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Rich resources from poor communities: An analysis of Namibia's access and benefit-sharing legislation

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ABSTRACT

Since pre-independence, Namibia has faced wealth disparities and unfair distribution of benefits arising from natural resources. Producers, who hold traditional knowledge related to genetic resources, continue to endure poverty. In response, the Government of Namibia collaborated with various stakeholders to develop access and benefit-sharing policies and regulations. This study aimed to investigate the effectiveness of access and benefit-sharing legislation in distributing monetary and non-monetary benefits from users of non-timber forest products to indigenous and local communities who produce them. To achieve this, we integrated the access and benefit-sharing approaches with the value chain framework to identify gaps in the implementation of benefit-sharing. We employed a mixed-methods approach, incorporating semi-structured interviews, participation in symposiums, and statistical data analysis. Our findings revealed that despite the established legislative measures aimed at improving the benefits for Namibian producers, the actual sharing of the benefits remains unsatisfactory. Only a few communities that harvest non-timber forest products had benefit-sharing agreements or joint patent ownership with global or regional industries. Moreover, the San communities, who received incentives from the Devil's Claw manufacturer in 2021, did not enter into any benefit-sharing agreements until March 2023. We suggest that the recently implemented access and benefit-sharing regulations may not fully address the benefit-sharing issues overlooked by previous policies and initiatives. Therefore, we recommend further studies in exploring the potential of establishing efficient non-timber forest product processing facilities to economically empower communities. This, will ultimately contribute to national economic growth and the achievement of sustainable development goals.

1. Introduction

Genetic resources are valuable materials derived from plants, animals and microbials (Medaglia Cabrera et al., 2014). Most plant genetic resources, particularly non-timber forest products (NTFP), are harvested from the Global South; however, they are often appropriated by the Global North without providing adequate benefits to the communities where they are sourced (Odek, 2017). Consequently, users in the Global North earn substantially more than the providers and knowledge holders of the NTFPs from the Global South (Watanabe, 2015). Although the annual value of NTFPs, particularly pharmaceuticals and foods, is estimated to be more

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than USD50 billion, much of the revenue generated from their commercialisation remains in the Global North (Morgera et al., 2014). In Africa, for example, producers who hold extensive knowledge of various NTFPs often receive negligible benefits from their commercialisation (Ten Kate and Laird, 2004). The producers cannot afford the high costs and stringent regulatory requirements for processing materials into value-added products before they are sold to the consumer (Laird, 2013; Wynberg, 2013). This leads to a significant loss of revenue for these communities.

Recently, tensions have arisen between firms and various influential stakeholders, including communities, activists and NGOs, concerning the regulation of sharing monetary and non-monetary benefits derived from natural resources, particularly through access and benefit-sharing mechanisms (Odziemkowska and Dorobantu, 2021; Sirakaya, 2020). Benefit-sharing systems, such as the Nagoya Protocol on Access and Benefit-Sharing (ABS)[1] and its interlinked BioTrade initiative aim to balance the rights of genetic resource provider countries and the user countries, potentially increasing the value of biodiversity through conservation and sustainable commercial use for research and development (Sirakaya, 2020; Tran et al., 2016). However, the anticipated benefits, particularly for indigenous and local communities (ILC) closely linked to the genetic resources that are also associated with their traditional knowledge, remain unrealised, especially in regions with inadequate political representation of indigenous peoples (Heinrich et al., 2020). While the Nagoya Protocol seeks to ensure fair benefit-sharing for ILCs through prior informed consent and ABS agreements, concerns arise about the ability of ABS clearinghouses to enforce these agreements due to ongoing difficulties in harmonising regulations among signatory countries (McCune, 2018). Meanwhile, BioTrade, promoted as a sustainable and fair market strategy for poverty reduction, has often disadvantaged ILCs in resource-providing countries while benefiting the wealthy, who have the means to acquire the required technologies and certification for product quality and traceability (Bakouan and Sawadogo, 2023).

In Namibia, where income inequality is the second highest in the world and over a third of the population lives in poverty, ILCs that rely on NTFPs for their livelihoods do not effectively benefit from regional and global users of the resources (Namibia Statistics Agency and World Bank, 2017; Wynberg and van Niekerk, 2014). Indigenous communities such as San often have no direct market reach and are dependent on traders and exporters who buy and sell these products, notably to global firms (Nakanyete et al., 2023). ILCs also typically have little to no means of negotiating for improved trade agreements or influencing opportunities to establish local manufacturing firms. Since 1992, the Namibian government has collaborated with national and international stakeholders on initiatives to promote sustainable commercialisation of genetic resources and improve the livelihoods of vulnerable communities (Drews, 2020; Drews et al., 2008). The United Nations Conference on Trade and Development's BioTrade initiative facilitated Namibia in creating a sustainable NTFP industry (Suleman, 2017). Additionally, the government has recently implemented ABS regulations to enforce the equitable distribution of benefits to communities that provide resources and associated traditional knowledge. According to the ABS Act,[2] equitable benefit-sharing includes monetary and non-monetary benefits like employment, royalties, intellectual property rights, trust funds, participation in product development, research access, training, infrastructure and technology.

In this paper, we develop an ABS-value chain framework to analyse the implications it has on enhancing the economic and social benefits for ILCs involved in NTFP production. Due to its critical role in influencing benefit-sharing outcomes, value chain analysis attracts considerable interest from policymakers, scholars, and funding organisations (Gereffi and Lee, 2016). Global value chains (GVCs) analysis, in particular, could offer insights into the international trade patterns between the Global South and the Global North (Najarzadeh et al., 2021). In addition, the governance structures are complex and multifaceted, encompassing national and international regulations as well as different types of public, private, and social governance (Gereffi and Lee, 2016). Therefore, we evaluate the monetary and non-monetary benefits that Namibia's NTFP producers gain from their integration into global and regional value chains as well as the effects of governance structures in ensuring benefit-sharing. Our hypothesis indicates that impactful agreements are more likely to be established when all ABS and value chain partners, including the government, communities, firms, and NGOs, negotiate collectively. As such, the paper discusses reasons for the inefficiency of benefit-sharing legislation in so far addressing income inequalities between users of genetic resources and NTFP harvesting communities. Our study, thus, contributes to broader debates concerning economic inequalities in the use of natural resources, with particular emphasis on quantitative and qualitative data that highlight the value of plant genetic resources.

This paper comprises five sections, including this introduction. Section 2 defines ABS and BioTrade concepts and presents our integrated ABS-value chain framework. Section 3 outlines our data collection methods. In section 4, we present empirical findings on the impact of ABS in Namibia, including its influence on the valuation of NTFPs for indigenous and/or local producers, the status of benefit-sharing agreements, as well as a case study on the impact of Devil's Claw on indigenous San communities. Finally, in Section 5, we summarise the significance of ABS legislation and propose an approach for ILCs to enhance their position in benefit-sharing negotiations.

2. Defining preconditions and principles of BioTrade and ABS

Intergovernmental discussions on the regulations of genetic resources, which started in the 1980s, led to the adoption of the Convention on Biological Diversity (CBD) in 1992 (Ruiz Muller et al., 2017). Initially, the CBD's objectives only addressed biodiversity conservation; however, the majority of the Global South states opposed this, prompting the inclusion of sustainable resource use and fair trade and benefit-sharing (Greiber et al., 2012; Secretariat of the CBD, 2011). This shift enabled the launch of BioTrade in 1996, a

[1] Fully referred to the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilisation.

[2] Access to Biological and Genetic Resources and Associated Traditional Knowledge Act, 2017.

United Nations (UN) initiative supporting value-added biodiversity products in over 20 Global South countries (Sanderson et al., 2018; Ruiz Muller et al., 2017). BioTrade covers various value chain stages, enhancing emerging markets (Ruiz Muller et al., 2017; Oliva et al., 2020).

In 2014, the Nagoya Protocol on Access and Benefit-Sharing (ABS) came into effect, to improve the economic and social benefits of genetic resources for local producers and associated traditional knowledge holders (Secretariat of the CBD, 2011). Parties of the Nagoya Protocol from the Global South made the adoption a precondition for ILCs to participate in the approval of access to genetic resources for sustainable use (Buck and Hamilton, 2011).

The ABS has been ratified by over 139 member states and the European Union (Secretariat of the CBD, 2023). It necessitates states to establish regulatory laws for access and use of genetic resources and traditional knowledge (Ruiz Muller et al., 2017; Secretariat of the CDB, 2011). States that provide genetic resources must develop national ABS standards, while states that use the resources establish compliance procedures to ensure fair benefit-sharing through prior informed consent and mutually agreed terms (Kamau, 2022; CBD Secretariat, 2010).

Essentially, BioTrade and ABS share common objectives in promoting fair and equitable benefits along value chains, with BioTrade encompassing a broader scope of biodiversity and sustainable tourism, while ABS focuses on genetic resources (*see* Table 1), but both systems must adhere to relevant laws and regulations (see Table 2).

2.1. Challenges to implementing national ABS regulations

Owing to the Nagoya Protocol offering member states the flexibility to adopt ABS legislation, drafting national ABS laws and harmonising them with BioTrade projects present various complexities (Lee and Cho, 2022). This implies that there is no consensus-based international law that addresses and implements the equitable and fair sharing of benefits. Consequently, each state has the responsibility to develop and implement its ABS policies and regulations (Ruiz Muller et al., 2017). However, it remains challenging for most countries providing genetic resources in the Global South to do so without impeding already-existing BioTrade activities (Suleman, 2017; Medaglia Cabrera et al., 2014). Meanwhile, numerous countries in the Global North transitioned from providers to users of genetic resources, making ABS compliance measures difficult to implement because national laws would then violate the principles of prior informed consent and mutually agreed terms (Mahop, 2022; Morrison et al., 2021).

Furthermore, member states encounter legal challenges in defining ABS-related terms, such as what constitutes genetic resources' ownership, access, utilisation, traditional knowledge, and fair and equitable benefit-sharing (Kamau, 2019; Ruiz Muller et al., 2017). Ambiguity, particularly in the definition of access and use of genetic resources, requires the reconciliation of contradictory principles, namely, adaptability to deal with rapid advances in biotechnology and knowledge, and precision (Rabitz, 2017; Tvedt and Schei, 2014). Although the CBD definition appears to assure the ABS operational system, not all governments have formalised this definition into their ABS national laws. In China, for example, the definition is only adopted in animal husbandry and seed laws, but not in natural resources law (Zheng, 2019). Additionally, the Nagoya Protocol is the first international framework to refer to traditional knowledge in the context of benefits arising from genetic resources (Tvedt and Schei, 2014). Consequently, the incompatibility of indigenous or local customary law with legal principles of ownership rights in Western law often impedes the effective implementation of ABS systems (Avilés-Polanco et al., 2019). As such, traditional knowledge is frequently misappropriated through biopiracy and patents issued to industries since ILCs' knowledge and processes are not recognised in the Western-based system of intellectual property rights (Medaglia Cabrera et al., 2014; Wallbott et al., 2014).

2.2. The ABS-value chain framework

Implementing ABS is a complex task that involves combining traditional knowledge, innovation, research, biodiversity protection, economic development, technology, and equity into a comprehensive, coherent, and effective policy (Wynberg, 2006). To address this complexity, we recommend a framework that incorporates value chain actors into national ABS negotiations to ensure equitable benefit-sharing interventions from all key actors involved in the use of genetic resources and associated traditional knowledge (*see* Fig. 1). The ABS value chain framework can provide strategies through the negotiations on what constitutes fair sharing of benefits

Table 1
Activities involved in BioTrade and ABS.

BioTrade	ABS
Voluntary system	Mandatory regulations
Direct and indirect use of biodiversity and ecosystem	Access and use of genetic resources
Monetary and non-monetary benefit-sharing to all actors along the value chain	Fair monetary and non-monetary benefit-sharing with provider states and/or traditional knowledge holders
Requires prior informed consent regardless of the involvement of research and development activities	Requires prior informed consent when research and development activities are involved
Implementation guided by BioTrade principles and criteria along with private standards	Mutually agreed terms define conditions for access and use of genetic resources, biochemicals and derivatives
No explicit laws, but influenced by sectorial laws and regulations including ABS	Governed by national, regional and/or international laws and regulations on ABS

Source: Authors, information adapted from Vivas Eugui and Ruiz Muller (2018).

Table 2
The value (in NAD) of exports of non-timber forest commodities over the years.

commodities	Pharmaceutical and related plants	Oils	Melons	Live plants	Fruits	Natural gums and resins	Other products	Total (NAD)
2004	3,875,346	428,888	3,875,346	1,543,702	136,092	3697	600	**9,863,671**
2006	5,176,050	931.223	5,198,100	430,227	137,260	718	17,000	**11,890,578**
2008	15,908,084	10,944,223	8,679,204	1,539,010	170,704	176,521	51,560	**37,469,306**
2010	7,432,477	298,573	8,258,654	7,238,656	333,465	128,070	50,669	**23,740,564**
2012	24,564,128	2,468,580	9,835,313	5,377,924		222,133		**42,468,078**
2014	30,648,299	17,378,877	6,011,927	13,581,001	5297	551,464		**68,176,865**
2016	43,543,572	22,886,087	14,475,675	187,247	45,677	82,747	5714	**81,226,719**
2018	50,226,377	10,243,178	13,509,547	49,355	89,537	30,662	120,733	**74,269,389**
2020	66,102,164	7,836,273	11,741,131	1123	14,926,916	574		**100,608,181**
2022	68,011,358	12,732,970	25,141,400	156,715	20,887,927	403,875	1,315,813	**128,650,058**

Source: Author, data from the Namibia Statistics Agency

from each of the actors. ABS tends to prioritise market-driven approaches in addressing transnational governance and legal disparities, incentivising biodiversity conservation, and enhancing justice for ILCs through employment opportunities and labour arrangements, while empowering them as actors within value chains (Wynberg, 2013; Peterson, 2017). For associated traditional knowledge with traceable origin, in particular, ABS negotiations should include the associated ILCs, the government, involved companies and other institutional stakeholders to provide transparency, legal certainty and fairness in terms of equal participation (De Roeck, 2020; Sirakaya, 2020).

Incorporating a value chains perspective in ABS implies that value actors such as traders, exporters, importers, manufacturers and retailers should be directly engaged in negotiations with the government and indigenous and local communities (ILCs) as providers of genetic resources. These negotiations would resolve the globally neglected issue of benefit-sharing within complex value chains by determining whether it should occur at the end of the chain or individual steps, addressing challenges related to bureaucratic paperwork and the due diligence required to define contributions by each value actor (Michiels et al., 2021). Additionally, collaboration with other stakeholders like non-governmental organisations (NGOs) and academic institutions is also essential, particularly in research. Policies, including the ABS, must be supported by reliable research on benefits transfer to effectively ensure equitable benefit-sharing (Luswaga, 2023). By doing so, the framework can address current gaps in the legal duties of value actors and alleviate the bottleneck that these gaps produce in benefit-sharing.

3. Methods

According to Morrison et al. (2021) and Avilés-Polanco et al. (2019), studies of this nature should examine national ABS regulations, the stakeholders involved in their implementation, as well as the effects of benefit-sharing on ILCs. For this purpose, we adopted a mixed-method approach to analyse the impact of BioTrade and global value chains on ILCs engaged in NTFP production, as well as the mechanisms for implementing ABS regulations in Namibia.

Our data collection involved semi-structured interviews with informants representing government agencies, NGOs, and various actors in NTFP value chains such as traders, exporters, global importers and manufacturers. We interviewed seven key informants from the Ministry of Environment, Forestry and Tourism (MEFT), Nyae Nyae Development Foundation of Namibia, Namibia Nature Foundation, and the Kyaramacan Association, a coalition of harvesters. We also conducted interviews with three Namibian Devil's Claw traders, two of whom were exporters, and two importers who were also traders and manufacturers from Germany and France.

Additionally, we participated in three symposiums[3] focusing on ABS regulations and ABS-BioTrade activities, where talks were delivered by experts from organisations such as the Ministry of Industrialisation and Trade, the German Development Agency (Gesellschaft für Internationale Zusammenarbeit), BioInnovation Africa, and Devil's Claw exporters and importers. These symposiums provided valuable insights for our analyses. Furthermore, we collected statistical data from the Namibian Statistic Agency, the Kyaramacan Association, and the Nyae Nyae Development Foundation to assess the value of NTFPs and the monetary and non-monetary benefits shared with ILCs by the involved value actors.

For sampling, we employed both purposive and snowball techniques. Purposive sampling was used to select the relevant key informants and Namibian traders. While European importers/manufacturers and NTFP value actor specialists were identified through purposive and snowball sampling, the majority (6) of those we contacted did not respond to or declined our requests for interviews. Ultimately, using a referral-based approach, we were able to conduct interviews with the two importers.

Data collection was carried out from June 2021 to March 2023. Qualitative data were transcribed and analysed using MAXQDA, employing coding by theme. Quantitative data analyses were conducted using Excel.

Ethical approval for our research methods was obtained from the University of Namibia, the Ethics Committee at the National Commission on Research, Science and Technology, as well as the MEFT.

[3] a national workshop on Devil's Claw BioTrade on 4 November 2021, the launch of the ABS Act and Regulations by MEFT and stakeholders on 25 November 2021, and an international conference session on improving the sustainability of the Devil's Claw supply chain on 22 May 2022.

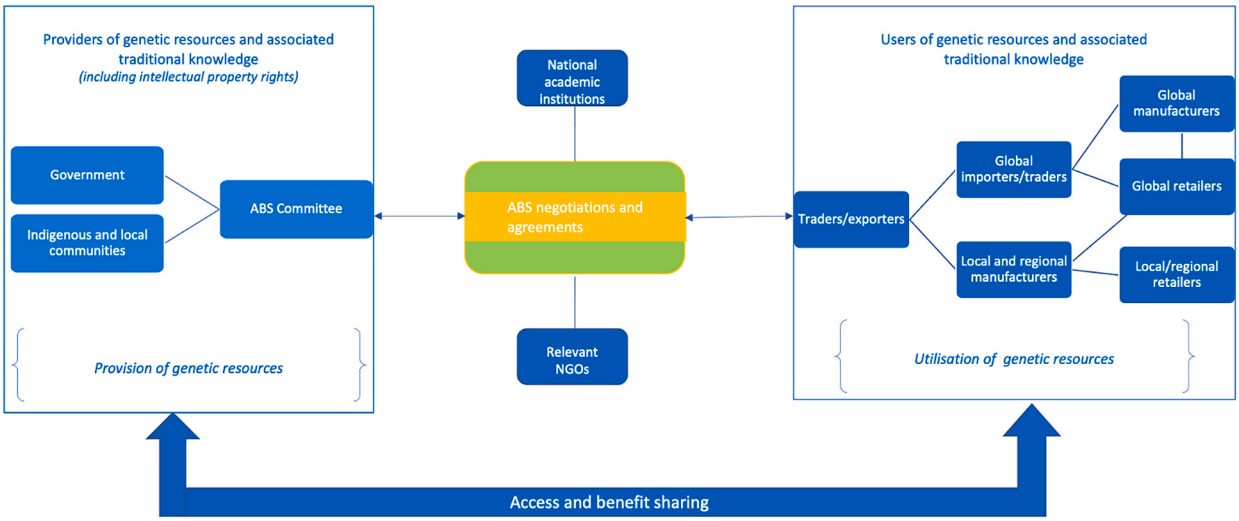

Fig. 1. ABS value chain framework.
Source: Authors.

4. Addressing ABS in value chains of NTFPs from Namibia

Based on the data collected from the Namibia Statistics Agency, the trade and value of NTFPs harvested by ILCs have increased over the last two decades. The value of NTFPs increased from NAD[4] 9.86 million in 2004 to NAD 128.7 million in 2022 (*see* Fig. 2). The extent to which ILCs have been able to capture and benefit from this value was not disclosed. However, 43% of ILCs are reported to be multi-dimensionally poor and receive no monetary or monetary benefits (Namibia Statistics Agency, 2021).

Namibia is recognised as one of the first three countries in the world to have developed comprehensive BioTrade projects, which aimed to create economic opportunities for ILCs by connecting them with global markets (United Nations Environment Programme, 2012). Consequently, Namibia has been involved in a series of ABS-compliant BioTrade projects since 2006 (Drews, 2020; El Mohamadi, 2022). These projects have established GVC corporations between Namibia and European countries, leading to an increase in the export value of NTFPs for pharmaceuticals, cosmetics and nutrition (*see* Table 3). According to the BioInnovation Africa coordinator, the projects aimed to maximise the use of biodiversity endowments while promoting sustainable development through conservation and rural livelihoods and employment. As a result, the BioTrade partnerships between Europe and Namibia were founded on innovative approaches to equitable benefit-sharing:

"These projects are executed in Namibia given the abundant diversity of plant species with a range of traditional uses, which are considered to offer some source of innovation for natural ingredient products and an opportunity for local development and conservation. [project coordinator, BioTrade Workshop, November 4, 2021]"

Before the BioTrade initiative, industries that utilised Namibia's genetic resources failed to recognise ILCs for their knowledge, innovations and practises. When the traditional knowledge-based Devil's Claw, Hoodia, Marula, Manketti, Ximenia, Kalahari Melon and Namibian Myrrh were first commercialised for regional and global markets, the knowledge associated with them was misappropriated through biopiracy and the granting of exclusive patents to industries. In 2007, BioTrade projects were reported to have benefited 42,720 producers of NTFPs (United Nations Environment Programme, 2012). A number of these beneficiaries came from ILCs with whom BioTrade industries negotiated benefit-sharing agreements and patent co-ownership was granted. Notably, the Eudafano Women's Cooperative became the first cooperative in the world to co-own a patent with a multinational company (Ministry of Environment, 2022). This cooperative collaborates with over 2500 rural women in northern Namibia to collect Marula fruits and Kalahari Melon for oil processing (Eudafano Women's Cooperative, 2022). The cooperative packages and exports finished products to industries in Europe, the United States, and South Africa, generating recent revenues of up to USD15.4 million in the past five fiscal years (Whiteside, 2022; Eudafano Women's Cooperative, 2022).

Although ILCs actively participate in NTFP value chains and contribute their knowledge of use, only a limited number receive a share of profit (Mosimane and Silva, 2015; Wynberg and van Niekerk, 2014). For example, the first BioTrade corporation involving indigenous Ovahimba communities and international companies from South Africa, France, and Germany resulted in only 319 people benefiting from the commercialisation of Namibian myrrh (Chinsembu and Chinsembu, 2020). According to Chinsembu and Chinsembu (2020), myrrh resin harvesters received a total of USD 35,000 between 2007 and 2008. In 2010, an ABS agreement was signed between a South African company and five Ovahimba communities, which led to the establishment of a Trust[5] and a processing facility

[4] The exchange rate between the Namibian dollar and the US dollar was 18:1 at the time of our data analysis.
[5] Kunene Conservancy Indigenous Natural Products Trust.

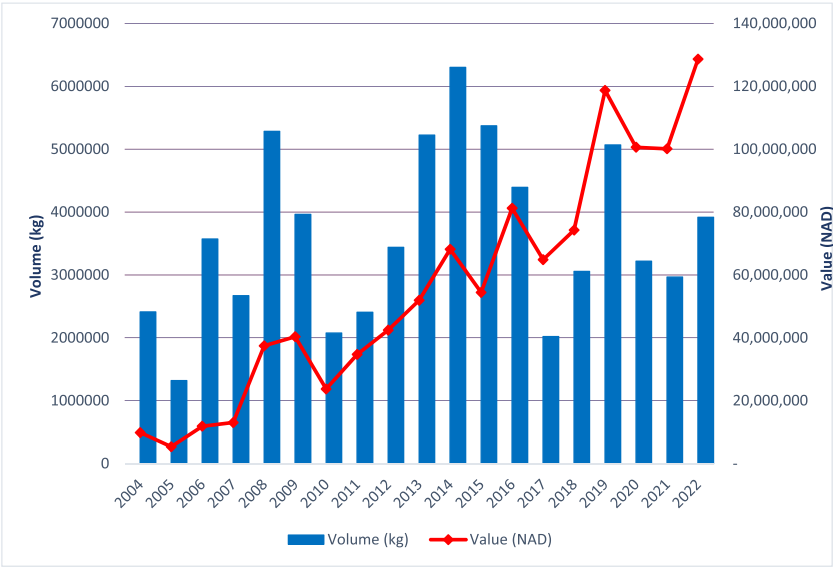

Fig. 2. Total export volume and value of non-timber forest commodities harvested by ILCs over the years.
Source: Authors, data from the Namibia Statistics Agency.

Table 3
An overview of ABS-related legislation and activities developed in Namibia.

Event	Year
Creation of the Diversity Programme	1994
Inauguration of BioTrade Working Group; Initiation of ABS policy formulation	1998
Formation of the Indigenous Plant Task Team; Passing of the Forestry Act	2000
Implementation of the first National Biodiversity Strategy and Action Plan	2001
Chairing the first round of negotiations under the ABS regime	2004
Resumption of the drafting of the ABS bill	2006
Establishment of the Interim Bioprospecting Committee	2007
Adoption of the Nagoya Protocol; Adoption of the Policy on the Utilisation of Devil's Claw Products	2010
Resumption of the drafting of the ABS bill (third time) National consultation on the proposed ABS bill	2011
Adoption of Industrial Policy	2012
Implementation of the second National Biodiversity Strategy and Action Plan	2013
Ratification of the Nagoya Protocol; Establishment of the ABS legal system	2014
Passing of the Access to Biological and Genetic Resources and Associated Traditional Knowledge Act	2017
Implementation of the Act and Regulations on Access to Biological and Genetic Resources and Associated Traditional Knowledge	2021
Ratification of the SADC Protocol on Industry	2022

Source: Authors, information adapted from Suleman (2017) and Shikongo (2014).

for the production and sale of myrrh essential oils to multinational companies (Chinsembu and Chinsembu, 2020; Kunene Conservancy Indigenous Natural Products Trust, 2018).

Agreements for benefit-sharing between producers and other value chains are often influenced by social, cultural, and political factors in addition to ABS regulations (Heeren-Hauser et al., 2020). It should be noted that the shared benefits with indigenous and vulnerable communities, particularly for traded raw materials, tend to be lower.

4.1. The impact of multi-stakeholder governance on the implementation of ABS regulations

Since gaining independence in 1990, the Namibian government has been promoting the sustainable use of NTFPs for rural development and poverty alleviation, in accordance with its Constitution, emphasising ecosystem and biodiversity conservation for present and future generations (Namibian Constitution, Art. 95 (I)). To fulfil this commitment, the government established a National Biodiversity Strategy and Action Plan, serving as a foundational framework for subsequent national policies and laws (see Table 3.) that govern the sustainable access and use of genetic resources (Heeren-Hauser et al., 2020; Republic of Namibia, 2014). In addition,

the Indigenous Plant Task Team, composed of stakeholders from the government, intergovernmental institutions, NGOs, community organisations, unions, academia and donor agencies, was established to oversee the commercialisation of NTFPs, permits acquisition and benefit-sharing agreements, as well as strategies for the ILCs' long-term economic opportunities (Suleman, 2017; Drews et al., 2008). However, these governance structures have not significantly improved the participation of ILCs, especially indigenous communities, in regulation development and benefit-sharing negotiations (Wynberg, 2013). This is because legal regimes have only given indigenous communities nominal regard, paying little consideration to their perceptions regarding commercialisation or agreement negotiations (Chaturvedi, 2009; Vermeylen, 2008). Due to their limited involvement and institutional support, some NTFPs associated with traditional knowledge were patented and licensed to international companies, without following the proper ABS process, including obtaining prior informed consent from ILCs and establishing benefit-sharing agreements (Cossa, 2022; Vermeylen, 2008).

The governance stakeholders recognise the need for amendments in international and national regulations due to the limited contribution of NTFPs to improved income for ILCs and the gross domestic product (Ndeinoma, 2018; United Nations Environment Programme, 2012). Consequently, pro-poor approaches were introduced aimed at empowering disadvantaged ILCs by integrating them into a green market economy. This involves strengthening community-based natural resources management in conservancies, community forests and national parks that cover 20% of Namibia's land area (MEFT/NACSO, 2022; Heeren-Hauser et al., 2020; United Nations Environment Programme, 2012). After Namibia ratified the Nagoya Protocol in 2014, the government passed the ABS Act in 2017, and the ABS regulations came into force in 2021 following their scrutiny by ABS-aligned government agencies[6] and influential stakeholders, particularly international institutions, NGOs and research institutes. Furthermore, ABS-aligned trade policies, such as the Industrial Policy, the Growth-at-Home Strategy and the SADC[7] Industrialisation Protocol, were implemented to strengthen NTFP value chains in the pharmaceutical, cosmetic, and nutraceutical industries, to reduce income inequality and increase local employment opportunities (personal communication, November 25, 2021). This has resulted in over 40 Namibian NTFP export businesses, with a 38% increase, facilitated by the BioInnovation Africa project, which focuses on fostering BioTrade business partnerships between Namibia and Europe (Drews, 2020; Gereffi and Lee, 2016). However, these business partnerships primarily serve those who can afford the necessary technologies and required certifications, rather than benefiting disadvantaged ILCs (Wynberg, 2013).

The ABS office system has been operational since 2022, although it had minimal staff at the time of our data collection. According to the ABS specialist, since the ABS regulations went into effect, the office received a relatively high number of applications, but only a small number of genetic resource users complied with the regulations. It was observed that the majority of applicants, especially those with extensive trade and export experience, failed to provide the required documentation as stipulated by the regulations:

> " During the application process, the office diligently assisted each applicant with thorough evaluations and provided regular updates on the status of their applications. Given that this was the first round of applications, the office took great care to ensure compliance and avoid any legal complications. However, many applicants, particularly from the Devil's Claw industry, failed to submit the required information and documentation in accordance with the ABS Regulations." [ABS specialist, Windhoek, 23 February 2023]

It is crucial for applicants to adhere to the ABS regulations by providing all relevant information regarding their supply chain, including third-party utilisation of commodities in material transfer and benefit-sharing agreements.

4.2. Devil's claw benefit-sharing agreements: a case study of San communities

Namibia is the largest supplier of Devil's Claw (Harpagophytum procumbens and H. zeyheri) in the world (Brendler, 2021). The San communities, who are the first inhabitants, have a long history of using this plant for medicinal purposes and possess traditional knowledge about it that spans centuries or even millennia (Wynberg and Chennells, 2009; Krugmann, 2001). However, the commercialisation of Devil's Claw in the 1950s, mainly for treating arthritis and inflammation in the Global North, led to one of the earliest cases of biopiracy in Namibia (Wynberg, 2004; Krugmann, 2001). Simultaneously, companies in Germany and the United Kingdom acquired extraction and processing patents, resulting in a significant increase in trade volume, reaching nearly 700 samples per year by the end of the 20th century (Krugmann, 2001).

For almost five decades, indigenous communities' traditional knowledge of Devil's Claw was appropriated through biopiracy (Chinsembu and Chinsembu, 2020). However, a donor-funded project called "Sustainably Harvested Devil's Claw" developed a benefit-sharing agreement for Namibian harvesters (Cole and du Plessis, 2001). The agreement was first implemented in the Omaheke Region in 1999 and benefited only 328 out of the targeted 10,000 national harvesters. The primary beneficiaries were the Ju|'hoansi and Nharo San communities, who received a direct payment of NAD 12.00/kg, an additional bonus of NAD 1.00/kg, and assistance in the form of weighing scales and storage facilities from the exporter for their sales in 2000. As a result, their income increased by at least 50% and, in some cases, by as much as tenfold, despite only earning an average of NAD 375 per harvester (Cole and du Plessis, 2001).

H. procumbens was ranked as the third most used medicinal plant in Germany in 2001, generating sales of approximately USD 34 million in that country alone (Lavelle, 2019). Meanwhile, the international trade value of dried Devil's Claw materials was USD 100 million per 700,000 kg in 2004 (Wynberg, 2004). According to MEFT data, Namibia exported a total of 6.686 million kg of Devil's Claw between 2015 and 2021 (Fig. 3). The majority of this total (91%) was exported to European countries, with France as the largest importer (43%), followed by Germany (25%), Poland (16%), Spain (5%), and Italy (2%). Only 5% of the total was sent to China, 2% to

[6] MEFT, the Ministry of Justice and the Ministry of Industrialisation and Trade.
[7] Southern African Development Community.

South Africa, and the remainder to other countries. While the current global trade value is not publicly available, projecting from the 2004 value, the exported quantity of Devil's Claw would have an average annual value exceeding USD 143 million. Despite the efforts of the Sustainably Harvested Devil's Claw project, the San communities involved in Devil's Claw harvesting did not directly trade with industries in the Global North. Instead, they work with intermediate companies, such as exporters, earning income that is inadequate to significantly improve their livelihoods. Only a few community members are employed in the industry, mainly as co-administrators of sustainable harvesting, typically earning less than 3500 NAD per month. Meanwhile, community members who harvest and add value by cleaning, cutting, drying and packing the materials for exporters earn an annual average of just 1538 NAD per harvester (Nakanyete et al., 2023). Notably, the exporters only consisted of five white Namibians and one white South African, which seems to demonstrate a legacy of post-colonialism. Our interview with a local trader, who unsuccessfully attempted to become an exporter of Devil's Claw, revealed that:

> "Entering the Devil's Claw export market is a challenge for new or indigenous exporters. Importers prefer to do business with these established exporters, even if the new exporter is competent or offers lower prices. Local traders have tried to enter the market, but it has been proven impossible. Some have managed to obtain the necessary permits and supplies, but finding customers in Europe has been difficult. [Local trader, Windhoek, November 2021]

Most of the experts and value actors interviewed confirmed the growing market demand for Devil's Claw. Despite this, only Nyae Nyae and N≠a Jagna conservancies received better rates per harvester, management fees and bonuses during our data collection (see Table 4). A German company purchased Devil's Claw from these conservancies to process and/or trade it as tea/infusion and capsules for human and animal consumption. Through the exporter, the company paid a bonus of €0.50[8] to the involved San communities for each 148g Devil's Claw package sold. Additionally, for every 1 kg bag of Devil's Claw horse powder purchased, the company donated €1 to an animal foundation in Namibia.

Compared to other harvesting communities in the country, the remuneration for the two conservancies was the highest. Both the exporter and importer, who acquired the products from the conservancies, stated that they paid more due to the conservancies offering first-grade *H. procumbens* that were certified Fair for Life and organic. According to the informant from the Nyae Nyae DevelopmentFoundation, the well-organised communities received support from the NGO in contract negotiations and were provided with market information to prevent exploitation, resulting in a favourable price structure.

Devil's Claw harvested in Bwabwata National Park was also certified organic, with the harvesters organised under the Kyaramacan Association. However, the community received a lower rate per kilogramme, a reduced management fee, and no bonus. The Kyaramacan Association informant highlighted the lack of representation of the Khwe and !Xun San communities in traditional authorities and the lack of support from NGOs for contract negotiations, as observed in the conservancies. When inquired about the lack of bonuses for this community, the relevant exporter did not provide any justification.

Although none of the companies disclosed their profit from Devil's Claw sales, the German trader indicated that the products accounted for approximately 20% of their total income. Furthermore, the trader expressed confidence in the ongoing process of getting their products into regional retailers, foreseeing that it would lead to self-sufficiency for the business.

Meanwhile, the informant from the French importing and trading company, which also processed Devil's Claw, expressed the view that no industry, including their own, shared benefits with the San communities due to the lack of national ABS regulations at the time. The informant shared their company's social initiative of building a kindergarten in the Zambezi Region, which would provide mothers harvesting Devil's Claw with greater flexibility to drop off their children and go to work. While this may benefit local communities, it may not necessarily benefit the San, as they constitute a minority in the region and are not the majority of the harvesters there.

The informants from both the German and French firms reported ongoing efforts to improve benefit-sharing with San communities, especially in light of the recent ABS regulations. However, no ABS agreements were signed with any San communities until March 2023 when the Nyae Nyae and N≠a Jagna conservancies signed their first agreement. Meanwhile, the Bwabwata communities did not have an ABS agreement until the end of our data collection.

5. Discussion and conclusion

Since the adoption of Namibia's first National Biodiversity Strategy and Action Plan, as well as BioTrade and ABS programmes nearly two decades ago, there have been expectations that ILCs would receive fair profits and other benefits from the use of genetic resources, including NTFPs associated with their traditional knowledge. However, our findings confirm that the ILCs as producers in both regional and global value chains of NTFPs have had little impact on their livelihoods. Instead, it is the global users who profit significantly, while various communities where the resources are primarily extracted endure poverty (Wynberg, 2004). To address this challenge, the national ABS regulations, which came into effect in 2021, aim to increase legal certainty regarding the rights of ILCs over genetic resources, ensure fair benefit-sharing, and establish mechanisms to penalise offenders who contravene or fail to comply. However, compliance challenges experienced thus far with the regulations, particularly in acquiring information from national value chain actors and their global trading partners, the ABS regulation is unlikely to readily lead to a transformative reduction in benefit-sharing inequality. This challenge is compounded by the fact that indigenous San communities and the global genetic resource user firms were not directly involved in prior ABS discussions. To ensure inclusivity, transparency and fairness in ABS negotiations and

[8] The exchange rate between the Euro and the Namibian dollar was 1:19.8 at the time of our data analysis.

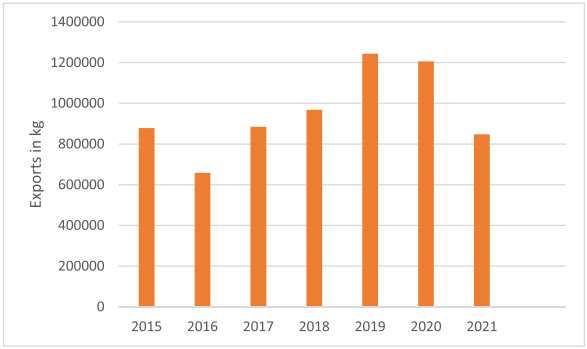

Fig. 3. Devil's Claw exported from Namibia between 2015 and 2021. *Source*: Authors, data from MEFT.

benefit-sharing with traceability, it is essential that pertinent ILCs, government entities and businesses participate in the negotiations (Wynberg, 2013; Michiels et al., 2021; De Roeck, 2020).

The indigenous San communities in Namibia possess valuable traditional knowledge of plants that have been commercialised for various purposes. However, they are highly vulnerable to exploitation, with their traditional knowledge often undervalued or stolen (Chinsembu and Chinsembu, 2020; Schroeder et al., 2020). Therefore, it is crucial to fairly compensate them for their contributions to the creation and commercialisation of natural products such as Devil's Claw. The participation of ILCs in the implementation of ABS regulation can play a crucial role in benefit-sharing strategies by learning from the successful experiences of other countries with effective ABS legislation, such as South Africa.

The example of the traditional knowledge benefit-sharing agreement of Rooibos signed in South Africa in 2019 demonstrates the positive outcome that can be achieved through collective action, strong legal support, government leadership, solidarity among indigenous peoples, and mutual recognition of achievable win-win agreements (Schroeder et al., 2020). The San and Khoi of South Africa received their first payment of more than NAD12.2 million or 1.5% of the farmgate price in 2022 (Modise, 2022). In addition to monetary benefits, non-monetary benefits such as employment opportunities, bursaries, development programmes, mentoring, and support for livelihoods are also addressed (Schroeder et al., 2020; Wynberg, 2019). By considering value chain declarations in the benefit-sharing negotiation, as recommended in the ABS-value chain framework, Namibia and other countries facing benefit-sharing challenges can aim for similar outcomes.

While national economic or value capture from genetic resources in Namibia may improve with the national ABS regulations, effective implementation is crucial to ensure that these benefits reach deserving communities associated with traditional knowledge in genetic resource production. Benefit-sharing initiatives and agreements have often favoured those who are more prominent, better organised, well-resourced, or politically connected, at the expense of marginalised indigenous communities (Wynberg, 2013). In ethnically diverse environments, where indigenous communities lack representation in traditional or local authorities, they may not be the primary ABS beneficiaries. Therefore, the government should identify resource and traditional knowledge owners to recognise them as primary contacts and beneficiaries, while the state and relevant institutions provide secondary support (Suleman, 2017).

In summary, it has been two decades since Namibia began engaging with BioTrade and ABS initiatives, yet little evidence of their impact has been reported. As of the time of writing this paper, despite the recent enforcement of ABS regulations, there has been no substantial distribution of either monetary or non-monetary benefits to ILCs. While these regulations may ultimately improve profits from genetic resources for Namibia, without the direct involvement of relevant ILCs and global firms in ABS agreement negotiations, poverty, economic disparities and social injustice among ILCs who provide these resources and traditional knowledge, may persist. Therefore, our hypothesis that collective negotiations could lead to more impactful agreements has not been supported by our findings. The ABS-value chain framework presents an ideal approach for addressing current gaps in the legal obligations of value chain actors and the bottlenecks these gaps create in benefit-sharing.

In addition to robust benefit-sharing regulations, to ensure equitable value capture by ILCs, it is essential to recognise and/or promote their value-added activities. In the case of the growing global demand of Devil's Claw, for ILC producers who already add value to the materials sold as natural medicine, establishing processing facilities could create sustainable, long-term employment opportunities and promote value transfer. Global user companies could enhance their reputation and reduce their costs, including taxes, transportation expenses, storage requirements, and quality control compliance, associated with sourcing materials from the country providing the resources (Krugmann, 2001). To align with sustainable development goals, genetic resources integrated into GVCs should offer ILCs opportunities for both economic and social development.

We recommend conducting further studies to explore the potential of establishing local NTFP processing facilities as a sustainable or supplementary approach to enhancing the bargaining power and economic upgrading opportunities for the marginalised indigenous and local producers.

Table 4
Devil's Claw volume and revenue generated by San communities in 2021.

Communities	No. of harvesters	Quantity harvested (kg)	Total income of harvesters (NAD)	The rate paid to harvesters (NAD/kg)	Management fees (NAD//kg)	Total Management Fee (NAD)	Bonus to Harvesters (NAD)	Total Income (NAD)
Nyae Nyae Conservancy	608	25,264.40	1,339,013.20	53	13.38	338,257.60	130,241.00	1,807,511.80
N≠a Jagna Conservancy	782	23,259,50	1,069,937.00	46	10.87	253,035.60	105,431.50	1,428,404.10
Bwabwata National Park	936	34,257	1, 438,794	42	8	274,054	0	1,712,848.00

Source: Authors, data from the Nyae Nyae Development Foundation and the Kyaramacan Association.

Author statement

We, the authors of this manuscript, declare no conflicts of interest associated with this research. All authors have read and approved the final manuscript in accordance with Environmental Development.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

The authors do not have permission to share data.

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