South African Journal of Botany 110 (2017) 39–51

Contents lists available at ScienceDirect

South African Journal of Botany

journal homepage: www.elsevier.com/locate/sajb

Making sense of access and benefit sharing in the rooibos industry: Towards a holistic, just and sustainable framing

R. Wynberg

Department of Environmental and Geographical Science, University of Cape Town, Private Bag, Rondebosch 7700, South Africa

ARTICLE INFO

Available online 4 October 2016

Edited by E Joubert

Keywords:
Access and benefit sharing
Rooibos
Research and development
Convention on Biological Diversity
Nagoya Protocol
Biodiversity Act
Social justice
San
Khoi

ABSTRACT

Over the past decade, a series of controversies has arisen about equity and justice in the rooibos industry, centred both on the biological resource and on the traditional use and knowledge that fostered the growth of this lucrative trade. Accusations of biopiracy, meaning the misappropriation and patenting of genetic resources and knowledge without consent, have taken centre stage, leading to a reassessment of the conditions under which rooibos is traded. Claiming to be the primary holders of traditional knowledge relating to rooibos, indigenous San and Khoi have also launched demands—to date unmet—for a stake in rooibos benefits. Meanwhile, small-scale coloured rooibos producers, despite their involvement in fair trade, remain marginalized. All remain embedded in a political history of rooibos that is characterized by dispossession and adversity, having been propped up by the South African apartheid system.

The melding of these issues with a complex and ambiguous legal framework has led to a situation described by some as "the mother" and "testing ground" of so-called access and benefit sharing. Such approaches stem in part from the Convention on Biological Diversity and its Nagoya Protocol, which lay down new and more equitable ways of treating trade in genetic resources and the use of traditional knowledge. With growing international interest in rooibos tea and its bioactive compounds, a surge of patents associated with the plant, the successful granting of geographical indication status, and threats to the industry of changing climates, ecologies and ecosystems, the stage is set for a reconceptualization and transformation of the industry.

Drawing on longitudinal research over the past 20 years, this review paper aims to bring conceptual clarity and a holistic analysis to an often emotional, divided and, to date, narrowly framed debate. Through exploration of rooibos histories and traditional knowledge claims, bioprospecting and patent activities, and conservation imperatives, this paper reviews the spectrum of issues that require attention when considering access and benefit sharing in the rooibos industry and provides suggestions for a more integrative, environmentally responsive and just approach.

Contents

Abbreviations: ABS, access and benefit sharing; CBD, Convention on Biological Diversity; BABS Regulations, Bioprospecting, Access and Benefit Sharing Regulations; DEA, Department of Environmental Affairs.

E-mail address: rachel.wynberg@uct.ac.za.

http://dx.doi.org/10.1016/j.sajb.2016.09.015
0254-6299/

1. Introduction

Against a backdrop of inequality enforced by the former apartheid regime, the high conservation value of the country's biodiversity, and an interest in sustainably developing the nation's natural resources for economic development, South Africa ratified the United Nations Convention on Biological Diversity (CBD) in 1995. In what has been called the "Grand Bargain" (Gollin, 1993), the CBD laid down a new way of treating trade in genetic resources and regulating bioprospecting: in order to gain access to genetic resources, users needed to give the provider country fair and equitable benefits, including technology transfer; to receive such benefits, a provider country needed to facilitate access to genetic resources ("access and benefit sharing"). The rights of indigenous peoples and holders of traditional knowledge were also strongly recognized, and bioprospecting was conceptualized as an important mechanism to create incentives for conservation.

Coinciding with the democratic elections of 1994, this heralded a new era for South Africa. Conservation and social justice became integrally intertwined in a new set of biodiversity and bioprospecting laws and policies that entrenched equity and benefit sharing (Wynberg, 2002a; Kepe et al., 2005). After decades of often unscrupulous exploitation, companies and researchers wishing to use the country's biological resources—or traditional knowledge associated with these resources—were now required to demonstrate that they had both received the prior informed consent of communities who were resource or knowledge owners, and negotiated a benefit-sharing agreement based on mutually agreed terms (Taylor and Wynberg, 2008). Without a so-called access and benefit sharing (ABS) permit, issued by the Department of Environmental Affairs in terms of South Africa's National Environmental Management: Biodiversity Act (NEMBA), Act 10 of 2004 (hereafter referred to as the Biodiversity Act) and its 2008 regulations, those found to be non-compliant faced the risk of a hefty fine or even imprisonment.[1]

A suite of benefit-sharing agreements has been negotiated since the promulgation of the Biodiversity Act. This was spearheaded to a large extent by the case of the succulent plant *Hoodia gordonii* (Masson) Sweet ex Decne, long used to stave off hunger and thirst by the indigenous San, the oldest—and most marginalized—human inhabitants of Africa (Deacon and Deacon, 1999; Lee et al., 2002; Wynberg and Chennells, 2009). The active ingredients of the plant were patented in 1998 by the South African-based Council for Scientific and Industrial Research (CSIR), alongside the negotiation of lucrative deals to develop anti-obesity products. This was done without the consent or knowledge of San communities, despite being based on their traditional knowledge. The CSIR was subsequently forced to negotiate with the South African San Council (hereafter referred to as the San Council), which represents the three indigenous San communities of South Africa—≠Khomani, !Xun and Khwe.[2] This in turn led to a benefit-sharing agreement in 2003 (CSIR and South African San Council, 2003).

Although *Hoodia* was later abandoned as a commercial product due to safety and efficacy concerns (Blom et al., 2011), the case has been precedent-setting. Claiming to be primary traditional knowledge holders of all Southern African biodiversity, representatives of indigenous San and, more recently Khoi, are now at the frontline of many deals in the region. *Sceletium tortuosum* (L.) N.E. Br., for example, a succulent plant well known for its mood-enhancing properties, is the subject of a benefit-sharing agreement between the San Council and HG&H Pharmaceuticals (HG&H and the South African San Council, 2011). San Council benefits include 5% of net proceeds received by HG&H and an annual exclusivity payment of 1% on sales. In a similar example, an agreement between the San Council, the National Khoisan Council[3] and a local pharmaceutical company (Cape Kingdom Nutraceuticals et al., 2013) gives the San and National Khoisan Councils 3% of the profits from products emerging from the use of buchu [*Agathosma betulina* (Bergius) Pillans and *Agathosma crenulata* (L.) Pillans], an essential oil used widely in international flavour and fragrance industries and also an important tonic, anti-inflammatory, antiseptic and diuretic (Moolla and Viljoen, 2008).

Attention has now turned to South Africa's most successful and oldest indigenous natural product industry—rooibos tea [*Aspalathus linearis* (Burm.f.) Dahlgren], and the array of new products that incorporate rooibos, such as cosmetics, slimming preparations, novel foods, extracts and flavourants. First commercialized at the turn of the 20th century, this is today a R300 million (US$22.2 million)[4,5] local industry, employing some 5000 people and trading amounts of up to 15,000 tons per annum (DAFF, 2014). Although rooibos tea constitutes less than 0.3% of the global tea market, it represents 10% worldwide of the growing herbal tea market and 30.9% of the South African tea market (DAFF, 2014; Phakathi, 2016).

Like many other historical enterprises in South Africa, however, these economic feats have been mirrored by a history of dispossession and marginalization (Hayes, 2000; Coombe et al., 2014). Beginning with the genocide of San and Khoi in rooibos-growing landscapes centuries ago (Penn, 2006) and continuing with the relocation of coloured and black people[6] in the area through the 1913 Natives Land Act and the ongoing marginalization of such groups through apartheid policies, the geographical and political backdrop to the rooibos industry is one of dispossession and adversity. Moreover, for nearly 40 years (from 1954), the rooibos tea industry operated as a government monopoly, serving as the sole buyer from producers and the sole seller to approved exporters and tea processors (Hayes, 2000). While the abolition of both apartheid and this system in the early 1990s opened the door to coloured producers, about 200 of whom now trade rooibos tea as South Africa's only indigenous fair trade product (Nel et al., 2007), most of these farmers remain marginalized, and will continue to be so—physically, because of their remote location; environmentally, thanks to the harsh, drought-prone conditions under which they farm; and economically, on account of their limited marketing capacity and continued struggles to gain access to extension services, credit and land. Inequality continues to characterize the industry: less than 7% of rooibos tea lands are today controlled by coloured farmers, who produce about 2% of rooibos tea volumes, with white farmers cultivating about 93% of the planted area (Wynberg, 2002b; Sandra Kruger and Associates, 2009).

Over the past decade, a new set of controversies has arisen about equity and justice in the rooibos industry, centred both on the biological resource and on the traditional knowledge that fostered the growth of this lucrative trade. Accusations of biopiracy, meaning the

[1] Biodiversity Act, Section 98(2).

[2] The South African San Council was established in 2001 as part of the Working Group of Indigenous Minorities in Southern Africa (WIMSA). WIMSA is charged with uniting and representing San communities from Botswana, Namibia and South Africa. As Chennells et al. (2009) explain, the South African San Council represents the modern form of San leadership, aiming to represent different San communities in South Africa democratically. Although the council is not the only body that claims to represent San communities, it is the largest, and has been a central actor in negotiating benefit-sharing agreements based on traditional knowledge claims.

[3] Although absent from *Hoodia* negotiations, the National Khoisan Council, established by former President Nelson Mandela in 1999 to accommodate Khoisan historical leadership within South Africa's constitutional framework, has increasingly become a partner to various benefit-sharing agreements, in collaboration with the South African San Council. The Khoisan historically comprise five main groupings, namely San, Griqua, Nama, Koranna and Cape Khoi.

[4] Calculated as of 14 August 2016, oanda.com.

[5] These figures exclude export sales and non-tea products such as cosmetics and extracts.

[6] These terms, despite originating from apartheid's racial categories, are still used widely in South Africa as a form of self-identification, in official publications and in popular discourse. In the context of this paper, the term "coloured" is used to refer to mountain communities in many of the areas where rooibos grows naturally. These groups are typically mixed-race descendants of settlers, former slaves and Khoi people. "Black" refers to black Africans, with major groups including Zulu, Xhosa, South Sotho, North Sotho, Venda, Tswana, Tsonga, Swazi and Ndebele.

misappropriation and patenting of genetic resources and knowledge without consent, have taken centre stage, leading to a reassessment of the conditions under which rooibos is traded (Berne Declaration and Natural Justice, 2010). At the same time, the San Council and National Khoisan Council have launched demands—to date unmet—for a stake in rooibos benefits, based on their claims to indigenous knowledge about the plant. The juxtaposition of these issues with a complex and ambiguous legal framework for ABS, together with South Africa's 2013 ratification of the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity, an international agreement under the CBD, has led to a situation described by some as "the mother" and "testing ground" of ABS in South Africa.

With growing international interest in rooibos tea and its bioactive compounds (e.g. Khan and Gilani, 2006; Joubert et al., 2008, 2009; Villaño et al., 2010; Breiter et al., 2011; Joubert and de Beer, 2011; Marnewick, 2014), a surge of patents associated with the plant (Wynberg et al., 2009), the successful granting of geographical indication status (World Intellectual Property Organization, 2013; Coombe et al., 2014) and threats to the industry of changing climates, ecologies and ecosystems (Raimondo and von Staden, 2009; Oettlé, 2012; Ives, 2014a), the stage is set for a reconceptualization and transformation of the industry.

With the aim of providing conceptual clarity and a holistic analysis to an often emotional, divided and, to date, narrowly framed debate, this paper reviews the spectrum of issues that require attention when considering ABS in the rooibos industry. Section 2 describes South Africa's legal framework for ABS within the context of the CBD and recently adopted Nagoya Protocol. It is followed by an analysis of traditional knowledge claims made by the San Council and National Khoisan Council, alongside a historical review of the rooibos industry and links to traditional use. Contemporary questions of justice and identity are discussed in the context of small-scale rooibos farmers who reside in the mountainous areas of Wupperthal and the Suid Bokkeveld. Section 4 discusses the interface between bioprospecting and biotrade, the questionable placement of rooibos tea along this spectrum, and the possible neglect of potential bioprospecting benefits. The invisible injustices of environmental challenges in the rooibos industry are described in Section 5. A concluding section brings these different threads together with proposals for a future approach that is more integrative, sustainable and socially just.

This review draws on the author's longitudinal research on rooibos, spanning a period of more than 20 years and involving interviews with multiple actors in the rooibos value chain, focus groups with farmers and scrutiny of the archives. Research began in 1994 with a study for the Land and Agriculture Policy Centre (a policy think-tank to support the newly elected democratic government) on land-use options in rooibos growing areas (Wynberg et al., 1994) and evolved to examine the use of geographical indications in the rooibos industry (Downes et al., 1998) and pro-poor models of commercialization for rooibos (Wynberg, 2006a). It has also included commissioned work on the identification of groups in the rooibos and honeybush industries which should benefit from fair trade (Wynberg, 2002b, 2006b), research to determine a fair price and equitable benefit for small-scale rooibos tea producers (Wynberg and Custers, 2005) and an investigation of links between patents and value-adding in the rooibos industry (Wynberg et al., 2009). This review also links to ongoing research and policy work to investigate regulatory approaches that best achieve the objectives of the CBD (e.g. Taylor and Wynberg, 2008; Wynberg et al., 2015).

2. Legal frameworks for access and benefit sharing in South Africa

South Africa has been at the global forefront of ABS regulation (Crouch et al., 2008; Taylor and Wynberg, 2008; Lowman, 2012). Following ratification of the CBD in 1995, and amid public controversies and concern that the natural and cultural heritage of South Africa was being "sold for a song", without proper controls and oversight, a research and consultative process was initiated as early as 1996 to develop ABS policy. This was linked in part to a broader, highly consultative post-apartheid law reform initiative to develop a biodiversity policy that represented the interests of all South African citizens (Wynberg, 2002a).

In 2004, the Biodiversity Act was promulgated, with Chapter 6 specifically focused on ABS. The three objectives of the Act mirrored those of the CBD, providing for[7] the management and conservation of biodiversity; the sustainable use of indigenous biological resources; and the fair and equitable sharing among stakeholders of benefits arising from bioprospecting involving indigenous biological resources. The Biodiversity Act provided only a broad framework for ABS, however, leaving the detail to be dealt with in subordinate national legislation. In 2008, the Bioprospecting, Access and Benefit Sharing (BABS) Regulations thus came into effect following a protracted period of public engagement (Taylor and Wynberg, 2008). Table 1 summarizes key provisions of the Biodiversity Act and BABS Regulations.

The eight years of implementation since promulgation of the BABS Regulations have witnessed considerable challenges, ongoing stakeholder consultations and several legal amendments (Crouch et al., 2008; Lowman, 2012). This has been due in part to the complexity of the issues under consideration, but mostly to significant concerns about the cumbersome nature of the regulatory framework and permit approval process, the length of time required to secure a permit—in some cases, more than two years—and the ambiguities and workability of the legislation.[8]

The difficulties of identifying traditional knowledge holders and finding representative communities with whom to negotiate benefit-sharing agreements have been especially challenging, particularly where shared or existing knowledge is involved. Moreover, and perhaps most significantly for rooibos, the very wide scope of the Biodiversity Act includes commodity trade, or biotrade, as part of the bioprospecting definition, in contrast with the CBD and Nagoya Protocol, which confine regulation to the utilization of genetic resources only. This issue is explored further in Section 4 of this article.

3. Traditional knowledge, traditional use and justice in the rooibos industry

3.1. Laying claim to rooibos

Establishing "proof" of traditional use and knowledge of rooibos—and thus the potential for benefit sharing—has become the central preoccupation of both government and claimants. This was catalysed in September 2010 by a letter written on behalf of the South African San Council to the Director-General of Environmental Affairs, claiming the rights of San as primary knowledge holders of rooibos and honeybush tea, among other species. "We request your department to 'regulate' the bioprospecting that is taking place in South Africa in regard to the above biological resources/plant species", stated the letter, proposing that "the San, as 'primary knowledge holders'… be formally acknowledged as 'stakeholders' within the meaning of the Act, as an indigenous community whose 'traditional uses' of the indigenous biological resources have initiated or contributed towards the current bioprospecting" (Chennells Albertyn, 2010). A series of meetings

[7] Biodiversity Act, Section 2.

[8] By 2014, 15 bioprospecting permits had been issued, including 11 integrated export and bioprospecting permits and 4 bioprospecting permits. While the total number of applications is unknown, it is significantly higher than the number of permits granted. In part, the low number of permits is due not only to government inefficiencies, but also to the poor quality of permit application documentation (DEA Deputy Director: Resource Economics, pers. comm., January 2014).

Table 1
Key provisions of the Biodiversity Act (10 of 2004) and its Bioprospecting, Access and Benefit-Sharing Regulations.

The Biodiversity Act and BABS Regulations require anyone carrying out bioprospecting that involves indigenous biological resources and, if applicable, associated traditional use or knowledge, to obtain a permit

A permit is also required for anyone exporting indigenous biological resources for bioprospecting or other research, and export must be in the public interest

Foreign individuals or companies must apply jointly with South African individuals or companies for bioprospecting or export permits

A permit will only be issued if there has been material disclosure to stakeholders, if their prior informed consent to the bioprospecting has been obtained, and if the Minister (of Environmental Affairs) is satisfied that certain conditions as set out in the legislation have been met. Consent must be reflected in a benefit-sharing agreement, which could include both monetary and non-monetary benefits

The Act includes two categories of stakeholders whose prior informed consent to a bioprospecting project must be obtained

They are:

- those who give access to the indigenous biological resources (e.g. a landowner or a gene bank); and/or
- indigenous communities whose knowledge or traditional use of indigenous biological resources has contributed to, or may contribute to, the bioprospecting

Importantly, the law makes a distinction between the "discovery phase" of a bioprospecting project and the "commercialization phase". In the discovery phase, researchers attempt to find out if an indigenous biological resource has any commercial potential. In the commercialization phase, that potential has already been identified. Those doing discovery phase research need to notify the minister about what they are doing, and do not require a bioprospecting permit. A bioprospecting permit is needed only for the commercialization phase

"Bioprospecting", in relation to indigenous biological resources, means any research on, or development or application of, indigenous biological resources for commercial or industrial exploitation, and includes

- the systematic search, collection or gathering of such resources or making extractions from such resources for purposes of such research, development or application;
- the utilization for purposes of such research or development of any information regarding any traditional uses of indigenous biological resources by indigenous communities; or
- research on, or the application, development or modification of, any such traditional uses, for commercial or industrial exploitation;

"Indigenous biological resources" includes

- any indigenous biological resources, whether gathered from the wild or accessed from any other source, including any animals, plants or other organisms of an indigenous species cultivated, bred or kept in captivity or cultivated or altered in any way by means of biotechnology;
- any cultivar, variety, strain, derivative, hybrid or fertile version of any indigenous species or of any animals, plants or other organisms referred to above; and
- any exotic animals, plants or other organisms, whether gathered from the wild or accessed from any other source which, through the use of biotechnology, have been altered with any genetic material or chemical compound found in any indigenous species or any animals, plants or other organisms.

The Act also establishes a Bioprospecting Trust Fund, into which all money arising from benefit-sharing agreements must be paid, and from which all payments to stakeholders will be made

followed in 2011 and 2012, with the San Council presenting their position to the government and to representatives of the rooibos and honeybush[9] industries.

In 2013, a memorandum of understanding was signed between the San Council and the National Khoisan Council. The memorandum recognized "the importance of working together to realize … shared traditional knowledge and associated intellectual property rights, in particular with regard to rooibos and honeybush". The agreement was "to establish a negotiating body of behalf of all San and Khoi Khoi peoples in South Africa" in matters relating to their traditional knowledge and associated intellectual property rights with regard to rooibos and honeybush. A series of principles underpinned the agreement, including the importance of "meaningful consultations" among community members and with "all rural communities that have traditional knowledge, or that are currently involved in the growing of rooibos and honeybush to ensure that they are properly consulted and recognised". Thus, from the outset, the San Council and National Khoisan Council have recognized the role of other knowledge holders.

In parallel with these developments, and as part of a strategy to leverage wider benefits from the rooibos tea industry, negotiations commenced between Nestlé South Africa and the San Council and National Khoisan Council for the development of a novel tea-vending machine product, with a benefit-sharing agreement concluded in 2014. In terms of this agreement, the two councils were to receive 3% of net sales, to be shared equally between them.

With the onus on the state to "prove" such claims, the Department of Environmental Affairs (DEA) commissioned research in 2014 to investigate the ethnobotanical use of rooibos and honeybush, to reveal how traditional knowledge provided scientific and commercial leads, and to make recommendations about the ownership of such knowledge. The resultant report rather ambivalently concluded that "there is no evidence to dispute the claim by the San and the Khoi people of South Africa that they are the rightful holders of traditional knowledge associated with rooibos and honeybush" (DEA, 2014). "In light of these findings," suggested the department, "any individual or organization involved in bioprospecting or biotrade using rooibos or honeybush species [is urged to] engage with the Khoi or San communities or people to negotiate a benefit-sharing agreement in terms of NEMBA and the BABS Regulations" (DEA, 2015).

These developments have caused ructions in the rooibos industry. The industry position has been that there is no convincing evidence of San traditional knowledge of rooibos tea prior to the commencement of the industry, and thus that it would not be open to entering into a benefit-sharing agreement (Industry representative, pers. comm., April 2016). It has also dismissed the DEA (2015) report as lacking credibility, and has commissioned its own report, which is still pending.

3.2. Historical perspectives and unravelling claims

Questions have been raised not only about the validity of claims and the quality of the research conducted, but also about claiming "priority", or "who was first", without acknowledging the long chain of rural communities, individuals, researchers and companies that have contributed in different ways towards product development (see also Osseo-Asare, 2014, for an insightful analysis of the concept of priority). A central tension is the balance between achieving historical and restorative justice for the San and Khoi and recognizing the many others who have provided knowledge towards the success of the rooibos industry. Such contributions range from the momentous discoveries of individuals such as Tryntjie Swarts, who located the "golden nests" of rooibos seed in the 1920s and thus facilitated the industry's expansion; Annekie Theron, who accidentally discovered in 1968 that rooibos had a soothing effect on her hyper-allergic baby, leading to a dramatic increase in demand for rooibos (www.annique.com; Hayes, 2000; J. van Putten, pers. comm., 2000); the numerous researchers and innovators who demonstrated the health-giving properties of rooibos and have pioneered different processing techniques (Joubert and de Beer, 2011) and the production innovations of local farmers (e.g. Oettlé, 2012).

As one industry respondent remarked:

> *The San and Khoi don't have a clue what rooibos is: if there is benefit sharing from rooibos, it must go to people who are in the industry. The poor people of the Cederberg—they don't know what is going on. Commercial farmers themselves are of mixed blood. So just where do you draw the line?* (Industry representative, pers. comm., May 2016).

Contrary to perceptions, the historical record is far from clear. While San and Khoi undoubtedly inhabited rooibos-filled landscapes, by the end of the 18th century—and certainly by the time the rooibos industry was initiated in the area—the numbers of San had been "shattered,

[9] I exclude the honeybush industry from this analysis because of the considerable differences between it and the rooibos industry. However, many of the same principles about ABS and its conceptualization would apply.

dispersed and subjugated" (Penn, 2006). They had been "absorbed as an underclass into the colonial world or expelled beyond it, to regions where new Creole communities emerged" (Penn, 2006). Nonetheless, their knowledge of local plants was unquestionably passed on.

A common reference point, cited by many, is that of the botanist Carl Thunberg, who wrote: "Of the leaves of the *Borbonia cordata* [an earlier classification of *Aspalathus*] the country people made tea" (Thunberg, 1986). From this, it has been surmised that rooibos tea was inherited from San and Khoi traditions. However, as palaeontologist Le Quellec (2009) observes, *Aspalathus cordata* is not the same as rooibos, and the "country people" may well have been Dutch settlers whom Thunberg encountered, rather than San or Khoi. Indeed, evidence of a tea "culture" among Dutch settlers exists from as far back as the early 17th Century, who consumed tea brought to the Cape Colony from China (Rosenthal, 1959). Le Quellec (2009) also notes that the series of names given for rooibos—bossiestee, Koopman's tea, veld tea, naaldtee, kaffir tea, rankies tea, maktee among others—are either in English, Dutch or Afrikaans, while no Khoisan name was reported for the plant.

Such insights emphasize the importance of rigorous historical analysis, but are not necessarily conclusive. San and Khoi were part of an oral culture and the absence of a historical record does not conclusively prove anything. As Penn (2006) observes, "Recorded history is usually what dominant cultures leave behind them as they relegate the dominated to the shadowy status of 'people without history'."

Leaving aside questions of priority, it is indisputable that the rooibos industry drew from traditional use and knowledge, in whatever guise these were manifest. When Barend Ginsberg, a Russian immigrant and descendant of the well-known Popoff family that dealt in black tea, settled in the Clanwilliam area in 1904, he immediately saw the marketing potential of rooibos tea. This could only have been done on the back of local knowledge. Scher (1991) notes that Barend Ginsberg's son Benjamin, "while out hawking around nearby Citrusdal, discovered that the local coloured population were making their own tea—rooibos. After tasting it he realized that with a little refining, this could be a marketable product." Grandson Bruce Ginsberg notes that "in earlier times, the Hottentots would cut the tea with knives and bruise it with wooden mallets against rocks. After mixing water with the bruised product, they left the bruised leaves in cracks in the rocks to sweat and partly ferment under the hot sun, before throwing it out on flat rocks to dry. Once dried, it would be swept together with rough, home-made reed brooms, and placed in bags to be carried down the mountains and sold" (Ginsberg, 1976) (Fig. 1). Drawing from such knowledge—but adding to it through experimentation and old Chinese tea-curing techniques—Benjamin Ginsberg began investigating the development of rooibos, his dream being to make a "Ceylon of the Cape" (B. Ginsberg, pers. comm., 2009; J. van Putten, former employee of Rooibos Limited, pers. comm., 2000). It was during the early 1900s that tea connoisseurs were also looking to establish a South African flavour, through the blending of teas to make different varieties (Rosenthal, 1959). A notable event in 1907 was the South African Exhibition in London, advertising Cape "Rooi" Bush among other indigenous products. Again suggesting use by settlers, the advert remarked that the tea "is largely used by the Elite of the Rural District and is valued for its soothing effect upon the system" (Fig. 2).

Demand for rooibos increased, and Barend Ginsberg, with Olaf Bergh, a farmer friend and forefather of the current chief executive of Rooibos Limited, commenced experiments on the cultivation and processing of the tea. Research on rooibos cultivation continued in the 1920s, primarily through the efforts of Dr. P. le Fras Nortier, a medical doctor and amateur botanist, leading to improved methods and increased production of the tea.

Again, local knowledge took the industry to new heights, this time through the efforts of Tryntjie Swarts, a local woman who worked at the farm Kleinvlei as a nanny for Olaf and later Cecil Bergh. James van Putten, a former employee of Rooibos Limited, recalled an interview with her in her old age in the 1970s:

> *When Dr. Nortier started planting tea he needed seed to be collected. The best way to do this was to lie on one's tummy and use the wetted tip of a match to pick out seeds from the soil. One day Tryntjie was lying on her stomach and saw an ant collecting seed. The next day she told her husband Jan to bring a spade and they discovered heaps of seed in the ant burrows. She took spoonfuls and her rate of seed collection multiplied! The ant was doing its own selecting as it did not take green seed. At first, Tryntjie made sure Hans kept quiet about their find so they could reap the rewards. But "wine talks" and one evening after lots of wine she spilled the beans to a group of friends and everyone knew about the "golden nests"* (J. van Putten, pers. comm., 2000).

Fig. 1. Traditional method of cutting rooibos tea with knives and bruising it with wooden mallets against rocks. Photo: Rooibos Limited.

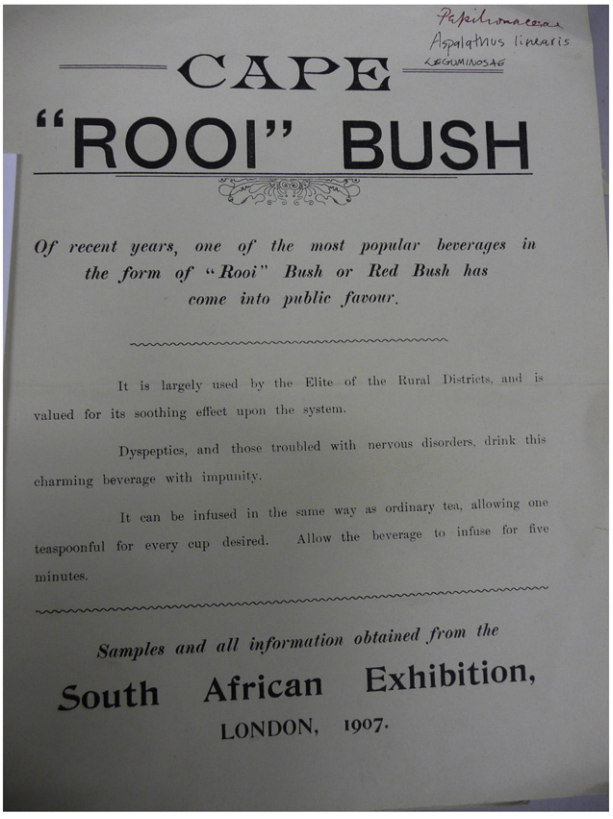

Fig. 2. Advertisement for Cape "Rooi" Bush at the South African Exhibition, London, 1907. Photo: Rachel Wynberg. Archives: Kew Botanical Gardens.

This find had economic benefits for Tryntjie Swarts, who was able to collect much more seed, at a going rate of £5 per matchbox. However, it had significantly more profound benefits for Ginsberg and the rooibos industry, which kept a tight control over seed supply as a means to ensure control over cultivation (Industry representative, pers. comm., 2001). On the back of this discovery, together with technology advances, the industry was able to expand drastically, establish plantations and launch the first brand of rooibos tea, Eleven O'Clock (Dahlgren, 1968; J. van Putten, former employee of Rooibos Limited, pers. comm., 2000). Tryntjie Swarts's contribution, however, remains largely unacknowledged, as does that of the original holders of knowledge about rooibos tea who, through the colonial laws of the Cape Colony, and later by apartheid, were largely confined to providing cheap labour for the industry, and prevented from acquiring land and creating economic opportunities (Figs. 3 and 4).

Black tea shortages during World War II led to increased local demand for rooibos and a steady rise in production and price (Pettigrew, 2001), but with the end of the war in 1945, the rooibos market collapsed, prompting the establishment of the Clanwilliam Tea Cooperative in 1948. In 1954, at the request of producers, and under the Marketing Act of 1937, the Minister of Agriculture instituted the Rooibos Tea Control Scheme, a statutory, one-channel marketing system. The all-white board appointed to implement the scheme was authorized to regulate the production and marketing of rooibos tea by acting as the sole buyer from producers and the sole seller to approved exporters and tea processors. It further had the authority to prohibit producers from selling rooibos to any party without its approval. Additionally, the board set the prices of tea sold to processors, laid down certain quality and grading standards and acted as the central point for undertaking research on rooibos tea cultivation (Fig. 5).

Through the establishment of the Rooibos Tea Control Scheme, the rooibos industry was assured of direct government protection and support, including subsidies for affiliated producers, research and the provision of extension services. This had clear ramifications, not only for the rooibos industry, which entered a period of substantial growth and development, but also for producers excluded from the scheme. In apartheid South Africa, this meant the mostly coloured farmers from mountainous areas who had traditionally gathered rooibos tea from the wild. As Hayes (2000) has commented, the social and political reasons for establishing the control board weighed far more heavily than reasons affecting the competitive position of the industry.

Fig. 3. The wooden block used by Tryntjie Swarts to scarify rooibos seeds and thus enable germination. The block is now displayed in the Clanwilliam Museum, with a tattered note that reads: *"Tryntjie Swarts se blok waarmee sy saad behandel het. Sy was die eerste person wat waargeneem het dat miere rooibosteesade versamel. Persoonlik oorhandig aan mnr JW van Putten."* (*Tryntjie Swart's block which she used to treat seed. She was the first person who observed that ants collect rooibos tea seed. Personally handed to Mr. JW van Putten*). This kind of block was used from 1929 to 1965. Photo: Jaci van Niekerk.

Fig. 4. The rooibos industry has largely been built on the back of cheap labour carried out by dispossessed black and coloured people. Photo: Rooibos Limited.

The control board monopolized the industry for nearly 40 years, but in 1993, for a variety of reasons including the democratic process then taking place in South Africa and increased recognition of the need to add value to the product, it was abolished and replaced by a public company, Rooibos Tea Natural Products. The company, which changed its name to Rooibos Limited in 1995, took over the processing and packaging facilities at Clanwilliam as well as responsibility for production, marketing and quality control. With deregulation the industry changed dramatically. Privatization opened it up, not only to new processors, packers, distributors and producers, but also to new marketing channels and investment opportunities. The rooibos industry expanded, entering a period of substantial growth and development—from an average of 500 to 600 tons in the 1950s and 1960s to some 3000 to 4000 tons in the 1970s, 1980s and 1990s, and up to 15,000 tons today (Hayes, 2000; Snyman, 2004; DAFF, 2014).

3.3. Identity, priority and indigeneity

The emergence of a democratic state saw increased support to small-scale black and coloured rooibos farmers and the opening up of ethical trade opportunities. Farmers residing in the mountainous areas surrounding Wupperthal and the Suid Bokkeveld (Fig. 6) became the first marginalized producers to trade rooibos tea through fair trade organizations (Nel et al., 2007). In both of these areas, farmers had been harvesting wild "veldtee"[10] long before commercial planting of rooibos commenced in the 1930s.

Circumstances vary considerably between producers in Wupperthal and those in the Suid Bokkeveld, although both have a long history of rooibos tea production. The village of Wupperthal was established as a Moravian mission station in 1836 and has a population of some 2250 inhabitants, of whom about 500 live in the main settlement, the rest residing in 11 satellite stations in the mountains. More than half of the households receive annual incomes below US$2995 per annum, and there is generally a high reliance on rooibos tea, which contributes 55% to 68% of producer household income (Wynberg and Custers, 2005).

Like those in Wupperthal, residents of the Suid Bokkeveld who attempted commercial rooibos tea production were marginalized by the apartheid regime, through limited access to land, markets, finance and support services. The location of these farmers, in the south of the region, which consistently records the highest temperatures and lowest

[10] "Veld" means open, uncultivated country or grassland in Southern Africa.

Fig. 5. The Rooibos Tea Control Board, 1950s. Photo: Rooibos Limited.

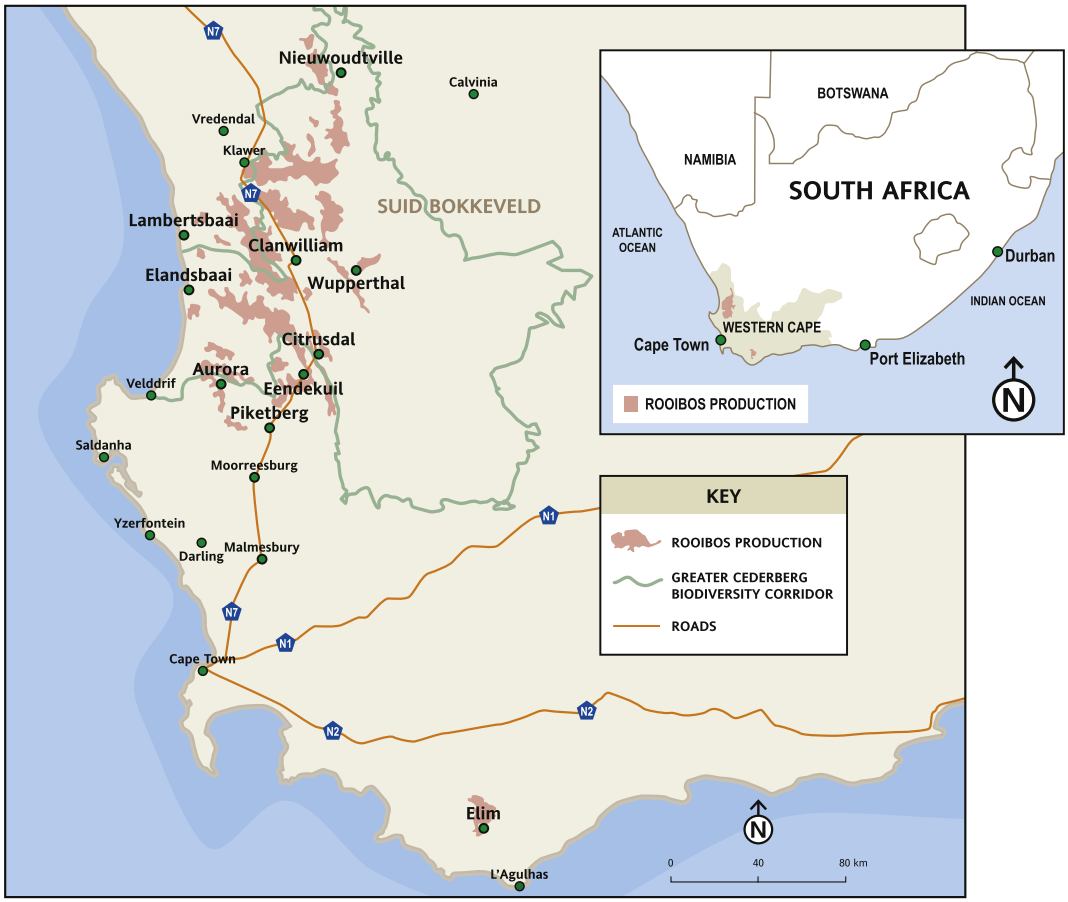

Fig. 6. Rooibos production area.

rainfall levels for the area, has exacerbated this marginalization and heightened their vulnerability to climatic changes and drought (Oettlé, 2005).

In total, about 600 people live in the Suid Bokkeveld, more than 90% of whom are from groups that were discriminated against by apartheid (Oettlé, 2005). In producer households, up to 75% of household income is derived from rooibos tea. Typically, rooibos farmers from Wupperthal and the Suid Bokkeveld earn about US$1560 to US$2800 per annum, while large-scale rooibos farmers can earn up to US$200,000 per annum (Wynberg and Custers, 2005). Today, many farmers in these areas are engaged in a form of rooibos tea commercialization based on fair trade and organic methods of production.

In contrast to the proactive position that has been taken by the San Council and National Khoisan Council, most harvesters and small-scale farmers in these areas—where the harvesting and use of rooibos has formed a central part of livelihoods and cultures for decades—remain completely unaware of the ABS regulations that protect their rights. These coloured farmers are typically mixed-race descendants of settlers, former slaves and Khoi people (Beinart, 2001) who do not easily identify as "indigenous" (Ives, 2014b) and do not associate themselves with contemporary San and Khoi political structures such as the San Council and National Khoisan Council. As one rooibos farmer from the Heiveld Cooperative in the Suid Bokkeveld remarked, responding to the information that the San Council and National Khoisan Council were claiming benefits from rooibos:

> *Who are the Khoi? Am I perhaps Khoi? Just as the Heiveld producers became used to having a market, the market got better and suddenly the commercial farmers were also allowed to enter [referring to fair trade]—leaving the small farmers "om aan die agterspeen to drink" [worst off]. To top it off, the Khoisan now declare that they want to benefit! Our people [from the Suid Bokkeveld] are the ones who collect seed. Are we going back to the old South Africa where people are classed by race? I don't know where I belong—black, white, coloured?* (Representative of the Heiveld Cooperative, pers. comm., November, 2012).

With efforts now being made by the San Council and National Khoisan Council to reach out to these communities, it is difficult to know how these matters will be resolved. For example, rooibos farming communities who do not readily associate themselves with a San and Khoi identity may not find it acceptable to have their interests represented by these indigenous groups, or to be part of the same benefit-sharing agreement. As Ives (2014b) remarks:

> *Coloured rooibos farmers have put forward an alternative politics of indigeneity. They [have] articulated their understanding of indigenous belonging through rooibos farming … Many have rejected a temporally and spatially incarcerating idea of cultural indigeneity.*

In other words, the plant, and not the culture, serves as the anchor for many, and as the hope for an economically viable future (Ives, 2014b).

Having said this, the claim of the San Council and National Khoisan Council is strongly symbolic and political, representing the voice of generations of indigenous peoples. The industry position can be considered to be somewhat naïve and duplicitous in this regard: on the one hand, countless rooibos advertisements and brands exploit the image of San and Khoi and their traditional links to rooibos (for example, www.redbushtea.com; www.khoisantea.com; www.achterfontein.co.za). On the other hand, the industry dismisses such claims as unfounded. The inconsistencies are stark. Clearly, there is a case to be made for benefit sharing linked to traditional knowledge, but the precise nature and form of this requires careful construction and consideration to incorporate the various complexities and nuances described.

4. Distinguishing between rooibos as a genetic resource and as a biological resource

4.1. Biotrade or bioprospecting?

While the intractable issue of traditional knowledge has dominated the ABS rooibos debate and the attention of regulators, a potentially larger set of questions also requires resolution. The first concerns the scope of South Africa's Biodiversity Act, which, in contrast to the narrow definition of genetic resources embraced by the CBD and Nagoya Protocol, defines "indigenous biological resources" broadly in relation to bioprospecting to include "any living or dead … organism of an indigenous species; any genetic material or derivatives of such organisms, or any chemical compounds and products obtained through use of biotechnology".[11] The term "bioprospecting" is also broadly defined to include "any research on, or development or application of, indigenous biological resources for commercial or industrial exploitation".[12] Biotrade—or commodity trade in biological resources such as rooibos—is thus included within the remit of the BABS regulations, a view subsequently entrenched in a 2013 amendment to the Biodiversity Act. The breadth of this definition has significant implications, in that it regulates a wide range of activities, which is also contrary to ABS approaches in neighbouring countries. This has led to conflicting regulatory approaches for shared species such as devil's claw [*Harpagophytum prucumbens* (Burch.) DC. ex Meisn.], baobab (*Adansonia digitata* L.), and *Hoodia gordonii* [(Masson) Sweet ex Decne.] and associated traditional knowledge holders (Wynberg, 2014).

Regulating biotrade is important when the volumes are large and where resource overexploitation is a concern (Laird et al., 2010). Regulation can also be an important tool to promote value adding and beneficiation and to bring the equity concerns of ABS to the commodity raw material trade for herbal medicines, cosmetics, and food products. However, addressing these concerns requires measures quite different from those called for in bioprospecting and the utilization of genetic resources, which, as defined by the Nagoya Protocol, means "to conduct research and development on the genetic and/or biochemical composition of genetic resources, including through … biotechnology". Biotrade per se should not require benefit-sharing agreements and prior informed consent, a fact also recognized by the limited scope of the Nagoya Protocol. The South African experience of conflating the two in a single regulatory system has led to negative impacts on harvester communities, on traditional knowledge holders, and on the industries creating economic opportunities (Wynberg et al., 2015).

It is worth noting that earlier drafts of the BABS Regulations specifically exempted industries that trade in indigenous biological resources, mentioning rooibos tea, buchu, aloe species, thatch grasses, reeds and bees. The motivation for this exemption was that these represented commodity trade, not bioprospecting. While the exemption was later removed, this view still holds in practice. Commenting on the government's approach to rooibos tea, the DEA notes: "the trade in the unchanged resource—e.g. rooibos/honeybush tea being sold as tea in tea bags or as tea leaves—is not bioprospecting. Even adding the raw product—rooibos tea leaves—to wax to produce a candle would not be bioprospecting. However, if the extract of the rooibos tea was added to wax to make a candle with the essences of rooibos, it would be considered bioprospecting" (Legal Services, DEA, pers. comm., 11 October 2010).

In practice, however, confusion reigns about the distinctions between biological and genetic resources, especially where species such as rooibos have multiple uses in more than one sector. For example, research and development on rooibos for new foods, beverages, cosmetics and botanical medicines might include original research on

[11] Biodiversity Act, Section 1.
[12] Biodiversity Act, Section 1.

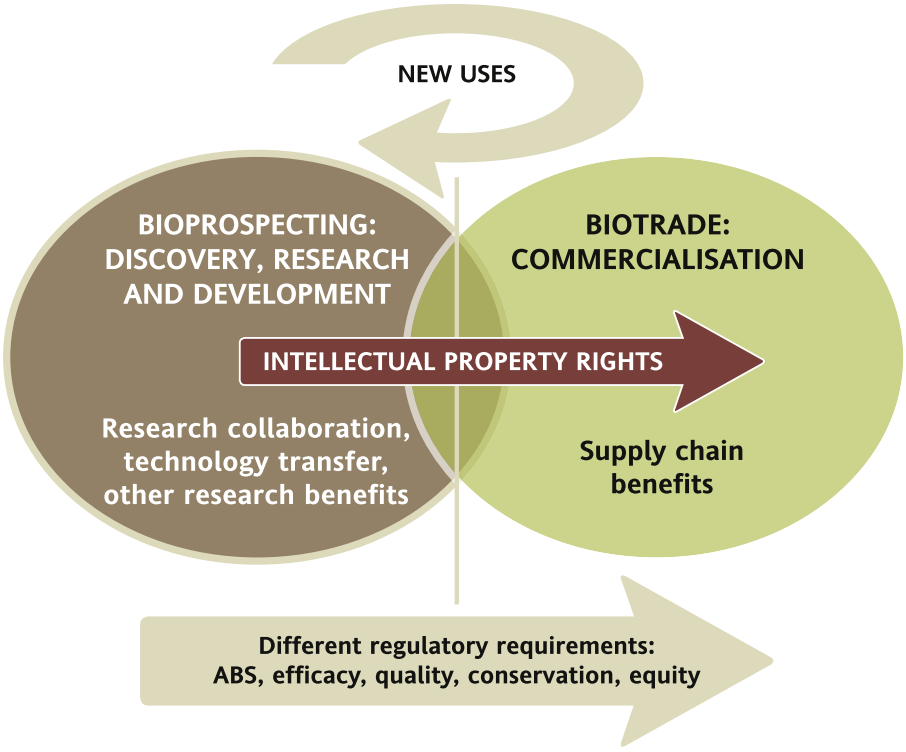

Fig. 7. Distinctions and overlaps between bioprospecting and biotrade.

genetic resources and traditional knowledge (Joubert and de Beer, 2011). At this stage, under the CBD, these activities would be characterized as bioprospecting, or genetic resource use. After companies have investigated new properties or traditional knowledge, demand very quickly shifts into the biological resource trade, or biotrade. Fig. 7 illustrates some of the distinctions and overlaps between these different activities.

The regulation of biotrade seems to stem from a concern that material traded as a commodity may subsequently be transferred to third parties and enter a new research and development cycle. A controversial case involving research and development on extracts of rooibos and honeybush brought many of these concerns to the fore (Berne Declaration and Natural Justice, 2010). In this case, the food giant Nestlé secured rooibos and honeybush plant material from a local South African processor, did research on extracts and filed patents, but without the requisite agreements in place. Although the material was obtained from a local processor, it could equally have been purchased off the shelves of any European supermarket, raising questions about the challenges of regulating research and development on commodities such as rooibos tea that are already commercially available.

4.2. Protecting national interests and strengthening benefits from research and technology

It is fair to say that to date most of the efforts of the South African ABS regulatory system have focused on regulating biotrade rather than on protecting national interests and strategically strengthening the research and technology benefits during bioprospecting. This is vividly illustrated in relation to rooibos, where little attention has been given by ABS regulators to the surge of interest in its biochemical and health properties. This interest has focused primarily on the low tannin content of rooibos, the presence of various minerals, and the antioxidant properties of several unique flavonoid C-glycosides such as aspalathin and nothofagin (Von Gadow et al., 1997a, 1997b; Erickson, 2003; Joubert et al., 2008, 2009; Joubert and De Beer, 2011), thought to protect against free radical damage that can lead to cancer, heart attacks and strokes.

Much of this research is linked to foreign patents, with Wynberg et al. (2009) reporting 95 entries for rooibos in the patent database mostly focused on processes for producing extracts (13); teas and health foods (29); pharmaceutical compositions and uses (24); and cosmetics (23).[13] Of these, 67 were filed by Japanese companies, with 15 granted, 10 pending and 42 withdrawn, rejected or expired. While in all likelihood many of these remain commercially dormant, they do raise questions about the manner in which material was accessed and compliance with South Africa's Biodiversity Act.

A final point is that both the CBD and Nagoya Protocol are underpinned by the principle of fair and equitable benefit sharing between technology-rich countries of the global North and biodiversity-rich countries of the global South. There is some irony in the fact that these principles of global injustice have been all but ignored in the case of rooibos (Amusan, 2014). An important recent development, formalized through the signing of an economic partnership agreement between the European Union and South Africa, has led to the granting of geographic indication status for rooibos as an important mechanism to secure the plant's origin and provenance (World Intellectual Property Organization, 2013; Ismail, 2016). This followed a decade-long dispute brought about by the 1994 filing of a trademark application for the name "rooibos" in the United States, with the eventual cancellation of the trademark (World Intellectual Property Organization, 2013). While such victories are cause for celebration, they are also an opportunity for critical engagement about who stands to benefit. As observed by Coombe et al. (2014), it is imperative that geographic indications be framed as a rights-based approach to address histories of exploitation, dispossession and disenfranchisement. Debates concerning geographical indications and ABS have historically been entirely separate, championed by different government departments, but bringing them together into a combined space of deliberation is an important way to break the benefit-sharing impasse.

[13] By 2016, this had increased to 141 entries for rooibos. An equivalent analysis of uses, status and ownership has not been conducted on this updated dataset.

5. Environmental concerns

It is vital to recognize and reward traditional knowledge holders and ensure national benefits from rooibos, but there are also invisible injustices which must be attended to if the full transformation of this sector is to be realized. A central motivation for ABS, embedded in both the CBD and the Nagoya Protocol, is that bioprospecting should enable biodiversity conservation to "pay its way" by creating incentives for supporting biodiversity conservation (World Wide Foundation for Nature, 2007; Pavoni, 2013). Despite these imperatives, the conservation of rooibos as a genetic resource, as a habitat and ecosystem, and as a landscape has been all but ignored in contemporary ABS debates.

Land degradation is one among many environmental concerns raised by the cultivation of rooibos. Because the crop is an indigenous species, it is often promoted as an environmentally friendly alternative to conventional crop systems. However, this disregards the fact that thousands of hectares of natural mountain fynbos, constituting one of the most biologically diverse ecosystems in the world, are ploughed up every year for planting to monocultures of rooibos tea. The footprint for cultivated rooibos has grown from 14,000 ha in 1991 to over 60,000 ha today (CAPE, 2006; Industry representative, pers. comm., 2016). This has had devastating impacts on biodiversity. In just 12 years, there has been a 300% increase in the number of species threatened with extinction as a result of rooibos cultivation—from 37 taxa in 1997 to 149 taxa in 2009, with 57 species in the most severely threatened categories of "endangered" and "critically endangered" (Raimondo and Von Staden, 2009). Through the Rooibos Biodiversity Initiative and South African Rooibos Council (Pretorius, 2007), there is increasing awareness of the threats to biodiversity of this expansion, but it is important to strengthen such initiatives, with ABS providing a possible mechanism.

Chemical inputs are also a concern. Although rooibos is a low-input crop requiring little water or extra fertilizing, many commercial farmers spray plants with cypermethrin, a synthetic pyrethroid insecticide typically used to kill insects on cotton. Although touted by the industry as a pesticide which is non-toxic to mammals, evidence exists of toxicity to humans and laboratory animals, as well as to beneficial insects and other animals (Cox, 1996). Cypermethrin is also listed as a possible human carcinogen and is known to suppress the immune system and cause developmental delays (Cox, 1996). Glyphosate (Roundup), a non-selective herbicide used commonly in the rooibos industry to kill unwanted grasses and weeds when rooibos is grown in rotation with grain crops, is also known to have health side effects, having recently been pronounced a "probable carcinogen" by the World Health Organization (Cressey, 2015).

The cultivation of rooibos can also impact negatively on wild populations of the species. In addition to impacts on rooibos subspecies through the expansion of plantations, seed selection within cultivated plantations may have inadvertent effects on adjacent wild forms, through "illegitimate" pollination across populations that would never have mixed in the wild, and the introduction of unfavourable gene material (Dahlgren, 1968). Resultant effects could include a reduction in the genetic diversity of *A. linearis* and thus greater vulnerability to physical and biological changes. This is especially pertinent in the context of drought and climate change. This potentially serious problem receives little attention from farmers, who seldom isolate plantations.

Moreover, there are concerns about industry reliance on a single variety of rooibos from a single, narrow genetic base. Four main types of rooibos tea exist—rooi (red), vaal (grey), swart (black) and rooibruin (red brown)—but it is the Nortier variety of the rooi type (also known as Rocklands) which has been selected, originally from wild forms, for commercial cultivation (Dahlgren, 1968; Van Heerden et al., 2003). Reliance on a single variety has likely reduced the plant's overall lifespan, with fungal infection being a particularly acute problem, especially when cropping occurs late in the growing season (Stassen, 1987).

A further concern relates to the unsustainable harvesting of wild rooibos. Traditionally, wild varieties of *A. linearis* have been used only on a subsistence basis by communities for the brewing of "veld" tea (Hawkins et al., 2011). However, wild rooibos is currently facing unprecedented harvesting pressures. This is due in part to increased demands from international markets, which offer premium prices for wild rooibos tea, and also to ongoing drought conditions in this region which have reduced yields in cultivated fields and led to increased pressures on the more resilient wild populations (Smith, 2003). While the harvesting of wild rooibos can be sustainable, much depends upon the quantities removed, the methods utilized and the frequency of harvesting. Important strides have been made to improve the sustainability of wild tea harvesting (Malgas and Oettlé, 2007) but this is nonetheless an issue that requires ongoing monitoring and attention.

Clearly, rooibos tea production is not without environmental impacts, but it seems that until recently conservation has featured negligibly in the rooibos business model. ABS thus presents a useful mechanism to formalize conservation efforts, in concert with ongoing initiatives to establish the "Right Rooibos Sustainability Standard"[14] to make production more environmentally sustainable. This includes the reduced use of agrochemicals, improved control of wind and water erosion, the use of "shelter belts" in cultivated lands to provide a refuge for the natural predators of rooibos pests, increased mulching to promote carbon and water retention, and the retention of populations of wild rooibos (Oettlé, 2005; Pretorius, 2007). Greater scrutiny could also be given to the criteria used to grant permits for land-clearing for rooibos, to ensuring maximum protection of biodiversity, and to the creation of biodiversity offsets for land cleared.

6. Conclusion

Implementing ABS in the rooibos industry and achieving greater equity, sustainability and justice is clearly a multifaceted and complex task, requiring a more unifying, integrative and inclusive view than that evident to date. Such an approach needs to:

- explicitly recognize the historical and existing injustices of the sector;
- acknowledge the significant contributions towards the industry's success that have been made by traditional knowledge holders, researchers, individuals, farmers, and commercial enterprises;
- regulate research and development to optimise benefits from bioprospecting;
- take action to deal with the environmental problems the sector faces; and
- set in place restorative measures to transform the industry.

Cognizance also needs to be given to the limited ability of ABS to solve wider problems, such as the struggles faced by many farmers to gain access to extension services, markets, credit and land, and the resulting importance of embedding ABS within a wider developmental agenda.

Just how one does this is open to debate. One proposal that could have merit is to establish a structure based on the engaged and committed input of a wide array of actors with divergent and sometimes competing interests—from the range of national and provincial government departments involved through to research institutions, nongovernmental organizations, the San Council and the National Khoisan Council, other traditional knowledge holders, farmers, industry representatives and conservation bodies. This could take the form of a trust that receives agreed levies from the industry, on a sliding scale and in proportion to turnover, and distributes benefits at appropriate levels through a transparent, consultative mechanism. Such an approach could also form a valuable and neutral platform for enhancing the economic benefits of

[14] http://www.conservation.org/global/ci_south_africa/publications/Documents/handbook-implementing-rooibos-sustainability-standards.pdf.

Fig. 8. ABS in context.

the industry. Although this role has to some extent been played by the present Rooibos Council, its limited mandate and participation and perceived bias have restricted its effectiveness (Coombe et al., 2014).

Fig. 8 summarizes some of the central issues that require consideration—from recognizing all traditional knowledge holders to sustainable use and exploitation and recognizing the wide spectrum of benefits that should be considered. It also describes some of the broader contextual aspects that should be considered holistically in any deliberations about the industry.

What is clear is that the rooibos industry is poised for transformation. Decisions taken today will not only influence the local industry but also have impacts across the seas. Access and benefit sharing, while fraught, irreconcilable and fractured today, could well catalyse just the kind of forum needed to turn perceived challenges into opportunities for growth, redress and a reconceptualization of the rooibos industry.

Acknowledgements

I am grateful to the many people who have provided their time and insights for this article and who agreed to participate in the research. Jaci van Niekerk is thanked for her research support, especially in hunting down the story of Tryntjie Swarts. Anne Woods, Paul Wise, Paula Wood and Fahdelah Hartley helped with research, editing and illustrations. Comments from Noel Oettlé and two anonymous reviewers refined the arguments. This work is based on research supported by the South African Research Chairs Initiative of the Department of Science and Technology and the National Research Foundation of South Africa. Any opinion, finding and conclusion or recommendation expressed in this material is that of the author and the foundation does not accept any liability in this regard.

References

Amusan, L., 2014. The plights of African resources patenting through the lenses of the World Trade Organisation: an assessment of South Africa's rooibos tea's labyrinth journey. African Journal or Traditional, Complementary and Alternative Medicines 11, 41–47.

Beinart, W., 2001. Twentieth-Century South Africa. Oxford University Press, Oxford.

Berne Declaration and Natural Justice, 2010. Dirty business for clean skin: Nestlé's rooibos robbery in South Africa. (Briefing paper) https://www.cbd.int/abs/side-events/resumed-abs-9/id2114-berne-policy-brief.pdf.

Blom, W.A.M., Abrahamse, S.L., Bradford, R., Duchateau, G.S.M.J.E., Theis, W., Orsi, A., 2011. Effects of 15-d repeated consumption of *Hoodia gordonii* purified extract on safety, ad libitum energy intake, and body weight in healthy, overweight women: a randomized controlled trial. American Journal of Clinical Nutrition 94, 1171–1181.

Breiter, T., Laue, C., Kressel, G., Gröll, S., Engelhardt, U.H., Hahn, A., 2011. Bioavailability and antioxidant potential of rooibos flavonoids in humans following the consumption of different rooibos formulations. Food Chemistry 128, 338–347.

CAPE, 2006. Biodiversity Business. Biodiversity Working for People and the Environment. Cape Action for People and the Environment, Cape Town (http://www.sanbi.org/sites/default/files/documents/documents/biodiversitybusiness.pdf.).

Cape Kingdom Nutraceuticals, South African San Council, National Khoisan Council, 2013. A benefit sharing agreement as contemplated by the South African Biodiversity Act 10 of 2004. Unpublished agreement.

Chennells Albertyn, 2010. Letter to the Director General, Department Water and Environmental Affairs (11 October).

Chennells, R., Haraseb, V., Ngakaeaja, M., 2009. Speaking for the San: Challenges for Representative Institutions. In: Wynberg, R., Chennells, R., Schroeder, D. (Eds.), Indigenous Peoples, Consent and Benefit-Sharing: Learning from the San–Hoodia Case. Springer, Berlin, pp. 165–192.

Coombe, R.J., Ives, S., Huizenga, D., 2014. The Social Imaginary of Geographical Indicators in Contested Environments: the Politicized Heritage and Racialized Landscapes of South African Rooibos Tea. In: David, M., Halbert, D. (Eds.), Sage Handbook on Intellectual Property. Sage Publications, Thousand Oaks, CA, pp. 224–237.

Cox, C., 1996. Cypermethrin. Journal of Pesticide Reform 16, 15–20.

Cressey, D., 2015. Widely used herbicide linked to cancer. Nature (24 March. http://www.nature.com/news/widely-used-herbicide-linked-to-cancer-1.17181, accessed 22 August 2016).

Crouch, N.R., Douwes, E., Wolfson, M.M., Smith, G.F., Edwards, T.J., 2008. South Africa's bioprospecting, access and benefit-sharing legislation: current realities, future complications, and a proposed alternative. South African Journal of Science 104, 355–366.

CSIR and South African San Council, 2003. Benefit-Sharing Agreement (March).
DAFF, 2014. A Profile of the South African Rooibos Tea Market Value Chain. Department of Agriculture, Forestry and Fisheries: Directorate Marketing, Pretoria.
Dahlgren, R., 1968. Revision of the genus *Aspalathus*. Botaniska Notiser 121, 194–208.
DEA, 2014. Traditional Knowledge Associated with Rooibos and Honeybush Species in South Africa. Siyanda Samahlubi Consulting for Department of Environmental Affairs, Pretoria https://www.environment.gov.za/sites/default/files/reports/traditionalknowledge_rooibosandhoneybushspecies_report.pdf, accessed 22 August 2016).
DEA, 2015. Statement on Report of the Study Conducted on the Traditional Knowledge Associated with the Rooibos and Honeybush Species in SA. Department of Environmental Affairs, Pretoria (http://www.polity.org.za/article/dea-report-of-the-study-conducted-on-the-traditional-knowledge-associated-with-the-rooibos-and-honeybush-species-in-sa-2015-05-19, accessed 22 August 2016).
Deacon, H.J., Deacon, J., 1999. Human Beginnings in South Africa: Uncovering the Secrets of the Stone Age. David Phillip Publishers, Cape Town.
Downes, D.R., Laird, S., Casey, J., Dutfield, G., Mays, T.D., Wynberg, R., 1998. Innovative Mechanisms for Sharing Benefits of Biodiversity and Related Knowledge: Case Studies on Geographical Indications, Trademarks and Databases. Prepared for UNCTAD Biotrade Initiative: Research and Contributions on Rooibos Tea.
Erickson, L., 2003. Rooibos tea: research into antioxidant and antimutagenic properties. HerbalGram 59, 34–45.
Ginsberg, B., 1976. Rooibos Tea. The Herbal Review. The Society of Herbalists, London, pp. 7–12.
Gollin, M.A., 1993. An Intellectual Property Rights Framework for Biodiversity Prospecting. In: Reid, W.V., Laird, S.A., Meyer, C.A., Gámez, R., Sittenfeld, A., Janzen, D.H., Gollin, M.A., Juma, C. (Eds.), Biodiversity Prospecting: Using Genetic Resources for Sustainable Development. World Resources Institute, Instituto Nacional de Biodiversidad. Rainforest Alliance and African Centre for Technology Studies, Washington DC, pp. 159–197.
Hawkins, H.-J., Malgas, R., Biénabe, E., 2011. Ecotypes of wild rooibos (*Aspalathus linearis* (Burm. F) Dahlg., Fabaceae) are ecologically distinct. South African Journal of Botany 77, 360–370.
Hayes, P.B., 2000. Enhancing the Competitiveness of the Rooibos Industry (M.Phil thesis) University of Stellenbosch.
HG&H and the South African San Council, 2011. Review of the Benefit Sharing Agreement between HG&H Pharmaceuticals (Pty) Ltd, Niche Botanicals (Pty) Limited H.L. Hall and Sons Limited. A Benefit Sharing Agreement as Contemplated by the South African Biodiversity Act 10 of 2004 and the Regulations Promulgated Thereunder, 22 February.
Ismail, A., 2016. SA's rooibos tea gains protection under EU deal. Fin24, 17 June http://www.fin24.com/Economy/sas-rooibos-tea-gains-protection-under-eu-deal-20160617 (accessed 23 August 2016).
Ives, S., 2014a. Farming the South African "bush": ecologies of belonging and exclusion in rooibos tea. American Ethnologist 41, 698–713.
Ives, S., 2014b. Uprooting indigeneity in South Africa's Western Cape: the plant that moves. American Anthropologist 116, 310–323.
Joubert, E., De Beer, D., 2011. Rooibos (*Aspalathus linearis*) beyond the farm gate: from herbal tea to potential phytopharmaceutical. South African Journal of Botany 77, 869–886.
Joubert, E., Gelderblom, W.C.A., Louw, A., De Beer, D., 2008. South African herbal teas: *Aspalathus linearis*, *Cyclopia* spp. and *Athrixia phylicoides*—a review. Journal of Ethnopharmacology 119, 376–412.
Joubert, E., Gelderblom, W.C.A., De Beer, D., 2009. Phenolic contribution of South African herbal teas to a healthy diet. Natural Product Communications 4, 701–718.
Kepe, T., Wynberg, R., Ellis, W., 2005. Land reform and biodiversity conservation in South Africa: complementary or in conflict? International Journal of Biodiversity Science and Management 1, 3–16.
Khan, A., Gilani, A.H., 2006. Selective bronchodilatory effect of rooibos tea (*Aspalathus linearis*) and its flavonoid, chrysoeriol. European Journal of Nutrition 45, 463–469.
Laird, S., Wynberg, R.P., McLain, R.J., 2010. The State of NTFP Policy and Law. In: Laird, S., McLain, R., Wynberg, R. (Eds.), Wild Product Governance: Finding Policies that Work for Non-Timber Forest Products. Earthscan, London, pp. 343–366.
Le Quellec, J.-L., 2009. Revisiting the image of "bushmen tea". IFAS Research Newsletter 10, 7–9 (HAL Archives, Lesedi, Johannesburg).
Lee, R.B., Hitchcock, R., Biesele, M., 2002. Foragers to first peoples. Cultural Survival Quarterly 26, 18–20.
Lowman, M., 2012. The Effectiveness of Access and Benefit-Sharing Legislation in South Africa: Practical Considerations for National Regimes (MPhil thesis) University of Cape Town (https://open.uct.ac.za/handle/11427/12090, accessed 22 August 2016).
Malgas, R., Oettlé, N., 2007. The Sustainable Harvest of Wild Rooibos. Environmental Monitoring Group, Cape Town.
Marnewick, J.L., 2014. Antioxidant Properties of Rooibos (*Aspalathus linearis*)—In vitro and In vivo Evidence. In: Laher, I. (Ed.), Systems Biology of Free Radicals and Antioxidants. Springer, Berlin and Heidelberg, pp. 4083–4108.
Moolla, A., Viljoen, A.M., 2008. "Buchu"—*Agathosma betulina* and *Agathosma crenulata* (Rutaceae): a review. Journal of Ethnopharmacology 119, 413–419.
Nel, E., Binns, T., Bek, D., 2007. "Alternative foods" and community-based development: rooibos tea production in South Africa's west coast mountains. Applied Geography 27, 112–129.
Oettlé, N., 2005. Enhancing Sustainable Livelihoods in the Suid Bokkeveld. In: Douma, A., Hirsch, D. (Eds.), Local Contributions to the Rio Conventions. Both Ends, Amsterdam, pp. 28–30.
Oettlé, N., 2012. Adaptation with a Human Face: Lessons Learned from an Ongoing Adaptation and Learning Process. Environmental Monitoring Group, Nieuwoudtville, South Africa.
Osseo-Asare, A.D., 2014. Bitter Roots: the Search for Healing Plants in Africa. University of Chicago Press, Chicago.
Pavoni, R., 2013. Channelling Investment into Biodiversity Conservation: ABS and PES Schemes, in: Dupuy, P-M., Viñuales, J.E. (Eds.), Harnessing Foreign Investment to Promote Environmental Protection: Incentives and Safeguards. Cambridge University Press, Cambridge.
Penn, N., 2006. The Forgotten Frontier: Colonist and Khoisan on the Cape's Northern Frontier in the 18th Century. Ohio University Press, Athens OH.
Pettigrew, J., 2001. One hundred years of tea. Tea and Coffee Trade Journal 173, 53–69.
Phakathi, B., 2016. About half of rooibos crop is exported, as the tea's popularity grows abroad. Business Day Live (20 July. http://www.bdlive.co.za/business/trade/2016/07/14/about-half-of-rooibos-crop-is-exported-as-the-teas-popularity-grows-abroad, accessed 22 August 2016).
Pretorius, G., 2007. Biodiversity Best Practice Guidelines for the Sustainable Production of Rooibos. Natura Libra Environmental Consultants, Malmesbury, South Africa (http://www.cepf.net/Documents/rooibosguidelines.pdf, accessed 22 August 2016).
Raimondo, D., Von Staden, L., 2009. Patterns and Trends in the Red List of South African Plants. In: Raimondo, D., Von Staden, L., Foden, W., Victor, J.E., Helme, N.A., Turner, R.C., Kamundi, D.A., Manyama, P.A. (Eds.), Red List of South African Plants, Strelitzia 25. South African National Biodiversity Institute, Pretoria, pp. 19–40.
Rosenthal, E., 1959. Tea in our land through three centuries. Southern African pamphlets 166, 111–120.
Sandra Kruger and Associates, 2009. Rooibos Socio-Economic Study. Sandra Kruger and Associates, Stellenbosch, South Africa.
Scher, M., 1991. Rooibos—the cup that refreshes. Springbok 49–57.
Smith, N., 2003. Drought puts rooibos tea prices on the boil. Business Day.
Snyman, S., 2004. Customised Sector Program Report for Rooibos Sector. Trade and Investment South Africa. Department of Trade and Industry—Agroprocessing (August).
Stassen, P.J.C., 1987. *Aspalathus linearis* (Rooibostee): Die Invloed Van Oespraktyke Op Sekere Vegetatiewe en Fisiologiese Aspekte DSc (Agric) thesis Universiteit of Pretoria.
Taylor, M., Wynberg, R., 2008. Regulating access to South Africa's biodiversity and ensuring the fair sharing of benefits from its use. South African Journal of Environmental Law and Policy 15, 217–243.
Thunberg, C.P., [1986]. Travels at the Cape of Good Hope, 1772–1775: based on the English edition, London 1793–1795, edited by Emeritus Prof. Vernon Siegfried Forbes, translation from the Swedish revised by J. & I. Rudner, Cape Town: Van Riebeck Society, xlviii–366 p. (p. 44).
Van Heerden, F.R., Van Wyk, B.-E., Viljoen, A.M., Steenkamp, P.A., 2003. Phenolic Variation in Wild Populations of *Aspalathus linearis* (Rooibos Tea). Biochemical Systematics and Ecology. Proceedings of the Phytochemistry and Legume/Animal Interaction Symposia Held at the 4th International Legume Conference in Canberra, Australia, 2–6 July 2001 31, pp. 885–889.
Villaño, D., Pecorari, M., Testa, M.F., Raguzzini, A., Stalmach, A., Crozier, A., Tubili, C., Serafini, M., 2010. Unfermented and fermented rooibos teas (*Aspalathus linearis*) increase plasma total antioxidant capacity in healthy humans. Food Chemistry 123, 679–683.
Von Gadow, A., Joubert, E., Hansmann, C.F., 1997a. Comparison of antioxidant activity of aspalathin with that of other plant phenols of rooibos tea (*Aspalathus linearis*), alpha-tocopherol, BHT and BHA. Journal of Agricultural and Food Chemistry 45, 632–638.
Von Gadow, A., Joubert, E., Hansmann, C.F., 1997b. Comparison of the antioxidant activity of rooibos tea (*Aspalathus linearis*) with green, oolong and black tea. Food Chemistry 60, 73–77.
World Intellectual Property Organization, 2013. Disputing a name, developing a geographical indication. http://www.wipo.int/ipadvantage/en/details.jsp?id=2691 (accessed 30 May 2016).
World Wide Foundation for Nature, 2007. ABS: What's in it for Conservation? An Inquiry Aimed at Stimulating Debate on the Role of Conservation Organisations in ABS. Prepared by WWF for Discussion with Experts at the Working Group on Access and Benefit Sharing, Montreal, 8 October.
Wynberg, R., 2002a. A decade of biodiversity conservation and use in South Africa: tracking progress from the Rio Earth Summit to the Johannesburg World Summit on Sustainable Development. South African Journal of Science 98, 233–243.
Wynberg, R., 2002b. Study on the Rooibos and Honeybush Industries in South Africa for the Identification of Target Groups which should Benefit from Fair Trade. Report prepared for Fair Trade Assistance. November. Project number 02/062/FO (FTF-UK 2002) 22/5/2002.
Wynberg, R., 2006a. Identifying Pro-Poor, Best Practice Models of Commercialisation of Southern African Non-Timber Forest Products PhD thesis University of Strathclyde, Glasgow.
Wynberg, R., 2006b. Product Rationale Paper for Fairly Traded Rooibos Tea. Prepared for Fairtrade Labelling Organisations International (FLO). September.
Wynberg, R., 2014. Implementing Access and Benefit Legislation in South Africa. One Step Forward: Two Steps Back? Prepared for PhytoTrade Africa. Unpublished document.
Wynberg, R., Chennells, R., 2009. Chapter 6: Green Diamonds of the South. A Review of the San–Hoodia Case. In: Wynberg, R., Chennells, R., Schroeder, D. (Eds.), Indigenous Peoples, Consent and Benefit-Sharing: Learning from the San–Hoodia Case. Springer, Berlin, pp. 89–126.
Wynberg, R., Custers, S., 2005. Determining a Fair Price and Equitable Benefit for Small-Scale Rooibos Tea Producers. An Analysis of the Costing and Pricing of Small-Scale Production of Organic and Fair Trade Rooibos, and Benefit Flows along the Rooibos Value Chain. Report Prepared for Fair Trade Assistance, Netherlands, October.
Wynberg, R., Hughes, J., Baas, A., Bell, S., Sharp, J., Hanks, K., Myanti, M., 1994. Policy Options for Optimising the Use of Natural Resources in the Citrusdal Zone, Western Cape Province. EEU Report No. 15/94/126. Work Commissioned by the Land and Agriculture Policy Centre.

Wynberg, R., Silveston, J., Lombard, C., 2009. Value Adding in the Southern African Natural Products Sector: How Much Do Patents Matter? The Economics of Intellectual Property in South Africa. World Intellectual Property Organization, Geneva, pp. 18–55 (ISBN 978–92–805-1794-1)

Wynberg, R., Laird, S., van Niekerk, J., Kozanayi, W., 2015. Formalization of the natural product trade in Southern Africa: unintended consequences and policy blurring in biotrade and bioprospecting. Society & Natural Resources: An International Journal 28, 559–574.