An analysis of 'needs talk' in relation to sustainable development and education

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Abstract

The year 2005 marked the beginning of the United Nations Decade of Education for sustainable development. Commonly, sustainable development (SD) means development that does not compromise the needs of future generations. Therefore the term implies two broad categories of needs: needs of present generations and needs of future generations. In this paper, I theorise about these two categories of needs. More importantly, however, I theorise about needs discourses associated with sustainable development. In other words, I focus not only on needs as the distribution of satisfactions but also on the contested character of needs or the politics of needs. Nancy Fraser writes that 'needs talk' functions as a medium for making and contesting of political claims: 'it is an idiom in which political conflict is played out and through which inequalities are symbolically elaborated and challenged'. Furthermore, she proposes a scheme for classifying the varieties of needs talk in late capitalist societies, suggesting that there are three major needs discourses: 'oppositional' discourses, 'reprivatisation' discourses and 'expert' needs discourses. All of these relate to sustainable development, but sustainable development produces another discourse which might be described as a 'futures' needs discourse. In this paper I explore some of the current rival needs discourses and reflect on 'futures' needs discourses vis-à-vis sustainable development. I also suggest some implications of my discussion for education.

Introduction

The year 2005 marked the beginning of the 'United Nations Decade of Education for Sustainable Development', providing an opportune time to (re)consider key concerns related to education for sustainable development (ESD). I should point out at the outset that although the UN resolution 75/254 implies a new line of interest, a considerable body of literature has been produced on ESD and it has been the subject of a great deal of controversy and contestation over the past twenty years. The debate centres on the term sustainable development and the proposal that it should be a key focus of (environmental) education. I shall (re)visit this later in the paper. However, of greater concern is an aspect of the conventional definition of sustainable development which appeared in the Brundtland Commission report:

"development which meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987). Needs is an aspect that appears to be neglected in much that has been written on sustainable development and ESD. My interest though, is not only on needs as the distribution of satisfactions, but on the emergence of needs discourses and needs interpretations, that is, with the politics of needs. In my exploration I divide my paper into four main sections. First, I discuss some of the difficulties with the terms sustainable development and ESD. Second, I discuss the emergence of needs discourses in late capitalist societies. Third, I examine how these might relate to sustainable development. Fourth, I look at some of the implications that needs discourses or 'needs talk' (in relation to sustainable development) may have for education.

The term sustainable development

Sustainable development, a term first used in eighteenth-century German forestry management practices,[1] was popularised in the 1980s. The term has great political appeal ostensibly because it integrates two highly attractive notions. One of which promotes the conservation or preservation of non-human nature and the other allows opportunities for human aspirations to 'develop'. However, as Bonnett (2002) argues, sustainable development is a problematic term. It is heavily contested, subject to internal contradictions (the notions of conservation and development are conflicting) and raises epistemological difficulties (for detail see Rist, 1997; Bonnett, 1999).

Although sustainable development may be viewed as a continuum ranging from weaker (based on conventional understandings of economic growth) to stronger sustainability (challenges unbridled technological advance), many authors contend that the term essentially reinforces a problematic anthropocentric stance. Mitchum (cited in Bonnett, 1999) presents two arguments. First, he argues that proponents of sustainable development were attempting to move away from the notion of scarcity which the Western (modern) world defines as the economy of subsistence, even though the latter is possibly the only route to sustainability. Second, he argues that the notion of sustainable development involves a subtle addiction to management, since it

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[1]   According to Van Zon (2006), the term sustainability was first used in the year 1713 in a German publication on forestry by Hans Carl von Carlowitz. The reason for its use at the time was because people in many German states were fearful that there would be a shortage of wood. Van Zon points out that the word sustainability is not found in the 1933 edition of the Oxford English Dictionary, indicating that the word did not exist in the English language at the time. This is confirmed by the 1986 supplement of the dictionary which states that the word 'sustainability' was used for the first time in 1972.

views the world as "a spaceship in need of an operating manual" (quoted in Bonnett, 1999, p.317). Drawing on the work of the critical discourse analyst Fairclough, Stables and Scott (2002) make the case that in democratic societies, politicians resort to the creation of compound terms such as sustainable development which embrace what could appear to be opposite aspirations. They note that compound terms such as sustainable development have a strong appeal as policy slogans but are difficult to implement – a huge gulf therefore develops between policy sloganising and policy implementation.

Education for sustainable development

Sauvè (1996) points out that the relationship between environmental education and sustainable development (sustainability) is perceived in different ways. For some, sustainable development is the ultimate goal of environmental education, thus the term *environmental education 'for' sustainable development* (EEFSD). For others, sustainable development encompasses specific objectives that should be added to those of environmental education, thus the expression *education for environment 'and' sustainable development* (EFE and SD). For others still, environmental education inherently includes *education for sustainable development*, thus the use of both terms is tautological.

Education for sustainable development has in the main been shaped by the emergence of *sustainability* as a concern within the environmental movements of the 1980s and 1990s and by the orientation to environmental education, *education for the environment. Education for sustainability*, however, has been at the centre of controversy. For some, *education for sustainability* is associated with critical discourses on education (see Fien, 1993a, 1993b, 1993c; Gough, 1997; Huckle and Sterling, 1996; Plant, 1998; Huckle, 1999). Critical approaches to education maintain that education is openly ideological (not value-neutral) and so given people to nature relationships and people to people relationships that have gone wrong on planet Earth (i.e. human activity that is eroding the planet's biophysical base leading to an increasing gap between haves and have-nots), we have little choice but to educate for sustainable development. However, even if such an approach were to be adopted, the problem of what is meant by sustainable development would remain unresolved. For example, narrow stipulative definitions of sustainable development hold the danger of indoctrination. Recognising this danger Huckle (1999, p.38) argues that critical *education for sustainability* should not be based on a single preferred construction of sustainability. In his view it should rather be seen as "a process of critical reflection and action on those forms of technology and social organisation that might allow us to live

sustainably with one another and the rest of nature". Huckle's (1999) view represents a shift from a narrow instrumentalist approach to environmental education and provides greater space for debate, contestation, speculation and nuances of thought within discourses on critical *education for sustainability*. However, those arguing from a more liberal stance have pointed out that education for sustainable development might be anti-educational. For example, Jickling and Spork (1998) challenge the idea of educating 'for' anything that is external to education itself. As Jickling (1997, p.95) writes:

> When we talk about 'education for' anything we imply that education must strive to be 'for' something external to education itself. We may argue, in an open sense, in favour of education for citizenship or character development. However, as prescriptions become more specific interpretations of education become more loaded and more problematic. . .

Debates on sustainable development are likely to continue and become more pronounced in view of the UN declaration. Along with Sauvè (1996), I would argue that the issue of sustainable development and how it is reflected in discourses on environmental education will remain: it is important for different conceptions of environment, education and sustainability to coexist. As, Huckle (1999), Sauvè (1996), Jickling (1995), Robottom (1990) have argued, diversity in environmental education needs to be acknowledged as a stimulus for "critical reflection, discussion, contestation, and evolution" (Sauvè, 1996, p.28). In a recent publication Wals and Jickling (2002, p.123) support the view that sustainable development should not have a single meaning or fixed definition but rather be the focus of ongoing, critical (re)examination. Although they are wary of sustainability being used as the pre-eminent organizing concept of education, they do see its potential for what they term, "sustainability talk". Wals and Jickling (2002, p.123) elaborate on the idea as follows:

> Sustainability talk potentially brings together different groups in society searching for a common language to discuss environmental issues. . . Where different ways of looking at the world meet, dissonance is created and learning is likely to take place – so-called: "learning at the edge". This dialogue also allows the socio-scientific dispute character of emerging knowledge and values to surface. Participation in such a dispute is an excellent opportunity to learn about a highly relevant, controversial, emotionally charged and debatable topic at the crossroads of science, technology and society.

It is evident that sustainable development and ESD are contested terrains. Before discussing the terms further, I shall explore the key focus of the paper, 'needs talk' in relation to sustainability and education.

The emergence of needs talk as a major vocabulary in political discourse

In my view, the angle of vision of much of the critique of sustainable development and education evident in the literature should shift to a focus on needs. 'Needs talk' has been given scant attention in the proliferation of literatures on education and sustainable development of the past 25 years despite the fact that the word 'needs' features strongly in the most widely quoted definition of sustainable development. With a few exceptions (for example, Miller, 1999; Hamilton, 2003), even in political philosophy there is little theorisation of needs, and this is so despite the fact that need has become "institutionalised as a major vocabulary of political discourse" (Fraser, 1993, p.162).

In the Brundtland Commission Report (WCED, 1987) two sets of needs are mentioned: the 'needs of present generations' and the 'needs of future generations'. Before referring to these, I shall first focus on what is meant by needs by generating questions on it. For example, are needs the distribution of satisfactions; a principle of social justice; or a variant of desires and wants? What is meant by 'needs'? Answers to the mentioned questions (and many other related questions) are complex. For one thing, the term 'distribution of satisfactions' would have to be interrogated. For example, what is meant by 'satisfactions', are they individual or group satisfactions, and how can competing satisfactions be met if there are not sufficient resources available? Many needs may qualify as a principle of humanitarianism but not necessarily as a principle of social justice. Distinguishing when needs claims are claims of justice or claims of humanity/benevolence becomes crucial – the boundaries between these, however, often are blurred (see Miller, 1999 for a detailed discussion). Needs could be distinguished from desires and wants in that if the former are not met, the individual or group suffer: that is, they are harmed. But this begs the question of what constitutes harm. There are many more questions concerning what is meant by need(s). However, suffice it to say that questions such as these belie the apparent simplicity of the definition "development which meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987). I shall return to particular difficulties with respect to meeting the "needs of future generations".

Fraser (1993), however, introduces another dimension to the analysis of needs which focuses on the politics of needs. Talk about needs has not always been central to Western political culture. In the past it has often been relegated to the margins and considered antithetical to politics. So, why has talk about needs become so prominent in the political culture of welfare state societies?

Fraser (1993) raises several other questions of which I shall mention two. Firstly, does the emergence of the needs idiom presage an extension of the political sphere or, rather, a colonisation of that sphere by newer modes of power and social control? Secondly, what are the varieties of needs talk and how do they interact polemically with one another? In responding to these questions, Fraser does not offer definitive answers but rather outlines an approach to thinking about such questions. I shall elaborate on this, arguing that her approach could provide a more nuanced understanding of needs (talk) in relation to sustainable development.

Fraser's central focus of her inquiry is not on needs but rather on discourses about needs and in so doing she shifts the angle of vision to the politics of needs. Put another way, she shifts the focus from the usual understanding of needs, which pertains to the distribution of satisfactions, to the politics of needs interpretation. She sharpens the focus on the contextual and contested character of needs claims so that the interpretation of people's needs are not seen as simply given and unproblematic; the politics of needs concerns a struggle over needs. Fraser (1993) goes on to suggest that the politics of needs comprises three moments that are analytically distinct but interrelated in practice. I summarise them as follows:

1.   The struggle to validate a given need as a matter of legitimate political concern or to enclave it as a nonpolitical matter

2.   The struggle to interpret the need – the struggle for the power to define it and to determine what would satisfy it.

3.   The struggle to satisfy the need – the struggle to secure or withhold provision.

Fraser's inquiry into the politics of needs led to a social discourse model which maps three major kinds of needs discourses in late capitalist societies: 'oppositional' discourses, 'reprivatisation' discourses and 'expert' needs discourses. Oppositional discourses arise when needs are politicised from the bottom which lead to the establishment of new social identities on the part of subordinated groups. These discourses arise when needs become politicised such as when women, people of colour or workers contest the subordinate identities and roles they have been assigned or that they have embraced themselves. Among other things oppositional discourses create new discourse publics and new vocabularies and forms of address. Fraser (1993) points out that the wave of feminist ferment established terms such as 'sexism', 'sexual harassment', 'date rape' and 'wife battering'. In her view, reprivatisation discourses have emerged in response to the oppositional discourses. They articulate entrenched needs that would previously have gone without saying. Institutionally, 'reprivatisation'

initiatives are aimed at dismantling or cutting back social welfare services, selling off nationalised assets, and deregulating private 'enterprise'; discursively it means depoliticisation. They may insist that 'wife battering' is domestic rather than political.

For Fraser (1993), expert needs discourses link popular movements to the state. They are best understood in the context of 'social problem solving', institutional building, and professional class formation. They are closely connected with institutions of knowledge production and utilisation, and they include social science discourses generated in universities and 'think tanks' legal discourses generated in judicial institutions, journals, and professional associations, and so on. Expert discourses tend to be restricted to specialised public discourses associated with professional class formation, institution building and 'social problem solving'. However, sometimes expert rhetorics are disseminated to a wider spectrum of educated laypersons – expert public discourses sometimes acquire a certain porousness – and become the bridge discourses linking loosely organised social movement with social state. It is the polemical interaction of these three kinds of needs talk that structures the politics of needs in late capitalist societies. The interaction between these three kinds of needs talk could provide a basis for reflecting on the idea of sustainable development, particularly in view of the definition of sustainable development which appeared in the Brundtland Commission Report.

Needs talk and sustainable development

Fien's (1993b) typology provides a useful starting point for critical reflection on sustainable development in terms of *people to nature* values/principles and *people to people* values (see table 1), as does his placement of needs as a value/principle of social justice. His two broad categories: ecological sustainability and social justice are in tension with one another – or, it could be perceived to be. A primary focus on ecological sustainability may be described as biocentric/ecocentric whereas viewing social justice as central of sustainable development could be described as anthropocentric. People who argue from liberal and Gaianist (influenced by deep ecological perspectives) positions favour values related to ecological sustainability but view values associated with social justice as being anthropocentric (human-centred). Those who take up critical and/or ecosocialist positions emphasise issues related to social justice in preference to those associated with ecological sustainability. The first group, which favours values related to ecological sustainability, extend the notion of needs to non-human nature and refer to the needs of nature. Some of them would restrict needs to sentient beings only, arguing that animals, which have rights, also have needs. As a whole, Gaianists and deep ecologists contest the idea that 'needs' are endemic to human beings.

Table 1:   Core values central to sustainable development

People and nature: Ecological sustainability	People and people: Social justice principle
Interdependence: people are part of nature and are dependent on it.	*Basic human needs*: the needs of all individuals and societies should be met, within the constraints of the planet's resources.
Biodiversity: every life form warrant respect independent of its perceived worth to humans	*Inter-generational equity*: future generations should be left with a planet that at least has similar benefits to those enjoyed by present generations.
Living lightly on the earth: all persons should use biophysical resources carefully and restore degraded ecosystems	*Human rights*: all persons should enjoy the fundamental freedoms of conscience, religion, expression etc.
Interspecies equity: people should treat all life forms decently and protect them from harm	*Participation:* all persons in communities should be empowered to exercise responsibility for their own lives.

Adapted from Fien (1993b)

But, the value/idea, 'basic human needs' is contested and controversial. In her cogent argument, Fraser (1993) presents the view that thin needs are uncontroversial but when one descends to a lesser level of generality the needs claims become controversial. For example, let us assume that shelter is a basic human need in non-tropical climates – at this level of generality such a claim would be uncontroversial. However, as soon as we become more specific and ask what homeless people need in order to be sheltered from the cold, the needs claim becomes more controversial. As Fraser (1993, p.163) illustrates when she asks: ". . . [should they] sleep undisturbed next to a hot-air vent on a street corner, in a sub-way tunnel or bus terminal. . . a bed in a temporary shelter. . . a permanent home? And, we can go on to proliferate such questions – in doing so, we will proliferate controversy". Furthermore, "needs" is not necessarily a value/principal of social justice. Miller (1999) argues that an individual's satisfaction or relief is based on the moral imperative of benevolence or humanity rather than justice. Justice, he argues is concerned with the fair allocation of resources to meet satisfactions. Also, much of the discussion here focuses on the needs of present generations. Thinking about needs of future generations further complicates matters. Can and should present generations determine the needs of future generations? How would they determine what the needs are? Yet, at the same time the decisions that

present generations make, could place future generations in very vulnerable/needy positions. In brief, I reiterate the complex nature of needs. But, the discussion should be taken further and so I turn to the politics of needs, that is, to discuss some needs discourses and how they might relate to sustainable development.

Oppositional discourses in relation to sustainable development are evident in a contemporary era. For example, the NGO forum that met at the Rio De Janeiro Earth Summit in 1992 formulated alternative principles on sustainable development to those of governments. Concerning new vocabularies, environmental justice is an example of a new term constructed within oppositional discourses – the environmental justice movement is led mainly by women of colour in the USA. More recently, we have also witnessed oppositional voices from what is referred to as the new social movements. As Irwin (2003, p.329) writes:

> Contemporary anti-globalisation protest is a remarkable 'rhizome' of radical groups, upstanding citizens, charities, long standing emancipatory organisations, environmental groups, right wing organisations, anarchists, communists and so forth, who have all found a common thread which weaves together their disgust at the solidified locus of financial, discursive and policy flows which have coagulated in supra-national organisation such as the [World Trade Organisation] WTO, World Bank, [International Monetary Fund] IMF, and various events such as the recent United Nations Earth Summit at Johannesburg.

Referring to reprivatisation discourses, Irwin (2003) argues that most of the nations of the world currently adhere to neoliberal policies of privatisation and devolvement promoted by the World Bank, IMF and WTO. As far as expert discourses are concerned, over the past two decades we have witnessed several conferences held on sustainable development as well as education for sustainable development, journals on sustainable development (for example, *Journal of Sustainable Development in Higher Education*) have been established and several special issues of journals have been published on education and sustainable development (for example, *The Trumpeter*, *Philosophy and Theory of Education*, *Environmental Education Research*) as well as inter-governmental conventions such as the World Summit in Johannesburg (2002) have been held. Fraser's social discourse model is pertinent to sustainable development. The struggle over needs is evident in oppositional discourses of anti-globalisation movements, which struggle against reprivatisation discourses produced by organisations such as the WTO, IMF and the World Bank as well as national governments. Expert discourses influence both oppositional and reprivatisation discourses and are also influenced by these. However, the issue here is what implications these may have for education.

Some implications for education

As I said earlier, need is a complex construct, easily invoked in political speeches and social policies. However, it is a controversial and contested idea. In this paper I briefly discussed why need is such a complex issue and the importance of understanding the politics of needs, that is, how needs are constructed or produced within different political discourses. As Foucault (1977, p.26) writes: "need is also a political instrument, meticulously prepared, calculated, and used".

At a time of increasing concern about the planet's biophysical base that is rapidly being eroded, the perennial existential question of *how should we live* emerges strongly. Related to this are questions of how and what should be learned and taught in educational institutions. In response to these questions notions such as sustainable development and *education for sustainable development* have great appeal presumably because they purport to serve multiple and often disparate aspirations. However, as pointed out sustainable development generally and 'needs' more specifically, are complex and contested ideas. It is very difficult to determine what is meant by needs for needs form part of and are constituted by much of the political struggles that prevail in contemporary societies. Viewing sustainable development through the needs lens powerfully emphasises the complex, contested and controversial nature of the term. Such a perspective could provide students with the opportunity to learn about what Wals and Jickling (2002, p.123) describe as "a highly relevant, controversial, emotionally charged and debatable topic at the crossroads of science, technology and society".

In South Africa's new National Curriculum Statement (NCS), sustainable development forms part of the knowledge foci/content prescriptions of subjects such as Geography and Life Orientation. *Environmental and social justice* is also one of principles which underpin the NCS for Further Education and Training. Sustainable development will therefore form part of school learning programmes. However, because of its popular appeal there is a danger that it will be reduced to simplistic definition and formulation in terms of narrowly defined outcomes. It is vital that sustainable development forms part of classroom conversations. However, these conversations must recognise and critically debate the complex, controversial and contested nature of the term. For this to happen, teachers will have to understand the complexity of sustainable development and engage critically with the construct. They will also have to understand learning outcomes as being dynamic and not static. South Africa is the fifty-second wealthiest country in the world but is one hundred and twentieth on the United Nations human development index, indicating the extent of the gap between the haves and the have-nots. South Africans need to be careful that sustainable development does not become a

subtext for unbridled economic growth thus widening the gap between the wealthy and the poor. We should be careful about what we will educate for in the decade 2005 to 2014. Looking through the 'needs' lens makes possible an appreciation of the complex nature of the term sustainable development and further, reference to needs in classrooms may enable better understanding of sustainable development because 'needs' is a term learners might be able to relate to more easily.

The introduction of aspects of sustainable development into South African education coincides, and in a sense is integral to curriculum and school reform currently taking place. Popkewitz (1991, p.244) cautions against accepting reform as truth producing and progressive, referring to what he terms, the "dangers of an epistemology of progress". Dominant discourses on sustainable development (produced through supranational bodies) and curriculum reforms (influenced by globalisation) such as outcome-based education, are underpinned by an "epistemology of progress". Progress stories embedded in both global discourses on sustainability and curriculum reforms threaten to narrow democracy by thwarting efforts to achieve social justice and to develop a critical citizenry that is reflexive in a rapidly growing consumerist society. Shifting the angle of vision on sustainability to a focus on needs could shift the understanding of reform (social, political and educational) as "truth producing and progressive" to understanding it as an "object of social relations" (p.244). Such a move might provide pedagogical space for critiquing/deconstructing education programmes embedded in Western (enlightenment) progress stories.

References

Bonnett, M. 1999. Education for sustainable development: a coherent philosophy for environmental education? *Cambridge Journal of Education,* 29(3): pp.313–324.

Bonnett, M. 2002. Sustainability as a frame of mind – and how to develop it. *The Trumpeter,* 18(1): pp.1–9.

Fien, J. 1993a. Education for sustainable living: an international perspective on environmental education. *Southern African Journal of Environmental Education*, 13: pp.7–20.

Fien, J. 1993b**.** *Education for the environment: critical curriculum theorising and environmental education*. Geelong: Deakin University Press.

Fien, J. 1993c. *Environmental education: a pathway to sustainability*. Geelong: Deakin University Press.

Foucault, M. 1977. *Discipline and punish: the birth of the prison*. Alan Sheridan (trans.). England: Penguin Books.

Fraser, N. 1999. *Unruly practices: power, discourse and gender in contemporary social theory*. Cambridge: Polity Press.

Gough, A. 1997. *Education and the environment: policy trends and the problem of marginalisation*. Melbourne: The Australian Council for Educational Research.

Hamilton, L. 2003. *The political philosophy of needs*. Cambridge: Cambridge University Press.

Huckle, J. and Sterling, S. (Eds). 1996. *Education for sustainability*. London: Earthscan.

Huckle, J. 1999. Locating environmental education between modern capitalism and postmodern socialism: a reply to Lucie Sauvè. *Canadian Journal of Environmental Education*, 4: pp.36–45.

Irwin, R. 2003. Education and Guattari's philosophy of the environment. Paper presented at the annual conference of the Philosophy of Education Society of Great Britain. Oxford: New College, Oxford University.

Jickling, B. 1995. Sheep, shepherds, or lost? *Environmental Communicator*, 26(6): pp.12–13.

Jickling, B. 1997. If environmental education is to make sense for teachers, we had better rethink how we define it. *Canadian Journal of Environmental Education*, 2: pp.86–103.

Jickling, B. and Spork, H. 1998. Education for the environment: a critique. *Environmental Education Research*, 4(4): pp.309–327.

Miller, D. 1999. *Principles of social justice*. London: Harvard University Press.

Plant, M. 1998. *Education for the environment: stimulating practice*. Dereham: Peter Francis.

Popkewitz, T. 1991. *A political sociology of educational reform: power/knowledge in teaching, teacher education, and research*. New York: Teachers College Press.

Rist, G. 1997. *The history of development*. London: Zed Books.

Robottom, I. 1990. Contestation and consensus in environmental education. *Curriculum Perspectives*, 7(1): pp.23–27.

Sauvè, L. 1996. Environmental education and sustainable development: a further appraisal. *Canadian Journal of Environmental Education*, 1: pp.7–34.

Sauvè, L. 1999. Environmental education between modernity and postmodernity: searching for an intergrating educational framework. *Canadian Journal of Environmental Education*, 4: pp.9–35.

Stables, A. and Scott, W. 2002. The quest for holism in education for sustainable development. *Environmental Education Research,* 8(1): pp.53–60.

Van Zon, H. 2006. Summary: history of sustainable development. Netherlands: State University of Groningen. <http://www.dho.nl/documents/SummaryHistory.pdf> 25 August.

Wals, A. and Jickling, B. 2002. 'Sustainability talk' in higher education: from doublethink and newspeak to critical thinking and meaningful learning. *Higher Education Policy*, 15: pp.121–131.

World Commission on Environment and Development (WCED). 1987. Our common future. Oxford: Oxford University Press.

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