

Namibia is the only country where legislation exists with regard to harvesting of DC. Although Botswana has some legislation in place nothing is done to control DC export. It is disturbing to know that almost no legislation exists in South Africa to protect the export of this species. In both Botswana and Namibia, DC is regarded as a low risk species that does not require special conservation status (Golding 2002). The same author strangely enough does not comment on its status in South Africa. Hilton-Taylor (1996), however, regards it as vulnerable in Botswana but as not threatened in South Africa.

The cultivation of such a species (as an alternative to harvesting in the wild) to meet the current demands is not a simple solution and at present is unlikely to be profitable. Such species should be a priority for *ex situ* conservation and strict protection in core conservation areas.

Current indications are that unless greater efforts are made at all levels to ensure a sustainable supply of plant and animal products to maintain the traditional healing industry, substantial health, conservation and economic benefits will be lost to the country. However, encouraging steps have been taken in the past few years. On the international scene South Africa has signed the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) (1973), whereby trade in endangered species is controlled through a stringent system of permits and customs control measures (Department Of Environmental Affairs & Tourism 1999). In 1995 South Africa also ratified the Convention on Biological Diversity which aims to promote sustainable use of resources through regional cooperation. In an attempt to supply the growing demand for traditional medicines, medicinal plant nurseries have been established at, amongst others, Silverglen (Durban) and Estcourt, while an indigenous plant nursery has also been started in the Hluhluwe Game Reserve in KwaZulu-Natal. A White Paper – *Policy on the conservation and sustainable use of South Africa's biological diversity* – was tabled in 1998, which aims at promoting the sustainable use rather than exploitation of resources, as well as the sharing of benefits to communities (Pelser 2003).

The aim of this study was to evaluate the existing knowledge on DC and its relevance to make sound management decisions regarding the sustainable use of this resource. A community-based programme involving the sustainable harvesting of DC in the Vryburg area (North West Province) is also discussed and evaluated.

SUSTAINABILITY AND SUSTAINABLE UTILISATION: THE CASE FOR DEVIL'S CLAW.

One important aspect on how sustainability may be achieved concerns the intrinsic capacity of all ecological systems containing human society to support continued economic progress. This in short means that people can become better off over time, although the patterns of production and consumption choices will change (Pezzey & Toman 2002).

DC used to be very abundant and was considered a problem plant by most farmers. This led to the serious eradication of plant populations by farmers especially in Namibia, from the 1950s to the 1970s. It was not until the medicinal value of DC was widely recognized that large-scale exploitation began. No long-term goals were set to harvest these plants sustainably and due to the rising international demand, levels of exploitation have increased

considerably. The very patchy distribution of DC even on favourable soil and in suitable habitats makes it difficult to estimate an overall density of plants per hectare for the total area of distribution. Wild populations of DC normally reach densities of 5–7 plants per hectare, but population sizes of up to 1200 plants per hectare may be reached (Hachfeld & Schippmann 2000).

Crosson & Anderson (2002) define sustainable agriculture as a system that indefinitely meets the demands for food and fibre while incurring farm-level economic and environmental costs that societies find acceptable. These costs should meet some broad socially agreed equity criterion. The incomes of poor farm communities must thus rise enough to permit significant improvements in nutrition for all members of the family as well as improved access to health and educational services. Pezzey & Toman (2002) add a normative element (a value judgement) to the standard economic framework. They do this by defining a sustainable, and therefore desirable, path of economic development as one in which expected well-being per capita rises over the long term. They, however, do not foresee that sustainability can be achieved without the interference of governments. Unless greater efforts are made at both national and local government levels to ensure a sustainable supply of indigenous plants to maintain the traditional healing industry, many health, conservation, cultural and economic benefits will be lost (Derwent & Mander 1997).

The International Food Policy Research Institute estimates that between 2002 and 2020, 90% of the increase in local demand for food is expected to be in the less developed countries (Crosson & Anderson 2002). South Africa, as one of these countries, is an area with very limited agricultural potential, especially within the Kalahari, which is approximately the distribution range of DC (Van Wyk, Van Oudshoorn & Gericke 1997). The average rainfall in this area is between 150 to 450 mm per annum (Low & Rebelo 1996), which is less than the generally accepted minimum of 500 mm per annum for dryland crop production (Yeld 1997). Furthermore, because of the population densities of the rural areas, the available arable land per person in 1997 was 0.16 ha and was at that stage estimated to drop to 0.1 ha per person towards 2000 (Yeld 1997).

As a result of the acute scarcity of water in these areas neither dryland crops nor livestock farming can be accepted as solutions to the alleviation of poverty in the Kalahari. The sustainable harvesting of DC can thus become a viable alternative livelihood and can effectively create farm and non-farm employment opportunities to communities in these areas (DEAT 1998; Yeld 1997).

Until fairly recently the policy of “conservation through the exclusion of human activity” has been considered as the only conservation option. A shift towards Community Based Conservation (CBC) is however taking place. Kothari, Anarudha & Pathak (1998) ascribed this to the following: (a) local communities continue a day-to-day interaction with the areas and the species to be conserved (b) exclusion attempts have created severe conflicts (c) considerable natural systems exist in areas under control of local communities – CBC is possibly the only option in these areas (d) government (nationally and locally) is unable to carry out the task of conservation due to a number of factors (e) political support for conservation is declining (f) experience suggests that the cost involved in conservation goes down once CBC is in place (g) local communities have invaluable knowledge for conservation efforts and lastly (h) people demand a voice in decision-making and want to re-establish control over resources which sustain their lives and livelihoods.

It is no secret that the old style of conservation in South Africa has gone forever and in its place a new system has been established. Essentially the new system is one that includes people in the conservation equation, rather than excludes them. It is a system where the biological diversity in specific areas is conserved, but in which far greater benefits from the protected areas accrue to the people living around those areas, and ideally also to those people who live far away from such protected areas (Holt-Biddle 1997).

The unsustainable utilisation and extreme over-exploitation of DC in the North West Province came under the attention of the Department of Agriculture, Conservation, Environment and Tourism (DACET) during the late 1990s. This led to a concerted effort to manage this resource on the principles of Community Based Conservation (Van der Vyver 2002). The purpose of this study was to evaluate the current harvesting industry of DC against these principles.

STUDY AREA

The communal farmland around Cassel (2623 DD), a fairly densely populated and low-income rural area in the North West Province of South Africa almost due west of Vryburg, presented the ideal locality and situation to use for this pilot study. North West Province is also the only province which is pro-actively attempting to manage over-exploitation. Although various attempts have been made to manage the utilisation on a sub-regional scale, none has been successful and therefore neither Botswana nor Namibia was included in this study.

The area between Vryburg and the western border of the North West Province where the DC occurs covers approximately two million hectares. For Namibia, Hachfeld & Schippmann (2000) estimated an average of two plants per hectare. Although this may not be the exact figure for the Cassel area, the indication is that the entire population of the province probably comprises a very large number of plants.

Biological data was gathered at two different experimental populations. Two populations were used in the Shrubby Kalahari Bushveld (Savanna Biome) (Van Rooyen & Bredenkamp 1996) close to Nossob Camp in the Kgalagadi Transfrontier Park (hereafter referred to as Nossob). This area in the Northern Cape Province receives erratic rainfall of about 200 mm per annum. Detailed pollination experiments were conducted at Nossob. A population at Glen Agricultural College close to Bloemfontein (hereafter referred to as Glen), was used to study the reproductive phenology (the study of periodic biotic events, such as flowering and fruiting, in relation to climatic factors), pollination and seed germination. This population falls within the Moist Cool Highveld Grassland of the Grassland Biome (Bredenkamp & Van Rooyen 1996). This area receives between 600 and 700 mm rain per year and can be regarded as being on the periphery of the distribution range of DC. The Glen population was to an extent used as a pilot study to address problems encountered at Nossob.