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# Justice for the Environment: Developing a Set of Indicators of Environmental Justice for Scotland

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## ABSTRACT

This paper explores the context of environmental justice (EJ) in Scotland, and presents a case study whereby the main attributes for an indicator of EJ were identified, encompassing procedural and distributive aspects of justice. Through a participatory process, weights were assigned using a Multi-Criteria Analysis tool, the Analytical Hierarchy Process (AHP). Results show that overall, environmental injustices are mostly associated by respondents to unequal distribution of health burdens due to pollution, yet greater weight is attached to procedural justice by community environmental activists. The paper suggests that AHP may be applied to many situations and could form a basis for the development of tools to address and deliver EJ in Scotland.

## KEYWORDS

Environmental justice, indicator, Analytical Hierarchy Process

## I. CONTEXT

The concept of social justice is embedded in policy-making in Scotland and the UK, and sustainable development is a stated principle of government. Environmental Justice (EJ) is now also an aim of the current Scottish coalition government, as borne out by the Partnership Agreement (2003: 5) which states 'We want a Scotland that delivers sustainable development; that puts environmental concerns at the heart of public policy, and secures environmental justice for all of Scotland's communities.'

If EJ is to make a shift from the rhetoric of government into deliverable targets and actions, the current debate needs to move towards setting up an achievable framework. By using a case study to develop an indicator of EJ for Scotland, this paper aims to assist in translating the concept of EJ into concrete attributes, as identified by various stakeholder representatives including community members with first-hand experience of campaigning for EJ.

In this paper, connections with environmental sustainability, social justice and their respective indicators are explored in order to identify what constitutes EJ in Scotland. This is followed by a description of a participatory study to develop EJ indicators, and the results of this process are then weighted using a Multi-Criteria Analysis technique. Finally conclusions are drawn as to how far this approach can be used to address EJ in Scotland and areas for future consideration.

Environmental justice is a concept that promotes the equitable treatment of people of all races, incomes and cultures with respect to environmental laws, regulations, policies and decisions. EJ seeks to tackle social injustices and environmental problems through an integrated framework of policies. An equitable distribution of the environmental costs and benefits of economic development, both globally and nationally, is required, based on the premise that everyone should have the right and be able to live in a healthy environment with access to enough environmental resources for a healthy life. EJ also recognises that it is predominantly the poorest and least powerful people who are missing these conditions (ESRC, 2001).

Yet EJ goes beyond the efficient distribution of costs and benefits as a definition of what is socially good. It also examines issues of procedural equity and access to the processes of justice, a crucial element of this concept. According to ESRC (2001: 13), 'the procedures and processes needed to tackle negative environmental impacts are neither fully developed nor fully accessible on an equal basis to different social groups. Many environmental injustices may be caused or exacerbated by procedural injustices in the processes of policy design, land-use planning, science and law.' Therefore, institutional change is required.

EJ has many connections with the concepts of environmental sustainability and social justice. According to Dobson (1998), these concepts overlap substantially although their agendas may be fundamentally different. It is possible to

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imagine a situation of perfect equality which is destructive of the environment, and also a situation of perfect environmental sustainability which is inequitable. Given the problems in defining sustainability, and the lack of targets for resource consumption reductions in developed countries, Scandrett (2000) suggests that EJ provides an alternative discourse to sustainable development. EJ emphasises commitment to the struggle of communities who suffer most environmental damage and gives them a voice to access decision-making, which links with social justice to ensure sustainable and equitable development.

EJ recognises that social well-being is not only about social welfare measured in efficiency gains, but also about equity in the access to benefits arising from the use of available resources. Thus EJ can address our concerns as to the use of our environmental resources and how to ensure equitable participation in environmental decision-making. This has been framed in academic terms by Paavola and Adger (2002) who put forward an analysis of justice by looking at distributive justice and procedural justice, a distinction which is useful for EJ.

*Distributive justice:* distribution of environmental goods and bads, with equity and fairness as common concepts. Distributive justice breaks with the GDP model because it proposes that the unequal distribution of these goods remains a fundamental issue, and not just a regrettable necessity. Utilitarianism itself tends to erase inequalities from the calculation, by summing the total well-being of society, which means that injustices, both social and environmental, are built into the system. This raises the question of how to alleviate these injustices by working within that system.

*Procedural justice:* this is concerned with how and by whom decisions are made, and encompasses participation and legitimacy as common concepts. A community's loss of control or lack of effectiveness in producing changes over its members' lives can lead to a sense of powerlessness and grievance, yet even those bodies which are endeavouring to alleviate injustice, such as environmental groups and local authorities, may use language which is off-putting for disadvantaged groups, further leading to disengagement.

Inequalities can arise from a system based on efficiency and it is the role of the state to address this. This is done by using tools which are publicly accountable, visible and defensible in terms of their methodology and rationale, such as indicators. This paper investigates whether it is possible to widen the frame of reference for indicators to include EJ. Below, a number of existing indicators are reviewed to assess how far they address EJ and evaluate to what extent additional indicators for EJ are required.

*Existing indicators and EJ*

The hugely dominant and powerful indices of GDP and GNP are used to measure macro performance and the state of the economy. These indices were never

designed to reflect well-being and thus environmentalists often criticise them for being 'crude' (Dunion 2003: 175) since there is no account taken of an equitable distribution of economic wealth. The shortcomings of GDP/GNP with regard to EJ are to do with the lack of discrimination between growth which is positive for well-being and that which is negative. For example, the transfer of services from the family or community into the cash economy, such as child care and care for the elderly, is seen as positive growth; yet these may indicate a decline in social well-being without any adjustment made to reflect this.

In an attempt to overcome the limitations of GNP, the Index of Sustainable Economic Welfare (ISEW) was developed from the work of Daly and Cobb (1989). According to Jackson and Marks (1994), GNP grew 2.3 times between 1950 and 1990 in the UK, while ISEW grew until the mid-1970s and then fell back almost to its 1950 level, due to increased income differentials, loss of social cohesion and long term environmental damage. However, the main value of this index is perhaps to serve as a catalyst for debate since its valuations may seem somewhat arbitrary.

The concept of sustainability has provided an objective which has unified economic, social and environmental goals and allowed them to be considered and debated together. Scotland's 24 indicators for sustainable development (SE, 2003a) are predominantly environmental, dealing with areas such as air and water quality and waste production. There are also links to social justice, and it is clearly a positive step to see the integration of different government policies. However, if inequitable distribution is a key element of EJ, the fact that sustainability indicators are aggregating information for the whole of Scotland means they will be unable to help pinpoint individual cases of injustice.

As indicators of social justice, Scotland has 29 Social Justice Milestones, (SE, 2002) and a Scottish Index of Multiple Deprivation (SIMD, Noble et al., 2003). None of the milestones specifically covers environmental issues, yet they can help to build up a picture of the quality of life in Scotland and highlight aspects of social justice relevant to EJ. Although it is hoped to include environmental indicators within the SIMD, this has not yet been done.

In the USA, the Environment Protection Agency suggests a number of tools, such as GIS and the compiling of an environmental justice database to identify any 'hotspots' of injustice in the case of any new development being planned in that area. Various states have developed their own methods, such as the Toxic Release Inventory in Florida (Florida Centre for Public Management, 2003). However, these tools are limited to distributive issues; procedural justice is not covered.

Thus it can be seen that existing indicators fail to satisfactorily address EJ, particularly in the lack of any indicators to reflect procedural justice and ensure satisfactory levels of community participation and representation. It is true that procedural issues encompass a wider area than simply EJ, yet since this is so

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crucial to the definition of EJ it is necessary to devise ways of including it in any indicator.

*Scotland as a case study*

Attributes of EJ which were identified in this paper are applicable to the whole of Scotland. However, in order to focus on the specific properties of the environmental injustices in a geographical area and with a defined community or group of stakeholders, the indicators which arise from these attributes should be measured and weighted to reflect the problems of that area. This would reflect EJ's localised nature. In this paper, Scotland was used as a case study to develop the attributes which would form the basis of the indicator, and these attributes were weighted nationally to form an indicator giving an illustrative analysis of people's concerns.

It is not possible to identify one indicator applicable to all circumstances and thus the EJ indicators developed in this paper should be seen as a basis for public and private sector organisations, such as local authorities, the Scottish Environment Protection Agency (SEPA) and industries, who will need to develop their own, tailor-made indicators which reflect their needs and what they are able to achieve with their available resources.

EJ indicators can add value to the environmental decision-making process in the following ways:

- by showing if society is becoming more equitable over time in terms of the distribution of environmental goods and bads, as affected by targeted policies;
- by showing what constitutes a healthy environment for any community in Scotland, so that any projects proposed for an area can be checked against these indicators. Indicators could augment an EIA process, and be used alongside a survey of residents so that local issues are represented;
- by ensuring that local communities are involved in planning processes which affect their areas.

Dunion and Scandrett (2003) suggest that it is accepted in the UK that poorer and less powerful social groups face a greater risk of living in degraded environments than wealthier or more powerful groups. In addition, Scotland acts as a source of natural resources used for development that occurs elsewhere, leading to disproportionate environmental damage. Poverty in Scotland relates both to post-industrialism in rural and urban areas and also the pre-industrial history of the concentration of power in rural areas with their unequal distribution of land ownership. In the United States, marginal communities have often been targeted as areas where polluting industries could be located without consultation with the local people. In Scotland, by contrast, communities were often

founded around polluting industries, such as coal mining or steel production, especially in the more populated Central Belt. More recently, rural communities have faced nuclear power stations, aquaculture operations and the proposed siting of industrial-sized windfarms in their areas.

The Environment Agency (2002) has demonstrated that in England there is a distinct correlation between deprivation and poor environmental quality, and it is likely that this pattern is repeated in Scotland. Should we be looking at extending this injustice and its attendant risks into more affluent areas by locating polluting industries more widely, or is it justifiable to put all developments in one area?

Tackling environmental injustice is a complicated process, not least because it questions development and the belief that as an economy grows, prosperity and social well-being also rise for an increasing majority of people. Yet development also means more pollution, greater environmental risk and an increased use of scarce natural resources. Many communities may accept the environmental risks that go along with development, since the industries will create local jobs. However, often the surrounding community suffers from the environmental costs but does not directly benefit from the development, as with landfill sites or aquaculture operations where few local jobs are created. Thus the involvement and input of the community, both in planning decisions regarding new developments and in discussing how to mitigate negative impacts from existing developments, are crucial. As Dunion (2003) states, more public participation in risk assessment and risk decision-making can only lead to an enhanced public acceptance of the resulting decision. The need to increase public participation in environmental decision-making is now on the agenda in Scotland, following the UK's adoption of the Aarhus Convention (UNECE, 1998), and on-going reform of the planning system in Scotland (Scottish Executive, 2003b). In addition to land-use planning, EJ also encompasses the need for environmental regulations which are fair and which are adhered to, and for improved responsiveness and wider responsibilities for regulatory bodies.

To sum up, EJ in Scotland as described in this paper means working on improving the quality of the lived environment for everyone in numerous ways, including the following:

- creating a more equitable, transparent, accountable and efficient planning system which considers EJ in all of its actions;
- working towards greater community involvement in local decision-making processes and establishing indicators of procedural justice for local authorities and regulatory bodies;
- aiming for a more equal balance of power between authorities, regulatory bodies and developers on one side and communities on the other;
- getting local input into the allocation of resources to improve deprived areas or areas suffering from environmental damage;

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- developing a wider remit for SEPA to allow greater powers of prosecution and inspection where necessary;
- collecting environmental data and allowing public access to environmental information;
- ensuring that regulations and planning conditions are enforced;
- placing a stronger emphasis on the rights of the environment in terms of protecting designated areas and applying the precautionary principle with new developments.

To be considered alongside the points above, however, is the difficulty of reconciling an increasingly centralised state planning model with the desire of campaigners for local control over planning decisions. Yet, although structural changes may be deemed necessary, this paper seeks to show how progress towards addressing EJ can be measured by the development of indicators, and the rationale for this is made below.

## II. METHOD

The issue of investigation was the development of an indicator for EJ in Scotland. An indicator is seen as a quantifiable measure of EJ, yet a challenge is posed to its development since it also needs to respect subjective, qualitative perceptions of the way the concept is manifested, which are difficult to measure.

Van der Bergh and Verbruggen (1999) have suggested five criteria which may constitute a good indicator. They should:

- use calculation procedures which are, among other things, objective and scientifically sound.
- relate to clear policy objectives.
- have a clear interpretation and be understandable to non-scientists.
- cover the functioning of a system as a whole.
- be based on a parameter of values that are stable over a long period of time.

Following a review of the literature on EJ, a draft set of 16 possible indicators was produced based on the literature and those areas pertinent to EJ which it was felt existing indicators failed to address. This served as a basis for discussion with various stakeholder representatives in semi-structured interviews and encompassed both distributive and procedural issues. There were areas of overlap in order to stimulate discussion, and measurements were kept deliberately vague at this stage.



Analysis identified various stakeholder groups with a strong interest in EJ, 21 representatives of which were interviewed individually or in small groups. There were 7 community environmental activists based in the Central Belt, Highlands and southern Scotland. Other representatives (hereafter referred to as 'experts') were from the Scottish Executive, SEPA, Scottish Enterprise, Edinburgh Green Belt Trust, a housing association, Friends of the Earth Scotland, academics in the fields of mediation and planning, and Edinburgh City Council. The individual indicator areas were discussed with a view to identifying a final set, along with questions which arose from the formulation of the draft indicators regarding the role for EJ indicators.

Following the interviews, the final selection of 9 indicator attributes was made. It was found that interviewees were almost totally consistent in their selection, and the majority view was taken if there was any conflict. All stakeholders were then contacted and asked to prioritise the attributes in order of importance to construct the indicator, for example, whether 'Air Quality' was more important than 'Water Pollution' as an element of EJ. While Atkinson, Machado and Mourato (2000) used a survey-based approach to evaluate competing principles of equity in policy making, a non-monetary preference elicitation method was chosen for this study: the Analytical Hierarchy Process (AHP).

AHP is a Multi-Criteria Analysis technique, originally developed by Saaty (1980), and uses a number of pairwise comparisons between criteria to assess relative importance for each criterion, and give a prioritised ranking. In this study, a short Excel-based programming model was developed based on the concept and principles of AHP, in order to determine the attributes of an EJ indicator. In AHP, the overall objectives are set at the top of a hierarchy, and the criteria and decision alternatives are set at descending levels so that a pairwise comparison of all attributes is carried out, from the lowest hierarchical level upwards. This process reduces mental bias for respondents, since prioritisation is constrained to a pair, rather than bundles, of attributes, allowing for a more straightforward comparison process.

Here the use of AHP at two hierarchical levels was selected as a way of prioritising attributes of EJ for all stakeholders, who completed the exercise individually. Respondents were first asked to rank the 7 different attributes of distributive justice against each other, as in: 'How important is A in relation to B?', as shown below in Table 1. The score of 1 meant they were equally important.

A: Air pollution	5 4 3 2 1 2 3 4 5	B: Noise pollution
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TABLE 1. Example of pairwise comparisons of distributive justice attributes.

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They then ranked the 5 procedural justice attributes against each other, for example, how important is the presence of a local group compared to being consulted on local developments. Finally the concepts of distributive justice and procedural justice were compared in Level 1 as shown below in Table 2:

Level 1	<i>Distributional justice</i>	<i>Procedural justice</i>
Level 2	<i>Distributive Attributes</i>	<i>Procedural Attributes</i>
	Air quality	Environmental group
	Noise pollution	Consultation
	Water pollution	Power-sharing
	Land pollution	Access to information
	Visual pollution	Local control
	Public green space	
	Private green space	

TABLE 2. AHP hierarchical levels for this study.

As with many decision-making tools the application of AHP has not gone without criticisms. These mainly evolve around two themes: criticisms concerning the robustness of the relationship between the method's results and a weight system habitually employed to differentiate importance between AHP attributes, and criticisms focusing on more theoretical issues regarding the mathematical assumptions upon which the technique is embedded. As the objective of this study was by no means related to the examination of resource allocation – which is the usual case when attribute weighing occurs – there has been no need to assign differentiated importance to the different attributes (as a matter of fact the whole point of the paper was to allow for stakeholders to do this), so criticisms relating to weighting do not bear any relevance to this paper. As far as theoretical criticisms are concerned, it seems that these are either still a matter of debate or that they involve *potential* methodology inconsistencies (ODPM, 2001), hence indicating that there is concern rather than conclusive judgment that AHP is a problematic method to use. Furthermore, perhaps it is worth mentioning that the voicing of those concerns has not put off practitioners from applying AHP to examine a remarkably wide host of issues resulting in literally thousands of journal and other citations (Forman and Selly, 2001). A final concern with AHP that involves the link between the points of the 1 to 9 scale and the corresponding verbal descriptions of attribute levels is also not relevant to this use of the method, as verbal descriptions have not been employed but respondents were asked to directly consider the numerical scale of 1 to 9.

Generally, studies applying AHP have involved small samples of experts, resource managers and stakeholders (see Schmoldt and Peterson, 2000), but it is also a valid technique for individual respondents. Alphonse (1997) suggests AHP is useful for dealing with complex socio-economic problems in developing countries, describing different scenarios in agricultural land use planning.

### III. RESULTS

While the results of this case study should be seen as an example of how AHP can help to develop a set of indicators of EJ, rather than being a definitive answer to the problem of delivering EJ, the development of an indicator was seen by all respondents as a positive step towards measuring progress. However, the difficulties inherent in measuring such a wide concept were recognised. It was pointed out that EJ is more of a social process than a principle to be used as a management tool and therefore indicators may not be appropriate. Yet it was hopeful to see a widening in the field of discourse, and the existence of separate EJ indicators for Scotland emphasised the importance of environmental factors in the decision-making process and when measuring quality of life. It was also suggested that the more the various indicator sets overlapped, the better, since this should lead to integrated policy making.

The community members and those experts who worked with community groups were overwhelmingly in favour of including procedural justice indicators, even though the need for equity in the processes of justice is not confined to EJ. Representative comments included:

‘Community involvement is at the heart of environmental justice.’

‘Procedural justice is crucially important.’

This contrasted with the views of most of the other experts who, while recognising that procedural issues were important, concentrated on discussing the measurement of distributional aspects.

Other difficulties cited were the high costs of fighting planning applications, the lack of access to information, and the fact that communities had less power than developers and may not be acting from a position of consensus. The setting up of indicators of accountability for planning authorities and regulatory bodies was felt to be a positive step.

Many representatives expressed the need for an educational element to EJ, with greater emphasis on good citizenship and environmental awareness as subjects to be taught in schools if future community members were to become active citizens. Likewise, adult education classes could build capacity in the general public. Planning Aid Scotland was praised *vis-à-vis* the voluntary capacity-building workshops they hold.

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A number of interviewees felt strongly that the indicator alone would not resolve problems of EJ since deeper structural inequalities in the system needed to be addressed first. These included:

- inequitable patterns of land ownership in Scotland;
- the need to widen SEPA's remit;
- centralised political and economic power which effectively disenfranchised rural communities;
- the inequitable balance of power in the planning process, for example in the perceived need for a third party right of appeal.

Indicators were split into Distributive and Procedural sets to reflect different aspects of EJ. It was felt that distributive indicators should not relate simply to the source of pollution, since proximity is not always a clear indicator of pollution even if there is a wide buffer zone, as with groundwater pollution. It was also recognised that industrial sites could be well-run and well-regulated. Negative distributional outcomes were felt to relate to sources such as the following:

- industrial sites (opencast mining, derelict and contaminated land, large or numerous windfarms)
- waste operations (landfill sites, incinerators, sewage works)
- agricultural sites (fish farms, GM crops, high pesticide use)
- communications (motorways, airports, mobile phone masts, pylons)

Positive environmental goods were included in the indicator set since these help to build up a picture of the lived environment.

*Indicators of distributive justice: negative impacts*

*1. Air quality*

Air pollution is often widely dispersed, yet was a major area of concern for interviewees. Only three air quality management areas in Scotland are monitored for the sustainability indicators, and these fail to widely reflect local situations. This attribute could be measured in relation to a local authority's air quality strategy, with monitoring to check for areas exceeding maximum allowable standard for local air quality.

*2. Noise pollution*

Different localities suffer from different types of noise pollution and this needs to be recognised within this indicator. The source could be industrial or from transport, and either intermittent or constant, but surveys and measuring equipment should identify cases where noise exceeds the allowable standard.

### *3. Water pollution*

Water quality is also measured in Scotland's sustainability indicators, yet this only looks at the number of kilometres of river identified as poor or seriously polluted, and does not cover marine water quality. Proximity to polluted water may be a possible indicator for EJ, although proximity to the *source* of water pollution is not necessarily the right measure. Water quality categories such as those used by SEPA (Good, Highly Polluted, etc) could be used to identify areas of concern.

### *4. Land pollution*

This indicator encompasses derelict or contaminated land. These brownfield sites may be vacant for many years causing a loss of amenity to the community, and there may be increasing health risks. GIS mapping techniques could be used to show how derelict land has increased or decreased over a period of time in a particular area, or the amount of greenfield sites being lost to development.

### *5. Visual pollution*

Visual pollution covers, eg, incidence of graffiti, vandalism, fly-tipping and litter, since these factors clearly detract from a good living environment. Although these are produced within the community, anecdotal evidence from interviewees suggests that local authorities expend less effort cleaning up more deprived areas. Loss of visual amenity by proximity to wind farms or unsightly industrial buildings may also be included. Specific areas could be selected, both affluent and deprived, and aspects of visual pollution could be quantified and correlated to the deprivation index.

## *Indicators of distributive justice: positive aspects*

### *6. Access to public green space*

This refers to open, public green space being accessible cheaply and easily by public transport routes, or being within walking distance from the community. It is meant to signify semi-natural habitats with good levels of biodiversity, such as urban parks, community woodland, and also Scotland's natural heritage, and with a good level of maintenance of these areas. This indicator could involve analysis of public transport routes out of deprived sectors to open green areas, along with a correlation to local plans of existing green space and the distribution of housing in proximity to such areas.

### *7. Access to private green space*

More affluent areas have well-maintained, private gardens for residents to enjoy, even if they are shared tenement gardens. Allotments or gardening projects at school could also be included as they are private places where individuals can spend time outdoors.

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*Indicators of procedural justice**1. Presence of a local environmental group*

Community groups have been instrumental in fighting environmental injustice, often forming in response to some problem. The presence of a group can be a positive indicator, even if it might pinpoint a location of environmental injustice, yet much was dependent on the range and number of participants. An existing group could serve as the first point of contact for individuals who needed, for example, to fight a new planning proposal or investigate instances of pollution in the area. Members often move on to become involved in other groups, such as Community Councils or local plan consultations.

*2. Consultation on local developments and initiatives*

A Scottish Executive consultation (Geoff Peart Consulting, 2002) showed a high level of public interest in planning (70%), yet only 7% had actually become involved and many of them had not found the process easy or straightforward. All planning authorities have a statutory responsibility to involve local communities, and some authorities go above these responsibilities, believing it leads to an improved decision-making process (Jenkins et al, 2002). Yet interviewees complained that too often the consultation process felt like tokenism. Continuing and greater efforts are needed to extend participation levels and build capacity, and for greater accountability on the results of the process. Ideas suggested included the use of a variety of participatory methods, a greater range of information sources, and for public meetings to be held outside office hours.

*3. Power-sharing at public meetings*

Many campaigners had experienced problems in the way public meetings were managed and it was felt that they needed to be more inclusive and equitable. Questionnaires and surveys to those involved would be helpful in gaining feedback for developing this indicator. The use of more deliberative frameworks, such as small discussion groups rather than a panel of experts, would be useful, and studies could also assess the amount of time allowed for different members taking part in the process to speak, eg, do women get a fair share?

*4. Access to information, and responsiveness by public bodies*

Scotland is already in the process of implementing the Freedom of Information Act whereby environmental information should be made available to the public. Surveys of those who request information would indicate the ease and speed of responsiveness. Community members said they often felt it was not worth complaining to the local authority, industry or SEPA as nothing was ever done, and this needs to be addressed by an on-going report showing response rates.

*5. Local control over industrial practices*

A lack of control over aspects of their lives was seen as a major problem for communities fighting for EJ. This indicator could also include the degree of control over resource use/management as well as industrial practices, and un-

derlines the need to strengthen the power of communities. Community members called for a fund to be set up to give them support for fighting against planning appeals by developers and help level the playing field. Support for Business Environmental Partnerships was seen as a positive step, in terms of corporate social responsibility; and greater support and training for Community Councils was suggested. The use of Good Neighbour Agreements between communities and firms would be a good indicator.

The AHP ranking exercise was sent to all 21 interviewees and resulted in a 52% response rate. Attributes of distributive and procedural justice were compared separately with each other, then distributive and procedural justice were rated in a single comparison. The weighting of all scores was calculated by finding the geometric mean.<sup>2</sup> Results are shown in Table 3.

<i>Distributive Attributes</i>	<i>Weighting</i>	<i>Procedural Attributes</i>	<i>Weighting</i>
Air quality	2.44	Local control	2.62
Water pollution	2.05	Power-sharing	2.58
Land pollution	1.63	Access to information	2.42
Noise pollution	1.43	Consultation	2.06
Private green space	1.21	Environmental group	1.29
Public green space	1.14		
Visual pollution	1.10		

TABLE 3. Ranking exercise results: attributes of distributive and procedural justice.

For the distributive attributes, the results strongly reflect the respondents' health concerns regarding EJ, since air and water pollution were the most strongly weighted elements. Land pollution, which includes proximity to contaminated land, was ranked third, but other, more nuisance, attributes (noise and visual pollution) were deemed less important. Positive attributes (access to open and private green space) were also more weakly weighted, and may reflect the fact that respondents all lived in rural areas or in Edinburgh, surrounded by easily-accessible countryside.

For procedural attributes, the first three elements were similarly weighted, with consultation slightly lower and presence of an environmental group the least important.

As Table 4 shows, distributive and procedural justice in level 1 ranked almost equally overall (1.01). However, since this is a single comparison, it is useful to look at the breakdown of how each person responded. Of the three community members, two ranked them equally important and two ranked procedural issues with a score 4, giving an overall ranking of 0.51 in favour of procedural justice. Of the seven experts, only one ranked procedural justice higher (score 4), giving distributive justice a higher weighting overall (1.51); this respondent

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was an expert in public participation and had worked extensively with local community groups.

	<i>Experts</i>	<i>Community</i>	<i>Overall</i>
Distributive : Procedural justice ratio	1.51	0.51	1.01

TABLE 4. Ranking exercise results: ratio of distributive to procedural justice.

## IV. DISCUSSION

The results gained from the AHP exercise are significant in that they allow analysis of the weighting assigned to the attributes by different groups, such as those people who have personal experience of campaigning for EJ, rather than simply aggregating the results. Future studies could assess the results of a specific group of respondents from a particular area in order to pinpoint the overriding concerns of that community, allowing local views to be taken into account, and highlighting the varying experiences of EJ. In the same way, attributes of EJ could be varied to reflect the local situation.

There was a disparity between those respondents with experience of campaigning against EJ, who gave procedural justice attributes more weight, and the majority of expert respondents who favoured distributive justice. Since the experts are usually working in decision-making roles, it is important to ensure that the voice of community members is heard through more inclusive approaches to decision making. As one community member stated, 'Participation and being listened to is more important than measuring pollution.'

Procedural justice is of course not only limited to EJ, but ranges across the whole spectrum of justice. While local authorities are required to produce certain indicators, such as time taken to determine planning applications, there are few national indicators regarding the processes of justice, and this is recommended as an area for future study. However, it is recognised that increasing involvement and control for local communities in the processes of government is not straightforward, especially when political and economic decisions are becoming more centralised.

For distributive justice, the respondents of the study clearly linked EJ to health concerns by the weight attached to air, water and land pollution over other aspects of the lived environment. Air quality has come under much scrutiny with regard to EJ, as borne out by a number of studies (eg, Mitchell and Dorling 2003, Yearley et al 2003) but the outcomes are complex and difficult to analyse. The establishment of a database to monitor small-scale areas for air quality on a long-term basis is one step which would help to identify instances of EJ and alert authorities and local communities to problems which exist over time.



Yet the problem of EJ is not going to be solved simply by collecting more data. A recent report from the Environment Agency (*The Guardian*, 31/7/2003) suggested that firms were finding it more cost-effective to pollute and pay repeated fines than to install more pollution abatement technology, and from an economic and commercial standpoint this is likely to be true. Dunion (2003) calls for SEPA to be allowed to prosecute firms independently of the Procurator Fiscal, as is the case in England, in order to increase the success rate of prosecutions and enforcement of conditions. However, the possible risks of a development also need to be calculated to help the local community decide if they are willing to accept them in order to gain economic benefits. Some form of planning gain, whereby developers also provide, for example, a local leisure centre for the community or pay compensation into a community fund, may bring about higher levels of public acceptability for many forms of development.

For procedural justice, local control over industrial practices was weighted as the most important indicator, and one community respondent who lived close to a landfill site described the successful outcome of regular discussions between community representatives and the landfill operators. This suggests that planning applications should include provision for on-going local involvement if a potentially-polluting development is approved. A study by Friends of the Earth Scotland (2004) to investigate the usefulness of Good Neighbour Agreements showed that, if given legal status, they are one tool which can increase the power of local communities in negotiations with firms. The need for a third party right of appeal in planning to give more equal rights to individuals and communities in local planning decisions was emphasised, and this is currently an area being consulted upon for a new Planning Bill in Scotland.

Power-sharing at public meetings scored highly too, and reflected the experience of those community members who had been discouraged by their involvement in the planning process. Access to information was also weighted as important and the implementation of the Freedom of Information Act and Aarhus Convention should be useful in meeting this need. The presence of an environmental group was ranked least in importance, despite the fact that all community members were members of a group. This perhaps suggests that respondents wanted to feel that they could influence local decisions individually.

The suggested indicator set and the weighting exercise described above aim to enable various institutions to address EJ issues in a range of settings whereby the weighting of attributes shows areas of most concern. However, many interviewees suggested that environmental and social injustices take place within a context which highlights an underlying need for structural changes in our institutions. While this study has emphasised the desire for greater local involvement and wider powers to be given to communities, our increasingly centralised economic and political systems mean that decision-making structures are increasingly remote, thus limiting the scope of local involvement in decision making.

## JUSTICE FOR THE ENVIRONMENT

Throughout Scotland the population is portrayed as apathetic and unwilling to become involved in political processes, with turnout in the last election one of the lowest in history (The Guardian, 2/5/03). Yet as Jenkins et al (2002) discovered, apathy is more often a term which hides alienation, mistrust and frustration with national and local government, and a perceived lack of desire by authorities to truly take into account local views in a centralised decision-making process. With few fully-functioning communities to empower, what future can there be for a proposal to improve EJ by strengthening the rights and involvement of communities?

In the future, rather than looking at EJ through the lens of social justice, we may need a more radical interpretation of the concept, that of justice *for* the environment. This would mean, for example, some of the following steps:

- a real adherence to the principles of sustainable development, putting the needs of future generations first by use of the precautionary principle and the prohibition of any industry which causes irreversible environmental impacts;
- the reintegration of pollution with the producer by use of the proximity principle and legislation which will not allow repeated pollution events;
- a real commitment to renewable energy, and a reduction in energy use;
- legislation for stronger measures of corporate responsibility, such as the monitoring of undertakings and guarantees given by developers/industries, to ensure these are enforced.

Scotland is a small country with an industrial history that has led to an inequitable society and degraded environment for many people. However, the government has made a real, on-going commitment to improving issues of social exclusion and EJ. While indicators are useful tools for assessing progress, and this paper aims to add to the discussion by suggesting a possible approach for the use of indicators in delivering EJ, it also suggests that more underlying institutional changes are also required if long term environmental protection is to be assured within an equitable society.

This was clearly a small-scale study, yet it is felt that the results are indicative of the kinds of issues and indicators which might arise from a more focussed use of this method. A new study based on a specific geographic location would be beneficial in highlighting local concerns relevant to adjacent industries, and helping to target policies to alleviate injustices. Also, future studies could take the viewpoint of a single institution for a more specific analysis of EJ and ways of addressing the issue, which would lead to a more focussed indicator set.

## NOTES

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<sup>2</sup> Rather than calculating the central tendency of distribution by adding together values (arithmetic mean calculation), the calculation of the geometric mean involves multiplying those values, which limits the influence of outliers upon the value of the mean, hence making it more representative of the values of the distribution.

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