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Futures, ethics and the politics of expectation in biodiversity conservation: a case study of South African sustainable wildflower harvesting

Abstract

Corporate efforts to demonstrate ‘sustainability’ within production networks are driving a continued demand for new metrics. This raises questions concerning which experts will be enlisted in their creation, what data and calculative methods they will draw on, and how and whether different publics will be convinced of the rigour of these metrics and their ethical purpose. Debates about futures and expectations tend to be western-centric; in response, this paper highlights the sophisticated environmental science and knowledges in a global South context where politics and uncertainty are of utmost importance. It draws on research into sustainable wild flower harvesting in the Cape Floral Kingdom (CFK), in the Western Cape province of South Africa, to explore the politics of expectation and future making driving debates about biodiversity conservation and socio-economic empowerment within rural communities. It focuses specifically on how expectations of technologies, databases, knowledge and the environment play out in this particular site of production, influencing debates about sustainability, but also perspectives on what is ethical. The case study demonstrates that expectations are neither uniform nor uncontested, but bound up with inequities of power and authority in defining futures. The paper draws on postcolonial approaches to conclude that a radical opening of databases and knowledge production might challenge these asymmetries, but that constraints exist because of external pressures and expectations that arise from the political economy of biodiversity conservation.

Keywords: biodiversity, conservation, database, ethics, futures, South Africa, postcolonialism, *fynbos*

1. Introduction

Within global production networks, corporate efforts to demonstrate ‘sustainability’ are driving a continued demand for new metrics. This raises questions concerning which experts will be enlisted in their creation, what technologies, data and calculative methods they will draw on, and how and whether different publics will be convinced of the rigour of these metrics and their ethical purpose (Freidberg, 2010). This paper is concerned with how the shift towards metrics and governance through technology plays out in sites of production. Specifically, we are interested in the politics of expectation that surround the use of technology, how the shift towards technology influences debates about sustainability in specific places, and how this shapes perspectives on what is ethical in such places. We explore these issues through a case study of sustainable wildflower harvesting and biodiversity conservation in the *fynbos* ecosystem of South Africa’s Western Cape.

Studies on the politics of expectation have argued that promises and expectations are crucial to provide dynamism and momentum in new ventures in science and technology, while failure can bring reputational, professional and commercial damage (Brown and Michael, 2003). In the case of biodiversity conservation, failure can also lead to irreversible ecological damage. Thus the way in which the future is presented is political. As Wilkie and Michael (2009: 504) argue, how the future is discursively constructed is a “means of enacting a future that (hopefully) makes a present that (hopefully) shapes the future”. They do not assume a linear model of time

where expectations are “simply prospective pointers to a future generated in a present that draw upon a past set of presuppositions”. Rather, future scenarios fold implications and consequences back onto present activities; innovations in the present open up “future potentialities, which in turn serve in the potential making of the present with a view to affecting the future” (*ibid.*: 505). The future is thus always a site of contestation, and who and what constructs futures will exclude some versions of the future to the advantage of others.

As a consequence of its positioning within a specific political-economic nexus, expectations within environmental conservation are shifting towards a more active sense of constructing the future in the present. Conservation constructs expectations by not only *looking into* the future, but *looking at* the future, mobilising the future “in real time to marshal resources, coordinate activities and manage uncertainty” (Brown and Michael, 2003: 4; see also Borup *et al.*, 2006). Conservation is thus a form of pre-emption or anticipatory action that has political and ethical consequences (Anderson, 2010: 778). Technology and scientific knowledge are central and both are interwoven with political economy in mutually defining ways:

as we create worlds of... information which reflect our political economy in all its contradictions, it should be no surprise if the politics that get read out of these worlds should help us shape the world in the image of that political economy – again in all its contradictions. (Bowker, 2000: 660)

This paper explores the politics that underpin these processes, the ways in which political economies are reflected in scientific knowledge and *vice versa*, the ways in which competing ethics are articulated in the mobilising of futures in the present, and the different actors involved in biodiversity conservation networks. We use a case study approach to suggest that who constructs expectations and futures – scientists, conservationists, retailers – is as significant as

how they are constructed. We focus specifically on the problem of the relationship between databases constructed by conservationists and the biome they seek to catalogue. We examine the intricate challenges in bringing the complexity of the biome and its sustainable harvesting into the databases, and explore the potential of the databases to play a key role in the sustainability of both the resource and its commodity chain. We are interested in how multiple and competing expectations are or might be articulated by diverse actors, and to what effect. This includes expectations emerging through the paradoxical ‘commercialization of nature’ (Castree, 2003; Johnson, 2010; Prudham, 2009) in the interests of conservation, and the ways in which expectations of future natures inhabit contemporary environmental management in diverse and contested ways.

Much of the current debate about futures, technologies and expectations tends to be western-centric and based around assumptions that sophisticated science resides only in advanced economies. In contrast, we focus on the science and knowledges that are evolving in a global South context, where politics and uncertainty are of utmost importance and where debates about futures are highly significant. It draws on research (conducted between January 2010 and March 2012) on biodiversity conservation in the Agulhas Plain in the Western Cape of South Africa and, specifically, a sustainable harvesting pilot project at Flower Valley Farm. 61 interviews were conducted with stakeholders in wildflower harvesting and conservation, including trustees at the Flower Valley Conservation Trust (FVCT), various environmental NGOs, farmers and landowners, pickers, pack-shed workers, academics, botanists and other members of the scientific community. In what follows, we first outline the key issues for biodiversity conservation in the Agulhas Plain and chart the emergence of the sustainable harvesting project. This is contextualised both in terms of the unique *fynbos* ecosystem, and the

national and international market-led approach to biodiversity conservation driving recent initiatives. Secondly, we explore how futurity and expectations are managed within the sustainable harvesting project through the use of technology and scientific knowledge. The case for sustainable harvesting of wildflowers is shaped by the veracity of scientific knowledge – specifically ecological knowledge produced by botanists and conservationists – and the databases in which this is stored. We examine the nature of knowledge being produced and expectations of using the databases to scale up the Flower Valley pilot. Finally, we examine the competing expectations and ethics at work in wildflower harvesting. In particular, we suggest that commercial expectations do not always map neatly onto sustainable harvesting and explore the paradoxes inherent in commodifying *fynbos* wildflowers in order to conserve them.

2. Biodiversity conservation in South Africa’s Cape Floral Region

Since the ending of apartheid in 1994, environmental issues in South Africa have been shaped increasingly by socio-economic imperatives and political expectations. Conservation cannot be divorced from socio-economic issues because of South Africa’s past and the problematic positioning of conservation within both imperialism and apartheid. Recent years have witnessed a policy shift away from ‘fortress conservation’ (Brockington, 2002) – dominated by the vested interests of white land-owners – towards community-based conservation (Adams and Hulme, 2001). A National Biodiversity Conservation and Action Plan is now in place, which works towards conservation and sustainable utilisation of biodiversity. As a consequence of profound structural social and economic inequality, “conserving biodiversity and progressively realising rights of all citizens are now expected to be mutually reinforcing” (Crane *et al.*, 2009: 145). The question is whether these expectations are realisable in a context in which conservation interests

remain hegemonic because of inequities of power and entitlements to land and natural resources, in which the government is wedded to market-led realisation of environmental visions, and in which international retailers exercise enormous influence.

South Africa is, of course, not unique in terms of its market-led approach to sustainable development; biodiversity conservation here is also shaped by the broader international context. The Convention on Biological Diversity at the 1992 Rio Earth Summit first put biodiversity conservation on a neoliberal footing at a global scale (Ten Kate and Laird, 2000). In 2004, the United Nations formalized the Millennium Ecosystem Assessment, popularizing the idea of ecosystem services and ascribing economic value to nature. In addition, the Organisation for Economic Co-operation and Development's (OECD) International Futures Programme (2005) produced a bio-economy policy agenda for governments. OECD is promoting a neoliberal approach to the utilization of biological materials and information (Parry, 2007), which is also concerned with the public acceptance of the bio-economy agenda through intellectual property rights legislation and biodiversity conservation (TEEB, 2011). As Bek *et al.* (forthcoming) argue, "the primacy of the neoliberal paradigm within national policy has placed economic rationalism at the heart of many areas of policy. Thus, if an economic case can be made for conservation, then there is a greater likelihood of attaining policy backing." This is certainly the case in South Africa.

The focus of this paper is on a biodiversity conservation pilot project centred on the 580 hectare Flower Valley Farm, located within the Cape Floristic Region (CFR) [see Map 1]. The CFR is the smallest and richest of the world's six floral kingdoms (Ashwell *et al.*, 2006), a UNESCO World Heritage Site, and listed by Conservation International as one of the world's 'biodiversity hotspots': 'the richest and most threatened reservoirs of plant and animal life on

earth'. It is extremely floristically diverse, home to an estimated 9,600 plant species¹ of which 70% are endemic. The main vegetation type is known locally as *fynbos* – translated from Afrikaans as ‘fine-leaved bush’ and commonly used to refer to the distinctive vegetation of the CFR (Manning, 2008). *Fynbos* consists of four plant families; evergreen shrubs of the proteas (*protaecae*) and ericas (*ericaceae*), grass-like reeds of the restios (*restionaceae*), and daisies (*irididaceae*) (Privett, 2002). The United Nations Development Programme views the Agulhas Plain as an area for the highest priority for conservation as it possesses the largest number of threatened lowland *fynbos* species in South Africa (UNDP, 2003). 80% of the CFR is privately-owned; it is threatened by conversion to agricultural land use, poor fire management, alien species infestation and infrastructural development (Ashwell *et al.*, 2006). Harvesting of *fynbos* is the “largest single livelihood opportunity in Agulhas Plain”, but unsustainable harvesting – over-exploitation of wildflower resources for profit, poor harvesting techniques and excessive off-take of flowers (and seeds) – also threaten the ecosystem (FVCT, 2010: 14). Nearly one third of the original area of *fynbos* has been lost and 1200 species are critically rare, threatened or vulnerable.

[Map 1 near here]

Fynbos thus represents what Bowker (2000: 655; see also Lorimer 2007) terms a “charismatic” ecosystem, more likely to attract attention from policymakers and the public than others. The obvious environmental beauty of the CFR together with its ecological rarity, the clear opportunities for socio-economic upliftment in local communities, and the existence of a strong

¹ As discussed subsequently, this figure is contested but is widely accepted within the international conservation movement.

local pro-biodiversity activist base (the self-styled *fynmense* or ‘*fynbos* people’) who have lobbied relentlessly, have ensured that Flower Valley has been a *cause célèbre* with the international donor community. *Fynbos* flower harvesting is one of the main components of the agricultural sector in the CFR. Indeed, for several decades both cultivated and wildflowers have been harvested for domestic and export markets, with a large proportion of exports sent to the Dutch auctions. Wildflowers are usually harvested from areas of privately owned land that have been set aside and protected, and harvesting has occurred with minimal regulation. This has generated an expectation amongst local and international conservation interests that, without active intervention and protection, the CFR will be decimated as more areas are ploughed up for cultivation and as wildflowers are removed with little concern for the ecosystem as a whole (Laubscher *et al.*, 2009; Mustard *et al.*, 1997; Robyn and Littlejohn, 2002).

An opportunity for piloting a sustainable wildflower harvesting project arose in 1999 when local conservationists secured funds from UK-based NGO Flora and Fauna International (FFI) to purchase Flower Valley Farm, saving it from conversion to vineyard. The Flower Valley Conservation Trust was established to create a business that linked social investment with biodiversity (FFI, 2006a; FFI, 2006b). Whilst the initial impetus for the establishment of FVCT came via international channels and the involvement of FFI, the organisation and its staff have strong local roots. The Board represents diverse constituencies including farmers, international NGOs, local conservationists, entrepreneurs and social activists. Conservation is the organisation’s primary objective, tied closely with socio-economic ambitions (Bek *et al.*, forthcoming; <http://www.flowervalley.org.za>).

With backing from South African organisations (e.g. the South African National Botanical Institute; Cape Action for People and the Environment (CAPE)), and multi-lateral

agencies (e.g. Global Environment Facility), FVCT is responsible for developing and testing a sustainable harvesting code of practice, which ensures that flower picking rates allow sufficient time for the ecosystem to rejuvenate successfully (Jones, 2004). The expectation is that FVCT can achieve biodiversity conservation through engagement with market opportunities – “building an economy based on biodiversity” (Co-ordinator of CAPE, 22/09/2006). The existence of twin ethical dimensions in conservation and community development enables the product to be directed towards lucrative niche markets. The overarching objective of the FVCT pilot was to convince landowners, private businesses and local communities that biodiversity, if managed and harvested sustainably, provides significantly better economic benefits in the long-run, compared with alternative agricultural land-uses, thus ensuring the conservation of the *fynbos* ecosystem. Key to this is FVCT’s marshalling of scientific knowledge and its use of technology to manage sustainable harvesting.

3. Managing expectations through technology and scientific knowledge

FVCT claims that without intervention the *fynbos* will be irrevocably damaged or destroyed; core to its mission is the expectation that sustainable wild harvesting can be both economically and environmentally sustainable through the use of technology, governance and scientific knowledge. FVCT is designing databases through which to compile knowledge and, in turn, train flower pickers in sustainable harvesting. To eradicate poor picking practice, sustainable off-take levels (no more than 50% of the plant) for certain species have been established through fieldwork by botanists, applying the precautionary approach to reduce harvesting risks. A Species Vulnerability Index has been compiled by botanists at CAPE, which underpins a Sustainable Harvesting Code of Practice (SHCP). This index grades individual species on a scale

of one to ten according to their level of vulnerability. The grade determines the permitted pattern of harvesting, which in some instances may mean that picking is prohibited. Pickers are trained to use the SHCP via the Agricultural Sector Training and Education Authority (AgriSETA) vocational education accreditation system. The regulatory authority, CapeNature, grants harvesting permits on the basis of the research underpinning the SHCP. The SHCP is supported by a recording protocol, a species identification schedule and a data capture system. This scientific knowledge is fed into a Resource Base Assessment (RBA) database, which enables the species resource base to be quantified for any given area. This database is the brainchild of the FVCT Conservation Manager and, as a locally-driven initiative, has become a central part of the pilot project. It provides essential data for assessing the extent of existing species stock and the harvesting patterns and rates that are likely to be sustainable. An auditing and certification system, with an associated brand and marketing strategy, has been developed for participants in the sustainable wild harvesting pilot.

While impetus for the pilot emerged within local conservation circles, two key commercial drivers are significant. First, UK-based retailer, Marks & Spencer – a market leader in sustainable and ethical trading through its Plan A² – is the biggest single buyer of sustainably harvested bouquets and has opened markets for sustainably harvested wildflowers. Second, the notion that a sustainably harvested brand would generate premium returns for certified harvesters and exporters encourages the latter to harvest wildflowers in an environmentally sustainable and socially responsible way. There has been some debate as to whether the financial returns per unit are significantly higher than could be achieved via other market outlets. However, having piloted the RBA and SHCP within one supply chain the challenge now for FVCT is to rollout

² For details of Marks & Spencer's ethos ('Plan A'), see <http://annualreport.marksandspencer.com/financial-review/plan-a.aspx>.

sustainable wild harvesting more widely within the industry, while simultaneously adopting the lessons learned during the pilot. FVCT is also using geo-mapping to develop a harvesting database of individual farms as a key tool in the rollout process (FVCT Conservation Coordinator, 02/02/2011). This contains and tracks a remarkable range of data. The database has been developed using information gathered from the accredited network of sustainable harvesting suppliers who deliver to the commercial pack-shed. This includes FVCT's own picking team who harvest wildflowers sustainably on both Flower Valley Farm and neighbouring land. The simple data provided on the pack-shed's delivery notes enable the supply of *fynbos* to be tracked precisely. Thus, the number of stems of each species removed from each area (each piece of land being split into blocs) is recorded in the database, and the daily, weekly, monthly, and annual rates of harvesting can be tracked for each bloc. Coupled with the RBA, which estimates the quantity of any given species on any bloc of land, this should provide an effective monitoring and evaluation tool. The RBA and harvesting databases have so far been used only on Flower Valley land, but the intention is to roll these out across the wildflower supplier base. In this way off-take rates and impacts can be closely monitored and researched. The databases are intended to be accessed by individual suppliers, who can monitor and plan their harvesting patterns, and pack-sheds and retailers, who will be more aware of the likely availability of given species. Furthermore, the databases could be used by the regulatory body CapeNature to enhance their oversight and enforcement.

3.1 Assessing the databases and biodiversity knowledges

Three specific issues for FVCT emerge out of recent and ongoing debates about databases. The first concerns the relationship between the knowledge stored in the databases and the

expectations inherent in the approach to conserving biodiversity that they aim to support. The SHCP, the vulnerability index and the databases are designed to support expectations that *fynbos* wildflowers can be harvested sustainably. The RBA and SHCP have been central to the piloting of sustainable harvesting to date. The geo-mapping database builds upon these tools and is viewed by FVCT as a central tool in the rollout of the pilot project, but it is yet to be integrated into the sustainable harvesting programme in a significant way. Some form of data capture system is required for the credibility of sustainable harvesting. The quest for such credibility makes the FVCT project stand out in comparison to many other ethical production schemes, such as those in the wine industry, that rely solely on often impenetrable audits (McEwan and Bek, 2009b). This uniqueness also stems from the fact that the databases have emerged from local concerns, driven by the pro-biodiversity activists and *fynmense*, rather than being imposed from above by some mega-conservation or commercial body. However, since the databases remain small in terms of coverage, uncertainty as to their efficacy prevails. Only 150 *fynbos* species are harvested for the wildflower market. Research into these species is ongoing and there are still significant gaps in knowledge about the impact of harvesting upon re-growth, reproduction and mortality rates of individual species. Thus, while the adoption and implementation of the SHCP represents a major step forward in biodiversity management, its precise content will evolve only as the *fynbos* knowledge base becomes more detailed and sophisticated. For some stakeholders in the value chain this uncertainty about what precisely constitutes ‘sustainable’ harvesting is unnerving as current best practice may later prove to be fallible. As Waterton (2010: 649) argues:

Databases, as specific kinds of archives... have had, by their very nature, to be built on some kind of guesswork, some faith, that we are doing this right, that we are entrusting

and layering things and meanings that will be interpretable and meaningful in times to come.

As discussed subsequently, the knowledges and technologies informing the FVCT databases are contested and are as yet unable to convince all stakeholders, particularly conservationists, of a safe future for *fynbos*.

Despite this uncertainty about the databases, the geo-referencing practices that they rely upon commodify and make exploitable wild *fynbos* – the very thing to be protected (we return to this paradox subsequently). In addition, while *fynbos* ecology has traditionally been under-researched by botanists, its status as a *cause célèbre* in conservation circles has meant that, by virtue of its uniqueness, it has become an exotic other – more likely to be studied, which in turn inspires more botanists to study it (Bowker, 2000: 657-8). The identification of ‘red data’ (endangered) species has precipitated increased levels of scientific interest in these species (Laubscher, *et al.* 2009). However, only the 150 harvested species of *fynbos* (e.g. the King Proteas, pincushions, leucadendrons and brunias), several of which are also red data species, have ‘star’ status in terms of their marketability and commercial value. Commodifying these could create a propensity to research only these species out of the thousands in the CFR, particularly where research is commercially-funded. As the Quality Systems Manager of AMCFruit (08/02/2011) argues: “There has not been that amount of research into the rest of the *fynbos* species [that] there has on the more lucrative ones”. This is significant for two reasons: first, “things that do not get classified are not considered of economic, aesthetic or philosophical importance” (Bowker, 2000: 659) and, second, what gets recorded in databases provides “a very good representation of our political economy, broadly conceived: that which we can use through our current modes of interaction with nature” (*ibid.*: 660). The reflections of political economy

that are recorded in biodiversity databases produce the future policies that help to manage the environment in the image of that political economy.

There is thus a need for some reflection on the second issue: the nature of the databases and the knowledge that is included and/or excluded. Databases are not innocent objects divorced from power and politics. They are loaded with historical, cultural and political baggage, have historically served powerful elites and centres, and “carry with them particular culturally and historically contingent assumptions about the nature of the world and the nature of knowledge; what it is, and how it can be preserved or renewed” (Waterton, 2010: 661). Against this critical backdrop, the FVCT databases are notable. They are intended to be dynamic and a constant work in progress. They also rely on being scientifically rigorous in order to be convincing; yet, in the absence of comprehensive existing scientific knowledge about *fynbos* ecology, they are built out of a range of local knowledges, which might be thought of as both ‘scientific’ and ‘non-scientific’. The SHCP and databases did not emerge in a top-down fashion from a research institute or mainstream conservation agency. Rather, they were developed from the grassroots using the knowledge of people who are both trained botanists, but who also live ‘on the land’ and have a feel for local ecology. Indeed, one of the challenges for FVCT at the outset was the lack of formal science upon which to base the sustainable harvesting standards. In many ways, the SHCP and databases represent a holding operation while the science (or better knowledge) is developed. Whereas databases have been criticised for privileging ‘expert’ knowledge at the expense of ‘local’ knowledge, the knowledge informing the FVCT systems sits along a continuum between the two, intended to highlight and eradicate poor harvesting practices whilst better knowledges – both ‘scientific’ and local – come to the fore and can be incorporated.

Despite this more inclusive approach to knowledge, issues remain concerning the nature of this knowledge. The technologies utilised by FVCT are concerned with knowing nature. This should be a complexifying process, but in the creation of biodiversity and harvesting databases a cartographical imagination is deployed that might limit complexity (Ellis and Waterton, 2005). This is not simply a case of reducing the complex *fynbos* ecosystem to a catalogue of 150 species. The database also deploys a spatiality of topographically knowable nature that centres knowledge around botanical knowledge and technology, and potentially excludes other knowledges and imaginaries, particularly indigenous ones. As a consequence of the violence of colonialism and the assimilation policies of the apartheid regime, local people with aboriginal Khoe and San heritage have little if any attachment to their traditional languages, cultures and ways of life (ILO/ACHPR 2009). However, indigenous knowledges persist not only in individual plant nomenclature (e.g. boegoe, dagga, koekemakranka, karee), but also in understandings of the herbal, medicinal and culinary properties of individual *fynbos* species, which were shared with early European settlers. Despite this, these knowledges are largely absent from the database.

Furthermore, a fundamental contradiction underpins attempts to conserve biodiversity through databases. Conservation depends upon the creation of taxonomic inventories; one cannot protect species that have not been documented. Biodiversity databases attempt assemblage and yet remain reliant on a narrative of commensurability, which is oxymoronic:

“To coordinate commensurability, to order according to a common standard or measure, to make uniform, is to deny, suppress, and stifle diversity... Assemblage and diversity are in contradiction with one another” (Turnbull, 2009: 5).

Rendering diversity commensurable inevitably writes out different knowledges and alternative ways of knowing that diversity. In the case of *fynbos*, indigenous knowledges about the different

properties of plants might provide an alternative imaginary to botanical knowledge. For example, indigenous people used the word *buchu* for any fragrant plant that could be dried and powdered,³ mainly for medicinal or herbal purposes, rather than to designate a single species.

This raises a significant question about whose knowledge is recorded in the database, which is already a source of some local contestation in the Agulhas Plain. Despite consulting people with longstanding associations with the land in developing the SHCP, FVCT did not engage with the farming community at large. This has caused some resentment among farmers and landowners, particularly those growing cultivated *fynbos* who contest the botanic knowledge underpinning sustainable harvesting rules (Conradie, 2010). For example, some farmers argue that the 50% off-take rule is wrongly applied to sprouting plants that regenerate despite greater off-take; they also argue it is unworkable because fields are harvested multiple times each year and it is difficult to tell whether a pruning scar is from this or a previous year. They would prefer that 50% of the land is set aside, but this is rejected by ecologists who argue that it brings risks for seed banks in the event of wildfires.

Despite these difficulties, FVCT does recognise and value the knowledge of the flower pickers – traditionally local, Afrikaans-speaking Coloured⁴ people. The pickers' knowledge of sustainable harvesting is under-researched, despite the fact that they “have been here for generations ...[and] have knowledge from their parents [and] grandparents” (FVCT Conservation Co-ordinator, 02/02/2011). The Conservation Co-ordinator has worked directly with picking teams in assembling the knowledge recorded in the databases and SHCP,

³ [Http://fernkloof.com/medicinal-plants.my](http://fernkloof.com/medicinal-plants.my) (accessed 25/07/12).

⁴ We are mindful that this term is deeply contested; there are also very specific historical and political meanings attached to what it means to be ‘Black’, ‘White’ and ‘Coloured’ in the Western Cape (Erasmus 2000). Many of the people we interviewed self-identify as Coloured, reflecting their identity as people of mixed race, with diverse ancestry that may include indigenous, white European, Asian and other African heritage. The profile of pickers has also changed recently, with increasing in-migration of Xhosa workers from the Eastern Cape.

particularly around species location, harvesting patterns and regeneration. However, this is not to suggest that pickers' knowledge is without limitations. For example, when asked about the role of fire, some pickers were unaware of the essential ecological role this plays, viewing it negatively and affecting their ability to earn money. Pickers' knowledge is also diminished when sustainable harvesting is reduced to a small number of tick-box requirements. As one botanist (01/03/2011) explains:

When we did the first trial runs for our audits it really struck us how much of a historical cultural knowledge the pickers have, which has been passed down. What we wanted them to do was not always all that practical because of the inherent knowledge that they have. They do inherently become affiliated to the environment they work in. They are aware of the consequences of some of the things they do.

Despite this, training reduces pickers' understanding of sustainable harvesting practice to three rules: 50% off-take, stem length and angle of cut. They prioritise these requirements over other practices and nuances in *fynbos* ecology derived from training and intrinsic knowledge. Yet there are many other important issues – for example, not cutting into old growth or not harvesting in areas of heavy alien infestation (Grower, 02/03/2011). Significantly, the Conservation Coordinator at FVCT is aware of this: “The unfortunate thing is that the latter is not part of the code of practice” (02/03/2011), suggesting that at some point these broader knowledges might be incorporated.

Related to the problematic nature of knowledge is a third issue, which concerns the static nature of databases compared with the dynamism of nature. Species databasing is part of a long history of biological pragmatism that excludes the dynamic nature of biodiversity. The concept of a species is nothing more than an assemblage of diversity; rather than a static entity,

“speciation and diversification occur as a result of changing genes in an historically contingent environment” (Turnbull, 2009: 2). In other words, a species is “a temporary achievement of sameness within a flow of difference” (Waterton, 2010: 658). While FVCT’s databases are open to incorporation of new information as it emerges through botanical research, the drive to inventory species diversity without incorporating the dynamism of biodiversity itself (and not just knowledge of biodiversity) thus records and renders biodiversity static. This is driven by a pragmatic conservationism wherein biodiversity needs to be inventoried through dominant species concepts in order to have some purchase in public policy (Turnbull, 2009; Bowker, 2000, 2005).

Despite South Africa having rich local scientific resources in biodiversity, taxonomy and conservation science (Crouch and Smith, 2011), the drive to inventory species of *fynbos* is still problematic. To give four examples: first, estimates of the number of species vary from around 6,000 to over 9,000; there have been problems with the accuracy of taxonomies used by survey groups and with finding the rarest species in altered habitats (Hall and Veldhuis, 1985). Second, there are widely divergent opinions on the major *fynbos* vegetation types, primarily because of high species richness and localization, which makes classification of vegetation types based on species composition impossible. Third, some botanists seek to exclude areas of highland *fynbos* (itself a contested categorisation) from the biome because of a lack of species diversity. Finally, inventorying is difficult in a context of rapid habitat change and dynamism in which some species have been fundamentally altered. For example, the Western Cape is currently witnessing distinct changes in both weather and farming patterns, which might be explained through the effects of climate change. As the Quality Systems Manager of AMCFruit told us, “our weather conditions are changing all the time. There has been a whole shift in the protea cycle and... the

cultivated flowers are definitely starting later than they used to” (08/02/2011). The extent to which the FVCT databases – and biodiversity conservation in the CFR more widely – are able to accommodate this and other less observable aspects of dynamism is thus an important question.

A great deal of research by botanists, ecologists and conservationists is continually ongoing into the dynamics of *fynbos* ecology. Given the vast number of *fynbos* species it is hardly surprising that enormous gaps in knowledge exist. Thus, the SHCP, and RBA and harvesting databases are evolving and being refined as new findings emerge. For example, there was much pre-existing anecdotal knowledge about the ability of various species to reproduce flowers at specific rates. It has been assumed that picking rates enabling flowers to fully reproduce are optimal for maintaining the overall health of the plant. However, recent research has shown that even at these rates the root system can be depleted over a long period of time, effectively harming the plant and requiring lower picking rates. Accommodating new knowledge within FVCT’s databases has thus been prioritised. Whether or not this can be responsive in a radical sense to the dynamism of the *fynbos* biome remains to be seen.

The FVCT case study raises questions about how databases might be more inclusive of diverse forms of knowledge and how biological species and their diversity are characterised in databases in order to capture ecological dynamism. In positing tentative answers to these questions, we suggest that what is required is a more radically open, more postcolonial database. This, in turn, requires several conceptual shifts. First, in order to avoid the erasure of different kinds of knowledge, the database needs to be a “theatre of diversity... a conceptual space in which narratives of commensurability and differing knowledge traditions are held in tension with one another” (Turnbull, 2009: 7). These concerns are ethical and relate to the future, asking questions about what the inventorying of species implies for their future and our knowledge of

them (Waterton, 2010: 659). The challenge is to find ways of including diverse human conceptions of nature within a biodiversity database and not reducing cultural and biological diversity “by submitting different knowledge traditions to a one size fits all, lowest common denominator regime” (Turnbull, 2009: 6). This requires a radical opening up of the idea of the database to incorporate diverse discursive traditions and ontologies. In this sense, therefore, databases might be more in tune with a postcolonial sensibility and reality, rather than simply shaped by hegemonic, partial and incomplete scientific knowledge.

Second, we suggest that this radical opening requires a postcolonial politics of expectations and futures, which opens possibilities for rethinking the temporal politics of conservation. In particular, acknowledging that pasts inhere in both presents and futures is significant for including indigenous and local knowledges. Modernity is a “problem of entangled times” (Chakrabarty, 2000: 243) in which past, present, and future are drawn together in profoundly complex relations. Linear notions of time and progress, therefore, often have little relevance when viewed from outside Western cultures where processes of transformation and development are negotiated in complex ways. The modernity that biodiversity conservation embraces through its concerns with human agency, innovation and technology, becomes more inclusive when rethought through notions of time as entangled, enabling the inclusion of indigenous ecological knowledges.

In considering what this might mean for FVCT, a postcolonial database would need not to be treated as a container, but as a space in which knowledge production is dynamic, negotiated and accommodates difference. Thinking of databases in this way disrupts the static notion of repository and instead sees them as contingent and dynamic. Given FVCT’s commitment to dynamism in accommodating new forms of scientific knowledge, there is potential for further

opening of the databases along these lines, and for greater sensitivity to the complexities of local histories, politics and cultures because the database is home-grown and has emerged in the site of production. It remains to be seen whether FVCT can achieve this potential within the broader institutional framework and sets of expectations within which they operate and seek acceptance (we return to this point subsequently). However, the South African context is enabling; the National Heritage Resources Act 25 (1999), specifically, enables indigenous peoples through non-governmental heritage organisations and community groups to participate in the conservation and management of resources, and recognises the value of their environmental skills and knowledge (ILO/ACHPR 2009).

Finally, creating database infrastructure also needs to be inclusive, “allowing it to be built from use, rather than preconceived categories or even anticipation of use” (Waterton, 2010: 666). FVCT has been very open about its databases, but more progress is required to counter suspicion and negativity about their use. As the pack-shed Marketing Manager explains, the geo-mapping database “is such a powerful tool. But people are so cautious as to what might transpire from that. It is almost as if it is poison” (02/02/2011). One reason for this suspicion about databases is explained by a botanist (01/03/2011):

There are some funny perceptions out there [among landowners, pack-sheds] like Flower Valley is making money for themselves, we are using it to gather information on them, all kinds of weird perceptions about our project and what we are trying to do.

The suspicion and hostility is a feature of the culture within which FVCT operates, particularly its necessary embedding in the commercial world, where openness is rare. The flower harvesting community also has a longstanding culture of secrecy and mistrust. FVCT is very open by comparison; all the pilot data comes from the Flower Valley Farm and FVCT has been prepared

to disseminate this in order to demonstrate the benefits of the databases. However, greater openness and inclusivity in the development of the databases and the knowledge they contain is essential to reducing suspicion and hostility, and to ensuring the continued success of the sustainable harvesting project.

3.2 Expectations of scaling up

Given that sustainable harvesting began as a pilot project, the underlying expectation is that the technologies and procedures for governing sustainability will eventually be adopted across the Agulhas Plain and the CFK more broadly. Indeed, as one respondent puts it, scaling up is a necessary part of gauging the success of the pilot:

It's picking up 20,000 hectares, which actually isn't all that much. So... to scale up to say 200,000 hectares and move to the Southern Cape... I think only at that point will we be able to say this thing has actually proven to be a success in the sense that we actually have intervened in the local economy, but with a mixture of market and non-market mechanisms and we've arrived at a solution which is sustainable, truly sustainable.
(Manager, Table Mountain Fund, 15/09/2010)

FVCT states that 30,000ha are under sustainable harvesting and recently announced that a further 26,000ha is now harvested only by accredited pickers in the Overberg Test Range. FVCT is also moving to work with another export company, Bergflora, which means that more land will be sustainably harvested. Therefore, scaling up has started to accelerate significantly as the pilot has concluded.⁵

⁵ See https://www.givengain.com/cgi-bin/giga.cgi?cmd=cause_dir_news_item&news_id=93755&cause_id=1866

Expanding sustainable harvesting is, of course, potentially paradoxical in that it relies on commodifying the thing requiring protection (see McAfee 1999), expanding the market for and increasing consumption of wildflowers, which in turn could pose increased threats to the CFK. Generating value from certain species and creating a market demand for these may lead to more unsustainable practices, especially in a context of widespread rural poverty and limited livelihood opportunities for local people. This is a particular concern regarding pickers on piece rates, as opposed to the day rates used by FVCT. Even some sustainable harvesting-accredited picking teams work on piece rates – the standard *modus operandi* of increasingly casualised agricultural work in South Africa (Barrientos and Kritzinger, 2004.; du Toit, 2004; Ewert and du Toit, 2004). As one respondent puts it:

You can make R3 [c. 0.26 GBP] from this, quite a lot of money. A flowerpicker who makes a percentage of the value of the flower, maybe 25c of this, would go through this piece of land and take every single stem. They would think short term because next year that flowerpicker might not have a job... If you are in a certain economic situation, if you won't have the job in a month's time, why not take as much as possible? (Grower, 30/09/2010)

Pickers working within the sustainable supply chain are less likely to be under these pressures as the market – and thus jobs – are guaranteed. Indeed, expansion of the sustainable market should make jobs more secure, especially if social audits are part of the process. The first step for FVCT is to convert the existing markets to sustainable harvesting. This should not increase pressure on the resource base. Problems emerge only if the market keeps growing. The question then arises as to whether the databases can provide mechanisms for controlling harvesting. An upper limit on supply might lead to a price increase. This would be positive, as long as harvesting levels are

controlled, because wildflowers are the least lucrative sector of the *fynbos* market compared with cultivated focal and dried flowers. Strong revenue growth would not then depend entirely on volume growth (Conradie, 2010: 46).

When these points were put to the Manager of Table Mountain Fund, he responded by referring to the efficacy and robustness of the databases, technology and knowledge for governing sustainable harvesting:

You've got the best technology in the world for looking at the research around flower harvesting...what can be harvested and why and when. You've got all the research around intervention and management of the fields, from over-seeding to ploughing,... deep and shallow burning. You've got world class technology on training and certification, auditing of your flowerpickers. You've got a lot of investment in flowers...the flower itself and its capacity. So if you assemble all of this, you go well, you've got this huge platform with which to operate.

Other experts in biodiversity and sustainability made similar points about the robustness of the databases and expanding the FVCT pilot: "the basis has been laid..., Now is time to use that information and build on it" (Grower, 26/01/11); "They should be upscaling and rolling out, they have enough experience in testing behind it" (Member of the Council for Scientific and Industrial Research, 26/01/11). Clearly, a great deal of expectation is invested in the databases and associated technology for sustainable harvesting and conserving biodiversity, even while the science is still incomplete. However, the role of technology in generating a sustainable future can be compromised by competing expectations and ethics that emerge primarily from the paradoxes inherent in commodifying biodiversity in order to conserve it. The databases will need to have enough purchase when fully implemented to make the limits on harvesting clear such that

carrying capacity will not be exceeded. This will in part depend on the extent to which the databases are respected and institutionalised by all parties involved in the production network.

4. Competing expectations and ethics in wildflower harvesting

The politics of expectation associated with FVCT are not solely articulated around sustainable harvesting and biodiversity conservation, but include socio-economic and other expectations. As the Executive Director of FVCT argues: “For some people wild harvesting has been about the conservation of a single species, for others it is about gender empowerment” (25/3/2010). Approximately 100 people have secured employment via the sustainable harvesting supply chain. This is a “drop in the ocean against the 6000 jobs needed in the area” (UCT economist, 09/09/2011), but FVCT activities are directly and indirectly helping to stabilise household incomes in various ways, including generating funds for alien vegetation clearance and the development of a charcoal factory. In addition, the contract with Marks & Spencer was secured on the basis of the sustainable harvesting story, to which those 100 jobs can be attributed. Other markets – local and international – are being found, securing more jobs. Importantly, more skilled/managerial posts are being created to the benefit of local people from disadvantaged backgrounds. This is a significant contribution in an economy that is struggling to generate jobs, particularly in rural areas. In addition, the bouquet industry operates throughout the year, countering the seasonality of employment patterns and associated hardships for rural workers in the Agulhas Plain.

Despite this, commercial expectations of the environment and what it can produce in relation to assumptions made about consumer expectations present challenges for sustainable harvesting. In short, retailers have virtually no knowledge of *fynbos* ecology and are completely

distanced from the FVCT databases. While this distancing might enable rather than constrain more radical, postcolonial databases, it could also mean that the requirements for sustainability are overridden by commercial expectations. Moreover, retail cycles and notions of time do not map neatly onto nature. For example, several producers commented on the lack of understanding of the seasonality of *fynbos* wildflowers. One supplier explained that Marks & Spencer initially treated wildflower harvesting like the cut flower industry: “they wanted a flower that is not growing! It’s not exactly a controlled environment” (22/09/2010). Another supplier complained:

The market also needs to know what is going on in the veld... I know that already... they have worked out this year’s Christmas bunch! Whether it will be there with the right things flowering or not is another matter. It is already worked out and the orders are in.

The pack-shed have to deliver whether they take the last stem off the Agulhas Plain to get that colour because that is what the market wants! (16/3/2011)

Retailer requirements of minimum stem length also have consequences. They limit the range of species that can be harvested and thus put more pressure on harvested species. Minimum length can also lead to poor picking practice, such as cutting into old growth or to the ground to get a long enough stem. This is a problem where retailers demand stems from a particular plant too early in the growing season and also when drought limits growth. As Adam (1996: 320) argues, the imposition of capitalist time on the variable and rhythmic temporality of nature creates a discordant time-politics; this is also a major obstacle to environmental protection, “since a sustainable environment is not easily achieved by political systems that are inextricably bound to the globalized capitalist economy (and thus are dependent for their legitimation on the rhetoric and achievement of technological progress and continued economic growth)”.

The rigid expectations and demands of retailers can also be in conflict with the notion of sustainability. Many suppliers complain that standards are too harsh, particularly retailer expectations that wildflowers should be perfect and unblemished:

You have heard of ‘cat nails’? ...It’s a mark on the side of the proteas. They [the retailers] hate that. At the shed they will reject if there is too much... It’s wild *fynbos*! It cannot compare to greenhouse flowers, those marks are there, they are part of the wild... They are not something to do with bad quality, it’s a healthy flower with marks.
(Supplier, 27/09/2010)

These expectations mean that harvested flowers are often discarded: “One of the huge problems is that the flower has to be perfect. I cannot believe what [the pack-shed] throw[s] out” (Grower, 26/01/2011). Most complaints are directed towards retailers: “It is flaw from the market side. They cannot expect this species to be perfect this time of the year” (Grower, 16/3/2011).

Underpinning retailer expectations is an idea of fixed consumer preferences, yet these are often much more flexible than assumed. However, retailers tend to be inflexible, which creates difficulties for those with greater knowledge of *fynbos* in trying to shape the market. According to one respondent:

[Bouquet] designs have not changed much. That is putting pressure on certain species constantly. What we are trying to do is to bring *restios* into bunches. There is a huge diversity of *restios* and most of them re-sprout, so have huge potential, they preserve well. People do find it attractive but you have to change the market. If you keep creating one expectation then people just want that expectation. So, we are trying to go away from traditional markets – three standard flowers in a bouquet. You should be doing seasonal

bouquets. They don't do this enough. (Member of the Council of Scientific and Industrial Research, 26/01/11)

Improvements could also be made at other points in the production network. Our research has revealed that whilst the pack-shed is given several days' notice of orders by Marks & Spencer, this information is not passed onto suppliers until the night or even the morning before picking. This means that managers cannot plan their picking patterns to make the most efficient use of the resource base (in an ecological sense). Indeed, where orders are phoned through on the spot pickers take whatever is nearest, which is not sustainable practice and means that some areas will be under more pressure than others. It is unclear why the pack-shed uses this approach, but longer lead-in times would produce more sustainable harvesting.

The challenge for FVCT is that there are competing expectations and ethics, and thus competing futurities, at work within sustainable harvesting. FVCT has ethical concerns with both conserving the environment and economic development. The environmental and ecological ethics are articulated around the need to conserve the present for the future, whereas developmental ethics are intended to be more transformative in generating a better future. The paradox is played out in the drive to protect nature by improving and commodifying nature. This in turn brings the project into the realms of landowners (farmers/growers/suppliers) and retailers, whose ethics and expectations may not always align with those of FVCT. However, this might also be read as an ethical move since a vision of a different and better future can have a motive force that stimulates action to reduce environmental destruction (Connolly, 2008). FVCT is attempting to do what all sustainable development initiatives arguably aim at, at least rhetorically: future making without future taking. Resource depletion and degradation is a form of future taking accompanying future making (Adam and Grove, 2007). Despite the critiques of

the inordinate power of retailers (Campbell and Le Heron, 2007; Dolan and Humphrey, 2004; Freidberg, 2007; Tokatli, 2008; Tokatli, *et al.* 2008), FVCT might have some leverage over the retailers who are buying into the biodiversity conservation story because it fits with their responsible corporate image. For example, Marks & Spencer has been reluctant to emphasize the sustainable harvesting story in its marketing of sustainably harvested bouquets, in part (we suspect) because of corporate scandals following exposure of unethical sourcing by other retail companies claiming to trade ethically. If FVCT is able to match expectations of the SHCP and the biodiversity databases in delivering sustainable harvesting with demonstrable sustainable practice on the ground, Marks & Spencer (and other retailers of sustainably harvested bouquets) would have a more robust marketing strategy and faith that its sourcing practices match its ethical claims. While there are paradoxes and tensions in attempting to conserve the *fynbos* ecosystem through further commodification, there is potential within sustainable harvesting to at least bring together different ethical concerns that otherwise might work against each other.

5. Conclusions

The FVCT project is an important pilot study within broader efforts to conserve South Africa's unique and endangered *fynbos* ecosystem. The problematic history of colonial and apartheid conservation, and contemporary political expediency, demand that biodiversity conservation also has socio-economic benefits. This coheres with an international context that has become increasingly neoliberal in its approach to biodiversity conservation through the creation of bio-economies. Within these contexts, FVCT has initiated a sustainable harvesting project that depends both on there being a market for wild *fynbos*, thus generating livelihoods for rural

workers, and rigorous scientific knowledge, use of geo-mapping technology and databases, and governance techniques for sustainable practice to protect the *fynbos* from over-harvesting.

This paper has attempted to demonstrate the importance of understanding the politics of expectation at work in biodiversity conservation projects such as the FVCT pilot (Laws, 1994; Borup *et al.* 2006). Both scientific and economic expectations that *fynbos* wildflowers can be harvested sustainably are generated by creating knowledge, databases and techniques of governance. As we have seen, these expectations are by no means uniform or uncontested. In addition, expectations of different stakeholders may be contradictory, as in the case of retailers and conservationists. As Borup *et al.* (2006: 295) argue, expectations are divergent and spatialised, “scattered across different communities”, which prompts consideration of how and where these “link into inequities of power and authority in defining futures”. The nature of knowledge is therefore critical, not least because people have different levels of access to and ownership of knowledge and attach different levels of trust to expectations arising from it. Different interpretations and social patterns of expectations across communities often arise from “asymmetries in access to the information on which expectations are based” (*ibid.*: 292). A radical opening of databases and knowledge production is one way in which these asymmetries might be challenged.

It is particularly imperative in the context of South Africa that mapping biodiversity in the interests of conservation avoid repeating the imperial drive to create databases and archives, which sought to catalogue a social, political and environmental empire in order to better govern and extract economic value from it (Richards, 1996). The FVCT case demonstrates the potential opportunities of developing a postcolonial database in biodiversity conservation, which makes possible an engagement with the complexity and historicity of data so that “social, political and

organizational context is interwoven with statistics, classification systems and observational results” (Bowker 2000: 645). In other words, it helps us imagine how databases could be flexible and “as rich ontologically as the social and natural worlds they map” (*ibid.*: 645). This paper has outlined ways in which FVCT is recognising and attempting to counter some of the problems concerning biodiversity databases (in terms of rendering biodiversity commensurable and static) and scientific knowledge (in terms of partiality and exclusions). Its attempts at openness and dynamism inform FVCT’s future-making and its environmental and economic expectations; the possibilities and challenges it faces inform the creation of databases elsewhere.

While there is scope for more radical knowledge creation to produce more inclusive negotiation of the politics of expectation surrounding biodiversity conservation, the ethical drive within the FVCT project should not be underestimated. In attempting to reconnect what scientific development often separates – people, technology and the environment – FVCT is profoundly ethical. It also has potential to foster a wider and deeper debate about bringing together:

...socio-cultural wisdom and the public quest for progress; of economic pursuit of profit and social chains of obligation, care and responsibility; the timescale of resource use and the timescale of depletion – as well as future oriented action, knowledge and ethics (Adam and Grove, 2007: 96).

It is generating knowledge not to colonise the future, but in recognition that it is part of deeds and processes already underway, and to foster responsibility for their potential impacts on future generations. In the context of the history of biodiversity conservation in the Western Cape, FVCT’s ethical potential remains a significant and exciting departure.

Two key challenges for biodiversity conservation in South Africa remain. First, it needs to communicate the inter-relatedness of environmental and human well-being in the competition

for government resources. Second, it needs to negotiate the power of retailers to drive the sustainability agenda in counter-productive ways. The centrality of the biodiversity database and the market value of 150 species to sustainable harvesting of *fynbos* perhaps mean that FVCT underplays the significance of wider social and cultural benefits. However, as we have argued, this results from external pressures and expectations rather than an internal drive within FVCT, and reflects the challenging context within which FVCT operates. What is laudable has been FVCT's ability to navigate these different pressures in different arenas and catalyse benefits in various realms – ecological, social, economic, even political. This is suggestive of wider possibilities for meeting the challenge of connecting environmental and human well-being through a radical opening of scientific knowledge and technology in biodiversity conservation, and of how to manage the postcolonial politics of expectations that emerge from such an opening.

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