Exploring the Application of the Ecological Footprint to Sustainable Consumption Policy

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1. Introduction

The issue of sustainable consumption encapsulates many of the environmental impacts we face today. While we may not necessarily see the effects of consumption of products directly, somewhere on Earth emissions to water, air and land as well as other adverse environmental impacts like land degradation are caused along the production and supply chains of these products. Even though consumption has been a long-neglected topic in dominant environmental discourse there are indications that it is now moving closer to the centre of contemporary policy-making (Cohen 2001[1], DEFRA/DTI 2003a[2]). This is one of the potential reasons for the ecological footprint's popularity; the increasing acknowledgment of the environmental impact being placed on other countries by the developed world through their consumption patterns. At present there are no indicators in the UK that addresses this issue. The ecological footprint provides an overview of the developed countries dependency on energy and materials. The UK government's preliminary set of sustainable consumption and production indicatorsonly show whether the UK has managed to "decouple" economic growth from environmental degradation (DEFRA/DTI 2003b[3]). Not one of the indicators has been able to address the issue of shifting environmental pressure onto developing countries by the UK although there is the chance ot include this issue in a revised set of indicators.

Regional and local governments within the UK have shown a strong interest in the issue of global responsibility and many organisations have ended up considering the use of the ecological footprint as a comprehensive indicator of sustainable consumption.

The objective of this paper is to review how the ecological footprint approach has been applied in policy and assesses the effectiveness of the various methods employed in its application. Results of a survey of all the local authorities that have undertaken an ecological footprint study in the UK are presented. Three case studies of UK local authorities are highlighted. It will be confined in its review largely from the UK context.

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[1] Cohen M.J. (2001) Exploring Sustainable Consumption – Environmental Policy and Social Sciences, Eds. Cohen M.J. & Murphy J. Pergamon, Elsevier Science.

[2] DEFRA/DTI (2003)a, Changing Patterns – UK Government Framework for Sustainable Consumption and Production, www.defra.gov.uk/environment/business/scp

[3] DEFRA/DTI (2003)b, Joint DEFRA/DTI consultation paper on a set of 'decoupling' indicators for sustainable development, www.defra.gov.uk/environment/business/scp

2. The Ecological Footprint

The ecological footprint (EF) provides an aggregated indicator of natural resource consumption (energy and materials) in much the same way that economic indicators (such as Gross Domestic Product or the Retail Prices Index) have been adopted as a way of representing dimensions of the financial economy. Co-originated in the early 90s by Professor William Rees and Dr. Mathis Wackernagel, ecological footprint analysis has rapidly taken hold and is now in common use in many countries at national and local levels. Its application includes analysis of policy, benchmarking performance, education and awareness raising and scenario development.

EF essentially accounts for the use of the planet's renewable resources. Non-renewable resources are accounted for only by their impact on, or use of, renewable, bioproductive capacity. The ecological footprint deals only with demands placed on the environment. It does not attempt to include the social or economic dimensions of sustainability. The footprint is a 'snapshot' estimate of biocapacity demand and supply usually based on data from a single year. Both available biocapacity and the eco-efficiency of the economy can change over time which is why it is not possible to forecast or 'backcast' footprints from current data although it is possible to make assumptions about future consumption and thus create informative scenarios.

The EF of a region or community is defined as the bioproductive area (land and sea) that would be required to sustainably maintain current consumption, using prevailing technology. Probably the most important dimension of the ecological footprint is the fact that impact is related to the population of the city or region that consumes the goods and services. Traditionally, environmental pressures were mostly local or national, meaning the consumer was affected by the environmental consequences of the production. However, with recognition of global environmental concerns (eg climate change) and an increasingly globalised economy, geographic location of environmental pressures has little relation to the location of consumption. EF takes on the task of re-allocating the environmental pressures to the consumer.

The ecological footprint is defined as consumption (measured in, for example, kg) times production efficiency (hectares/kg). Production efficiency in ecological footprint terms means simply how much bioproductive area it takes to produce one unit service of a given product. The ecological footprint depends on the efficiency of production – for a given farmer/county/state/country, their footprint varies depending on whether they use more or less area to produce a given unit of goods or services.

The basic ecological footprint is an additive model. It sums several mutually exclusive uses of bioproductive area: arable, forest (for both wood products and carbon sequestration), pasture, degraded or built land, and sea space. A key issue in the calculation of ecological footprints and biocapacities is the method used to aggregate areas of different quality facilitating international comparisons. Areas of generally different productivity (arable, pasture, forest, sea) are 'normalised' by multiplying them by equivalence factors relating to their bioproductivity. The equivalent areas are then expressed in standardised global hectares as described earlier.

Use of fossil fuel-derived energy is typically accounted for in terms of its carbon dioxide emissions although it is also possible to assess ecological footprints of energy use in terms of the land area required to sustainably derive biofuel alternatives. The former results in a more conservative estimate of the impact of fossil fuel use and have thus been the more common method.

2.1 The popularity of the ecological footprint

A range of regional ecological footprint projects have been produced including the South East[4] and London[5]. Starting in 2004 the project, 'Ecological Budget UK' project will undertake a detailed resource flow analysis and ecological footprint of the UK by regional development area (RDA) and devolved country[6]. The project will ensure that a structured analysis of material and energy flows of each RDA has been undertaken and it will also calculate the ecological footprint of each RDA to highlight the impact of such flows.

At present, there are a growing number of local authorities that have conducted an ecological footprint for their local authority area and are applying the results. One of the first ecological footprints of a local authority was undertaken for the Isle of Wight. Since this initial study, Ecological Footprints of Liverpool, York, London, five Scottish cities; Aberdeen, Dundee, Edinburgh, Glasgow and Inverness, as well as Angus and Brechin, North and North East Lincolnshire, Herefordshire and Oxfordshire and Essex have all been undertaken. The islands of Jersey and Guernsey have also been footprinted. The Scotland's Global Footprint project – a partnership between WWF and Scottish local authorities began in 2004.

3. Applications of the Ecological Footprint

The fundamental ideas behind performance indicators are to assess/evaluate progress and promote improvement. The Department of Food, Environment and Rural Affairs has described indicators as "central to the monitoring and reporting of progress towards sustainable development".

A survey was undertaken of all the local authorities that have undertaken an ecological footprint study in the UK. In this section the results of this survey study are presented.

North Lincolnshire Council stated that it was an important tool to assist in developing a community- based approach to sustainable development. This involves the integration of the ecological footprint into the community planning process through "Local Strategic Partnerships" (LSPs) and the "Community Strategy".

Other important reasons for conducting an ecological footprint study were to analyse potential scenarios to determine targets and predict footprint reductions, to assist in sustainable development and environmental strategy formation and to provide a snapshot in time to inform local agenda 21 and community strategies.

There was a general consensus amongst respondents that the ecological footprint would act as a baseline data set from which future projects could be performed. The overall results suggested that the general aim of footprint studies have been more focused towards that of public awareness and education with its use as a policy tool taking a more secondary role.

The majority of the local authorities found the results of their ecological footprints to contain valuable and interesting results. York City Council stated that it was very useful to gauge themselves against the average earthshare of land of 1.9 global hectares as well as gaining new insights from including such a broad range of data. Camelford reported that

[4] www.takingstock.org
[5] www.citylimits.org
[6] For more information on this project please contact the Dr. John Barrett (jrb8@york.ac.uk)

they were surprised at the larger size of the EF and the large impacts of waste, nourishment and mobility. In contrast Angus city council said that the results were not that surprising however it did provide them with a very useful data set.

The questionnaire revealed that in both the UK and elsewhere the most important perceived outcome of ecological footprint studies has been the interest that it has created from local residents, environment groups and other key individuals due to its resonance. Mersey Travel stated that it "Identified a way forward with regards to making the academic research more accessible by developing an educational tool". This response was supported by York City Council who said that the EF "Offers a focus for policy and action that is tangible and measurable, academically compiled and easy to understand". Outside the UK this view was also supported. The university of Oslo who carried out an Ecological Footprint for the city reported that they were surprised at the large scale of media interest. This had the knock on effect of informing NGO's and environmental officers at differing levels of government increasing the level of awareness of the Ecological Footprint.

With regards to internal promotion of the Ecological Footprint Angus Council had very positive experiences; " people were interested in the project just because it was unusual – they hadn't heard of an EF before. The concept is easier to understand than sustainable development – that term just switches people off". It was recommended by a number of local authorities that the concepts and ideas had to be promoted in a very simplified manner that was easy to understand as decision makers want things "simple and short".

A wide variety of methods have been used and suggested by local authorities as to the best way of communicating the EF results to policy makers. These included gaining good PR through involving the press, producing a short one page colourful summary and conducting a simple, lively presentation that policy makers could understand using simple examples from their lives. It has also suggested that a presentation conducted by an expert in the field is highly useful as they can answer difficult questions and help to convince sceptical policy makers. The city of Vantaa recommended that it was best to produce a publication before conversing with policy makers as it was important to get the initial ideas into their heads.

In conclusion the main purposes for undertaking ecological footprint studies were:

- Use within the "Community Plan"
- To analyse potential scenarios to determine targets and predict footprint reductions
- To assist in sustainable development and environmental strategy formation
- To provide baseline data set from which future projects could be performed
- To provide useful information to undertake public awareness and education campaigns
- To use the ecological footprint as a key performance indicator

3.1 Policy Outcomes

The ecological footprint is a tool that can be used to inform policy makers on the impacts of the different policy options that they are considering. From this information it should then be feasible to derive a range of policy options that can lead towards the development of a comprehensive sustainable development strategy. For example, Oslo city recognises the use of the footprint to evaluate the alternatives in development processes, for example where there are specific requirements for energy efficiency, land use management and

essential infrastructure. Both the construction process itself and the subsequent use of the housing would thereby be subject to a form of environmental management. Most Local Authorities reported that it was difficult to identify concrete policy outcomes as a result of the Ecological Footprint study. It has however been noted by a number of people, including Lewan Lillemor from Lund University, that the Ecological Footprints have spread the insight of scarce natural resources and western land appropriation. Angus Council commented that the ecological footprint project helped to raise environmental issues amongst elected members. Although they cannot be sure that policy outcomes are a direct result of the Ecological Footprint study a number of important initiatives have been put into practice since the completion of the project. These include the implementation of a fair trade policy, the investigation of a Green Procurement policy, the set up of a group for monitoring I.T waste issues, the further development of a Green Transport plan and the development of a State of the Environment Report for Angus. Bristol City Council has used their Footprint study as a key performance indicator within their community strategy to evaluate the interest in sustainable development. York City Council also stated that they would be using the footprint as part of their community plan but would also use it as a monitoring tool as part of the councils Environment Management Strategy. The Borough of Telford and Wrekin have made the Ecological Footprint part of the local strategic partnership thinking and have also used it to help form organisational policies.

To support local authorities a number of software tools have been produced or are in the process of being produced to support local authorities and make the task of undertaking an ecological footprint less arduous. FLAT (Footprinting Local Authorities Tool) allows local authorities in England to calculate a 'snap shot' ecological footprint of their area for 2000 and allows the user to compare their ecological footprint directly with that of the UK. Another software tool in development is REAP (Resource and Energy Analysis Programme). REAP is a scenario-based integrated resource/energy-environment modelling system. Its methodology is based on a comprehensive accounting of how energy and resources are consumed, converted and produced in a given region or economy under a range of alternative assumptions on population, economic development, technology, price and so on.

4. Experiences in Using the Ecological Footprint

Listed below are a group of case studies where the ecological footprint has been applied to policy. The first case study (Cardiff City Council) demonstrates the value of process and integration as well as being prepared before the start of an ecological footprint project. The second case study (Angus) identifies the value in adopting a community-based approach. The third case of York discusses how the ecological footprint was included in the Community Strategy along with the value of lifestyle scenarios.

4.1 Ensuring Longevity – Cardiff City Council Case study

4.1.1 Introduction

The above analysis clearly highlights that local authorities envisage a wide variety of policy applications. However, it is difficult to find examples of where a policy decision has changed solely because of an ecological footprint analysis. Partly this is due to the inherent complexity and inclusiveness of strategic decision-making. The Ecological Footprint may have helped focus the minds of the council members on a particular issue, the impact of imported food for example, but may not have been used to calculate the reduction that a

new farmer's market may have had on the ecological footprint. Of course, the subtle extent to which the footprint may have influenced policy is probably impossible to quantify with any certainty. It is safe to state, though, that there is no evidence that the ecological footprint has been systematically used to help construct, analyse, and measure and then monitor the effect of a specific policy within a local authority.

One of the main barriers identified by local authorities is not having the capacity to undertake such an analysis. Either an analysis of policy was not included within the project brief or the local authority officers do not have the tools to undertake the task after the completion of the project. Other barriers mentioned were concerned with "political buy-in" (or lack of it) of the ecological footprint and the sustainable consumption agenda. These issues are discussed below in more detail. As a case study to explore these issues it was decided to provide a case study of a local authority that is currently undertaking an ecological footprint study. The case study (Cardiff City Council) was seen as a good example for overcoming many of the problems faced by local authorities. Not every measure taken by Cardiff City Council may be directly relevant to other local authorities but the underlying principles of their approach are both transferable and applicable.

4.1.2 Background the Cardiff City Council (CCC) and the Ecological Footprint

The initial reasons that CCC wanted to undertake an Ecological Footprint study were two fold. Firstly, it concerned the policy level where CCC wanted to get a handle on the impact that Cardiff was having at a global level. Even though CCC had developed a range of sustainability indicators there was a feeling that these indicators did not consider the global impact that Cardiff was causing. CCC felt that this is an element that has been lost in many local authorities. Secondly at a practical level the ecological footprint could be seen as an educational tool and means of raising awareness. The first step that CCC took two years before starting the project was to include a commitment within the local Sustainability Strategy stating that Cardiff had a responsibility to reduce its global impact and that the ecological footprint would be employed to assess this impact.

4.1.3 Internal Steps undertaken by Cardiff City Council

CCC were concerned that previous ecological footprint studies didn't seem to be making that much difference on the ground. While the studies themselves were both highly interesting and scientifically robust the ecological footprint was not being employed to inform policy decisions. CCC believed that one of the key reasons for this was because the ecological footprint was not mainstreamed into the policy of the organisation. By relying on existing structures that had already been formed with CCC, the process of embedding the ecological footprint within the organisation.

As mentioned, the first step was to include the ecological footprint in the Sustainability Strategy. Even more important than this was including the ecological footprint within the Community Strategy as an established target. CCC believes that the Community Strategy is currently the driving force for local authorities. This is supported by a number of local authorities as national government has placed a significant emphasis on the strategy. The modernisation agenda suggests that the Community Strategy (or Plan in Scotland) is all encompassing with the local transport plan and other such strategies sitting below. It is an overarching strategy driving the performance of the business plan.

As well as the Community Strategy CCC also built the ecological footprint into the Performance Plan or Corporate Business Plan. All these actions were to ensure that internal stakeholders were aware that an ecological footprint project was going ahead. It was

important for CCC that internal stakeholders would not just be used within the data collection process of the project. This would disempower them by not consulting them and ignoring their valuable contribution to specific issues in Cardiff. To avoid this from the beginning of the project the internal stakeholders are thinking about the scenarios they could explore with the ecological footprint.

A cabinet report was produced on the ecological footprint. Permission was sought from the cabinet to engage in the project. In the report it stated that this project will have an affect on CCC policies and that all parts of the authority have to engage in the project. This was seen as essential and a very specific measure within the "buy-in" process.

A structure that already existed within CCC was an internal management group called the "Sustainability Advocates". The "Sustainability Advocates" consist of senior managers throughout the organisation from a wide range of departments including transport, economic strategy, housing, waste and planning. The function of the group is to embed the ideas of sustainability throughout the organisation attempting to ensure that the concept of sustainability does not just exist as a small branch of one department. The group meets regularly and has constantly been informed of the ecological footprint project. Presentations to the group have been made by ecological footprint "experts" to encourage political buy-in. This approach has ensured that politicians and senior managers know what to expect from the project, be ready to provide data and ensures that the ecological footprint will be put to use throughout the organisation. CCC strongly believes that the project cannot be run in isolation from the professionals who work in that field.

4.1.4 Conclusions

Since the project has started in Cardiff there has been a change in the potential use of the ecological footprint after project completion. In many respects the project has been seen as a "learning curve" a "process" where the full potential is being realised. CCC believes they have developed a more sophisticated view of the kind of impact it can have on the authority. They now see the footprint as more of a policy tool than an educational one. This contradicts the results from the questionnaire and it is possible that in other studies the full potential of the footprint have yet to be realised.

One potential criticism that has been faced is the idea that policies are not built on numbers and figures; they are based on trade-offs and what can realistically be achieved within the current political climate. Therefore, knowing what the impact of a particular policy is irrelevant. CCC would suggest that this is a simplistic argument. Politicians do need to think about the issues of economic growth and social welfare. The ecological footprint is not making the decision for you; it is providing sounder information about the relative impact of a policy. CCC has no doubt that having calculated the ecological footprint that it will have an effect on policy decisions. Policy development in the council is all about providing relevant information for decision support producing "evidence-based" policy decisions.

4.2 Integrating with the Community - Case Study of Brechin

Angus Council carried out an ambitious ecological footprinting project as part of its Local Agenda 21 Strategy for Angus. The main aim of the LA21 Strategy is to promote sustainable development as a means of improving the quality of life locally, while at the same time making a contribution to tackling global problems, and ensuring that the quality of life of future generations is also safeguarded.

The LA21 Strategy is closely linked to the Angus Community Plan that includes sustainable development as one of its three key principles. The process of preparing the Community Plan involved a partnership approach between the Council and key agencies supplemented by extensive consultation.

From the outset the ecological footprint was considered more as an educational and awareness raising device than one which drove policy. The ecological footprint was seen primarily as a means of empowering the community - as one means of communicating the concepts underpinning sustainable development.

Angus Council therefore decided to carry out a survey of households in the Brechin area to determine the size of the average household's ecological footprint. This involved inviting people to complete a questionnaire regarding their lifestyles, e.g. questions on travel, energy use, water, and shopping, waste and the local environment. The responses were analysed and reported back to the community.

This was the first **community based** footprint project in Scotland. An ecological footprint is normally calculated as a desktop exercise looking at resource flows in and out of an area and the results are then fed back to the community. However, this exercise **involved** the community in gathering the information to formulate the footprint.

Questionnaires were given out through schools in the Brechin area but were also available to the public through the libraries, housing office, and the local community centre. People were encouraged to take part through money-off vouchers for items that would help reduce their footprint, e.g. low energy "A" rated white goods and window blinds – donated by local stores. Other local businesses donated items for a prize draw, e.g. an organic food hamper, a bicycle, wild bird food and organic dog food. Everyone who participated in the project and returned a completed questionnaire received a free low energy light bulb.

Children participating through the schools all received a free goodie bag (made out of unbleached cotton), containing items which reinforce the message, e.g. recycled pens, pencils, rubbers, rulers, mouse mats (donated by the Scottish Executive), and wildflower seeds (donated by Scottish Natural Heritage) as well as leaflets containing information about the environment.

Pre publicity included a leaflet explaining the project, and the concept of ecological footprinting, being placed in the lid of every household's bin. Some publicity was also given through the local press, which included a photograph of schoolchildren participating in one of the schools and another with the businesses who sponsored the prizes.

A paper questionnaire was produced (on 100% recycled paper) because schoolchildren needed to take it home for help to complete it. However, people were encouraged to complete the questionnaire "on-line" at Best Foot Forward's website. Most of the schools had the children complete their questionnaires "on-line" and the website also included a facility for teachers to request an eco footprint for their class.

The questionnaire also contained an insert page giving "Footprint Tips" on how to reduce the size of a household's footprint. The "Footprint Tips" page was loose and could be retained by the recipient for future reference. The schools also received a "Footprint Challenge" leaflet giving numerous ideas for projects and offering prizes for the best ones.

Future plans include rolling out to the other burghs in the Angus area.

The project was part funded by the Fresh Futures/New Opportunities Fund and was match funded by the Council through "in-kind" contributions of officer time and cash for printing costs, purchasing the cotton goodie bags, and recycled pens, etc.

The ecological footprint concept is seen by the Council as being a very useful tool to communicate sustainable development issues to the community. The only setbacks experienced in this study concerned the questionnaire, which was described as having too many vague questions that did not expose any useful data. Questionnaires need to be concise and better targeted to suit their intended audiences.

The methods used for this project are easily replicable and other local authorities in Scotland have shown a great deal of interest. Indeed, a seminar was held in Arbroath in March 2003 on the topic of EF, which was very well attended by representatives of almost all the local authorities in Scotland through the Sustainable Scotland Network and WWF Scotland[7]. The interest in EF has grown enormously in recent years as both a means of communicating sustainability as well as a method of measuring our progress. This project provides a practical use to the concept, which may prove to be the catalyst for further "on the ground" projects in future.

4.3 Building the Ecological Footprint into the Community Strategy

One of the earlier ecological footprint studies in the UK was undertaken in York. With expertise at the local university in ecological footprinting, most individuals with an environmental agenda were aware of the methods. This was partly due to the members of the university playing an active role in local agenda 21 and other sustainability activities across the city. The Local Agenda 21 Steering Group were keen to undertake an ecological footprint study of the city. The opportunity arose under a one-year scheme introduced by the Energy Saving Trust called "Planet-York". Planet York was designed as a demonstration project that attempted to bring together communities to tackle the issue of climate change. Over the period of a year schools, businesses, energy suppliers, the City Council and householders were involved. The overall aim was to reduce the carbon dioxide emissions of the city. An ecological footprint study was undertaken to act as a tool for communicating the ideas of sustainability and linking local action to global issues. The project also undertook a number of practical measures to ensure a reduction in the ecological footprint and carbon dioxide emissions. These being:

- More than 10,000 homes fitted with energy efficient insulation, boilers, appliances and low energy lightbulbs;
- Cleaner air, with at least 100 buses, vans and trucks fitted with special pollution traps;
- Solar energy in the first schools, homes and businesses;
- 100 new vehicles running on clean fuel - LPG, natural gas or electricity.

The results available so far show that 5,000 householders and 79 businesses took part in Planet York. One of the results from the study, that is difficult to monitor, is how often the local press, environmentally concerned residents and the City Council now quote the ecological footprint. Numerous press articles quote the need to reduce the ecological footprint even though they do not have a technical grounding in the approach. It is a recognised term across the city and there is general acknowledgement that it is important to reduce the ecological footprint. One of the reasons for this occurrence was the seminars organised across the city to various interest groups. The project researchers made presentations to different groups in the City Council, environmental organisations, housing

[7] Sustainable Scotland Network: http://www.sustainable-scotland.net/

associations and general public groups. The researchers also appeared on the radio on a number of occasions that generated a lot of public interest.

After all this hard work there was a danger that the ecological footprint could still disappear from the policy agenda with a change in the "Sustainability Officer" and political parties in the May 2003 local elections. It is fair to state that the City Council were not sure what they were going to do with the study after the initial excitement. It was the enthusiasm of the Sustainability Steering Group that helped keep the momentum alive. A year after the study has been completed the ecological footprint is now forming one of the central themes in the Community Plan. The new Sustainability Officer is keen that the ecological footprint is adopted as an indicator for the city and the first "Strategic Aim" of the Community Strategy is:

"To reduce the ecological footprint of York to a more sustainable level"

The Environment Forum was established in January 2003 to ensure environmental issues were considered as part of the Local Strategic Partnership to produce the Community Plan. The group is chaired by a member of the Local Agenda 21 Steering Group and is made of representatives from groups in the city with interest in the natural, built and global environment. The group has produced its section of the Community Plan with strategic aims, key actions and success measures. All of these mention the Ecological Footprint of York. With advice from the Forum and officers a group of senior officers and councillors felt that measuring the sustainability of York was very difficult but that the Ecological Footprint provided and ideal opportunity to York.

5. Technical Issues

The respondents identified the lack of technical knowledge and expertise needed to be able to conduct a rigorous, consistent, reliable and comparable ecological footprint study as the greatest implementation barrier. While the final results may be easy to comprehend there are complex calculations underlying the ecological footprint. The city of Vantaa in Finland and the University of Oslo in Norway, as well as practitioners in the UK including SEI-Y and Best Foot Forward, have attempted to reduce the lack of technical know-how by giving lectures, providing opportunities for relaying information and holding discussions on the ecological footprint.

The experience of the authors in dealing with local authorities suggests that at the heart of this technical 'deficit' are the twin issues of data complexity and transparency of the methodology. Most local authorities appear comfortable with the principles underlying ecological footprint analysis but are concerned at what they often consider to be a 'black box' calculation.

As examples in the UK and Europe have demonstrated, what at first sight may appear to be a 'black box' becomes a lot more transparent with some minimal training on the methodology. This needs to be much more widespread. A lack of training is often, and wrongly, interpreted as an opaqueness of method. However, the problems of data complexity and lack of local data remain. Aggregated indicators, such as the ecological footprint, rely on a range of data sources and are necessarily time consuming and complex to calculate. This problem has been solved by some authorities in the UK and elsewhere in Europe by investing in calculation tools which save considerable time and effort.

Inconsistencies in the methodologies and results calculated are strongly prevalent even amongst the most technically experienced professionals in the field, raising scepticism of the methodologies being adopted. This problem was highlighted early on, in the European Common Indicators Programme resulting in the development of a standardised, transparent methodology for calculating the footprint of sub-national geographical regions (SGA) (Lewan and Simmons 2002). The methodology was trailed in 5 European cities (including Oslo in Norway and Bristol in the UK) using a calculation tool developed by Best Foot Forward but, unfortunately, European funding was discontinued before the results of these trials could be integrated back into the methodology and fully documented.

Clearly, as with technical standards in other fields, if a footprint methodology is to be properly documented, maintained and improved in the longer term, collaborative working amongst experts is essential. Providing this in the context of an educational setting where wider training can take place is important, as highlighted by the City of Ancona in Italy.

The issue of standardisation, transparency and credibility are central to the emerging international ecological footprint network that passed an initial declaration, the "BEDZED Declaration" (REF at least to website). Several people involved in the footprinting of cities and regions attended this meeting.

6. National and Local Government Concerns

At the **local level** there is unanimous concern amongst the respondents about the incorporation of the ecological footprint approach as a main driver into an already very broad set of policy initiatives. One of the reasons being that many of the issues covered by the EF are felt to be of a scale beyond the control of the local authority.

Due to the complexities surrounding the theory of the ecological footprint, and the fact few people outside the environmental scene are aware of its existence it has often been met with ignorance and critique. York City Council highlighted the very important fact that before any misconceptions concerning the ecological footprint can be clarified, there is a desperate need to get policy makers to understand the relevance of sustainable development, and only once this is engrained into the system will it be possible to understand the context in which the ecological footprint belongs.

There is a clear need for greater dissemination of the ecological footprint and its relevance to policy makers and politicians, with effective communication this is a barrier that can potentially be overcome successfully. However, it is not just a lack of communication that exists. There are still key methodological issues that need to be addressed; issues that opponents to ecological footprinting will happily quote in an attempt to discredit the methodology. These include issues related to carbon sequestration, the incompleteness of the ecological footprint, uncertainties in calculations and aggregation. This is not the place to answer these concerns[8]. However, it is important for any user of the ecological footprint to be clear about its limitations, it is essential that no one "oversells" EF and finally it is important that when presenting the ecological footprint the speaker has a basic grounding in the methodology. One difficult question that cannot be answered has the ability to discredit the whole methodology.

[8] Please refer to Section 1.5 that provides details of the various critiques on the ecological footprint.

7. Culture within Local Authorities

The success of the ecological footprint is not purely dependent on whether it is or isn't the most appropriate indicator of sustainability, but whether the local government prioritise the sustainability agenda.

Comments made by survey respondents suggested that barriers exist because of non-existent management systems, lack of commitment from the top, and little importance given to environmental concerns. For example, the University of Oslo admitted that economic interests always take priority in the forming of local policy, while environmental concerns to some extent are viewed as limited and separate efforts. Until sceptics become more aware of the increasing interdependencies between the economy and the environment the EF will come up against this barrier time and time again.

In practice, local authorities, on the whole, do not use performance indicators to improve services and reduce environmental impact. Evidence-based policy decisions are not the norm. The report "Acting on Facts – Using Performance Measurement to Improve Local Authority Services" jointly produced by the Improvement and Development Agency (IDeA) and the Audit Commission (AC) highlight some of the issues behind this phenomena in England and Wales. This highlights that while LAs have been collecting the data and publishing the results, the authorities have not put the necessary procedures in place so that the information is used to improve performance. Comments made by the auditors from AC identified that over 50 per cent of authorities said they found it difficult to develop a corporate approach to performance management, or to set meaningful targets.

There is very little connection between strategy and plans produced by the authority and the performance indicators. Both IDeA and AC recognise the importance of performance measurement being used as a part of everyday management activity. This requires PIs to move away from being a complacent activity to becoming a drive for improvement.

As well as these manageable and cultural obstacles there are also practical problems associated with PIs. These can range from selecting indicators that are difficult to measure to indicators that provide no insight into the related issue. Many local authorities have faced difficulties with an endless list of indicators and not being able to understand the complete picture.

Another problem lies in the lack of internal collaboration between the different departments of governing bodies. As stated by the university of Oslo other sections of the local government, such as the transport or energy departments, may have little interest in what comes from the environment section. One response to this has been the work of De Klein Aarde, in collaboration with the Van Hall Institute and a number of local authorities in Holland. Here the footprint has been actively used to try and draw together the agendas of different local government departments and promote a cross-cutting sustainable development programme. City Council are going down the same route. The following quote by Dr. Alan Netherwood from Cardiff City Council highlights the problem of conflicting goals due to the fragmentation of policy and decision making.

"We are very excited about this integrated and long term way of measuring sustainable development. The information from the MFA and footprint will help us to develop our policy in a much more informed way, joining up data from traditionally separate policy areas. The process we're adopting in Cardiff will hopefully enable the footprint to bridge silos and achieve the buy in to change the way we think about formulating policy, taking on board the big 'crunch' issues."(Dr. Alan Netherwood, 12.11.03).

At a national level the same problem exists, as identified by Sharon Ede (Government of South Australia). There is a desire to reduce greenhouse gas emissions as well as a focus on increasing exports where local produce would suffice.

In summary, the EF can be seen as a tool that will help promote “integrated thinking”, promote a performance culture and help prioritise the importance of sustainability.

8. Conclusions

In terms of its policy application, many of the misconceptions concerning the ecological footprint exist because of “over-selling” the indicator, suggesting that it can provide a comprehensive indicator of sustainability. This approach has resulted in criticism and has helped undermine the useful of the ecological footprint, particularly in the policy arena. This means having a clear understanding as to what the project entails from the beginning.

A real financial commitment to understanding the global impact of a local authority or a region is required. To provide such an integrated and complex tool is a difficult process. However, the authors would argue that it is a necessary one. Sustainability cannot be reduced to a simple list of 15 questions requiring a tick in the right box. The issues are complex and require a deeper understanding of resource flows, land appropriation and global equity. Such an understanding cannot be achieved through the development of indicators that have not truly quantified environmental impact at the local and global level.

Cardiff City Council has shown what can and will be achieved in the future by embedding the concept within the organisation. Their approach suggests that there is little reason behind just undertaking an ecological footprint study. Hertfordshire county council have taken a similar philosophy by engaging with their policy development officers in an internal working group to develop policy proxies, assist in data collection and to develop scenarios. A software tool is required that will allow the user to explore the concept and its findings in more depth. It is difficult and presumptuous to suggest that one indicator can induce change. However, by undertaking an ecological footprint there is often the acknowledgment that sustainable consumption is an important issue.

In the past, ecological footprint studies have not been taken further because the project has been the driving force of one dedicated individual within the local authority. If this individual leaves the organisation the situation can occur that no one has the necessary interest or enthusiasm to carry on the work. This identifies the importance organisational capacity and political “buy-in”.

Something that was made clear by many organisations was the need for transparency in the EF approach. In reality this does not mean more detailed reports about the methodology but also the need for training to gain an understanding of why it is a complex model.

Data concerns do still exist but these are gradually being dealt with. As mentioned, the adaptation of an already existing survey or the use of ACORN data will help this process in the future. The price of an ecological footprint is also reducing as the process becomes easier and more refined. However, a financial commitment often demonstrates a stronger commitment to the sustainability agenda and therefore it is reasonable for an organisation to pay for an insights the ecological footprint offers.

To summarise the ingredients to successfully undertaking an ecological footprint study, these would be:

- Commitment by the organisation across all areas and not just one individual;
- Adopt the ecological footprint for monitoring meaning that it will be re-calculated on a regular basis;
- Integrate the ecological footprint into a meaningful strategy that is seen as one a guiding force within the organisation (such as the Community Strategy);
- Don't "over-sell" the ecological footprint always identifying limitations;
- Transparency and accountability are essential for both the data sources and calculations.

Most importantly, the ecological footprint is still one of the only indicators that can provide a comprehensive idea of the impact of consumption, making it an invaluable tool on the road to sustainability.