FINAL DRAFT

The Impact of Certification on the Sustainable Use of Devil's Claw (*Harpagophytum procumbens*) in Namibia

PREPARED FOR

The Food and Agriculture Organisation of the United Nations

Non-Wood Forest Products Programme

BY

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May 2003

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ACKNOWLEDGEMENTS

The contributions of many people towards the completion of this study are gratefully acknowledged, this includes those that contributed directly to this study and those that have in the past completed various studies on Devil's Claw.

In particular, Sven Walter of the FAO Non-Wood Forest Products Programme is thanked for his considerable support and inputs and for recognising the important contribution this study could make to the current debate on the sustainable utilisation of Non-Wood Forest Products and associated benefits to rural producers. Wolfgang Kathe and Susanne Honnef of TRAFFIC are thanked for there support and valuable inputs. The comments provided by Adrian Whiteman and others on the first draft are also gratefully acknowledged.

The information provided by many, especially that provided by harvesters and exporters in Namibia, was essential for this study. Elly Hamunyela from the Ministry of Environment and Tourism who made available Devil's Claw export data is thanked for her contribution. The contributions from Pierre Du Plessis, Cyril Lombard and Michel Mallet, of CRIAA SA-DC, who have all contributed to the information and understanding that currently exists on Devil's Claw are also acknowledged. William Hofmeyr is thanked for editing the document.

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ABSTRACT

The harvesting of and trade in various Non-Wood Forest Products (NWFP) has increased significantly over the last decade. In addition to other reasons for this, this increase has partially been the result of a need of rural communities, particularly in developing countries, to identify opportunities that can contribute to the generation of additional sources of much needed cash income on the one hand and an increase in demand of NWFP, especially those with medicinal values, in developed countries on the other. In many instances the sale of NWFP has made an important contribution to improved livelihoods of those involved although there are cases where this has been to the contrary. Apart from the issues this has raised related to for example, Intellectual Property Rights and benefit sharing, the issue of the sustainable utilisation of NWFP has also become of major concern.

In light of this, many efforts have concentrated on how to maximise benefits from the trade in NWFP while at the same time ensuring the sustainability of these resources. The focus on the sustainable utilisation of these resources has not only been as result of concerns for the resource itself but also for the continued long-term benefit of producers from the trade in these resources.

The aim of this study was to assess the socio-economic and ecological impact of certification on the sustainable use of devil's claw (*Harpagophytum procumbens*) in Namibia. The study focuses on the impact of Organic Certification on the sustainable utilisation of Devil's Claw with particular reference to the Sustainably Harvested Devil's Claw project in Namibia.

The study was commissioned by the Food and Agriculture Organisation - Non-Wood Forest Products programme in the context of its programme activity focussing on the *Analysis of the Relevance and Applicability of Certification and Benefit-Sharing Mechanisms in the Field of NWFP*, which aims at analysing the actual and potential contribution of certification and benefit-sharing to the sustainable use of NWFP.

1 GENERAL OVERVIEW ON THE USE OF DEVIL'S CLAW IN NAMIBIA

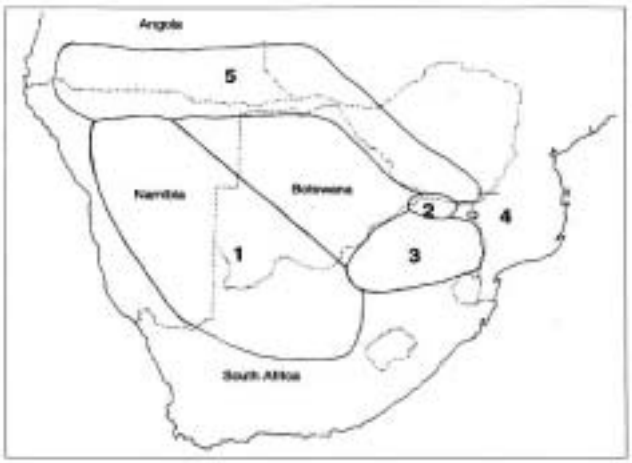
Harpagophytum, or Devil's Claw, comprises two species, *H. procumbens* (with two sub-species, *procumbens* and *transvaalensis*) and *H. zeyheri* (with three sub-species, *zeyheri, sublobatum* and *schijffii)*. It is a perennial prostrate vine that grows mainly in deep Kalahari sands, and has a strong taproot with a number of secondary storage tubers growing laterally off the taproot. The tubers of the species (BURCH. DC. EX MEISNNER 1840, ssp. *procumbens*) have been listed in the European Pharmacopoeia for the treatment of rheumatism and arthritic ailments for some time while *H. zeyheri* was added to the definition in January 2003 to cover all Devil's Claw products. One of the reasons given for this was because it was more widely used.

Although the plants were first collected and described by European scientists in 1820, the medicinal properties of the Devil's Claw were only "discovered" in Namibia in 1907 by G.H. Mehnert, as a result of his access to the knowledge of the indigenous Khoi and San people. This early bio-prospector exported some dried Devil's Claw tubers to Germany, where they were first studied by Zorn at the University of Jena in the 1950s. By 1962 the Namibian company Harpago (Pty) Ltd started exporting Devil's Claw tubers in larger quantities to the German company Erwin Hagen Naturheilmittel GmbH.

1.1 Main Production Areas

Devil's Claw is found in most countries in the sandy Kalahari areas in southern Africa. H*. procumbens* is found mainly in Namibia, but also occurs in Botswana and some of the northern regions of South Africa. *H. zeyheri* occurs in these three countries, as well as in Angola, Zambia and Mozambique. *H. zeyheri* is harvested and marketed, but has until now not been preferred in the trade because of its lower concentration of active ingredients.

Distribution of *Harpagophytum spp*.



KEY

1. *H. procumbens spp. procumbens*
2. *H. procumbens spp. transvaalense*
3. *H. zeyheri spp. zeyheri*
4. *H. zeyheri spp. schijffii*
5. *H. zeyheri spp. sublobatum*

Figure 1 - (Ihlenfeldt H. D. & Hartmann H.)

There has been no comprehensive range-wide survey of Devil's Claw, although one has now been conducted in Namibia as part of a National Devil's Claw Situation Analysis (NNDCSA) and other range states might follow suit to comply with the Convention on International Trade in Endangered Species (CITES) decisions and to improve resource management strategies. A similar study has also now been conducted in South Africa.

There have been other studies which have focussed mainly on the status of the resource. One such particular study **"Population status and methods of a sustainable harvest of**

the medicinal plant *Harpagophytum* (Devil's Claw) in southern Africa – Part A " was carried out by Berit Hachfeld, the results of which were published in 2002. The study covered Devil's Claw areas in both Namibia and South Africa.

Population figures cited in the literature are therefore local and / or anecdotal. Population densities have been reported as varying from less than one to more than 2 000 plants per hectare. Plants tend to occur in definite population clusters, which can possibly be explained by the adventitious establishment of a single mother plant due to the animal-borne seed dispersal, followed by a local population increase. However, there might also be a correlation with groundwater availability, and competition for this resource from other deep-rooted plants.

Namibia is by far the largest producer of Devil's Claw in the world. The only other producers are South Africa and Botswana, although significant quantities of Devil's Claw originating from Angola into Namibia have been reported (pers.com. MET Office Rundu - February 2003).

1.1.1 Cultivation

Although there is at present no major supply of commercially cultivated Devil's Claw, efforts are being made in this regard. There are three main players in southern Africa involved in relatively large-scale Devil's Claw cultivation trials. Two of these are in South Africa and one is in Namibia, although the Namibian entity is linked to South Africa. The production of cultivated Devil's Claw for 2002 was estimated to be no more than four to six tonnes (Cole August 2002).

There has been considerable debate regarding the possibility of the supply of commercially cultivated Devil's Claw having a negative impact on harvesters of wild-harvested Devil's Claw. In this respect, however, two scenarios can be considered, one which sees cultivation seriously marginalising rural harvesters, the other benefiting them.

a. **Negative impact on harvesters**: The supply of large quantities of cultivated material could impact negatively on the livelihoods of rural harvesters by taking up much of the market share. This scenario should also be seen in the context of a CITES listing, which would result in cultivated material being preferred to wild-harvested material. For a variety of reasons such as the unavailability of capital, technology and, in some cases, access to land, it is also unlikely that rural harvesters would be able to enter into commercial cultivation.

   If the cultivation methods that are currently being developed can succeed under more favourable climatic, human resource and institutional/infrastructural conditions, but cannot be replicated in the context of the far less favourable conditions prevailing in traditional use areas, the expropriation of the rights of the original providers of traditional knowledge regarding Devil's Claw will have been completed, with the only winners being the commercial farming and pharmaceutical sectors.

b. **Positive impact on harvesters**: Appropriate cultivation efforts at a rural level could have a positive impact on the livelihoods of rural harvesters. For example, appropriate cultivation efforts could provide rural harvesters with the opportunity to increase their resource base, thereby ensuring their continued participation in the trade. At the same time, cultivation efforts could also provide an opportunity to "rehabilitate" areas in which unsustainable harvesting has taken place.

However, at this stage and in the short to medium-term the commercial cultivation of Devil's Claw would not seem to pose any negative threat to the livelihoods of rural harvesters of wild Devil's Claw (Cole August 2002).

1.2 Main Applications

The indigenous San and Khoi peoples of southern Africa have used Devil's Claw medicinally for centuries, if not millennia. It has also been adopted into the traditional knowledge systems of in-migrating Bantu-speakers who arrived in the area between 1 500 and 500 years ago (the modalities of this integration are not known, but it seems very likely to have been learned from the San). In addition to general anti-inflammatory and analgesic uses, ethno-medicinal uses have been recorded for dyspepsia, fever, blood diseases, urinary tract complaints, post-partum pain, sprains, sores, ulcers and boils. *Harpagophytum* products are generally registered as a Herbal Medicines in France and Germany, or as a Food Supplements in the United Kingdom, Netherlands, the USA and the Far East. Lending credibility to its efficacy, Devil's Claw's applications are listed in various references, amongst which the following may be considered to be the most important.

1. As already indicated, Devil's Claw is listed in the European Pharmacopoeia. Formed in 1964, it lays down common standards for the composition and preparation of substances used in the manufacture of medicines, with the aim of guaranteeing their quality. The monographs listed have the force of law, replacing earlier national pharmacopoeias. It supplies manufacturers with "reference substances", enabling them to ascertain and ensure the quality and conformity of medicines produced and marketed in Europe, or exported from it. It is recognised as one of the main authorities on medicinal quality and safety, and its cooperation with the European Union has resulted in the setting-up of a scientific research programme to standardise biological medicines, and an official network of medicine control laboratories (ONMCL). This pooling of expertise helps to ensure that the same quality standards are applied throughout Europe.

2. The indications are also recorded in the monographs of The European Scientific Cooperative on Phytotherapy (ESCOP) for the treatment of painful arthrosis, tendonitis, loss of appetite and dyspepsia. ESCOP was founded in June 1989 as an umbrella organisation representing national phytotherapy associations across Europe with the aim of advancing the scientific status of phytomedicines and assisting with the harmonisation of their regulatory status at the European level.

3. Under the German Commission E, Devil's Claw is indicated for the treatment of painful arthrosis, loss of appetite and dyspepsia, and as a supportive therapy for degenerative disorders of the locomotive system. The German Commission E is a governmental regulatory agency that was established in 1978 to evaluate useful herbs and to publish monographs listing uses and side effects.

The active ingredients that have been noted include iridoid glycosides such as harpagoside, procumbide and harpagid, phenols such as acetosid and isoacetoside, and other substances including harpagoquinones, amino acids, flavonoids, phytosterols and carbohydrates (J. Gruenwald). In general, the level of active ingredients and in particular that of harpagoside is used to determine the quality of dried tubers supplied. Aqueous or ethanol-based technologies are the most commonly used for the extraction of the active ingredients, although extraction can also be effected with liquid carbon-dioxide and a co-solvent. Various patents regarding extraction technologies have been registered (J. Gruenwald 2002).

In Germany, the percentage of prescriptions by physicians of *Harpagophytum* for the treatment of poly-arthritis, and back and joint pains has increased significantly from 40% in 2000 to 60% in 2001. *Harpagophytum* accounts for approximately 74% of the treatments for rheumatism in Germany (J. Gruenwald 2002).

1.3 Main Markets

The demand for Devil's Claw on the international market has increased considerably over the last decade. The largest supply of Devil's Claw on the international market originates from Namibia. Namibia's exports have increased from about 180 tonnes in 1975 to over approximately 1000 tons in 2002. A total of approximately 4000 tons of dried material has been exported from Namibia between 1995 and 2002 to various destinations. The income in foreign earnings for Namibia is significant, for example, the value of the sales of Devil's Claw in 2002 can be estimated to be worth as much as US$ 2.7 million. (This is based on an average export price of US$ 2.70 per kg in 2002 for exports totalling 1000 tons). The amounts exported between 1995 and 2002 are detailed in the graph below.

Total Namibian Devil's Claw Exports (1995 – 2002)

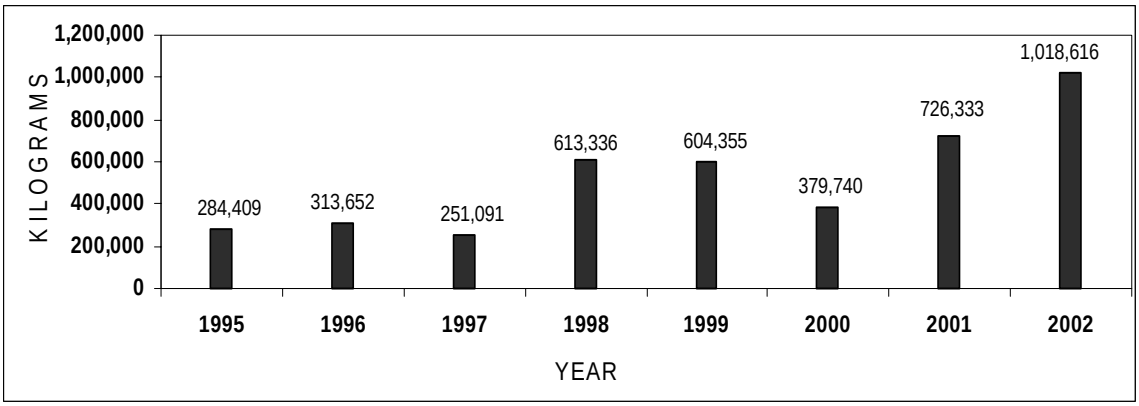


Figure 2 - Based on MET Export Permit Data

It is also not known what proportion of these export figures represent exports of *H. zeyheri.* It is, however, believed to be significant as *H. zeyheri* is also harvested and sold, often being mixed with *H. procumbens*.

The majority of Devil's Claw is exported to Germany, France and South Africa, with other destinations including the United Kingdom, Switzerland, the United States of America and the Far East.

Total Namibian Exports by Destination (1994 – 2001)

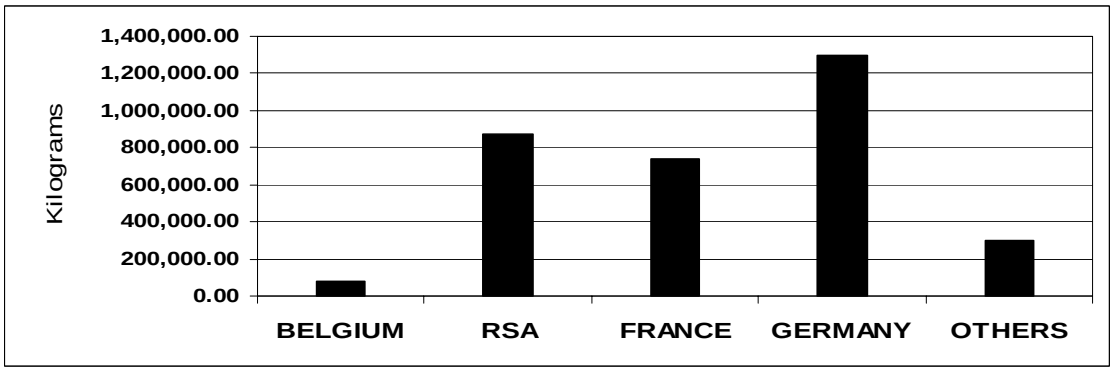


Figure 3 - Based on MET Export Permit Data

In Germany, *H. procumbens* has now become the third most frequently used medicinal plant, with sales of approximately 30 million Euros (based on mono-preparations and pharmacy sales). The turnover grew by 113 % between 1999 and 2000, and by 59% between 2000 and 2001. The only medicinal plants with higher sales figures were *Hypericum perforatum* (St Johns Wort - 48 million Euros) and *Ginkgo biloba* (Ginkgo -128 million Euros). (J. Gruenwald 2002).

The increase in demand for Devil's Claw can be attributed to the following:

- an increase in the number of people suffering from arthritis and other locomotive disorders;
- well-substantiated clinical and other research data;
- the demonstrated effectiveness and safety of Devil's Claw products; and
- intensified marketing initiatives by product manufacturers.

However, some caution regarding the continued demand for Devil's Claw on the international market is advised. The demand is in some cases directly related to government policies in importing countries on herbal medicines. For example, the increase in prescriptions in Germany can be attributed to Devil's Claw being listed on Medical Aid schemes and therefore claimable by users. Furthermore, France has recently (beginning of 2003) de-listed almost 600 medicines from Medical Aid schemes and many of them fall into the Herbal Medicine category.

1.3.1 The Regional Trade Situation in Botswana

Commercial exports from Botswana started via South Africa in the 1970s. Botswana's production dropped considerably from 1996 to 2000, although supply figures increased for 2001 and are expected to increase even further for 2002. Stakeholders from Botswana complain that their efforts to secure better prices for harvesters are being frustrated by buyers who play them off against Namibian suppliers.

Amount of Devil's Claw Exported from Botswana between 1992 and 2001 (Kg)

IMPORTING COUNTRY	1992	1993	1994	1995	1996	1997	1998	1999	2001
Germany	0	0	0	0	–	0	0	0	15 000
South Africa	10 719	3 278	24 437	45 633	–	2 451	501	1 550	500
South Korea	0	0	0	0	–	3 002	0	500	0
Namibia	0	0	0	0	–	0	0	0	1 800
Others	0	0	0	0	–	40	0	0	6
Total	**10 719**	**3 278**	**24 437**	**45 633**	–	**5 493**	**501**	**2 050**	**17 306**

Figure 4 - Data supplied by Botswana Agricultural Resources Board, Gaborone (2002). (Raimondo and Donaldson 2002)

1.3.2 The Regional Trade Situation in South Africa

South Africa has in recent years become both a major export destination and exporter, with imported material from Namibia and Botswana being re-exported by entrepreneurs in that country. The amounts involved are not monitored in South Africa, and South Africa's role in the trade is currently not quantified. Export permits are not required to export Devil's Claw from South Africa, making it difficult to monitor the trade. The following figures were supplied and reported to the CITES Plants Committee.

Quantities of Devil's Claw Harvested in South Africa between 1999 and 2001

YEAR	N. Cape Dry material (kg)	N.W. Province Dry material (kg)	Total Dry Material (kg)
1999	6 900	–	6 900
2000	1 258	–	1 258
2001	6 248	14 780	21 028

Figure 5 - (Raimondo and Donaldson 2002)

1.4 Conservation and Policy Regulation

While the increase in demand has brought about greater opportunities for those involved in the harvesting of and trade in the plant in Namibia, it has also vastly increased the pressures on this resource. Concerns about the sustainability of harvesting go back at least to 1975, by which time exports had risen to 180 tonnes per year. In 1977 Devil's Claw was listed as a protected species under the Nature Conservation Ordinance. In terms of this ordinance, permits were required to harvest the plant. Devil's Claw is also protected through similar legislation in both Botswana and South Africa.

A Namibian study in 1986 (Nott) established that only 10% of the harvested Devil's Claw was being harvested with a valid permit, and the permit system for harvesting, possession and transportation of Devil's Claw was subsequently discontinued, as it could not be effectively implemented. Permits thereafter continued to be required only for the export of Devil's Claw and were mainly intended as a way to monitor exports -- no quotas or other limitations were imposed.

Increasing concerns regarding possible over-utilisation in Namibia were raised again in 1999. This was due to a dramatic increase in export figures of dried Devil's Claw from approximately 300 tonnes in 1996/7 to over 600 tonnes in 1998/9, and to reports of unsustainable harvesting practices and exploitative prices being paid to harvesters. This prompted the Government of Namibia to reintroduce an amended permit system for the harvesting of Devil's Claw in 1999. It is unclear, however, whether the reintroduction of the permit system has improved matters. The permit system has been evaluated as part of the NNDCSA, the results of which are expected to be published in May 2003, but initial findings suggest that the permit system is neither effective nor efficient (Proceedings of NNDCSA Workshop, Nov 2002).

Concern regarding the sustainability of Devil's Claw was also highlighted at an international level when in April 2000, at the (CITES) eleventh Conference of Parties (CoP 11) held in Gigiri (Kenya), Germany proposed that both species be listed on Appendix II. Namibia and other southern African range states did not support the listing and the proposal was withdrawn, primarily because of the absence of scientific data available to support such a listing.

The following two decisions regarding the biological status of and trade in Devil's Claw were taken at CoP 11.

Decision 11.63

In the light of increasing international trade in the roots of *Harpagophytum spp*. (Devil's Claw), the range and importing States should submit to the Secretariat all available information concerning the trade, management and biological status of *Harpagophytum* species and regulatory measures applying to them.

Decision 11.111

The Plants Committee shall:

a) Review information submitted to the Secretariat in accordance with Decision 11.63;

b) Summarise the biological and trade status of *Harpagophytum* species subject to international trade; and

c) Prepare a report on the biological and trade status of *Harpagophytum* species, at least six months before the 12th meeting of the Conference of the Parties (CoP12), for consideration at that meeting.

This information was submitted and presented to CoP 12 in November 2002. Although importing countries were also expected to provide such information, only Germany managed to submit a report. The following decisions were adopted at CoP 12:

a) Range states of *Harpagophytum spp*. that authorize the export of specimens of these species should provide an update on implementation of the policies and management programmes mentioned in the report submitted in fulfilment of Decision 11.63 for consideration by the Plants Committee at its 14th meeting. A report on progress with the implementation of this decision should be provided to the Secretariat 90 days before the 14th meeting of Plants Committee for inclusion by the Secretariat in a report to that meeting.

b) Range states and importing states should negotiate with the Devil's Claw industry to obtain support for management programmes that promote sustainable use and the development of communities that are managing the resources. Assistance in this regard could, if necessary, be requested from the Plants Committee and the Secretariat. A report on progress with the implementation of this decision should be provided to the Secretariat 90 days before the 14th meeting of Plants Committee for inclusion by the Secretariat in a report to that meeting.

c) Range states should explore how processes and mechanisms in other international treaties can be used to provide support for sustainable resource use and fair trade, and should request the CITES secretariat to provide assistance if required. A report on progress with the implementation of this decision should be provided to the Secretariat 90 days before the 14th meeting of Plants Committee for inclusion by the Secretariat in a report to that meeting.

CoP 12 also recommended the listing of Devil's Claw on Appendix III of CITES. The decision to list and de-list rests with individual range states that may at any time request such a listing or delisting. Such a listing would have implications mainly for importing countries, which would be required to maintain specific records regarding the import of Devil's Claw. Participants at the National Devil's Claw Stakeholder Workshop in Namibia in November 2002 recommended against such a listing for the time and to reconsider this decision in future if necessary.

The potentially negative market impact of such a listing might, however, be significant. This has already partially been demonstrated by the drop in Devil's Claw export figures in 2000 as a result to a large extent by the negative message sent to the market by the proposed listing of Devil's Claw's on Appendix II of CITES in that same year. The negative impact of such a listing is created by the messages the listing sends out, for example, that the resource is threatened and that trade in Devil's Claw will become more difficult (caused mainly by additional regulatory requirements). In addition, in some quarters CITES is seen as being too conservationist.

Furthermore, the trade in Devil's Claw products takes place within a competitive market in which Devil's Claw already commands a significant portion of the market share. As is the case in competitive markets competitors are always trying, through various approaches, to increase their market share. In this regard, the listing of Devil's Claw has the potential to be used by competitors to increase their market share.

1.4.1 Geographical Indication or Origin

Over the past two or three years several stakeholders have expressed concern that Devil's Claw might be cultivated in areas far removed from its natural range, and that other countries might produce and market Devil's Claw at the expense of the Namibian industry. Possible mechanisms to protect and enhance Namibia's and the region's opportunity, for example, "Appellation of Origin" and "Geographical Indication of Origin", could be

considered as potential Intellectual Property Rights tools for this purpose. Although not conclusive, it appears there might be a *prima facia* case to investigate this further. However, there are also several important legal, economic, commercial and financial issues that will need to be considered beforehand.

1.5 Main Stakeholders in Production, Processing and Trade

The harvesting of and trade in Devil's Claw in Namibia is characterised by a complex set of formal and informal arrangements. This system is further complicated by a lack of information and data, particularly regarding the informal sector, which plays a large role in the supply of Devil's Claw. In terms of supply, three main groupings can be identified: harvesters, middlemen and exporters (Cole August 2002).

1.5.1 Harvesters

Harvesters in Namibia are drawn from the very poorest sections of society, who eke out a living under the most marginal of agricultural and socio-economic conditions and who rely on the harvesting and sale of Devil's Claw to generate a cash income. The importance of this income to household food security should not be underestimated.

The exact number of harvesters of Devil's Claw in Namibia is not known. However, some estimates have put this figure to be between 5 000 and 8 000 harvesters. In 2002 a total of 278 harvesting permits were issued by 10 MET offices. This is clearly not a true reflection of the actual number of harvesters. If one, for example, takes the total amount of Devil's Claw exported in 2002 (about 1000 tons) and divides this by the number of harvester permits issued, the result is an average production of approximately 3.5 tons of dry Devil's Claw per harvester, which is virtually impossible.

The following generalisations can be applied to the organisation of harvesters:

a) Individual harvesters

These harvesters are generally close to a harvesting location, but may move to other areas. They are independent and will in most cases sell directly to an exporter. In some case, however, Devil's Claw may be sold to middlemen.

b) Group harvesters

It is more common that harvesters are organised into groups of harvesters who harvest in a particular area. The manner in which they are organised, however, varies quite considerably, and also determines the income they generate from harvesting. These groups fall into two broad categories:

- Organised into a group by a middleman and taken to a particular area in which they may remain for some months to harvest. The middleman will supply food and water when they collect the dried Devil's Claw. The cost of food and transport is often deducted from the wages they receive on completion of harvesting. In this scenario, harvesters are unlikely to receive fair compensation for their harvesting efforts. The bulk of Devil's Claw is supplied in this manner.
- In other instances, harvesters are organised into groups by other bodies (e.g. NGOs & church organisations) which attempt to maximise the benefits to harvesters.

The manner in which harvesters are organised and the benefits they receive have a direct impact on the sustainability of the harvesting practices.

1.5.2 Middlemen

From discussions with exporters regarding their supply networks, it is estimated that there are currently between 50 and 100 middlemen supplying exporters, but there may be an additional layer of middlemen supplying these middlemen. Some exporters have highly organised supply networks with a number of middlemen directly linked to them. There are other middlemen who could be described as being more opportunistic, however, as they will supply any exporter.

There is clearly a link between the number of middlemen, or marketing layers, between primary producers and product manufacturers, on the one hand, and the benefits derived by harvesters, on the other. The fact of the matter is that there is usually a chain of middlemen between the primary producers, the exporters and the processors of the final product, and the poor price paid to the primary producers is a reflection of this.

However, middlemen could also play a positive role by linking poor rural harvesters to the market and by providing other services that would not otherwise be available to them. For a marketing system to be mutually beneficial, it would have to be organised in a manner that prevents the exploitation of harvesters by middlemen.

1.5.3 Exporters

Over the period 1995 to 2002 there have been 17 Namibian exporters that have exported two tonnes or more of dried Devil's Claw in total. In addition, there have been many others who have exported very small quantities. Over this same period there were nine exporters that exported 100 tonnes or more. The number of exporters does fluctuate from year to year, although there has been an increase in their numbers over the last few years. In general, all exporters have additional sources of income and in most cases the contribution of Devil's Claw exports to their incomes is relatively small (between 2.5% and 25%).

1.5.4 Buyers & Processors

Although the Devil's Claw from Namibia is sorted and bagged by the exporters before export, between 60% and 80% of all Devil's Claw supplied by Namibian exporters goes to international buyers that only clean, grade, pre-process (grind) and repack it. No in-country value-addition, apart from the initial slicing and drying, takes place. Only 12% of the exports went directly to extractors/manufacturers (excluding the unknown percentage that a major buyer may have extracted/manufactured itself). During the period 1996 to November 2002, one buyer accounted for 25% of all Namibian supplies (C. Lombard, based on MET figures presented at the National Devil's Claw Workshop, November 2002).

1.6 National Institutions and Projects

In Namibia, the main responsibility for Devil's Claw falls under the Directorate of Special Support Services (DSSS) in the Ministry of Environment and Tourism (MET). Other key governmental institutions include the Phytosanitary Section, which issues phytosanitary certificates for the export of Devil's Claw, and the National Botanical Research Institute (NBRI), which is responsible for species collection and identification and also maintains a seed bank in the Ministry of Agriculture, Water and Rural Development (MAWRD).

In November 1999, Namibia convened its first Devil's Claw Stakeholder Workshop. A major recommendation was the formation of a Namibian Devil's Claw Working Group (NDCWG), which was then established in January 2000.

The current members of the NDCWG include the following :

- The Ministry of Environment and Tourism
    - Directorate Specialist Support Services (Chair and CITES authority)
- The Ministry of Agriculture, Water and Rural Development
    - Directorate of Planning
    - National Botanical Research Institute
- The University of Namibia
- The Centre for Research and Action in Africa, Southern Africa Development and Consulting

The NDCWG may co-opt additional members should the need arise, and the minutes of the meetings are publicly available. The main aim of the NDCWG is to improve information dissemination and to coordinate research and other efforts at a national level. To date the NDCWG has been instrumental in initiating many efforts regarding Devil's Claw, including policy evaluation, the Namibian National Devil's Claw Situation Analysis (NNDCSA) and hosting the first Regional Devil's Claw Conference in February 2002.

South Africa also established a Devil's Claw Working Group in October 2002 and Botswana is likely to set one up in 2003. A Regional Devil's Claw Working Group was also established in February 2002. The first meeting of the RDCWG was scheduled for February 2003 but has not yet taken place although efforts are currently underway to convene this meeting. This meeting is now scheduled for September 2003. An ad hoc meeting of regional representatives did take place during the Namibian Devil's Claw Stakeholder Workshop in November 2002. The establishment of these Working Groups is seen as being a significant step towards improved collaboration between the range states and stakeholders in these countries.

The only significant NGO active in the field of Devil's Claw in Namibia is the Centre for Research and Action in Africa, Southern Africa Development and Consulting (CRIAA SA-DC), which in 1997 was involved in setting up the Sustainably Harvested Devil's Claw project (SHDC) with rural harvester groups.

1.7 Summary

Harpagophytum, or Devil's Claw, is a perennial vine with a taproot and side storage tubers that is indigenous to southern Africa. Local inhabitants have for decades used these tubers for the treatment of a variety of ailments, but they have more recently become popular in Europe and elsewhere as an effective treatment for rheumatism and arthritic aliments. Total production from exporting countries has grown to around 800 tonnes per annum. Local harvesting and trade is characterised by a complex and informal set of arrangements that inevitably results in the harvester being at the bottom of the chain.

In Germany it has become the third most used herbal medicine. Various patents on the extraction of the main active ingredients and numerous products have been registered. Increased demand has resulted in pressure on the resource, however, and references to sustainability have been made. Many questions regarding Intellectual Property Rights (IPR), the Convention on Biological Diversity (CBD), benefit sharing, transfer of technology and product certification have also been raised. However, a number of initiatives to address these and other issues are being made at international, regional, national and local levels.

2 CERTIFICATION OF DEVIL'S CLAW

For the purposes of this case study the example of organically certified Devil's Claw produced by members of the Sustainably Harvested Devil's Claw (SHDC) project in Namibia will be used.

2.1 Background to the SHDC Project

The Devil's Claw harvesters who participate in SHDC project are among the most marginalised and powerless people in Namibia. They have limited skills in negotiating and bargaining. While concerted efforts were made to secure their input and to incorporate them into the design of the project, the initial benefit-sharing arrangements had to be made on behalf of harvesters by service NGOs. The arrangements contained in the SHDC project are fluid and evolving, however, and it is envisaged that harvesters will increasingly articulate their own priorities and expectations as they develop their organisational capacity and become more confident regarding their rights and powers as resource users (Cole & Du Plessis).

Devil's Claw has been established in the world market for decades, but before the SHDC project very little thought had gone into sharing benefits with harvesters. In fact, as discussed above, the growth of the industry had been based on extremely exploitative relations of production and trade. Into this situation the SHDC project introduced a simple model for benefit-sharing arrangements, based on the insight that there is a growing congruence of interests linking ethical consumerism in the North to sustainable resource use and socio-economic equity in the South, and that the proper role of the trade under these circumstances is to link producers to consumers in a way that gives everyone what they want (Cole & Du Plessis).

A straightforward description of the SHDC project would be:

Donors fund a service NGO (CRIAA SA-DC) to activate and organise groups of registered harvesters. Harvesters engage in an exchange of knowledge about sustainable resource use and voluntarily adopt sustainable resource management practices that they have helped to formulate. Harvesters are assisted by pre- and post-harvest ecological surveys to set sustainable harvesting quotas, and to monitor compliance with sustainable harvesting techniques. They elect a co-ordinator and/or record-keeper and are assisted with simple processing technology such as knives, drying racks, scales, record-books, clean new bags and storage facilities, and with extension/liaison services and the securing of group harvesting permits.

The product is certified "Organic" by the Soil Association (UK). The Soil Association Standards for Wild Crafted products is attached as Appendix I. When a group of harvesters have a full load of dried tubers, they contact the exporter directly or through the SHDC extension worker. The exporter collects the load and pays cash on the spot. In return for pre-financing, collating and transporting, the exporter makes a fair profit. An agreement between the exporter and CRIAA SA-DC (on behalf of the harvesters) to purchase the entire Devil's Claw produced and benefit-sharing mechanisms are in place. The benefit-sharing arrangements are discussed in further detail in point 2.3.3 hereunder.

2.2 Certification Schemes

While standards and certification schemes have been well developed for "traditional agricultural production" for some time, it is only recently that certification schemes and standards have been developed for non-wood forest products, with specific reference to "wild-harvested products" such as Devil's Claw and nuts. Initially there were no standards for wild-harvested products, and the agricultural standards that were applied were found to be inappropriate.

A number of certification schemes were considered for the certification of Devil's Claw, including the following:

- social certification;
- organic certification; and
- product quality certification / fair trade schemes.

2.2.1 Main Driving Forces for Certified Products

There were a number of reasons why organic certification was chosen for the Devil's Claw produced by the SHDC project, including the following:

- A market demand for organically certified Devil's Claw was identified.

- Organic certification would help to capture a niche market that would result in higher prices being paid for the product, making it possible for higher prices to be paid to harvesters. This would enable harvesters to recognise that there is a direct link between compliance with the standards and the higher prices paid, and to take resource management decisions accordingly.

- Organic certification would provide buyers with a guarantee that the Devil's Claw production was being undertaken with due care to resource sustainability and quality control, and that harvesters were benefiting both socially and economically.

- It was also felt that organic certification, as opposed to other certification schemes, would better reflect the fact that the Devil's Claw was harvested in a sustainable manner, and that the standards for organic certification would be more appropriate for product traceability and origin, and would therefore be more credible.

Organic certification not only certifies the material as "organic" but also certifies that all ecological and administrative considerations such as ecological surveys, harvesting quotas, proper record keeping, post-harvest assessments and sustainable harvesting methods have been taken into account.

2.2.2 Willingness of Buyers to Pay More

As part of Namibia's Devil's Claw Situation Analysis, a survey questionnaire was sent to leading Devil's Claw product manufacturers in Europe. A sub-section of this questionnaire dealt with whether or not buyers would be prepared to pay more for a "certified product". In the questionnaires returned to date, only one buyer – a producer of an organically certified product – indicated a willingness to pay more. While other buyers raised concerns regarding the quality of non-organic material, none were prepared to pay a higher price for improved quality. The link between certified material and improved resource management, i.e. sustainability, was also not recognised.

In 2001 it was discovered that the entire quantity of "organically certified" Devil's Claw supplied by the harvesters of the SHDC project was sold to an operation that was not producing an "organically certified" or an equivalent product. In this instance the buyer was prepared to pay a higher price for Devil's Claw with full knowledge that that no additional benefit would accrue to them as a result.

2.2.3 Ratio between Certified and Uncertified Products

The supply of organic Devil's Claw represents a very small percentage of total supply.

Quantities of Organic and Non-Organic Production of Devil's Claw in Namibia

YEAR	ORGANIC (Kg)	SALE PRICE US$/Kg	NON-ORGANIC (Kg)	SALE PRICE US$/Kg
1999 (N$ / US$ 1: 6)	10 210-00	3.7 (8 DM)	604 355-00	2.3 (5 DM)
2000 (N$ / US$ 1: 6.7)	7 080-00	3.8 (8.5 DM)	379 740-00	2.2 (5 DM)
2001 (N$ / US$ 1: 8.5)	3 810-00	2.9 (9 DM)	726 333-00	2.0 (6.5 DM)
2002 (N$ / US$ 1: 11)	4 650-00	4.2 (4.6 Euro)	1 018 616-00	3.2 (3.5 Euro)
TOTAL	**25 750-00**		**2 729 044-00**	

Note : The above prices are prices paid to exporters by buyers (FOB). The prices for organic material are based on SHDC data. The prices for non-organic material are based on information obtained from exporters as part of the NNDCSA (in press) and reflect an average price only. The exchange rate used is based on the average US$ / Namibian Dollar exchange rate for that particular year.

Figure 6 – MET and SHDC export data

It is interesting to note that while the prices in US$ dropped, especially in 2001, the prices actually increased slightly in Deutsche Mark terms. The drop in price reflected in the above table is due to exchange rate fluctuations.

The current low volumes of organically certified Devil's Claw being supplied can be attributed to a combination of the following factors:

- Limited organically certified Devil's Claw production areas supplying limited volumes;
- reluctance on the part of buyers to pay higher prices for certified material;
- the availability of a large volume of cheaper non-certified material;
- logistical, institutional and resource-management difficulties at various levels related to meeting certification standards; and
- the costs of certification in relation to the benefits obtained. This is to a large extent a consequence of the current market price and the supply of larger volumes of cheaper non-certified material. Nevertheless, the cost–benefit scenario could be improved by the supply of higher volumes of certified material, and increased numbers of producers of certified material.

2.2.4 Linkage of Standards and Certification Initiatives to National and International Laws and Regulations

In general, the certification schemes discussed above are entered into on a voluntary basis. Certain products and markets might, however, require some form of certification in accordance with international and or national legislation and regulations. Certification schemes must in any event be in accordance with international and national rules, regulations and conventions (Walter). Namibia, for example, is a signatory to various international agreements, including the Convention on Biological Diversity (CBD), the Convention on International Trade in Endangered Species (CITES) and other trade agreements that would impact on the production and trade of certified products in Namibia.

At present Namibia does not have any legislation or national organisational structure in place that regulates or facilitates certification. There has, however, recently been increased interest in product certification in a broad sense. This is mainly in the traditional agricultural

sector but also covers natural products. A study commissioned by the Namibian Ministry of Agriculture Water and Rural Development as a result of this increased interest is currently underway to identify potential certifiable products and to assess the viability of establishing a local certifying agency.

The Soil Association, which is a member of the International Federation of Organic Agriculture Movements (IFOAM), is relevant to the organic certification of Devil's Claw from the SHDC project. The Soil Association sets out basic standards for organic certification, and in this case for wild crafted products such as Devil's Claw. These standards are in line with international and national rules and regulations, for example those of the European Union. In the case of Devil's Claw, a producer must comply with these standards in order to be licensed as an organic producer. Generally, these standards cover issues of sustainability, quality, record keeping, traceability and collection areas.

2.3 The Impact of Certification

The objectives of the SHDC project are entirely in line with the Convention on Biological Diversity (CBD) objectives of conservation, sustainable use and equity. The provisions of the CBD regarding access to genetic resources and traditional knowledge are also directly relevant to the project. There was no explicit reference to the CBD at the outset and the "close fit" between the project and the Convention can therefore best be attributed to the fact that the CBD codifies sound development and resource-use principles that had been articulated in other fora long before the CBD was agreed upon in 1992 (Cole & Du Plessis).

2.3.1 Resource Management and Utilisation of the Product

In its project areas, the SHDC has already had a significant impact on the conservation of Devil's Claw, and possibly on the wider conservation of biological diversity. In the first place this was achieved by recognising and legitimising traditional knowledge about sustainable harvesting, and extending a "best practices" message based on traditional knowledge to those harvesters who did not have such traditional knowledge, probably because they were too young or were not from a traditional harvesting background.

The following is a summarised description of sustainable harvesting practises:

- Ecological surveys are conducted and harvesting quotas are set for a particular area. Although due to time and financial constraints this is not possible throughout Namibia, harvesting only mature plants and allowing a rest period between harvesting can contribute to sustainability.
- Harvesting should only commence once the fruiting bodies have formed.
- Harvesting should be done in such a way that the taproot is not disturbed and some storage tubers should be left.
- The hole should be filled in afterwards.

Positive results from post-harvest impact assessments have been recorded in SHDC project areas where these methods are complied with (Carr S.). This is, however, in stark contrast to the general harvesting that takes place outside of the SHDC project areas.

The conservation impact has not only been in the form of improved protection (through sustainable utilisation) of an economically important species at local level, but also in the form of the potential prevention, or at least slowing of genetic erosion by increasing the survival of individual plants which can now or at some later date be included in screening programmes aimed at identifying desirable traits. Ironically, this second type of conservation might ultimately work against the interests of the very people responsible for conserving the genetic diversity of the Devil's Claw population.

There are indications that improved benefit sharing and the local organisational and institutional empowerment of harvesters achieved by SHDC have a potentially wider impact on the ecosystems in project areas. Specifically, the harvesters' groups have been identified as grassroots focal points for interventions to commercialise other natural products from the area, and for efforts to increase cultivation of semi-wild drought-resistant crops.

2.3.2 Benefits to the Stakeholders Concerned

In 1999, the SHDC project covered an area of some 307 415 ha. In total, the project worked with 328 registered harvesters and produced 10 210 kg of Certified Organic Devil's Claw, which generated N$122 524 (US$ 20 420 at N$ 6 : US$ 1), an average of US$ 62 per harvester. Harvesters were paid N$ 12 (US$ 2) per kg (SHDC project report).

In 2000, 216 registered harvesters sold a total of 7 080 kg of Certified Organic Devil's Claw through the project, earning N$ 95 883 (US$ 14 310 at N$ 6.7 : US$ 1) at an average of US$ 66 per harvester. Harvesters were paid N$ 12 (US$ 2) per kg. In this year a bonus of N$1/kg (US$ 0.14) was paid to 162 of the registered harvesters on 4 740 kg produced, reflecting an increase in total earnings of about US$ 664 (SHDC project report).

In 2001, 181 registered harvesters sold a total of 3 810 kg of Certified Organic Devil's Claw, earning N$ 49 530 (US$ 5 827 at N$ 8.5 : US$ 1) at an average of US$ 32 per harvester. Harvesters were paid N$ 13 (US$ 1.53) per kg. In this year a bonus of N$5 per kg (US$ 0.58) was paid to 160 registered harvesters on 2 819 kg, reflecting an increase in total earnings of about US$ 1 635. An additional N$ 5 000 (US$ 588) was set aside by the exporter for investment at a later stage (SHDC project report).

In 2002, 137 registered harvesters sold a total of 4 650 kg of Certified Organic Devil's Claw, earning N$ 92 070 (US$ 8 370 at N$ 11 : US$ 1) at an average of US$ 61 per harvester. Harvesters were paid N$ 20 (US$ 1.8) per kg. An additional bonus payment of US$ 0.72 was made in March 2003. (SHDC project report).

Summary Table of SHDC Production and Income from Devil's Claw

Year	Exchange rate US$: N$	Number of harvesters	Total production (kg)	Purchase price per kg (US $)	Total income (US $)	Average income per harvester (US $)
1999	1 : 6	328	10 210	2.00	20 420.00	62.00
	No bonus paid					
2000	1 : 6.7	216	7 080	2.00	14 310.00	66.00
	Bonus payment of 0.14 US$ per kg paid to 162 harvesters with additional income US $ 664.00					
2001	1 : 8.5	181	3 810	1.53	5 827.00	32.00
	Bonus payment of 0.58 US$ per kg paid to 160 harvesters with additional income US $ 1 635.00					
2002	1 : 11	137	4 650	1.80	8 370.00	61.00
	Bonus payment of 0.72 US$ per kg					
Note : The average Namibian $ / US $ exchange rate for each particular year has been used.						

Figure 7 – Based on SHDC records

The numbers of harvesters who participate in the SHDC project has declined over the period of its implementation. This decline can be attributed to a number of factors including the following :

- The 2001 and 2002 rainfall figures were particularly low affecting growth rates and consequently resulting in less resource being available.

- In both 2001 and 2002 one group of harvesters did not produce because of a resource management decision by them to give the resource a rest period.

Sustainable harvest quotas are set per production area and are typically equally divided between the numbers of harvesters per area. Lower harvestable quantities being available therefore results in lower individual harvestable quotas. This prompted several harvesters not to participate as the returns were not worth the labour investment.

2.4 Who Adds Value and Who Benefits?

Apart from the initial post-harvest slicing and drying, very little value adding takes place in Namibia. It is worth reiterating, in this regard, that between 60% and 80% of all Devil's Claw supplied by Namibian exporters is going to buyers that only clean, grade, pre-process (grind) and repack. There is consequently significant potential for increased value addition in Namibia that would improve benefits to Namibians, especially harvesters, involved with Devil's Claw.

When the retail value of Devil's Claw preparations in Northern markets is calculated on a dry-weight equivalent basis, prices range from US$ 300 to US$ 700 per kilogram of dry tubers. The bottom line is that Namibia captures at most 1% of the value of the trade in Devil's Claw extracts, and harvesters no more than 0.5%. Even when the retail mark-ups and packaging, marketing and processing costs are taken into account, it seems obvious that the processors and formulators are making outrageous profits at the expense of extremely poor people. Crushed tubers intended for use in herbal teas sell for about 20 times their import price (40 times what harvesters get) in German pharmacies.

The table below provides an indication of the incomes earned by those involved at the different levels of the production and supply chain.

Overview of Income Received at the Different levels of Stakeholders for 2002

2002	Amount Received by Harvesters (KG)	Amount Received by Middlemen (KG)	Amount Received by Exporters (KG)
Organic	US $ 2.50	-	US $4.20
Non-Organic (Average Price)	US $ 0.45 – US $ 1.35	US $ 1.80	US $ 3.20

Figure 8

Although small, the cash earned by harvesters is all the more valuable because it is distributed in remote areas where few other sources of income are available. Nevertheless, a typical Devil's Claw harvester only earns somewhere between US$10 and US$50 a year from harvesting – a clear demonstration of the extreme poverty of harvesters.

Over the last 25 years, the Deutschmark price of Devil's Claw has dropped by 85%, with Namibian harvesters and exporters only kept in the trade by the continued weakening of the local currency. Even so, the current price of dried Devil's Claw on the international market is not a reflection of the value of the raw material, or of the inputs by harvesters in terms of labour and management.

2.5 Differences and Similarities between the Market/s for Certified and Uncertified Products

There are significant differences between certified and uncertified Devil's Claw, mainly related to resource sustainability, product traceability, quality control and price. In terms of the level of active ingredients, often used as a measure of quality, however, there are no significant differences. The fact that Devil's Claw is certified as being organic does not necessarily guarantee a higher level of active ingredients, although it does guarantee various other aspects.

At present no testing for the level of ingredients takes place in Namibia and in most cases samples of Devil's Claw are supplied to the buyer for testing by the exporter. Local testing is possible and testing equipment is available, and it is therefore desirable for testing to take place locally in order to add value and to supply a high quality product. Discussions emanating from the NNDCSA have highlighted this, and it is anticipated that the feasibility of testing locally will be investigated in the near future.

As a result of the supply of larger volumes of uncertified Devil's Claw, buyers are more concerned with the level of active ingredients than with other issues that would be covered by organic certification, for example sustainability or benefit sharing. If certification could guarantee higher levels of active ingredients, the situation would be substantially different, and a significant increase in demand for certified material could be expected.

2.6 Summary

The SHDC project has demonstrated that improved benefits (cash income) to harvesters of Devil's Claw does have a positive impact on its sustainability. In this regard, certification has contributed to both improved harvester benefits and sustainable utilisation, and can continue to do so in the future. The organic certification of Devil's Claw has not only necessitated that certain standards are complied with, but has also made it possible for a higher price to be obtained for the primary producers. Other benefit sharing arrangements that have been put in place with the exporter have reinforced good resource management practises on the part of harvesters. In addition, the SHDC project has contributed to the general empowerment of the harvesters associated with it, and the value of this can not be underestimated.

The current supply of organically certified Devil's Claw represents only a very small percentage of the total supply of cheaper non-organic Devil's Claw on the international market, however, and this has limited the impact of the supply of such material from the SHDC project. In this respect, SHDC harvesters and other harvesters in Namibia are at the bottom of the beneficiation chain, with very few opportunities for value addition.

There is undoubtedly scope for improving resource management practices, sustainable harvesting, product quality, local value addition and benefits to Namibian producers of Devil's Claw, especially to harvesters. One particular mechanism would be through certification, but this also depends on commitment on the part of the broader industry to sustainable utilisation of Devil's Claw.

3 COMPARATIVE ANALYSIS OF ORGANIC AND CONVENTIONAL PRODUCTION

In this section the differences between organic and conventional harvesting of and trade in Devil's Claw will be illustrated by examining the circumstances of the harvesters of the SHDC project prior to and after project implementation. Reference will also be made to the general norms that apply regarding the conventional harvesting of and trade in Devil's Claw in other parts of Namibia.

This example has been selected to demonstrate that while significant benefits have been realised in all spheres as a result of organic certification, these benefits have also been realised through good project design and implementation and harvester resource management. Reference will also be made to shortcomings of the project and the lessons that have been learnt. Certain results might not have been achieved through good project design and implementation alone, but were probably the result of organic certification and good project design complementing each other.

It should be noted that concise quantitative data pertaining to conventional production are difficult to obtain due to the ad hoc and informal manner in which such production is organised and the extremely remote rural areas in which it takes place.

3.1 Certification System

It was decided that organic certification was the most appropriate certification scheme for the Devil's Claw from the SHDC project. The reasons for this and other considerations have been discussed above in section 2.2.1. It would nevertheless be appropriate to provide some additional information on the certification process and system.

The Devil's Claw produced through the SHDC project is certified organic by the Soil Association under a "group scheme", sometimes also referred to as a producer group. In order to qualify for group certification the following conditions must be met:

- The group must be organised and have an internal control system in place. A key person in this regard is the local coordinator, who keeps records and ensures that the internal control system operates.

- Regular visits to the area by an external person should take place (in this case a person from CRIAA SA-DC) and information regarding the activities and results of the visit should be recorded.

If the internal control system is shown to be effective, the inspection is reduced to an audit of the system and only 10% – 20 % of the farms or areas need to be inspected annually. There are, however, arguments that this figure should be increased to nearer to 100% (Harris et al).

For the certification of Devil's Claw from the SHDC project, two separate licences are issued after the annual inspection and compliance with the standards has been demonstrated. One licence is issued for the **production** of Devil's Claw covering the area (farm), harvesting, slicing, drying, packaging, storage and record keeping. The other licence is issued with respect to **processing** and covers the repackaging, storage and record keeping of the local exporter.

3.1.1 Stages in the Certification Process

Prior to certification a number of issues need to be addressed and mechanisms to deal with them put in place, including the following:

- establishment of effective production and management systems;
- identification of a market and the requirements to enter the market;
- identification of private sector or other entities that would be involved in the market chain;
- identification of the requirements for organic certification and the costs involved; and
- identification of a certifying body. In this case it should be noted that most importers are insisting that the product is certified by a certifying body that is accredited to IFOAM.

Once these and perhaps other issues have been addressed, three main stages can be identified for organic certification. (Harris et al)

Stages in the Organic Certification Process

STAGE 1 - Application and Registration
This stage involves the application and conversion to a recognised organic system and systems associated with the effective management of organic production. It should be noted, however, that wild harvested products are very often already organic by default because poor rural farmers can not afford chemical fertilizers and pesticides for example. The aspect of a conversion period with regards to wild harvested products needs to be investigated further although some certifying bodies do not require this in respect to wild harvested products.
STAGE 2 - Certification and Inspection
This stage involves the processes of certification and annual inspection. In this regard, both production and procedural standards must be complied with in order for an organic license to be issued. In some cases importers are also carrying out their own independent inspections.
STAGE 3 - Import Requirements
This stage revolves mainly around the importer and the procedures and requirements to import, manufacture and market an organic product.

Figure 9 – Adapted from Harris et al

3.1.2 Costs

Under the group certification scheme only one fee for certification is payable, making it more affordable. The SHDC costs of certification have thus been covered by funds from donors. The annual costs of certification for 2001 and 2002 are shown in Figure 10 below. The total cost reflects the costs of inspection, license renewal and airfares. Local transport and CRIAA SA-DC costs are not included.

SHDC Annual Costs of Certification

YEAR	Exchange Rate US$: N$	NET PROFIT FROM SALES (US $)	COST OF CERTIFICATION (US $)	GROSS PROFIT (US $)
2001	1 : 8.5	6 170.00	3 293.00	2 877.00
2002	1 : 11	3 970.00	3 580.00	390.00

Figure 10 - SHDC data

Net Profit from sales refers to the profit realised from the sales after all costs, such as transport and packaging, have been deducted. The gross profit refers to the profit margin after the costs of certification have been deducted.

As can be seen from the above table, once the costs of certification have been deducted, the real profit margin becomes negligible, particularly for 2002. The net and gross profits

reflect the total profit margins for both the harvesters and the local exporter. At present, because of donor funding covering the costs of certification, the net profit is used in the calculation of additional benefits distributed to harvesters. If this were not the case, the distribution of benefits to both the harvesters and the local exporter would have to be calculated from the gross profit. This would realise insignificant profit margins for both the harvesters and local exporter (see point 3.5 hereunder for further discussion.)

3.2 Description of the Differences between Organic and Conventional Production

A description of the circumstances applicable to the harvesters of the SHDC project before and after project implementation will serve to illustrate the differences between organic and conventional modes of production of and trade in Devil's Claw.

3.2.1 Prior to SHDC Project Implementation

Prior to the establishment of the SHDC project in 1977/78 harvesters in these areas :

- obtained from around US$ 0.15 (or even less) to a maximum (in exceptional cases) of US$ 1.20 per kg for their dried, sliced Devil's Claw (assuming a N$/US$ exchange rate of 6 : 1), as impoverished harvesters who could not bargain from a position of strength were effectively forced to sell at whatever price they could get;
- often supplied stock under dubious credit arrangements and were often "paid" in alcohol or other consumer goods at highly inflated values;
- had very poor links to exporters, usually through a series of middlemen;
- did not know from season to season if buyers would turn up to purchase their stock, and had limited choices or options regarding buyers;
- only sold very limited amounts;
- had no idea of the actual weight of the material they sold or the price they received per kilogramme;
- had no idea what the product was being used for, outside of their own local utilisation, or even where it was going to once it was sold;
- had no opportunity to link a better quality of supply with higher prices;
- had no assistance regarding ecological and sustainability issues; and
- had no voice in the industry and no opportunity to take up issues with wider stakeholders.

These conditions did not apply exclusively to the primary producers with whom the project works, but are similar to those experienced by the majority of Devil's Claw harvesters in Namibia.

3.2.2 After SHDC Project Implementation

Subsequent to the implementation of the SHDC project, however, harvesters:

- obtain a minimum of US $ 1.80/kg (2002) for their dried, sliced Devil's Claw;
- are paid in cash at strategic stages during the harvesting season;
- deal directly with the exporter (GAMAGU – Mike and Sabine Krafft, Dordabis, Namibia), with whom they are developing a practical and operational relationship. In some areas it may become prudent to utilise "functional" middlemen from the rural areas to exporter. They also have access, if necessary, to other important exporters / traders;
- can plan their harvesting level and sell all their stock every season;
- can (and usually do) sell greater quantities than before;
- have scales at community storage facilities, which allow each harvester to know how much they produce and sell, and also enable the community to know how much they are selling to the exporter;

- have an improved understanding regarding what the product is used for in the export market, and have in some case even met the importers of their product;
- understand and exploit the link between good quality material and the higher prices obtainable by virtue of organic certification;
- are assisted annually with ecological surveys for quota-setting, post-harvest surveys, and organic certification; and
- have been well represented at various national and international stakeholder fora.

Additional differences between organic and conventional production of Devil's Claw are summarised in Figure 11 below.

Major Differences between Organic and Conventional Production of Devil's Claw in Namibia

Organic	Conventional
• Ecological surveys (pre- & post-harvest)	• No ecological surveys conducted
• Harvest quotas set	• No harvest quotas set
• Registration of harvesters and harvester permits	• No harvester registration but harvesting permits obtained on an ad hoc basis
• Local co-ordinator and committee in place	• No local co-ordinator or committee in place
• Capacity building and other training offered	• No or limited capacity building or other training
• Record keeping	• No record keeping
• Product traceability and coding	• No product traceability
• Monitoring of harvesting	• No monitoring of harvesting
• Quality control at all levels	• No harvester quality control
• Premium price paid directly to harvesters with bonus payment after sale by exporter	• Market chain means harvester receives low percentage of price with no bonus payment
• Reliable partnership with local exporter	• No reliable partnership with local exporter
• Annual inspection by certifying body	• No annual inspection
• Sustainable harvesting methods employed	• Unsustainable harvesting methods
• Secure market & access to market and other information	• Unreliable market & no market information

Figure 11

3.3 Benefits from Certification

The benefits which stakeholders derive from certification are to a significant degree a function of the nature of the production and trade process. The key here is the development at all levels of good partnerships that reflect a commitment on the part of all partners, not only in the short-term but, more importantly, in the long-term. It is more often the case that real benefits can only be realised in the longer-term, and they are thus more likely to be sustainable.

A number of benefits, both monetary and non-monetary in nature, can be realised through certification. Non-monetary benefits are often more difficult to quantify than monetary benefits, and are thus easily undervalued. The major benefits can be described as follows:

3.3.1 Economic

The major economic benefit is that the certified product can command a higher price than conventional products. This premium usually reflects organic quality and the costs of certification. In many instances, however, the premium only covers the costs of certification and in economic terms can therefore not be considered a benefit.

3.3.2 Market Access

Certification can facilitate access to niche markets which are prepared to pay the premium price. These markets are invariably more secure for producers in the long-term, especially if a partnership arrangement is entered into. Secure markets are important to primary producers because they provide a certain degree of security that allows them to plan, and therefore to manage the resource more effectively.

3.3.3 Processing

In certain circumstances certification can facilitate increased local value addition. In the case of Devil's Claw and many other NWFP, however, this has not been the case. As in the case of other benefits, the opportunity to increase value through further local processing is dependent on the establishment of a partnership with a product manufacturer.

In the case of the SHDC project, for example, a simple way to add more value locally by crushing (milling) the Devil's Claw before export was proposed. The milling of Devil's Claw is one of the first processes in extraction or production. Despite a number discussions and requests for information in this regard, however, the proposal never received any serious attention. This raises questions about the willingness of the pharmaceutical industry to share even the simplest of benefits with primary producers (Cole & Du Plessis).

3.3.4 Multiplier Effect

The realisation on the part of others that good practices such as certification yield positive benefits can stimulate them to engage in similar practices. In Namibia, the SHDC project has resulted in various positive spin-offs in the wider Devil's Claw industry at national and local levels. These include an increase in awareness and implementation of sustainable harvesting methods, improved quality control, higher prices and an increase in the establishment of organisational structures at local levels.

3.3.5 Resource Knowledge

Certification and/or good project design can contribute to improved knowledge regarding the resource and can thus also improved resource management. This is particularly the case when resource management uses a combination of local (traditional) knowledge and scientific research results. Not only is traditional knowledge essential, but its incorporation into management plans ensures direct harvester participation and understanding of the long-term objectives of the plans.

Improved resource knowledge and management can be witnessed in two cases in the SHDC project, where harvesters in two different areas decided not to harvest in a particular year because of resource availability. This is a significant result and demonstrates direct harvester input into resource management. It is also significant in that poor harvesters, who understood that this would mean a loss of income, still felt that in terms of long-term sustainability the decision not to harvest had to be taken. This must be seen as a direct result of the certification process and project implementation.

Further evidence of resource knowledge has been provided by the comparable results of the ecological surveys and the harvesters' own perceptions of the status of the resource.

3.3.6 Social Capital and Empowerment

The organisational and other requirements of certification that require training in various fields can be considered to contribute significantly to community empowerment in the broader sense. Furthermore, the recognition of ownership and realisation of benefits deriving from their activities also contributes to the empowerment of local harvester groups.

The broad positive impact on the livelihoods and general well-being of those involved that this has should not be under-estimated.

3.4 The Impact of Certification on Livelihoods

The most important contributions of the certification of Devil's Claw and the SHDC project to the livelihoods of the harvesters have been in the following areas (Cole & Du Plessis):

- *social development*, by boosting the overall organisational and institutional capacity of marginalised rural communities to manage their own resources and trade;

- *economic development*, by increasing the earnings of harvesters, distributing cash in a region with few other sources of income, and conserving an important natural resource for use by future generations;

- *sustainable development* in a harsh agro-ecological environment, through sustainable use of a hardy perennial desert plant;

- *livelihood security and well-being*, through cash incomes and the encouragement of sustainable resource management; and

- *food security*, through expanded income options and cash earnings, and – to an un-quantified extent – through the creation of "paid" opportunities to collect other wild foods that might not themselves warrant a dedicated collection effort.

Despite these contributions, however, it should be noted that harvesters of wild Devil's Claw in Namibia and other range states are often drawn from the very poorest sections of society, and eke out a living under the most marginal of agricultural and socio-economic conditions. Furthermore, in Namibia these harvesters are often from the most marginalised communities in terms of access to both economic and social empowerment. This is especially the case with regards to San people, and women from all ethnic groups.

The harvesting of and trade in Devil's Claw and the certification thereof offers only one small opportunity for rural inhabitants to generate much needed cash income. In this scenario it can not be considered to be that large. In most cases the income generated represents a once-off occurrence and is not sufficient to support poor rural families throughout the year. In view of the absence of other opportunities, however, the impact of the benefits derived from Devil's Claw on the livelihoods of the poor can be considered to be significant in both economic and social terms.

The socio-economic issues influencing and impacting on Devil's Claw resource management, harvesting, trade and benefits cannot be seen in isolation from the broader realities facing people in the rural areas, or from current overall socio-economic conditions in Namibia. Within the SHDC project areas and other rural areas, there is an urgent need to create other income-generating opportunities to supplement the benefits obtained from Devil's Claw if there is to be any substantial improvement in the livelihoods of the rural poor.

3.5 Economic Viability

Given the cost-versus-benefit scenario of certification as described above in 3.1.2, the economic viability of the organic certification of Devil's Claw within the current context of the SHDC project is questionable. It is further marginalised by the production and supply of large quantities of cheaper non-certified material and the lack of long-term commitment from importers to sustainable utilisation and fair trade.

The prospects for economic viability might, however, improve with increased production and thus economies of scale, and the listing of Devil's Claw on CITES, which might necessitate some form of certification or changes in legislation in range states regarding harvesting, trade and processing.

3.6 Summary

Certification does create a competitive advantage in some areas and contributes to sustainable utilisation, and its associated economic and social benefits. Nevertheless, some of the associated positive results could also be achieved through other mechanisms. By securing a better price for harvesters the SHDC project has provided them with a long-term incentive to implement sustainable harvesting techniques, and to take control of the management of the resource.

The challenge is therefore to develop enabling environments that strengthen the link between certification and benefits in order for it to become economically viable in the long term. In this regard, the establishment of partnerships with long-term commitments is essential. Furthermore, there is a simultaneous need to address the broader livelihood security issues for the real benefits of certification to be realised.

4. CONCLUSION

4.1 The Impact of Certification on Sustainable Use

Certification can impact positively on sustainable utilisation. The SHDC project has been able to demonstrate that by ensuring good prices, making information available, creating options, strengthening the harvesters' bargaining position and providing general support, harvesters are taking responsibility for the management of this resource. Compliance on the part of harvesters with sustainable harvesting techniques, for example leaving the tap-root undisturbed and refilling the hole, has increased to between 80 and 85 percent. This is not generally the case in other areas where Devil's Claw is extensively harvested in Namibia.

The issue of sustainable utilisation of Devil's Claw, or any NWFP for that matter, can not be addressed by certification alone, however. The issues impacting on sustainable use are far broader in nature and revolve mainly around livelihood security. Livelihood security provides an enabling environment for positive progress and development, and thus ultimately also to sustainable use. The practices entailed by sustainable utilisation are difficult to implement when there is, for example, a lack of clarity regarding land ownership and access, and acute poverty, particularly in communal or open-access areas.

Certification can only be used as a tool to promote sustainable use if real benefits accrue, and a clear link between these benefits and sustainable use can be recognised. These benefits need not be only economic.

Additional aspects related to the impact of Devil's Claw certification on sustainable use in Namibia are summarised in Figure 12 below.

Summary of Key Issues Related to the Organic Certification of Devil's Claw

SELECTED KEY ISSUES AND QUESTIONS	ORGANIC CERTIFICATION OF DEVIL'S CLAW
1. Product traceability Does certification provide opportunities to trace products from the source to the consumer by a functioning monitoring system?	Traceability and monitoring of sourcing and trade are among the crucial prerequisites for certification. The SHDC project has a harvester coding, monitoring and record keeping system in place throughout the supply chain.
2. Tenure rights Does certification contribute to the clarification of tenure rights?	Not directly, but active resource management by harvesters gives them some form of utilisation rights. Tenure rights and access to the resource are key elements for the sustainable utilisation of Devil's Claw. More importantly, however, tenure rights are central to livelihood security.
3. Empowerment Does the certification process empower normally disadvantaged stakeholders?	Not necessarily in its own right, but organic certification standards do require certain organisational mechanisms to be in place, and these do contribute to empowerment. Good management or good project implementation, as well as strong support from consumers, the industry and political authorities, would also facilitate empowerment of participants at all levels of production.
4. Market potential Do markets exist for certified NWFP with a higher premium price?	There seems to be a niche market for organic products (e.g. in Germany and the United Kingdom), but estimates of its future potential are contradictory. It is likely that the market for certified products with higher prices will not increase considerably.
5. Costs Are high costs related to the certification process the main reason for reluctance on the part of major stakeholders?	In general, the industry is not willing to pay much higher costs, because they cannot be readily compensated for by an increase in sale prices. Reluctance is not only related to cost, but also to a lack of commitment to sustainable production and benefit sharing mechanisms. The cost/benefit relationship is also a matter of concern to local rural producers deciding whether or not to certify.
6. Sustainable harvesting Does certification promote sound exploitation and harvesting techniques?	Certification requires that sustainable harvesting methods are used. In the case of the SHDC project pre and post harvest surveys are conducted and local monitoring ensures compliance. However, other mechanisms such as company rules and guidelines could be as effective. Certification can only be used as a tool to promote sustainable use if real benefits result and a clear link between these benefits and sustainable use can be recognised.
7. Multiplier effect Does certification have a positive impact on the production of and trade in non-certified products?	To some extent it provides a model for sustainable utilisation and the production of high quality products. In contexts where consumer consciousness is high, this effect will be relatively higher, whereas in contexts where cost-consciousness predominates, as it seems is currently the case, the effect will be less pronounced.

Figure 12

4.2 Certification: Future Trends in Namibia

4.2.1 Certification of Devil's Claw

An increased concern about the sustainability of Devil's Claw has resulted in an increase in demand for certified material. The preference on the part of some buyers for some kind of certification is, however, largely a result of their need to determine the species of Devil's Claw supplied, i.e. product traceability rather than sustainability is the driving motive.

At present the market for organically certified Devil's Claw is under-supplied although it is unclear what the total demand is. Within the context of the present scenario, however, future growth and continued certification of Devil's Claw from the SHDC project seems unlikely, largely as a result of the costs involved and the absence of meaningful long-term partnerships and benefit sharing arrangements. The increase in organically certified material is also dependent on including new production areas that fulfil the requirements of certification, for example, management systems in place and harvesters having control over resource utilisation.

A listing of Devil's Claw on CITES might necessitate some form of certification process that can demonstrate compliance with the requirements of the particular listing. While this might improve resource management to some extent, it is debatable whether it would result in correspondingly improved benefits to harvesters, for example higher prices.

4.2.2 Certification of Other Medicinal Plants and NWFP

There has been an increase in efforts in Namibia and the sub-region to identify and commercialise medicinal plants and other NWFP. A number of potential species have been identified in Namibia, and research to develop these products is currently underway. The harvesting and processing of and trade in these resources could result in some form of certification. A study aimed at identifying potential certifiable products and assessing the viability of establishing a local certifying agency has been commissioned by the Namibian Ministry of Agriculture Water and Rural Development as a result of this increased interest in certification, and is currently underway.

As with the case of Devil's Claw, however, future trends regarding the certification of other medicinal plants and NWFP will be determined by market demand, economic viability and the resultant real benefits.

4.2.3 Impact of Cultivated Products on Certified Wild Products

The certification of cultivated products should have no significant negative impact on certified wild products. In some circles wild products are still considered to be of a higher quality than cultivated products of the same species, and thus demand for wild products is likely to continue.

It should be noted, however, that poor communities are at a relative disadvantage and have to compete like all other players in an open market. It is unlikely that poor communities would have the necessary capacity to initiate commercial cultivation themselves. The technical and administrative knowledge required to adhere to standards and manage exports constitutes a professional specialisation in its own right, and also requires substantial working capital.

4.3 The Way Forward

There is at present a significant demand for organically certified products in Europe and other developed countries, but this demand is greater for certified conventional products, such as vegetables, than it is for certified wild products. Nevertheless, demand for

organically certified products is likely to increase and is thus likely to create additional opportunities for certified wild products.

At present there are 62 developing countries that export organically certified products to the European Union within the framework of regulation (EEC) 2092/91 (Harris et al). Despite factors that limit the viability of the certification of wild products for the poorer sectors of society, there is evidence to suggest that greater economic and social benefits can be realised from organic production and trade. In order for this to happen the following would need to be addressed:

1. the reduction of the costs of certification, to be more in line with the socio-economic circumstances of the harvesters of wild products such as Devil's Claw;

2. the development of local certification bodies;

3. the active promotion of organic certification at all levels;

4. the establishment of long-term partnership agreements with buyers and manufacturers; and

5. the investigation of mechanisms that would facilitate and increase opportunities for organic certification.

While organic or other certification schemes do provide niche marketing opportunities, increased earnings, social and environmental benefits throughout the production and supply chain, these benefits can also be realised through other mechanisms. In this regard therefore, organic production and fair trade and the principles they embody should be considered the norm rather than the exception.

LIST OF REFERENCES

1. Carr, S. J. 1999. **The Sustainably Harvested Devil's Claw Project – Post Harvest Report, Omaheke Region Namibia.** CRIAA SA-DC, Windhoek.

2. CRIAA SA-DC. February 2002. **Proceedings of the First Regional Devil's Claw Conference.** Windhoek, Namibia.

3. CRIAA SA-DC. November 2002. **Proceedings of the Namibian National Devil's Claw Workshop**.

4. Cole, D. 1999. **Community Devil's Claw Workshop proceedings.** CRIAA SA-DC, Windhoek

5. Cole, D & du Plessis, P. May 2001. **Namibian Devil's Claw (*Harpagophytum spp.*). A Case Study on Benefit-Sharing Arrangements.** Prepared for the Ministry of Environment and Tourism - Directorate of Environmental Affairs - Namibian National Biodiversity Programme.

6. Cole, D. November 2001. **The Sustainably Harvested Devil's Claw project in Namibia and Organic Certification.** Paper presented at the 2001 regional organic seminar on Organic farming, the emerging industry for Africa – opportunities and prospect. Lusaka – Zambia.

7. Cole, D. August 2002. **An Initial Assessment of the Impact of Cultivation on Rural Livelihoods and the Current Structure of the Informal and Formal Marketing Structures of Devil's Claw in Namibia.** Prepared for Fauna and Flora International. United Kingdom.

8. Domitilla, R. & Donaldson, J. May 2002. **The Trade, Management and Biological Status of *Harpagophytum spp*. in Southern African Range States.** A report submitted to the twelfth meeting of the CITES Plants Committee, Leiden (The Netherlands), 13-17 May 2002.

9. Du Plessis, P. 1999. **Proceedings of the Namibia National Devil's Claw Stakeholders Workshop.** CRIAA SA-DC, Windhoek.

10. Gruenwald, J. November 2002. **Expanding the Market for Devil's Claw in Europe.** Paper presented at the Namibian National Devil's Claw Conference.

11. Harris, P.J.C, Browne, A.W, Barrett, H.R, Cadoret, K. February 2001. **Facilitating the Inclusion of the Resource Poor in Organic Production and Trade : Opportunities and Constraints Posed by Certification.** Prepared for the Rural Livelihoods Department, Department for International Development (UK).

12. Ihlenfelt, H. D & Hartmann, H. 1970. **Die Gattung *Harpagophytum* (BURCH.) DC. Ex MEISSNER. (Monographie der afrikanischen Pedaliaceae).** Mitt. Staatsinst. Allg. Bot. Hamburg 13 : 15-69.

13. Lombard. C. November 2002. **Identification of Important Devil's Claw Export Trade Issues in Namibia.** Paper presented at the Namibian National Devil's Claw Conference.

14. Nott, K. 1986. **A Survey of the Harvesting and Export of *Harpagophytum procumbens* and *Harpagophytum zeyheri* in SWA/Namibia.** Unpublished report, Etosha Ecological Institute.

15. Strohbach, M. 1998. **The Sustainably Harvested Devil's Claw Project – Ecological Survey March 1998.** CRIAA SA-DC, Windhoek.

16. Strohbach, M. 1999a. **The Sustainably Harvested Devil's Claw Project – Ecological Survey February 1999.** CRIAA SA-DC, Windhoek.

17. Strohbach, M. 1999b. **Proposed Research Program to Verify the Long-Term Sustainability of the Devil's Claw Project as carried out by CRIAA SA-DC.**

18. Walter, S. June 2002. **Certification and Benefit-Sharing Mechanisms in the Field of Non-Wood Forest Products – An Overview.** Medicinal Plant Conservation - June 2002.

19. Wegener, T. 2000. **Devil's Claw : From Traditional Remedy to Modern Analgesic and Anti-inflammatory.** HerbalGram 50.

Additional data was also sourced from SHDC project reports prepared for donor agencies. These reports are available from CRIAA SA-DC.