Brechin & surrounds household footprint survey

A supplement to

An ecological footprint analysis of Angus

- Scotland -

Prepared for

Angus Council

Prepared by

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Introduction

Best Foot Forward (BFF) were kindly asked by Angus Council to conduct a household ecological footprint survey of Brechin and surrounds as part of a larger footprint study of Angus.

Brechin itself (population 7,777) sits within the larger Angus region (population over 110,230). The City of Brechin and District has its own Community Council, one of 26 in Angus. The purpose of the Community Council is to 'ascertain, co-ordinate and express the views of the community it represents to local authorities and other public bodies.' (Angus, 2003).

The survey was conducted using paper and computer-based questionnaires during April and May 2003.

The survey results and an ecological footprint analysis of responses are presented in this report. These should be considered in conjunction with the full Angus study report (Vergoulas *et al*, 2003) which provides a more complete footprint of the region.

Survey Methodology

A 37 item paper-based questionnaire was prepared by BFF for distribution by Angus Council. This was backed up by an online data collection system[1] – being piloted for the first time to determine the benefits of this means of data gathering.

Data from the questionnaires was checked for accuracy against the online data capture system.

[1] The online questionnaire can be viewed at www.bestfootforward.com/brechin/brechincitylimits.htm

A significant problem with both systems was the presence of data gaps. This was due to incorrect or incomplete data. Questions were often missed out or answered in a manner which was not easy to quantify. Furthermore, when given the option to enter either precise data, or choose from a set of multiple choice/default options, many did the latter thus reducing the sensitivity of the questionnaire.

Questionnaire answers were reviewed manually to determine the validity of responses. Where multiple questions were incomplete a default, average response was substituted. Where data units were missing, the default units were also applied.

In all, data from 249 household questionnaires (covering 893 individuals) was judged to be usable.

What was measured?

Questions were designed to capture key aspects of personal consumption and behaviour, which impact on the environment; for example, personal travel patterns, household waste management and so on.

In total, the questions captured around one-third of the total average ecological footprint – when calibrated against the Angus Council ecological footprint findings. The questions fully addressed issues such as personal transport, but dealt with the provision of goods and services (and the consequential waste), for example, in less detail.

Arguably, of most interest is the variability in ecological footprint within Brechin. Such data shows the potential for change within current infrastructure constraints as well as highlighting some barriers to change.

A key ‘health warning’ with such data is that the answers are self-completed. Many of the more ‘extreme’ answers may well be subject to error.

Results

The Brechin household ecological footprint questionnaire findings are presented below. Responses are categorised into the following for ease of comparison with the Angus Study:

- Personal transport (mobility)
- Domestic energy use and land (shelter)
- Domestic food consumption (nourishment)
- Domestic waste from consumption (goods)

Average household size of those surveyed was 3.6, with the frequently reported value being 4. This was possibly because the sample was biased towards school age children. Thus the increased likelihood of household sizes of 3 and above. The largest household size was 8 (a single entry of '20' was assumed to be a typographical error).

Personal transport

As expected most travel was by car. The average was 268 vehicle kilometres (km) per household week or 75 vehicle km per person. This ranged from a minimum of zero to a maximum of 1,440 vehicle km per household per week (equivalent to around 200 km or 125 miles per day, per 7-day week).

Average household bus usage was 23 passenger km per week (5 passenger km per person). Answers ranged from 0 to 378 passenger km per household (this maximum figure was for a household of 4).

Train usage was just 7 passenger km per week (1.5 passenger km per person). Answers ranged from 0 to 640 passenger km per household.

Respondees walked and cycled more than they took the train, with a household average of 19 passenger km per week (5 passenger km per person). Answers ranged from 0 to 112 km per household per week.

On the matters of holiday, 29% of households took no holiday. The same percentage vacationed by plane (short haul) with slightly more (35%) taking a break in the UK or Ireland. The remaining 7% holidayed further afield taking a long haul plane journey.

Domestic energy use and land

Questions in this section sought to estimate key contributors to domestic energy consumption as well as consider issues relating to land use for housing (and gardens in particular).

Televisions' were on for an average of 31 hours per household per week (just over 4 hours per day). Viewing hours ranged from 0 to a maximum of 140 hours. The majority of these televisions (59%) were 'always' or 'sometimes' left on standby, thereby consuming electricity even when they were not being viewed.

Households had an average of 3 energy-efficient, and 13 standard, lightbulbs fitted. These averages hide the fact that 91 households had no energy efficient bulbs fitted and 27 had only one. 58% of respondees admitted to lights being 'always' left on. Only 6% said lights were never left on. The remainder responded that lights were 'sometimes' left on.

A minority of 8% of respondees said they used renewable electricity, the remaining 92% did not.

Computer and music equipment were on for an average of 12 hours per household per week. Two-thirds of respondees (69%) admitted to these devices ‘always’ being on standby.

Average weekly household usage of other energy consuming appliances was found to be: washing machine (9 runs per week) and dishwasher (3 runs per week). The average number of baths taken per week was 6 per household, with twice the number of showers being taken. One household of 4 made the unlikely claim that they all showered 4 times per day!

82% of households did not have a water saving device fitted to their toilets.

A hosepipe was used for less than an hour per household each week.

Information on the space heating of homes, typically the largest consumer of energy, is difficult to determine without specific consumption data - given the wide variety of housing types, the effects of climate, the effectiveness of any insulation and consumer habits. Here respondees were merely asked whether they preferred there homes ‘cool’, ‘warm’ or ‘hot’. Average consumption figures were attached to each answer. Two-thirds (69%) said they preferred their home to be ‘warm’, 25% said ‘cool’ and the remaining 5% chose ‘hot’.

As indicated earlier, several questions were also asked relating to the use of gardens and other outdoor spaces.

Outdoor space per household varied massively from 0 to 20,000 square metres. The average figure was 293 square metres. Almost half (48%) gave ‘none’ of their garden over to food production or managed it for wildlife. An average of 25 litres of peat per annum was used per household in the garden.

Domestic food consumption

Food consumption was ascertained based on food origin and diet. As with other questions, where multiple-choice/default options were available these were often chosen in preference to direct data entry.

Average consumption of food of UK origin was 5 kg per household per week. Food with an 'overseas' origin consumed was double this (10kg per week). Meat consumption was, on average, 2kg per week.

Domestic waste from consumption

The consumption of household goods is most easily measured by considering the content of domestic waste. The impact of this consumption depends not just on the tonnage of items consumed but also how this waste is managed (whether it is reused or recycled).

Respondees were asked to provide a count of the number of items, of various materials (plastic, steel etc.) thrown away or recycled in their household each week.

Table 1 below gives the average number of items, by type, thrown away and recycled.

Table 1: Average number of items, per week, by type, thrown away or recycled per household

	paper	glass	plastic	aluminium	steel	other
Thrown away	5.8	3.0	6.7	4.6	3.4	5.8
Recycled	7.0	3.3	2.5	2.7	1.8	-

Of course, such questions only capture a small portion of personal material consumption, as much is indirect or linked to capital items (such as white goods, construction, freight transport and so on).

Overall Ecological Footprint Score

As previously stated, the Brechin household questionnaire only seeks to measure a portion of the overall ecological footprint. The Angus report, referred to earlier, provided a more complete picture of those environmental impacts attributable to individuals drawing – as it does - on official secondary data sources. Furthermore, the responses are not thought to be a representative sample of the Brechin population. This is mainly due to the evident bias towards larger households, possibly due to the over-representation of school age respondees.

The average household size of those completing the survey (3.57) is significantly higher than either the Brechin or Angus averages (2.34 and 2.46 respectively).

Evidence suggests that those living in larger households have a lower per capita impact on the environment. This is due to the more efficient use of resources. For example, a house will require the same amount of heating regardless of the number of occupants. Similarly, larger households are more likely to car share or buy goods in bulk, requiring less packaging waste.

To avoid confusing the partial (and biased) footprint data gathered by questionnaire with the more complete data calculated in the Angus study, all the footprint results presented here are calibrated to take into account the limited range of consumption categories measured by the survey and the variations in household size. Where data was not available from the survey, the Angus average data was substituted.

The average household ecological footprint, as measured by the questionnaire, was 13.7gha. This equates to 4.4gha per capita. The range of values was substantial reflecting the impact of different lifestyles.

Household footprints varied from 0.5 to 37.4gha (the lower value is most likely due to missing or erroneous data). Individual footprints varied from a low of 0.3gha (again

probably due to data errors) to a high of 20.3gha – the latter being more than three times the UK average.

How does Brechin compare with Angus?

The figures in Table 2 below compare the Brechin and Angus ecological footprints by main components. Notes below the table indicate data assumptions.

Table 2: Comparison of Brechin and Angus residents by component

Component	Angus study results	Brechin study (adjusted) results
Food	1.43	1.43 (see Note 1)
Energy use & built land	0.68	0.65 (see Note 2)
Personal transport	0.79	0.73 (see Note 3)
Materials & waste	1.88	1.58 (see Note 4)
Total	4.78	4.43

Note 1: Insufficient data for Brechin, Angus average used. Experience suggests that this data does not vary significantly within a region.
Note 2: Adjustments based on response to questions on home heating and house/garden area (electricity use assumed to be average).
Note 3: Adjustments based on questions related to car, bus and rail use (air, water and motorcycle travel assumed to be average).
Note 4: Adjustment based on domestic waste estimate derived from items thrown away or recycled. Should be treated with particular caution (recycling rate and services usage assumed to be average).

The questionnaire responses suggest that the lower Brechin ecological footprint is due to a combination of factors; lower material consumption (less waste), reduced travel (across all measured mode: car, bus and rail) and slightly reduced domestic energy use.

Although the Brechin survey results cannot be considered as reliable a measure of consumption as the official sources used to calculate the Angus ecological footprint,

the consistently lower component figures for Brechin point to a very real difference in lifestyles and environmental impact.

Despite Brechin's lower ecologicalfootprint it should still be remembered that – like the Angus results – the residents of Brechin still live beyond the average sustainable 'earth share'.

If everyone lived like the average Brechin resident we would still need

2.3 planets

to sustainably support the global population.

Recommendations

The Brechin household ecological footprint survey – and online data collection – has proven a useful means of determining the range of possible consumption patterns within Brechin and could be extended to other communities. However, the survey has been dogged by poor data quality due both to data gaps and the tendency of respondees to go for multiple-choice answers (where these are presented) rather than enter their specific household data. The length of the survey is undoubtedly also a factor, with a noticeable 'tail off' of responses towards the end of the questionnaire.

To avoid such problems in the future it is recommended that fewer, high level questions are asked which more precisely secure data on actual consumption (for example, kWh of gas consumed, vehicle fuel consumption and so on). This would require greater 'coaching' of respondees, but it is felt that fewer, more focused interviews would – overall – yield more accurate data.

References

Angus Council. 2003. Angus Council website. www.angus.gov.uk

Vergoulas, G.; Lewis, K.& Jenkin, N. 2003. *An Ecological Footprint Analysis of Angus*. A report commissioned by Angus Council. Best Foot Forward, Oxford.