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The legal principles guiding a cohort of early career environmental professionals

Environmental management has the hallmarks of a post-normal science: the stakes are high, decisions are urgent, facts are uncertain and values are often disputed.[1,2] Many modern environmental problems are intractable and cannot be solved using evidence-based tools from narrow scientific disciplines.[3] Instead, managers must juggle competing priorities while negotiating various development and conservation trade-offs. This introduces unavoidable subjectivity in the way we manage nature. Sound judgement becomes as relevant as measurement, analysis and optimisation.

Environmental professionals do not all fit the common stereotype of the green activist. Studies have consistently shown, both nationally[4] and internationally[5,6], how environmental professionals hold diverse values. These values vary from ecocentrism, that is, the belief that humans have a duty to protect nature for its own sake, to anthropocentrism, which is the belief that nature should be managed to improve human well-being. Despite ethical pluralism, one would expect that environmental legislation supplies a common set of rules that apply to all, regardless of personal values.

In South Africa, the *National Environmental Management Act* 107 of 1998 (NEMA) is the overarching law that guides environmental management. Chapter 1 of the Act outlines the National Environmental Management Principles – a set of ideals that underpin environmental regulations nationally. These principles are non-hierarchical, so each should be equally important. But environmental managers are human and would naturally favour principles that resonate with their own core beliefs. We explored how a cohort of early career environmental professionals (the authors of this paper) prioritises the principles set out in NEMA. First, we explored whether there is general consensus on which principles are considered relatively more important. Second, we explored patterns in these principles and determined whether certain preferences tend to be complementary or mutually exclusive.

Prioritising NEMA principles

As a substitute to a face-to-face lecture on environmental legislation necessitated by the national lockdown due to COVID-19, students in the master's programme in environmental management at the University of the Free State were asked by the course instructor (F.B.) to reflect on Chapter 1 of NEMA and identify the three principles that they considered most important. Each student was tasked with writing an essay of no more than 1000 words justifying their selection of their three most important principles. This paper is a synthesis of the students' (coauthors') reflections.

The master's programme is a part-time degree for early career environmental professionals. The nine participants had varying years of experience (1–15 years) in the private, public or academic sectors. Thus, they met the broad definition of 'experts' by having substantive knowledge on environmental management, the normative ability to communicate environmental judgements, and the adaptive ability to apply knowledge under new circumstances.[7] Expert performance is often uncorrelated with the perception of expertise[8], so the fewer years of experience of some respondents should not invalidate their judgements.

Chapter 1 of NEMA is made up of Section 2, with four sub-sections. Section 2(1) refers mainly to the position of NEMA in the South African legal landscape. Section 2(2) refers to the need of environmental management to put people's needs at the forefront, while Section 2(3) outlines how development should be socially, environmentally and economically sustainable. Section 2(4) is made up of 18 sub-sections (*a-r*), which describe the guiding ideals of the Act. Therefore, if we consider Sections 2(2), 2(3) and the subsections of 2(4), respondents had a set of 20 principles from which to select their three most important ones. The elicitation process was, therefore, similar to the IDEA protocol[9] (Investigate, Discuss, Estimate, Aggregate). First, participants selected their three most important principles individually (Investigate). Second, ideas were summarised anonymously by F.B. in a draft manuscript and circulated to participants for comments (Discuss). Third, participants could again make private comments on the collective contributions of the group (Estimate). Lastly, the second round of responses was combined into this final version (Aggregate).

Perspectives on NEMA principles

In general, there was a lack of consensus on the most important principles in NEMA and 14 of the 20 principles were prioritised by at least one respondent (Figure 1). Principle 2(4)*a* was the most frequently selected principle, being chosen by four of the nine respondents. This principle is the longest in the chapter because it describes the considerations of sustainable development, including the mitigation of impacts, the risk-averse precautionary principle, and keeping natural resources within sustainable limits. One respondent justified their choice by explaining that 'it is not always possible to stop development...but if developments take place, measures should ensure that the environment is not totally degraded'. A second respondent wrote 'this principle is important because it compels managers to not only consider the immediate, but also the long-term, impact of development', which was echoed by another: '[this principle] aims to ensure present needs are being achieved without jeopardising future generations'. Thus, these views place the onus on developers to ensure intergenerational equity.

Section 2(4)*f* was prioritised by three participants. This section focuses on the participation of all interested and affected parties in environmental governance, especially disadvantaged and vulnerable individuals. The reasons for prioritising this principle varied from those of social justice ('informal rights and community customs are recognised by law and should be protected'), to operational pragmatism ('marginalised people can delay projects if engagement is superficial and does not truly consider their concerns'). Section 2(4)*p*, which describes the polluter-pays principle, was also selected by three respondents. One respondent justified their choice by explaining that 'those who act irresponsibly must face the consequences and costs of remediation'.
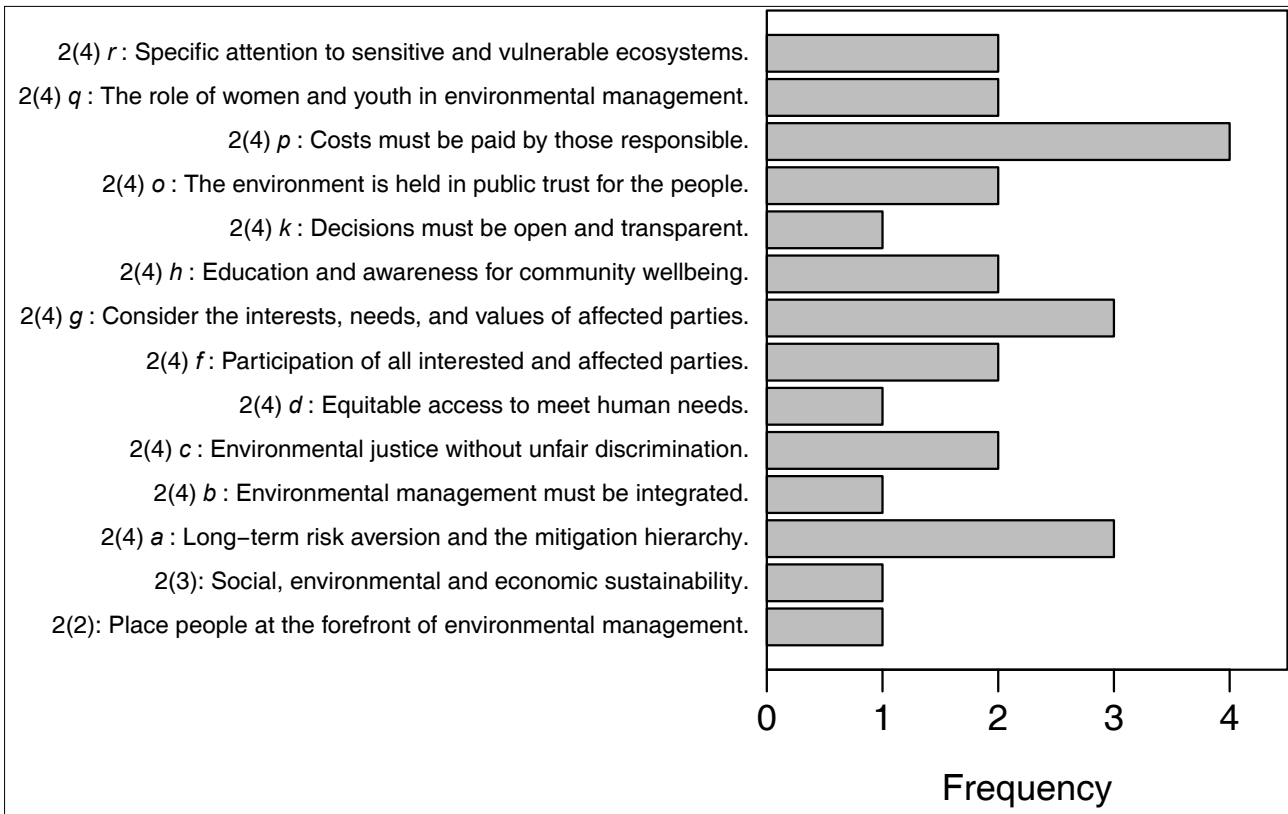
Figure 1: The frequency at which principles from the *National Environmental Management Act* were prioritised by a cohort of early career environmental professionals.

A further six principles were each selected by two respondents (Figure 1). Many of these also focused on the human side of environmental management (Sections 2(2), 2(4)*d*, 2(4)*g*), but they included that environmental management should integrate social, economic and environmental considerations (2(3) and 2(4)*b:* 'this compels managers to consider aspects that are often overlooked by development') and that decisions should be transparent (2(4)*k*: 'lack of transparency can lead to corruption').

A remaining five principles were each prioritised by only one respondent (Figure 1). Intriguingly, one of these is perhaps the most ecocentric principle in NEMA, Section 2(4)*r*, which requires that sensitive, vulnerable, highly dynamic or stressed ecosystems require specific attention by managers and planners. While the respondent highlighted the fragility of ecosystems, their justification also stated that 'degraded land with low ecological significance should be prioritised for development'. This demonstrates how even ecocentric views can be expressed in the context of development.

Of the six principles that were not selected by any respondent, three concerned issues of environmental governance (2(4)*l* – the need for intergovernmental coordination, 2(4)*m* – resolving conflicts of interest amongst organs of state, 2(4)*n* – implementing international commitments to further national interests). The remaining unselected principles referred to ensuring environmental health and safety through the whole project life cycle (2(4)*e*), considering all impacts in decision-making (2(4)*i*), and that workers have the right to refuse work harmful to themselves or the environment (2(4)*j*).

## Identifying archetypes of environmental priorities

There was a lack of consensus about which NEMA principles were most important, which is understandable because these principles are supposed to be equal under law. Nevertheless, we explored whether respondents who favoured certain principles would also be more or less likely to favour others. We quantified this using a cluster analysis based on whether prioritised principles tended to be selected together (Figure 2).

Two clear clusters emerged. The first cluster (grey in Figure 2) reflected humans as the focus of environmental management. Thus, this cluster related to *why* we ought to implement environmental management. The anthropocentric vision of this cluster was encapsulated by one respondent who explicitly stated that 'a holistic take-home message is that people are at the centre of any and every form of environmental planning, management or decision-making'. By contrast, the second cluster (black in Figure 2) included principles related to sustainability, transparency, risk-aversion and public participation, and can be interpreted as answering questions about *how* we ought to implement environmental management. This cluster was described by one respondent who wrote that these principles 'enable authorities to make environmentally-centred decisions with the aim of providing an environment that is not harmful to future generations'. One exception to this separation of the *why* and *how* clusters was the general interpretation of the polluter-pays principle, Section 2(4)*p.* This principle could be interpreted operationally (i.e. who is liable for environmental damage?), but it seems as though respondents interpreted it in terms of fairness (a social justice issue) and not in terms of accountability (a legal liability issue). Nevertheless, the existence of two clusters seems at odds with a recent argument that environmental management tools are constrained by the anthropocentric ethical position[10] (although, admittedly, pluralistic environmental values do not preclude narrow environmental implementation).

NEMA: Dividing wedge or unifying foundation?

Here, a relatively small cohort of environmental professionals did not prioritise legal principles the same way. This suggests that unifying environmental professionals under a common creed[12], similar to the Hippocratic Oath for medical practitioners, is unlikely to be successful.
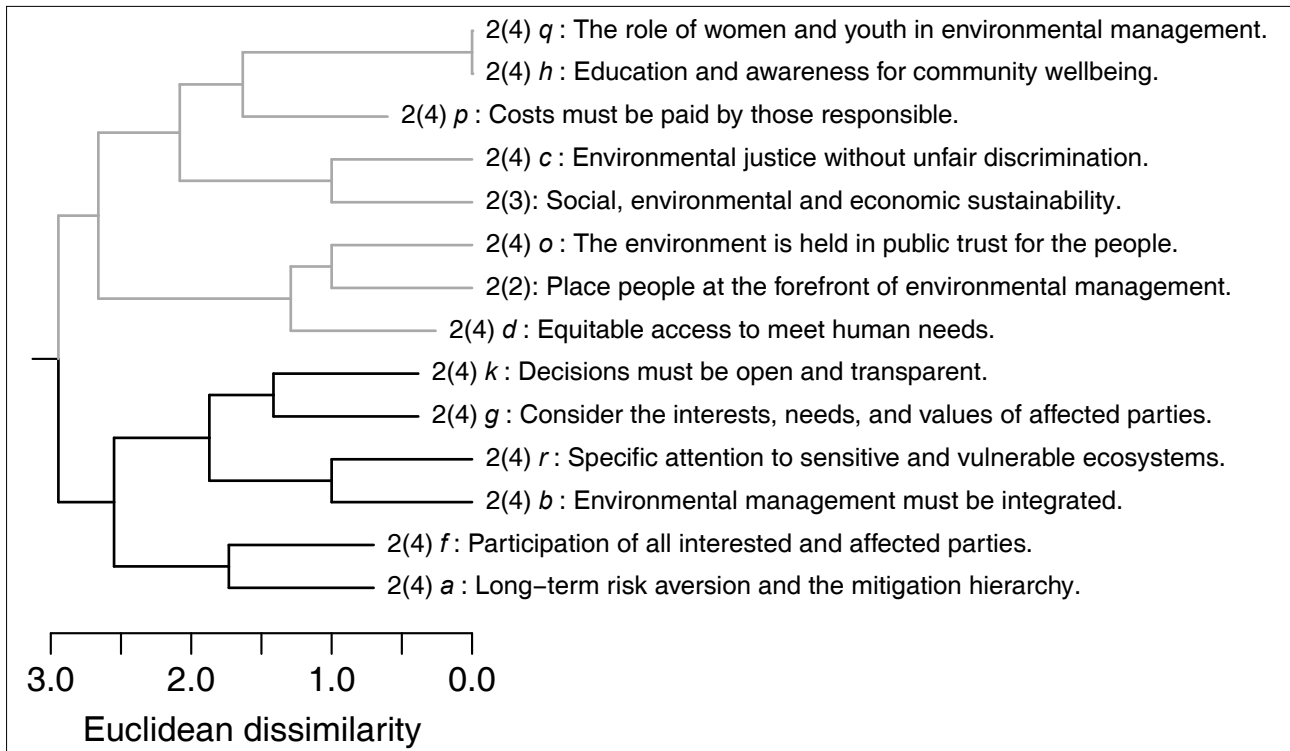
Figure 2: A cluster analysis of principles from the *National Environmental Management Act* that tended to be selected together by early career environmental professionals. Here, minimum Euclidean dissimilarity of 0 implies that the same principles were always selected together, while a maximum Euclidean dissimilarity of 3 denotes principles that were never selected by the same respondents. Cluster analysis was based on Ward's hierarchical agglomerative clustering method on a Euclidean distance matrix in R version 4.0.2.[11]

Pluralistic values can improve the efficacy of environmental management[6,13], but only if it avoids the pitfalls of factionalism. There need not be an ideological battle between those who prioritise human needs and those who prioritise the environment.

At the start of this millennium, Adams and colleagues[14] articulated four independent ways in which nature conservation is related to development aspirations. Their framework is particularly relevant in South Africa, where environmental and development ambitions regularly conflict. First, environmental protection could be seen as completely independent of development. Second, environmental protection is constrained by poverty, so development is a means to more effective conservation. Third, environmental protection is a means to achieve development and poverty alleviation. Fourth, environmental protection and development are mutually dependent and should not be viewed separately. None of these perspectives is superior to the others, but effective and sustainable environmental protection requires awareness of such ethical pluralism.[15] After reading a first draft of this manuscript, one of the contributors noted their surprise at the results: 'I didn't intentionally interpret these principles as human- or environment-focused'. This contributor went on to share a personal experience about differing perspectives: 'We don't all see the world and development through the same eyes. This is something I have experienced in my work life [as an environmental manager], especially when there is a bunch of engineers around'.

Post-normal science allows for differing worldviews. Environmental problems are complex and cannot be solved algorithmically. Instead, solving most environmental problems requires deliberation around scientific evidence while considering values, trade-offs and political feasibility. In post-normal science, authenticity is as important as expertise[1,2] because effective deliberation is only possible when all stakeholders believe they are negotiating in good faith (rather than battling hidden agendas). Sincere dialogue between stakeholders can help define a shared consensus and bring together different worldviews.

Based on this, we make two recommendations for the education and career development of resilient environmental professionals. The first is a call for critical introspection around our own values and ethical priorities. An essential form of professional development for environmental managers is understanding our own motivations, worldviews and biases. This should not entail conformation to the perceived norms of the environmental sector, but rather an appreciation that our own set of beliefs is only one of many possibilities. The second recommendation is that we make a concerted effort to acknowledge that others do not necessarily interpret the world in the same way we do. Rather than imposing our own worldviews on others, it might be more effective to pursue common goals even when motivations might differ.[16] If environmental professionals understand the social, political and ethical contexts of their work, they are more likely to realise their vision for a sustainable future that supports human and ecological flourishing.[17]

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Competing interests

We have no competing interests to declare.

Data availability

All data are included as a self-contained R-script in the supplementary material.

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