impacts and examining issues of equity and environmental space.

The meeting recognised the conflicts between environment and development goals caused by export orientated policies in developing countries, and the pressure to export induced by structural adjustment and external debt repayment. At the Symposium, Norwegian NGOs urged the CSD to "elaborate maximum and minimum standards for a fair per capita share of global natural resources by the year 2010", under the banner of a New International Consumption Order (NICO).

The results of the Symposium were presented to the CSD in May 1994, where governments agreed to draw up elements for an international work programme to be adopted at the third session in April 1995. To prepare these elements, Norway held a second Roundtable Conference on Sustainable Production and Consumption in February 1995. A 35-page package of proposals of action was completed at the meeting, bringing together contributions from governments, industry, trade unions, academia and NGOs. The stress was on actions that developed countries should take to reduce their disproportionate burden on the planet. As the South African Education Minister Sisibu Bengu stated at the meeting, "industrial countries must change their patterns of production and consumption in such a way that less developed economies are given more room for development".

During the meeting, important differences emerged between a number of NGO groups arguing that the "dominant development paradigm based on growth and the market has failed" and some OECD governments who wanted to play down the importance of the environmental space concept because of its redistributive implications. This split had echoes of the North-South divisions over the New International Economic Order (NIEO) in the 1970s. Significantly, Bill Long, Director of Environment at the Paris-based Organisation for Economic Co-operation and Development (OECD) highlighted the importance of the geopolitical changes over the past decade, such as the collapse of communism and the withering away of the NIEO, for providing a more comfortable context within which industrialized countries could explore changes in their consumption patterns "in their self-interest not only because others are demanding it of them".

BOX 2.3: THE OSLO SYMPOSIUM ON SUSTAINABLE CONSUMPTION - SUMMARY OF KEY ISSUES

Why change ?

"The present generation, especially the wealthiest people and countries have an ethical responsibility to ensure a fair share of "environmental space" and resources for the poor and future generations....Reducing consumption in the North will not necessarily ensure sustainable consumption and could make both North and South worse off."

What is sustainable consumption ?

"A proposed working definition of sustainable consumption is 'the use of services and related products which respond to basic needs and bring a better quality of life while minimizing the use of natural resources and toxic materials as well as the emissions of waste and pollutants over the life cycle of the service or product so as not to jeopardise the needs of future generations."

Where should we start ?

"An immediate aim is to attract political recognition of the need for change toward sustainable consumption as well as public understanding and support of the main directions for change."

What are the main policy goals ?

"Practical steps toward sustainable consumption would include:

- Improving analysis, public awareness and participation
- Providing incentives for sustainable consumption
- Energy: sustainable use, efficiency and renewable sources
- Implementing new strategies for transportation and sustainable cities
- Accelerating the use of more efficient and cleaner technologies
- Strengthening international action and cooperation."

Extracts from the Report of the Symposium: Sustainable Consumption, Ministry of Environment, Norway, January 1994.

The OECD is likely to be a major source of analysis of consumption issues, including footprints in the years ahead. The OECD's Environment Directorate sees sustainable consumption as a useful integrating concept that can bring value-added by bringing attention to the need to manage demand for goods and services, thereby complementing the traditional environmental policy focus on regulating industrial pollution. The starting point is to understand the forces that drive consumption, such as consumer and stakeholder demands, competition, innovation and financial flows. Over the next two years, the OECD will also aim to clarify the conceptual framework and boundaries for

decision-making, and identify the major trends in end-use consumption. Policy options will then be assessed, including the implications for non-OECD countries.

Footprints as Trade, Climate and Agricultural Issues

The breadth of the footprint agenda means that much of the detailed work of analysis and policy making will take place in other policy arena, notably trade, climate and agriculture.

To a large extent, the issue of ecological footprints is inevitably a trade issue. Its focus on sustaining carrying capacities in "distant elsewherees" adds a new dimension to an already complex international trade and environment policy agenda. Dr Harmen Verbruggen at the Institute for Environmental Studies in Amsterdam argues that "a genuine reconciliation of trade and environment implies 'making space for the South' and 'differentiated responsibilities' are taken seriously by the North by affording to the South relatively lower environmental standards and longer compliance periods with respect to both national and international environmental problems" (Verbruggen, 1994).

With this viewpoint, it becomes easier to understand the scepticism in many developing country governments that new environmental measures in the developed world, particularly those based on life cycle assessments, are a form of green protectionism that interfere in their domestic production patterns and are so incompatible with free trade. Currently, strategies for sustainable consumption in the developed world are primarily dictated by internal waste control and resource efficiency agendas and have little to do with a comprehensive sustainable management of resources through cooperation between consuming and producing countries.

Taking Verbruggen's approach to trade and environment results in an apparent paradox: On the one hand, environmentalists are increasingly concerned that developed countries are exploiting 'ghost acres' in developing countries, creating 'footprints' in distant elsewherees and that they should give up a share of this appropriated environmental space to developing countries to pursue their development ambitions. On the other hand, 'making space for the South' appears to be a license for increased over-consumption by the North of developing country environmental resources through accelerated export-led development. Sharing environmental space could therefore increase footprints !

A more in-depth assessment of the practical measures that citizens in the UK can take to reduce their footprints abroad is made in the section on product labelling (see 4.2).

The implementation of the Framework Convention on Climate Change is likely to set an important legal precedent for other areas of the footprint debate, because of the centrality of the equity issue between North and South: "equity issues have been widely recognised as possibly the most crucial issue to be resolved in negotiating an agreement on global warming" (Thomas, 1992). In many ways the emergence of new concepts like footprints and environmental space can be seen as an outgrowth from the debates on equitable burden sharing during the negotiations of the Climate Convention in the early 1990s. Michael Grubb and others have categorised at least five possible interpretations of equity, which through considerable light on the footprints' debate:

- Egalitarianism: all human beings should be entitled to an equal share in the atmospheric commons (in other words, environmental space).
- Historical Responsibility: those who have caused the global warming should bear the main burden for responding (analogous to the concept of ecological debt).
- Status Quo: current levels of emission have established a common law right to emit at that level, so that reductions should be met equally by all countries.
- Willingness-to-Pay: it is fair for those most concerned to solve a problem should bear the burden.
- Fair Consequences: an agreement would be equitable to the extent that it mitigates the unequal international distribution of wealth (see Grubb, Sebenius, Magalhaes & Subak, 1992).

The intensity of the passions aroused by differing interpretations of equity in the climate negotiations was demonstrated in 1991, when India's Centre for Science and Environment attacked allocations of greenhouse emissions and sinks made by the US World Resources Institute as "based less on science and more on politically motivated juggling. Its main intention seems to be to blame the developing countries for global warming and perpetuate the current global inequality in the use of the earth's environment and its resources" (Agarwal & Narain, 1991). The final text of the Convention signed in Rio does make some steps to recognise both the importance of limits (Article 2) and equity (Article 3). Subsequent negotiations on the scope for joint implementation of the Convention and the use of tradeable emission rights also have important implications for the footprints debate: Milieudefensie for one is just starting to explore the possibility of a system of tradeable user rights for environmental space.

Given the agricultural slant of much of the footprints debate, it is not surprising that the UN Food and Agriculture Organisation (FAO) has picked up the concept in its post-Rio analysis of how best to integrate environmental and sustainable development issues into agricultural planning and policy making (Schuh & Archibald, 1994). The FAO's particular concern has been to assess the ecological footprint of distorting policies in developing countries. The FAO raises the question of the footprints caused in developing countries by US, EU and Japanese agricultural subsidies, an issue exemplified in the case of EU beef dumping in West Africa (Madden, 1993). But the FAO also highlights the negative 'footprints' caused by the developing countries themselves in their own back yards through limiting their farmers' access to international markets. The banana case study looks at the policy footprint of EU trade restrictions (see Section 3.1).

2.4.2 Action in the UK

In the UK, the footprint idea is now being used as an umbrella term to describe the whole range of impacts generated by one country's policy, consumption, production and investment patterns on the capacity of other countries to achieve sustainable development. At the Green College seminar held in early 1993 to prepare for Britain's follow-up strategy to UNCED, the concept of footprints was presented as a way of rethinking the UK's foreign policy in environmental terms (Thomson & Sandbrook, 1993)

The idea was picked up by a number of leading environment and development organisations (ACTION AID, CAFOD, Christian Aid, OXFAM, Save the Children and WWF-UK) who presented their strategy for *Lightening Our Footprints* at the Partnerships for Change conference held in September 1993. These NGOs argued that the debate about lightening ecological footprints needs to be set in a broader context of the trade, debt and aid policies of countries like Britain (Box 2.4). WWF has subsequently adopted footprints as one of their strategic priorities for the future, while OXFAM is using footprints as an umbrella term to communicate the causes of Third World poverty to the British public.

Professor Pearce also used the footprint image in his *Blueprint 3* assessment of Britain's progress towards sustainable development:

"The UK economy has many impacts upon other countries. It contributes to other countries' income but also places demands on their natural resources (eg importation of natural resources, such as forest products, and tourism). The UK also contributes to the pressures on global resources -- climate system, ozone layer, waste assimilation and biodiversity stock" (Pearce, 1993).

Pearce draws on the work of John Proops and Giles Atkinson who have examined the import and export of environmental resources on global scale using a weak definition of sustainability that equates environmental resources as simply another form of capital stock for the economy. The two reach the surprising conclusion that during the 1980s global sustainability was positive and increasing, largely to Japan's very high savings ratio (Proops and Atkinson, 1993). Pearce also concluded that the "current activities of the agricultural sector are not sustainable because of their impact on critical natural capital and the international ecological footprint of EC support for agricultural production". To counter Britain's tendency to import sustainability from other parts of the globe - or in other words to create footprints -- Pearce suggests "returning sustainability to the exporting nations through environmentally sensitive aid". This is the approach taken by the Dutch Ecooperation initiative discussed above.

BOX 2.4: THE UK'S IMPACT ABROAD: LIGHTENING OUR FOOTPRINTS

"Policy reform must include the following:

Aid: The Government should make available more information about the planning, progress and evaluation of aid projects, and put more emphasis on community-based and process approaches.

Trade: The Government should press for an international trade system which takes into account the need for fair commodity prices and the inclusion of social and environmental costs of production.

Debt: The Government should unilaterally apply full Trinidad Terms, especially to the poorest countries, and encourage other OECD countries to do so.

Technology Transfer: The Government should promote increased cooperation between institutions in the UK and other countries, and assist the transfer of environmentally sound and appropriate technologies.

International Financial Institutions: The Government should press for fundamental reform so that projects and structural adjustment loans support equitable and sustainable development. The institutions must implement the principles of transparency, accountability and participation.

The UN system: The Government should use its position in the UN, particularly its membership in the Commission for Sustainable Development, to ensure that the programmes of all UN agencies support sustainable development.

Foreign Direct Investment: The Government should ensure that UK companies fully disclose the social and environmental impacts of their operations abroad, and should meet or exceed the laws or policies of national governments in host countries.

Tourism: The Government should draw on best practice examples to encourage the development of a code of practice on sustainable tourism for British companies and assist developing countries in implementing sustainable tourism.

Use of the Global Commons: The UK Sustainable Development Strategy should set a clear path towards the equitable use of the global commons, particularly through sustainable energy, transport and industry policies.

ACTION AID, CAFOD, Christian Aid, OXFAM, Save the Children and WWF-UK, September 1993.

The final strategy for sustainable development published by the UK Government in January 1994 recognised the importance of the footprint issue:

"Concerns about sustainability relate not only to a country's own environment but to the environmental impact which its economic activity has beyond national boundaries. The UK, like other countries, thus needs to consider the impact of its international activity (trade and investment) globally and in individual overseas countries. Some academics have described this as a "footprint", which may have positive or negative side-effects" (HMSO, 1994).

The strategy dealt with aspects of the UK's footprint, particularly for agriculture and forestry, but presented no over-arching view on Britain's responsibility to reduce its consumption of global resources. Nevertheless, the strategy gave legitimacy to concerns about the UK's footprint abroad, and since its publication, numerous groups outside of government have suggested how the concept could be fleshed out.

Discussions at the *Global Forum '94* conference on sustainable cities stressed the importance of communicating the concept in clear terms, stressing the benefits and not the sacrifices required to lighten the footprint, and countering a tendency to use the concept as an excuse for 'fortress isolationism'.

For example, the UK's footprints abroad were identified as a key indicator of the UK's environmental health in the *Environmental Challenge* initiative. This brought together seven of the largest UK environmental agencies with the aim of presenting clear indicators of the state of the UK environment to assist decision-makers and also to act as a guide for the general public, "bombarded with confusing information on the environment" (Environmental Challenge, 1994). The *Green Gauge* report distinguishes between the footprints created through 'imports' (eg raw materials) and 'exports' (eg pollution), and suggests a menu of indicators, ranging from UK share of global greenhouse emissions, through the UK's exports of Red List chemicals to the proportion of the Top 100 UK companies which report on their environmental impacts abroad. The report then focuses on UK timber imports as one of its 'Top 10' (Fig 2.2). The significance of including footprints as one of its three fundamental concerns lies in the fact that the last comparable government document on the State of the UK Environment contains no information on possible impacts abroad (HMSO, 1992).

In preparation for the 1994 session of the UN Commission on Sustainable Development, which will review the Agenda 21 chapters on land and sustainable agriculture, *UNED-UK* organised a working group on Britain's international agricultural footprint. The group which had representatives from environment and development groups, the academic community, the private sector and farmers concluded that:

"There is increasing concern that Britain, and by extension the rest of the European Union, has an 'international agricultural footprint', which is damaging the capacity of developing countries to achieve the main objective of sustainable agriculture and rural development (SARD) agreed at UNCED "to increase food production in a sustainable way and enhance food security" (UNED-UK, 1994).

The group defined this international agricultural footprint as:

"The ways in which the UK, through its consumption and production patterns, trade and investment flows, agricultural, aid, debt and other policies, diminishes both the human and environmental capacities of other countries on which sustainable development depends (particularly in the developing world), and thereby appropriates a disproportionate share of the world's limited environmental resources".

The working group made two significant contributions to the footprints debate:

- first, it is important to examine the depletion of both human and environmental capacities for sustainable development: the 'ecological' focus of the footprint term obscures the fact that Britain's impact overseas can be as much to disrupt livelihoods as degrade natural ecosystems.
- second, that footprints are driven by a variety of macro-economic and public policy factors, which to a large extent determine the consumption patterns of British citizens of Third World produce. These driving forces include trade policies, financial flows and UK business practice overseas.

At the local level, the Council for the Protection of Rural England has adopted footprints as the slogan for its new campaign to curb urban sprawl: "we need to find policies and incentives to ensure new building takes place where its footprint treads most lightly on the environment" (CPRE, 1994). While the CPRE's *Urban Footprints* can be seen as a return to the local roots of Rees' original idea, it limits its scope to the relationship between UK urban areas and the countryside, and uses no definite methodology for estimating impacts. This raises a danger of footprints becoming a catch-all phrase for any type of impact: from any type of source, whether a household, a city, a company or a nation.

INDICATORS

for the state of the

UK ENVIRONMENT



TIMBER IMPORTS

Trees and forests are of vital importance to all our lives. They are central to the regulation of our climate and are a major source of materials for heat, medicines, food and shelter. But they are being destroyed at an irresponsible rate.

The UK imports 87 per cent of its timber requirements, mainly from forests which are not managed sustainably. For example, logging operators often remove all the timber trees, damage many of the remaining trees, then abandon the area. And in some cases, timber is removed illegally from protected areas where indigenous people live.

If the UK is not to be guilty of the continued destruction of the world's forests, there must be an immediate cessation of timber imports from illegal sources and a phasing out of timber from unsustainable sources.

"Environmental Measures" and "Green Gauge" are the first two reports produced by an alliance known as the Environment Challenge Group which includes the Council for the Protection of Rural England, Friends of the Earth, Green Alliance, International Institute for Environment and Development, the New Economics Foundation, Royal Society for the Protection of Birds, The Wildlife Trusts, WWF UK (World Wildlife Fund for Nature) and Wildlife and Countryside Link.

The alliance is supported by Association for the Conservation of Energy, British Association of Nature Conservationists, British Herpetological Society, Butterfly Conservation, Herpetological Conservation Trust, Marine Conservation Society, National Society for Clean Air and Environmental Protection, Plumbers' Association, Save the Cotswolds Campaign, Wildlife and Wilderness Trust, United Nations Environment and Development UK and the Woodland Trust.

*Available from RSPB, WWF UK and the New Economics Foundation, price £7a plus postage and packing.

Green Gauge



2.5 Fault Lines and Ways Forward

This review of the conceptual origins and application of footprint and other similar ideas has revealed the complexity and confusion surrounding the post-Rio debate on changing consumption patterns in industrialized countries. First of all it has become evident that the term footprint is being used in at least four different ways:

- as a general description of the impact of one group, area or policy on another (eg FAO).
- as a more precise description of the environmental impact of towns and cities on "distant elsewhere", expressed in quantitative terms (eg Rees).
- as an umbrella term for the impacts on consumption and production in the industrialized world on developing countries (eg UK Government and NGOs).
- as an ecological critique of traditional economic policy making and analysis (eg Rees and Pearce).

This report is concerned primarily with the second interpretation, and how the footprint term can become a more rigorous tool for policy analysis and decision-making on the external dimension to sustainable development in the UK. If footprints is to serve this purpose, then it will be critical for all involved to be crystal clear about the boundaries of the debate, and in particular what is not included.

Few, if any of the ideas now incorporated under a footprints umbrella or packaged together as part of environmental space concept are new: in many ways, this new wave of vivid ideas can be seen as a merger of older concerns about colonialism and ghost acres with more recent efforts to establish an equitable system for managing the shared global climate system.

The review has also shown that footprints analysis in theory and practice rests on a number of essentially contested views on how lifestyles in rich countries like Britain need to change in order to achieve global sustainable development. This should not be surprising given the diversity of definitions for sustainable development as a whole. There appear to be three fault lines in the current discussion on notions of the limits to growth, efficiency and sufficiency, free trade and self-reliance, and redistribution, equity and planning.

2.5.1 *Limits to Growth, Efficiency and Sufficiency*

The lineage of footprints and other consumption concepts reaches back to the early 1970s and the limits to growth debate (Box 2.5). What we are seeing today is a rejuvenated limits to growth discussion, where attention has shifted from limited sources of resource inputs to the availability of sinks for pollution and waste, and the urgency of the need for change has increased, because we are now "beyond the limits". But perhaps more so than with the first limits to growth debate, ambiguity reigns. As John Hille notes in his report

on the application of the environmental space concept to Norway, "the polemic over sustainable consumption (or, to use an older label for essentially the same controversy, the limits to growth) has hitherto attracted its fair share of oversimplifications, if not outright intellectual dishonesty, on both sides" (Hille, 1995). Hille points to the "simple exercises in multiplication [and] an over-eagerness to make claims for absolute, objective limits to growth "used by the critics of growth. On the other hand, Hille notes that "the advocates of growth have often tended to found their case on simple declarations of faith in the ability of technology to overcome all limits".

Central to the new debate about the limits to growth is the question of the potential for efficiency gains to achieve the necessary reductions in environmental degradation, or whether cuts in the volume of consumption will be required, along with changes in cultural norms to favour goals of sufficiency rather than growth. What gives the current argument spice is the growing recognition on behalf of governments that reductions in energy and material intensity is not enough to achieve sustainable development, if economic growth leads to absolute increases in pollution that outweigh efficiency gains: the issue is particularly acute in the case of transport policy.

Similarly, governments, academics, NGOs and some industrialists are today more appreciative of the possibilities for improving environmental efficiencies, particularly when driven by an ecological tax reform, shifting the burden of taxation away from labour onto resources and pollution. Indeed, this approach forms the core of the European Commission's new model of development, set out in its 1993 strategy for economic recovery, the White Paper on Growth, Competitiveness and Employment. This proposes that the current tendency of the European economy to overuse environmental resources should be replaced by "a strategy to offer society a better quality of life with a lower consumption intensity and as a consequence with a reduced stress on environmental resources" (EC, 1993). But the differences still remain. Manus Van Brakel, one of the authors of the Milieudefensie *Sustainable Netherlands* action plan argues that "the acknowledgement of limits to the carrying capacity of the earth also implies a 'culture of having enough'.

Finally, there are real doubts about the utility of the concept of carrying capacity. A recent study of rangeland ecology in Africa drew the conclusion that "there is no biologically optimal carrying capacity which can be defined independently of the different management objectives associated with different forms of animal exploitation (Behnke & Scoones, 1992). Approaches from ghost acres in the 1960s to footprints and environmental space today also tend to suggest that a particular area is being used for one exclusive use, whereas in most developing countries multiple-use is a norm with agro-forestry and intercropping, yielding multiple economic benefits. This assumption of exclusivity can lead to over-estimates of the appropriation of land in developing countries by the North.

BOX 2.5: THE LIMITS TO GROWTH - THEN AND NOW

Donella Meadows et al, *The Limits to Growth* (1972)

1. If the present growth trends in world population, industrialization, pollution, food production, and resource depletion continue unchanged the limits to growth on this planet will be reached sometime within the next 100 years. The most probable result will be a sudden and uncontrollable decline in both population and industrial capacity.
2. It is possible to alter these growth trends and to establish a condition of ecological and economic stability that is sustainable far into the future. The state of global equilibrium could be designed so that the basic material needs of each person on earth are satisfied and each person has an equal opportunity to realise his or her individual human potential.
3. If the world's people decide to strive for this second outcome rather than the first, the sooner they begin working to attain it, the greater will be their chances of success.

Donella Meadows et al, *Beyond the Limits* (1992)

1. Human use of many essential resources and generation of many kinds of pollutants, have already surpassed rates that are physically sustainable. Without significant reductions in material and energy flows, there will be in the coming decades an uncontrolled decline in per capita food output, energy use and industrial production.
2. This decline is not inevitable. To avoid it two changes are necessary. The first is a comprehensive revision of policies and practices that perpetuate growth in material consumption and in population. The second is a rapid, drastic increase in the efficiency with which materials and energy are used.
3. A sustainable society is still technically and economically possible. It could be much more desirable than a society that tries to solve its problems by constant expansion. The transition to a sustainable society requires a careful balance between long-term and short-term goals and an emphasis on sufficiency, equity, and quality of life rather than on quantity of output. It requires more than productivity and more than technology, it also requires maturity, compassion and wisdom.

2.5.2 - Free Trade and Self-Reliance

Much of the motivation behind the new wave of footprints analysis is a realisation of the inability of deregulated free trade to take account of social and environmental factors. Some propose a more self-reliant strategy, one that reduces distances between production and consumption and allows developing countries to achieve food security through agriculture geared towards local needs not luxury export markets. International trade is

thus seen more as a one-sided extractive relationship, with no corresponding benefits flowing to producer countries.

These sentiments are part of the ongoing three-way argument about how trade and environment policies can be made both mutually supportive and sustainable: the 'free traders' who argue that removing market barriers will improve efficiencies in resource use; the 'fair traders' who want to ensure that the benefits of trade flow more to developing country producers, and do not damage their health or environments (see Barratt Brown, 1993 & TWIN, 1994); and the 'new protectionists' who desire a reimposition of border controls to prevent a global 'race to the bottom' in social and environmental standards (Hines & Lang, 1994 & Goldsmith, 1994).

There are many who question, however, whether transport is a useful variable. For example, Michael Barratt Brown, Chair of TWIN Trading, argues that "it costs less in energy to move a tonne by sea across the Atlantic than to move it by road across England" (Barratt Brown, 1994). Liberal proponents of trade as a mechanism for development argue that the problem does not lie with exchange over a distance, but the fact that the information conveyed by the market is purely economic and does not incorporate natural resources or ecological scarcity. A solution is therefore to provide information and incentives so that people can better act on their tastes and fulfill their preferences for cleaner products: the question of how product labelling can fulfill this role is discussed in section 4.2.

Given the EU's exclusive competence in the fields of trade and agriculture, any discussion of the footprints made by Britain overseas inevitably involves questions of coordination and legislation at the European level. The European Commission has already opened a debate with the Member States on whether the EU should consider a new generation of social and environmental preferences as part of the forthcoming revision of its General System of Preferences (EC, 1994). The scope for Britain to unilaterally affect footprints through trade policy is therefore limited, although it has substantial potential to finance efforts by developing countries to make their export industries more sustainable through British bilateral aid flows.

2.5.3 - Equity, Redistribution and Planning

What marks out the debate on footprints from a simple enquiry into the environmental impacts of products consumed here in Britain overseas in developing countries is a sense of the unfairness of the current distribution of consumption between North and South. Footprints and environmental space are thus concepts about rights and entitlements to resources. As we have seen in the climate debate, what is fair is a highly contested notion. For simplicity's sake, ideas such as footprints and environmental space have tended towards the egalitarian end of the equity spectrum.

Implicitly or explicitly, most proponents of environmental space, ecological footprints and other ideas are suggesting a radical overhaul of the international economic system on a par with the NIEO of the 1970s. It is significant that the NGO demands at the 1994 Oslo Symposium were couched in exactly these terms, calling for a New International

Consumption Order, or NICO. But the geopolitical situation has been transformed since the days of commodity power which buoyed up the demands for the NIEO. Despite the often repeated calls for increased aid flows to the South and a fair resolution of the debt problem, there is a continuing net decline in official development assistance, with levels falling in 17 out of the 21 members of the OECD DAC. And within the OECD, widening inequality in most countries suggest that most governments have now either abandoned the goal of income and resource distribution, or find themselves severely constrained by economic forces from pursuing their goals for social justice.

The radical redistributive implications of footprints and associated ideas go far beyond the ambitions of any social democratic party in Europe. Pieter Van Driel, a staff officer at the Dutch Labour Party's think tank makes some searching personal criticisms of both the practicality and fairness of equal shares of environmental space (Milieudefensie, 1992). Driel argues that "the relationship between standard of living, access to resources, use of resources and effects on environmental space is complex and far from clear cut", and that the international division of labour from which all theoretically should benefit should allow "a country a greater use of certain environmental resource than the global or continental average". Moreover, an equal division of environmental space per capita ignores such features as climate, history, as well as sovereign control over resources. Finally, Driel examines the links between resource and income inequalities: "what we started addressing as an issue of distribution of environmental space has turned into a matter of income distribution".

This raises questions over the sheer practicality of planning resource use on this scale. In a sense, radical interpretations of footprints and environmental space would lead to a planetary system of rationing that would dwarf anything yet achieved in peace or war. Analysts such as Wolfgang Sachs believe global environmental management on this scale is plain hubris, "rationing out what is left of nature" (Sachs, 1993), and proposing more decentralised control over resource use.

But even if a global rationing approach is undesirable or impractical, it is evident that substantial rethinking of economies and lifestyles in countries like Britain will still be required for global sustainable development. As Professor David Pearce stated clearly in *Blueprint 3* "it is still doubtful whether even the very basic needs of at least one billion of the world's poorest people can really be met without an enormous convulsion in the denial of expectations over future consumption of materials and energy amongst the very wealthy".

A central challenge for proponents of ecological footprints is therefore to develop practical mechanisms that simultaneously sustain natural resources in developing countries, while increasing the flow of financial resources, for example, enhanced value added from environmentally-benign exports or payments for environmental services (such as biodiversity conservation). Linking increased financial flows to the maintenance of sources of supply as Pearce and others have suggested is a self-interested, but potentially fruitful way of overcoming "aid fatigue" in the North.

2.5.5 Ways Forward

Discussions of footprints and other concepts are relatively new. Despite the fault lines, the need for Britain to extend its sense of environmental responsibility to the impacts that its consumption and production cause in "far-off places about which it knows little" is not disputed. Out of these clashing interests and viewpoints, two possible strategies emerge for lightening Britain's overseas footprints: the radical and the reformist.

- The radical strategy would be guided by the need to equalise shares of available carrying capacity on a global basis and develop more self-reliant consumption and production patterns. For citizens, this strategy would mean *reducing their footprint* abroad, cutting back on exports from developing countries. Using Orwell's expression, this could be described as the "herrings and potatoes" option.

- The reformist strategy would be guided by the need to place Britain's dependence on external sources of supply on a fair and sustainable basis. For citizens, this strategy would mean taking action to *lighten their footprint*, changing their consumption and influencing policy so that the flows resources from developing countries can be maintained on a fair and sustainable basis. This could be described as the option of enlightened self-interest.

As we shall see in the next section, which features more detailed analysis of UK footprints generated by four particular products from the developing world -- -- the distinction between reducing and lightening a footprint is not a semantic nicety: it is central to how Britain interprets its global responsibility for achieving sustainable development.

3. FOOTPRINT CASE STUDIES

This section tests the usefulness of the footprint approach both as an analytical tool and vehicle for communicating distant impact to the UK citizen through the use of four case studies of commodities produced in developing countries and consumed in the UK. They are:

- **Bananas:** Bananas are a traditional tropical crop on which many of the poorest developing countries are dependent for foreign exchange earnings. Bananas are of particular interest at the moment as they are the centre of a trade dispute between the EU and certain Latin American producers over the EU's quota system. Furthermore, moves have been made to establish certification and labelling schemes for environmentally preferable bananas. The case study focuses on Costa Rica.
- **Cotton:** Cotton is an everyday item, often seen as a natural product. Although a few top of the range green consumer initiatives are underway to promote cotton clothes with reduced environmental impacts in developing countries, a new generation of aid programmes that invest in sustainable production systems suggest positive ways forward for lightening the footprint.
- **Forests:** Tropical deforestation is the leading developing country issue of concern to the British public. Timber has also been the focus of the considerable efforts during the past decade to establish more sustainable production and trading systems.
- **Prawns:** The rapid increase in production of tiger prawns among Asian economies is symptomatic of a wider diversification by many developing countries into non-traditional cash crops during the 1980s. In Thailand and Bangladesh, serious social and environmental problems have been caused.

3.1 Green Bananas: The UK Banana Footprint

3.1.1 World Trade

Since the Berlin Wall fell in 1989, world production of bananas has rapidly expanded in expectation of realizing new markets in Eastern Europe. Global production for 1994 is estimated at 450 million boxes, a 50% jump over 1989 production of 300 million boxes (Brennan 1994b). In global terms, bananas are the fifth most important traded commodity after cereals, sugar, coffee and cocoa, worth \$7.5 billion in 1993 (ECCR, 1994). In 1991, the world's largest producer was India exporting 13% of world trade, followed by Brazil with 12% and South America as a whole with 26% (ECCR, 1994). An important consideration in terms of the potential influence of developed country consumers is that most bananas are consumed in the country of production as a staple food, although for the Windward Isles, Costa Rica, Honduras, and Ecuador, between 70% and 90% of the crop is exported.

The major exporters to the UK are The Windward Islands, Jamaica, Belize and Suriname, which account for 65% of the total. Costa Rica, Guatemala, Honduras, Colombia and Ecuador have a 25% share of the market, with Cameroon and the Ivory Coast taking 18%.

3.1.2 *Production and Trade in Costa Rica: A Banana Republic?*

In Costa Rica, the expansion of banana production and exports can be divided into three historical phases (Mata and Mata, 1992). The first phase began as far back as 1880, when Costa Rica exported 110,800 bunches of bananas. By 1890, Costa Rica was exporting one million bunches and by the time exports levelled off in the 1908-1916 period, exports had reached ten million bunches per year. During the Depression years up through the end of World War II, production stagnated and even declined somewhat. A post-war surge took production back up to the ten million level prior to the beginning of the second expansion period that began in 1968.

The next two expansion phases occurred between 1968-1974 and from 1987-1993. Exports went from close to ten million bunches in 1968 to 42 million in 1974. In the interim period prior to the next expansion production levelled off and even declined. This decline has been attributed to three factors (Mata and Mata, 1992):

- * Conflict between workers and management stimulated by the political left and fuelled by concern over social equity.
- * Withdrawal of foreign companies.
- * Growth of other economic sectors in the country.

In the mid-1980s, the Monge administration affirmed its support for further expansion of the banana sector. However, the next expansion phase was clearly fuelled by expectations regarding the market potential of Eastern Europe. This led to an impressive rise in exports - virtually a doubling in production in six years - in the late 1980s and early 1990s. Exports (now measured in boxes of 18.14 kgs) went from 52 million boxes in 1987 to 101 million boxes in 1993. This increase in production more than doubled the land area under banana plantation from 24,772 ha in 1989 to 49,432 in 1993 (Brennan 1994b). By 1989 bananas had become the country's largest export, although they were overtaken by tourism in 1993. In 1993 banana exports in Costa Rica accounted for 27% of total exports and 7% of GDP (EIU, 1994). Currently Costa Rica is regarded as one of the most efficient, if not the most efficient, producer of bananas in the world. Exports are dominated by multinational firms. The local banana trade organization estimates that 95% of exports pass through the hands of multinationals (Corbana, 1992 in Vargas and Segura, 1994).

In the second half of 1993, three companies were responsible for 62% of the country's total exports: Banana Development Corporation, Standard Fruit Company and Compania Bananera Atlantica (COBAL) (Barquero 1994). These companies are the local subsidiaries of Del Monte International, Dole International, and Chiquita Brand International respectively. In actual production terms, the trade association suggests that by 1990

multinationals actually owned 60% of producing area. Although direct employment on banana plantations rose above 20,000 for the first time in 1991, this rise would consolidate as the establishment of new plantations is more labour intensive than that of yearly maintenance and operations (Vargas and Segura, 1994).

The rapid rise of the banana to renewed economic prominence in Costa Rica (and indeed in other Latin American producing countries with a strong competitive advantage) appears to have come to a grinding halt in the last year. Expectations regarding Eastern European consumption have failed to come to fruition and the European Union decided to limit imports from these countries from late 1993. Costa Rican production in the first half of 1994 was up only 2.4% over figures for the same period in 1993 (Barquero 1994). This is a considerable drop from the rapid 12% annual growth rate seen in the country since 1987.

3.1.3 The Lome Trade Deal

In February 1993, the EU Council of Ministers ratified the decision to limit Latin American imports under the fourth Lome Convention (Lome IV). The new agreement took effect in July 1993. The EU trade deal has already caused considerable realignment in banana production and trade patterns and may also eventually have an impact on consumption patterns. As a result, the EU's trade policy is influencing the nature and extent of banana footprints by the UK and other EU Member States. While the democratic nature of EU decisions can be debated, UK citizens do at least in theory have the ability to affect EU policy through a number of channels, and thereby seek to reduce Britain's footprint.

Under the EU agreement, quotas were established for Latin American and other producers who are not parties to the Lome Convention. Most of the 70 African, Caribbean and Pacific countries that have signed the Lome Convention are ex-European colonies. In terms of banana production the countries benefiting from these qualitative trade restrictions are Caribbean islands such as St. Lucia, Jamaica, St. Vincent, the Dominican Republic and African countries, such as Cameroon and Cote d'Ivoire.

The 1993 agreement allocates Latin American banana producers a two million ton per year annual quota, with a 170% tariff levied on subsequent imports into the EU (Brennan 1994a). In response, Costa Rica led an effort by Latin American producers to challenge the legality of this agreement under the rules of the General Agreement on Tariffs and Trade (GATT). Although two GATT panels condemned the banana quotas as discriminatory and illegal, these were non-binding, and as a result Costa Rica, Colombia, Venezuela and Nicaragua decided in late 1994 to accept slightly modified EU quotas. This decision came in the face of continued EU refusal to alter the basic conditions of agreement. A block of countries led by the world's largest producer Ecuador and including Mexico, Guatemala, Honduras and Panama continue to oppose the Lome deal.

Costa Rica, Colombia, Venezuela and Nicaragua won marginally greater market access to the EU as a result of agreeing to the revised framework agreement that took effect on January 1, 1995. Costa Rica obtained a 23.4% share of the 2.2 million ton quota for 1995 allotted to Latin American banana producers. This amounts to roughly 29 million

boxes. Sources suggest that Costa Rica must now divert 8 million boxes normally destined for the EU to other markets, principally the US (Brennan, 1994a). Combined with the recent failure of Eastern European markets to live up to expectations, these events have precipitated a non-EU banana glut. This has led to a rapid decrease in banana prices in the US. US price halved, from \$10.80 per box in January 1993 to around \$5.00 per box, between January 1993 and July 1994 (Anon, 1994a and McPhaul, 1994a). Companies and countries exporting to the US market have suffered losses in export revenues. For example, in September 1994, Panama reported that earnings had dropped by 7% on the year to date despite a rise in exports by volume of close to 4% (Anon, 1994c). Estimates of potential losses from the EU action in Costa Rica came to \$74 million in exports and 5,000 jobs.

Multinationals operating in Costa Rica and other Latin American countries have taken to the offensive. In addition to pressuring the US government to investigate the quota system, US multinationals have initiated action against countries agreeing to the EU quota system. In early 1995, Chiquita Brands International, in conjunction with the Hawaiian Banana Growers Association succeeded in pressuring the US Trade Representative to include Costa Rica in a so-called 301 investigation (McPhaul, 1995). If Costa Rica is found to have engaged in 'unreasonable' or 'discriminatory' trade practices, the US could impose retaliatory duties on Costa Rican exports to the US.

3.1.4 A 'Green' Banana?

No footprints analysis of bananas is available. Nonetheless obtaining a rough picture of the environmental impact of banana production is fairly straightforward. Converting that into a 'footprint' is much tougher. There are four main components of environmental deterioration caused by banana production (Vargas and Sevlra, 1992):

- * Deforestation and loss of biodiversity.
- * Accelerated soil erosion and downstream sedimentation.
- * Solid waste generation.
- * Agrochemical pollution.

Banana production can also be linked to public health problems, such as the spread of malaria (Mata and Mata, 1992). Comprehensive data on the nature and extent of these environmental impacts is not available in Costa Rica. It is, however, possible to discuss these impacts in qualitative terms.

Deforestation: The conversion of primary forest for banana production totalled 130,000 ha between 1884-1967, 13,000 ha between 1968-1985 and 4,000 ha from 1986-1992 (Mata and Mata, 1992). The latter figure represents 10% of the 40,000 ha converted to bananas during the period. This reflects Mata and Mata's assertion that the latest expansion of bananas occurred primarily on pasture lands with additional acreage coming from lands under forest regrowth and to a lesser extent primary forest. The source and validity of these statistics, however, remains unclear and they are not cited by other

authors. Other informed sources suggest that it is not known to what extent the recent expansion of plantations actually led to the conversion of tropical forest (Willie, pers. comm. 1995).

Whether or not plantation expansion came directly at the cost of loss of virgin forest is somewhat academic from an extreme conservationist perspective. If one assumes that Costa Rica was originally covered by forests, it is clear that either directly or indirectly banana production comes at the expense of forest acreage.

Soil Erosion and Sedimentation: Concerns regarding soil erosion and sedimentation result primarily from the clearing of forests adjacent to water courses on plantations, as well as the risk of rainfall erosion from cultivated surfaces. An IUCN study concludes that the erosion risk is severe in all phases of cultivation and that nothing is done by growers in the way of efforts to control sedimentation (Brenes-Quesada 1992 in Mata and Mata, 1992). According to one estimate, Costa Rica's coral reefs are 90% dead in places, and siltation is known to be one of the major factors in causing the decline of the Atlantic coast reefs (ECCR, 1994).

Solid Wastes: Both organic and inorganic solid wastes also find their way into water courses presenting danger to fish, birds and other animals downstream. Another IUCN study, carried out during the latest expansion in the Costa Rican banana industry, indicated that the following solid wastes were generated each year: 2.7 million tons of organic material including unused bunches, banana trunks, leaves, etc.; 0.4 million tons of plastic bags; and 0.2 million tons of rope (Abarca, 1992 in Mata and Mata, 1992). Excess organic material finding its way into rivers results in elevated biological oxygen demand with consequent deleterious effects on aquatic species.

Agrochemical Pollution: Banana production is said to account for 35% of all pesticides imported into Costa Rica (ECCR, 1994). Considerable pollution comes from agrochemicals applied at various stages of the production process. Most notable in Costa Rica are the agrochemicals applied to combat nematodes and the fungus, yellow sigatoka. Use of pesticides and fertilizers may have lasting effects on soil quality, a negative impact on aquatic life and adversely affect human health.

The case of 8,000 Costa Ricans awaiting a Texas court ruling on a class-action lawsuit gives an indication of past company behaviour and the resulting human health impacts. Along with 8,000 other workers from 12 different countries, the Costa Ricans are seeking damages against multinational chemical and banana companies that manufactured and used the pesticide DBCP from 1968 onwards. DBCP is thought to have caused sterility amongst the plantation workers. What makes the case even more damning is that the companies continued using the pesticides even after evidence that 15 Californian manufacturing workers had become sterile as a result of their contact with DBCP and the US Environmental Protection Agency enforced a complete US ban in 1979. In an earlier case settled out of court for \$20 million in 1992, 800 Costa Rican banana workers received (after legal fees) between \$1,500 and \$15,000 each (Scanlan 1994). Anecdotal evidence suggests that DBCP may also have led to additional impacts of sterility, cancer, miscarriages, and birth defects amongst women and children in the banana zones,

although no systematic studies have been undertaken to confirm or deny this (Solloway, 1994).

DBCP is of course just one of the nematocides, fungicides, herbicides and insecticides employed in banana production. There is one report that 76% of pesticide intoxication cases received by the National Insurance Institute come from banana workers (Mata and Mata, 1992). Ten times as many of these cases come from the Huetar Atlantica zone - where banana activity is highest - as from the rest of the country. In 1992, the National Insurance Institute reported 2.5 cases of pesticide poisoning per 1,000 agricultural workers (Quiros 1994). Paraquat - a herbicide restricted in the US and banned in Sweden - is the most widely used herbicide in Costa Rica. It led to 15 accidental deaths from 1980-92 and is responsible for 10% of poisoning cases in the country. Note that the figures on poisoning cases represent only poisonings of workers that are actually reported.

Finally, there is an intriguing case that the most recent expansion in the Costa Rica banana industry was a factor in the resurgence of malaria in the country during the late 1980s and early 1990s (Mata and Mata, 1992). While 70% of Costa Rican territory is suitable habitat for the Anopheles mosquito, concerted public health campaigns had reduced mortality to zero by the 1970s and morbidity due to malaria to 0.4 cases per 10,000 in 1982. While Mata and Mata accept that subsequent rises in morbidity to 22 cases per 10,000 by 1992 occurred largely as a result of failures in the public health system, they also raise the question of whether the ideal breeding grounds provided by banana plantations might have also played a role. Standing water in plantation canals and soils provides a generous habitat for the Anopheles larvae, as well as a supply of their food source - algae.

Just how serious these impacts are is unfortunately a subjective matter due to the lack of detailed life-cycle studies of the environmental, social and economic impact of banana production. For example, it can be argued that the deforestation and biodiversity loss resulting from banana production are acceptable, if not inevitable. The availability of previously deforested land and the social stigma associated with deforestation may mean that future deforestation by banana growers will be limited, at least in Costa Rica. While conversion of forest does entail the loss of goods and services provided by the forest, the production of 7% of Costa Rica's GDP and 25% of its exports from 1% of its land area is an important consideration.

In comparison, tourism's export value was slightly than banana exports in 1993. Given that the country's attraction as a tourist destination relies heavily on the roughly 12% of Costa Rica that is dedicated to strictly protected areas, the contrast in revenue generating potential is clear.

While the extent of the erosion and sedimentation impacts remains unclear, they probably pale in comparison to the pollution issues, particularly those related to the use of agrochemicals. Even industry sources will admit that the scale and impact of the use of pesticides is largely unknown. The actual public health impacts of agrochemical use are demonstrated and can be quite serious. Long term effects on not only health, but on aquatic life and future land use may also be potentially serious.

As stated above, Costa Rica and other Latin American producers take a quarter of the UK market for bananas. Geest Caribbean, a subsidiary of British banana producer Geest, accounts for about 3% of Costa Rican production. Geest has a poor reputation in Costa Rica for its labour relations. In 1994, a prolonged strike by workers resulted in violence when police and private guards hired by the company fired on barricaded strikers. The strike has since been resolved.

3.1.5 *ECO-O.K Bananas*

In July 1993, the US-based environmental organisation, the Rainforest Alliance, in collaboration with the Costa Rican Fundacion Ambio, launched its ECO-O.K. Banana Project (also known as the Banana Amigo project). This is part of the Rainforest Alliance's broader programme of environmental certification and labelling of products (see Section 4.2 for discussion of its Smart Wood programme for timber). An ECO-O.K. Coffee Project is underway in Guatemala. The aim of the project is to provide consumers in the USA and Europe with a more environmentally friendly banana

An indicator of ECO-O.K's success is that COBAL, a subsidiary of Chiquita, has already certified one-half of its Costa Rican farms and plans on eventually certifying all its farms (Anon, 1994b; Willie, pers. comm. 1995). In addition, industry sources suggest that the government may even adopt the ECO-O.K. standards as minimal legal environmental requirements for banana production. Another positive knock-on effect of COBAL's interest in the ECO-O.K project, is that Costa Rica's plastic's manufacturer, Polymer has begun recycling the infamous blue, pesticide impregnated bags into plastic blocks for use as walkways for banana workers (Anon., 1994b).

The ECO-O.K. banana project - as with all of the Rainforest Alliance's green labels - contains the following components (Rainforest Alliance, 1994):

- * A set of clear, measurable, verifiable environmental standards for commodity production.
- * Inspection teams comprised of trained local and international technicians.
- * An independent certification process.
- * A product certification mark.
- * Local partner organizations.
- * The general aim of 'partnership' - bringing together banana producers and workers, government, scientists, environmentalists and other stakeholders to transform the banana industry (ECCR, 1994).

The Rainforest Alliance stresses that the programs are voluntary and that the standards are designed to be "stringent enough to bring meaningful change, but realistic and practical enough to allow implementation within existing technological, managerial and economic limits". The definition of the ECO-O.K. standards is based on available scientific

information and on negotiations between all stakeholders. Although some standards are fixed, they are also flexible and should evolve with changing technology and new research.

Standards for the ECO-O.K. banana involve some 115 specific regulations and measures. The most prominent of these respond to the environmental impacts of banana production highlighted earlier:

Deforestation and loss of biodiversity: further clearance of forest for new plantations, clearance of existing forest patches and planting within three kms of parks is prohibited; growers must allow natural regrowth along rivers and roads to provide biological corridors for species migration.

Soil Erosion: actions to restore buffer strips along streams and vegetative ground cover.

Solid Waste: all plastics must be collected and either recycled or disposed of properly and farms must begin a solid waste management campaign.

Agrochemical Pollution: pesticides allowed under international law are permitted, though there are some restrictions. Some pesticides (e.g. Paraquat) are prohibited, with further standards for chemical storage, testing of workers for pesticide contamination and protection of drinking water sources. Additional studies are underway to gather data on the downstream effects of pollutants and sediments.

The project's strength is that it provides banana growers with concrete, practical steps that they can take towards reducing the environmental impacts of production. Its weakness is certain concessions to producers were necessary so as not to make initial participation prohibitively expensive. The ECO-O.K. banana is, therefore, obviously not fully 'O.K.' from a purely environmental perspective. It is not an 'organic' banana. In addition, it remains to be seen if, and how, the standards can 'evolve' over time in response to increased information about the nature of the environmental impacts. A final concern, as with any such program, lies with the problem of 'regulatory capture.' In other words, it is important that the regulators' - the Rainforest Alliance and Fundacion Ambio in this case - do not lose sight of their original environmental objectives as they become more involved with the organizations they are 'regulating'.

Another important feature of the cooperative spirit of the project is the division of responsibilities. While the government and banana companies may negotiate the package of incentives and disincentives needed to transform production (the National Chamber of Banana Companies in Costa Rica has its own environmental commission), the two NGOs use their comparative advantage in campaigning and communication to inform consumers of the issues, and to do what they can to ensure a 'willingness to pay' higher prices for greener bananas. The NGOs are also involved in training plantation supervisors and technicians, and advising workers and their families on how to improve environmental and human health conditions.

ECO-O.K bananas are not organic. Organic bananas are grown in Australia, Israel, India, Sri Lanka, the Dominican Republic and the Canaries, but there seems to be little

information on marketing, availability, production levels and labelling (ECCR, 1994). In 1989, *Fresh Produce Journal* reported that GEEST was a "leading supplier of organic produce", but since then the company has sold off its organic business (ECCR, 1994). Integrated Pest Management (IPM) for bananas is practiced, and much of banana research and development is focused on IPM approaches. However, there are no banana IPM labelling schemes, although GEEST is again reported to have done much work on IPM (ECCR, 1994).

3.1.6 The Banana Footprint.

As has already been stated, no-one has yet calculated a Banana Footprint. How important is the UK's Banana footprint?

Average UK consumption of bananas is estimated at 10 kgs per person in 1993 up from 5 kgs in 1983 (Smith 1994). In very crude global terms, for a 10kg/capita consumption, the UK's population of 58 million people consume a total of 580,000 tonnes of bananas/year. Taking an average yield of 12 tonnes per hectare (estimated from figures in ECCR 1994), then the base UK banana footprint is about 48,300 hectares. This is equivalent to about **one half of a percent of the UK land area currently under permanent pasture** (used as a comparison because bananas are actually a 'herb'), or 2% of the UK's Forest and Woodland cover (used as a comparison because banana plants look like trees).

This base footprint, however, ignores the wider environmental and social impacts, such as waste, pollution and damage to health, which are really the most interesting aspects of the impacts of bananas on the environment. A massive quantity of data would be required to transform estimates of these wider impacts into land area equivalents. It should also be noted that the calculation of cultivated land area from export figures and average yields, often does not 'square-up' with actual measurements of areas under banana plantations even taking domestic consumption into consideration. For example, Brennan (1994b) cites a figure for the land area under banana plantation in Costa Rica of 49,432 has. However, using an estimate of yield of about 12 tonnes/ha., and an average export yield of 1.7 million tonnes, gives an area for production of 142,000 has. It may be that the Brennan figure does not include smallholder producers of bananas.

3.1.7 Options for UK Citizen Action

Currently the British public has little or no accessible and accurate information on the social and environmental impacts of banana production, trade and consumption. Raising awareness is a precondition for further citizen action. If this is achieved, then five main options appear open to British citizens to lighten or reduce their footprints:

- * Switch consumption to other fruits and vegetables.
- * Participate in labelling schemes by purchasing green-certified banana such as the ECO-O.K. banana.
- * Lobby banana companies to adopt ethical and environmental standards.

- * Lobby for aid to sustainable banana production.
- * Lobby for changes in UK and EU policy that would reduce the negative environmental impact of banana production.

Switch Consumption

The first option is of limited satisfaction. In terms of taste and, perhaps in terms of nutrition, perfect substitutes for bananas are really non-existent. If consumers turn to other mass-produced close substitutes the topic simply changes to a discussion of the environmental impacts of these other products. After all the net gain in reduction of environmental impacts is simply that of bananas minus that of, for example, apples. Clearly, the only conscience-clearing choice available for the diehard green consumer is to switch to other fruits that can actually be produced without the use of chemicals.

Eat ECO-O.K

Opting for an ECO-O.K. banana is a second-best environmental solution, but it does maintain the consumers ability to continue consuming bananas, and provide revenues to developing countries. Given that compliance with certification programs costs money - COBAL has already spent \$1 million in bringing its farms up to ECO-O.K. standards - the consumer may also need to pay a little extra for this choice in favour of environmental improvement.

The real problem is lack of supply: ECO-O.K bananas did make a brief appearance in UK markets, but are now hard, if not impossible to get hold of. According to the ECCR Report *Going Bananas ?*, the ECO-O.K banana project has three certified plantations (ECCR, 1994). Two are in Costa Rica and one is in Hawaii. An ECO-O.K project has also recently been started in Ecuador. Those bananas exported through 'Jamaica' producers go mainly to Germany. No ECO-O.K bananas go to the USA, due to competition with very cheap bananas. If individual consumers want ECO-O.K or 'greener' bananas, they are going to have to demand them from the retailers and banana companies. Environment and Development organisations will have to do more, possibly in partnership with retailers, to raise consumer awareness and generate the ever important willingness to pay.

Lobby Companies

Lobbying the banana companies themselves is an important part of citizen action. The most important companies in the UK are Geest and Fyffes. Geest is the UK's largest banana importer and distributor. In future they will be handling up to 10% of the total production of Costa Rican bananas (ECCR, 1994). Geest have their own environmental management system and environmental manager and report on environment matters in their annual report. Geest perform external audits of their environmental performance. ECCR report that Geest has small pockets of virgin forest reserves on their land, and although they deny clearing rainforest illegally, do have permits for forest clearance. The ECO-OK project had initiated talks with Geest, but these have not been followed-up. Fyffes, who are based in Dublin is the second largest banana importer, and the UK is the

companies largest market (ECCR, 1994). According to the ECCR Report, "Alistair Smith of Farmer's Link notes that Fyffes is seen as the 'cleanest' of the big companies, as they have not found any serious contraventions of acceptable labour and environmental practices in the countries where they source their bananas".

Citizens, environment and development organisations and the UK Government's *Going for Green* initiative could consider encouraging a joint venture between a 'green' banana producer and a major retailer in the UK. More broadly, UK citizens need easy access to comprehensive information on corporate performance on sustainable development. Currently, no such information is available in Britain, although there is a model in the US-based Council for Economic Priorities (CEP). The CEP provide ratings for amongst other things, the environment, workplace issues, charitable giving, community outreach, and women's and minority advancement.

Lobby for Aid to Sustainable Banana Production

There are many mechanisms through development assistance projects, programmes and policies that could facilitate the transition to more sustainable banana production, including the Dutch Ecooperation agreement with Costa Rica (see Section 2). The British government currently supports the UN Food and Agriculture Organisation's Prior Informed Consent procedure for pesticides, as well as the OECD's three year 'Activity on Pesticides'. But as this Case Study shows, the issues are very much broader than just pesticides, and so citizens could lobby individually as well as through development organisations for a more comprehensive and concerted approach for devoting aid to sustainable production schemes, particularly for those former British colonies in the Caribbean who are highly dependent on bananas for their foreign exchange earnings.

An EU Solution?

Citizen action to change environmentally unfriendly trade policies at the European level is a potentially powerful and important tools. The EU is the single largest single importer of bananas in the world, importing about 33% of the world's total. The case of the EU quotas on Latin American producers is an interesting case of knock-on environmental impacts.

From the environmental perspective, the policy will probably increase the footprint of the EU banana. Banana production in the Caribbean is known to be relatively smaller in scale and more inefficient than that of Latin American production (Smith, 1994; Willie pers. comm., 1995). This implies that EU bananas require more land and therefore more deforestation and biodiversity loss. Expansion in the Windward Isles has also led to encroachment into steep and erosion prone lands that are really only of marginal use for banana production (Smith, 1994). Meanwhile, in countries such as Costa Rica, falling beef prices mean that previously deforested land is increasingly available to banana growers. Thus the land use impacts would seem to be in favour of Latin American producers - per British consumed banana.

The impact of EU trade policy in terms of agrochemical usage is unclear. Smaller production units may use less pesticides due to financial constraints than large

multinational operated plantations. On the other hand, multinational plantations may be better informed regarding applicable doses and safety requirements of these chemicals. In addition, it may be important to consider the prospects for improvements in agrochemical use in the future. Clearly, Costa Rica is one Latin American producer moving towards the production of a more environmentally friendly banana.

The quotas will also inhibit institutional change. Falling revenues due to the drop in the US price for bananas obviously has an impact on the financial health and operations of the large multinationals. Generalized experience might suggest that when businesses hit hard times the first cuts come in the areas viewed as non-essential. Participation in new environmental initiatives such as COBAL's efforts to join the ECO-O.K. project, thus, might be negatively affected by the EU's discrimination against Latin American producers.

Two options are open to the UK citizen: opposing EU quotas for Latin American bananas and/or pressing for new trade preferences for socially and environmentally superior bananas. The UK-based group, Farmers Link have presented the following proposals to the European Parliament (ECCR, 1994):

- * The need for independently verifiable criteria for the production and marketing of socially and ecologically sustainable bananas into the EU.
- * Ensure that all free and independent trade unions in the banana plantations supplying EU markets be given both moral and financial support.
- * Establish a labelling system for sustainably produced bananas.
- * Abolish tariffs on sustainably produced fruit into the EU market (preferential access).
- * Phase in these measures to allow for producers to adapt and make the transition to sustainable production.
- * Facilitate participation by small and medium scale independent producers and workers unions in negotiations.
- * Create an independent body acceptable to all parties for the monitoring and implementation of new criteria for sustainable banana production and trade.

Taken together these proposals amount to what the establishment of an International Commodity-Related Environmental Agreement (ICREA) for bananas. The details of how an ICREA could work is discussed in more detail in the Cotton Case Study (see Section 3.2).

In sum, the banana 'footprint' may warrant closer scrutiny by UK citizens and policy makers. Currently, the options for consumer action are limited. Action to change corporate and public policies is therefore needed.

3.2 A Footprint in the Sand: The UK Cotton Footprint

3.2.1 Introduction

Cotton is often virtuously marketed as a 'natural product'. Yet this 'natural product' is a 'sink' for 11% of the world's agro-chemicals (some say up to 25% of the world's pesticides), with cotton fields covering up to 4.7% of the world's staple crop-growing area, or 2.4% of the world's arable land (Enquete Commission 1994, OECD, 1994, Dinham, 1993). The average annual global cotton growing area is 33 million hectares, equivalent to about one and half times the UK's total land area. Cotton even has its own symbolic environmental disaster, the Aral Sea, once the world's fourth largest inland lake, shrunk by 60%, following the diversion of rivers for cotton irrigation. The Bhopal tragedy was caused by a factory which produced pesticides for the Indian cotton industry. The magnificent Nile river is now seen by some as no more than a glorified drainage ditch for Egypt's cotton and vegetable production. Cotton has now joined the list of commodities behind which there is growing public pressure for both non-government and government-based eco-labelling (including in the USA, UK, Germany and the Netherlands).

Visualizing the UK's cotton footprint seems almost as hard as attempting to calculate it, since many of the impacts (aside from the land area occupied by cotton) are not easily converted into a 'land area equivalent', such as the pollution of water, degradation of soil over a period of time, diversion of water from one use to another, and human health impacts. It is also hard - although not impossible - to identify the various international and regional policy initiatives, such as commodity agreements, trade liberalization agreements, market regimes, aid programmes, and economic adjustment programmes, which the UK is party to, and which will have an impact on cotton production policies, and hence the cotton footprint. These issues are discussed below, and it must be confessed at the outset that it has proved impossible to estimate an actual UK cotton footprint.

While cotton can undoubtedly be seen as an environmental villain, it is also a vital source of livelihood, employment, and economic development for producer countries. The best sustainable development option, may not necessarily be the 'greenest' from an environmental standpoint, nor is it necessarily the case that sustainable development is best promoted through a mass effort to reduce the cotton footprint.

The cultivation and processing of cotton is a very large and complex chain encompassing millions of people and organizations across the world. Within this chain, the main concerns relate to use by farmers of high input levels on human health and the natural resource base, chemicals used for processing, and hazards to human health from textile production.

3.2.2 World Production and Markets

For the period 1990-1992, worldwide production of cotton exceeded 20m tons per year (of lint, raw cotton amounted to 50 million tonnes). 60 countries grow cotton commercially (de Vries and Kox, 1995). Five countries provide the overwhelming share of total production: the United States (15% of total production area), China (19%), India

22%), Pakistan (8%), and the ex-CIS states 9%). Together they account for 75% of world production. The remaining share is spread across a large number of much smaller producers in Africa (10%), Asia, and Latin America. For some of the latter countries, cotton represents an enormously important crop, providing the major share of export earnings. For example, for four Sahelian states in West Africa - Burkina Faso, Mali, Chad, and Senegal - cotton represents between 28-39% of official export earnings. Cotton is one of Paraguay's highest export earnings, accounting for up to 32% of export earnings (Dinham, 1993). 170,000 families depend upon cotton growing for their living, which amounts to 1.5 million people, or over one third of Paraguay's population.

A low proportion of cotton grown is traded internationally in its raw state, with most countries processing the crop to a varying extent. For example, Egypt and Turkey export less than one tenth of their production in raw form, and because they also import raw cotton, they are actually net importers (de Vries and Kox, 1995). Germany imports \$5 billions worth of clothing and textiles, and yet the total value of the world export of yarn is only \$3.8 billion (de Vries and Kox, 1995). The Multi-Fibre Agreement provides some degree of protection for developed country manufacturers, by upholding quotas on imports of finished clothing from developing countries. However, the force of this agreement will gradually decline over the next ten years and the GATT/WTO provisions should ensure that textiles can be imported into developed countries without barriers.

World market prices for cotton have been fairly volatile. For example, they have ranged over the last ten years from \$2.67/kg in 1983 for 'A' rated cotton, to \$1.20/kg in 1992 (World Resources Report, 1993). Prices are particularly dependent on growing and harvest conditions in the USA and China since, in both countries, domestic processing tends to take priority over exports. Hence, any shortfall in production is translated into a substantial cut in exports. Similarly, better than expected harvests are channelled largely into exports. Thus, for example, adverse weather, bringing lower than expected yields, tends to produce a rapid increase in world market prices, while good harvests bring a fall in prices.

Expenditure on clothing represents about 6% of disposable income in the UK, a figure broadly similar to other European countries. Growth in this market has been fairly limited, and is likely to continue to be slow. As a result, the establishment of new capacity in processing and tailoring has been at the expense of higher cost capacity elsewhere, rather than bringing about an expansion of the market overall. By contrast, the market for clothing in developing countries is likely to be more vigorous, given rising incomes and increasing populations.

3.2.3 Production systems

Cotton is grown under a range of techniques, from large scale irrigated schemes, in the US and central Asia, to rainfed, smallholder plots, as found in much of sub-Saharan Africa. Yields under intensive irrigated production lie around 2,000 to 2,500 kg/ha, whereas on less intensive rainfed farms, yields are closer to 500 to 1,000 kg/ha. In both cases, the maintenance of yields demands substantial levels of fertilizer, and pesticide use.

Worldwide, cotton production is the largest consumer of pesticides accounting for one quarter of global pesticide production. In India, over 50% of pesticide consumption is directed against cotton pests (the same for Egypt), costing about 3,000 million rupees a year (Dinham, 1993). The main pesticides currently used include pyrethroids and organic phosphorous compounds. Formerly, cotton production relied heavily on use of DDT. While most countries abandoned its use in the 1970s, there remains evidence of its continued use through residues found in cotton fibre. Pesticide choice has to change fairly frequently, because resistance amongst pests to a given agent builds up rapidly.

Pesticide use has a series of impacts on the human and natural environment. Despite progress in some areas with integrated pest management systems, in most production systems, application still tends to be based on simple calendar methods. This means that the cotton crop is sprayed on certain fixed dates, whether or not the pest population is at the appropriate stage. This brings much higher levels of pesticide use than necessary and increasingly rapid development of resistance to a given chemical. In addition, the insecticides used tend to be broad spectrum and eliminate all insect life, whether damaging to the cotton crop or not. As a result, cotton growing and surrounding areas tend to be very poor in species, particularly soil organisms and natural predators. In addition, in West Africa there is evidence of farm livestock being badly affected by heavy pesticide use. Data from the US estimates total losses from the adverse effects of all pesticide use (not just cotton related) at US\$838 million and 45,000 cases of poisoning (fatal and non-fatal). Such losses include livestock losses, honeybee poisoning, fish and wildlife losses.

Overall, such costs represent one third of benefits associated with pesticide use. Insecticide spraying methods vary from aerial application in schemes such as the Gezira, in the Sudan, to backpack sprays on smallholder African plots. Health hazards are considerable in both cases, with an estimated 30,000 to 40,000 deaths a year due to all pesticide poisonings and a possible 2 million cases of long term damage to health each year. Cotton-related impacts are thus likely to represent about one quarter of these. Farmers rarely can read the instructions and receive no advice regarding safe methods of application. Pesticides also find their way into domestic water supplies directly, through aerial spraying, and indirectly through leaching.

At harvest time, many producers use defoliation sprays, to speed up collection and cleaning of the crop. It is unclear what long term effect these chemicals may have on human and natural systems.

Irrigated crop production

In the central Asian states, irrigated cotton production has been associated with devastating environmental impacts, due to diversion of water from the two main rivers supplying the Aral Sea. As a consequence, this once huge inland sea has shrunk by 60%. This is thought to have affected local climate systems around the Aral sea, bringing much drier weather patterns, the loss of livelihoods amongst populations bordering the sea, and greatly increased health hazards. At the same time, excess irrigation water and salinisation have badly damaged the irrigation schemes themselves, bringing falling yields and abandonment of land.

In Africa, schemes such as the Gezira in the Sudan and the Office du Niger in Mali were developed for cotton production in the early part of this century. Now, however, cropping patterns have become much more diverse, with the incorporation of food grains, fodder, and sugar. Problems found within African irrigation schemes are similar to those elsewhere; diversion of water from other uses causing downstream losses, dam siltation, salinisation, and poor drainage. However, these problems cannot be attributed to cotton cultivation alone.

Irrigated cotton requires substantial amounts of water. In the Sudan, an estimated 29 m³ of water is needed per kg of raw cotton grown, a figure similar to other African schemes. While in Israel, higher yields and greater water use efficiency mean that each kg of cotton needs only 7 m³ of irrigation water.

Rainfed farming

In many West African countries, cotton is grown on part of the household's land. For example, in southern Mali, on a typical family holding of 5-8 ha, cotton takes up 20%, millet and sorghum 50% and other grains, beans and fodder the remaining 30%. Cotton provides a vitally important source of cash income to farmers and enables investment in equipment, such as an oxen plough team. Cotton farmers tend to be substantially better off than those reliant on food grain production alone, and have access to a range of inputs through cotton marketing boards, such as chemical fertilizer which is then spread across both cotton and food crops.

Use of animal traction has expanded the area which can be cultivated, putting pressure on land availability and fallowing systems. As a result, farmers have become increasingly reliant on chemical fertilizers and have to find alternative means of providing fodder for their livestock, since natural pastures no longer suffice. Many dryland farming systems formerly relied on transhumant herds for replenishing their soil fertility. For several months of the dry season, migrating herds of cattle, sheep, and goats had access to water and pasture in farming areas in exchange for depositing their dung on fields, and allowing herders to buy grain for livestock. The extension of land under cotton has brought the disappearance of fallow pastures and greatly reduced access to fodder and water. Cotton is also a late maturing crop, and leaves few crop residues of any interest to animals. Hence, increased cotton cultivation has had an adverse impact on livestock-crop linkages and the viability of transhumant pastoralism in the drier reaches of the Sahel.

Soil erosion is a major problem in rainfed farming systems, although not particularly associated with cotton cultivation. In southern Mali, given the importance of the cotton crop, the parastatal textile company and associated research organizations have turned their attention to the best means of reducing rainwater runoff from fields and of enhancing soil fertility. Such techniques, once developed, are of broader interest and relevance to small farmers elsewhere in Mali.

3.2.4 Marketing of cotton

Until recently, in many African countries, cotton production has been tightly controlled by marketing boards which have supplied seed, fertilizer, pesticide, and equipment to farmers

on credit to be paid off when the cotton crop is harvested. Many West African farmers have become locked into a loan system, due to rising input prices and stagnant returns from cotton, and see little prospect of escaping their debts. Marketing boards have tended to offer a guaranteed low price to farmers, regardless of world price movements. In some cases, farmers are getting but a small share of the world market price. In others, marketing boards have sunk into crippling indebtedness. According to De Vries and Kox (1995), in the 1980s, Kenyan cotton producers received 60% of the market price and Tanzanian farmers, 40 to 45%. This contrasts with subsidies to cotton producers of between \$0.15 to \$1.21 per pound of cotton in the early 1990s in the US and the EC.

In the last few years, cotton boards have been shaken up by structural adjustment programmes aimed at liberalizing the economy and reducing government deficits. At the same time, political liberalization has enabled farmers to organize and assert their rights more effectively in negotiations with marketing boards. As a result, farmers have a broader range of options regarding sale of the crop and sources of inputs. However, it also shifts the risks associated with changing world market prices from marketing board to farmer, with attendant costs.

3.2.5 Processing of cotton.

Cotton goes through a number of stages in its transformation from boll to finished clothing. Cleansing, carding, spinning, weaving, finishing, bleaching and dyeing operations produce the cloth which then must be treated, cut, assembled and transported to the market place or high street shop. A very large number of small and medium sized enterprises are involved in these stages of processing, which makes it difficult to collect precise data on their activities. Various stages of processing involve very large quantities of water, for washing the material and removing traces of chemicals used in previous processes. Many dyes cause concern because of their possibly carcinogenic effects. Processing and manufacture of cotton in confined spaces cause problems of bronchial disease due to heavy concentration of dust and fibers in the air.

3.2.6 Greener options for cotton production

There are three options for changing how cotton is grown; the first involves a shift towards integrated pest management, and the second a shift to Low External Input Sustainable Agriculture, and the third to organic production methods. Which of the options is suitable, or even feasible depends upon how intensive the production system is, the farmers income, and a host of factors outside of the farmers control (for example internal prices, and the willingness to pay a premium for green products).

Integrated Pest Management

Integrated pest management (IPM) systems aim to reduce and if possible eliminate pesticide use, but some pesticide use is not inconsistent with IPM. The emphasis however is on using a broad ecological approach to control pests, using a variety of crop management and biological control methods. IPM systems involve much lower levels of insecticide use through much more careful timing of applications, while keeping the overall cotton production system intact. For example, it is estimated that IPM methods can

reduce the number of pesticide applications from 20-40 per season to two. Critics allege that the original concept (which entailed the eventual phasing out of pesticides) has in the hands of the big agrochemical companies become 'integrated pesticide management', a way of consolidating the use of pesticides in production systems (see Dinham, 1993). IPM is widely practiced and is of considerable benefit in regions which have high pesticide inputs. An Indian cost-benefit analysis which reveals a cost reduction of 28% compared with conventional cotton growing (de Vries and Kox, 1995). Other similar examples are given by Conway and Pretty (1991), for the USA and Central America. In other words both the price and the use of fertilizers and pesticides has reached the extent that intensive production is losing out to less-intensive production and even more to other field crops. The generation of employment is an additional significant benefit of IPM. Constraints to wider adoption are cited as being the risk-averse nature of farmers, and the lack of skilled labour. IPM forms a large part of Agenda 21's vision of a transition towards more environmentally sustainable agriculture.

Low External Input Sustainable Agriculture

While IPM is an appropriate system for large scale intensive farmers, small scale traditional and non-irrigated producers who are constrained in moving towards 'organic' production (discussed below), may be able to adopt so called agro-ecological approaches, such as entailed in the broad term, Low External Input Sustainable Agriculture (LEISA). LEISA does not rule out any technologies, but rather emphasizes local priorities, and the need to learn from and build upon traditional agricultural practices. Thus modern scientific knowledge on inter-cropping, nutrient cycles, and agro-forestry may be combined with traditional knowledge of soil and water conservation, multiple-use plants and so on (de Vries and Kox, 1995).

Organic Cotton

Organic production would demand a more radical change in production and marketing systems. Organic cotton (as defined by the ICAC Recorder, 1994) is "cotton grown without synthetic inorganic fertilizers, fungicides, herbicides, insecticides, growth regulators, and defoliant and duly certified by a recognized certifying authority".

Cotton can be produced to this organic standard, but to gain such an appellation is tough, and many producers and consumers may be content with falling just short, and using a vaguer term such as green or clean, or natural (often thought to be the same as organic). Currently, organic cotton provides a tiny share of world production at around 0.5% of area cultivated. This is about 8000 ha, 75% of which are in the US, and aimed at the US market (de Vries and Kox, 1995). However, there is increasing consumer interest in organically grown cotton, as shown with the emergence of several clothing labels which use exclusively organic cotton, including Esprit, and Bo Weevil of the Netherlands. Bo Weevil has a joint venture with the Gujarat State Cooperative Cotton Federation Limited to produce organic cotton. So far, 572 bales of organic cotton have been sold at a premium price of 22% over non-organic cotton. Certification has been done by a company called SKAL (ICAC Recorder, 1994). Bo Weevil also have collaborative ventures in Turkey, Argentina, and Egypt, with much of the production sold in Germany.

There are several problems faced by cotton farmers wanting to change to organic production. These include the need to regenerate soils which have become sterile through prolonged use of chemical fertilizer and insecticide, accessing alternative seed varieties which do well under less intensive production, and learning how to manage pests through natural methods. There is little in the way of guidelines, training, research and development programmes, or technical support, available to producers wanting to make the transition to organic systems. A transitional period of three years without use of chemical inputs is needed before farmers can have their crop certified as 'organic'. This in itself can impose heavy costs from foregone production. In the EU, compensation is available to farmers in this transition period (Ciano and Boggia cited in de Vries and Kox, 1995) Evidence from the USA, however, shows that once established, profit margins per hectare for organic cotton are higher than for cotton grown by conventional methods. This is because lower yields per hectare are more than compensated for by lower expenditure on inputs. In addition, marketing systems need to be established to allow farmers access to the premium paid for organic production. Given the relatively small share taken by raw material costs in high street price, there is room for a considerable premium without this much affecting the price of the final product. Although for low price articles such as T-Shirts the additional price is more significant.

Although some studies have suggested that countries with low yields, plentiful and cheap labour, and alternative pest control strategies may be able to produce organic cotton more economically than higher yielding countries, countries like India and Turkey suffer a higher percentage drop in yield (average drop 37%) compared to US States (between a 29% drop in California, and an actual increase of 7% in Tennessee and Missouri).

The requirements for the certification of organic cotton can be summarized as follows (in addition to fulfilling the requirements of organic production):

- * The producer must be registered with a recognized certifying agency.
- * The producer must keep full records of fields in use for a period of three years prior to certification, and be independently monitored subsequently.
- * The producer will maintain a buffer zone to prevent contamination from neighbouring non-organic fields.
- * Even though it may cost more to produce organic cotton, there is no guaranteed price for organic cotton.

3.2.7 A Cotton Footprint?

Despite the many studies into cotton production and cotton markets, including the social and environmental impacts, there is little information upon which to base a footprint assessment. No-one working in the field has yet used the footprint concept to articulate or visualize impacts, to elaborate policy options, nor generally as a way of searching for new criteria to examine environmental impact and sustainable use of natural resources.

The Enquete Commission on the "Protection of Humanity and the Environment" set up by the German Bundestag (Enquete Commission, 1993) examined various options for the sustainable management of substance chains and material flows. Textiles and clothing were chosen as a potential field of application, partly because of the complexity inherent in the textiles and clothing chain, but also partly because of the public interest and involvement in clothing issues, including the pressure in Germany for the eco-labelling of textiles. The Commission noted the major constraint in not being able to obtain "up to the minute data on material flows associated with textile for clothing". One major problem for the Commission was that what is called a 'cotton shirt' is much more than just cotton for the purposes of substance chains. Other substances used during the processing of cloth, or indeed the dyes and process agents are relevant. Furthermore, the journey from cotton field to manufactured garment is very complex and spread over many countries, maybe starting in Egypt, but then ending up in low wage manufacturing countries in Asia.

The Enquete Commission commissioned detailed research from two institutions and used a public hearing in order to try to obtain up-to-date information on textile material flows. Despite this, the Commission recognised that questions relating to ecology and toxicology - the major impacts of relevance to a footprints study were outside the scope of the work.

Other studies point to the poor documentation on the specific environmental impacts of cotton. Although generalised impacts are known, for example on soil deterioration, massive water consumption (except for rainfed cultivation), contamination of water and damage to non-target crops and other species, including humans, there is little accurate quantitative data on environmental impact (Dinham, 1993. The Pesticides Trust, 1994). In Egypt for example, toxic pollutants, which include pesticides (and other chemicals linked to cotton production -for example, salts produced by over-irrigation and poor drainage) derived from cotton spraying are thought to be leading to declines in fish production in Lake Karon, Lake Manzallah, Lake Mariut and Lake Burullus (Dinham 1993). As a generalisation, highly intensive agriculture (high use of pesticides and fertilizers as is characteristic of cotton growing) is the main cause of an observed rapid degradation in water quality, and uses 70% of available fresh water (Dinham, 1993). Broader impacts on soil fertility associated with harm to soil fauna caused by organophosphates may also be important. Such impacts could broaden the cotton footprint significantly, but little quantitative data is available.

Additional environmental factors are inherently difficult to quantify. For example, population tends to increase in cotton areas. According to them, "The increased amount of land dedicated to food crop production leads to (more) reduction in fallow land and conversion of forest and other cultivated areas to agricultural use. Reduction of fallow periods and cultivating soils reduces the soil quality and stability in the longer term" (de Vries & Kox, 1995)

Diversion of water from other uses is another factor which is hard to quantify in terms of 'footprint'. It could for example be argued that the trend towards large scale perennial irrigation, involving the construction of dams, displaces (either physically or economically), traditional systems of sustainable agriculture. The resulting irrigated systems if poorly managed can lead to rapid soil degradation and loss of once fertile land (waterlogging, salinisation, inefficient use of fertilizer). But much depends upon the

availability of water in that area (de Vries and Kox, 1995). Even the simpler problem of improper irrigation practices is hard to put a figure on - unless it is a major impact such as Lake Aral. Governments are cagey about producing figures of land going out of production due to poor agricultural practices.

The effects of displacing other potential crops is also interesting in environmental terms. De Vries and Kox cite just one example: In Sao Paulo in Brazil, a defined area of land planted with coffee will take 2,000 years to erode away 15 cms of top soil, but if planted with cotton this will take only 70 years.

Even the impacts on human health have been surprisingly little studied. Although Egypt has 1.26 million workers potentially exposed to pesticides, there is no data on exposure to pesticides under field conditions (Dinham, 1993). Indirect effects on health, for example, drainage and irrigation ditches and canals for cotton providing habitats for disease vectors, such as malaria and schistosomiasis, although well known, have again not been well quantified. It can be argued that Britain bears a special responsibility in that Britain supplies between 20% and 30% of Egypt's pesticide imports, and nearly half of Sudan's pesticide imports which are mainly used for cotton (Dinham, 1993).

A simple footprint calculation:

In summary, the UK's cotton footprint is caused by:

- * The UK consumption of cotton.
- * An indirect influence through participation in international or regional agreements, affecting trade or national economic, social and environmental policies (GATT, WTO, Structural Adjustment Programmes, Lome, Multi Fibre Agreement, UN bodies).
- * A direct influence through the UK bilateral and multilateral aid programme - generally in affecting land or water use policies, and specifically in funding projects and research into cotton and integrated pest management, or funding NGO activities.
- * The impact of NGO projects.
- * The influence of trade delegations and information communicated to producers on consumer demand and preferences, which subsequently effects production practices.
- * The impact of Foreign Direct Investment and UK companies working abroad.
- * The impact of Technology Transfer - for example, Pesticide exports or IPM technologies.

Calculating the Footprint requires detailed knowledge of the following:

- * The volumes of imported cotton for different production regimes, by country of origin.
- * The yields per hectare for the different production regimes.
- * Pesticide, fertilizer, defoliant, and other inputs per unit area.
- * The Environmental impacts for each regime, including;
 - Soil degradation (loss, salinisation, over-application of fertilizer, damage to soil fauna).
 - Absorptive capacity of soil, water, and other affected ecosystems.
 - Water pollution (pesticides and other inputs).
 - Harvesting impacts (defoliants).
 - Pest resistance (if pests become resistant over time and harvest are lost as a result, that total application of pesticide has effectively been dumped into the environment).
 - Water use and alternative uses of water (massive irrigation for cotton may preclude or displace other sustainable agriculture options).
 - Toxicological data (impacts on human health and on wildlife).
 - Migration impacts (the effect of cotton production stimulating population growth in the area).
 - Climatic effects (for example effects around the Aral Sea).
 - Energy Use.
 - Harvest waste (dumped or burned).
- * Formulae for converting these environmental impacts into equivalents expressed in land area (this will be a very complex process - for example, although it may be theoretically possible, given the lack of data, it may in fact be unfeasible to design a methodologically satisfactory way of converting the soil and water absorptive capacity for pesticides into equivalents in terms of land area. Why it might be asked, should impacts best described in volumetric terms be forced into land area equivalents?).
- * Rates at which land grown under the different regimes are going out of production, and a formula which builds this time and permanent degradation factor into the calculation of 'footprint'.
- * Environmental impacts beyond production, including;
 - Transport.
 - Production of fibres and yarns.
 - Finishing (dyes, printing).
 - Clothes and product manufacture.
 - Use.
 - Disposal/ re-use.

- * A 'strategic environmental assessment' of the indirect UK policy and institutional impacts, and a conversion factor to translate these impacts into equivalent land area.

In short, what would be required to calculate the cotton footprint, would be a full life cycle analysis of cotton consumption; an assessment of indirect policy, technology transfer, and investment impacts; and a methodology for converting factors measured as mass, distance, volume, and time, (and possibly morbidity and life expectancy) into area. Also, reflecting upon the difficulty of obtaining the data required, motivation would be an important factor. The researcher would have to be thoroughly convinced of the added value to be had from a footprints analysis.

Finally, if information to be of any use in choosing between different production options, or in designing policies to encourage sustainable practice is to be produced, then the following production regimes would have to be compared:

- * A Footprint for Intensive Production (the current practise).
- * A 'Projected' Footprint for cotton produced under an Integrated Pest Management regime.
- * A 'Projected' Footprint for Low External Input Sustainable Agriculture.
- * A 'Projected' Footprint for Organic Cotton.

The last three footprints would be projected in the sense of being scenarios of 'what if all current production was converted to either IPM, LEISA, or Organic?'

It will come as no surprise to learn that even the most basic data required to perform a 'back-of-the-envelope' calculation is not readily available.

All that is possible is the crudest of calculations of the agricultural land area needed to supply the UK with its cotton and cotton products. With this calculation there is no geographic differentiation, no estimate of environmental impact (!), and no information on the relative impacts of different environmental factors.

The first problem is estimating an average annual UK consumption of cotton per person.

The Enquete Commission estimated for Germany an annual per capita textile consumption of about 20 to 23 kg. Since about half of this can probably be estimated as being made of cotton (a big assumption), and since the German standard of living is slightly higher than that of the UK, we might reasonably estimate that an average annual per capita consumption of cotton cloth is about 8kg in the UK.

Assuming a UK population of 58 million, this means a total consumption of 464,000 tonnes of cloth/cotton lint.

Since only 40% of raw cotton yield turns into cotton lint, then 464,000 tonnes of cloth/cotton lint is the equivalent of 1,160,000 tonnes of raw cotton.

Based on a high average yield of 1,300 kg/ha, 1,160,000 tonnes would require a land area of 892,308 hectares, or an area 94 km times 94 km, to supply it. Taking a lower - say Africa average yield - of 800 kg/ha, would require a corresponding land area of 1,450,000 hectares.

Thus by one estimate, what might be called the base UK cotton footprint is equivalent to about **one fifth of the UK's cropland area** (based upon the World Resources 1994-95 estimate of 6,665,000 ha.s of cropland in the UK).

This calculation is very crude and ignores all of the broader direct and indirect impacts described in the above section. Most seriously, it is unable to accommodate the social impacts, which as with the Banana Case may well be the most serious of all.

Not knowing even the magnitude of the land-area equivalent of the various environmental impacts makes it nigh impossible to judge whether conversion to less environmentally harmful regimes would effectively increase or decrease the cotton footprint. All things being equal, if cotton yield decreases, the land area needs to increase to meet demand, ie the footprint increases.

Of course because of environmental impacts, the cotton footprint is larger than the land which the cotton occupies. What area or volume of water for example is needed to dilute/absorb/degrade pesticide or salt concentrations to WHO or EC 'safe' levels? Suppose an equal water and soil area (to the area under cultivation) of a defined depth, is required to dilute, disperse, absorb and degrade the pollution arising from cotton production, then organic cotton which may have half the yield of intensive cotton (estimates vary between 25% and 50% reduction in yield for organic cotton, although some claim that the yield recovers as the soil regenerates and natural enemies of pests re-establish), but none of the pollution would still have the same footprint as intensive cotton. This is because organic production may require up to twice the productive area to yield the same amount of cotton.

But if all the environmental impacts translated into an area which was less than the area occupied by the actual cotton production, then organic cotton would have the larger footprint for a given level of output. A footprint analysis may reveal that IPM with judicious use of pesticides but maintaining a relatively high yield has the smallest footprint. Is this useful to know for policy making? Are we gaining information in a footprints analysis or losing it? These issues need to be debated.

From a producer point of view, the land area need not increase if they are compensated by a 'green price premium' or higher margins due to lower input costs, and more broadly employment opportunities.

It seems apparent that reducing all environmental impacts to a single measure - equivalent land area - while not lacking a certain pedagogic value, is slightly absurd in terms of the weighting we may choose to give to different environmental impacts. Footprints are a

striking visual representation of environmental externalities, but as an operational tool for determining and guiding different cotton producing options, even without the calculations, their use seems to be limited.

Even the most drastic and seemingly guaranteed way for consumers to reduce cotton footprints, that of not buying, may not bring the desired environmental result. Not buying could mean widespread loss of jobs and incomes; knock-on effects for farmers since cash crops like cotton enable investment in equipment, education, training for other farm and non-farm activities; loss of an opportunity to influence production processes; and loss of the beneficial technology-forcing effect which has been observed in Mali, where anti-erosion measures learned from cotton are applied to other crops. Poor farmers, made poorer by lack of income from cotton, will have no possibility to adapt and respond to positive signals and incentives for green cotton production, if and when their governments, the development agencies and consumers eventually create them. At a national level, heavily indebted cotton producers will find it even harder to service their external debts, and government services will suffer as tax income from cotton declines (de Vries and Kox, 1995). Balanced against this of course will be considerable environmental and health benefits, but taken as a whole it is clear that a transition phase will be critical.

This is not to say that there shouldn't be pressure exerted by consumers, but that it should be solutions-focused pressure, which ensures that if producers get the message that intensively produced cotton is not acceptable to rich consumers, then accompanying that message will be the promise of support from NGOs, development agencies and governments to make the transition to green cotton, and a message of a 'willingness to pay' for greener products.

3.2.8 Options for UK Citizen Action

As with the banana case, the options for citizen action in the UK to improve this state of affairs falls into two broad categories: action as a consumer to exert demand for improved cotton products, and action as a citizen shaping the supply of more sustainable cotton products.

As a consumer, the citizen has three choices:

(i) 'Deep Green' Cotton - Organic: For those UK citizen's wanting the 'greenest possible' cotton, not only is the absolute production of organic cotton limited, but the availability of certified organic cotton in the UK market is practically zero.

The market for US organic cotton is virtually all domestic. In the USA, the California certified Organic Farmers, the Texas Department of Agriculture Organic Crop Improvement Association and the TN Land Stewardship Association certify organic cotton. Arizona will soon follow with their own certification board (ICAC Recorder 1994). In Australia, domestic consumed organic cotton does not require certification, but for international markets the Australian Quarantine and Inspection Service certifies.

Egypt and Turkey produce small amounts of organic cotton, but local certification is not yet available, although for Turkey certification is through the Institute of Market Ecology in Switzerland (ICAC Recorder, 1994).

In addition to the problem of lack of local certification, cotton suffers the common labelling problem of lack of harmony in certification rules and different and confusing (for the public) names for cotton grown without fertilizers and insecticides. In addition some labels deal only with post production processes (dyes, cloth manufacture and treatment). There are currently no labelling systems which deal comprehensively with the whole range of 'greener' cotton from IPM and LEISA to organic, and all aspects of post harvest treatment.

Consumers in Germany and the Netherlands do not have such difficulty in obtaining clothes made from organic cotton. Manufacturers in Germany, such as Esprit process mainly US organic cotton for German and European consumption. In the UK, 'Esprit de Corps' has an "Ecollection" sold only in its flagship store in London's Covent Garden. 'Esprit' are intending to mainstream Ecollection clothing, and are aiming to produce all their T-shirts and sweatshirts from organic cotton by the end of 1995 (Dorothy Myers, pers. comm). In London's King's road, the "Natural Fact" shop sells some items classed as organic, and Katherine Hamnett in association with the Pesticides Trust have an "Environmental Cotton 2000" collection. All of these are at the top-end of the market where considerable cachet is attached to the wearing of ecologically friendly material. In terms of volume they are insignificant. It is hard to imagine that organically produced cotton clothes will ever occupy anything more than just the outer margins of the cotton trade. Other cotton materials and textiles (for example for bedding, furnishings, fabrics) if produced organically will be even more marginal - being that much less visible to a mass consumer audience, and cotton mixtures will be virtually invisible. If there are no mass markets, it will be unrealistic to hope that consumer choice of itself will stimulate wholesale change in growing practices. Broader action is needed.

The UK Pesticides Trust has been researching the impacts of cotton production for a number of years. They now have a 3 year programme working with a group of cotton producers in Senegal, assisting them to convert to organic production, and to link them up with European and Swiss processors. The Pesticides Trust are also looking at projects in East and Central Africa.

(ii) 'Light Green' Cotton: It was shown in the Banana Case Study that the ECO-O.K banana is not an 'organic' banana. Concessions were required to bring producers 'on-board'. IPM and LEISA cotton is moving away from environmentally and socially damaging practices, and may provide far more environmental and social benefit than a strategy aimed at only organic. In the late 1980s, nearly half of US cotton production was under IPM (Conway and Pretty, 1991). So could the UK consumer support these forms of production through purchasing choices? Currently no.

The main problem is finding a way of describing, identifying, labelling, and certifying the processes. There is little work in this area. There are no agreed standards, and no agreed criteria. A greater difficulty would be that there is not the environmentally and socially conscious market necessary to distinguish the different production methods. This is a

shame because some forms of IPM and LEISA may actually be the more sustainable option - sustainable in the sense of balancing both ecological, economic and social considerations. Organic may be the ecologically sustainable option, but it may not be feasible or practical (due to varying environmental and economic factors). Reducing pesticide use by itself (which is but one of the environmental impacts) will not result in sustainable practice, but it is an important step in the right direction. Income generation and other agricultural, social and economic objectives are important and should be part of the decision in choosing viable production processes (de Vries and Kox, 1995).

In the UK, Traidcraft sells 'ethical clothing': this is not certified 'organic' cotton, but cotton which is produced under socially just and 'environmentally sympathetic' conditions. The UK Friends of the Earth catalogue includes 'Green Cotton' which is the trademark of a Danish Company, but makes no claims to being organic, but uses no chemicals in some processes and is hand-harvested. More widely, the British Textile Technology Group are holding an 'Ecotextile' Conference in April 1995.

As was said earlier, the UK effort is very small when compared to the mainstreaming going on in Switzerland (Coop Schweiz) and Germany (Hess Natur catalogue, Otto, Steilman), activities in the Netherlands (Hennes and Mauritz), Sweden (IKEA), and in the USA where several large/medium companies are involved, such as the GAP, Patagonia, Esprit and Field Crest Cannon (Dorothy Myers, pers comm, 1995).

(iii) People Friendly Cotton: Social issues, particularly related to workers rights and workers conditions of employment, have been an issue for 'ethical' campaigners for many years. Although their concerns may cover environment to the extent of not promoting bleached products, or products which have been subjected to polluting treatment in the finishing and manufacturing stage, these ethical campaigns have not examined production practices in the field. So for example, the wholesalers, T-Shirt Connection supply unbleached cotton shirts and tops from Egypt where workers conditions are claimed to be good, but they don't go so far as to specify organic. Generally speaking, the separation between environmental campaigners and social and ethical campaigners on the issue of labelling and sustainable trade practices is very notable. The footprints analysis approach may offer some opportunity for bringing these related concerns and organisations together.

Traidcraft have a *People Friendly Clothing* campaign which aims to involve consumers in demonstrating concern over social conditions within the clothing and textiles trade, and asks retailers and manufacturers to adopt a Clean Clothes Code. According to a survey undertaken by the *Ethical Consumer* magazine, Littlewoods, C&A, Marks and Spencers, B&S and the John Lewis Partnership, all had either codes of conduct or policies covering workers rights and conditions (Ethical Consumer, 1994). Ethical Consumer raised concerns that these codes and policies were "unverifiable" by consumers. For example, Marks and Spencers are reported to be working closely with suppliers to ensure that "only minimum amounts of water, chemicals and energy are used in dyeing and finishing fabrics". In addition, Marks and Spencers will not buy cotton-harvested with defoliants, and may have other codes relating to cotton. However, Ethical Consumer reported that the exact policies and specifications are not for general publication. Other retailers have policies in respect to post-harvest processes (dyeing, bleaching and so on), but not

growing practices. Many of the top high street clothing stores questioned by Ethical Consumer failed to reply.

If even the apparent 'progressive' retailers like Marks and Spencers appear to feel that consumers have no right to know about products purchased in the store (the limp excuse of commercial confidentiality?), the possibility of cooperation and partnership between stakeholders to promote 'green' textiles is perhaps limited. Nevertheless, following the 'Ecotextile' Conference in April, a large UK company or any number of high profile retail outlets could decide to become a market leader in green cotton. Perhaps *Going for Green* could facilitate such an initiative?

If consumer opportunities to influence production processes are currently limited - due in part in the UK to limited supplies of organic cotton, and to lack of awareness both within the textile industry and amongst the public - other options are available to the UK citizen, broadly aimed at stimulating a parallel increase in supply.

The current level of awareness amongst the UK public on cotton issues is very low compared with other European countries, such as Germany or Holland. This could improve when the planned EU eco-label for T-shirts is introduced: draft proposals were issued last April, and could be finalised this June. But to initiate an ambitious campaign of awareness raising designed to increase the demand for organic or other forms of 'green' cotton would probably backfire as consumers would be disappointed by the lack of affordable and available supply:

Looking at the wider issues caused by the consumption of clothing, the UK-based Women's Environment Network recommends the following:

- * Buy less clothes
- * Demand and buy well made, quality clothes
- * Shop for clothing which uses recycled fibres
- * Ask for unbleached and green cotton
- * Mend and make your own clothes
- * Recycle clothes - pass them on to others or auction them.

Providing people with information, motivation, and a way of exerting a market influence is only part of what can be done, and in isolation can have negative effects as was described in an earlier section. An informed public is needed to create the political will, and to support the political change necessary to create the enabling environment of policies and actions, including legislation, fiscal instruments, and various departmental policies needed to support sustainable practices. This has been discussed in the context of the Banana Case.

Again two main options for political action emerge: lobbying for aid and for revisions to trade agreements to encourage the sustainable production and consumption of cotton.

(A) Lobbying for Aid to Sustainable Production of Cotton: A number of European donor agencies are already engaged in initiatives to promote the transition towards more environmentally and socially sympathetic cotton production. Their efforts mirror the

relative importance of their country's commercial sector. Multilateral development agencies, such as the World Bank, African Development Bank are involved in cotton IPM projects, which doesn't of course mean that they may not be supporting intensive production at the same time.

- *Britain:* The British ODA is supporting a number of research projects aimed at reducing pesticide applications, and replacing them with pheromones (for example, with the Department of Agriculture in Egypt), or developing other biological control techniques (for example in Pakistan and Egypt). Care UK has an cotton IPM project in Zimbabwe.

- *Germany:* The German aid agency GTZ is supporting 'greener' cotton projects in Nicaragua and Tanzania (some organic), the output of which will be bought Remail, a Swiss company.

- *The Netherlands:* The Dutch sustainable development agreement with Benin is attempting to focus on cotton. Low prices for cotton on the international market has forced Benin to intensify production in an ecologically unsustainable way. The agreement is examining the possibility of Benin switching to more ecologically friendly production in return for the Netherlands agreeing to purchase a guaranteed quantity, at a guaranteed price. In 1994, various feasibility studies were carried out into the potential market for ecologically produced cotton, and the level of 'greenness' demanded by Dutch consumers.

- *Sweden:* Swedecorp, the commercial branch of the Swedish aid agency, has conducted a survey of Swedish importers of textiles and garments in respect to 'ecological' cotton and organic cotton. The survey showed that these companies were sure demand for green cotton products would increase, but that something had to be done about the confusion of labelling schemes. Furthermore, the companies indicated that they were not so interested in the highest possible organic standard. Swedecorp then designed a programme to support the developing countries so that they do not become losers in environmentally-conscious world trade with the following components:

- * An environment seminar for trade attaches from developing countries
- * A market survey on trade, environment and industry, and issues of labelling and certification
- * Training of Swedish Importers who are members of delegations to developing countries to convey information about the demands for environmentally friendly products
- * Membership of a Committee for Trade and environment established by trade organisations
- * Implementation of a Pilot Project on Organic Farming of cotton in Uganda, to gain 'hands-on' experience of the issue. The main purpose of which is to transfer knowledge about organic farming and the certification process to a developing country.

- * Finding a Swedish buyer for the Ugandan produced organic cotton and identifying a Ugandan exporter. Two Swedish companies have shown an interest. The exporter will receive consultancy support from Swedecorp for three years, and Swedecorp will finance the costs for certification of the cotton during the first year (OECD, 1994). In other words Swedecorp assists with the establishment of certification organizations and labelling systems.

How the Swedecorp initiative would fit in the context of the current EU discussion on an eco-label for textiles is uncertain.

(B) Lobbying for Sustainable Trade Policies for Cotton: Citizens could also lobby for changes to trade regimes affecting cotton, particularly at the EU level to give incentives for more sustainable practices.

The Economics Department at the Free University of Amsterdam has been examining the possibility of designing International Commodity-Related Environmental Agreements (ICREAs). A two year research programme financed by the Dutch government, looked at three cases: cocoa, copper, and cotton.

An ICREA is an agreement between countries to regulate trade-related environmental issues with regard to a specific primary commodity (de Vries and Kox, 1995). These ICREAs may be set up to agree sustainable development standards, and raise funds for transition costs; they may be mechanisms for transferring and raising funds (eg an import duty) from consumer to producer countries (where the funds pay for sustainable development programmes and projects); or they may be standard setting linked to trade preferences for 'sustainable' goods (de Vries and Kox, 1995). All of these options have their pedigree or ancestry in the tropical timber trade debate, from the pioneering (although now shaky) International Tropical Timber Agreement, and the work of Friends of the Earth's Tropical Rainforest Campaign, to the Worldwide Fund for Nature's Forest Stewardship Council.

The multilateral nature of ICREAs overcomes the disincentive for individual producers to unilaterally raise export prices (to cover the costs of internalising environmental and social impacts), who risk losing markets to cheaper cotton. De Vries and Kox cite support for the ICREA approach in Agenda 21 and its preparatory documentation, and make a case for cotton as a global environmental issue.

De Vries and Kox usefully distinguish three different ways in which developed countries can support the lightening or reduction of their footprints in the developing world: the labelling approach, the development assistance approach and the ICREA approach:

- * Labelling makes the user-pay, is voluntary from the producer point of view, and provides financial incentives to switch from intensive production (higher prices paid for green cotton);
- * Development assistance deals with some of the budgetary, technological and 'information' based constraints of making the transition to sustainable practice;

- * An ICREA for cotton would attempt to address domestic policy in support of sustainable cotton production more systematically, and would aim to coordinate action internationally to internalize environmental costs in cotton prices.

There are a number of pros and cons to the ICREA approach, including problems of negotiation, consistency with GATT/WTO rules and the liberalization trend, the problem that a huge amount of production is consumed domestically, etc. De Vries and Kox conclude that "a full fledged cotton ICREA is at this moment still a rather futuristic image". They opt instead for a "low profile" or "mini ICREA" which would set up a fund for "low cost - large result" environmental measures in the cotton sector, and which would start to define environmental norms and standards.

In conclusion, these are just a few examples of the activities which citizens could take. Government actions are complementary - in fact a necessary complement - to consumer and corporate initiatives. *Going for Green* made it clear at their national launch that their actions would not be restricted to individual citizens, but could also include 'groups, such as business and government. The universality of cotton could make it a useful focus for *Going for Green* to build up partnerships between citizens, companies and public agencies to lighten and reduce Britain's footprint abroad.

3.3 Three UK Forests Abroad: The UK's Forest Footprint

3.3.1 Introduction

To identify the UK's ecological footprint on other countries' forests is not a simple task. The UK's impacts on forests vary from those which are relatively direct (notably the import of wood products) to those which are more indirect, such as the imports of crops that tend to be grown on deforested land, aid for infrastructure development that opens up forests to agricultural clearance and the UK's export of air pollutants which leads to forest die-back in neighbouring countries.

In summary, a set of market, policy and institutional signals are being sent out by the UK, which cause other countries to use their forests in specific ways. The impact of these signals leaves an ecological footprint. It should be noted, however, that many of the signals cannot always be attributed to the UK alone; some of them - such as debt and structural adjustment requirements for developing countries, which lead countries to liquidate some forests to generate foreign exchange - are set by a number of OECD countries.

Having identified the broad range of signals sent out by the UK and others, we will scope out the ecological footprint which is due only to the UK's import of wood products. As we will see, this amounts to an area equivalent to three times the size of the UK's forests being more-or-less continuously appropriated to produce forest products for the UK (practically all in temperate and boreal areas), plus around 67,000 hectares being deforested or severely degraded each year (mostly in the tropics). The challenge of reducing this footprint is also briefly discussed.

3.3.2 The main forest problems

Each country, and each forest within it, will experience a different set of problems, to varying degrees. Some of the problems have a global dimension as well. Broadly speaking, the most significant are:

Deforestation: By *deforestation* we mean the full-scale removal of forest, to make way for other uses. Global deforestation is currently taking place at a rate of approximately 17 million hectares each year. The net quantity of forests is also declining in growing stock terms (the volume of biomass). Deforestation occurs because wood, fuel, food and fodder are being cut at rates which are faster than forest regeneration; because remaining growing stock is often poorly managed; and because many forests are being cleared to make way for other land uses. Reforestation is not of equal quantity nor quality - that is, it does not replace all the benefits of natural forest.

Deforestation is often considered to be the worst problem. It is sometimes used as a catch-all term or metaphor for many other forest problems. In many instances, these other problems are more significant:

Environmental degradation of forest areas: Forest exploitation and clearance can create other interlinked problems; notably soil erosion, watershed destabilisation and micro-climatic change. Industrial air pollution, particularly common in some temperate forests, reduces forest health. The long-term potential of forest areas to supply environmental benefits - many of which cannot be supplied by any other land use - is reduced by these effects. Degradation may ultimately lead to deforestation especially when, according to FAO's definition of deforestation, crown cover becomes less than 10 per cent (FAO, 1992).

Loss of biodiversity: The above problems are contributing to a rapid reduction in ecosystem, species and genetic diversity, in both natural and planted forests. This lowers the world's biological potential for improving material, food and medicine production. With tropical forests being perhaps the major repository of biodiversity, forest abuse in tropical regions has caused much concern. Estimates of the loss of species vary, but some scientists contend that one per cent of all species are being lost every year, due in large part to tropical deforestation and forest degradation.

Loss of cultural assets and knowledge: The culture and knowledge of many peoples, which is not always documented, and which have evolved through long periods of nurturing the forest, are diminishing as forest area reduces, as access to forest is increasingly restricted, and as traditional rights are eroded. This leaves mankind as a whole with a smaller knowledge base for forest stewardship.

Loss of livelihood: All the above problems are affecting the livelihoods of forest-dependent peoples - particularly poorer groups in poor countries who may not have significant agricultural land, and who depend on forests for "social security". With such people - who total between 200 and 500 million worldwide - further marginalised from the forest, social and economic problems are created elsewhere, such as in cities.

Climate change: It is probable that the cumulative effect of global forest loss and environmental degradation will contribute to regional and global climate imbalances. Forests play a major role in carbon storage; with their removal, carbon dioxide in the atmosphere may lead to global warming, with many problematic side-effects.

Deforestation tends always to hit the headlines as the major forest problem. However, deforestation has historically been an integral tool in the process of development. Under what circumstances, then, is it a problem?

The development process involves an appropriation of natural capital, involving means such as deforestation, and turning this into other forms of capital, producing food, fibre, energy or infrastructure. For development to be sustainable, the capital which is handed down to future generations must be at least equivalent to the (natural) capital which was liquidated. Deforestation becomes a problem where it does *not* result in the development of capital which provides equivalent, or greater, benefits to local communities and society as a whole. For example, where deforestation is undertaken for short-term gains by an elite, or by another country (such as a colonial power) to liquidate forest resources for development elsewhere.

Much of western, temperate agriculture was born out of forest removal, in order to capitalise upon the fertility of the forest soils. Practically all of England's woodlands were deforested by 1350, when the forest cover remaining was about ten per cent. For Europe and North America as a whole, however, deforestation accelerated in the 18th and 19th centuries, in order to clear land to grow food for expanding industrial cities, and to meet fuelwood and construction timber needs. (In more recent years, rising agricultural productivity in Europe and North America has allowed much farmland to revert to forest, through secondary growth or through afforestation. From a low of five per cent in 1900, the UK's area of forest and woodland is now closer to ten per cent.)

The processes associated with deforestation have, in general, been more destructive in the tropics. Here, many of the soils under forests are far less fertile, and are erodible. In the appropriation of tropical forests, much of the benefit is in the wood - which has been used, directly or indirectly, to support the industrial development of the colonial powers, or large corporations, or newly-independent governments, that commissioned most of the deforestation. With some exceptions, the tropical forest capital has hence been transferred to capital in (foreign) industrial cities - not to the land remaining in the tropics.

Deforestation in the tropics was negligible before the 1950s; but thereafter increased rapidly, made possible by the availability of heavy machinery. Since then, greatly-rising human populations in the tropics (one of the most significant phenomena this century) have also cleared forests the hard way - by hand. The annual rate of deforestation in 52 tropical countries increased from 9.2 million hectares in 1980, to 16.8 million in 1990 (FAO, 1992).

Indeed, it is the widespread failures of tropical deforestation that have, in the last thirty years, given deforestation a "bad name". As recently as 1956, Darby had described the phase of massive deforestation in Western Europe (at its peak 1050 to 1250) as "the great heroic period of reclamation". Until very recently, the prevalent Enlightenment attitude was that deforestation and conversion to other land uses was a symbol - almost a proof - of progress, sanctioned by laws that recognised that such "improvements" were necessary in order to acquire property rights. The prevailing policy, especially in the tropics, has been to "conquer" the forests.

Given that deforestation can produce both benefits and costs, the pertinent question then is: do we know what we will be gaining and losing for each instance of deforestation; and who makes the decisions on whether and how to deforest?

It is now accepted that, to deal with this question, a national, participatory process of defining a *Permanent Forest Estate (PFE)* should take place. With the involvement of all legitimate national stakeholders, and taking into account global demands on e.g. the biodiversity conservation and carbon storage functions of national forest, the nation decides how much forest it needs, now and for the future. It decides how much should be under permanent protection categories (for biodiversity and watershed regulation); and it decides how much should be for the production of forest products. Then, taking into account the needs for land for other purposes, notably food production and settlement, it decides which forests can be - over time - converted to other uses. Deforestation of the

Conversion Forests can then be considered desirable; deforestation of the PFE can be considered undesirable.

3.3.3 *What are the direct agents of deforestation and other forest problems?*

The direct, physical agents which bring about forest problems are listed below. Very broadly speaking, they are in order of magnitude of their effects, with the most significant first:

a Slash-and-burn cultivation: Estimates of the number of people making their principal living this way vary from 200-500 million globally. It is a significant cause of deforestation in much of Africa and SE Asia, where it leads to the replacement of forest by grassland and scrub. In 1980, the FAO reckoned that 45 per cent of deforestation was due to this cause. However, it is only a problem where the frequency of forest clearing is such that no useable forest regeneration takes place. In contrast, traditional, rotational shifting cultivation leaves, on a cyclical basis, a secondary forest fallow which can produce many of the goods and services of the original forest; such shifting cultivation can be considered a legitimate, and often sustainable, form of forest management.

b Timber cutting: This is probably the most significant cause of deforestation in SE Asia, Central Africa and - until about 1990 - West Africa. With the world's largest supplier of tropical timber, Malaysia, becoming logged out in some areas, the world's timber trade is moving towards sources such as the Amazon and the Congo basin. Logging frequently damages as many trees as it removes - and sometimes up to ten times as many. Once loggers have been in, and even if they do not remove all the trees, small-scale farmers and woodfuel collectors often proceed to completely clear the forest.

c Clearance for settled agriculture: This is a significant cause of deforestation globally. In 1980, FAO estimated that 55 per cent of deforestation was due to this and all other types of conversion to other uses (c to j in this list). As noted above, some of the (planned) agricultural clearance has led to significant long-term benefits, but much of the (unplanned) clearance, on inappropriate soils, has led at best to short-term gains, and the removal of many forest benefits. Much of the problem is due to cash crops, such as the massive forest clearance in South America to grow soya beans, and in Thailand to grow tapioca, upon which the European livestock industry depends.

d Clearance for tropical tree crops: This is a significant cause of deforestation, especially in SE Asia, and in particular peninsular Malaysia and Sumatra. Here, forests have been removed for rubber, palm oil, cocoa, coffee, tea and bananas. Many of these tree crops retain a forest-type structure, which helps to keep some of the soil and water conservation benefits - but biodiversity is, of course, considerably reduced.

e Clearance for forest plantations: This cause of deforestation is highly significant in SE Asia, especially Indonesia and, until recently, in South America, especially Brazil. Until recently, many foresters thought that the removal of natural forests to make way for higher-yielding plantations was the "right" thing to do, in spite of the many social and environmental losses involved.

f Clearance for infrastructure: Roads and dams have directly resulted in large forest losses in Brazil, Russia and SE Asia. However, they tend to have a larger indirect effect, by opening up the (previously inaccessible) forest to further encroachment.

g Clearance or regular burning for grazing: Regular burning, by pastoralists, is significant in drier parts of Africa, where it maintains a savannah landscape instead of forest/woodland. Much more significant, until recently, were the government-sponsored schemes to encourage the removal of forest to create large ranches in Brazil and Central America - in the latter case, it has probably caused two-third of all deforestation.

h Clearance for woodfuel: This is rarely a problem until the forest is already badly degraded; except in the driest areas of Africa, the Himalayas and the Andes, where it has led to the removal of woodland often for many kilometres around settlements.

i Clearance for settlement: The worst examples of this have been in the organised transmigration schemes operated, until recently, in Indonesia and Brazil - where people from overcrowded areas were settled by governments in the "empty" forests, often denuding the forests with inappropriate cultivation. In effect, governments were treating forests as a safety valve or reserve. In some crowded landscapes, such as densely-populated tropical islands, forests are removed for urban growth.

j Clearance for mining and oil exploitation: In certain isolated areas, such as the gold mines of Brazil and the oil fields of Ecuador, forests are cleared; but the more significant effect on forests tends to be the accumulation of spills and chemicals in watercourses and soils.

Usually, several of these agents work together in a chain: A common example, observed all over the world, is the development of roads - which leads to timber exploitation - which opens the way for unplanned agricultural settlement and fuelwood salvaging - which leaves eroded soils and tattered forest fragments which may then be appropriated by elites for speculative purposes. In Thailand and Brazil, for example, this chain has been cynically set in motion by influential people, exploiting poorer groups effectively as land clearance machines. FAO notes that about half of all logged tropical forests will go on to be cleared by small farmers (in Miller and Tangle, 1991).

The chain of forest problems is not entirely of human doing - it can often interact with *natural factors*. For example, deforestation can result in drier local climatic patterns, which can further hasten the die-back of vegetation and increase the incidence of fire. Deforestation of mangrove can increase the vulnerability of other coastal forests to damage by storm surges. Selective logging can make some forests highly vulnerable to high winds, with the result that winds can more easily pull down remaining trees.

3.3.4 What are the root causes behind deforestation and other forest problems?

"Deforestation is not just an event that sets in motion a chain of devastating ecological consequences; it is also a social process, reflecting a continuum of human responses to diverse and changing economic and political conditions -

responses that range from desperate hunger to outright greed" (Browder in Leonard 1989).

The direct agents of deforestation and forest degradation act in response to a range of policy, market and institutional signals. Very many of these arise outside the forestry and forest industry sectors.

Market, policy and institutional failures tend to either "push" stakeholders into the forest, through marginalising them in places outside the forest; or to "pull" stakeholders into the forest, through attracting them into the forest by excess profits. Many of them concern agriculture and industrial development, or are a result of basic macro-economic policies, and some are due to fundamental inequities. The effect of these failures can be worsened by certain demographic, physical and technological conditions. This subject is an enormous one, of which only some basic points are laid out below. Naturally, not all of the causes cited apply in any one country or circumstance:

Market and policy failures within and outside the forestry sector have a number of effects:

- *they undervalue forests* e.g. low stumpage fees for timber;
- *they overvalue the benefits of removing forests* e.g. subsidised agricultural prices;
- *they do not reflect the social and environmental externalities* of forest management or removal e.g. by not requiring that the operator covers such costs;
- *they make investments in sustainable forest management unprofitable or risky* e.g. high interest rates and lack of long-term financial stability;
- *they count against primary production*: Producers of raw materials, like wood, have seen their long-run terms of trade deteriorate in comparison to manufactured goods. Primary producers tend to receive a small portion of the final product price, typically 10%.

The ways in which the various policies act on forests are outlined in Box 1.

Institutional failures are strongly related to policy failures. They can be grouped in the following way:

- *Poor information and monitoring* of forest stocks and flows, and of changes affecting forests. Forest managers often have poor information on forest potential and behaviour, making it difficult for practices to be both productive and sustainable;
- *Differing priorities between stakeholders*, together with a lack of participation and mechanisms by which consensus can be reached;

Box 1

Economic policies and deforestation

Repetto (1990) describes a useful way of visualising the impacts of economic policies on tropical deforestation. This consists of a series of concentric circles:

Policies that directly affect timber and forest management are at the hub. They include policies for e.g. forest revenue structures, forest tenure institutions, reforestation incentives and the administration of timber concessions

Policies directly influencing the demand for forest products are in the circle immediately around the hub. They include policies for promoting wood-using industries, and energy pricing with respect to fuelwood substitutes.

Policies directly affecting the conversion of forest land, particularly the extension of agriculture, are in the next circle. The policies include: agricultural credit, tax and pricing incentives for frontier agriculture, and public investments that encourage frontier expansion, such as road building, agricultural research and extension

Macroeconomic policies with indirect effects on deforestation are in the outer circle. This includes exchange rate policies affecting forest exports/imports, policies affecting capital markets that will affect investors' time horizons, demographic policies, and policies on labour absorption and rural-urban migration.

Note that the policies in the outer circles are not necessarily "weaker" in their effect.

Source: Repetto R. Macroeconomic policies and deforestation. Paper prepared for UNU/WIDER Project The Environment and Emerging Development Issues, 1990

- *Uncoordinated decision-making*, which so often leads to conflicts between government policies and other inadequate responses;
- *Unclear or outdated institutional roles*, both within the forestry sector, and between the forestry sector and other sectors, resulting in inefficient, incomplete, duplicative or conflicting work;
- *Mis-directed international assistance* for poor countries;
- *Government control mechanisms* which are inappropriate, weak or ineffective;
- *Lack of political will*, as influential stakeholders tend to be unwilling to reach compromises between their demands on forests and those of others.

Weak and/or inappropriate tenure, and conflicts between land use policies and local rights, often lead to forest problems concerning weaker groups. Notable causes are:

- *Tenure systems which require deforestation* in order to obtain title; and which encourage speculation;
- *Poor recognition of access and user rights* for the landless, people with traditional claims to forests and/or weaker social groups who may depend upon forest resources;
- *Forest tenure systems with weak security* (especially in relation to agricultural tenure), discouraging settled, long-term forest activities;
- *Governments enforcing extreme forms of tenure*, such as nationalisation or total privatisation; and not recognising traditional, mixed and overlapping tenure; and
- *Poor national records and demarcation of forest tenure*, constraining initiatives which depend upon forest manager compliance.

Inequity between and within nations, in access to the benefits of forests, and to the resources required for their management and use, sets in motion a set of forces which conspire to liquidate forests. Between nations, this inequity is manifest in the considerable *commercial and official debt* owed by many developing nations to industrialized countries. This debt is strongly emphasised by some groups, such as Friends of the Earth, as a leading cause of tropical deforestation that is potentially removable by countries such as the UK. Structural adjustment, too, causes many governments to liquidate forests to generate foreign exchange - in the mid-1980s, the World Bank requested Ghana to lift the log export ban on certain species in order to generate revenue.

In addition, other - more direct - causes can exacerbate the above-mentioned failures of markets, policy, institutions and tenure, and inequity:

Increasing population: Growing and migrating populations require land for settlement and food production; often forests appear to be the most freely available land.

Increasing demands for forest products: Greater wealth and larger populations require increased levels of harvesting from ever-smaller forest areas.

Fragmentation of the forest: Clearance and small-scale reforestation increases the physical challenge of protecting patchy forests and controlling their use; and disproportionately reduces their biodiversity and watershed capabilities.

Increasing extent of infrastructure: Roads and railways increase the possibilities for uncontrolled access to previously inaccessible forests.

Inappropriate technology and skills applied to forest management: Simple, mechanised approaches with high potential environmental and social impacts are dominant; and the use of traditional multiple-use management is dying out. There are two basic approaches to harvesting wood products: one is clear-felling; and the other is a selective approach, which does not remove the whole forest structure. Foresters often disagree about which provides the best approach under given circumstances.

In conclusion, although each stakeholder group within a country tends to emphasise only one or two problems (the environment, or land rights, or poverty, etc), many of the problems are linked. Forest problems are the result of a syndrome, of many causes; and action on only one front will rarely solve them. Concerted action, by stakeholders together, is required.

3.3.5 What sorts of forest are most vulnerable to forest problems?

The impact of any forest problem depends upon the forest type and the values lost. Using the analogy of the footprint, the impact of the footprint depends to some extent on the type of ground - whether it is hard and resilient, or soft and vulnerable; whether there is a diversity of values to be lost, or a narrower range of values.

Forests cover a spectrum from the principally natural to the wholly artificial. Key types within this continuum are:

- 1 natural, principally undisturbed forest
- 2 natural forest that is being manipulated for forest production - some species being encouraged and others weeded out
- 3 secondary forest - natural forest that is regenerating after heavy disturbance (e.g. after logging, or as fallow in a shifting cultivation system)
- 4 agroforestry systems that combine natural forest and plantation
- 5 mixed species plantations
- 6 single species plantations

Each of these forest types will produce certain values, illustrated in Box 2. Naturally, the exact range of forest values will depend upon the specific forest, its geographical location, and the place of forestry with respect to other land uses. Furthermore, the value of the forest locally will be different to its value nationally and globally, since different attributes are sought at different levels.

Generally speaking, the more "natural" the forest, the more irreplaceable are some of its values, such as biodiversity, landscape and recreational benefits. The ecological footprint on such forests tends to be more severe than, for example, with plantations.

3.3.6 How can we measure the ecological footprint of one country's impact on another's forests?

From the above discussion, it should be clear that the ecological footprint of one country's activities on another is a result of:

Box 2

**Total economic value of tropical forests
and their development options**

The following table indicates the many use and non-use values that may make up the total economic value of a given forest.

USE VALUES		NON-USE VALUES	
Direct Value	Indirect Value	Option Value	Existence Value
Timber products	Nutrient cycling	Future direct and indirect values	Biodiversity
Non-timber products	Watershed protection		Cultural heritage
Medicine	Air pollution control		
Plant genetics	Microclimate control		
Education	Carbon storage		
Human living space			

Source: Pearce DW An economic approach to saving the tropical forests, LEEC Paper 90-05, London Environmental Economics Centre, HED, 1990

- a number of direct causes, such as forest use and clearance, some of which act to trigger off others in chains, and few of which are under the direct control of one country
- a number of indirect policy, market and institutional signals, few of which are the product of one country alone
- the general inequalities of the power structure, only part of which is due to one country
- the precise type of forest affected, and its resilience in the face of the uses to which it is subjected
- the values of that forest, which are different locally, nationally and globally

It is therefore difficult to postulate the precise magnitude of these effects, and to separate out the impact of one country e.g. the UK, in creating these effects.

There are other practical issues which also limit the extent to which the ecological footprint can be measured. It is principally a matter of the *records not being kept*:

We have not been aware of our ecological footprint in the past. To take the analogy further, we have not been looking where we are treading.

Overall national *deforestation records* have traditionally been created in different ways, but this is improving. Records of deforestation in any given country are usually patchy at best, and are not kept to uniform standards. FAO has tremendous problems in its decennial assessment of forest stocks - sometimes "deforestation" apparent in governmental statistics is because of a change in legal categories, not reflecting what's actually on the ground. The actual direct agent of deforestation is rarely recorded - it was US satellites recording burning in the Amazon which drew the world's attention to the causes of deforestation, not the Brazilian government. And this brings us to another reason why deforestation records are not kept or are false - it is often in policy-makers interests not to admit to what is happening, or to throw the blame on weaker parties - the shifting cultivator is often the scapegoat. FAO's assessment of the area of forest existing in 1990, and the extent of deforestation since 1980, relied heavily on satellite imagery of the world's forests, to provide some uniformity to measures; yet, still, records of the reason for deforestation are not kept.

Forest degradation, in contrast, implies significant alteration of forests, but not the entire removal of forest canopy. This is much more difficult to assess. The satellite technology which enables us to keep track of forest removal cannot tell us much about changes in biodiversity, or in the social and environmental functions of remaining forests. Few records of forest degradation are kept, except in some developed countries - and even there, causes of the deforestation are often not discussed (usually due to the political influence of the cause of degradation, such as industrial pollution).

Even basic records of the areal extent of different *forest activities* are not usually kept. Where they are kept, it is not easy to ascertain e.g. "where are the forests which are producing forest products for export to the UK"; and even more rarely do we know the condition and management status of those forests, and whether they were from the PFE or from properly-defined conversion forests. It is precisely for this reason that certification and labelling initiatives have come about. Even less often do we know "where are the forests which were deforested last year for tapioca production". Journalism is frequently a major source of such information.

With such records incomplete, it is hardly surprising that information on the UK's influence behind deforestation and other forest problems is lacking.

In these circumstances of little information, there are three basic approaches available to us if we wish to look at the UK's "deforestation" footprint.

Footprint 1: The UK's share of total, global forest problems: This does not worry about the detail: it adds up the total set of forest problems globally (1 to 6) and imputes the UK's share in causing these problems, according to the proportion of global timber imports, plantation crop imports, debt, and other direct agents and contributing causes

which are due to the UK. It gives a global total, but no geographic information. A disadvantage is that, since we do not know the relative weights and interactions of the different causes, we cannot use this as a model to assess e.g. the improvements which may be realised through debt relief.

Footprint 2: The UK's forest footprint due to a single, discrete use of the forest or causes of forest clearance:

In this approach, we would examine only one of the forest uses or causes of clearance e.g. palm oil imports that result from deforestation; or forest clearance from UK aid-sponsored road construction. This would provide geographically-specific information of reasonable accuracy, if the information was available.

Footprint 3: The UK's wood products import footprint: This is a more generalised variant of the above. It would aim to piece together a picture covering the weight of the UK footprint in a broad area which none the less is amenable to direct influence - the import of all wood products into the UK. This is an area with a reasonable level of information, at least in terms of which country the imports are coming from, if not which forests and the status and consequences of their management. It does, however, require some basic assumptions about the ways in which wood products are produced in each country (deforestation or forest management?). The advantage of this approach is that it will put the UK's forestry and wood products industries into perspective with the rest of the world, illustrating how far they are dependent upon outside production.

This approach was taken in *The Netherlands and the World Ecology*, which mapped out total timber imports from different countries, and assessed the number of hectares of foreign forest upon which the Netherlands depends. Unfortunately, the methodology for doing this was not described (IUCN, 1994). This is the approach which we take in section below.

3.3.7 The ecological footprint of the UK's wood products imports

Annex 1 shows how the ecological footprint of the UK's wood products imports was calculated. This involved following steps and assumptions:

- 1 Obtaining the volumes of different wood products imported (in 1992) for each of the main categories, by country of origin
- 2 Multiplying each volume by a conversion factor, to obtain a volume in roundwood equivalent for each type of product
- 3 Estimating the proportions of production from each country that are obtained (a) from deforestation i.e. from forest removal, with no planned regeneration of forest; and (b) from forest that is used more-or-less on a continuous basis i.e. (managed) forest that will regenerate. For (a), growing stock and average logging intensity figures were used; and, for (b), the net annual increments for that country on a national-average basis were used.

- 4 Using factors from 2 and 3 above, and the volumes from 1 above, estimating the forest areas (a) deforested or (b) under continuous use for providing the UK with products

The result of the above calculation suggests that **at least 6.4 million hectares throughout the world are more-or-less permanently taken up in providing wood products for the UK.** In addition, 67,000 hectares are deforested each year (or are so severely degraded that they will become deforested) in order to provide wood products for the UK.¹

Seventy-five per cent of the estimated deforestation takes place in developing countries (much of the tropical hardwood that the UK imports, for example - mahogany, iroko and meranti - is logged through highly destructive methods). However, only one per cent of the forests continuously given over to UK production are in developing countries - and a large proportion of these are plantations.²

The area concerned is three times the UK's own area of productive forest and woodland. In other words, only one quarter of the forests upon which the UK appears to depend for wood products are actually in the UK. Currently, the UK produces about seven million m³ of wood each year - only 15 per cent of total consumption. Domestic production is expected to rise to a peak of 15-20 million m³ in 2025 with increasing volumes of UK timber available.

The UK's *per caput* consumption of timber is 66% higher than the permissible global average, based on sustainable yield criteria.³

The above footprint is created through the import of wood products. However, the footprint would be larger if other imports - and exports such as greenhouse gases and air pollution - were to be included.

¹ The actual figures are likely to be higher, since we have used conservative estimates of conversion percentages, and since some imports made of wood, such as completed furniture and joinery, are not included.

² This compares with a figure of 5.6 million hectares of forest permanently producing for the Netherlands, and an annual deforestation through logging of 51,000 hectares. (These figures, from *The Netherlands and the World Ecology*, are very much of the same order as those we have calculated for the UK, but how they were calculated is not described.) The Netherlands figures are higher on a *per caput* basis than those we have calculated for the UK; indeed, the Netherlands is the world's largest *per caput* importer of wood products.

³ The UK's population of 58 million consumes approximately 46 million m³ of wood per year - that is 0.8 m³ per person. If the global total woodland area suitable for production is 2.1 billion ha, of which 0.7 billion ha is primary forest that should be protected for conservation reasons, then 1.4 billion ha is available globally for timber production. With an average sustainable yield of 2 m³/ha/ann, 2.8 billion m³ will be available every year, for a population of 5.8 billion. On a global level, this indicates a *per caput* timber availability, on a sustainable yield basis, of 0.48 m³. The UK's *per caput* consumption is 66% higher than this.

For example, if one were to include a forest area required to provide the UK with other goods and services in addition to wood products - carbon sequestration to make up for the UK's own burning of fossil fuels, carbon storage, essential biodiversity security, etc - then it would be clear that the UK depends upon a foreign forest area even greater than three times its own forest area. The UK is responsible for 2.37% of global greenhouse gas emissions - the eighth highest in the world (WRI, 1994). The notion of global payments to other countries, in order to cover the costs of their conserving forests for the UK's benefit, would be a logical one.

If one were to include the forests degraded by the UK's air pollution, then an even larger footprint would result. For example, 20% of Norway's forests are suffering pollution-related die-back, and many of the pollutants originate in the UK (WRI, 1994).

Note that we have not attempted to produce a "social" footprint - numbers of people affected, as well as numbers of hectares. This is likely to be particularly significant in tropical countries; many of the effects would be to do with social dislocation - people marginalised from land given over to forest production.

Some further facts on the UK's ecological footprint point to the severity of the "tropical" part of the footprint:

- Two-thirds of the UK's hardwood consumption is from tropical sources (House of Lords, 1990)
- Only 10.5% of the revenues generated by tropical sawn timber production accrue to producer countries, and only 28% of that is realised by the government - it is private enterprises and governments in importing countries which gain the greatest benefits (FoE, 1992, quoting a 1991 Oxford Forestry Institute study)
- 52% of Brazil's internationally-decried mahogany production ends up in the UK (FoE, 1992)
- Britain accounts for 8% of global trade in tropical hardwoods (Dudley, 1991)
- Yet, for no one tropical country does the UK provide a majority buyer - other countries are more significant
- If the "historical" footprint was drawn up, the UK would be found to have a very large footprint covering West Africa, South and South East Asia and the Caribbean - from timber imports and the conversion of forest land to agricultural plantations

3.3.8 The UK's ecological footprint if wood products were produced through sustainable forest management

Since we calculated the area permanently producing for the UK on the basis of average net annual increment on a national basis, the area would not be much different if we were

to postulate a supply to the UK, at the same volumes, but on a *sustainable yield* basis. The area might be 15 % more than at present.

However, sustainable timber yield only considers timber volume. *Sustainable forest management*, in addition to timber yield, also sustains the supplies of other goods and services, such as environmental services, and does so in a way which is - under local conditions - socially desirable, environmentally acceptable and economically viable. If many other environmental and social factors were taken into account, so that the UK was to be supplied through sustainable forest management, the area of the UK's footprint might be different again.

How do we calculate that footprint i.e. the lightest possible footprint given current consumption patterns? The difficulty here is in assessing which alternative means of production would be more sustainable in given countries - intensive plantations or extensive natural forest management are the basic choices. In some areas, the most sustainable approach locally would be to concentrate production on timber plantations, which would require a much *smaller* area for a given production. For production from many types of natural forest, in contrast, the area required would be *larger*, but the impact of that footprint would be much lighter, as the level of disturbance due to logging would be much slighter.

In other words, there is no single, universally-applicable solution for decreasing the UK's ecological footprint. Sustainable approaches have to be locally defined; in some instances, this will mean intensification, and in others a more extensive system.

3.3.9 *Minimizing or Lightening the UK's ecological footprint*

The general range of options available to the UK to decrease the footprint due to wood product imports would include:

- *Discontinuing any import from sources that involve deforestation*, since this invariably leads to a chain of negative social and environmental impacts (although certain imports from legitimate conversion forest should be allowable as exceptions). Bans and boycotts are not recommended, however, as they tend to remove economic incentives for forest stewardship, and as they transfer the problem to other forests.
- *Moving to supply sources in areas of ecological surplus* e.g. the high-yielding plantations of e.g. Brazil, Chile, and New Zealand grown on (previously degraded) land with non-contentious status; and resilient natural forests whose use is not subject to too many other demands. Such forests can withstand the footprint. They

have a comparative advantage in sustainable development; however, the social and environmental impacts associated with their use should be acceptable ⁴

[The proposal *Towards Sustainable Europe* (FoE Europe, 1995) does not allow for any systematic and permanent exploitation of forests outside Europe. In other words, the search for the ecological surplus must be confined to Europe alone; no logging of any primary forests is allowed, and 10% of forests must be allocated to nature conservation.]

- *Certification systems* that ensure that forests producing goods for the UK are sustainably managed. Much attention is now being given to certification, although the rationale for them has not been clearly analysed; this is the subject of another paper under the current study

[The UK's *Sustainable Forestry Programme* emphasizes this approach, in addition to general international collaboration.]

- *Timber tracing systems* to ensure that products from certified forests can be identified as such. These are now in development, but certain UK companies have managed to develop their own *ad hoc* arrangements - B&Q, the DIY retailer, has sourced 99% of its timber to a named forest or mill.

- *Reducing consumption*, through educational and advisory approaches that show how to produce the same benefits from less timber (these would include e.g. building design guidelines); and through regulations and incentives that encourage alternative approaches where these produce higher net benefits (e.g. recycling).

[The proposal *Towards Sustainable Europe* (FoE Europe, 1995) emphasizes this, with a total allowance ("environmental space") of 0.56 m³ per person per year for Europe - a reduction of 15% on current levels.]

⁴ Natural forests and plantations are not substitutes. Natural forests are increasingly being required for their unique benefits of biodiversity and recreation, and for other benefits that they provide more cost-effectively than plantations, notably climate and watershed regulation. Increasingly in the future, natural forests will tend to be in demand for non-timber uses within sustainable national land use patterns. The UK, through its trade and aid links, should support this trend; any demands for timber from natural forests should concentrate only on those forests which are able to sustain timber yields at the same time as other benefits.

The UK's demands for timber, especially for pulp and industrial timber, should tend to encourage plantations, where more can be produced in a smaller area. However, plantations can have significant, negative social and environmental impacts. In the tropics in particular, plantation establishment has frequently pushed poorer people off land upon which they depended, and/or has taken place through the removal of natural forests. Great care should be taken in providing incentives for plantation establishment. Good guidelines are now available (such as those produced by Shell and WWF-UK). British groups, such as CDC, are now much more aware of the need to fit plantations into sustainable land use patterns.

- *Encouraging exporting countries to make the necessary policy changes* required for the transition to sustainable forest management. Such encouragement should be through the aid programme and through international fora and agreements. The kinds of national policy change which are required generally include:

- a improving stakeholder involvement in decisions and management;
- b reforming policy and legislation towards the goal of sustainability;
- c creating incentives for sustainable forest management;
- d assuring appropriate tenure and rights;
- e agreeing stakeholder roles and improving their skills;
- f establishing a national permanent forest estate;
- g improving the capacity of government forestry departments and professional foresters;
- h improving information, monitoring, valuation and research on forests;
- i coordinating international forest initiatives at the national level; and
- j improving the financial environment for forestry

- *Removing some of the market, policy and institutional problems in the UK that lead, directly or indirectly, to forest abuse.* Possible responses include: debt relief; and ensuring better procedures for planning aid in tropical forest countries so that negative impacts on forests are reduced

- *Supporting international efforts to control the trade in unsustainably-produced wood;* primarily this means supporting CITES' work to control the trade in endangered wood species; supporting IFTO's work to encourage trade in tropical timber only from sustainably-managed forests by the year 2000; and furthering the adoption of the UN Forest Principles, in practice, by all governments, including supporting the work of the UN Commission on Sustainable Development

[The UK's *Sustainable Forestry Programme* emphasizes this approach]

- *Improving the aid process:* the UK's aid sends out both direct and indirect signals concerning forest use. Aid ought to help tackle the root causes of deforestation - therefore a far larger proportion should go to help the poor groups who are obliged to practice slash-and-burn, which is perhaps the largest single cause of deforestation. [Note that aid is probably more important in dealing with the forest footprint beyond the wood products footprint]

3.4 Prawns: an unsustainable luxury?

'Farms can now turn out 5,000 million prawn a year which...is enough for one cocktail per person per year. Soon it will be two...then three. Then it will be farmed raised prawn for breakfast, lunch and dinner'

Fish Farming International, 1992

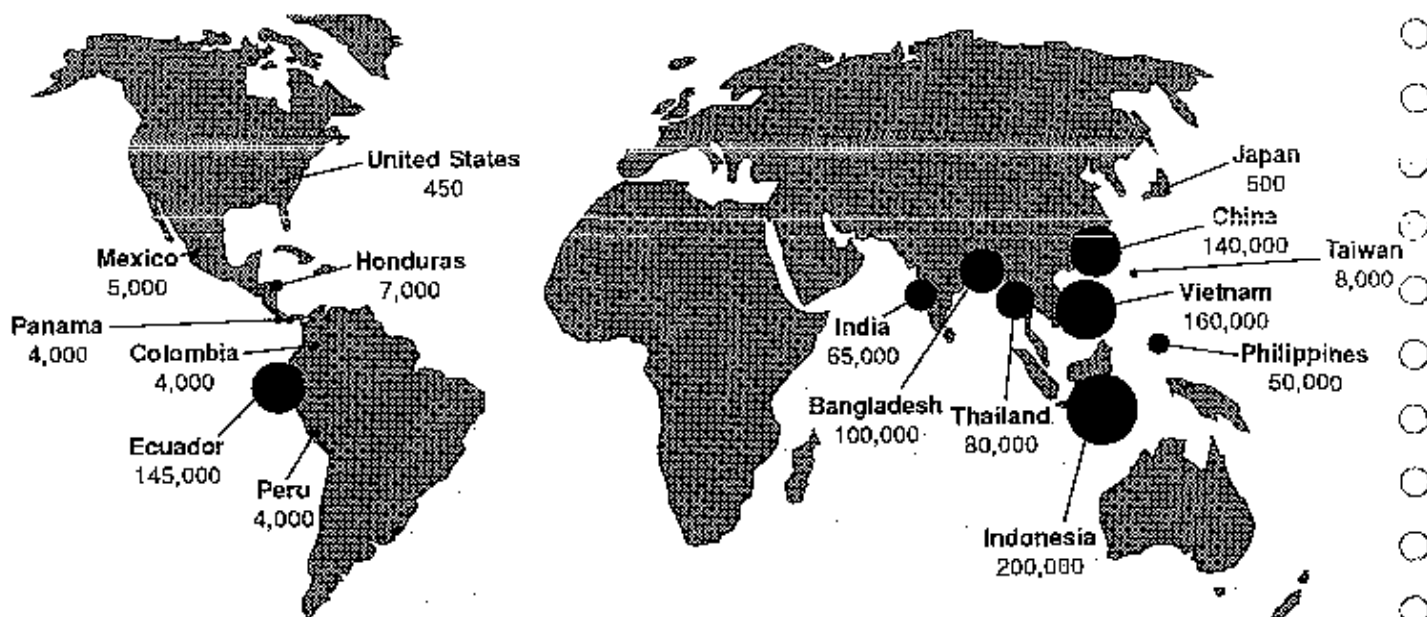
3.4.1 Introduction

Prawn farming was the gold rush of the 1980s. In just ten years the production of farmed prawn rose a phenomenal 600 %, from 90,000 tonnes to 635,000 tonnes (Infofish, 1990). However, this bonanza was not used to feed the poor or hungry. Although prawn were traditionally an important part of the diet for many coastal communities in Southern countries, these new farmed prawn were destined for the restaurant tables of the wealthy nations. In 1980, farmed prawn accounted for only 6 per cent of the world's prawn production. By 1993, farmed prawns had risen to 30 per cent of the market; 80 per cent of this is for international markets (Briggs, 1994).

Prawn farming is now the world's fastest growing aquaculture industry (Phillips et al 1992). The main producers are from China, Indonesia, Philippines, Thailand, Ecuador, India and Bangladesh (Map 3.1). The black tiger prawn *Penaeus monodon* is the largest and most commercially important of the penaeid species, and it dominates Asian aquaculture production. Currently, the main markets for farmed prawn are Japan and the USA. Europe is seen as the market with the greatest potential for future growth, and therefore vital to sustaining the prawn industry into the twenty first century (Infofish 1991). There are wide differences in consumption patterns within Europe. Mediterranean countries such as Spain and Italy prefer large, warm water prawns, many of which are now being farmed. Northern Europe, including the United Kingdom, prefer however, the smaller cold water prawn which are caught at sea by countries such as Greenland, Iceland and Norway. These are often processed by the exporters and arrive headless and frozen for consumers (Globe Fish, 1992). In 1993, the UK market for frozen prawns from India, Bangladesh, Pakistan, China and Thailand alone was worth over £47 million (H.M. Customs, 1993) (Map 3.2). In the UK, restaurants buy over 60 per cent of these prawns. However, market research suggests that this is set to change: one forecast suggests farmed raised prawn could increase in popularity as prices continue to fall and supply increases over the next few years (Globe Fish, 1992).

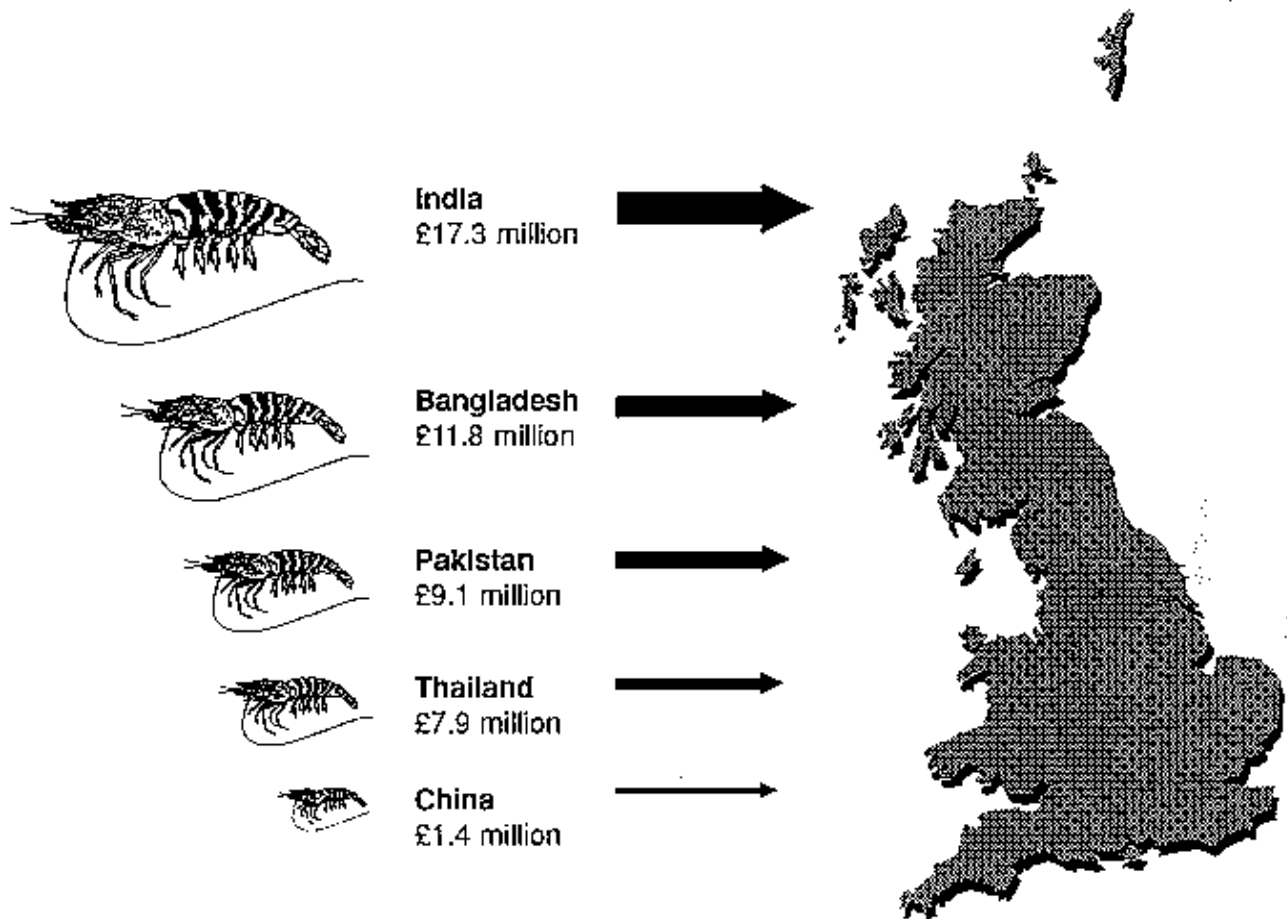
Prawn farming was one of a number of non-traditional cash crops that Southern countries developed during the 1980s and early 1990s. These crops included flowers, exotic fruits and horticultural products such as green beans. They were often of high value and seen as a relatively easy way to boost export earnings and reduce dependence on traditional cash crops subject to wide fluctuations in world prices (Thrupp, 1994). For example, the prawn farming industry is now worth in excess of \$US 6 billion world-wide. However, while such policies increased foreign revenue, they were not always beneficial to the environment and local communities. The rapid expansion of the prawn industry has particularly left a legacy of environmental and social problems that continue today.

Area Under Prawn Production Worldwide



Area under production in other countries: 20,800 hectares
 Total area under prawn production worldwide: 993,750 hectares

UK Imports of Frozen Prawns from Five Major Asian Producer Countries



Total UK Imports of prawns from major Asian producers are worth over £74 million

Based on figures compiled from HM Customs & Excise Data

3.4.2 The Prawn Production System

The farming of prawn often takes place along coastal areas in tropical climates. Prawn post-larvae or 'fry' as they are known, are collected from mangrove nursery areas where they live, and are transferred to man-made ponds where they grow into adult prawn. The most common species that is grown today is the *Penaeus monodon* - or Black Tiger Prawn as it is more commonly known.

There are three main commercial techniques used for the large scale production of tropical prawn: intensive, extensive and semi-intensive. Generally the more the intensive the system, the more "the farms get smaller, the technology more sophisticated, capital costs go up and production per unit of space increases dramatically" (Anon, 1991a). Where land is relatively cheap, extensive systems tend to predominated (Macintosh and Phillips, 1992), such as in China and Bangladesh. Where coastal land is limited and high prices prevail, semi-intensive and intensive cultivation techniques predominate as in Thailand and Taiwan (Liao, 1990, 1992).

As the system becomes more intensive, different feeding techniques are used. In the extensive system the prawn are generally fed by natural food produced in the ponds, while intensive production relies almost entirely on artificial inputs such as food pellets. Semi-intensive production lies half way between the two systems, both in terms of size and inputs: unfortunately, UK import statistics do not distinguish how the prawns were produced.

3.4.3 Thailand: Intensive Production

"We don't mind that prawn farms exist, but they should not affect the livelihood of the rice farmers...What we want is just to get our fresh water supplies back."

Thai Rice Farmer, (Traisawasdichai 1991)

Thailand is the top intensive prawn producer in the world and primarily cultivates *Penaeus monodon*. In less than seven year the country went from providing under 1 percent of the world's supply of this species to nearly 50 percent by 1993 (Briggs, 1994). The UK market in unprocessed prawns is worth nearly £8 million a year. Such growth has demanded the large scale clearing of land and a high level of artificial inputs to sustain the system. This has come at a high environmental cost in terms of the destruction of mangrove forests for ponds, the creation of high levels of pollution, and the excessive use of scarce resources such as clean water, for flushing out waste from the ponds. This private appropriation of common resources has meant that others in the community have suffered: rice farmers have found themselves having to water their plants with salty rather than fresh water.

These side-effects have not only damaged the livelihoods of local communities, but has also undermined the sustainability of the industry itself. Prawn farming in Thailand has followed

a classic boom and bust cycle experienced by many cash crops. As one Thai government official described the aquaculture experience: "it was like a gold rush boom, some got rich, some got ruined" (Stanley, 1993). In the area north of the Gulf of Thailand, production crashes occurred after just two growout seasons (Briggs 1994). The region fell from producing 70 percent of the country's *Penaeus monodon* exports, to only 20 percent. This was largely blamed on "the over exploitation of coastal areas, industrial pollution, improper site selection (particularly with regard to water supply and discharge), mismanagement and self-pollution combined with a 'get-rich-quick' mentality that over-stressed the ecology of the intensive prawn ponds" (Briggs 1994).

Part of this "get rich quick mentality" was forced on the owners due to spiraling land charges, as well as the collapse of the international price for prawn because of over-supply. Although many companies did go bankrupt, those who survived were keen to continue their search for higher profits by moving to new areas such as in the South East of Thailand. In many ways this was a modern day form of 'slash and burn' agriculture, but without the ecological benefits. Instead, the industry left behind an 'ecological desert' in central Thailand. However, the prawn entrepreneurs had not learnt their lesson. A study by the UK Overseas Development Administration found that productivity in the South-East had fallen by 24% in only three years, and that 75 % of farms were experiencing disease (Briggs, 1994).

The entrepreneurs are once again looking to move to new unpolluted lands and water as productivity again decreases. They have set their sights on the mangrove lined shores of the South-West of Thailand. The mangroves continue to be threatened, as does a traditional, indigenous lifestyle that has been in existence for generations and been based around this natural resource (Briggs, 1994).

3.4.4 Bangladesh: Extensive Production

"I dropped to my knees and broke down in tears. I could not believe they could do this to me. I cried to Allah, seeking punishment for the men who had flooded my rice field and made me a beggar overnight."

Bangladeshi Rice Farmer (quoted in Ahmed, 1994)

During the 1980s, there was a rapid expansion in the export of frozen foods from Bangladesh. Over 80 per cent of these frozen foods are made up of prawn, a quarter of which come from coastal aquaculture. Prawn cultivation in Bangladesh has increased dramatically during the last decade: production rose from 1,000 tonnes in 1980 to 18-25,000 tonnes in 1992. The UK is one of the most important markets (Briggs, 1994). During the 1980s, prawn cultivation was rotated with either wet season rice production, or dry season salt production. However, increasingly this system has been superseded by the monoculture of prawn, and the industry has displaced traditional agriculture and salt production systems over large areas of the coastal belt.

Unlike Thailand, Bangladesh relies on a low technology, low input extensive system. Ponds can be up to 100 hectares in size, compared to only a few hectares for intensive farming.

Stocking densities for the prawn fry are also very low, between 3,000 and 20,000 prawn per hectare, compared with over 100,000 for intensive farming. The prawn fry also mainly feed on naturally produced nutrients rather than commercial feeds (Hossain, 1991). The one resource that is abundantly used is land.

Pollution is not thought to be a major problem for extensive farming practices, due to the low level of inputs. While there are many other environmental impacts such as soil and water salinisation, what really stands out in Bangladesh is the social consequences, as prawn production encroaches on surrounding small-scale rice farmers. Within this low input, low output system, entrepreneurs chose to use land as a means of increasing production and therefore exports.

The land appetite of prawn farming in Bangladesh has generated significant social tension. Small scale rice farmers in the Southern Khulna region regularly find themselves in conflict with the prawn industry: salt water seeps into their fields from prawn ponds, often caused by the deliberate cutting of embankments by prawn producers. Prawn producers have used coercion, violence and even murder to secure land. As the trade industry yearbook, *World Prawn Farming*, observes for Bangladesh: "in this south Asian country, one of the world's poorest, landless and marginal farmers living along the coast are routinely terrorised by prawn field organisers specifically between June and December when rice is under cultivation" (Anon 1991b). One study has showed that approximately 1.2 million peasants are now landless, due to the expansion of prawn farming, which occupies 55 percent of land area in the Khulna region (Briggs, 1994). Inevitably, this has exacerbated problems of local food security. Although thousands of tonnes of protein is produced in the flooded agricultural land, this is nearly all exported. Traditionally, rice and prawn cultivation complemented each other. However, the situation today is quite different: the prawn season has expanded and the soil is given little, if any time to recover before rice planting. Prawn production has also resulted in the widespread destruction of homestead gardens, vital for the production of milk, meat, fruit and other timber products. As a result, local communities have been become more insecure and less resilient to environmental change. To date, most cost-benefit assessments have tended to be narrowly focused and have failed to take account of these external costs.

3.4.5 Is Semi-Intensive Prawn Farming the Solution ? A Footprints Analysis

It seems that both intensive and extensive farming practices are highly unsustainable. Whilst intensive farming generates mainly environmental problems, extensive farming has led to social conflicts and social displacement. They also have a number of inherent economic weaknesses due to their dependence on low input costs or high prices. Thus they are not only unsustainable from an environmental and socially perspective but perhaps also from a narrow economic viewpoint. One analyst has found that intensive farming was particularly vulnerable to reductions in import prices (Hirasawa, 1984). Conventional approaches to economic appraisal have effectively ignored environmental and social costs; many of which are tangible and some measurable. Ignoring these costs has led to a degradation of natural resource stocks, over-exaggerated claims of economic viability and a shifting of costs onto other groups.

Such a prognosis is extremely worrying for many countries reliant on this form of foreign exchange. However, in recent years there has been suggestions that the way forward is to produce prawn exports on a semi-intensive basis (Macintosh and Phillips, 1992; Primavera, 1991 & 1994; Beveridge, 1994 and Hambrey, 1993). In general, semi-intensive culture appears on the surface more environmentally sustainable. The system avoids the large tracts of land needed for extensive farming, as well as reducing the more polluting aspects of the intensive model. Thus there is less need to relocate production in order to retain productivity, whilst resource inputs, pollution, disease and water demand are also reduced. Although many of the social impacts of semi-intensive farming are the same as for the other two systems (eg low wages and unequal distribution of benefits), it also appears to be less vulnerable to the economic boom and bust cycle.

A footprints analysis shows, however, that even semi-intensive production appears to be far from environmentally-sustainable. Researchers at the Swedish Beijer Institute subjected semi-intensive farming to the footprints methodology (Larsson et al 1994). They chose Colombia, where over 70 per cent of prawn entrepreneurs used semi-intensive techniques.

First impressions of the study area around the Bay of Barbacoas, south of Cartagena, suggested that semi-intensive methods was reasonably environmentally sustainable. Ponds were relatively small and mangrove areas intact. The farms used a mixture of commercial feed and natural food production, thus minimizing waste problems. Stocking levels were moderate to high, reducing problems with disease.

While Rees worked out the aggregate spatial area or 'footprint' needed to support a city or country, Larsson and his team looked at the micro level of a one hectare semi-intensive prawn farm. They used the concept of ecological footprints interchangeably with the term 'spatial eco-system support'. One of the aims of the Colombian study was to estimate the amount of support needed, from land and water based eco-systems, to produce food; mangrove nursery areas, and clean water for a farm, as well as process wastes. Contrary to accepted wisdom, they found that a semi-intensive farm is unsustainable and highly dependent on vast tracts of land and oceans. The footprint analysis suggests that **between 35 and 190 times the size of the farm itself is required for ecosystem support** (Map 3.3).

The largest footprint was caused by the huge demand for prawn fry, which in turn depended on mangrove areas. The next major footprint was the marine eco-system which supported the fish used in the production of food pellets. This was estimated at 14.5 ha per ha pond, while the agricultural footprint from the cereal used in the pellets was considerably smaller at only 0.5 ha. Despite the energy required to run the farm as well as produce the pellets, the carbon dioxide forest was relatively small at between 0.8-2.5 hectares. To assimilate waste and provide clean water, a lagoon seven times the size of the pond was required at a depth of five metres. Finally, the adjacent mangrove area needed to be at least 4.2 hectares per pond, in order to provide sufficient organic matter to support natural food production in the ponds.

The Colombian study makes it clear that the ecological footprint of a semi-intensive prawn farm extends beyond its boundary fence into a global arena.

- Locally: Larsson's footprint analysis also revealed just how close the farms were to exceeding local capacity. The lagoon areas they were situated in was only just large enough

to sustain them; any new shrimp farms could cause a serious deterioration in water quality and result in disease and falling production.

- Regionally: The study also highlighted the dependence on neighbouring countries for young prawn. In Colombia, the demand for mangrove nursery areas far outstrips local supply. Instead the Colombian aquaculture industry were heavily dependent on Panama for supplying prawn fry, their most important raw ingredient. The Beijer study reported that Panamanian resources were under pressure and not being used in a sustainable manner, warning that "the largest support ecosystem, mangrove nurseries for post-larvae, extends far beyond the physical location of the prawn farm and is a vulnerable link in the farming operation". Many Colombian producers were not even aware of this threat to their industry due to the geographical distance between themselves and the Panama shrimp collectors.

- Globally: At a world level, Larsson showed that the Colombian prawn industry depended on sea fishing and cereal production for food pellets, and produced disproportionate amounts of the greenhouse gas, carbon dioxide, because of the energy intensity of the production process.

3.4.6 *Footprint Analysis: A Critique*

The Beijer study is one of the few detailed applications of footprints analysis to a particular commodity. It reveals the links between consumption, production and land, and shows the complexity and inter-relatedness of different parts of the prawn production system at the local, regional and global levels. But three pitfalls have emerged as well: the confusing nature of the footprints imagery, the research intensity of footprint analysis and the absence of social costs of production.

Confusing Imagery ?: Although the footprints image has a strong visual appeal, it can also be highly misleading. The footprint cartoon (Fig. 2.1) depicts a huge foot trampling over land outside of a city, leaving the impression that the footprint is permanent and exclusive (ie preventing other uses of the ecosystem). But a footprint does not necessarily leave a lasting impression. The prawn fry collection may make a demand on a mangrove area, but it is one of many demands placed on this resource. Instead it might be helpful to think of an ecological footprint as more of an 'ecological shadow' (echoing Jim MacNeill's terminology described in Section 2.3.1). For example, if prawn fry collection is carried out in a sustainable manner it would not necessarily leave a lasting imprint, but simply cast a shadow over the resource. Other shadows cast over the mangrove may include fishing for food or using the wood from the forest for charcoal or as construction materials

Research Intensity: The Beijer study took about 18 months to complete. It involved complex methodology and required extensive fieldwork and data collection. This raises doubts about the ability to use such a full-blown approach on a wide scale to calculate footprints.

Absence of Social Costs: By far the most important criticism of the footprints concept is the absence of a social impact component, which as was shown in the Bangladesh example, can be significant. If a conventional footprint analysis of an extensive prawn farm in Bangladesh was carried out, it is likely that it would show the impact to be very small because of the low

level of inputs and waste under this system. Such an analysis would ignore the displacement of local people and their existing livelihoods, as this is not quantified as 'spatial eco-systems support'. Currently, footprints analysis is far from being a holistic tool and cannot judge the true sustainability of a production process, taking account of social, ecological, environmental and economic criteria.

3.4.7 The UK's Prawn Footprint: Conclusions

Despite its faults, one of the merits of an enquiry into a product's footprint is that it reveals the close links between consumption and its ecological base, often in far-off countries. It also highlights the complexities of production processes and their dependence on different eco-systems spread throughout the globe. The prawn case also exemplifies the lack of understanding of environmental impact along the product chain, from the Southern producers to the consumer of prawn in the UK. Policy makers also do not have the basic information to make informed decisions on how to improve the situation: prawn import statistics are not available and are completely oblivious to the possible environmental impacts of their prawn cocktail in South or South-East Asia.

To be useful, the existing footprint methodology would need to be supplemented with ways of including social aspects and assessing the ecological efficiency of different production systems. Larsson attempted to do the latter by looking at the energy used in the prawn production process, from both natural and human-made sources. Currently food products are excluded from the European Community's Eco-label system. It could be productive for the UK to pioneer the development of a labelling system covering food products, which would explicitly include the both the ecological and social footprints of consumption.

4. TOOLS FOR MOBILIZING CITIZEN ACTION

4.1 The Scope for Citizen Action

Mobilizing citizens to take action to change consumption and production patterns is rapidly becoming a key area of the post-Rio agenda. Looking specifically at the efforts needed to lighten and reduce Britain's footprints abroad such action builds on a long tradition of development education and campaigning on consumer issues, trade, financial flows and business practices by public and non-governmental organisations. Recent examples include:

- Friends of the Earth's tropical rainforest campaigns, including *Stop the Chainsaw Massacre*.
- Traidcraft's *People-Friendly Clothing* campaign, launched in 1990.
- The Women's Environment Network's book *Chocolate Unwrapped: The Politics and Pleasure* by Cat Cox and subsequent campaign for regular testing of chocolate for pesticide residues (1993).
- Christian Aid's campaign on EC beef dumping in west Africa, *The Brussels Beef Carve up* (Madden, 1993).
- The World Development Movement's *Stop the Stitch Up!* campaign on trade barriers to textile imports (1994).

These information and awareness raising activities have now being supplemented by more substantial and targeted programmes to support citizen action. New initiatives include:

- The Global Action Plan's *Household EcoTeam Programme*, including a section on Eco-Wise Consuming.
- The Fairtrade Foundation's *Fairtrade Mark*, currently covering tea, chocolate and coffee products.
- The UK Government's *Going for Green* initiative, launched in February 1995, but focusing mostly on local and national environmental priorities.

All these and other activities to assist the citizen aim to broaden the sense of responsibility for wider, often distant impacts. They exemplify the multiplicity of roles that each individual fulfills: as part of a family, as a consumer, neighbour, worker, member of an environment or development group, and as a voter. There has often been a tendency to place the burden for change on the individual, without recognising that individuals require incentives and resources, accurate and available information, support and feedback and cultural norms that reward more sustainable behaviour. Even with these, there will inevitably be public and private sector activities that are outside the direct control of the citizen: our inherited infrastructures for energy, transport and waste management are a case in point, often locking citizens into resource intensive lifestyles. The bulk of private sector impacts on the

environment, particularly those overseas, are also opaque to the citizen, despite the welcome trend in voluntary corporate environmental reporting and improved product environmental information. As we have seen in the four case studies, the citizen's basic right to know the full social and environmental impacts of the goods and services s/he consumes is far from being met by British business today.

Some practical steps can, however, be taken by the UK Government to strengthen the capacity of its citizens to grapple with the footprints issue. The starting point must be with information: how does a citizen know when he or she is creating a footprint? The banana and cotton case studies highlighted the need for both an independent and trustworthy certification of the sustainability of the product, and then the labelling of products that meet criteria for sustainability to widen consumer choice. But even certification and labelling are currently voluntary initiatives, and only address the citizen as consumer. Wider political action is required, influencing companies and governments to redirect their policies. Local community action can be an important focus for such activities, particularly through the local Agenda 21 process. The rest of this section addresses in turn current progress towards forest certification; the experience of product labelling in the North-South context; and the potential for community action on footprints.

4.2 Forest Certification

4.2.1 *The challenge: communicating and reducing the "forest products footprint"*

The ecological footprint of one country's activities on another creates a number of ecological, social and economic *impacts*. Impacts on forests can be summarized as the *loss of*: forest area; forest quality; biodiversity; climatic stability; cultural assets and knowledge; and livelihood. These impacts are a *result of*:

- Direct causes, such as forest use and clearance for plantations and agriculture. Some of these trigger off others in chains. Few of them are under the direct control of the importing country
- Policy, market and institutional failures, some of which are outside the country concerned, but very few of which are from one country alone

There are so many impacts, and so many interacting causes, that it is difficult to sort out the precise magnitude of each - and especially to separate out the role of one country e.g. the UK, in creating these impacts.

Bearing in mind these uncertainties, several options could be considered by the UK to *reduce its forest footprint*.⁵ Some of them emphasise a *unilateral* approach:

- Discontinuing/banning imports from sources producing wood through deforestation (but allowing for legitimate conversion forest)

⁵ Described in more detail in "The UK's Forest Footprint" paper

- Moving to supply sources in areas of ecological surplus e.g. high-yielding plantations, or low-impact logging of extensive natural forest
- Reducing consumption in the UK, through education on how to produce the same benefits from less timber; and through regulations and incentives that encourage alternatives
- Removing some of the market, policy and institutional signals in the UK that lead, directly or indirectly, to forest abuse abroad e.g. debt collection

Other approaches work at the *international* level, to provide disincentives, e.g.:

- Supporting international efforts to control trade in unsustainably-produced wood e.g. CITES

Other options depend more on encouraging improvement *within the producing country*:

- Encouraging exporting countries to make policy changes required for a transition to sustainable forest management; perhaps through the aid process
- Supporting *certification* systems that state that forests producing goods for the UK are sustainably managed; together with *timber tracing and labelling* systems to ensure that products from certified forests can be identified as such

The selection of options is difficult in the absence of definitive information about the cause and severity of forest problems. Hence the choice ought to emphasise those actions which encourage positive improvements required anyway in the exporting country.

The latter options appear particularly attractive for two main reasons. Firstly, they concentrate attention on the main levels at which fundamental decisions to improve forestry have to be made: the nation (for policy, institutional and tenure issues); and the forest enterprise (for investment in the forest - as opposed to liquidating it). Secondly, they encourage activities that are required for national forestry anyway, such as improved management and information. Between the two approaches (policy change and certification), both regulatory and market mechanisms may be employed. The rest of this paper looks at the potential of certification to reduce the forest footprint, and to encourage sustainable forestry.

Sustainable forestry is essential for any approach aiming to reduce forest footprints

With stakeholder demands for different goods and services from forests conflicting increasingly, calls for sustainable forest management have become more urgent. However, perspectives on what constitutes sustainable forest management also differ. The clash therefore is felt in economic, political and intellectual spheres. The debate is evolving at the same time as initiatives on certification.

In these circumstances, what is "sustainable forest management" in practice? From an analysis of different opinions and the scientific basis of sustainability, our position is that there are

some general principles of sustainability, but that precise sustainability criteria need to be negotiated for individual circumstances; this involves stakeholder participation.

Hence, in making the transition to sustainable forest management in any given locality, the following aspects need to be included:

- Achieving *environmental objectives* e.g. maintaining biodiversity, watershed quality and climate regulation
- Achieving *economic objectives* e.g. maintaining timber yield and the forest's capital value
- Achieving *social objectives* e.g. meeting the livelihood needs and maintaining the cultures and knowledge systems of forest-dependent people
- Balancing *today's* needs with those of *future generations*
- *Integrating the above objectives* where possible - there are a number of possible "win-win" situations
- Making informed *trade-offs between objectives* where integration is not possible - often, choices will have to be made, so as to achieve maximum positive impacts and minimum negative impacts, both on-site and off-site
- Balancing the *different levels* at which needs and demands are expressed, from the forest compartment, to neighbouring communities and land uses, to the nation; to the globe. At each level, the integration and trade-off possibilities will be different
- Allowing for *complexities*, and many *uncertainties*; we will not always know the possible outcomes
- Adopting procedures for *continuous improvement*, which requires an emphasis on monitoring and learning
- Building on *natural processes*
- Ensuring *participation of all stakeholder groups in decision-making*, and *transparency* of decisions
- Providing good *information access* for all stakeholder groups
- Gaining the *commitment of the "losers"* of each decision, as well as the "winners"
- Ensuring all stakeholders are held *accountable* for their forest activities, given that these will have impacts on other stakeholder groups; requiring *verification*
- *Long-term, policy-level support* for sustainable forest management

How might certification help in this balancing act? We will examine this question further in this paper. First, however, we need to introduce the concept of certification.

4.2.2 *What is forest certification, and how did initiatives for it arise?*

The traditional - usually government-led - approach to forest problems has been regulatory. In poor countries, this approach has often been supplemented and assisted by aid-funded programmes. In general, these efforts have proved insufficient to reduce the pace of forest loss and degradation.

Public impatience with lack of progress is resulting in moves to look at the possibilities of market-based, voluntary approaches. These aim both to act as an incentive for sustainable forestry; and to provide mechanisms to show whether sustainability is being achieved.

The assumption behind these market approaches is that consumer interest in the forest dilemma is strong. This assumption is based on the increasing extent to which the public is involved in environmental and "indigenous peoples" organisations; the extent of media coverage of "forest issues"; and the changing purchasing policies of public and private corporations.

It is further assumed that this interest may cause discrimination in favour of timber from sustainably-managed forests, and a willingness to pay any associated extra cost. It is also thought that public acceptability of wood and paper products from sustainably-managed forests will help to maintain their market share against substitute non-wood products.

However, the actual purchasing behaviour of the private consumer is not yet significantly favouring "sustainable" production, at least for wood; and there is little evidence that a price premium exists for "Green" wood (Box 4.1).

The converse of these assumptions worries some stakeholders with interests in the status quo, namely that consumer concern over forest condition may result in discrimination against wood products that the consumer *perceives* to derive from unsustainably-managed forests.

These assumptions have provided the impetus for development of forest certification. *Certification, as it is currently being pursued, has four key parameters:*

- It aims: (1) to act as a market incentive to improve forest management; and (2) to improve market access and share for the products of such management.
- It is conceived as an economic, market-based instrument; and as such participation in certification programmes should be, and currently is, voluntary.
- It takes place by assessing the effect of forest activities against standards previously agreed as significant and acceptable to stakeholders.

- Certification is undertaken by third party organisations which have no self-interest in a specific forest activity; which are not stakeholders in the forests being certified; and which can assure the public of independent and professional judgement.

Box 4.1 The "green market": some facts and figures

- In 1989, B&Q (a UK, DIY chain) surveyed their customers and found 76% were concerned about rainforest condition and 15% would refuse to buy tropical timber.
- A 1991 MORI poll commissioned by WWF revealed that 48% of the UK population regarded themselves as concerned about rainforest destruction and that 15% try to avoid buying tropical hardwoods.
- In the US, a 1993 study which revealed that, in a sample of 12 000 consumers having annual incomes of more than \$50 000, 68% of consumers were "willing to pay more for furniture whose construction material originated from sustainably managed North American forest". Knowing the origin of the material was the fourth most important selection criteria among the six proposed.
- In 1994, a survey undertaken by Mintel International showed 60% of UK shoppers prepared to adapt their purchasing habits according to their environmental principles; and 40% of the total make a positive effort to buy environmentally friendly products. Only 10% of shoppers admitted to having no concern for the environment. However, more than half of the respondents found green claims confusing.
- In the UK, many local councils operate procurement policies with respect to tropical timber purchasing, as does the Ministry of Defence. In the US, the Minneapolis City legislature is considering a ban on the use of all tropical timber within the city limits.
- In the Netherlands, a survey of the 50 largest towns and cities conducted by the Dutch Friends of the Earth revealed that: 6 local councils have to a certain extent prohibited the use of tropical hardwoods; 35 local councils refrain from using tropical hardwoods in projects commissioned by themselves; and 26 local councils have a "kind of policy regarding tropical forests".
- In Germany, there are bans against the use of tropical timber in many large cities such as Cologne, Frankfurt, Hamburg, Bremen and Munich and also, according to the environmental group Rettet den Regenwald, an unknown but steadily growing number of smaller communities.
- A recent publication by the UK Institute of Directors, which has 48 000 individual members - all of whom are company directors, said that businesses should not buy products that "destroy tropical rainforests".
- Presently, because little certified timber is available in the Netherlands, customers will, where appropriate, use recycled plastics - paying up to four times as much for this option. It is believed that a price premium of 5-10% on certified timber will be acceptable.
- In Switzerland, it is generally assumed that the reduction in tropical imports by nearly 50% since the mid eighties is the result of environmental pressure.

In summary, the effect of certification can be viewed as either a positive or negative incentive on the individual forest operator:

As a *positive incentive*, certification has to provide the company involved with a commercial advantage over its competitors. This can take the form of preferential access to new customers or increased market share, or better prices through direct sales or niche marketing.

As a *negative incentive*, certification has to ensure that the costs of not participating are greater than those of participating. This usually means that, although participation in principle is voluntary, the company feels compelled to comply for fear of losing market share and access.

4.2.3 What are the current certification initiatives?

Current certification initiatives are developing against a rapidly-changing background of international and national initiatives in forestry, biodiversity, conservation, environmental management systems and trade - many of which also aim to achieve sustainable forestry on the ground (see Figure 1). In this section, we introduce the four main international certification initiatives, the main umbrella initiative, some national efforts, and discuss some "also" certification approaches.

There are four **operational certification schemes** with an international coverage:

- *Woodmark*, operated by the Soil Association, UK (an NGO which has long experience of certifying organic agriculture)
- *The SGS Programme*, operated by SGS Forestry, UK (a private group, with a Swiss parent operation with much experience of quality control and monitoring trade)
- *The Green Cross scheme* of Scientific Certification Systems, USA (a private certification group)
- *The Smarrwood scheme* of the Rainforest Alliance, USA (a campaigning NGO with a strong interest in tropical forest environments and peoples)

Between them, these groups have certified isolated forests in the USA, Mexico, Honduras, Costa Rica, Guyana, Brazil, West Africa, Indonesia, Malaysia, Papua New Guinea (community forestry) and the UK. The total volume of timber from these and all other certified forests accounts for about 1.5 million m³ of timber - less than 0.5 per cent of global trade (Baharuddin and Simula, 1994). In other words, the practice has only just taken off.

Much of the current work of certification programmes has been in defining and agreeing standards and operations. Several versions have been developed by a wide range of organisations. At present, nearly every certification body and nascent certification programme defines its own standards. While most call for adherence to a long-term management plan, minimum-impact harvesting methods, and efficient utilization of all products, including non-timber products - and some include social criteria - the specific

standards differ often considerably. Certificates from different certifying bodies for similar forest areas refer to different standards, which is causing confusion.

The *Soil Association* operates Generic Standards defining "responsible forestry"; the standards are intended to apply to any country, and to all types of forest, but not forest which is to be converted to other uses. Additional local standards are supposed to be drawn up, however, to address specific circumstances (this has already been done for the UK). Six principles provide the framework for timber production standards, covering: environmental impact; sustained yield; land rights; local control, consent and benefit; economic potential; and management and monitoring.

Under each of these principles, standards are set for activities which: (a) *must* be carried out; (b) are *recommended*; and (c) are *prohibited*. These are highly comprehensive. All these standards are kept under review by an Advisory Board and Standards Committee.

The *Smart Wood Certification Programme* of the Rainforest Alliance, on the other hand, has a highly comprehensive set of standards - about 100 different criteria covering sustained yield, conservation of environmental processes, and social impacts, with different sets for natural forests and plantations.

There is considerable pressure, at least initially, to set standards nationally. This is mainly for political reasons. Traditionally, governments have been responsible for setting the standards of forest management. Today, in contrast, it is considered by many that government involvement should not be exclusive and national standards should be set by a wider stakeholder group⁶. Conflicts of interest are perceived by some stakeholders when governments own and manage forests as well as regulate forestry activities. Where national standard setting initiatives do proceed, it is important that mechanisms are examined to permit an eventual international harmonisation of such initiatives.

In principle, a voluntary certification programme is open to all applicants. In practice, the development of inappropriate standards may discriminate against some applicants. The most common error in standard setting is to develop external standards that contain too much detail. Such standards are inflexible. Consequently, they are difficult to interpret and use in different forest situations; and they often discriminate against forests that were not in the minds of the standard setters when they were developed.

Detailed and inflexible external standards also tend to discriminate against poorer and relatively unsophisticated groups - such as community-based forestry operations or farm woodlands. They may have to withdraw from their traditional markets because of their inability to respond to the new product specifications.

We suspect that, as certification develops, the rigors of accreditation and practical experience will force a convergence of standards. This is already happening with the four up-and-running certification bodies whose programmes are evolving to be compatible with. It is for

3 This is consistent with Agenda 21, the Forest Principles and other outputs of UNCED (1992)

reasons of harmonisation, and non-discrimination, that the *Forest Stewardship Council (FSC)* was established, with much attention on its Principles and Criteria.

The FSC is highly significant. In the international arena, only the FSC has produced standards explicitly for certification. Composed of representatives from the scientific community, business, indigenous peoples and NGOs, it has been set up as an international non-governmental umbrella organisation to accredit nationally-based forest certifying bodies. It will not be involved in certification activities itself, but will act as the ultimate accreditation authority. The FSC is based in Mexico, with a global remit.

The FSC has consistently insisted on the widest possible consultation during its formation and the development of its standards. The FSC standards are designed for all types of forest; boreal, temperate and tropical as well as natural forest, plantations and conversion forest. They are expressed as 10 Principles and Criteria for natural forests. Principles and Criteria for plantations and conversion forest have yet to be finalised. The FSC also expects to commence formal accreditation of certification bodies in April 1995.

The FSC Principles and Criteria form a broad umbrella, under which specific standards can be formulated by certification bodies and local forest management units (LFMUs) for different forest types in different countries; and by which these forests can be consistently evaluated.

Despite the effort at consultation, which is still ongoing, some corporations consider the standards to be too detailed on environmental and social factors, and yet weak on the need for economic viability. In contrast, some NGOs consider the standards to be too weak on environmental and (especially) social factors. The FSC aims to ensure that initial local standards are not so high that they only define an "elite" few forests; but not so low that standards are meaningless. Periodic revision and an insistence to assess change over time (FSC Principle 8) aim to ensure that quality is continually raised.

In most standards, to date, there tends to be a presumption that a closeness to natural, unmanaged forest is indicative of sustainability - polycyclical, highly diverse systems are often chosen as the standard. This may prejudice against some monocyclical, low-diversity systems which otherwise achieve considerable social, environmental and economic benefits.

This drawback has been recognised in the case of plantations, for which separate guidelines have been drawn up by ITTO and are now being considered by the FSC. The Smart Wood certification programme operated by the Rainforest Alliance appears to implicitly recognise such differences by operating a two-tier system - recognising first good management and then sustainable management. No source, as yet, has been certified through the Smart Wood programme as "sustainable".

Partly in response to NGO and other international initiatives there is also a number of *national initiatives which explicitly recognise certification*. These national initiatives fall into three broad types:

- Development of *national certification programmes* (the most active are in Switzerland, Sweden, Indonesia, Finland and Canada).

- Use of *certification to identify traded wood* - mainly tropical wood - as originating from sustainably managed forests. Initiatives which aim to encourage the production of certified wood are either the result of private-sector initiatives, or have some form of government sponsorship. The clearest examples of private-sector initiatives are in the UK (the WWF 1995 Group) and Brazil.
- *Encouraging certification by main trading partners and suppliers.* The Swiss national programme aims to provide support for the development of certification in poorer countries.

The UK's role in certification has been significant. Two (non-governmental) certification programmes, with an international scope, operate from the UK. Much of the initiative behind the FSC has come from UK-based bodies. Many of the companies which are now demanding proof of production through sustainable sources are UK-based (the WWF 1995 Group). The Overseas Development Administration has been expressing cautious support to the notion of certification (see Box 2).

4.2.4 *Initiatives which are commonly confused with certification*

The imperative to provide buyers with more information on the origin of wood and paper products, and to demonstrate the sound management of forests, has spawned many initiatives. Several make claims which are not backed by a credible certification programme. These claims either tend to concern the management of forests from which wood and paper products come; or are national labels promoting the generally good forest management of a particular country.

The "*Made in Country X*" labelling initiatives do not necessarily make direct claims concerning particular wood or paper products; but are rather designed as *promotional aids*. They certify product origin, and imply that forest management in the country is generally of a high quality. Such initiatives are current in Switzerland ("Swiss Wood" certificate of origin), Finland ("Plus Forest") and the UK (Forest Industry Council of GB "Woodmark" - not to be confused with the Soil Association label of the same name!).

WWF (UK) has investigated the reliability of various claims on wood and paper products and produced a report entitled "Truth or Trickery" (WWF, 1994). It exposes *self-certification* schemes. The unwillingness of such initiatives to accommodate independent verification of their claims (only 3 of 81 companies were willing), together with the wide array of labels used, serves to reduce their credibility and effectiveness. All self-certification schemes lack one vital component - independence.

Box 4.2: The UK Government's views on timber certification and labelling

Well designed and implemented certification and labelling schemes could offer useful market-based incentives to sustainable forest management, by enabling consumers to make choices between timber from sustainable and unsustainable sources. Certification and the monitoring that goes with it could also offer valuable practical benefits to timber producers through the provision of improved management information.

Much work still has to be done on the development of internationally-recognised, compatible and practically applicable standards, which are acceptable to a sufficiently wide range of governments, NGO's and end-users, for certification to be credible. Setting standards for forest management is primarily a matter for national governments, and certification and labelling needs to be acceptable to the governments of timber-producing countries. But schemes also have to be credible to individual timber purchasers, and it seems likely that many will seek non-governmental approval in order to ensure objectivity.

It is important that certification should reflect the multiple use of forests, and the fact that forest management is a dynamic process. It also should not unduly favour large-scale operators.

The Overseas Development Administration is helping the Soil Association to develop its Responsible Forestry Programme, particularly in developing countries. The Government, however, agrees that the potential benefits of certification and labelling schemes extend to temperate and boreal timber, which should equally be sustainably produced.

The Government does not believe that certification should be used by individual governments to impose import controls. Trade measures applied unilaterally by one country in order to secure particular ends in another would conflict with the UNCED Forest Principles, and would be contrary to our international trading objectives in the framework of GATT and the WTO.

Source: I Symons, Overseas Development Administration, Letter to IED, 1994

4.2.5 Is certification working in practice?

What has been the experience of certification on the ground? Does it work in practice?

We have noted that timber from forests which have been actually certified accounts less than 0.5 per cent of global timber trade. With so little actual experience on the ground, assessing how well it works is a matter of judgement as well as empirical analysis. Hence we have looked at stakeholder opinion as well as stakeholder behaviour.

The main consumers for certified timber appear to be retailers of e.g. furniture and D-I-Y material, encouraged by the apparent, but general, environmental concerns of consumers in Europe and North America; and local authorities and public corporations, for whom environmental soundness is a policy issue. Consumer groups, by nature, tend to be "pro-

choice" and are therefore generally supportive of certification - but they require independent verification, and tend to trust NGO verification more than governmental or private sector inspection.

Clearly, certification has yet to cover more than a "boutique" end of the market - *it has yet to provide incentives for the majority of forest owners/operators*. The owners/operators that have begun certification without a request from a buyer appear to do so in order to gain possible market access (larger forest owners) and/or to reduce the length of the marketing chain, in order to realise higher prices by cutting out middlemen. Those that sell into "green" markets tend to favour certification. Similarly, timber importers are encouraging timber exporters to address the possibilities. Whatever their degree of support, cost appears to be the major concern; followed by international harmonisation, so that they do not have to meet the *different standards of many importing countries*.

If the effect on actual consumer behaviour is small, and on forest operators is gradually increasing, certification has none the less made a substantial impact on the NGO community, and on certain governments. Environmental NGOs are generally supportive of certification, and many are involved in the FSC initiative. Indigenous people's NGOs and social groups tend to be less convinced, partly because the social criteria and standards of just about all certification programmes- as well as the promotional programmes - are weaker or vaguer than the environmental criteria; hence certification as it currently stands can appear to be yet another vehicle for achieving environmental benefits at social cost.

Governmental opinions vary widely. Analysis of the discussions at the International Tropical Timber Council (ITTC) can be used to help register shifts in governmental opinion. These have moved from a position where many governments did not wish to consider certification at all, believing it to be a trade barrier (in 1992), to one where consultants (Baharuddin and Simula) were appointed to marshal the facts and opinions (in 1993), to one where governments were sharing their ideas on principles and prerequisites for certification (in 1994).

Today, most governments offer *tentative support* to certification, or at least they accept the notion of certification. Such governments tend to list a number of conditions for certification to be acceptable: notably non-discriminatory practices and principles; the need to phase certification in; the need - or otherwise - to allow conversion forests to be certified; the degree of international control/monitoring; the type of external body deemed acceptable; the need for national coverage; and the need or otherwise for external funding to cover the costs of a transition to certification. Governmental support for certification tends to come more firmly from importing governments (such as the Netherlands and Austria), and from governments of countries which export to "greener" markets in Western Europe and North America (such as Indonesia, Finland and Sweden).

The potential of certification is now generally accepted, although some groups still raise fundamental dilemmas which are summarized below. To many governments, trade groups and NGOs, certification now appears to be inevitable, and a better alternative to bans and boycotts. The hope is that certification could be a useful mechanism to reconcile the needs of free trade and economic, social and environmental sustainability. Few, however, see it

as a solution in isolation. There is a sense that certification has to be part of a strategic approach to sustainable forest management; it is not a single-issue "miracle cure".

4.2.6 *Where most stakeholders agree on certification*

Most views seem to conclude, reluctantly or otherwise, that the issue now is not *whether* certification should go ahead, but how it should go ahead - what should be the *structure and mechanics* of certification. In some areas, there is broad agreement:

- temperate, boreal and tropical forests need all to be included
- harmonisation is needed for: (1) acceptable standards of sustainability; and (2) mutual recognition between different certification programmes;
- standards and procedures should be set through wide stakeholder participation;
- local interpretation of standards needs to be allowed for;
- certification procedures and the accreditation of certification bodies should be clear and rigorous;
- certification should be based on cooperation and transparency, not discrimination;
- cost-minimisation needs serious attention; and
- the public needs to be educated about certification, and bogus schemes should be exposed.

With this general agreement more or less in place, we are witnessing institutional positioning taking place - in particular, of international institutions such as ITTO and the International Organisation for Standardisation (ISO), which has been involved in successfully setting and harmonising standards and quality control programmes globally. Where there are gaps, new groups - notably the FSC - are being formed.

4.2.7 *The sticky issues - differing views that need resolving*

In other areas, there is less agreement. These "sticky issues", noted below, should be the focus of research and fora for further debate. Continuing ITTO, IIED, CIFOR and FSC work will be helpful here. More legal study may be required. Many issues, however, cannot be resolved until there is more experience of certification on the ground. Support to existing initiatives, and their evaluation, is therefore desirable.

The effectiveness of certification in solving forest problems. Dilemmas are:

- whether certification will lead to systemic market changes, or establish only a small "niche" market;

- whether certification will improve market access, or act as a trade barrier;
- the scope for illicit timber entering the market.

Who should run certification schemes. Dilemmas are:

- whether national schemes should be run by government, by industry, by NGOs or by partnerships; and
- whether international harmonisation and accreditation should be run by an NGO such as FSC; or by a multilateral body, and whether this should be in the UN system such as UNCTAD or GATT, or outside the UN, such as ITTO

Types of forest to be certified. Dilemmas are:

- natural forests only; or including plantations, separately or integrated;
- the minimum size of forest to be certified; and
- whether or not conversion forests can be certified.

The standards, and their assessment. Dilemmas are:

- how much participation is required for defining standards;
- whether to go for minimum, achievable standards or to set maximum requirements;
- whether to set detailed standards, or to go for general standards with local interpretation;
- how to make assessment practicable in the forest; and
- how to ensure that standards, and their interpretation, lead to a balanced, holistic picture of what is going on - not a grotesque sum of isolated measurements

Phasing. Dilemmas are:

- whether to go for a slow approach, led by pilots or by less stringent schemes, or to start with a major commitment; and
- whether or not a grace period should be included for compliance. Japanese industry prefers this; so do many ITTO Producer Member governments - who believe that it is only fair to begin certification after 2000, when ITTO's Objective 2000 should ensure a level playing field of sustainably-managed forests.

Concessions for "special cases". Dilemmas are:

- whether or not special provisions need to be made for small producers, such as community groups, to enable their forests to be certified; and
- whether or not support to poorer countries should be included as part of certification schemes; such as to cover the incremental costs required for them to establish and run, certification programmes.

4.2.8 Conclusions

Our conclusions on certification's possible role are based on the limited experience of certification activities on the ground to date, upon opinions of different groups on how they see it performing, and upon the performance of economic instruments in general. They are restricted to five main points:

1. Certification as a market-based incentive works only with forest products which are sold in environmentally-conscious markets; socially conscious markets are less well-developed, and certification deals less well with social issues. Companies may either be interested in certification in order to exploit a perceived "green market" opportunity; or may use certification as a tool to reduce the environmental risk associated with selling wood and paper products in such markets.

As certification is expected to work through the market, forest managers who produce goods and services that (1) do *not* enter the market or (2) enter undeveloped markets or markets which do not discriminate in favour of products from well-managed sources, are unlikely to see any immediate value in certification. Certification may be most successful as a market-based instrument in well-developed markets of high-income countries, but not for many low-income countries. In markets where certification can succeed, early entrants may gain a competitive advantage.

Where wood and paper products are traded, certification could succeed for the sale of such products from low-income to high-income countries, but not for sales between low-income countries. Low-income countries may need assistance in order for their timber to compete with timber from high-income countries on an equal footing in high-income country markets. Outside Russia, low-income timber-exporting countries are predominantly tropical and may not have the resource capability or institutional prerequisites for quality forestry to take place; and then for certification to be possible. The availability of certification may, however, encourage individual companies and countries to invest further resources aimed at improving forest management.

To improve the value of certification, more work needs to be done on developing secure and efficient *tracing and labelling* systems. Products need to be identified and segregated, and require physical evidence that the certified product originates from a particular forest; this requires a secure data capture and communications systems running parallel to the physical evidence.

Most certification schemes also need more rigour in dealing with *social issues*; and in dealing with *off-site impacts*. These are areas about which consumer pressure is only now developing.

It appears that, in future, certification programmes may have to cover landscape and land use standards and issues, as the trade-offs beyond the forest boundary are increasingly seen as significant sustainability issues. This parallels advances in organic agriculture, which are incorporating factors beyond the farm (e.g. the LEAF programme, UK).

2. Certification acts at the individual forest level and is local in impact; the prospects for scaling up to cover large areas of forest are unsure. The first forests to become certified tend to be those which are already being well-managed, where the costs of preparing for successful certification are low. Certification will require considerable uptake before it can have a *large scale* impact on the way that forestry operates; and on the forest problems which have been identified. It may need regulatory support to do this; certification bodies alone do not at present seem able to offer the institutional environment required.

3. At present, it appears that the bigger producers, in wealthier countries, are better able to take up certification. Inappropriate standards, in particular, may discriminate against some applicants. External standards which contain too much detail are inflexible. Consequently, they are difficult to interpret and use in different forest situations; and they often discriminate against forests that were not in the minds of the standard setters when they were developed. Some may require considerable investment or recurrent costs to meet them.

4. Certification's contribution to solving broader-scale forest problems is, and will continue to be, mostly indirect. As well as acting as a direct incentive on some individual forest operators, certification can work effectively as an indirect incentive to promote the activities required for sustainable forest management. Upton and Bass (1995) have identified many of the broader needs at LFMU, national and international levels (summarized in Figure 2); they note where certification may have a potential to contribute. For example; the national working groups for certification standard-setting are focusing attention on distinct forest problems and the precise sustainability needs of different forest types. This will have broader spin-offs. Yet it must be made clear that there are many causes of forest problems, other than forest management and trade; these cannot be tackled directly by certification.

5. Where certification can contribute, it is likely to form only part of the solution, albeit a central one. Complements will be needed at the forest level, and at policy level.

At the *forest level*, certification often requires improvements in management quality - such as the setting up of Environmental Management Systems. These are not common. This implies investment and long-term commitment to training, systematic documentation, adherence to prescribed and documented operating procedures, etc. Certification may be the catalyst to ensure the need is addressed, but often other resources are still required to ensure that the need is satisfied.

At the *policy level*, requirements are:

- Demarcation of a permanent forest estate (PFE) ⁷
- Establishing multi-stakeholder forest fora and decision-making processes, especially for standard-setting
- Incentives to encourage investment in sustainable forest management, notably for "weaker" groups that could get left behind as bigger operators take up certification. Secure tenure and assistance in forming associations will be especially important ⁸
- Stability in regulations, incentives and financial policy
- All policies to be aimed at encouraging sustainable forestry (including policies outside the forest sector) - this will require the ability to coordinate policies

Further observations on the potential role of certification are more tentative, because of the lack of evidence and precedent. These are summarized in Figure 2.

In terms of the forest footprint, certification's impacts on production, trade, consumption and investment - and on the UK's role in these, are the significant issues.

Production: Certification deals directly with the way that forest products are produced at the enterprise/LFMU level, with the direct aim of encouraging, and demonstrating, sustainable practices. On the evidence so far, this incentive/information role is positive.

Because certification has to be precise, it forces a clarity in defining what is locally "sustainable" (or "good") forestry, and about how local forests are actually achieving this. As such, it potentially offers very good information on whether impacts on the forest are positive and negative. ⁹

However, the consumer is not told precisely what that impact is. These details remain confidential. Rather, the consumer knows what standards have been met - and that they have *all* been met (an "all-or-nothing" approach). In addition, certification does not trace particular causes of problematic impacts. These two attributes mean that certification is not a good tool for *communicating*, to the public, the precise footprint. Rather, it identifies where the impacts, and hence the footprint, are light - and hence *encourages investment in areas of*

⁷ Certification will also always be of a forest area that is being managed. Certification, therefore, assumes that prior decisions have been made with regard to different land uses and in setting aside areas as national parks for protection and conservation. Certification cannot assess whether or not a particular forest area should be managed.

⁸ A number of studies (e.g. LEEC 1993) indicate that there are currently few incentives to return any revenue to sustainable forestry. Baharuddin and Simula (1994) consider that this will still be the case, even were any price premium available for certified timber.

⁹ The practice of certification has to be precise, unambiguous and repeatable in its assessment; whilst the paradox is that perspectives on sustainable forest management differ, and have often been expressed vaguely and ambiguously. Reconciling this difference is perhaps the most difficult part in developing and operating a certification programme. Some certification programmes have therefore included an interim goal of "good" forestry, where the full parameters of sustainable forestry cannot be agreed.

ecological surpluses i.e. areas which can withstand the pressures of demand for forest products.¹⁰

Trade: As noted above, currently certification covers only a small fraction of the trade. However, it has potential to develop at least a number of market "niches", if not a systemic change in the quality of traded products. UK companies are taking a lead in certification. As such, they are now much more aware of the precise source of their products (this is an aim of the WWF 1995 Group of companies). This has two effects - concentrating patterns of trade onto areas of ecological surplus; and providing opportunities for forest operators to deal direct, cutting out certain middlemen. Where community groups can benefit from certification (such as the Bainings community in Papua New Guinea, selling to B&Q), then there are prospects for reducing social impacts and, indeed, for increasing the equity with which forest benefits are shared.

Consumption: As a market-based instrument, certification is inherently set up to *modify* consumption, and is not equipped to *reduce* it, so it does not deal with requirements for an overall reduction in the level of timber consumed. Certification only indirectly influences *investment*; but, once it becomes clear that EMS systems and other elements of sustainable forestry need to be put in place for certification, it will undoubtedly encourage these investments.

In summary, the potential roles of certification in encouraging sustainable forestry and reducing footprints are: providing market *incentives* to invest in sustainable practices at forest level; offering *verification* that improvements are being made, and thereby increasing *accountability*; and pointing to areas of *ecological surplus*.

Certification programmes are evolving; few are operational on a large scale; and the potentials are only beginning to be realised. There is still much scope to focus certification, so that its potential contribution can be fully realised. Below, we outline the ways in which we consider certification should develop.

Some guidelines on effective certification

From the above, we can conclude that there are certain basic requirements that should be in place to make certification programmes acceptable and effective. These are discussed in Annex 2; considerably more detail is given in Upton and Bass (1995, forthcoming). In many ways, the four current certification initiatives and the FSC are evolving towards these requirements. The requirements are:

- *Focus on the forest level* (all current certification programmes do this)
- *Designed to be a market-based instrument* (met to an incomplete extent)

¹⁰ However, this assumes that the government of an exporting country has already identified, and excluded from the production estate, areas of high environmental importance, which should not be managed for timber - in other words, basic policies for sustainable forestry need to be in place (as listed in section 5.1).

- *A tripartite structure: forest operator; certifier; accreditor (all are putting this in place)*
- *An environmental management system, and a policy of continuous improvement, in the enterprise being certified (not yet integral to all)*
- *Meaningful standards agreed locally by all stakeholders, and internationally harmonised (evolving, with FSC helping harmonisation)*
- *Certification comprising assessment of management and documentation, as well as forest inspection (evolving in some schemes)*
- *Verifiable chain of custody and integrity of labelling claims; so that products from certified forest are identified as such, and kept distinct from other products (evolving)*
- *Moderate costs and technological requirements that do not prejudice against certain groups (evolving)*

4.3 Product Labelling

Product labelling could help to lighten ecological footprints, provided three conditions are met:

(i) That the labels can be an objective indicator of the ecological footprint of a product from cradle to grave. In other words, they should be based on an analysis of social and environmental impacts of the product not only in the country of consumption but also in other countries affected by the product life cycle.

(ii) That all products regardless of their origin are the subject of labelling schemes. Labelling schemes should be applicable to products that are of relevance to developing countries

(iii) That labelling has a significant effect on consumer decisions on purchase and/or producer decisions on product design and choice of inputs.

4.3.1 Can Labelling Give Sufficient Information on Ecological Footprints?

Three types of environmental label can be distinguished (OECD, 1993):

(i) Single issue/mandatory: where Government requires information to be displayed about the hazardous nature of a product or other attributes.

(ii) Single issue/voluntary: where one aspect of the environmental impact of a product is targeted or one stage of the life cycle and usually focusing on impacts in one location. Examples include recycled content or totally chlorine free bleaching for paper products.

(iii) Multiple issue voluntary: where impacts at various stages of the life cycle are considered.

Internationally, these labels are awarded by a spectrum of different organisations, ranging from environmental organisations through independent bodies to government agencies. Labels which consider social impacts are also being awarded but are more recent and less common than environmental labels. In contrast to eco-labelling, social labelling is focused primarily on products from developing countries and is seen as a means of developing markets for particular groups of producers or promoting good working conditions (see Box 4.3).

BOX 4.3 - FAIR TRADE LABELLING

The Fairtrade Foundation was established in July 1992 by CAFOD, Christian Aid, the National Federation of Women's Institutes, New Consumer, Oxfam, Traidcraft Exchange and the World Development Movement. Its aim is to encourage sympathetic companies to develop specific products traded in such a way that a fairer deal is given to Third World producers. In recognition of this, the Foundation has introduced a Fairtrade Mark to appear on products which meets its standards, with the intention of encouraging consumers to preferentially select products carrying the Mark (Fairtrade, 1994). Companies that apply for the Mark to be carried on their products must satisfy a number of conditions. For example, they may use only suppliers on the Foundation's approved register, and abide by certain trading standards, such as paying a 'social premium' to finance social-economic benefit for the producer. Companies and suppliers are also subject to regular audits. Companies pay a fee of 2% of sales turnover to the Foundation for the right to use the Mark for approved products.

The Foundation has drawn up a set of criteria for assessing whether products should be awarded the Fairtrade Mark, which are designed to "allow objective and balanced assessment of the social and environmental performance of the 'third world' suppliers". The criteria are based on a mixture of good trading and employment practice, consumer and labour expectations and legal requirements. The Foundation's general criteria, include issues such as:

- Employee representation
- Employment conditions
- Health and safety
- Environment
- Child Labour

Specific criteria have also been developed for tea, chocolate and coffee. For example, the environmental criteria for tea products are:

- * There should be no use of 17 listed pesticides;
- * There should be active development of alternative means of pest control;
- * There should be initiatives to protect water courses and forested areas; and
- * Where possible, renewable fuels should be used to ferment and dry the leaf.

The Fairtrade Mark has now been awarded to 11 products, including Clipper and Seyte (tea), Cafe Direct (coffee) and Maya Gold (chocolate). Recent research by MINTEL suggests that 36% of the British public feel strongly enough about both environmental and ethical issues to buy products which bear them in mind on a 'when I see them' basis. An important strategic thrust of the Fairtrade Foundation's work is to get fairly traded products out of a 'third world ghetto' and into mainstream supermarkets. They have achieved particular success with Cafe Direct coffee, which is now stocked by CWS, Safeway, Waitrose, Gateway, Asda, Sainsbury's, CRS and Tesco, and has achieved a market share of 2-3%.

A key distinction is between labels which display manufacturers' own claims and those which are awarded by third parties on the basis of independent verification of environmental and social performance. Labels are increasingly being used by manufacturers to display claims about the nature of the product concerning its properties and social or environmental attributes. Such claims can often be misleading or overly general and add to confusion rather than provide objective information. In the context of ecological footprints, schemes which involve third party verification are therefore essential.

Single issue mandatory labels are too limited in scope to be of relevance to ecological footprints. Single issue voluntary labels are also unlikely to give sufficient information but much depends on the type of product. Where little processing is involved and most of the production stage of the life cycle takes place at one location, a single issue label may give adequate information. Such is the case with schemes which certify that wood products come from a sustainably managed forest. In the case of sawn timber where there is likely to be little processing in other locations after the extraction and sawmilling stage, such certification could give a fairly comprehensive picture of the ecological footprint. This is particularly so because in such schemes a number of economic, social and environmental criteria are usually involved as in the principles agreed on by the Forest Stewardship Council (FSC, 1993). For other types of wood-based product, for example, paper, certification of the wood source will be insufficient. Other impacts at the pulp and paper production stage of the life cycle would need to be considered as well.

Multiple issue labels have become fairly common. Today, more than 30 eco-labelling schemes have been set up in a number of countries in Europe, North America, Asia and Oceania to deal with multiple environmental issues. The early schemes examined only certain parts of the life cycle. Later schemes have been based on fairly sophisticated life cycle analyses. In theory, the more comprehensive the analysis of the life cycle underlying the labelling criteria the more should be revealed about the ecological footprint of a product. However, the analysis of impacts at different locations raises issues of weighting and interpretation.

A common approach of labelling schemes, for example that of the EU, is to assign points for different levels of performance for a number of environmental parameters. To obtain the label the product must not exceed a specified total point sum. The assignment of load points and the choice of parameters involves a significant element of subjectivity. The importance given to impacts occurring in countries outside the labelling country depends on the values of those setting the criteria. It is quite possible therefore that the choice of parameters and the points system could work to the disadvantage of developing countries/give a misleading picture.

In the case of the EU's eco-labelling scheme, products imported into the Community must meet the same criteria as domestic goods. This has generated some controversy from foreign producers, notably over EU eco-labelling proposals for paper products. These proposals contained a hurdle requirement that virgin fibre should originate from regions where sustainable forest management is practiced, as well as load points for the consumption of renewable resources; thinning and saw mill residuals which are primarily used by Northern producers are excluded from the definition of renewable resources. The controversy has focused on how the use of recycled fibre affects the load points: paper with recycled content reduces the consumption of renewable resources and cuts the amount of amount of waste

generated per tonne of product. Brazilian pulp producers have protested that giving a priority to recycled content means that it would be very difficult for pulp from a sustainably managed source in Brazil to meet the criteria for the label (ABECEL, 1994). ABECEL, the Brazilian paper producers association argues that the proposals give more weight to the problem of waste disposal within the EU than to the encouragement of sustainable forest management in other countries.

4.3.2 Achieving Equal Access of Products

In 1993, the OECD Secretariat concluded that the vast majority of developed world eco-labels were based on consumption and waste-related criteria and did not involve products with significant international trade flows. At the end of 1994, the only products for which labels had been awarded under the EU scheme were washing machines and dishwashers, both produced mainly by developed countries, although some of the raw materials or intermediate inputs could come from developing countries. The criteria for these labels focus only on the consumption of energy, water and detergents in the country of product use.

Recently, however, UNCTAD has found that developing countries are becoming more exposed to the effects of eco-labelling in OECD countries since some of the new product categories are of great export interest to them. For example, the EU is in the process of establishing eco-labels for footwear and certain textiles (T-shirts and bed linen). UNCTAD estimates that around 45% of value of imports in broad product categories earmarked for eco-labelling in the EU originate in developing countries (Vosselaar, 1994). UNCTAD analysis suggests that the choice of product categories for eco-labelling can be influenced by domestic producers with the result that categories which would be of interest to suppliers from developing countries are excluded (Jha & Zarrilli, 1993). Developing country suppliers may find it difficult to represent their interests in the eco-labelling schemes of developed countries and may be unable to provide finance to the labelling authorities in such countries to conduct research on product categories of interest to them.

Where product categories are relevant to developing countries, it appears that access of products from such countries may still be restricted and concerns have been raised that eco-labels can constitute a barrier to trade. This is for a number of reasons (Jha & Zarrilli, 1993; OECD, 1993):

- the choice of criteria can reflect the environmental conditions and preferences of the labelling country (eg paper products)
- plant inspection and verification may be difficult or expensive for companies from developing countries.
- application fees and annual fees for use of the label although calculated in the same way for domestic and foreign producers may prove to be more onerous for smaller producers from developing countries.

Increasing international attention is now being focused on the transparency, access and credibility of eco-label schemes, and steps are being taken towards mutual harmonisation as a way to avoid trade disputes (Box 4.4).

BOX 4.4: ECOLABELLING AND INTERNATIONAL TRADE

The transparency, access and credibility of ecolabel schemes has now emerged as an important trade issue. ISO has been working to standardise some of the essential elements of ecolabelling schemes. In order to allow an opportunity to foreign producers to explain the processes they use, the procedures for developing criteria for an LCA-based ecolabel need to be transparent and allow for consultation with all interested parties at key stages. Transparency at the development stage increases the opportunities for access to the ecolabel by exporters. It is also important to provide opportunities for input from the public if the resulting ecolabels are to command credibility from consumers. As a result, the design of ecolabels need to take account of the GATT and the Technical Barriers to Trade Agreement.

Eco-labelling schemes should also be rigorous and even-handed in assessing compliance with criteria. An effective and credible testing programme requires hardware, personnel and methods. As yet there is no international system for accreditation and recognition of testing organisations. Technical assistance to developing countries is needed in a number of areas, including environmental testing, environmental auditing, life cycle analysis, certification and participation in international technical committees.

To tackle the trade issues raised by non-product related issues in ecolabels, it could be useful to identify sensitive traded products on which it is particularly important to involve developing countries in ecolabel proposals. Harmonising ecolabelling schemes would mean agreement that schemes should be based on uniform criteria, but because of varying environmental conditions and production methods this is unlikely to be political fruitful. In the longer term, the most fruitful approach could be to examine the scope for mutual recognition or equivalence between eco-labelling schemes. To move towards, mutual recognition a common set of principles would be needed of what is good practice in an ecolabelling scheme to provide a basis for equivalence.

OECD Workshop on Ecolabelling and International Trade, London, October 1994

4.3.3 Can Labels Affect Consumer and Producer Decisions ?

As Elizabeth Nelson, chairman of the UK Ecolabelling Board acknowledged recently, "global Ecolabelling schemes are still in their infancy...We must not raise the hopes of consumers that green labelling is just around the corner" (Nelson, 1994). Furthermore, Nelson noted that ecolabelling schemes have proved to be "dismally slow in terms of having a significant impact on market share and trade". In general, there appears to have been very little evaluation of the effect of labelling schemes on consumer choices and on market share of manufacturers

that are awarded labels. The UK House of Commons Environment Committee noted in 1991 that not one of its witnesses could provide any objective quantifiable evidence as to the impact of ecg-labelling on the environment (House of Commons 1991 in Wheeler, 1994). Similarly, 95% of participants in the Canada Environmental Choice Programme can provide no evidence of the label affecting consumer behaviour (Ann Graham, in Wheeler, 1994).

4.3.4 Labelling: Conclusions

Over the past year, OECD ecolabelling schemes have become the target of mounting criticism from Third World producers and governments as a tool of 'green protectionism'. To a large extent, the often heated discussions about ecolabelling and trade have become a proxy for the wider international negotiations on trade and environment. It is striking that despite the noise that is being made, there is little or no hard evidence of unfair practice towards developing country producers. The use of life cycle assessment as the basis for establishing ecolabel criteria means that a limited range of external environmental impacts of developed country consumption patterns are now being studied and negotiated. Labelling has thus become one of the principal policy battlegrounds on which discussions over consumer 'footprints' have raged. If progress is to be made, it is vital that a more representative range of developing country stakeholders -- such as consumer, environment, development, free trade union and co-operative producer associations -- become actively involved in consultation processes for setting the EU eco-label criteria and standards.

4.4 Community Action

The origins of the footprint concept lies in William Rees' enquiry into the resources needed to support his community of the Lower Fraser Valley. Rees is Director of the Task Force on Planning Healthy and Sustainable Communities at the University of British Columbia, which has prepared a useful brochure *How Big is Our Ecological Footprint ?* (Wackernagel, 1994). This explains the concept in simple terms, and proposes a range of measures that people can take to lighten this footprint at home, in the community and at work (Box 4.5). A brief glance at these proposals shows, however, that Rees and his team is using the footprint concept as an overarching argument for sustainable development, with no particular focus on developing country impacts or linkages.

BOX 4.5 : ACTION TO REDUCE FOOTPRINTS IN CANADA

Households can start by reducing their resource consumption. At home we can:

- start composting
- use more energy-efficient light bulbs, shower heads etc
- switch to forms of recreation and tourism which have low impact on the environment
- grow some of our own food
- live closer to work (or the other way around)
- use bicycles and public transport rather than cars
- buy items made or grown locally rather than far away.

At the urban level we must develop **infrastructures** that leaves options open. Cities and towns can:

- plan attractive increased population-density areas such as town centres and urban villages instead of accomodating further sprawl
- offer living, working and shopping spaces in integrated neighborhoods
- reallocate urban space to encourage decreased use of cars and increased use of public transport, bicycles and walking
- encourage the planting of trees and greenspaces
- establish urban land-trusts to give the community more control over land use
- promote various kinds of affordable high-density housing such as secondary suites and cooperatives
- introduce housing construction guidelines which minimise the consumption of resources
- develop comprehensive waste reduction systems which include municipal resource reuse and reduction schemes.

There must be changes in our **economies** . In doing business we can:

- rely on using locally available resources rather than imported ones
- regain local control over production and distribution of those resources
- secure local needs so that the long term livelihood of a region can be protected without compromising the livelihoods of other people in other regions
- charge the true costs for private transportation, pollution and resource use
- support community-based non-cash volunteer and mutual aid networks
- encourage ecologically sound businesses
- offer tax breaks and other incentives for encouraging sustainable lifestyles, and tax and regulate unsustainable behaviour.

Mathis Wackernagel, How Big is Our Ecological Footprint ?, Task Force on Planning Healthy and Sustainable Communities, 1994

In Britain, film maker and author Herbert Girardet has been commissioned by *London First*, a grouping of business leaders and civic figures, to explore how London's future prospects can be enhanced through an effort to achieve sustainability (Girardet, 1994). Girardet has mapped out the metabolism of London, tracking its inputs and outputs. For example, London

requires 20 million tonnes of fuel oil equivalent each year to meet its energy needs, along with 1000 million tonnes of water. In turn, London consumes over 2.4 million tonnes of food from all over the world, and produces, over 11 million tonnes of industrial and demolition waste and 60 million tonnes of the main greenhouse gas, carbon dioxide. It is clear that London, perhaps to a greater extent than other parts of the UK, takes more than its fair share of planetary resources to sustain its 7 million inhabitants and its role as a leading world city. London's dependency on other regions means that there is a 'sustainability gap' between its current consumption and world carrying capacity. Girardet has estimated that London generates a footprint 53 times its land area, just to grow its food requirements; **a total footprint 120 times London's land area is required for food, energy and carbon absorption.** London First are exploring ways in which this footprint can be reduced, including setting targets for sustainability, for example, setting a timeframe for making London a "Carbon Neutral City" by agreeing offset arrangements with forest holders, and stimulating markets for recycled materials.

More broadly in the UK, footprints adds a new dimension to the development of local Agenda 21s. About 80% of local authorities have now made some commitment to introducing a local Agenda 21, although only about 40% are involved in any organised programme of public involvement to reach consensus on local priorities and options. It is this public involvement that differentiates the local Agenda 21 movement from traditional, often adversarial planning approaches. The best local programmes are proving effective in drawing in organisations from all sectors of the community, which offers a good base for tackling some of the harder global issues involved in footprints debate in a non-threatening or confrontational way.

The footprints' phase is initially attractive for local authorities because many have yet to integrate an international dimension into their local Agenda 21 proceses (Church, 1995). For example, local indicators of sustainability have been developed by the United Nations Association with the New Economics Foundation and Touche Ross for the Local Government Management Board. Few of these indicators have global linkages, with the exception of energy use and an innovative section on meeting needs locally (eg % of allotments in use, % of income spent locally, % of local demand for water from local resources and % of building materials from local sources). It has proved difficult to collect data on these indicators, and none of the 10 pilot authorities have chosen these in their pilot programmes.

A few local authorities have shown some interest in tackling the international dimension to local Agenda 21s:

- Avon: Avon County Council has calculated that it makes a footprint 40 times its surface area to supply its needs. It is exploring local purchasing options.
- Croydon: Croydon Council have been one of the first to work on local Agenda 21, and it has identified the need for global links.
- Fife: Fife is the sole Scottish council involved in the UNA/NEF indicators project, and is keen to develop a global perspective and explore footprints.

- Gloucester: Cheltenham and Gloucester are interested in developing a full-scale footprint for Gloucester or another town in the area, as a logical extension to the Vision 21, local Agenda 21 process.

- Leicester: ENVIRON, the independent organisation running the Leicester Environment City project and helping lead the Leicester Agenda 21 process have worked extensively on local purchasing and consumption issues: Leicester Council has now changed its source of potatoes from Kent to nearby Melton Mowbray. Leicester has a strong international perspective, and Environ hosts the Friends of Vrindavan charity, which aims to protect and restore the sacred forests of Vrindavan, the birthplace of Krishna.

Even among the local frontrunners there is uncertainty over what to include and how to measure footprints. Some local authorities feel that the issue is outside their remit, and could pose an additional burden on authorities already engaged in local Agenda 21s and Eco-Management and Auditing. A clear introductory document demythologising the footprints concept and developing a common, but flexible framework for assessment and policy making by local authorities is imperative.

One starting point would be to work in a few pilot authorities on a limited number of priority developing country footprints, such as food, clothing and timber. The concentration of food retailing with a few large supermarket chains and the use of computerised sales and stock control systems offers an opportunity to assess the food footprint of an area with relative ease. The multi-sector working arrangements for local Agenda 21s could help to win business support for such assessments.

A footprint dimension could also be included in household level schemes to reduce environmental impacts, such as the *Global Action Plan* (GAP). GAP is an NGO initiative, launched in the USA and now operational in four other countries (Netherlands, Sweden, Switzerland and the UK), with up to 10 more countries starting off. It aims to empower a critical mass of citizens to permanently redesign their lifestyles. GAP's Household EcoTeam Programme provides participants with a simple blueprint on how to take practical action to reduce consumption in their daily lives, together with a support and feedback system to help them sustain their good intentions. Over several months, a group of friends, a family or neighbours, work through six environmental issues: waste reduction, water efficiency, energy conservation, transport, shopping and taking further action ('next steps'). Over 8000 households worldwide have participated in the programme, yielding measured resource savings of 40% reduction in waste, 12% and 15% cuts in energy and water use and an 18% fall in carbon dioxide emissions.

In the UK, the Action on Shopping pack is of most relevance to the footprint issue. It explains a life cycle approach to changing shopping habits, instilling a consciousness about where products come from. It describes the various labelling schemes on the market, including the EU eco-label and the Fairtrade Mark, and then gives special guidance on how to take account of Third World impacts, recognising that "developed countries have tended to use trade to exploit people and the environment". It also recommends avoiding buying tropical hardwoods and choosing alternatives such as walnut, oak and cherry as a contribution to reducing the threat to tropical rainforests. Finally, it raises the critical issue of the

environmental impact of financial decisions, and describes options for more ethical investment (GAP, 1995).

The issue of Britain's 'financial footprint' is rising to the fore, and is a prime area for citizen action through influencing their pension funds and investment companies. Since the 1960s, a small minority of investors in North America and Europe have been applying non-financial, ethical criteria to their choice of investment. Initially driven by negative concerns (eg to avoid companies involved in arms manufacture, alcohol, cigarettes or South Africa), the ethical investment movement has matured considerably and expanded to incorporate positive criteria in the selection process, such as a company's contribution to sustainable development. In terms of size, perhaps 10% of stocks listed on Wall Street are now screened according to some ethical criteria, while in Europe over ECU1 billion is now invested in green or ethical funds.

In the run-up to Rio and beyond, the mainstream financial community has begun to integrate environmental concerns into their activities. A number of driving forces have been at work, including a fear by banks and insurers of incurring liability for environmental damage at polluting companies, as well as a desire to make investments in companies likely to benefit from growing markets for environmental goods and services. The increasing demand from *insurers, bankers and investors for environmental performance data from companies* has been a stimulus behind corporate environmental reporting, as well as the establishment of independent analysis and rating schemes, undertaken by organisations such as the Investor Responsibility Research Centre and the Council for Economic Priorities in the USA and the Merlin Ecology Fund and Eco-Rating International in Europe.

A new urgency has been given to the development of ethical investment with the flood of portfolio capital from developed countries, including the UK and the City of London, into the emerging markets of the developing world (notably Asia and Latin America): almost \$40 billion was channelled by portfolio investors into emerging economies during 1993 alone. As the recent financial crisis in Mexico has shown, these flows are often speculative and do not address themselves to the long-term sustainable development of the country concerned. Many funds flow into extractive industries, such as timber and mining. Currently, there is no systematic understanding on the broad impacts of these flows for sustainable development in the Third World. But concern is growing, particularly in the wake of a number of cases where damaging investment practices were suggested by environmental groups.

These concerns came to a head in October 1993, when Barito Pacific, Indonesia's largest forest products company was floated on the Jakarta Stock Exchange. In advance of the flotation, Barito Pacific's agents staged a worldwide marketing roadshow to attract foreign investors. A coalition of 15 environmental and human rights group lobbied nearly 600 institutional investors on Barito's environmental and human rights record. Although the \$250 million share placement was a success, a number of finance houses decided not to invest. A BBC programme on the issue also discovered that two Indonesian companies accused of illegal logging for pulp and paper were backed by a number of leading UK investment funds.

5 - CONCLUSIONS

This study has explored the intellectual origins of the current footprints debate in Britain, and described how the footprint term and associated ideas is being used in international and national policy circles. The four footprint case studies on bananas, cotton, forests and prawns highlighted the methodological issues raised by footprint analysis and pointed to a variety of options for British citizens to reduce their environmental impacts abroad. The discussions of certification, labelling and community action revealed that some of the environmental impacts grouped under the footprint umbrella have already been addressed to a limited extent by other initiatives.

The rest of this final section presents the conclusions drawn from both IED's research and the comments of others on the usefulness of the footprint approach for assessing and communicating Britain's overseas environment and development impacts (see Annex 3 for full details of IED's consultative seminar).

5.1 Conceptual & Methodological Conclusions

(i) The footprint term is being used in a variety of different ways, ranging from the precise definition used by Rees (eg the appropriation of carrying capacity by communities in distant elsewhere) to a looser description of Britain's overall environment and development impacts on developing countries, applied by UK NGOs (eg the Partnerships for Change statement and the UNED-UK Land Report).

(ii) Britain's base footprint for a particular commodity -- the sum total of area required to sustain the supply of material consumption to the UK -- can be calculated with relative ease for the commodities it imports. Thus, Britain's base banana footprint amounted to one half of a percent of the UK land area under permanent pasture, the base cotton footprint was calculated at 20% of Britain's cropland area, while the forest footprint was three times the UK's own area of productive forests.

(iii) This base footprint, however, omits the wider environmental and social impacts, many of which may be of greater importance and interest to the British citizen. For example, these include the impact of pesticide use on local ecosystems and the health of workers in the cotton and banana cases, and the impact of commercial prawn farming on land and resource distribution, and local livelihoods in Bangladesh.

(iv) As it stands, the footprint can be seen as a more sophisticated successor to the 1960s notion of ghost acres, but one that perhaps focuses too heavily on the consumption of foreign resources, and not on the driving forces in terms of public policy and corporate practice that shape this pattern of consumption.

(v) Carrying out footprint analysis is a time-consuming and research intensive task. It took the Beijer Institute 18 months to complete their assessment of prawn farming in Colombia, while the related pilot study on International Commodity Related Environmental Agreements

by the University of Amsterdam lasted two years. The lack of basic information is a fundamental barrier to deeper understanding: as one participant at IED's seminar noted, "we don't know where we are walking".

(vi) There is a risk that footprint analysis could lead to a kind of resource reductionism by seeking to translate complex sustainable development trade-offs into a common currency, that of land area equivalents. This could in fact mark a step backwards in the wider sustainable development debate on indicators, which is moving away from single measurements of success (particularly those assessed in financial terms such as GNP) towards a 'basket' approach which recognises the complexity and trade-offs inherent in sustainable development. As the prawn case showed, further thought is required on how the social dimension can be integrated into the analysis.

(vii) The imagery of footprints is initially compelling. But on reflection, questions are raised: how can we measure the depth of the footprint (eg is the impact caused by a clog or a stiletto ?); what is the resilience of the local ecosystem (eg how squashy is the land on which the footprint rests ?); and how exclusive is the impact (eg is the image of a shadow not more appropriate ?).

(viii) The use of footprints in the North-South context in the UK has echoes of earlier critiques of Britain's colonial and neo-colonial expropriation of developing country resources. It has a top-down focus. What is notably lacking is an assessment from developing countries themselves of the footprints that we create in their countries and the balance of advantage. As it stands footprints is far too much a one-way concept. One priority for further research therefore would be to work with developing country governments, researchers and NGOs to gather their perspectives on footprints from the bottom up.

5.2 Conclusions for Citizen Action

(ix) Citizen action to reduce the social and environmental impacts that Britain generates overseas is severely constrained both by a lack of general awareness on the relationships between North-South and by an absence of information on specific products or issues.

(x) The four case studies demonstrated that as a consumer, the British citizen faces an extremely limited supply of more socially and environmentally responsible products from developing countries. Certified sustainable timber, green cotton and ECO-OK remain niche products, available to a tiny minority of mostly affluent consumers, willing to pay a premium. Stopping consumption or boycotting a product because of concerns over footprints does not appear to be a very productive avenue for consumers.

(xi) Environment and development groups are the most trusted source of information on North-South issues, and have started to incorporate the footprint image in the public communications work. They are likely to remain among the chief proponents of the idea.

(xii) Footprint concerns overlap with a range of existing initiatives to promote more sustainable consumption in the UK, notably the use of life cycle approaches in product management and in the EU's eco-label programme. Independent certification and labelling

is clearly essential to enable consumers to choose products with reduced environmental impacts. Further study is required to assess whether the EU eco-label scheme adequately incorporates both the full range of social and environmental footprints of labelled products and the perspectives of the key stakeholders in developing countries, such as producers, trade unions and citizen groups. The UK Government should also consider how common EU social and environmental labelling for agricultural products could be promoted.

(xiii) Whether footprints is used as a new umbrella term for the UK's distant impacts or not, it is urgent that these impacts are more effectively and comprehensively integrated into public policy. For example, footprints could be effectively used within Whitehall as an image to raise awareness among officials working on the international concerning Britain's dependence on external sources of supply.

(xiv) The Government bears a primary responsibility for collecting, analysing and communicating impacts. For example, the external environment and development impacts of British consumption and production patterns, public and private financial flows and public policy impacts need to be integrated into current Government efforts to develop national indicators of sustainable development by the end of 1995. The next edition of *The UK Environment* could also include a section on external environmental impacts, which would then be of use to a wide audience in schools, universities and research.

(xv) Influencing UK aid, trade and corporate policies emerged as one of the most promising avenues for citizen action. Although individual consumer action on North-South issues is likely to have minimal impacts at present, a refocusing of bilateral and multilateral (especially EU and World Bank) aid programmes to invest in sustainable production processes in developing countries could help close the supply gap. It would be useful to explore further the possibilities for the UK to develop its own set of bilateral sustainable development agreements on the Dutch model, with some of its developing country partners. EU trade policy also requires serious attention, both for the negative signals it may currently be sending to sustainable production in developing countries, and for the scope to develop a new generation of sustainability preferences, perhaps on the ICREA model.

(xvi) Partnerships between public, private and civil sectors along the chain from production to consumption also were a common theme in successful initiatives to improve environmental performance in developing countries (eg ECO-O.K. bananas and the Forest Stewardship Council). The UK Government could use its influence in important ways to stimulate new partnerships between British business, environment and development agencies to raise environmental standards of imports and generate additional development benefits in developing countries. As suggested in the cotton case study, *Going for Green* could facilitate a new joint venture on this type.

(xvii) Companies, both producers and retailers, are not providing adequate information to their customers and stakeholders in Britain on their overseas impacts. Organisations such as Business in the Environment and the Environment Council are encouraging companies to integrate environmental concerns into their supplier policies, while the CBI, ICC and ACCA are stimulating companies to report on a voluntary basis on their environmental performance, including international impacts. Particularly in light of recent concern over the behaviour of

British multinationals in Africa, now would appear to be an appropriate moment for a collaborative initiative to set common standards for corporate disclosure on overseas impacts.

(xviii) Britain's largest footprint arguably arises from the City of London. There is far too little research and action applied to the impacts of Britain as home to one of the world's premier financial markets. Citizens should need to know far more about the influence of investments made in developing countries by UK pension funds and investment companies. Within the context of wider EU efforts to achieve sustainable development through the follow-up to the Fifth Environmental Action Programme and the White Paper on Growth, Competitiveness and Employment, the UK could take a lead in examining both the impact of financial markets on developing country prospects for sustainable development and the options for improvement.

(xix) The foundations for citizen action need to be built at the local level, within the community. Citizens need to support and encouragement from those around them to take the necessary steps to help lighten and reduce Britain's footprint. There is great potential for using the footprint image to integrate the external dimension into local Agenda 21 processes.

In conclusion, there is both a growing concern about our impacts abroad and a desire for practical change. The former may be symbolized as a perception of a "blind trampling foot", whereby we in Britain create a range of social and environmental impacts elsewhere in the world, largely invisible to the UK citizen, and the latter as the "enabling hand". Much more can and needs to be done to assist developing countries establish the sustainable production and trading systems that allow both them and us to benefit from their scarce environmental resources.

ANNEX 1: Basis for estimating the Ecological Footprint of the UK's Wood Product Imports

The following steps were taken:

- 1 Obtain the volumes of different wood products imported (in 1992) for each of the main categories, by country of origin
- 2 Multiply each volume by a conversion factor, to obtain a volume in roundwood equivalent for each type of product
- 3 Identify the proportions of production from each country that are (a) from deforestation i.e. from forest removal, with no planned regeneration of forest; and (b) from forest that is used more-or-less on a continuous basis i.e. (managed) forest that will regenerate. For (a), growing stock and average logging intensity figures were used; and, for (b), the net annual increments for that country on a national-average basis were used.
- 4 Using factors from 2 and 3 above, and the volumes from 1 above, estimate the forest areas (a) deforested or (b) under continuous use for providing the UK with products

Step 1: Volumes of forest products imported to the UK in 1992

Notes: In each table, the 15 largest exporters worldwide are listed individually, with all other traders listed as 'developed NES' (not elsewhere specified) or 'developing NES'. Countries which have significant exports on a global scale, but who do not export to the UK, are not included in the tables; hence some tables include less than 15 individual countries. The countries which constitute the 'developed NES' and 'developing NES' vary for each category, according to which countries form the 'top 15' exporters.

Table 1. UK imports of industrial roundwood (coniferous), 1992.

Exporter country	('000m ³)
Poland	1
France	5
Sweden	5
Developed NES	97
Total imports to UK	108

Table 2. UK imports of industrial roundwood (non-coniferous) from tropical countries, 1992.

Exporter country	('000m ³)
Malaysia	2
Myanmar	2
Cameroon	2
Liberia	2
Brazil	1
Cote d'Ivoire	3
Ghana	1
Indonesia	1
Developing NES	5
Total imports to UK	19

Table 3. UK imports of industrial roundwood (non-coniferous) from temperate countries, 1992.

Exporter country	('000m ³)
France	19
USA	118
Germany	9
Switzerland	1
Developed NES	39
Total imports to UK	186

Table 4. UK imports of chips, particles and wood residues, 1992.

Exporter country	('000m ³)
Germany	2
Canada	1
France	11
South Africa	1
Netherlands	3
Belgium/ Luxemburg	3
Ireland	19
Developed NES	4
Total imports to UK	44

Table 5. UK imports of sawnwood, 1992.

Exporter country	('000m ³)
Canada	2255
USA	159
Sweden	1707
Malaysia	192
Finland	840
Austria	3
Russian Federation	690
Germany	69
Poland	76
Norway	123
France	20
New Zealand	4
Portugal	462
Ex-Czechoslovakia	14
Chile	93
Developed NES	374
Developing NES	203
Total imports to UK	7284

Table 6. UK imports of wood-based panels, 1992.

Exporter country	('000m ³)
Indonesia	278
USA	355
Belgium/ Luxemburg	330
Canada	91
Malaysia	100
Germany	135
France	124
Austria	36
Portugal	232
Brazil	98
Switzerland	20
Finland	126
Singapore	28
Spain	65
Developed NES	423
Developing NES	71
Total imports to UK	2512

Table 7. UK imports of wood pulp, 1992.

Exporter country	('000m ³)
Canada	343
USA	379
Sweden	237
Brazil	80
Finland	238
Portugal	117
Chile	70
New Zealand	2
Spain	107
Norway	80
France	12
South Africa	8
Russian Federation	28
Belgium/ Luxemburg	84
Germany	15
Developed NES	15
Developing NES	340
Total imports to UK	2155

Table 8. UK imports of paper and paperboard, 1992.

Exporter country	('000m ³)
Canada	581
Finland	1400
USA	298
Sweden	1429
Germany	557
France	431
Austria	137
Netherlands	249
Japan	11
Norway	305
Italy	85
Belgium/ Luxembourg	100
Switzerland/ Liechtenstein	34
China/ Taiwan	1
Developed NES	328
Developing NES	111
Total imports to UK.	6057

Step 2: Conversion factors for estimating roundwood equivalents

In the production of a cubic metre of forest products, a certain amount of the log is wasted. Hence a conversion factor is required in order to assess the volume of logs used to produce given products.

This varies enormously by product and by country. For example, in Cameroon, 3 m³ of logs are used to manufacture 1 m³ of sawnwood (which has the value of 2 m³ of logs!). And, in some forests, for every m³ of logs taken out, another m³ of wood is damaged in the standing stock. For this global exercise, we have not attempted to define country-specific conversion ratios. (This will tend to mean that we have been generous in our estimate for some developing countries, and conversely will have overestimated the volume of wood required to produce a given product in some developed countries.)

Very general conversion percentages into roundwood equivalents, using FAO standards, are taken as:

Industrial roundwood	100%
Sawnwood	65%
Wood-based panels	50%
Veneers	50%
Plywood	50%
Particle/fibreboard	75%
Wood pulp	75%
Paper and paperboard	65%

Step 3: Proportion of production from deforestation; and proportion from continuously-used forests

Net Annual Increments m ³ /ha/ann	Growing stock m ³ /ha	% clear-cut with no regen	
Boreal:			
Canada	1.7	106	20
Russia	1.4	90	90
Norway	2.6	112	
Finland	3.2	85	
Sweden	3.0	112	
Temperate:			
USA	3.6		
China	2.3		
Germany	5.6		
France	4.1		
Switzerland	6.5		
Spain	4.3		
Portugal	4.4		
UK	5.6		

Other temperate 4.0

Tropical:

Tropical natural	2.0	300	50
Tropical and sub-tropical plants	20.0	300	

Volumes m³ extracted per hectare under typical logging in the tropics (Poore)

Africa	20 (range 5 - 35)
Asia	80 (range 50 - 120)
Latin America	5

Sources: NAI and growing stock volumes from UNECE and FAO The forest resources of the ECE region, Geneva, 1985. Percentage clear-cut Canada from The state of the Environment Canada; percentage clear-cut Russia from The Netherlands and the World Ecology; tropical figures from Poore et al, No Timber Without Trees, 1989

Step 4: Estimation of the UK's Forest Product Import Footprint

	ha forest continuously producing for UK	annual ha forest cut/sev degraded for UK
Ind roundwood conif	23,262	517
Ind roundwood nonconif tropical		912
Ind roundwood nonconif temperate	19,539	
Chips, particles, residues	15,028	
Sawnwood	2,041,915	28,653
Wood-based panels	1,020,307	17,843
Wood pulp	856,928	12,882
Paper and paperboard	2,398,563	5,962
Total	6,375,542	66,769

ANNEX 2 Making forest certification effective

1 *Focus on the forest level:*

In certification, this area is defined as the Local Forest Management Unit (LFMU). The LFMU may be managed by a single owner or operator, a group, a community, or even lie within a single administrative boundary within which forestry activities are regulated by a national forest service.

2 *Designed as a market-based instrument:*

Certification is an economic *market-based instrument* which aims to raise awareness and provide incentives for both producers and consumers towards a more responsible use of forests. It is an especially appropriate choice of instrument where:

- *there is a strong willingness amongst consumers to pay the extra costs associated with the instrument or;*
- *any associated increase in cost associated with the instrument is offset against other commercial gains.* In certification these could include: (1) medium-term gains in efficiency and productivity; (2) protection of market share and increased marketing opportunities through product differentiation; (3) reduction of environmental risk, resulting in better access to financial markets for loans, rights issues, insurance, etc; (4) better stock control; and (5) improved image in "green" conscious markets and with employees.

3 *A tripartite structure: forest operator; certifier; accreditor:*

Figure 3 illustrates how a certification programme should be structured. In essence, the enterprise has to be certified by an independent certification body; and to ensure that the certification body is capable of objective judgement according to the standards selected, the certification body needs to be accredited. It is for accreditation of all types of certification bodies that the Forest Stewardship Council was set up. The FSC does not itself certify; rather it attests to the quality of the individual certification body and the appropriateness of the standards used.

4 *An environmental management system, and a policy of continuous improvement, in the enterprise/LFMU being certified:*

An EMS is required so that the forest enterprise can keep track of how it is meeting the standards required for certification, for setting targets to improve performance, and for generating some of the information sought by the certifiers. ISO 9000 can be used as a guideline for setting up an EMS.

5 *Meaningful, agreed standards:*

The issue of standards is one that has attracted considerable attention. It is bound up with the process of achieving consensus on a definition of sustainable forest management. Here,

we go into some detail, as standards are at the heart of certification's ability to highlight footprint impacts.

Certification requires clear standards at the appropriate level, which are able to assist the practice of certification being precise, unambiguous and repeatable in its assessment.

There are different types of standard which can be categorised as either being *external*; or *internal* to the LFMU. External standards are those set by third party independent bodies. These are usually international or national bodies; and all stakeholders usually participate in the standard setting process. Internal standards are those developed by LFMUs to describe the level of performance which their forestry activities must reach. Internal standards are interpreted from external standards and are specific to the LFMU. A vital part of the certification process is an assessment of this interpretation by the certification body.

Various attempts have been made to produce *guidelines* for forestry activities. These require considerable interpretation, and may provide insufficient guidance to certification bodies and forest managers. It is usually necessary to develop principles and criteria. *Principles* should define the standard's scope. *Criteria* should set out the key elements or dimensions that define and clarify the principles. Both the principles and criteria - together with institutionalised checks and balances within the certification programme - should enable accurate forest-level interpretation by the certification body and the LFMU.

Where international harmonisation is required because of trade considerations - as is the case in certification - it is preferable that a single external standard is developed at an international level for direct application by the LFMU. This, for example, is the practice followed with ISO standards. ISO standards are internationally recognised and directly applied by individual operations. The ISO standard for quality management systems - ISO 9000 - is an example of a successful external standard which has international recognition and can be directly applied by local management.

As one of the objectives of certification is to improve the management of forests *worldwide*; and because wood and paper products are important in world trade; it is inevitable that external standards for certification will have to take international considerations into account. In particular, the standards that are set need to be compatible with issues of free trade.

External standards must therefore allow flexibility to take account of different forest types, practices and objectives. They should not be overtly specific, which would effectively exclude imports of like products from being eligible. In order to safeguard that flexibility in standards does not result in reduced performance by the LFMU to unacceptable levels, it is equally important that certification bodies use internationally-established norms for their operation; and that internationally acceptable accreditation procedures are observed. Preferably these should be ones already defined by ISO and used by recognised national competent bodies experienced in the regulation of certification programmes.

There is, of course, a fine dividing line between trade discrimination and the competition between LFMUs which is required as part of certification.

Standard-setters must recognise that: (1) full information on critical variables probably does not yet exist; (2) standards and the performance of forest operations will improve over time; and (3) standards need to be simple and helpful, not complex and a barrier to progress.

There is more agreement on what is unsustainable, and on the basic elements of good forestry, making it easier to agree standards on such a basis. Standards for sustainable forest management will evolve as experience with and confidence in certification progresses. As in other spheres, standard-setting should be evolutionary.

External standards have to be acceptable to stakeholder groups. Participation is required to ensure that the perspectives and needs of different groups are included in setting external standards. An important consideration in so doing are the costs of implementing particular standards. In general, demanding standards are costly to meet; and detailed standards are costly to assess. Pitching the initial level required by external standards at just below current industry best practice ensures that they can be attained.

Internal interpretation of external standards set in this way should reflect a practical progression from: (1) cutting out unsustainable practice to; (2) introducing quality management that will form a basis for sustainable practice to; (3) achieving sustainable forest management itself.

Managers of LFMUs and certification bodies are required to come to a judgement regarding certification, knowing that environmental and social priorities may have to be compromised locally by the financial demands of the LFMU; or by the need to adjust to major events such as fires, insect attack, disease and storms, which severely disrupt the diversity and age distribution of the growing stock.

To cope with such situations, it is important that both the LFMU and the certification body incorporate appropriate procedures into planning and management systems. An assessment of the adequacy of management systems, to cope with such situations, should be an integral part of the certification process.

To summarise - good standards should satisfy well-defined and realistic boundary conditions; and be consistent and harmonised between external and internal levels and between different forest types.

6 *Assessment of management systems and documentation as well as at forest level:*

As implied above, certification is not merely a question of checking forests at field level. Rather, it involves document review (particularly those managed by the EMS) so that the systems in place for sustainable forestry can be checked, as well as sample field checking. The kinds of requirements that should be sought from LFMU operators are illustrated in Figure 4. Importantly, LFMU operators need to be reviewed regularly, so that consumers can be assured of their continual performance. Review inspections may revoke certificates if necessary; or, if only minor infringements are noted, Corrective Action Requests may be issued.

7 *Verifiable chain of custody and integrity of labelling claims:*

Once a forest has been certified, it is important that the products from that forest can be labelled as such, and kept distinct from other forest products. The international timber trade has gone to some lengths to avoid or evade tariff and non-tariff restrictions; the label must be secure against fraud. Where the forest operator and/or buyers of wood from the certified forest want to label the wood as coming from such a forest, they must apply for chain of

custody inspections. Chain of custody can be defined as *an unbroken trail of acceptability that ensures the physical security of sample, data and records*. Figure 5 illustrates the typical assessment requirements for chain of custody inspections. Products need to be identified and segregated, and require physical evidence that the certified product originates from a particular source, requiring a secure data capture and communications systems running parallel to the physical evidence. It is crucial, for credibility to be maintained, that the chain of custody remains intact throughout, particularly at stages where responsibility for the goods changes hands. Essentially, therefore, chain of custody is a stock control exercise; each organisation in the chain needing to keep records of purchases, stocks, production, and sales.

Certain physical labelling requirements must be in place. These will, to some extent, depend on the type of goods - hardwoods may use expensive bar-code systems, whereas low-quality or composite material may require a system of batch segregation and paper controls based on seals, codes and stamps.

8 *Moderate costs and technological requirements that do not prejudice against certain groups:*

Certification has two types of cost. Firstly, the direct costs of certification itself. Secondly, the indirect costs of restructuring necessary in order to reach a certifiable standard - better planning, training, forest management, silviculture, documentary procedures, etc. In many instances, the latter is likely to be more difficult and expensive than the former. Indeed, if systems are in place for sustainable forestry, those systems will both produce the data required for certification and enable the manager to keep on track for certification. The direct costs for a certificate for a 100 000 ha natural forest concession in the tropics are about \$22 000 per year.

Annex 3 - Results of IIED's Consultative Seminar on Ecological Footprints

IIED hosted a Consultative Seminar on Citizen Action to Reduce Ecological Footprints on 20 February 1995 to learn the experiences of a range of leading academics, environmental organisations, development agencies and local groups were interpreting and using footprints and other concepts. The seminar drew 20 participants from the Environment Council, Farmers' Link, the Fairtrade Foundation, Friends of the Earth, Global Action Plan, Greenpeace, London First, OXFAM, the Royal Institute for International Affairs, the SAFE Alliance, the Women's Environment Network, the World Wide Fund for Nature, as well as the Department of the Environment.

Introduction: Koy Thomson, IIED.

Background to Footprints in the UK

- * Footprints launched at the Green College Seminar and concerns for a new Foreign Policy Focus on Sustainable Development.
- * Theme of footprints taken up by environment and development organisations, and by the DoE, in its National Sustainable Development Strategy.
- * Diverse work on footprints (eg UNED-UK, Avon County Council...)
- * Parallel work in Europe (eg FoE Environmental Space).
- * Footprints is attractive, because it deals with an issue that Rio failed to come to terms with (eg justice, fair shares, equity, limits and ecological constraints). An attempt by NGOs and academics to quantify sustainability in response to the over-emphasis on process at Rio.
- * In 1994, IIED suggested to DoE that we might review the concept.
- * IIED's work linked with *Going for Green*, which lacked an overseas component.

Three Questions for the Seminar

1. To what extent is the concept a repackaging of old ideas? Repackaged because we have failed to communicate the issues to the public and to policy makers in a way which is striking and 'resonant' ?

The concepts provide a new perspective or spin - a new vocabulary to communicate complex issues: to grab the imagination and to force action. Or simply new colours to freshen a drab environmental message? In other words their main use is pedagogic or awareness raising.

2. Are the concepts actually a new way of assessing the impacts of human and economic activity - are they of real scientific, policy, operational significance?

Can the footprints approach help to measure sustainability? or is it a way of helping us make policy links, between impacts, equity and shares ?

3. Are these new wave of ideas a vain reductionist attempt to come up with a common currency of impact - a theory of everything, which can only lead to hubris ?

Economists use money as a proxy; footprints uses land area; food miles takes distance as the key determinant, while the Wuppertal Institute measure mass.

Environmental Space: Duncan MacClaren, Friends of the Earth

The Sustainable Europe campaign launched by Friends of the Earth (FoE), builds on the work of the Dutch and aims to stimulate national debate in the 26 participating countries and to feed into existing debates. The campaign takes the notion of environmental space as its starting point, which expresses the need for sustainability constraints to be placed on economic activity so that future generations inherit sustainable systems. In calculating environmental space, FoE take what they call a 'precautionary approach', and assume global equity as a starting point, a so-called 'right to a fair share'.

Footprints were interpreted as "distant impacts" on other peoples' environmental space. Thus for some; the term 'footprint' is an umbrella expression for a variety of quantitatively and qualitatively expressed causes and impacts, encompassing social, environmental and economic factors, while for others, it has a specific meaning relating to measurable impacts, and their conversion to a single figure expressed in land area equivalents.

FoE distinguish 'efficiency strategies' which are undoubtedly needed, with 'sufficiency strategies'. If we are to take a precautionary approach, FoE say, we should anticipate the possibility that efficiency gains may not be enough to keep human and economic activity within environmental space constraints. The ground therefore needs to be prepared for 'sufficiency strategies' which examine issues of needs, wants, values and lifestyle changes. FoE stress that while both efficiency and sufficiency strategies may entail cuts in consumption, they will not entail cuts in well-being.

The 'outputs' of the environmental space research will be 'inputs' into the broader environment and development debate. FoE suggested that although 'environmental space' as a concept does not necessarily deal with new issues, it is a 'repackaging', not because FoE and similar organisations have failed to communicate issues, but because there is a new context for the debate, which extends the boundaries of national environmental concerns to other nations, and to the global environment.

In FoE's view the 'quantification' of impacts is important to demonstrate that 'sustainability constraints' are not a marginal concern, nor a distant theoretical possibility, but of direct policy relevance.

Food Miles: Angela Paxton, SAFE Alliance

SAFE Alliance's work on 'food miles' arose out of its concern at the social and environmental impacts of the long-distance transport of food, particularly unseasonal imports

into the UK (eg Kenyan green beans). The low-costs of fuel and the power exerted by transnationals and multiple retailers were cited as the main drivers for increasing distance between production and consumption. Recommendations for action, include 'buy local' and increased taxes to internalise environmental costs into transport prices.

SAFE recognised that there was some concern whether transport by itself was a significant factor in environmental degradation, but stated that fair trade strategies was a way of overcoming the protectionist implications. In the UK, the phrase has caught on since the launch of the report in October 1994, particularly in the farming community who see advantages in its emphasis on import substitution.

London's Footprint: Herbie Girardet, London First

Herbert Girardet presented the findings of his research on London's environmental metabolism, which focuses on measuring the inputs and outputs required to sustain the city's consumption levels. Using this as a base, Girardet then presented some rough footprint assessments for London. For example, London's food footprint is 53 times the surface area of the city itself, while the land required for its food, timber and carbon absorption requirements was given as 120 times London's own area.

A number of points were raised in discussion:

- * What does the concept add in policy terms? Should the size of this footprint lead to rural resettlement, for example?
- * What is the comparative footprint/ metabolism of the alternatives, for example, thousands of villages or hundreds of towns, instead of one London?
- * What of the development impacts? Reducing our footprint could cut incomes for peasant farmers and through the poverty-environment link, increase net environmental impact.
- * The impact in footprint terms of London being the second greatest exporter of capital (the City of London), should be examined.
- * Footprints provide an intellectual framework for public and corporate planners in which to make trade-offs. But footprint analysis is not a precise science: they will change with technology and population. Carrying capacity is a controversial concept that can be used to legitimise coercive population policies, as well as the temptation for countries which don't have dense populations to increase their populations, in order to gain a greater aggregate share of environmental space. Believing that carrying capacity was a fixed biological measurement and not culturally and technologically determined, can lead to wrong decisions.
- * Groups and organisations are already using the concept of footprint, for example, in the context of local agenda 21s. Avon, for example, have calculated their footprint using the Rees methodology, as being 40 times the land area occupied by Avon itself. Avon believe that the policy implication is to reduce the footprint through encouraging local production and economic activity and cutting down on trade. In a broader context, a participant advocated 'self-reliance' and a return to theories of 'concentricity'. It was pointed out that 'footprints'

as a concept was not value free, and that the metaphor encouraged a tendency towards being anti-trade (trade as expropriation), autarkic, and encouraging practices such as import substitution which had often failed in the past. So although 'footprints' as a concept may help in ensuring that local action does not miss international aspects, it can lead to the wrong development actions being taken.

Lightening the Footprint: IED Case Studies

Steve Bass presented his case study conclusions on the UK's timber footprint and the usefulness of certification as a tool for environmental improvement (see Section 3.3 and 4.2). He made a number of general points about the lessons from using the footprint approach:

- * It is not just the area, but the 'squashiness' of the ground that matters.
- * It is not just the size of the foot, but its heaviness that's important
- * "We are not looking where we are treading": information on the impacts of UK forestry is woefully inadequate..

Although footprints conveys a vivid image of distant impacts, it may be misleading said Nicolette Fox describing her prawns case study. Perhaps a footprint is better seen as a shadow is more accurate, particularly when an area of land has multiple uses (eg a mangrove forest providing prawn fry, timber ecological services, fish, etc), or is intercropped or multicropped: one use does not prevent other 'feet' being there.

Koy Thomson pointed to the problems involved in converting a variety of impacts into a single metric, land, creating a tendency to overestimate the impacts.

Fair Trade Labelling: Phil Wells, Fair Trade Foundation

The Fairtrade Foundation takes a pragmatic view that trade will continue, and that ideology will have to take a back seat. The issue is how to and provide improve the well-being of poor producers by creating markets for fairly traded products. Key to this is getting fair trade products out of a 'third world' ghetto, and bringing them into mainstream supermarkets. The Fairtrade Foundation awards its Mark to products that meet its minimum standards. Additional benefits, including a higher price then accrue to the producer. Critical to the growing success of the initiative is being transparent, being seen to be independent and earning consumer trust. Work is going on to develop fair trade criteria and standards across the EU.

Cafe Direct in the UK has gained a 2% market share, and this could climb to perhaps as much as 10%. In its voluntary form, fair trade is likely to be a niche market: despite 25 years of intensive campaigning on fair trade issue in Holland, fairly traded Max Havelaar coffee only has 2-3% of the market. Switzerland which is the most 'successful' campaign, has two major supermarkets on board, and yet still only have 5% of the market. Yet at the same time, it is clear that a minority of consumers can often move markets by prompting across the board changes in corporate policy and stimulating policy initiatives to level the playing field.

Household Action: Trewin Restorick, The Global Action Plan

Originally developed in the USA, GAP now works with 25 local authorities, 3 corporations (British Gas, Cable and Wireless and Lucas) and 2 NGOs (WWF/Groundwork), as well as over 1,500 households in the UK. A six-month programme of action, guides participants through some basic steps to reduce waste and resource use: in the first year in the UK, reports suggest a 37% cut in household waste and a 12% reduction in water use. Although the fifth month's programme deals with shopping, and mentions fair trade and other third world issues, communicating distant impacts such as footprints to households was seen to be very difficult: people like to see tangible results.

CONCLUSIONS

1. There are two main interpretations or uses of the term 'footprint'. One emphasizes the quantitative aspects and sees the utility of the concept in terms of what it can add to quantifying and integrating distant impacts. The other interprets the term very broadly as a visual umbrella to collect all of a nation's distant impacts - social, economic, institutional and environmental. Supporters of this second interpretation are not so interested in the quantitative or methodological aspects of calculating footprints, nor by implication, the potential that a 'quantification' might have for informing policy choices. They see value in the term as a metaphor for distant impacts, and as a way of systematically addressing them.

Both 'camps', however, agree that the most important added value of 'footprints' as an idea is pedagogic, for teaching, communicating, raising awareness, and getting people to focus upon and be concerned about 'distant impacts', which are easy to ignore by virtue of their distance.

Both also agree that more research is needed to go beyond the issues of the calculation of a footprint, to answering what it then means in policy terms.

2. There was general agreement that if 'footprints' as a term - or more precisely 'ecological footprints' - does not include social impacts, that is a serious flaw. As someone pointed out, you cannot put a "hectareage on human suffering".

3. A general theme at the meeting was a reluctance to see the 'footprint' debate reduced to 'consumer' action rather than 'citizen' action. A concern was expressed that the Case Studies seemed to emphasize the role of the consumer, not the role of an individual as part of a citizen's group, or as a political decision-maker. Further, the group wished to emphasize the role of government as an active enabler -not only as a necessary complement to individual or group action as the report stated, but as a necessary pre-requisite.

4. The Footprint concept should be used as a tool for educating decision-makers, and for training civil servants and officials (DoE, ODA and so on).

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