Indigenous Natural Products
Producer and Processor Organisations Sub-Activity

EMP for Devil's Claw

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Natural Resources Institute

EMP for Devil's Claw

PROJECT DETAILS

Project Name:	Indigenous Natural Products Producer and Processor Organisations Sub-Activity
Project ID:	MCAN/COM/RFP/3C01001-A
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Cover photo:	Courtesy of Dave Cole

Contents

Acronyms and Abbreviations

ARD	Associates for Rural Development
CBNRM	Community-based natural resource management
CRIAA SA-DC	Centre for Research Information Action in Africa-Southern Africa Development and Consulting
DCEIA	Devil's Claw Environmental Impact Assessment
DCEMP	Devil's Claw Environmental Management Plan
DCRSWG	Devil's Claw Range State Working Group
DCWG	Devil's Claw Working Group
EC	European Community
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
GSIP	Gender and Social Integration Plan
INP	Indigenous natural products
IPTT	Indigenous Plant Task Team
IRDNC	Integrated Rural Development and Nature Conservation
MCA-N	Millennium Challenge Account Namibia
MCC	Millennium Challenge Corporation
MET	Ministry of Environment and Tourism
NBRI	National Botanical Research Institute
NNF	Namibia Nature Foundation
NRI	Natural Resources Institute
PPIG	Primary Production Improvement Grants
PPO	Producer and processor organisations
SEA	Strategic Environmental Assessment
SHDC	Sustainably Harvested Devil's Claw
THRD	Traditional Herbal Remedy Directive
ToR	Terms of Reference
UK	United Kingdom
UoG	University of Greenwich

General Project Information

The Producer and Processor Organisations (PPO) Sub-Activity is a major component of the Indigenous Natural Products (INP) Activity (contract MCAN/COM/RFP/3C01001-A) implemented under the Millennium Challenge Account Namibia (MCA-N) programme, as part of the support given to the agriculture sector. The goal of the MCA-N INP Activity is to increase economic opportunities for INP stakeholders through improved organizational, business and technical capacities along the value chain. The overall objective of the MCA-N INP PPO Sub-Activity is to sustainably increase the number and income of households involved in the INP sector by broadening the number, increasing the volume and improving the quality of natural products and by adding value to natural products. The INP PPO Sub-Activity seeks to meet its overall objective by providing training, technical assistance, hardware and supplies to eligible PPOs to enhance their technical and organizational capacities to develop better market linkages, organize and operate the INP enterprise more effectively, and utilize the local INP resource base sustainably.

The lead organization implementing the INP PPO Sub-Activity is the Natural Resources Institute (NRI) of the University of Greenwich (UoG). Local partner organizations sub-contracted are: Integrated Rural Development and Nature Conservation (IRDNC), Centre for Research Information Action in Africa-Southern Africa Development and Consulting (CRIAA SA-DC), and the Namibia Nature Foundation (NNF).

Table 1 shows some project parameters and data.

Table 1: Project parameters and data for the INP PPO Sub-Activity

Project Parameter	Project Data
Location of INP PPO Sub-Activity	Namibia-wide, with an emphasis on the northern communal areas
Size (budget) of INP PPO Sub-Activity	US$ 4,070,430 over 4 years
Starting date of INP PPO Sub-Activity	05 July 2010
Starting date of implementation	01 January 2011
Completion date of INP PPO Sub-Activity	30 June 2014
Period covered by the EMP for Devil's Claw	01 January 2011 - 30 June 2014

Executive Summary

Purpose and approach

The purpose of the Environmental Management Plan for Devil's Claw, henceforth referred to as Devil's Claw Environmental Management Plan (DCEMP), is to outline and characterize practical and implementable measures that are proposed to:

- reduce identified environmental and social risks and mitigate identified negative environmental and social impacts on one hand; and
- enhance identified positive environmental and social impacts on the other.

The DCEMP is prepared in compliance with applicable environmental and social requirements in Namibia, specifically Namibia's Environmental Management Act of 2007 (GRN, 2007), as well as with the environmental and social policies of the Millennium Challenge Corporation (MCC), as per MCC's Guidelines for Environmental and Social Assessment (MCC, 2006) which apply to the MCA-N programme.

The DCEMP is approached as an instrument that is broad in scope, including measures that go beyond the scope of the MCA-N INP PPO Sub-Activity. For example, managing the environmental and social risks arising in Namibia from increases in global market demand for devil's claw (however little influence the INP PPO Sub-Activity may have in bringing about such increases) requires coordinated responses and actions from a range of national, regional and even international stakeholders and actors, not just the INP PPO Sub-Activity.

The DCEMP comprises measures collectively aimed at addressing impacts from ongoing commercial devil's claw harvesting and trade in Namibia as well as from the INP PPO Sub-Activity in particular. The DCEMP also specifies monitoring requirements and institutional arrangements and responsibilities.

The DCEMP complements the Devil's Claw Environmental Impact Assessment (DCEIA) (Krugmann, 2010a) and builds on the information baseline and impact analysis it provides. The DCEMP is crafted as a stand-alone document that is supported by the DCEIA, but can be read on its own.

Background

Global commercial trade in dried active side-tuber material, harvested from devil's claw (*Harpagophytum* spp.*)* plants in the range states of Botswana, Namibia and South Africa (and other range states such as Angola) used in developed countries' markets for various medicinal applications, has been going on for at least 50 years. Namibia has been the principal source of supply for this market, accounting for more than 90% of all devil's claw production. Within Namibia, the commercial devil's claw trade chain (from the point of harvesting to the point of export) evolved as a largely informal unorganized structure and process, involving up to 8,000 poor (and often marginalized) rural people (men and women) as harvesters and primary processors and up to 200 traders.

Given its largely unorganised nature, devil's claw harvesting has not always been done with the necessary attention to ensuring sufficient plant regeneration prior to harvesting. The

risk of unsustainable harvesting and over-harvesting has tended to increase with market demand and been particularly great in open-access communal areas close to larger human settlements during periods of peak demand.

Poor rural people engaged in unorganized devil's claw harvesting and informal devil's claw trade typically have received extremely low prices and been exploited by middlemen and exporters, while Namibian exporters have been relegated by lead overseas buyers to being mere price takers. These exploitative relationships, and in particular the very low prices received by harvesters at the beginning of the trade chain, have been instrumental in causing or reinforcing patterns of unsustainable local resource use in Namibia, although devil's claw harvesting and sale has provided a sizable number of very poor rural households with small but significant cash income (and in-kind benefits).

Starting in 1997, the Sustainably Harvested Devil's Claw (SHDC) project helped harvesters on a number of pre-independence resettlement farms in the Omaheke to organize themselves. The SHDC project resulted in tangible benefits accruing to its participants - in terms of higher prices, increased and more stable incomes, sustainable harvesting, quality control, and traceability. While the initiative was successful in meeting its objectives and served as a model for subsequent efforts toward organised harvesting, it contributed only about 1% or less of annual devil's claw exports from Namibia. SHDC's devil's claw production was certified organic with a view to capturing a niche market for certified side-tuber material, but this approach turned out not to be viable economically, given the high costs of certification and the relatively small scale of the harvesting operations.

Since 2006, two conservancies in Otjozondjupa Region (Nyae Nyae and N#a Jaqna) and the Kyaramacan Association in Babwata National Park (West Caprivi) have taken up organised commercial devil's claw harvesting and trade, based on the benefit-sharing model and best practices developed by the SHDC project. The combined production of sustainably harvested devil's claw by these PPOs has increased substantially since 2006, constituting now around 10% of annual devil's claw exports from Namibia.

The overall objective of the INP PPO Sub-Activity of the INP Activity is to sustainably increase the number and income of households involved in the INP sector by broadening the number, increasing the volume and improving the quality of natural products and by adding value to natural products. The INP PPO Sub-Activity seeks to meet its overall objective by providing PPOs with technical and organizational training and technical assistance as well as equipment, facilities, supplies and services.

In the context of an evolving devil's claw sub-sector, the INP PPO Sub-Activity may, of-itself, stimulate interest in devil's claw harvesting. It is this eventuality that is addressed by the development of a DCEMP.

Risks and impacts from traditional and organised harvesting & trade and from the INP PPO Sub-Activity

The DCEIA (Krugmann, 2010a) identified a number of intertwined risk factors as collectively posing a potential threat to the health and integrity of devil's claw resources in open-access areas that are prone to over-harvesting, especially during years of high market demand.

These include environmental, economic, social, and institutional risk factors. The DCEIA further found that traditional and "improved" devil's claw harvesting and trade has both positive and negative social impacts. Where organised controlled-access harvesting is practiced, this has positive environmental impacts in terms of (more) sustainable resource use, relative to previous unorganized open-access harvesting in the same location or unorganized open-access harvesting in other locations (the "unorganized open-access harvesting" baseline). This might be called a sustainability premium in that it is a rent accruing to communities all members of a community as a result of their collective management of a previously open-access resource.

The INP PPO Sub-Activity is anticipated to have mainly (indirect) positive impacts -- both environmental (in terms of strengthened PPO capacities to use the devil's claw resource base sustainably) and social (in terms of increased incomes and larger numbers of beneficiaries as well as in terms of enhanced gender awareness among PPOs and service providers and better integration of women and vulnerable groups in INP enterprises). The likelihood of it causing a market boom is very small, although a boom might happen for reasons unrelated to, and completely beyond the control of, the INP PPO Sub-Activity.

Scenarios "with and without the INP PPO Sub-Activity"

Simple qualitative risk/impact scenarios are considered for the devil's claw sub-sector in Namibia, with and without the INP PPO Sub-Activity, based on two key variables:

i. The extent to which devil's claw production in Namibia is organised, uses sustainable harvesting methods, and takes place in areas where resource access is managed and controlled -- measurable in terms of the proportion of devil's claw exports from Namibia that comes from organised managed-access harvesting and trade enterprises in the country in any given year); and
ii. The level of global market demand for devil's claw – measurable in terms of the total amount of dried devil's claw side-tuber material purchased by international buyers in any given year.

The purpose of considering scenarios (possible futures) is not to "predict the future" for the devil's claw sub-sector in Namibia or "establish targets" for the INP PPO Sub-Activity. Rather, the intent is to provide an indication of the complexity of the situation and the INP PPO Sub-Activity's important but limited role in influencing and managing potential risk/impact levels in the devil's claw sub-sector, and to motivate for a broad approach to the DCEMP.

Mitigation measures and monitoring activities

Mitigation measures recommended to be taken by the INP PPO Sub-Activity are all activities planned and budgeted anyway under the implementation of the INP PPO Sub-Activity. In line with the suggested scope for the DCEMP, the INP PPO Sub-Activity can be viewed as part of a programme of mitigating the environmental and social risks and adverse impacts of devil's claw sub-sector in Namibia. This gives the INP PPO Sub-Activity an even stronger rationale.

The mitigation efforts by the INP PPO Sub-Activity need to be complemented by other mitigation measures for which other stakeholders are or should be responsible, for example:

- Effective implementation of the new Devil's Claw Policy by the Government of Namibia;
- Regional collaboration on devil's claw policies such as managed wild-harvesting and cross-border trade; and,
- Promotion of enrichment planting and cultivation.

Both the INP PPO Sub-Activity and other devil's claw stakeholders need to undertake monitoring activities to verify if mitigation measures are having the intended effect and whether/how they might be adjusted and to determine the degree of compliance with national regulations. As with the mitigation measures, and for the same reasons, all of the monitoring activities for which the INP PPO Sub-Activity is responsible are already part of the implementation plans for the INP PPO Sub-Activity. The INP PPO Sub-Activity serves as part of a broader mitigation and monitoring programme for the devil's claw sub-sector in Namibia.

1. DCEMP - Purpose and Approach

1.1 Purpose

The purpose of the Devil's Claw Environmental Management Plan (DCEMP) is to outline and characterize practical and implementable measures that are proposed to:

- reduce identified environmental and social risks and mitigate identified negative environmental and social impacts on one hand; and
- enhance identified positive environmental and social impacts on the other.

The DCEMP is prepared in compliance with applicable environmental and social requirements in Namibia, specifically Namibia's Environmental Management Act of 2007 (GRN, 2007), as well as with the environmental and social policies of the Millennium Challenge Corporation (MCC), as per MCC's Guidelines for Environmental and Social Assessment (MCC, 2006).

1.2 Approach

The DCEMP is approached as an instrument that is broad in scope, including measures that go beyond the scope of the MCA-N INP PPO Sub-Activity. Managing the environmental and social risks arising in Namibia from increases in global market demand for devil's claw (however little influence the INP PPO Sub-Activity may have in bringing about such increases) requires coordinated responses and actions from a range of national, regional and international stakeholders, not just the INP PPO Sub-Activity.

The DCEMP comprises measures collectively aimed at addressing impacts from ongoing commercial devil's claw harvesting and trade in Namibia as well as from the INP PPO Sub-Activity in particular. This is consistent with the hybrid nature of the DCEIA (prepared as a separate document) which assesses both 'generic' environmental and social impacts (from ongoing commercial devil's claw harvesting and trade in Namibia) and 'project-specific' environmental and social impacts. The DCEMP also specifies monitoring requirements and institutional arrangements and responsibilities.

Drawing on the DCEIA, the DCEMP provides background information and analysis (Section 2) necessary to allow the reader to put in context identified risks and impacts (Section 3). The DCEMP, further, considers some simple "with and without INP PPO Sub-Activity" scenarios (Section 4) before outlining mitigation measures and associated monitoring activities (Section 5).

The DCEMP complements the Devil's Claw Environmental Impact Assessment (DCEIA) (Krugmann, 2010a) and builds on the information baseline and impact analysis that it provides. The DCEMP is crafted as a stand-alone document that is supported by the DCEIA, but can be read on its own.

2. Background on the Devil's Claw Resource, its Commercial Harvesting and Trade in Namibia, and the Role of the INP PPO Sub-Activity

2.1 Geographic distribution and habitat preference of devil's claw

Devil's claw is found in many areas of the Kalahari characterized by deep sandy soils and low rainfall (150 – 500 mm/year). Within this type of habitat, devil's claw is found primarily in areas having a relatively thin cover of grass, herbs and brushes (and hence are characterized by relatively low levels of competition for scarce water and nutrients) and not being heavily grazed. However, the plant tends to be most abundant and locally occurs in the highest densities in degraded open-access areas that are trampled and/or overgrazed. Countries sharing the devil's claw resource comprise the so-called range states (Namibia, Botswana, and South Africa) as well as Angola, Zambia, Zimbabwe, and Mozambique.

2.2 Commercial devil's claw harvesting and trade in Namibia and the range states

2.2.1 Origins and evolution

Global commercial trade in biologically active side-tuber material, harvested from devil's claw plants (*Harpagophytum* spp.) in the key range states (Botswana, Namibia and South Africa) and used in developed countries' markets for various medicinal applications, has been going on for at least 50 years. Namibia has been the principal source of supply for this market, accounting for more than 90% of all devil's claw production. Aside from exports from Namibia and the other two range states to overseas destinations, devil's claw has also been traded between the range states, sometimes for re-export overseas, and purportedly also (illegally) from Angola across the border to Namibia.

Within Namibia, the commercial devil's claw trade chain (from the point of harvesting to the point of export) evolved as a largely informal unorganized structure and process, involving up to 8,000 poor (and often marginalized) rural people (men and women) as harvesters and primary processors and up to 200 traders. The arduous harvesting work done by individual poor rural people (without much if any coordination or organization) has taken place in often remote and mostly open-access communal areas. Many of the traders have functioned as middlemen, "connecting" harvesters with exporters via single- or multi-stage trading links and transactions down the trade chain, while some of the traders have acted as agents on behalf of exporters. At times when demand for Devil's Claw has been high, harvesting teams have been used. These consist of groups of harvesters dropped in isolated areas and paid by volume of harvested material. Such practices promote unsustainable harvesting because external teams have no self-interest in conserving specific Devil's Claw populations for future use.

Given its largely unorganised nature, devil's claw harvesting has not always been done with the necessary attention to ensuring sufficient plant regeneration prior to harvesting. The risk of careless harvesting and over-harvesting has tended to increase with market demand as measured by the export price of bulk Devil's Claw. The risk has been particularly great in open-access communal areas close to larger human settlements, and during periods of peak demand. Common unsustainable devil's claw harvesting methods have included: damaging or entirely removing the taproot of plants, harvesting plants that are too young and

immature, failing to leave harvesting areas, plant populations, or individual plants fallow long enough for side-tubers to regenerate sufficiently, and failing to re-fill holes around plants after harvesting, thus disturbing the normal growing cycle and threatening plant survival.

Such harvesting methods have had adverse resource impacts in particular local areas easily accessible to greater numbers of harvesters and hence prone to over-harvesting. This has had negative effects on the health, stability and growth of local plant populations in these areas, with attendant risks to the "economic survival" of some of the affected plant populations (and hence the livelihoods of the harvesters), as their depletion make them increasingly unattractive as harvesting targets.[1]

While there is evidence of past unsustainable harvesting and over-harvesting practices in some locations, getting a clear, comprehensive picture of the spatial and temporal patterns of such practices and of their local and wider impacts on the resource base has been difficult. For one, the very informality of devil's claw harvesting and trade has made monitoring and information-gathering difficult if not impossible. For another, the irregular patchy nature of the spatial distribution of the devil's claw resource and the unpredictable intra- and inter-annual changes in plant population sizes, densities and growth dynamics, in response to the highly variable climate of the Kalahari, combined with the "phenologic plasticity"[2] of individual plants (including dormancy during dry spells), makes any regional or national devil's claw resource assessment complicated, challenging and, to a greater or lesser extent, inconclusive.

What analysts and practitioners do agree on, however, is that most of the devil's claw harvesting activity to date has taken place in the communal areas of four Regions: Omaheke, Otjozondjupa, Caprivi and Kavango, and that large devil's claw resources on private farms and protected areas in these and other Regions have so far been virtually untouched and constitute a sizable as yet untapped devil's claw reserve (see Section DCEIA, Section 6.1).

Poor rural people engaged in unorganized devil's claw harvesting and informal devil's claw trade, and lacking information about market prices, typically have received extremely low prices (and sometimes only in-kind benefits such as food) from middlemen and agents for their dried devil's claw tubers – far less than the prices for which the devil's claw material is later exported. In fact, historically the whole devil's claw industry and its rapid expansion have rested on exploitative relationships both within producer countries (most importantly Namibia) and between the producer countries (exporters) and consumer countries (lead buyers). In Namibia, thousands of poor and marginalized harvesters (who have found themselves in the weakest bargaining position of all stakeholders) have been exploited by middlemen and exporters, while Namibian exporters in Namibia (and the other range states) have been relegated by lead overseas buyers to being mere price takers.

[1] Threats to the "economic survival" of devil's claw populations do not necessarily imply threats to their physical survival, let alone the biological survival of the *Harpagophytum* species.

[2] "Phenologic plasticity" refers to the ability of a plant to undergo "ad hoc" adaptive change in flowering and fruiting behaviour, and foliage growth, in response to unpredictable environmental change.

These exploitative relationships, and in particular the very low prices received by harvesters at the outset of the trade chain, have been instrumental in causing or reinforcing patterns of unsustainable local resource use in Namibia. On the other hand, notwithstanding the exploitation and low prices, devil's claw harvesting and sale has provided a sizable number of very poor rural households with small but significant cash income (and in-kind benefits) that have supplemented other household income sources and thus diversified the local livelihood base. These benefits, however small and limited, have sustained the global commercial devil's claw market.

Compared to the domestic price gap (between the point where newly harvested devil's claw is offered for sale and the point where it is exported), an even larger international price gap has long existed between export prices on one hand and overseas retail prices for end products made from devil's claw on the other. This latter price gap has been due to various factors, including the lack of long-term purchase agreements between exporters and overseas buyers, negotiating tactics used by the latter to play out different Namibian and range state exporters against each other, and lack of organization (cooperation and coordination) among Namibian exporters (and across range state stakeholders). It is also worth noting that the investment cost in industrial phyto and medicinal extracts production and retailing is high and usually mitigated by high industrial throughputs by a range of different products. Industrial processing of Devil's Claw alone is probably not viable at the current on-shelf price of end product unless new, cheaper, extraction process or higher value end markets can be developed.

Unorganized harvesters typically have taken home less than 1% of the overseas retail value of devil's end products, while exporters have captured up to 4% or so of this value (see DCEIA, Section 5.5).[3] The minute extent to which available global retail market value is retained in Namibia is a reflection of the lack of organization of the Namibian devil's claw industry and the absence of market supply control in Namibia (and the other range states). It is also a symptom and cause of the stark market power asymmetry that has existed between Namibian actors (exporters and harvesters) and overseas buyers since the global devil's claw trade started 50 years ago.

2.2.2 Recent developments

The above description of the structure and dynamics of the commercial devil's claw market typifies the way the commercial devil's claw trade evolved over the first 3-4 decades (up to the late 1990s) and remains characteristic for much of the commercial harvesting and trade activity today. However, since the late 1990s the situation has begun to change in Namibia.

Starting in 1997, the Sustainably Harvested Devil's Claw (SHDC) project[4] helped residents of a number of pre-independence resettlement farms in the Omaheke - some of country's poorest and most marginalized rural people, relying on devil's claw harvesting for their basic

[3] Taking the market value of devil's claw side-tuber extracts produced overseas (rather than overseas retail prices) as the reference market value, the value margins captured by harvesters and exporters would be higher, but still unacceptably small.

[4] Designed and implemented by CRIAA SA-DC

needs and survival - to organize themselves. This was done with a view to collectively deriving more income and benefits from the devil's claw resource and putting their devil's claw harvesting and trade enterprise on a more sustainable footing. To this end, devil's claw harvesters were registered, harvesters' rules were developed and agreed for compliance by all registered harvesters, and training was provided in sustainable harvesting methods.

In addition, a local institutional structure was set up to collectively plan, implement and monitor all devil's claw related activities, including harvesting, drying, packing and storage of side-tubers, as well as monitoring during harvest and post-harvest impact assessment, and the project was certified organic. All this was done to ensure sustainable harvesting, quality control, and traceability and to be able to secure higher prices for dried tuber material. As well, an agreement was concluded with a Namibian exporter who undertook to buy all devil's claw output from the project at an agreed (higher than market) price and (eventually) to share part of his profit with the harvesters (through bonus payments).

The SHDC project, together with an associated biological field research programme, largely achieved its objectives and desired local impact during its lifetime (1997-2006). It resulted in tangible benefits accruing to its participants - in terms of higher prices, increased and more stable incomes, sustainable harvesting, quality control, and traceability. It also provided an organizational and benefit-sharing model for a profitable and sustainable commercial utilization of local devil's claw resources for possible replication by other PPOs in communal areas, and it established best methods and practices in sustainable harvesting, primary processing, resource inventory making, harvest quota setting, and post-harvest monitoring and impact assessment. While path-breaking in demonstrating the feasibility of sustainable forms of devil's claw harvesting and trade, the SHDC project had only a limited impact on the extent to which the national devil's claw production comes from sustainably harvested areas: only about 1% or less of annual devil's claw exports from Namibia originated from devil's claw harvested in the project area.

But that has also started to change. Indeed, as a result of a new-found role of plant resources like devil's claw within Namibia's CBNRM programme, organised sustainably harvested devil's claw production has expanded significantly since the end of SHDC in 2006.[5] With the new emphasis on integrated resource use and management, an increasing number of conservancies have been extending their interests and activities beyond animal wildlife use and are applying to attain community forest status as well, so as to acquire legal use rights also for plant resources. This has increased the scope for conservancies to utilize devil's claw (and other INP) resources where they occur in commercial quantities increases. A critical advantage of promoting devil's claw production in conservancies and other CBNRM structures has been that these existing structures have evolved organizational and resource management frameworks within which the management of plant resources like devil's claw can be conveniently and successfully integrated and sustainable harvesting can be ensured.

Since 2006, two conservancies in Otjozondjupa Region (Nyae Nyae and N#a Jaqna) and the Kyaramacan Association in Bwabwata National Park (West Caprivi) have taken up organised

[5] The SHDC ended in 2006 as a donor-funded project, but organised devil's claw harvesting and trade have continued on the "SHDC farms", but with lower levels of support from CRIAA SA-DC.

commercial devil's claw harvesting and trade, based on the benefit-sharing model and best practices developed by the SHDC project. All three PPOs have developed and are implementing devil's claw management plans that build on and include elements from the SHDC project, including: use of sustainable harvesting methods and correct practices for slicing, drying and storing devil's claw side-tuber material, monitoring during harvest, post-harvest impact monitoring, and (where necessary and feasible) resource surveys to establish resource inventory inventories and set harvest quota.

For illustrative purposes, the devil's claw management plans for the Nyae Nyae and N#a Jaqna Conservancies and for the Kyaramacan Association are appended as Annexes A and B, respectively. In order to facilitate and operationalise the implementation of these devil's claw management plans, practical tools have been developed that are used by these PPOs, in collaboration with service providers and MET, for the monitoring of harvesters (during harvest) and for post-harvest impact assessment. These tools are attached as Annexes C and D, respectively.

All three PPOs register their harvesters after they have trained them in sustainable harvesting methods and require registered harvesters to comply with agreed harvesters' rules. All three PPOs have established long-term devil's claw purchasing agreements with Namibian exporters under which each year, prior to actual harvesting, the total amount of devil's claw to be harvested and the purchasing price are agreed. All three PPOs have also been certified organic.

The combined production of sustainably harvested devil's claw by these PPOs has increased substantially since 2006, constituting now around 10% of annual devil's claw exports from Namibia). This is (more than) 10 times the percentage contribution by the SHDC project prior to 2006. (See DCEIA, Section 7.1, Tables 7 and 8, for more details).

2.2.3 Evolving government policy to regulate the expanding commercial devil's claw trade and its challenges[6]

After large-scale devil's claw exports had started in 1962, export volumes grew quickly over the years, which raised concerns over possible over-utilisation of the devil's claw resource base. This led the Government to declare *H. procumbens* a protected plant species under the Nature Conservation Ordinance of 1975[7] and to introduce a permit system to control the harvesting, processing, transport, and export of side-tuber material in Namibia.

However, growing evidence in the 1980s that most harvesting was done illegally, without the required permits, suggested that the permitting system was not working. This led the Government in 1986 to suspend all existing permits for devil's claw harvesting, storing and transporting while maintaining permit requirements for exports, as this was the only part of the permit system that had worked relatively well.

[6] This section draws on Section 7.3 and Annex D of the DCEIA (Krugmann, 2010).

[7] With the recent revision of the Devil's Claw Policy in 2010,, the 'Protected Plants' Schedule of the Ordinance has now been amended to also include *H. zeyheri* in the list of protected species, in order to broaden and strengthen the devil's claw regulatory framework.

Further substantial increases in devil's claw exports during the 1990s raised renewed concerns about the over-utilisation of the resource base. These concerns as well as reports about exploitation of harvesters and complaints from some land-owners about unfilled harvesting holes posing a danger to livestock and vehicles, prompted MET to re-introduce a permit system for devil's claw harvesting in 1999, as part of a draft policy entitled "Policy on the Harvesting and Export of *Harpagophytum* Products".

However, an assessment, in 2003, of the effectiveness of the re-introduction of the harvesting permit system concluded that the draft policy was not well understood and that there was a significant level of non-compliance with existing regulations, due to a general lack of awareness on the part of both MET and the harvesters, characterized by misinterpretations and inconsistencies. The permit system was found not to be effective and therefore not contributing to improved resource management. At the same, the assessment recognised that the context in which harvesting takes place was a complex and difficult one, making effective implementation of harvesting permits a real challenge.

The Draft Policy of 1999 remained in use for 10 years, until it was revised and finalized in 2010. The new policy ("National Policy on the Utilization of Devil's Claw (*Harpagophytum*) Products 2010") clarifies, refines, and operationalises certain provisions of the Draft Policy, as follows:

- it establishes clear operational procedures for what traders and exporters must do to register with MET, as required;
- it stipulates a harvesting season (01 March – 31 October); and
- it refines existing permitting procedures in order to facilitate traceability of material -- specifically, it establishes clear operational procedures for traders and exporters to keep records of all transactions, indicating, *inter alia*, where (in which harvesting areas or trading locations) material was obtained.[8]

Notwithstanding these improvements, the extent to which MET will be able to make the new Policy work in practice remains to be seen. Ensuring compliance with the stipulated operational procedures (for the registration of traders and exporters and for permit applications and renewals of harvesters, traders, transporters and exporters) and with related information requirements (through report-back of harvesters, traders and exporters) will be a challenge, given the number of actors involved ((up to) 8,000 harvesters, close to 100 traders, and 5 exporters), the remoteness of many of the areas where harvesters and traders operate, and low levels of education and resources among many of the harvesters.

As well, implementing the new Policy effectively will require a considerable administrative, monitoring, enforcement, and (internal as well as external) awareness- and capacity-building effort on the part of the Ministry of Trade and Industry (MET) which, in turn, will require sufficient human and financial resources to be mobilized and allocated, combined with the necessary political backing and institutional commitment. None of these ingredients for implementation success can be taken for granted, but all will be needed if the Policy is to

[8] Linking permits for traders to specific harvesting locations from which to purchase devil's claw is important not only for traceability but also to prevent situations where continuing parallel informal trade undercuts organised harvesting by PPOs.

improve on the poor levels of compliance with the regulations of its predecessor, the Draft Policy of 1999.

The Namibian experience of (attempted) regulation of the commercial use of devil's claw highlights the challenges involved in trying to prevent or control illegal devil's claw trade. The issue of continuing informal unsustainable (and illegal) devil's claw harvesting and trade is one to be addressed by MET. It is an issue beyond the mandate and influence of the INP PPO Sub-Activity, although the INP PPO Sub-Activity may be able to be of assistance to MET in various ways (e.g. by coordinating on-the-ground monitoring activities and by sharing field information).

2.3 Demand for devil's claw products – global markets and drivers of demand

Over the years, the world market for devil's claw has grown substantially both in terms of volumes exported and in terms of the number and spread of export destinations. Germany continues to be the largest importer. Other major importing countries include Italy, France and Poland[9]. Strong inter-annual variations in levels of demand for devil's claw from some of the major individual importing countries, due to a variety of reasons, have contributed to the unpredictability of overall global demand. Half a dozen other countries spread over five continents (Europe, Africa, Asia, North America and South America) have imported smaller quantities of devil's claw during the last two years (2009-2010). The emergence of new entrants (like South Korea, Switzerland, USA, and Brazil) may contribute, in time, to greater diversification among importing countries and buyers, as some of these newcomers become significant export destinations (see DCEIA, Section 5.3 for more details).

Markets for end-products of devil's claw are currently dominated by traditional herbal remedies sold over the counter rather than on prescription. New herbal remedy uses, and specifically devil's claw uses, are emerging, such as for the treatment of back pain. In addition, other market segments (for veterinary herbal remedies/animal food supplements and herbal teas with therapeutic qualities, respectively), while so far small, hold potential for significant expansion.

In the target markets for devil's claw, in particular the European Union, the proportion of people consuming devil's claw generally has been increasing as populations have aged. On the other hand, devil's claw is but one of a range of possible products for arthritis and rheumatism. If other (competitive) products change in price or perceived efficacy relative to devil's claw (or vice versa), end users will switch away from or to devil's claw based products. Recently, this substitution effect accounted for a significant drop in demand for herbal remedies made from devil's claw in Germany when devil's claw was taken off the list of herbal remedies covered by the country's public health insurance.

An initiative with a potentially significant impact on global demand for devil's claw is the EC Traditional Herbal Remedy Directive (THRD). The THRD will come into force in April 2011, and it will only be after that date that it will become clear what its impact will be. The Directive means that all DC products have to be registered. Registration is expensive, but

[9] Poland has become a major importer (and Germany has lost some of its pre-dominance as importer) since 2006, in which year a major German importing company shifted its operational base from Germany to Poland.

enables the manufacturer to make claims on the packaging (hitherto these were not allowed). This could have two effects. It could constrain demand for devil's claw from the many existing small-scale bottlers and branders of DC products who are unregistered. It could also mean that the registered companies can sell a lot more devil's claw products because they can explain to the consumer on the packaging what effect it might have if they take the product.[10]

Most, if not all, of these drivers of global demand for devil's claw are beyond the influence of the INP PPO Sub-Activity.

2.4 The MCA-N INP PPO Sub-Activity

The goal of the overall MCA-N INP Activity is to increase economic opportunities for INP stakeholders through improved organizational, business and technical capacities along the value chain. The INP Activity has three sub-activities: i) Innovation Fund Sub-Activity; ii) Market Information Delivery Sub-Activity; and iii) Indigenous natural Products (INP) Producer and Processor Organisations (PPO) Sub-Activity. The aim of the Innovation Fund is to provide grant funding to research entities, academic institutions, NGOs and private firms for priority INP innovations, such as new/improved INP resource assessment methods and new/improved techniques to harvest and/or process INPs. The purpose of the Market Information Delivery Sub-Activity is to develop and provide appropriate access to a market information system by collecting information on INP volumes traded and prices from PPOs, processors, and buyers, and analysing, making available and disseminating this market information in a timely and effective manner.

The overall objective of the INP PPO Sub-Activity of the INP Activity is to sustainably increase the number and income of households involved in the INP sector by broadening the number, increasing the volume and improving the quality of natural products and by adding value to natural products. The INP PPO Sub-Activity seeks to meet its overall objective by providing technical and organizational training and technical assistance as well as equipment, facilities, supplies and services, by way of primary production enhancement grants, or primary production improvement grants (PPIGs), to eligible PPOs to enhance their technical and organizational capacities to develop better market linkages, organize and operate the INP enterprise more effectively, and utilize the local INP resource base sustainably.

An initial PPO training needs assessment suggested the following priority areas for PPO training and technical assistance (Nott, 2010a): organizational capacity, administrative skills, record keeping, business and marketing skills, leadership skills, INP product development and value addition, **sustainable harvesting methods, during-harvest and post-harvest monitoring, INP resource management, processing and production methods, monitoring INP quality, cultivation and enrichment planting**, **gender mainstreaming (and the integration of women and vulnerable groups).**

All of these topical areas matter for PPOs harvesting and selling INPs (including devil's claw) and will tend to have (direct and/or indirect) positive resource/environmental and social

[10] Ben Bennett, personal communication, February 2011.

effects. But it is the training topics highlighted in bold that will have greater specific relevance to devil's claw based INP enterprises and will likely have the greatest direct positive environmental and social impacts - in helping to maintain the health and integrity of local devil's claw populations, ensure the sustainability of their commercial use by PPOs, and fully integrate women and vulnerable groups in commercial devil's claw enterprises.

As for PPIG grants, they will be used for the acquisition of the following types of equipment, facilities, supplies and services (Ridgway, 2010): equipment for enrichment planting, cultivation and primary processing, storage facilities, packaging and labelling material, laboratory analysis and business services. The envisaged close coordination and integration of the identification and selection of particular equipment, facilities, supplies and/or services for PPIG support with the determination of priorities for PPO training and technical assistance support will make it very likely that the use of PPIG grants reinforces the positive environmental and social impacts of PPO training and technical assistance (Krugmann, 2010b).

3. Environmental and Social Risks/Impacts from "Traditional" Informal Commercial Devil's Claw Harvesting, Ongoing Organised Harvesting, and the INP PPO Sub-Activity

3.1 Risks and impacts from "traditional" informal open-access commercial devil's claw harvesting and trade

3.1.1 Environmental risks

The DCEIA (Krugmann, 2010a) examined the complex, multi-faceted and inter-linked nature of the range of forces and factors that contribute to the environmental risk (plant resource impacts) associated with commercial devil's claw harvesting and trade. The following intertwined risk factors were identified as collectively posing a potential threat to the health and integrity of devil's claw resources in communal open-access areas prone to over-harvesting, especially during years of high market demand:

- Intrinsic biological destructiveness of harvesting parts of the root system, as in the case of devil's claw, which calls for appropriate harvesting techniques, if lasting damage to plants is to be avoided;
- Informal and unorganized nature of much of the devil's claw harvesting and trade (without much if any traceability and quality control of material) within Namibia -- although the proportion of devil's claw exports that comes from sustainably harvested areas (some of them certified organic) has been growing substantially in recent years and by now has become quite significant (see Section 3.2);
- Open-access (or uncontrolled-access) nature of many of the communal areas where devil's claw has been traditionally harvested, making it difficult to exclude outsiders from the resource;
- Complex supply chains in Namibia, multi-stage trading before harvested material reaches exporters, few long-term relationships and purchase agreements between harvesters and exporters, exploitative trading relationships between traders and harvesters, and lack of market information on the part of harvesters;

- Extreme poverty, marginalization and consequent exploitation of the primary producers (harvesters) which are disconnected from the rest of the actors along the value chain;
- Lack of bargaining power, extreme poverty and high market demand may combine to tempt or force individual harvesters to adopt ecologically and commercially unsustainable harvesting practices and to sell low-quality material, against better knowledge, in desperate attempts to increase harvesting volumes, sales and revenues;
- Persistently low prices received (relative to the market value of devil's claw side-tuber extracts produced overseas and even more so, relative to global retail prices of devil's claw products) and low value margins captured by Namibian harvesters and exporters;
- Namibian exporters are not organized -- although various attempts have been made over the years to facilitate their organization;
- there are few, if any, long-term relationships between exporters and overseas buyers (importers);
- Lack of cooperation, coordination and collective action at local, national and regional levels, on the part of Namibian (and range state) actors (harvesters and exporters) -- notwithstanding the establishment of a Devil's Claw Range State Working Group;
- Little or no upgrading and value addition takes place in Namibia – most or all of it occurs after export;
- Extremely skewed distribution of benefits and highly inequitable benefit-sharing along the global trade chain, with a particularly large value margin opening up between Namibian exporters and overseas buyers, captured entirely by the latter;
- Stark power asymmetry between lead buyers and supply-side actors (harvesters and exporters) in setting prices, controlling the principal value-adding stages (raw material processing and product development) and hence capturing most of the value margin;
- Limited data and information available on: the national devil's claw resource base and local devil's claw populations; spatial and temporal patterns of harvesting and trade activity within Namibia; and the impact of harvesting and trade on local devil's claw populations and the national resource base; and
- Ineffective application and weak enforcement of policy and regulatory instruments like the devil's claw policy and permitting system in Namibia.

3.1.2 Social impacts

Generally, little is known about gender roles and the involvement of women and disadvantaged/ vulnerable groups (e.g. marginalized ethnic groups) across communities engaging in "traditional" unorganized devil's claw harvesting. More research would be needed to better understand the gendered context and the nature/degree of participation of women and disadvantaged/ vulnerable groups in devil's claw harvesting and trade across these communities.

Positive impacts

The principal positive social impact from "traditional" commercial devil's claw harvesting and trade has been the cash incomes and in-kind benefits earned by thousands of resource-poor and often marginalized harvesters in Namibia who typically have few if any other sources of income. Even though the incomes and benefits derived from informal unorganized harvesting and selling of devil's claw are very low, they tend to supplement other income sources and diversify livelihoods and (in times of hardship) may be critical to survival.

Negative impacts

The informal unorganized form of "traditional" devil's claw harvesting leaves the harvesters in a very weak bargaining position and often desperate to sell, for which reason they usually receive extremely low prices (much lower than the prices they could get if they organised themselves). Therefore, "traditional" harvesters' incomes are far below the incomes they could earn if they organised themselves.

3.2 Risks and impacts from ongoing initiatives of organised devil's claw harvesting and trade (relative to the "unorganized harvesting" baseline)

This Section identifies environmental and social impacts of recent initiatives of organised controlled-access devil's claw harvesting and trade, relative to "traditional" unorganized open-access devil's claw harvesting as the baseline.

Organised controlled-access harvesting has taken place in:

- the SHDC project (1997 – 2006);
- in most of the Omaheke resettlement farms that used to participate in the SHDC project (after 2006);
- Nyae Nyae Conservancy, Otzondjupa Region (starting in 2006, with an early precursor activity in 2002);
- N#a Jaqna Conservancy, Otjozondjupa Region (starting in 2007); and
- Kyaramacan Association, Bwabwata National Park, West Caprivi (starting in 2008).

Based on the SHDC model, properly organised controlled-access devil's claw harvesting and sale entails registration of harvesters, their compliance with agreed rules for harvesting and sale of side-tuber material, use of sustainable harvesting techniques and appropriate primary processing methods, annual resource inventories prior to harvesting and harvesting quota setting[11], post-harvest impact monitoring, monitoring during harvest (as necessary), exclusion of non-registered harvesters and outsiders, arrangements for quality control and traceability, and long-term purchasing agreements with exporters.

[11] Annual resource inventories and harvesting quota are not required where devil's claw harvesting takes place within a rotational harvesting scheme. This is possible where land is owned privately (private farms) or can be easily demarcated. But it is difficult in most open-access communal areas.

3.2.1 Environmental impacts

Where organised controlled access harvesting is practiced, this has positive environmental impacts in terms of (more) sustainable resource use, relative to previous unorganized open-access harvesting in the same location or unorganized open-access harvesting in other locations (the "unorganized open-access harvesting" baseline). The better devil's claw harvesting and sale is organised and access to devil's claw resources controlled, the smaller the adverse impact on the local devil's claw resource base. Ideally, where PPOs are well organised, have received proper training and are experienced in devil's claw harvesting and sale, there should be no appreciable adverse impacts on local devil's claw resources and in fact the opposite is expected.

3.2.2 Social risks and impacts

The principal positive social impact of organised controlled-access harvesting and sale, relative to unorganized harvesting and sale, is that prices established through long-term purchasing agreements with individual Namibian exporters, prior to harvesting (as part of the training of harvesters), are higher and more stable than prices in the informal market, and hence organised harvesters' incomes from devil's claw are larger and more predictable.

A preliminary review of issues of gender and the integration of women and vulnerable groups (or lack thereof) within PPOs engaged in (more or less) organised controlled-access devil's claw harvesting and trade conducted for the INP PPO Sub-Activity in preparation of its Gender and Social Integration Plan (GSIP) (den Adel, 2010) identified a number of social risks and actual or potential negative social impacts associated with this commercial activity. The review also flagged the general lack of information on most of these gender and social integration issues and impacts and the consequent need for further research to understand these issues and impacts better before they can be mitigated. Identified social risks/ impacts include:

- Underrepresentation of women among the San harvesters, relative to other ethnic groups, on resettlement farms (former SHDC participants) in the Omaheke Region;
- Possibility of ethnically based tensions and ethnic discrimination against the weaker San groups (Omaheke);
- The "one member per household" harvester registration rule in some San-dominated PPOs (in the Omaheke and Otjozondjupa Regions) potentially gives men greater access to income than women (specifically where households are male-headed, with men selling devil's claw and keeping the cash from sales);[12]

[12] The purpose of establishing the "one member per household" harvester registration rule in the first place was to give more households a chance to participate in devil's claw harvesting in areas where with a more limited local resource base. There are two potentially conflicting objectives here: enhancing women's participation on one hand and ensuring equitable access to and equitable sharing of benefits from the use of limited devil's claw resources across households on the other. Both trade-offs and complementarities between these two objectives need to be considered and thoroughly discussed before any change to the "one member per household" rule is made, so as to arrive at a balanced outcome that is supported by everyone involved.

- Lack of access to land and natural resources (such as devil's claw) by poorer conservancy members, as a result of widespread illegal fencing of conservancy land by wealthy cattle farmers, in Herero-dominated conservancies (Otjozondjupa Region);
- Actual or potential exploitation of poorer young men (farm workers, conservancy members, or residents of nearby towns) by wealthy and influential devil's claw permit owners who hire these youngsters as casual harvesters (Herero conservancies, Otjozondjupa Region).

3.3 Risks/impacts resulting from the INP PPO Sub-Activity

3.3.1 Environmental risks/impacts

Positive impacts

As pointed out in the Strategic Environmental Assessment (SEA) (ARD, 2008) and reiterated in the DCEIA (Krugmann, 2010a), the INP PPO Sub-Activity is likely to have (indirect) positive impacts on the health and integrity of the devil's claw resource base and the sustainability of its commercial use (ARD, 2008). These indirect positive environmental impacts will materialize as a result of eligible PPOs using their strengthened technical, organizational and marketing capacities -- developed or enhanced through technical and organizational training and technical assistance as well as through PPIG-facilitated equipment, facilities, supplies and services, provided with the help of service providers and with support from the INP PPO Sub-Activity -- to develop better market linkages, organize and operate the INP enterprise more effectively, and utilize the local INP resource base sustainably.

Strengthened technical capacities of PPOs will enable them to manage the resource sustainably, using tools and methods such as: harvest quota setting based on resource inventories; established good practices for sustainable harvesting, post-harvest impact monitoring; and enrichment planting and cultivation where appropriate.

Strengthened organizational capacities will make it possible for PPOs to: develop and implement devil's claw resource management plans; plan, implement and monitor resource harvests; ensure quality control and traceability for all harvested material; meet all requirements of the national regulatory system for devil's claw (including timely application for and renewal of MET harvesting permits as well as careful and comprehensive recording of all market transactions on the permits); and exclude outsiders from harvesting.

Strengthened marketing capacities of PPOs will allow them to: develop and maintain effective long-term working relationships with key exporters and (if necessary) with their intermediaries; and secure 'premium' prices (and bonuses where relevant and applicable) for their sustainably harvested and traceable quality devil's claw produce from these exporters – thus having an economic incentive for sustaining their organized sustainable-harvesting system and maintaining the integrity of the local plant resource base.

A total of 26 PPOs having devil's claw as their principal INP resource have been selected by the INP PPO Sub-Activity as eligible for training and technical assistance support during the

1st year of the INP PPO Sub-Activity (Nott, 2010a).[13] These include the seven PPOs that have already been producing sustainably harvested devil's claw (see Section 2.2.2). The 26 devil's claw resource based PPOs are virtually all based in those Regions (Omaheke, Otjozondjupa, Caprivi and Kavango) where most of the devil's claw occurs and has been harvested in Namibia to date.[14] The greater the number of these PPOs that are successfully trained in organised sustainable harvesting and trade, the larger will be the proportion of devil's claw exports from Namibia that comes from sustainably harvested areas.

Negative impacts

If the INP PPO Sub-Activity succeeds in helping to make greater market demand happen, it will have a positive social impact (see Section 3.3.2) – but only to the extent that this increase in demand is met from organised production. It is conceivable, however, that market demand increases, in particular sudden demand surges, might also (or even primarily) stimulate informal unorganized and unsustainable harvesting activity in open-access areas and thus have a "perverse" negative impact on local devil's claw resource base.

But the global devil's claw market is complex and there are likely to be many forces and factors affecting the market that are not susceptible to be influenced by the INP PPO Sub-Activity. Also, it usually takes time for the market to show tangible signs of change as a result of efforts to influence global market players and processes. It is therefore highly doubtful that the INP PPO Sub-Activity could have any significant effect on market demand during its relatively short implementation time frame of 3.5 years. This does not mean, however, that an increase in market demand could not occur during the lifetime of the project. It rather means that any significant increase or surge in demand in the next 3-4 years would almost certainly be extraneous to the INP PPO Sub-Activity, i.e. a consequence of forces and/or events unrelated to or independent of the INP PPO Sub-Activity. Current initiatives that might result in an increase in demand for devil's claw include the EC THRD[15] and the MCA-N INP Innovation Fund Sub-Activity[16].

3.3.2 Social impacts

Positive impacts

It is anticipated that the INP PPO Sub-Activity will have (indirect) positive social impacts relative to the current status of commercial harvesting and trade activity in the devil's claw sub-sector, in two principal ways. First, the INP PPO Sub-Activity is expected to increase the

[13] This compares with a total of 63 PPOs, endowed with any of the targeted INP resources in commercial quantities, that were found eligible for support under the INP PPO Sub-activity during the 1st year, out of a grand total of 84 candidate PPOs to which the PPO Diagnostic Tool was applied at the beginning of the 1st year.

[14] The exception is one PPO in the Kunene Region in whose eastern part devil's claw occurs.

[15] For instance, the EC THRD initiative could result in a net increase of demand for devil's claw if increased sales by registered companies outweigh losses in demand from current small-scale bottlers and branders of devil's claw products (see Section 2.3 for more information on the THRD).

[16] In the event that the results of research supported under the MCA-N INP Innovation Fund Sub-Activity successfully remove significant demand constraints.

number of rural harvesters (men and women) who harvest and trade devil's claw in an organised and sustainable way and who consequently (on the basis of long-term purchasing agreements negotiated with exporters) receive higher and more stable prices and thus benefit from larger and more predictable incomes. The INP PPO Sub-Activity may also contribute to further raising and stabilising the incomes of devil's claw harvesters who already operate in organised sustainably harvesting schemes.

The INP PPO Sub-Activity is expected to bring about these (indirect) positive income effects by further strengthening existing devil's claw based PPO enterprises and by helping to build the technical, organisational and marketing capacities of a number of new PPOs that are intent on starting commercial devil's claw enterprises. These new PPOs include various existing CBNRM structures like conservancies and community forests that already have (more or less well functioning) institutional and management frameworks for (better) managed resource access.

The second expected (indirect) positive social effect from the INP PPO Sub-Activity will be a result of its efforts to address current issues of (and lack of information on) gender roles and the integration of women and vulnerable groups (or lack thereof), and attendant social risks (see Section 3.2.2) affecting (more or less) organised and managed-access PPO devil's claw enterprises, as outlined in the Gender and Social Integration Plan (GSIP) (den Adel, 2010). This positive social effect is anticipated to materialise during the implementation phase of the INP PPO Sub-Activity, as the gender and social integration strategies and actions set out in the GSIP are implemented. But the extent to which this positive impact materialises will not only depend on how effectively and efficiently the gender and social training, research and monitoring is carried out, as an integral component of the INP PPO Sub-Activity, but also on the degree to which these activities achieve their desired outcomes at the level of PPOs, service providers, trainers, and INP PPO Sub-Activity team members. Even with the best delivery of GSIP inputs, these outcomes will be uncertain, however, as they will be influenced by a range of factors outside the control of the INP PPO Sub-Activity.

Negative impacts

Where a conservancy or community forest establishes an organised devil's claw harvesting scheme within its boundaries with the support of the INP PPO Sub-Activity, this may affect the welfare and livelihoods of informal harvesters in the area in different ways. It is reasonable to expect informal harvesters from the area, who are eligible to join the scheme, to want to join, once aware of the benefits of organised harvesting, and it would be in the interest of the conservancy to make every effort to encourage informal harvesters from the area to join the scheme. The impact on the livelihoods of informal harvesters from the area who get integrated in the scheme will be positive, and it is hard to think of circumstances where informal harvesters from the area could not be absorbed in the scheme or did not want to join.

However, the situation will be different for informal harvesters who are not from the area and who may have been harvesting illegally. These harvesters would not be eligible to join the scheme, and not all of them may be able to harvest elsewhere or find alternative livelihood sources, at least not immediately. It is conceivable therefore that the livelihoods

of some of these informal harvesters, especially the poorer among them, are affected negatively, at least temporarily, notwithstanding the possible illegality of harvesting activities. This is not sufficient reason, of course, for not pursuing organised harvesting, as the environmental benefits are clear and the social benefits, on balance, are also positive.

4. Risk/Impact Scenarios for the Devil's Claw Sub-sector, with and without the INP PPO Sub-Activity, and the Nature and Scope of the DCEMP

The assessment of (actual and potential) environmental and social impacts from past, present and future commercial devil's claw harvesting and trade, presented in the previous section, can be used to construct some simple qualitative scenarios (possible futures) for how the evolving devil's claw sub-sector in Namibia might impact on the resource base and the harvesters, and what the role and impact of the INP PPO Sub-Activity might be in this context. These scenarios will then provide a framework for deciding on a suitable nature and scope of the DCEMP.

4.1 Risk/impact scenarios

Two key variables, emerging from the above impact assessment, lend themselves for the construction of simple qualitative impact scenarios. These variables are:

i. The extent to which devil's claw production in Namibia is organised, uses sustainable harvesting methods, and takes place in areas where resource access is managed and controlled -- measurable in terms of the proportion of devil's claw exports from Namibia that comes from organised managed-access harvesting and trade enterprises in the country in any given year); and
ii. The level of global market demand for devil's claw – measurable in terms of the total amount of dried devil's claw side-tuber material purchased by international buyers in any given year.

The second variable is an (indirect) measure for the commercial pressure on the devil's claw resource base in Namibia[17], while the first variable is a (more direct) measure of the degree to which devil's claw is harvested sustainably in Namibia. Both variables are complex dependent variables, in that they are influenced by a range of forces and factors operating at different levels (global, national, and/or local). However, the two variables differ greatly with regard to the extent to which the INP PPO Sub-Activity is capable of influencing them.

The two variables can be used to construct different risk/impact scenarios (possible impact futures for the devil's claw sub-sector in Namibia) by making different assumptions about

[17] The second variable is reflective of a rather static picture of the devil's claw market (and the demand and supply changes are connected). In fact, the market is more dynamic. Responses of individual harvesters, and the aggregate supply response, to changes in global demand are stimulated through price-change signals. It takes some time for these price-change signals, emanating overseas, to travel down the value chain and reach the harvesters, and the signals get weakened by the considerable number of value chain stages they must traverse. This results in an attenuated and delayed supply response. International price changes could have a more direct impact on harvesters and a more direct supply response, if it were possible to organise the domestic devil's claw industry, add more value in Namibia, and thus reduce the number of value chain stages and actors (see also the DCEIA, Section 5.4).

how they might evolve over the lifetime of the INP PPO Sub-Activity and beyond, as illustrated in Table 2. Combining assumptions of substantial progress with expanding sustainably harvested devil's claw production on one hand with constant or diminishing global market demand on the other would correspond to a devil's claw sub-sector future with significantly reduced environmental and social risks relative to current risk levels (lightest-shaded lower left-hand field in Table 2). Conversely, assuming levels of sustainably harvested devil's claw production to stagnate or deteriorate (despite the presence of the INP PPO Sub-Activity) and at the same time global market demand to rise substantially (as it has done repeatedly in the past 20 years for different reasons) would correspond to a devil's claw sub-sector future with significantly increased environmental and social risks (darkest-shaded upper right-hand field in Table 2). Bounded by these 'best-case' and 'worst-case' risk/impact scenarios, other intermediate risk/impact scenarios are conceivable, based on different combinations of assumptions.

Table 2: Risk/impact scenarios -- based on different assumptions about the level of market demand and the proportion of national devil's claw production that is organised

		Increase in Market Demand		
		None	**Market Upturn**	**Market Boom**
Proportion of National Devil's Claw Production that is Organised	**No progress**			
	Some progress			
	Substantial Progress			

Note: The darker the shading, the higher the level risk/impact

Given the aggregate and multi-faceted nature of the two variables considered here, it is not clear, *a priori*, which of the possible risk/impact scenarios may be the most likely or the most unlikely ones to materialise. Nor would it be of much relevance to try to delineate risk/impact scenarios in quantitative terms on the basis of more precise assumptions about the variables. The purpose of considering scenarios (possible futures) is not to "predict the future" for the devil's claw sub-sector in Namibia or "establish targets" for the INP PPO Sub-Activity. Rather, the purpose is to provide an indication of the complexity of the situation and the INP PPO Sub-Activity's important but limited role in influencing and managing potential risk/impact levels in the devil's claw sub-sector and motivate for a broad approach to the DCEMP, and to motivate for a broad approach to the DCEMP.

4.2 Nature and scope of the DCEMP – some conclusions

While it is reasonable to anticipate that the INP PPO Sub-Activity, through its PPO capacity-building efforts, will have a significant, if still indirect, positive impact on the extent to which devil's claw production in Namibia is harvested sustainably, the INP PPO Sub-Activity most likely will have very little, if any, influence over global market demand. Nor could the INP PPO Sub-Activity deal with the (negative) impacts from increasing market demand on the devil's claw resource base in Namibia on its own (given its limited mandate, objectives and resources). Rather, managing such a challenging situation would require coordinated responses and actions from a range of stakeholders, not just the INP PPO Sub-Activity.

This leads to the following conclusions:

- The INP PPO Sub-activity does not have the mandate or resources to address the full range of risks and impacts associated with the commercial use of devil's claw in Namibia, although it can make an important contribution toward this end.
- The DCEMP needs to be focused on how to mitigate and monitor the full range of risks and impacts resulting from Namibia's devil's claw sub-sector, rather than only those risks emanating from the INP PPO Sub-Activity alone, and hence needs to be given a broad scope.
- A broad-scoped DCEMP must include recommended measures and activities to be undertaken across different stakeholders, actors, and projects, not just the INP PPO Sub-activity.
- Such a DCEMP has relevance not only (or primarily) for the INP PPO Sub-Activity during its lifetime but also to other national and regional stakeholders, and beyond the lifetime of the INP PPO Sub-Activity.

5. Mitigation Measures and Related Monitoring Activities

In line with the suggested broader scope of the DCEMP, the set of recommended measures and related monitoring measures outlined in this section are intended to collectively address identified environmental and social impacts resulting not just from the INP PPO Sub-Activity, but more broadly from Namibia's evolving commercial devil's claw sub-sector, including the INP PPO Sub-Activity. Furthermore, recommended measures are not restricted to those within the scope of the INP PPO Sub-Activity but include measures for which other stakeholders, such as the government, will be responsible.

While the DCEMP provides a framework and outlines monitoring activities for the implementation of recommended measures, including those measures to be taken by other stakeholders, it is outside the scope of the DCEMP to provide further details on how other stakeholders might go about implementing proposed measures. This is up to the other stakeholders to examine and decide. Nor does the INP PPO Sub-Activity have a mandate to monitor whether/how measures recommended to be taken by other stakeholders are followed up and implemented by these stakeholders. All the INP PPO Sub-Activity is in a position to do is to facilitate consideration and implementation of such measures by other stakeholders by discussing the reasons for and nature of the proposed measures with these stakeholders and by encouraging their consideration and their implementation.

5.1 Mitigation measures

This section presents recommended mitigation measures. These are organised in two categories: measures to be taken by the INP PPO Sub-Activity and other measures that should be taken by other stakeholders.

5.1.1 Measures to be taken by the INP PPO Sub-Activity

The INP PPO Sub-Activity is designed to undertake the following devil's claw related activities which constitute mitigation measures addressing risks and adverse impacts of the devil's claw sub-sector:

- Environmental and social screening of PPOs -- eligible PPO focused on devil's claw should be subjected to environmental and social screening (as part of the annual PPO diagnostic process), using the PPO and Environmental and Social Diagnostic Tool (Krugmann.2010b)
- PPO training and capacity building[18] -- eligible PPOs focused on devil's claw should be trained to strengthen their capacity of devil's-claw-focused PPOs to use sustainable harvesting methods and manage the devil's claw resource sustainably, to run the commercial devil's claw enterprise efficiently, equitably and sustainably by (organizing harvesters effectively, maintaining quality control, ensuring traceability of harvested material, and integrating women and vulnerable groups), and to market devil's claw effectively (by developing better market linkages, set up long-term purchasing agreements with exporters, etc). An initial PPO training needs assessment carried out by the INP PPO Sub-Activity suggested a number of priority areas for PPO training and technical assistance (Nott, 2010a). These priority areas for PPO capacity building are listed in Section 2.4 above. Specifically for devil's claw enterprises, some of the more important ones include: sustainable harvesting methods, during-harvest and post-harvest monitoring, INP resource management, processing and production methods, monitoring INP quality, cultivation and enrichment planting, gender mainstreaming (and the integration of women and vulnerable groups).
- Technical assistance and mentoring -- eligible PPOs focused on devil's claw should receive technical assistance and mentoring on an individual basis, depending on need. This will focus on the areas of PPO capacity building identified in the training needs assessment (see previous point)
- Provision of equipment, facilities, supplies and services (through PPIGs) – eligible PPOs focused on devil's claw should receive equipment, facilities, supplies and services relevant to their commercial devil's claw enterprises in order to improve their enterprises. This will include stainless steel knives for harvesting, netting for tuber drying, facilities for dried tuber storage, packaging and labelling material, and laboratory and business services, as needed (Ridgway, 2010).
- Implementation of the Gender and Social Integration Plan (GSIP) – strategies and actions recommended in the GSIP should be implemented for PPOs focused on devil's claw as their INP. Of GSIP's eight strategies, the following are more specifically relevant to PPOs focused on devil's claw: analysis of gender and vulnerable groups; increasing access and benefits; and increasing participation and decision-making. Other GSIP strategies are also relevant but less INP-specific. Implementing each strategy entails carrying out a number of actions, as detailed in the GSIP (den Adel, 2010).

The above measures will help to mitigate the environmental and social risks and negative impacts of commercial devil's claw harvesting and trade in Namibia. More PPOs trained in the resource management, organizational and marketing aspects of a devil's claw enterprise -- and better trained PPOs using better equipment and facilities and having access to better supplies and services -- will mean that a greater proportion of devil's claw production in

[18] It needs to be pointed out here that registration of harvesters and actual harvesting by any PPO does not take place until after harvesters have been trained.

Namibia is produced by organizations using sustainable harvesting methods, sound resource management and monitoring, quality control and traceability. Similarly, PPOs that integrate women and vulnerable groups better in their devil's claw enterprises, as a result of the gender and social training received by PPOs and service providers, will have mitigated social risks and negative social impacts associated with devil's claw harvesting and trade.

All of the above measures constitute activities planned anyway for the implementation of the INP PPO Sub-Activity. In other words, none of the measures are additional to the activities specified in the INP PPO Sub-Activity implementation plans. This also means that there are no additional costs arising for the INP PPO Sub-Activity from the implementation of the recommended mitigation measures.

In line with the broader approach to the DCEMP, the INP PPO Sub-Activity can be viewed as part of a broader programme of mitigating the environmental and social risks and adverse impacts of devil's claw sub-sector in Namibia. This gives the INP PPO Sub-Activity a stronger rationale.

Table 3 provides and framework and overview of all mitigation measures – those by the INP PPO Sub-Activity and others by other stakeholders -- in terms of mitigation strategies, actions, target areas/groups, responsibilities, time frames and output indicators.

5.1.2 Measures to be taken by other stakeholders, actors and projects

For comprehensive mitigation of the risk and negative impacts, in particular environmental risks and adverse impacts, resulting from devil's claw sub-sector activity, the INP PPO Sub-Activity needs to be complemented by other mitigation measures for which other stakeholders are or should be responsible (see also Table 3):

- The MCA-N INP Innovation Fund Sub-Activity to support priority research and innovations that might help to market devil's claw more effectively and/or upgrade the devil's claw value chain in other ways, for the benefit of Namibian stakeholders, in particular harvesters.
- The MCA-N INP Market Information Delivery Sub-Activity to develop and provide appropriate access to a market information system by collecting information on INP volumes traded and prices from PPOs, processors, and buyers, and analysing, making available and disseminating this market information in a timely and effective manner.
- MET to implement the new Devil's Claw Policy effectively – MET needs to find a way to implement the Devil's Claw Policy effectively and make the permit system work, improving on earlier attempts to regulate devil's claw harvesting and trade and enforce permit systems. This is particularly important in harvesting areas that remain unorganized and hence have no internal structure and system in place for ensuring sustainable harvesting and sound resource management. The new system requires traders and exporters to register with MET and harvesters, traders, and exporters to obtain permits from and report back to MET on transactions on an annual basis as well as transporters (who are neither traders or exporters), commercial cultivators and researchers to obtain a permit from and report back to MET on activities and results.
- MET to manage cross-border devil's claw trade in the region – MET needs to engage with the relevant provincial governments (and if necessary the national governments)

of the range states of Botswana and South Africa as well as Angola to control legal cross-border trade to the other range states and (in the case of Angola) illegal cross-border trade into Namibia. The purpose would be to prevent improperly documented re-export from other range states and protect efforts of organised harvesting, quality control and traceability in Namibia, respectively.[19]

5.2 Related monitoring activities

Monitoring is required to verify if mitigation measures are having the intended effect and whether/how they should be adjusted, determine the degree of compliance with national regulations, and for other reasons. For the devil's claw sub-sector mitigation programme outlined above, minimum monitoring requirements include:

- Monitoring of PPO training and capacity building, progress made by PPOs, continuing eligibility, remaining training needs, adaptation in training packages, etc (diagnostic process)
- Monitoring activities at different levels in the implementation of devil's claw resource management plans by PPOs:
    - Post-harvest (impact) monitoring
    - Issuing of permits; and overall coordination
    - Correct harvesting & processing; illegal harvesting; illegal selling and buying; and potential harvest areas
    - Correct harvesting & processing procedures carried out.
- Monitoring of the impact of technical assistance and mentoring for PPOs
- Monitoring use of equipment, facilities, supplies and service provided through PPIGs
- Gender and social monitoring (see M&E Strategy of GSIP)
- Monitoring of compliance with existing permitting regulations and the extent to which it contributes to improved resource management
- Monitoring of devil's claw harvesting, trading, exports, transport – on the basis of permits and using the devil's claw market information systems being developed by the INP Market Information Delivery Sub-Activity:
    - Monitoring harvesting patterns (by location) and to determine spatial distribution of harvesting and production
    - Monitoring harvesting practices (by location) – post-harvest impact monitoring in organised schemes and areas of informal harvesting and trade
    - Monitoring trade chain (multi-stage) transactions and dynamics
    - Monitoring export volumes
- Monitoring prices obtained by exporters and harvesters
- Monitoring the results and impact of research on devil's claw supported by the INP Innovation Fund Sub-Activity
- Monitoring cross-border trade in the region (South Africa, Botswana, Angola)

[19] Last time the export price of devil's claw soared (in 2002) and devil's claw exports from Namibia surged, overseas companies, *inter alia*, resorted to sourcing devil's claw from other range states with less strict devil's claw policies. This needs to be prevented or managed better in future.

Table 4 provides an overview of these monitoring activities, organised in terms of the following categories: monitoring objective/object, monitoring approach/method, responsibility, time frame, and monitoring indicator(s).

5.3 Mitigation and monitoring - conclusions

As with the mitigation measures, and for the same reasons, all of the monitoring activities for which the INP PPO Sub-Activity is responsible are already part of the implementation plans for the INP PPO Sub-Activity. No additional monitoring is required and no additional monitoring costs arise. The INP PPO Sub-Activity serves as part of a broader mitigation and monitoring programme for the devil's claw sub-sector in Namibia.

Table 3: Mitigation and enhancement measures for the INP PPO Sub-$_{Activity}$ and the devil's claw sub-sector in Namibia -- framework and overview

Mitigation Strategy	Mitigation Action	Target Area/Group	(a) Responsibility and (b) Institutional Arrangements	Time Frame	Output Indicators
Environmental and social screening of candidate PPOs	Environmental and social screening of PPOs as an integral part of the PPO diagnostic process to determine eligibility of PPOs for support under the INP PPO Sub-Activity, using the PPO Diagnostic and Environmental and Social Diagnostic Tool	All candidate PPOs with an actual/potential devil's claw based INP enterprise	(a) **INP PPO Sub-Activity team** (b) Environmental and social screening to be done by service providers	Throughout the project period	Eligible PPOs selected
Training and Capacity Building of eligible PPOs	Assessing PPO training needs	Eligible PPOs with an actual/potential devil's claw based INP enterprise	(a) **INP PPO Sub-Activity team** (b) Training/cap. building activities to be implemented by service providers,	Throughout the project period	PPO training needs identified
	Developing PPO training packages			During the 1st year of the project period	Training packages have been completed and exist
	Running PPO training workshops			Throughout the project period	Training workshops completed
	Assessing PPO progress, re-assessing PPO training needs, and adjusting training packages				PPO progress and remaining training needs established and training packages adjusted
Development and implementation of PPO devil's claw resource management plans	Assisting PPOs in developing and implementing devil's claw resource management plans, using the Environmental Management Plan Template	Eligible PPOs with an actual/potential devil's claw based INP enterprise	(a) **INP PPO Sub-Activity team** (b) Training/cap. building activities to be implemented by service providers,	Throughout the project period	Devil's claw resource management plans developed and being implemented
Technical assistance and mentoring for PPOs	Technical assistance and mentoring for PPOs	Eligible PPOs with an actual/potential devil's claw based INP enterprise	(a) **INP PPO Sub-Activity team** (b) Training/cap. building activities implemented by service providers,	Throughout the project period	Technical assistance and mentoring provided
Provision of equipment, facilities, supplies and services to PPOs, using PPIGs	Provision of equipment for enrichment planting, cultivation, harvesting and primary processing	Eligible PPOs with an actual/potential devil's claw based INP enterprise	(a) **INP PPO Sub-Activity team** (b) Equipment needs to be determined by service providers in consultation with PPOs; PPIG recommendations to be made by INP PPO Sub-Activity to the Grant Committee of the INP Activity; Grant	Throughout the project period	Equipment provided
	Provision of storage facilities				Storage facilities provided
	Provision of packaging and labeling material				Packaging and labeling material provided

	Provision of laboratory analysis and business services		Committee to make funding decisions; INP PPO Sub-Activity to implement funding decisions		Laboratory analysis and business services provided
Implementation of the Gender and Social Integration Plan with regard to PPOs focusing on devil's claw as the commercial INP	A variety of actions are specified under each of the following eight proposed GSIP strategies (den.Adel.2010): ▪ Institutionalising gender and social integration ▪ Analysis of gender and vulnerable groups ▪ Increasing access and benefits ▪ Increasing participation and decision-making ▪ Protecting the well-being of children ▪ Training of trainers and service providers ▪ Social and gender input in material development ▪ Monitoring and evaluation	Eligible PPOs with an actual/potential devil's claw based INP enterprise	(a) Combination of**: Gender and Social Expert, INP PPO Sub-Activity team,** and **trainers & service providers**; as specified in the GSIP (b) Gender and Social Expert to work with PPOs, service providers and trainers	Throughout the project period	▪ Gender and social integration institutionalized ▪ Gender and vulnerable groups analysed ▪ Increased access for women and vulnerable groups achieved ▪ Increased participation and involvement in decision-making achieved ▪ Well-being of children protected ▪ Trainers and service providers trained ▪ Social and gender input provided in material development ▪ Monitoring and evaluation undertaken
Support to priority research and innovation on devil's claw	Priority research and innovation is aimed at helping to improve the chances for devil's claw to be marketed more effectively, increase market demand for devil's claw, and/or enhance devil's claw resource use sustainability through improved resource assessments by developing better assessment methods.	Research entities, academic institutions, NGOs, and private firms – in Namibia, in the region, and globally	(a) **INP Innovation Fund Sub-Activity** in collaboration with INP PPO Sub-Activity (b) Innovation Fund is managed by the MCA-N INP Manager	Throughout the project period	▪ Proposals for funding from Innovation Fund received ▪ Successful proposals selected ▪ Contracts signed and grants allocated ▪ Interim and final research reports submitted
Development and provision of access to a market information system for INPs including devil's claw	Collection of information on devil's claw volumes traded and prices from PPOs, processors, and buyers, and analysing, making available and disseminating this market information in a timely and effective manner.	PPOs, devil's claw harvesters, traders, exporters in Namibia	(a) **INP Market Information Delivery Sub-Activity** (b) Market Information System is managed by junior INP Market Information Development & Support Officer, assisted by a senior consultant; to be based at the NBRI and to support the IPTT Secretariat	Throughout the project period	▪ Market information system established ▪ Market information system accessed by PPOs, harvesters, traders and exporters ▪ INP Market Bulleting published on a 6-monthly basis

Implemention of new Devil's Claw Policy, with enforcement of permitting requirements	Issuing individual or group permits to devil's claw harvesters (Re-issuing harvesting permits only upon satisfactory report-back by harvesters)	Organised and unorganised harvesters and the harvesting locations within Namibia that are specified on their permits	(a) **MET** (b) MET working/coordinating with organised and unorganised devil's claw harvesters,	Throughout the project period -- and beyond	Devil's claw harvesting permits issued or re-issued
	Registration (and re-registration) of devil's claw traders and exporters	Namibians intent on devil's claw trading and/or exporters	a) **MET** (b) MET working/coordinating with traders and exporters		Devil's claw traders and exporters registered (or re-registered)
	Issuing permits to registered devil's claw traders (re-issuing trading permits only upon satisfactory report-back by traders)	Registered devil's claw traders and the locations from which they source devil's claw, as specified on their permits	a) **MET** (b) MET working/coordinating with registered devil's claw traders		Devil's claw trading permits issued or re-issued
	Issuing permits to registered devil's claw exporters (re-issuing export permits only upon satisfactory report-back by exporters)	Devil's claw exporters	a) **MET** (b) MET working/coordinating with registered devil's claw exporters		Devil's claw export permits issued or re-issued
	Issuing permits to devil's claw transporters (who are neither devil's claw traders nor exporters)	Devil's claw transporters (who are neither traders nor exporters)	a) **MET** (b) MET working/coordinating with devil's claw transporters (who are neither traders nor exporters)		Devil's claw transporting permits issued or re-issued
	Issuing permits for commercial cultivation/enrichment planting of devil's claw	Commercial devil's claw cultivators/ enrichment planters (CBNRM structures and private farms)	a) **MET** (b) MET working/coordinating with communal and private commercial devil's claw cultivators/enrichment planters	Throughout the project period -- and beyond	Devil's claw commercial cultivation/enrichment planting permits issued or re-issued
	Issuing permits for research on devil's claw (including feasibility studies for cultivation and enrichment planting)	Experimental devil's claw cultivators and enrichment planters	a) **MET** (b) MET working/coordinating with communal and private experimental devil's claw cultivators		Devil's claw research/ experimental cultivation/ enrichment planting permits issued or re-issued
Managing cross-border trade in the region	Controlling devil's claw exports to other range states (to prevent re-export)	Provincial/national governments of other range states (South Africa and Botswana)	a) **MET** b) MET working/coordinating with the provincial/national governments of South Africa and Botswana	Throughout the project period -- and beyond	Agreement with other range states to control cross-border movements of devil's claw – concluded and implemented
	Controlling illegal cross-border imports from Angola	Provincial/national governments of Angola	a) **MET** b) MET working/coordinating with the provincial/national governments of Angola		Agreement with Angola to control illegal cross-border imports – concluded and implemented

Table 4: Monitoring in support of the mitigation and enhancement measures for the INP PPO Sub-Activity and the devil's claw sub-sector in Namibia – framework and overview

Monitoring why? what? objective/object	Monitoring how? (approach, method, mechanism)	Responsibility: who monitors?	Time frame	Monitoring Indicator
PPO training and capacity building focused on devil's claw process and impacts	Monitoring as an integral part of the annual diagnostic process	INP PPO Sub-Activity team; service providers; trainers	Throughout the project period	Number of training exercises held; number of people trained; harvesting, processing and selling practices; product quality and traceability
PPO devil's claw resource management plans	Existing devil's claw management plans suggest monitoring (at different levels) of: ▪ post-harvest impacts ▪ Issuing of permits and overall coordination ▪ Correct harvesting & processing methods; illegal harvesting; illegal selling and buying; and potential harvest areas ▪ Actual harvesting & processing practices during harvest	INP PPO Sub-Activity team; service providers; trainers - for all levels below ▪ MET, PPO management, community resource monitors, and harvesters ▪ PPO management, traditional authority, and MET ▪ Community resource monitors ▪ Harvesters and local coordinators	Throughout the project period – and beyond	▪ Proportion of: harvesting holes refilled; and plants showing signs of regrowth ▪ Proportion of harvesters having legal permits; coordination performance indicators ▪ Suitable indicators to be developed when management plans are developed by PPOs ▪ Proportion of harvesters abiding by best harvesting & processing practices; patterns of deviations from best practices
Technical assistance to and mentoring of PPOs focused on devil's claw – process, outcomes and impacts	Monitoring as an integral part of the annual diagnostic process	INP PPO Sub-Activity team; service providers; trainers	Throughout the project period	Suitable indicators to be developed as part of the technical assistance and mentoring process
Use of devil's-claw-focused equipment, facilities, supplies and services (provided through PPIGs)	Monitoring as an integral part of the annual diagnostic process	INP PPO Sub-Activity team; service providers; trainers	Throughout the project period	See PPIG Manual (Ridgway.2010)

Implementation of GSIP with regard to PPOs focused on devil's claw	See M&E Strategy of GSIP (den Adel.2010)	Gender and Social Expert,; INP PPO Sub-Activity team; service providers; trainers	Throughout the project period	See M&E Strategy of GSIP
Support to priority research and innovation on devil's claw	Review of progress and final reports	MCA-N Innovation Fund Sub-Activity	Throughout the project period	Quality and utility of the research undertaken
Development and provision of access to a market information system for devil's claw	▪ Monitoring of devil's claw volumes trade/exported and of harvesters/exporters prices ▪ Monitoring of the access and use of the market information system	INP Market Information Development & Support Officer and senior consultant (at NBRI	Throughout the project period	▪ Numbers of market information surveys undertaken ▪ Numbers of users accessing the market information
Compliance with existing devil's claw regulations on registration and permits	Monitoring of: organised and informal harvesting and trading areas and operations; transporting operations; export operations; report-back by harvesters, traders, and exporters	MET	Throughout the project period – and beyond	MET to develop indicators
Spatial and temporal devil's claw harvesting, trade and export patterns in Namibia	Monitoring (organised and informal) harvesting and trade activities in space and over time, as well as changing levels of exports, on the basis of the permit system (using report-back data and information), and through periodic site visits. Should provide clues about the state and distribution of the devil's claw resource in Namibia.	MET	Throughout the project period – and beyond	MET to develop indicators
Devil's claw commercial cultivation and devil's claw research (experimental/ feasibility studies)	Monitoring on the basis of permit information and periodic site visits	MET; INP PPO Sub-Activity during project period	Throughout the project period – and beyond	MET to develop indicators
Cross-border trade in the region (South Africa, Botswana, Angola)	Monitoring of and checks on transport cargo at border posts; alerting border police to possible illegal activity	MET in coordination/collaboration with Home Affairs (customs officer and border police) and relevant provincial governments of South Africa, Botswana, and Angola	Throughout the project period – and beyond	Legal and illegal cross-border transports and quantities of devil's claw

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Annex A: Devil's Claw Management Plan for the Nyae Nyae and N#a Jaqna Conservancies (July 2008)[20]

1. INTRODUCTION

This document outlines the components and activities of the Devil's Claw Management Plan (DCMP) for the Nyae Nyae and N≠a Jaqna conservancies situated in the Otjozondjupa region of Namibia. The DCMP is not a standalone document, it is complementary to the conservancy constitutions and other management policies as well as other operational procedures already in place with regards to the harvesting and sale of Devil's Claw. It should also be noted that this should be considered as a "living plan" that can and should be changed to make it more effective and efficient to suit local needs.

This document provides some background information on Devil's Claw in Namibia, relevant research as well as other aspects that have been considered in the preparation of the DCMP.

2. BACKGROUND

2.1 DEVIL'S CLAW

Harpagophytum, more commonly known as Devil's Claw, comprises two species: *H. procumbens* and *H. zeyheri*. The plant is a geophyte with a main taproot off which secondary or storage tubers extend, and it is these secondary storage tubers that contain the highest concentrations of secondary compounds, including Harpagoside, which are harvested for their analgesic and anti-inflammatory properties. Devil's Claw derives its name from the fruiting body which has sharp re-curved hooks protruding off the fruit.

The medicinal value of Devil's Claw for the treatment of rheumatism, arthritis and other ailments of this type has been recognised by 'western medicine' only in the last 50 years. G.H. Mehnert, an early bio-prospector, exported some dried Devil's Claw tubers to Germany where they were first studied at the University of Jena in the 1950s. In 1962, the Namibian company Harpago (Pty) Ltd started exporting Devil's Claw tubers in larger quantities to the German company Erwin Hagen Naturheilmittel GmbH.

In Namibia Devil's Claw was listed in 1977 as a protected species under the Nature Conservation Ordinance of 1975 because of increased trade and the subsequent concerns regarding its conservation status. In terms of this Ordinance, permits are required to harvest and export Devil's Claw. An average of between 350 and 400 tons of dried Devil's Claw is exported annually from Namibia.

2.2 CONSERVANCIES IN NAMIBIA

Work towards the establishment of "communal area conservancies" began in the early 1980's. After an exhaustive consultation process the Nature Conservation Amendment Act was passed in 1996 paving the way for the legal registration of communal area

[20] Source: (Cole, 2008a)

conservancies in Namibia. The first conservancy was gazetted in 1998 and by the end of 2006 the number of gazetted conservancies stood at 50 covering an area of 118,704 sq km.

An extensive consultative process, including, mapping, the drafting of constitutions, electing management bodies etc. must be undertaken before a conservancy can be gazetted. One of the central components of conservancies is the sustainable utilisation of natural resources, which implies the management thereof.

The Nyae Nyae conservancy was the first to be gazetted in February 1998. It covers an area of 9,003 sq km and has a population of about 2300. The !Kaxa!Na conservancy was gazetted in July 2003 and has a population of about 7000.

3. MANAGEMENT RATIONALE

The foundation for the development of the DCMP for the Nyae Nyae and !Kaxa!Na conservancies is based on previous experience, relevant research, traditional knowledge and consultation with stakeholders. Key aspects that have influenced the DCMP are discussed below.

3.1 THE SUSTAINABLY HARVESTED DEVIL'S CLAW PROJECT

The Sustainably Harvested Devil's Claw (SHDC) project started in 1997/98 as a pilot project on one farm, Vergenoeg (Afrikaans meaning 'far enough'), and by 1999/2000 had expanded to 17 other farms in the Omaheke Region.

In the 10 years since then an extensive body of knowledge and information has been generated. One of the most important results was the compilation of "Devil's Claw Harvester Guidelines". A key component, directly linked to resource sustainability, was the development of a sustainable harvesting method.

3.2 RESEARCH

Research on the *"Population Dynamics and Sustainable Harvesting of the Medicinal Plant Harpagophytum procumbens (Devil's Claw) in Namibia"* was carried out over a five-year period between 2001 and 2005 at three sites located on two farms, Vergenoeg and Ben Hur, in the Omaheke Region of Namibia. Two main results are relevant.

1. Detailed calculation methods to determine annual harvesting quotas were developed together with rapid techniques for assessing the quantity of the resource.

2. Regular harvesting did reduce the growth of the primary tuber and storage tubers. However, it was found that this did not significantly increase plant mortality if the primary tuber was not disturbed during harvesting and the plant's normal growing cycle was not disturbed.

3.3 RESOURCE SURVEYS

The proposed DCMP does not make provision for resource surveys to be carried out. The primary objective of resource surveys is to establish sustainable harvesting quotas for the different harvesting areas. The decision to not include resource surveys does not in any way preclude the introduction of them at a later stage should a specific need arise.

The decision not to carry out resource surveys is based on the following main reasons.

- Resource surveys are time consuming and costly
- Resource surveys only provide a guideline as not all Devil's Claw populations can be surveyed. The combined area of both conservancies is about 18,000 sq km and is characterised by dense bush and forest that is largely inaccessible to vehicles. The vegetation makes it extremely difficult to find Devil's Claw populations.
- The establishment of harvesting quotas does not imply that sustainable harvesting methods will be carried out. The harvester is ultimately the main person responsible for ensuring the sustainability of the resource at the point of harvest.

With regard to the above it should be noted that the continuous monitoring of resource populations and records of harvesting levels over several years in the SHDC harvesting areas has demonstrated that harvesting level in many cases did reach the limit of the quotas set following resource surveys.

4. DEVIL'S CLAW MANAGEMENT PLAN

4.1 PURPOSE AND AIM

The purpose of the DCMP is to provide a tool for the efficient and effective management of Devil's Claw in the Nyae Nyae and ǂ a Jaqna conservancies to ensure the sustainability of the resource for both ecological and income generating reasons.

The main aim of the DCMP is to focus on empowering the harvesters of Devil's Claw to become the managers of the resource and ensure its sustainability by creating a sense of responsibility and ownership of the resource. The SHDC project has demonstrated that if harvesters benefit consistently and predictably from their resources, they will manage them if given the responsibility and are empowered to do so.

4.2 METHODOLOGY AND COMPONENTS

The basis of the DCMP will revolve around ensuring that sustainable harvesting methods are being practised by harvesters. This will be achieved through the implementation of monitoring procedures that will be carried out at various levels by those involved. In addition to other management, training or other activities that may be carried out, ensuring that sustainable harvesting methods are being implemented in both the conservancies will be monitored through the implementation of two main activities.

4.2.1 Harvest monitoring at a local level

Both conservancies have in place mechanisms to monitor various aspects related to mainly wildlife but also other natural resources. This is carried out by "community rangers" or "game guards" who are assigned to districts within the conservancies. The monitoring information is recorded in an "event book" and the information from all the event books is consolidated at conservancy management level.

Devil's Claw will be added to the event book monitoring system. The following aspects will be monitored throughout the harvesting period.

1. Are sustainable harvesting methods being implemented?
2. Are the correct procedures for slicing, drying and storing of Devil's Claw being carried out?
3. Is there any harvesting being undertaken by unauthorised harvesters in a particular area?
4. Is there any illegal or unauthorised selling or buying taking place?
5. Potential Devil's Claw harvesting areas will also be noted during patrols

4.2.2 Post-harvest impact assessments

The post harvest impact assessment provides a useful tool for harvesters to monitor their resource and to take appropriate decisions regarding the management thereof. For example, if holes are found not to have been filled action can be taken against harvesters who harvested in that area.

The post-harvest impact assessment includes monitoring the following aspects.

- An estimation of the number of holes dug
- The percentage of the holes refilled
- The verification of the areas harvested
- The noting of discarded taproots and any re-growth of the taproots of the harvested plants

The Ministry of Environment and Tourism (MET) will assume overall responsibility for carrying out the post-harvest impact assessments on an annual basis. These surveys will be carried out in conjunction with conservancy management representatives, community rangers and harvesters.

The surveys will take place in October / November when re-growth of the harvested plants can be detected. A minimum of 3 harvesting areas in each conservancy will be selected for an assessment to be carried out.

4.3 CONSERVANCY MONITORING DISTRICTS

4.3.1 Nyae Nyae conservancy

The Nyae Nyae conservancy is divided into 4 districts which include a number of villages. Each district is represented by a number of community rangers. A total of 10 community rangers are in place and are co-ordinated by a senior field officer.

NYAE NYAE DISTRICTS AND VILLAGES

DISTRICT	NORTH	CENTRAL	WEST	SOUTH
VILLAGES	1. De#ua 2. #Om!o!oo 3. //Xa//oba 4. Octagai 5. #Abacea 6. G/oaguru	1. Makuri 2. Djxokhoe 3. !Ao=a 4. N#animh 5. N//oag!osi 6. Baraka 7. Ben se Kamp 8. Mountain pos 9. Dou pos 10. Uukoroma	1. Duin-pos 2. Kaptein pos 3. Apel pos 4. Routs pos 5. N!om/xom 6. Den/ui 7. Eagle Pos 8. G/ago!oma 9. N#amtjoha 10. //ao/omi	1. Xamsa 2. Tamboti 3. N=ama 4. !Obaha 5. #abacea 6. //auru 7. N=ama-pan 8. Magamis 9. N!aci 10. Aha mountains
GAME GUARDS	**3**	**2**	**2**	**3**

4.3.2 N≠a Jaqna conservancy

The N≠a Jaqna conservancy is also divided into 4 districts. Each district has 2 game guards.

N≠A JAQNA DISTRICTS AND VILLAGES

DISTRICT	AASVOLNESS	MANGETTI	OMATAKO	KANOVLEI
VILLAGES	1. Aasvolness 2. Pespeka 3. Vicksrus	1. Mangetti Dune 2. Luhebo 3. Kukurushe 4. Kankudi 5. Meduletu 6. Danger 7. M'kata 8. Mparara 9. Sawmill 10. Soweto 11. Mgoro	1. Omatako 2. Bubi Pos 3. Kandu 4. Kameelwoud 5. Rest Camp	1. Kanovlei 2. Grashoek 3. Rooidak hek 4. Swartak 5. Forest station 6. Etameko
GAME GUARDS	**2**	**2**	**2**	**2**

4.4 IMPLEMENTATION OF THE MANAGEMENT PLAN

Ensuring the sustainability of the Devil's Claw resource will require the involvement of all the stakeholders who will have different responsibilities and carry out certain activities in this regard. However, the conservancy management structures will assume overall responsibility for its implementation.

4.4.1 Training

Training and support will need to be provided to those involved and the DCMP will have to be explained to conservancy members in order to ensure that it is successfully implemented.

4.5 ANNUAL REVIEW

The implementation of the DCMP and the results of the monitoring process will need to be reviewed on an annual basis to ensure that the desired results are being achieved. Amendments should be made where necessary in order to improve the implementation of the DCMP.

DEVIL'S CLAW MANAGEMENT PLAN		
MONITORING LEVEL	DESCRIPTION	RESPONSIBILITY
LEVEL 4	Post harvest impact assessment	• MET • Conservancy Management • Community Game Guards / Rangers • Harvesters
LEVEL 3	• Issuing of permits • Overall co-ordination	• Conservancy Management • Traditional Authority • MET
LEVEL 2	• Correct harvesting & processing • Illegal harvesting • Illegal selling or buying • Potential harvest areas	Community Game Guards / Rangers
LEVEL 1	Correct harvesting & processing procedures carried out	Harvesters & local co-ordinators

Annex B: Devil's Claw Management Plan for the Kyaramacan Association (April 2008)[21]

1. INTRODUCTION

This document outlines the components and activities of the Devil's Claw Management Plan (DCMP) for the Kyaramacan Association (K.A) situated in the Bwabwata National Park (BNP), West Caprivi, Namibia. The DCMP is not a standalone document, it is complementary to the K.A. constitution and other management policies as well as other operational procedures already in place with regards to the harvesting and sale of Devil's Claw. It should also be noted that this should be considered as a "living plan" that can and should be changed to make it more effective and efficient to suit local needs.

This document provides some background information on Devil's Claw in Namibia, relevant research as well as other aspects that have been considered in the preparation of the DCMP.

2. BACKGROUND

2.1 DEVIL'S CLAW

Harpagophytum, more commonly known as Devil's Claw, comprises two species: *H. procumbens* and *H. zeyheri*. The plant is a geophyte with a main taproot off which secondary or storage tubers extend, and it is these secondary storage tubers that contain the highest concentrations of secondary compounds, including Harpagoside, which are harvested for their analgesic and anti-inflammatory properties. Devil's Claw derives its name from the fruiting body which has sharp re-curved hooks protruding off the fruit.

The medicinal value of Devil's Claw for the treatment of rheumatism, arthritis and other ailments of this type has been recognised by 'western medicine' only in the last 50 years. G.H. Mehnert, an early bio-prospector, exported some dried Devil's Claw tubers to Germany where they were first studied at the University of Jena in the 1950s. In 1962, the Namibian company Harpago (Pty) Ltd started exporting Devil's Claw tubers in larger quantities to the German company Erwin Hagen Naturheilmittel GmbH.

In Namibia Devil's Claw was listed in 1977 as a protected species under the Nature Conservation Ordinance of 1975 because of increased trade and the subsequent concerns regarding its conservation status. In terms of this Ordinance, permits are required to harvest and export Devil's Claw. An average of between 350 and 400 tons of dried Devil's Claw is exported annually from Namibia.

2.2 CONSERVANCIES IN NAMIBIA

Work towards the establishment of "communal area conservancies" began in the early 1980's. After an exhaustive consultation process the Nature Conservation Amendment Act was passed in 1996 paving the way for the legal registration of communal area

[21] Source: (Cole, 2008b)

conservancies in Namibia. The first conservancy was gazetted in 1998 and by the end of 2006 the number of gazetted conservancies stood at 50 covering an area of 118,704 sq km.

An extensive consultative process, including, mapping, the drafting of constitutions, electing management bodies etc. must be undertaken before a conservancy can be gazetted. One of the central components of conservancies is the sustainable utilisation of natural resources, which implies the management thereof.

Namibia Conservancy legislation enables rural communities on communal land to form and register conservancies for the purpose of sustainable utilisation of wildlife through tourism and trophy hunting. The legislation unfortunately does not cater for communities that live on state own land such as National Parks. The residents of West Caprivi in cooperation with Ministry of Environment and Tourism overcame this legal obstacle by forming an Association upon which the M.E.T bestows uncertain use rights to the land. The ultimate aim is to replace the Association with a registered Trust and to enter into a Memorandum of Understanding which will set out the terms and conditions of the collaboration between the M.E.T and the Trust with regard to land and natural resource management, benefit sharing, and tourism infrastructure development in the Bwabwata National Park in the Caprivi strip.

The Kyaramacan Peoples Association is made up of 5100 members from various ethnic groups. The Association was formed in March 2006 with the assistance of the Office of the Deputy Prime Minister as well as help from the Legal Assistance centre. Their board is made up of 8 men and 2 women who are representative of most of the ethnic groups living in West Caprivi. The Association employs 27 community game guards as well as 14 community resource monitors (who are all women). In total 51 people from the community are employed by Kyaramacan Association.

2.3 THE IMPORTANCE OF DEVILS CLAW AS A RESOURCE IN WEST CAPRIVI

Devil's Claw has an impact on the vast majority of the West Caprivi population. Local research revealed that villagers halt other income generating activities, such as basket weaving, when Devil's Claw is in season. This illustrates the important role the plant resource has in income generation. There is a pressing need for Ministry of Environment and Tourism to know what is happening in terms of volumes harvested, the location of harvesting sites, harvesting techniques, and therein, the sustainability of the process.

Approximately 80% of non income families in the West Caprivi region are dependent on plant resources for both income generation and dietary needs. Human wildlife conflict is a prominent issue with elephant, wild dog, buffalo and hippo causing the often total destruction of crops, particularly the much depended on mahangu. A lack of hunting ability and limitations placed on crop growth, means that inhabitants are increasingly turning toward veld foods. In comparison with Devil's Claw harvesting, the Ministry of Environment and Tourism has not encountered any environmental degradation from the harvesting of veldfoods.

Products of particular interest to the project include the mangetti nut *(Schinziophyton rautanenii)*, the false mopane tree (*Guibourtia coleosperma*), the Jackalberry tree (*Diospyros mespiliformus*) monkey orange (*Strychnos cocculoides*), sour plum (*Ximenia spp.*), kudu berry

(*Pseudolachnostylis maprouneifolia*). Research into the seasonal consumption, social and demographic background of harvesters, the ecological status of the plant, and the geographical spread, are all areas which warrant future investigation.

2.4 CURRENT PROBLEMS OF DEVILS CLAW IN BNP

- Illegal harvesting of Devils Claw tubers within BNP has been identified by several stakeholders including MET, CRIAA, IRDNC, WIMSA, and independent researchers
- Unsustainable harvesting methods being practiced
- Poor quality of harvested material due to unskilled harvesting methods
- Difficult to monitor harvesting practices due to the unknown distribution of Devils Claw, the unknown number of harvesters, and the lack of manpower to patrol the area.
- Low prices are obtained for the material
- Lack of coordination and management

3. MANAGEMENT RATIONALE

The foundation for the development of the DCMP for the Kyaramacan Association is based on previous experience, relevant research, traditional knowledge and consultation with stakeholders. Key aspects that have influenced the DCMP are discussed below.

3.1 THE SUSTAINABLY HARVESTED DEVIL'S CLAW PROJECT

The Sustainably Harvested Devil's Claw (SHDC) project started in 1997/98 as a pilot project on one farm, Vergenoeg (Afrikaans meaning 'far enough'), and by 1999/2000 had expanded to 17 other farms in the Omaheke Region.

In the 10 years since then an extensive body of knowledge and information has been generated. One of the most important results was the compilation of "Devil's Claw Harvester Guidelines". A key component, directly linked to resource sustainability, was the development of a sustainable harvesting method.

3.2 RESEARCH

Research on the *"Population Dynamics and Sustainable Harvesting of the Medicinal Plant Harpagophytum procumbens (Devil's Claw) in Namibia"* was carried out over a five-year period between 2001 and 2005 at three sites located on two farms, Vergenoeg and Ben Hur, in the Omaheke Region of Namibia. Two main results are relevant.

1. Detailed calculation methods to determine annual harvesting quotas were developed together with rapid techniques for assessing the quantity of the resource.
2. The regular harvesting does reduce the growth of the primary tuber and storage tubers, however, it was found that this did not significantly increase plant mortality if the primary tuber was not disturbed during harvesting and the plant's normal growing cycle was not disturbed.

3.3 RESOURCE SURVEYS

A comprehensive resource survey was carried out in March 2008 by CRIAA-IRDNC-KA-MET, covering extensively the multiple use areas and parts of the core areas of the Bwabwata National Park. Though surveys provide an indication of resource distribution, they should not been seen as a definitive indication of population status and density. The following are some limitations of surveys:

- Resource surveys are time consuming, costly and require a substantial workforce
- Resource surveys only provide a guideline as not all Devil's Claw populations can be surveyed. The Bwabwata National Park is characterised by dense bush and forest that is largely inaccessible to vehicles. The vegetation makes it extremely difficult to find Devil's Claw populations.
- The establishment of harvesting quotas does not imply that sustainable harvesting methods will be carried out. The harvester is ultimately the main person responsible for ensuring the sustainability of the resource at the point of harvest.

For the Project to be sustainable, and to optimise the benefits to the Communities, it was decided to conduct a detailed survey. Reports from the past have shown that unknown volumes of Devils Claw have been harvested by the communities living in the area. The harvesting is often conducted in an unsustainable manner and often people from other regions infiltrate the area and harvest illegally. The Ministry of Environment and Tourism, together with other stakeholders, stressed the need for this Project to minimise the illegal and unsustainable harvesting of Devils Claw, control the market, and have an indication of population status.

4. DEVIL'S CLAW MANAGEMENT PLAN

4.1 PURPOSE AND AIM

The **purpose** of the DCMP is to provide a tool for the efficient and effective management of Devil's Claw in the Bwabwata National Park, to ensure the sustainability of the resource for both ecological and income generating reasons.

The main **aim** of the DCMP is to focus on empowering the harvesters of Devil's Claw to become the managers of the resource and ensure its sustainability by creating a sense of responsibility and ownership of the resource.

4.2 METHODOLOGY AND COMPONENTS

The basis of the DCMP will revolve around ensuring that sustainable harvesting methods are being practised by harvesters. This will be achieved through the implementation of monitoring procedures that will be carried out at various levels by those involved. In addition to other management, training or other activities that may be carried out, ensuring

that sustainable harvesting methods are being implemented in Bwabwata National Park, they will be monitored through the implementation of two main activities.

4.2.1 Harvest monitoring at a local level

The Kyaramacan Association has in place mechanisms to monitor various aspects related to mainly wildlife but also other natural resources. This is carried out by "community game guards" and "community resource monitors" who are assigned to Villages within the National Park. The monitoring information is recorded in an "event book" and the information from all the event books is consolidated at National Park management level.

Devil's Claw will be added to the event book monitoring system. The following aspects will be monitored throughout the harvesting period.

1. Are sustainable harvesting methods being implemented?
2. Are the correct procedures for the drying of Devil's Claw slices being carried out?
3. Is there any harvesting being undertaken by unauthorised harvesters in a particular area?
4. Is there any illegal or unauthorised selling or buying taking place?
5. Potential Devil's Claw harvesting areas will also be noted during patrols

4.2.2 Post-harvest impact assessments

The post harvest impact assessment provides a useful tool for harvesters to monitor their resource and to take appropriate decisions regarding the management thereof, for example if holes are found not to have been filled action can be taken against harvesters who harvested in that area.

The post-harvest impact assessment includes monitoring the following aspects.

- An estimation of the number of holes dug
- The percentage of the holes refilled
- The verification of the areas harvested
- The noting of discarded taproots and any re-growth of the taproots of the harvested plants

The Ministry of Environment and Tourism (MET) will assume overall responsibility for carrying out the post-harvest impact assessments on an annual basis. These surveys will be carried out in conjunction with KA management representatives, community game guards, community resource monitors, and harvesters.

The surveys will take place in October / November when re-growth of the harvested plants can be detected. A minimum of 3 Villages in Bwabwata National Park will be selected for an assessment to be carried out.

4.3 BWABWATA NATIONAL PARK MONITORING AREAS

Inside the Bwabwata National Park the area is zoned as following; 40km West from the Kwando River is referred to as the Kwando "core area". 50km East from the Kavango River, South of the B8 main road, is referred to as Buffalo "core area". No people reside within these two core areas. The area between these two core areas is referred to as the multiple use area. This is where the 10 Villages of the Bwabwata National Park are located. A total of 27 community game guards and 14 community resource monitors operate within these areas and are supervised and coordinated by senior field officers.

BNP GAME GUARDS AND RESOURCE MONITORS

Village Code	Village Name	No. Game Guards	No. CRM's
MCH	Muc'hiku	3	2
MUS	Mushashane	2	1
MAN	Mangaranganja	2	1
OMK	Omega I	4	2
SHA	Shamakhwe	2	1
CHE	Chetto	4	2
PIP	Pipo	2	1
MAU	Mautu	2	1
OMC	Omega III	3	2
MAS	Mashambo	3	1
	Total	**27**	**14**

4.4 IMPLEMENTATION OF THE MANAGEMENT PLAN

Ensuring the sustainability of the Devil's Claw resource will require the involvement of all the stakeholders who will have different responsibilities and carry out certain activities in this regard. However, the K.A management structures will assume overall responsibility for its implementation.

4.4.1 Training

Training and support will need to be provided to those involved and the DCMP will have to be explained to K.A members in order to ensure that it is successfully implemented.

4.5 ANNUAL REVIEW

The implementation of the DCMP and the results of the monitoring process will need to be reviewed on an annual basis to ensure that the desired results are being achieved. Amendments should be made where necessary in order to improve the implementation of the DCMP.

Annex C: Devil's Claw Harvesting Monitoring Data Collection Sheet[22]

DEVIL'S CLAW HARVESTING MONITORING DATA COLLECTION SHEET																				
AREA																				
VILLAGE																				
DATE																				
SURVEYER																				
GPS Point																				
OPEN HOLES (with taproot)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
OPEN HOLES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
NEW PLANTS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
COMMENTS																				

[22] Source: (Nott, 2010b)

Annex D: Post-Harvest Impact Assessment for Devil's Claw[23]

Methodology

The post harvest impact assessment is a tool to monitor compliance during the harvesting season with sustainable harvesting methods as well as the status of the resource. Firstly a check is made as to whether the hole has been closed or not, and secondly a check is made to determine the whether the harvested plant shows signs of regrowth.

The following is noted during the surveys and recorded on the data sheet:

- FILLED HOLES (Regrowth/No growth)
- UNFILLED HOLES (Regrowth/No growth)
- NEW OR NOT HARVESTED PLANTS

The areas to be surveyed are identified by harvesters in the respective villages. Each survey team is comprised of at least 3 recorders who walk through the area in a line so that the majority of holes in the area can be recorded. The survey team should consist of CBO staff and management, harvester/s, representatives of the buyer, the support organization and MET.

Data Collection

Data is collected and entered into the sheet below.

[23] Source: (Nott, 2010b)

DEVIL'S CLAW POST HARVEST IMPACT DATA COLLECTION SHEET

AREA	
VILLAGE	
DATE	
SURVEYOR/S	

GPS COORDINATES						
	START	**S**		**END**	**S**	
		E			**E**	

NUMBER OF FILLED HOLES	**REGROWTH**	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
		26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
		51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
		76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
		101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125
		126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150
	N0 GROWTH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
		26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
		51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
		76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
		101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125
		126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150
NUMBER OF UNFILLED HOLES	**REGROWTH**	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
		26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
		51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
		76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
		101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125
		126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150
	N0 GROWTH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
		26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
		51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
		76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
		101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125
		126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150
NEW OR UNHARVESTED PLANTS		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
		26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
		51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
		76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
		101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125
		126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150

COMMENTS	