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CONSERVATION OF BIODIVERSITY AND AFRICAN TRADITIONAL MEDICINE: A MARKET INCENTIVES AND LOCAL ECONOMIC DEVELOPMENT APPROACH¹

NICOLA SANER²

Abstract

The hidden economy surrounding the medicinal plant trade in South Africa is estimated to be worth approximately \$60 to \$100 billion per annum. There is increasing focus on the role that these resources play in the process of sustainable development. By combining Local Economic Development (LED), incentive structures and resource management systems strategies in the Eastern Cape, biodiversity degradation can be potentially decreased in line with community development goals. Qualitative data comparisons are used to assess the extent of the success of this holistic approach to development using the Umthathi Africulture Project as a case study.

Key words: local economic development (LED); traditional African medicine; biodiversity; sustainable development; resource management systems; tragedy of the commons incentives; Umthathi training project.

THE ROLE OF WILD PLANT RESOURCES in enhancing and retaining rural livelihoods is diverse (Wiersum and Shackleton, 2005: 67) yet due to population growth, commercialisation and a range of other factors, resource management systems have recently come under severe pressure (Shackleton and Shackleton, 2004: 138). Various needs of the marginalised poor are being met through biodiversity, including healthcare via indigenous medical plant use (Cocks, 2006: 9). Biodiversity conservation therefore needs to be combined with the aims of poverty alleviation as natural resources can serve either as a productive asset or as a safety net (Wiersum and Shackleton, 2005: 69). This paper explores the potential solution that exists in creating a market for medical plants which incorporates sustainable development and replacement costs and balances Local Economic Development (LED) and poverty alleviation with traditional values and uses for cultural plants.

LED can be used as a tool to expand the economic capacity of a local area thereby improving its economic future and standard of living for all (World Bank, 2009: 1). The linkages between rural development, livelihoods and the natural resource base must be recognised for successful development in South Africa and a more holistic approach needs to be adopted where poverty alleviation and biodiversity are combined and the ideas and dynamics of rural livelihoods become a focus (Shackleton and Shackleton 2004: 141). Therefore the combination of biodiversity as well as LED and community based natural resource management frameworks is important as together they target multi-resource livelihood activities and stimulate self-reliance among local groups, hence alleviating poverty (Wiersum and Shackleton 2005: 82). Local values regarding resources

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² Supervised by Prof Jen Snowball.

need to be emphasised to develop an appropriate community based natural resource management system and include rural communities in the conservation of biodiversity (Wiersun and Shackleton 2005: 84). The role of the state is also examined in the development of strategies and policies to address the management of natural resources.

One way to address challenges facing LED and resource management projects is to create a market for indigenous plants. This approach will be explored and the Umthathi Africulture Project in Grahamstown, Eastern Cape will be examined as a case study within the framework of LED and biodiversity management.

1. LED IN SOUTH AFRICA

LED has been a significant post-apartheid development tool encouraged by the national government aimed at empowering localities, with a specific focus on low income and marginalised communities (Nel and Rogerson, 2005: 2). With poverty alleviation being an important focus of policy in developing countries, South Africa's LED has taken on a pro-poor welfare focus within the neo-liberal (pro-growth) climate of the country.

The responsibility of economic development has shifted from the central to the local state due to competition between localities³, global economic restructuring and local dependence. The emphasis of South African LED strategies in cities has been on urban reconstruction and development to try and decrease the inequalities created by Apartheid. The private and the public sectors have formed growth coalitions and partnerships to attract mobile capital and facilitating LED projects (Maharaj and Ramballi, 1998: 131).

LED's focus on community-based development, business and locality development was implicit in the 1994 Reconstruction and Development Programme, the anchor framework for national post-apartheid planning, and was further institutionalised in the 1996 Constitution in terms of recognising the developing role that the government played (Nel and Rogerson, 2005: 6). The role that local government could play in the development process was enhanced both as policy makers and as advocates of democracy through strategic, visionary and influential interactions with their localities (Nel and Rogerson, 2005: 6-7). The Green and White papers were designed to provide local flexibility through normative planning and be responsive to local environments.

Localities have assumed greater control over initiatives and there has been an evident shift away from the provision of social services and public goods towards accelerated growth to increase the tax base and stimulate job creation (Maharaj and Ramballi, 1998: 133). Progressive LED strategies aim to encourage community participation in the planning process and to address the public's concern over who benefits from government policies (Maharaj and Ramballi, 1998: 133).

A key drawback to South African development policy is that little incentive or recognition is given to the private sector, Non Governmental Organisations (NGOs) or Community Based Organisations (CBOs) in the development process (Nel and Rogerson, 2005: 7). Capacity, resource and financial constraints; shortage of skilled staff; and limited experience of local governments among other factors have sometimes hindered the success of LED practices in South Africa. Another key concern is that partnership formation and collaboration, one of the cornerstones of LED, is not being adhered to

³ Localities in this context refer to a continuum of local based interest groups ranging from informal societies to NGOs and more formalised governmental structures.

though the marginalisation of non-local government actors (Hindson, 2003 and Rogerson 2003b).

Nel *et al* (2002), Rogerson (2002), Hindson (2003), and Tomilson (2003, cited in Nel and Rogerson 2005: 12) have highlighted the following as key issues which have emerged regarding applied LED in South Africa: the high failure rate of LED initiatives; limited private sector involvement; constrained achievements in poorer areas; politicisation of development agendas; grant dependence; underestimated economic sustainability levels; the debate around the role of local government as either facilitator or driver of projects; lack of training, facilitation and funds; the gap between planning of LED and the practice; and the sustainability challenge facing community-focused projects.

2. TRAGEDY OF THE COMMONS AND BIODIVERSITY, LED AND CULTURE IN SOUTH AFRICA

In the global community, the main motivation behind conservation efforts is biodiversity loss (Magome and Fabricius, 2004: 93). The fundamental causes for biodiversity loss are rooted in social, institutional and economic factors and will be more prone to depletion when the direct value of the goods in question are not realised (Pearce and Moran, 1994: 19). The central economic argument for finding a solution to the decline of biodiversity is that if economic values can be ascribed to biodiversity, then more practical and influential arguments can be prepared for its conservation (Pearce and Moran, 1994: 1). If a market is established where replacement costs are incorporated into the price of resources, the conservation of biodiversity may be possible.

Inconsistent administration of Apartheid legislation and policy has skewed under- and over development in various areas and therefore natural resources and land has been impacted as a result (Willis, 2004: 81-82).

The important role that wild resources play in the lives of the marginalised poor is becoming increasingly evident (Cocks, 2006: 9). The importance of sustaining communities in the process of development has become significant and in particular, small communities with appropriate, small-scale technology and production units who will take good care of *their* bit of land or other natural resources are emphasised (Tisdell, 2005: 161). Several different types of natural resources are used by rural households to meet their daily needs for shelter, fuel, food and medicine yet due to population growth, commercialisation and a range of other factors, resource management systems have recently come under severe pressure (Shackleton and Shackleton, 2004: 138). The role of wild plant resources in enhancing and retaining rural livelihoods is diverse (Wiersum and Shackleton, 2005: 67).

Currently within South Africa, the major focus concerning biodiversity has been on its utilitarian functions whereas the cultural values and their relevance in respect to biodiversity conservation have received less attention (Cocks, 2006: 9). If biodiversity loss is to be reduced, it is imperative that local people willingly contribute to the actions and responsibilities for conserving this biodiversity (Magome and Fabricius, 2004: 93).

Non-timber forest products (NTFPs) are biological resources collected from the wild by rural people for direct consumption or income generation on a small scale (Shackleton and Shackleton, 2004: 658). The important social welfare function of NTFPs is reflected in recent studies that indicate that poorer households and those headed by women are frequently more dependent on NTFPs for everyday survival than those headed by men or

more affluent households (Shackleton and Shackleton, 2004: 136). Additionally, poorer households sell a greater range of NTFPs and the income earned from this constitutes a greater contribution to total household income (Shackleton and Shackleton, 2004: 660).

People enter the NTFP trade due to lack of alternative income generating opportunities and the chance to gather “free” resources and changing them into saleable products is a safety net for many households (Shackleton and Shackleton, 2004: 663). Often this emergency net evolves into a permanent livelihood option.

Benefits from NTFPs are often seasonal and due to a lack of markets, low priced products, resource scarcity, market saturation, the density of communal areas, and the capacity of the resource base, poverty is not sustainably alleviated (Shackleton and Shackleton, 2004: 663). Participation in the trade of NTFPs is an important source of pride, independence and self-esteem, especially for women (Shackleton and Shackleton, 2004: 663).

However, there is little evidence of local people investing their resources in terms of time and money into biodiversity management. The benefits that rural people receive from their informal use of resources are greater than those gained from formal biodiversity management (Magome and Fabricius, 2004: 107). National and international taxpayers need to make a committed contribution to biodiversity management if the benefits are largely external to the local people (Magome and Fabricius, 2004: 107). NTFP are neglected in both policy and practice and rural institutions, conservation officers and resource managers constantly undervalue their role in society (Shackleton and Shackleton, 2004: 135).

(a) Biodiversity and Medical Plants

The failure of South Africa to appropriate benefits from conservation is evident in the market for plant products. Determining the price for sale and use of a plant involves bargaining difficulties and uncertainty due to the ambiguity as to which wild cultivars will be useful for breeding and cultivation purposes in the future (Tisdell, 2005: 97). Many local and rural people continue to maintain a diverse and flexible range of livelihood options and this includes, among others, the collection of medical plants (Magome and Fabricius, 2004: 272).

An immediate concern is that the decline in biological resources in many instances may also result in a decline in community or cultural diversity, which is measured through indices based on diet, medicine, language and social structure (Harmon, 1992 in Pearce and Moran, 1994: 11). Plants species can be used for medicine in two ways: firstly, for large-scale commercial use and secondly, as traditional medicines, which potentially will not attract a market price (Pearce and Moran, 1994: 101). Both uses have economic value yet the tendency up until now has been to focus on the first.

There are various needs of the marginalised poor being met through biodiversity, this includes healthcare via indigenous medical plant use (Cocks, 2006: 9). The most vulnerable species are those with a limited distribution and slow growing species with specific habitat requirements (Cunningham, 1997: 1). Cultivation of alternative supply sources is popular which is essential for certain rare species that lie outside core conservation areas yet due to the slow growth rates and low prices paid for traditional medicines, commercial cultivation of high conservation species tends to be unprofitable (Cunningham, 1997: 1).

Cunningham (1997: 2) found that due to the commercial harvesting to supply an urban demand for traditional medicines, limited geographical distribution, habitat destruction and overexploitation of resources, the non-sustainable use of favoured species was evident.

Traditional medical practitioners (TMPs) are a vital source of information regarding traditional medicines and many believe that they play a key role in healthcare and therefore the sustainable base of resources used by TMPs is essential (Cunningham, 1997: 2). Cunningham (1997: 2) argues that there are three main reasons for the overexploitation of medical plants: A growing demand for plants is placed on fewer resources due to the decline in the area of distribution of natural vegetation and the competition for land for other uses such as timber logging, commercial harvesting for export and for pharmaceutical use. Secondly, urbanisation is a driving factor and the creation of urban demand and markets surrounding plant trade can extend across international borders. Thirdly, the growth in the informal sector of medicinal plant gatherers and that of commercial gatherers has resulted in a disregard for traditional conservation practices and fuelled by high unemployment rates and low levels of formal education (Cunningham, 1997: 3). The influx of popular medical plants to meet urban demand keeps prices low and volumes high as resource replacement costs and sustainable use are not taken into account.

It must be noted that commercialisation of wild plants occurs both between rural and urban communities and in rural communities (Wiersun and Shackleton 2005: 78). Rapid urbanisation and greater demand for medical plants lead to a depletion of the rural resource base and overexploitation of certain species; employment options for TMPs also tend to increase as the ratio of medical facilities to the total population decreases (Cunningham, 1997: 3). Particularly in Africa, habitat change and overexploitation of resources through commercial harvesting is problematic (Cunningham, 1997: 3).

Demand is one of the main causes of overexploitation as the increasing scarcity of certain plants drives up the accompanying prices of these resources thus providing a greater incentive to harvest the remaining stock (Cunningham, 1997: 8). Cunningham (1997: 8) argues that for cultivation to succeed as an alternative supply source that takes harvesting pressure off resource stocks and improves the self-sufficiency of TMPs, plants have to be produced in large quantities and cheaply. Low prices make cultivation unprofitable and it seems that wild plant populations will have to decrease further before cultivation becomes a viable option (Cunningham, 1997: 11). The success of cultivation also depends on the support from TMPs yet studies have shown a general acceptance of cultivated material as an alternative resource (Cunningham, 1997: 11).

The hidden economy surrounding the medicinal plant trade in South Africa is estimated at approximately \$60 to \$100 billion per annum with over 200 000 practicing Traditional practitioners, 700 actively traded plant species and roughly 27 million indigenous medicine consumers (Thina Sinako proposal, 2007: 3). There is a need to recognise and formalise the currently informal structure of the market, as prices do not reflect the scarcity of, and demand for, the traded plants upon which many livelihoods' depend. Rising product prices have resulted due to under supply based on scarcity, which increases the use of inadequate substitutes or adulterants, by sick people. Furthermore, aggressive harvesting techniques, which aim to maximise harvest yields in the short run, have long run detrimental impacts on wild stocks (Thina Sinako proposal, 2007: 3). Exploitation of a public resource is indicative of the classic Tragedy of the Commons

scenario and in the case of medicinal plants overharvesting, these practices ultimately result in declining biodiversity and deteriorating levels of healthcare and rural livelihoods’.

(b) Tragedy of the Commons

Hardin’s (1968) theory of the ‘tragedy of the commons’ that the over-exploitation of shared resources by consumers is due to individualistic preferences outweighing collective preferences, has exerted much influence in debates and policy surrounding conservation of natural resources (Richards, 1997:2). A contradiction between individual incentives and collective incentives is identified through game-theory logic using an extension of the ‘Prisoners Dilemma’. The private incentive to exploit the resource, in this case traditional medicinal plants, is stronger than conserving the resources by using them in sustainable quantities and therefore it is deductively rational for individuals to overexploit common resources as the short term individual gains would exceed the costs. Based on this logic, sustainable natural resource management systems are often destroyed by incentives for private profit (Uphoff and Langholz, 1998: 251).

Many of the underlying assumptions, namely that of no communication and one time choices, which underlie the Prisoner’s Dilemma, are not widespread in reality. Empirical evidence shows that some fishing areas, forests and rangelands that are “neither state property nor private property” have not been exploited and therefore profit seeking private ownership and coercive state management are not the only institutional means that can conserve natural resources (Uphoff and Langholz, 1998: 252). Uphoff and Langholz (1998: 252) distinguish between “open access” resources, what Hardin was referring to in tragedy of the commons and “common property” resources that are more likely to be governed by conventions and social norms and consequently less likely to be degraded.

Hardin’s argument concentrated on the incentives that people have to manage resources in a sustainable manner. Through an expansion of this, identifying incentives that promote “resource-conserving behaviour (conservation activities)” can help policy makers and initiatives strengthen the possibility that both modern and traditional resource users will engage in conservation activities and accept regimes of protection (Uphoff and Langholz, 1998: 252).

The model developed by Uphoff and Langholz (1998: 252) has identified three sets of incentives of potentially equal importance for resource management systems: legal, economic and socio-cultural. These are organised as follows:

- (a) The extent to which the activity is legal (L), it is more likely to happen than if it is not legal (NL).
- (b) The extent to which the activity is profitable (P), it is more likely to happen than if it is not profitable (NP).
- (c) The extent, to which the activity is socially and culturally acceptable in a specific community (A), is more likely to happen than if it is unacceptable by prevailing social and cultural norms (NA).

Different combinations of these incentives will yield various results yet the optimal grouping is activities that are legal, profitable and socially acceptable (L+P+A) and when these incentives are aligned, there is a high probability that such an activity will occur. The

challenge lies in balancing incentives and institutional support that will encourage conservation activities even when it is profitable (as it usually is) for individuals to engage in “resource degrading behaviour (degradation activities)” (Uphoff and Langholz, 1998: 252-253). This will be explored further in relation to the case study of the Umthathi Africulture Project.

The Tragedy of the Commons is a well-known market inefficiency that often arises due to ill-defined property rights. In the case of natural resource management, this often results in negative externalities i.e. when the costs of a market are not fully internalised by the market participants. In the case of natural resources gathered for medicinal purposes, the land is common property but the use of the resources on the land is often subject to laws. There exists a private incentive to exploit the natural resources as well as the lack of incentive to conserve biodiversity and use the resources on a sustainable basis resulting in overexploitation and use of the resources. In figure one, the relationship between the harvesters and gatherers and the sustainable level of natural resource is reflected. As the resources are public goods, the point where it is in harvesters best interests to harvest is further along the curve than if the resources were privately owned.

Figure two reflects the marginal benefit and marginal cost of a harvester and gatherer of natural resources and the marginal social benefit and social cost. As the harvesters and gatherers don't take the replacement or conservation costs into account, the marginal costs of collecting natural resources used for medicinal use is assumed to be zero. Sustainable production thus falls to zero as harvesters and gatherers act in their self-interests and the marginal benefit and marginal costs intersect. If the land is privatised or there is intervention of some sort (e.g. from the Umthathi Project or other social institutions), output will be maximised but at a sustainable level and the marginal social benefit curve becomes the marginal social benefit curve.

Due to the positive external benefits that arise from rich biodiversity and conservation measures, the marginal social costs will exceed the marginal private costs, thus the optimal level of harvesting of natural resources is at LS as this takes into account all the social benefits.

3. MEDICAL PLANTS USE IN SOUTH AFRICA

In South Africa, rural and urban communities make extensive use of medicinal plants in their daily lives (Magome and Fabricius, 2004: 98). An estimated 27 million South Africans make use of indigenous medicines yet transactions involving indigenous medicines have not been well documented in health or subjective well-being literature (Cocks and Møller, 2002: 387). In traditional African belief systems, good healthcare is holistic and extends to the persons' environment and therefore medicines can be used to treat physical conditions on one hand and enhance personal well-being on the other. Indigenised medicines play an important role in primary healthcare by dispelling anxieties in the traditional Xhosa belief system and therefore promoting personal well-being (Cocks and Møller, 2002: 387).

In South Africa, 3000 plant species are used for medicinal purposes (10 percent of all species) and more than 350 species (more than 1 percent) are commercially traded. There are over 200 000 traditional healers in the country and 60 percent of the population frequent traditional healers as a compliment to modern medicinal treatment (Magome

and Fabricius, 2004: 98). A third of animals used by traditional healers are found in the *Red Data Book* species (Magome and Fabricius, 2004: 100).

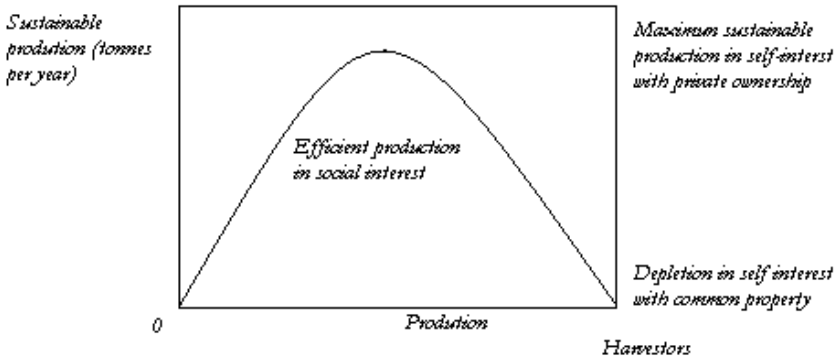


Figure 1: Medicinal plants production

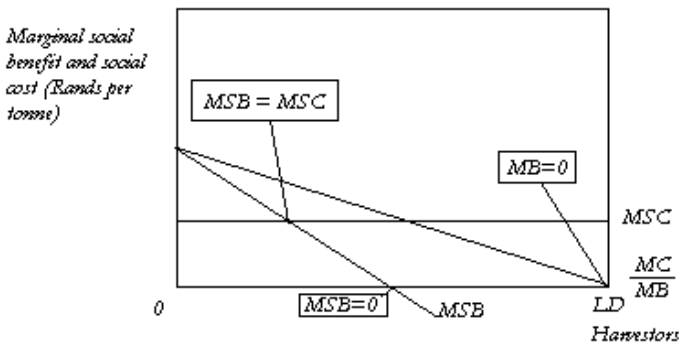


Figure 2: Marginal benefits and marginal costs

(Adapted from Parkin et al, 2008: 372-373)

The scale on which plant resources from wild populations are harvested is immense and is a concern among conservationists and rural harvesters (Cunningham, 1997: 3). Traditional taboos play a limited role in mitigating the impacts of resource harvesting and traditional healers, who are generally believed to be the guardians of biodiversity and key institutions in rural communities, are often responsible for the overexploitation of plants and animals (Magome and Fabricius, 2004: 100).

Magome and Fabricius (2004: 100) argue that community based natural resource management currently plays a key role in rural livelihoods in southern Africa yet is not the answer to biodiversity conservation. Due to high population rates, rapid urbanisation, rural unemployment and the value placed on traditional medicines, trade in traditional medicines is greater now than it has been in the past (Cunningham, 1997: 2). The recent escalation in use of indigenous medicine may be attributed to the AIDs pandemic in southern Africa and increased poverty (Magome and Fabricius, 2004: 98).

A study by Cocks and Möller (2002) conducted in the Eastern Cape reports on three *amayeza* (traditional medicine) stores, which described the significance of traditional Xhosa medicine in ensuring well-being and safety. Patrons of the stores were from all social groupings and were varied in levels of education, income and religious affiliations

(Cocks and Møller, 2002: 395). Dominant groups of consumers included middle-aged persons with some secondary education and housewives or unemployed persons. The prominence of unemployed persons as consumers of medicine reinforces the affordability for lower income levels (Cocks and Møller, 2002: 395). The commercialisation of indigenous medicines has increased the availability and range of products on offer and it was found that there was indiscriminate use of both herbal and commercially produced brand name medicines (Cocks and Møller, 2002: 395). The study also indicated that lay people felt comfortable in self-diagnosing and medicating themselves to promote both physical health and general well-being (Cocks and Møller, 2002: 396). It concluded that self-medication using traditional medicine is a flourishing trade in *amayeza* stores.

Intensive management inputs are necessary for managing the sustainable use of a vulnerable species in the case where demand exceeds supply and Cunningham (1997: 8) sees a potential solution to overexploitation through the combination of TMPs and knowledge of experts on plant biology and distribution. He adds that although the sustainability of herbal medicines is possible in practice, the labour power and intensive management skills required to achieve this are unlikely to be found in most African countries. Commercial cultivation is also hindered by slow growing and slow reproducing species with limited distribution and specific habitat requirements (Cunningham, 1997: 8).

Other problems of cultivation include a lack of institutional support for production and dissemination of key species for cultivation as well as the generally low prices paid by medicine traders and urban healers (Cunningham, 1997: 8).

Wiersun and Shackleton (2005: 71) found that communities in the rangelands of northern South Africa frequently use more than 200-300 plant species and many wild plant species were used as traditional medicines. Some were used on a regular basis while others only in an emergency. In the former South African homeland of Ciskei, it was found that the value of wild plants for cultural purposes was more than the value of wild plants used for direct consumption (Wiersun and Shackleton 2005: 72). The use of wild plants contributes significantly to household incomes and “the value of wild plants can range from being a natural or financial asset, to a socio-cultural asset used by people to express their identity” (Wiersun and Shackleton 2005: 72).

4. THE UMTHATHI AFRICULTURE PROJECT

The Umthathi Africulture Project, a Non Profit Organisation that focuses on education and development, was started in 1993 with the goal of eliminating poverty, unemployment and inequality. As LED targets the “poorest of the poor”, it is appropriate that the project is situated in the town of Grahamstown in the Eastern Cape, as this is historically the most disadvantaged of the nine South African provinces (Binns and Nel, 1999: 390). Sixty percent of the population are living in poverty, most without basic sanitation, and roughly half are unemployed, which limits access to nutrition limits thus further hindering health and productivity (Thina Sinako proposal, 2007: 13).

Umthathi Africulture Project specifically aims to address the needs of the unemployed, unskilled and malnourished women and children in the Eastern Cape by making optimal use of their existing human and natural resources. The project aims to promote sustainable management of indigenous botanical resources (for medicinal, food

and several other economically beneficial activities) and support and enhance plant-based livelihoods that are underpinned by biodiversity in the Eastern Cape.

Umthathi Africulture Project aims to facilitate a cultural shift away from the use of wild harvested species towards cultivated resources thereby reducing the environmental strain and improving the quality of resources utilised. The project has a four year foundation phase aiming to establish a valuable resource safety net while enhancing biodiversity and conservation strategies; improving the quality and access to traditional health care; building capacity linkages between NGOs, communities and institutions; linking biological and cultural diversity; developing sustainable livelihoods' and promoting resource self sufficiency; improving access to nutrition and delivering community skills training towards the establishment of micro-nurseries (see Appendix one for photos) (Thina Sinako proposal, 2007: 3). Ultimately, the Umthathi Africulture Project aims to be financially, institutionally and ecologically sustainable. Two theories will be used to analyse the Umthathi Africulture Project, the first is an LED approach and the second is a tragedy of the commons incentive based approach.

Table 1: Aims and activities of the Umthathi Africulture Project (Thina Sinako proposal, 2007: 4)

AIMS OF THE PROJECT	ACTIVITIES OF THE PROJECT
Input from beneficiaries to tailor project in each targeted area and community	Physical construction of demonstration areas and training building
Behavioural change in relating plant-based practices in target area	Complete the general cultivation course pilot
Indigenous plants produced to secure sustainable supply of stock for growers and micro-nurseries	Develop and pilot the two remaining courses of micro-nursery development and agri-business
Beneficiaries trained in plant cultivation pilot, micro-nursery, agri-business and agri-product developed	Expand target species list in consultation with the traditional healthcare practitioners
Issues identified for sustainable traditional uses and appropriate recognition of plant based rights and practices	Chemical fingerprinting – equivalence testing (wild vs. cultivated) for quality control
Appropriate income generation streams created to reinforce project impact and contribute to sustainability.	Increase supply of cultivated stock for training
	Monitor and evaluate training application and impact assessment to inform the next phase
	Trial appropriate ex-situ propagation techniques for expanding species list

5. ANALYSIS OF THE UMTHATHI AFRICULTURE PROJECT USING AN LED FRAMEWORK

This section will examine the Umthathi Africulture Project within an LED framework. Analysis regarding the presence of founding LED principles will be explored.

The establishment of a locally based initiative to combat widespread poverty and Umthathi's choice of target market resonate strongly with an LED approach. Umthathi Africulture Project has followed a pro-poor rather than neoliberal pro-growth LED approach (Rodriguez-Pose and Tijmstra: 2005, 39). This is evident through their inbuilt social goals and focus on poverty related issues.

The inclusive nature of LED strategies is visible their choice of partners and target groups. Partners include: Umthathi Africulture Project, Gardens Africa, Royal Botanic Gardens (Kew), SANBI. Target group and entities directly positively affected by the project: Traditional practitioners, wild harvesters, plant traders.

The traditional practitioners in particular play a pivotal role in the outcomes of the Umthathi Africulture Project. Due to their unique and respected position in their communities, they are highly influential. The co-operation of the wild harvesters and plant traders hinge on the traditional practitioners reaction to the project. Thus although there is no capital contribution by the traditional practitioners, without their co-operation, the project would not be able to move forward. Similarly, the attitude of the harvesters and the plants traders will be perpetuated into the community, making their “buy in” priceless. The strength of these linkages was emphasised in the planning phases of the project making the incorporation of community ideas and dynamics elementary. Umthathi Africulture Project focuses on community-based development as well as business and locality development that are in line with LED conceptualisation.

Umthathi Africulture Project has consulted regularly with the municipality to ensure that full use of resources occurs in the future. There is government support of the local nurseries and the municipality helped secure the long-term tenure of the project site, agreeing to let the project access municipal nursery infrastructure until it is fully functional. This illustrates the presence of strengthened linkages between local stakeholders and furthering the interests of local firms that is embedded in LED theory.

Poverty alleviation has been an important focus of South African LED strategies. With much of the responsibility of economic development shifting from the central to the local state, the support and involvement of the Makana municipality is indicative of a growth coalition that has formed between the private and public sectors of Grahamstown. Involvement of local governments and actors ensure that policies and outcomes have taken into account the specific local needs.

Using the LED framework developed in Blakely and Bradshaw (2002; 67), four important aspects of the Umthathi Africulture Project will be analysed: locality, business and economic base, employment resources and community resources.

(a) Locality:

By creating a market for medicinal plants in Grahamstown and the surrounding areas, the quality of the environment and the strong community capacity is used to multiply the natural economic advantages of the target groups involved i.e. traditional practitioners, wild harvesters, plant traders as well as the community who benefits from higher quality healthcare. The locality approach can be seen to generate economic efficiency in two ways. Firstly, cultivation of specifically targeted medicinal plants can lead to increased producer efficiency. Secondly, as the policies formulated by the local government (the Makana Municipality) are more in line with local needs and preferences (discussed above), the allocation of resources should result in improved consumer and allocative efficiency gains (Rodriguez-Pose and Tijmstra, 2005: 45).

(b) Business and economic base:

According to LED theory, the internal institutional linkages in the public and the private sectors should be maximised by the local economy (Blakely and Bradshaw; 2002, 68). This would include the shift from individuals to clusters and networks where there are clear human, natural and technological linkages. The network of traditional practitioners, harvesters and traders are incorporated into the larger economy of the Makana region through the training workshops and systems instigated by the Umthathi Africulture Project. Biological and cultural connectivity is boosted through environmental

educational (EE) programmes at the extensive body of Grahamstown schools (98 in total), as a fundamental addition to the national curriculum. The transferral of skills and investment in human capital through workshops helps to build up a base of human capital in the schools, homes and broader Grahamstown community.

Due to generally poor community knowledge on chronic disease prevention and home based care, the partnership with the Royal Botanical Garden, Kew is crucial in enabling better management, understanding of the environmental aspects of the Umthathi Africulture Project and strengthening natural linkages. As a leading botanical research institution with an emphasis on sustainable utilisation of plants and conservation, one of the areas of ethno botany that interest them is that of medicinal plants. Key to this is the conservation of local knowledge and uses of plants as well as the plants themselves. Local human capital and cultural values are respected and incorporated into practices central to sustaining communities and resources management systems.

Human capital accumulation and networking is evident through the partnerships with Garden Africa, an environment focussed development organisation, and South African National Biodiversity Institute (SANBI). Through collaboration with internationally based institutions, Garden Africa has been an important driving force regarding the identification of gaps in tried and tested poverty alleviation strategies ultimately supporting the holistic and inter-disciplinary approach taken by Umthathi Africulture Project. Garden Africa also stresses the important role of indigenous knowledge, and the need to add value to it, in truly sustainable development and poverty alleviation strategies. SANBI provides in country institutional support by collaborating with other local projects aimed at managing and conserving South Africa's biodiversity, thereby strengthening the projects natural linkages. Thus, the Umthathi Africulture Project has access to a mixture of both national and international human, natural and technological linkages.

(c) Employment resources:

Another founding LED goal by which Umthathi Africulture Project adheres is the stimulation of local employment activities using the available institutional, natural and human resources in sectors that would improve the community. Umthathi Africulture Project focuses on adding value to indigenous knowledge and existing labour, which further enhances accumulation of human capital. This dimension focused on the supply side of labour and natural resources (Blakely and Bradshaw, 2002: 70). This is reflected in the educational, training, job creation and poverty alleviation, and conservation aspects of Umthathi Africulture Project.

Educational aspects are particularly important. As project sustainability is critical, the project aims to facilitate the cultural shift of traditional practitioners from wild harvests to cultivated species. Traditional healthcare is often marginalized in South Africa despite the ratio being, on average, one traditional healthcare practitioner for every 500 head of population compared to figures serve to indicate the importance of establishing formal healthcare structures particularly in rural areas where access to biomedical healthcare is restricted. In targeting Grahamstown and surrounding 200km area, wherein 85 percent of the indigenous population rely solely on indigenous medicines, Umthathi Africulture Project aims to enhance sustainable harvesting techniques of medicinal plants as well as nutrition through the cultivation of vegetable gardens.

Furthermore, Umthathi Africulture Project incorporates the new traditional healthcare and environmental legislation that hinders the current harvesting habits of harvesters (usually the poorest women), into workshops.

The incorporation of culture specific strategies, pivotal to LED success, is evident in the manner in which workshops are constructed and delivered. First language trainers are matched to community workshops on household food security, health and nutrition, and small and micro-entrepreneurial activities.

Cultivation training is also essential and aims to determine the appropriate use of resources needed to maximise the gains from cultivated species from home plots. Harvesters and traders (who have previously collected from the wild) will be incorporated into the network. Training models for NGOs in the same areas of specialisation have been developed so that the positive externalities from the project can be maximised.

Job creation and poverty alleviation incorporate the training of harvesters and traders in micro-nursery development; agri-business and entrepreneurial training and product development course; and supporting the supply of the traders. The Traditional practitioners are the ultimate stakeholders with the direct beneficiaries being the wild harvesters and plant traders. The indirect beneficiaries include community members dependent on quality medical plants for their healthcare. Input from beneficiaries is used to tailor the workshops in each community in order to encourage community involvement and adoption of the Umthathi Africulture Project principles (Thina Sinako proposal, 2007: 4).

Table 2: Number of participants in the various training programmes in 2008 and 2009 (Thina Sinako proposal, 2007: 4)

Training Course	Number of participants	
	Year 2008	Year 2009
Agri-product Training	140	220
Cultivation Training	320	440
Micro-Nurseries	80	120

The conservation aspects focus on the unsustainable harvesting of plants for medicinal and horticultural purposes in the Eastern Cape is one of the many threats to their unique biodiversity.

The project is in line with 5 of the South African National Biodiversity Strategy and Action Plan, namely: conserving plant trade; protection of plant sustainability; providing sustainable livelihoods; networking capacity and in situ conservation. Due to predictions for sustained demand for medicinal plants, mainly fuelled by the HIV/AIDS pandemic and HIV/AIDS related illnesses, the project aims to reduce biodiversity loss by indicating the social and economic benefits of natural resource management within a community. Although HIV/AIDS is a widespread problem, with one in four people thought to be HIV positive, access to antiretroviral treatment (ART) is limited.

Many of the over-harvested species are used to combat opportunistic infections associated with HIV/AIDS and thus the project could be complimentary to health related problems such as Tuberculosis and the ART roll out programmes. This is a key area of need in the province and reinforces the Umthathi Africulture Projects LED approach.

The Umthathi Africulture Project would provide safe practice information regarding the identity, purity and potency of traditional medicines, circulating this information through traditional practitioner networks (Thina Sinako proposal, 2007: 4). Accumulation of knowledge in such areas is a step towards establishing increased understanding of traditional medicine and the role that they play in healthcare in South Africa. Importantly, progress in other initiatives in the future may depend on these findings so that appropriate cultural elements can be incorporated into smaller projects to ensure constructive problem solving. The success of LED initiatives is contingent on addressing poverty alleviation within an appropriate social context.

Furthermore, the conservation and livelihoods impact of the project is premised upon its multiplier potential. The 320 trained beneficiaries of 2008 are expected to have home gardens producing medical species boosting access to quality medicinal plant products and substances whilst increasing conservation impacts in the province (Thina Sinako proposal, 2007: 5). Tisdell (2005: 161) emphasises the importance of sustaining small communities through appropriate small-scale technology and production units “who take care of their bit of land”.

Umthathi Africulture Project recognises the linkages between rural development, livelihoods and the natural resource base and aims to stimulate self-reliance by targeting multi-resource livelihood activities.

(d) Community Resources:

The collaboration of organisations in the community is necessary for economic growth (Blakely and Bradshaw, 2002: 71). Nel (2001: 1008) stresses the availability of both human and social capital in combination with the usual factors of physical and financial resources. Through training workshops and sustained interests in the targeted community, Umthathi Africulture Project aims to grow both the social and the human capital necessary for sustainability.

Ultimately, the Umthathi Africulture Project is well conceptualised in terms of an LED framework. The majority of the LED guidelines and principles are met yet the key challenge of profitability remains a threat to the overall success of the project. As indicated from the loss of the Thina Sinako grant, administrative challenges also remain a hurdle.

6. ANALYSIS OF THE UMTHATHI AFRICULTURE PROJECT USING A TRAGEDY OF THE COMMONS FRAMEWORK

Using the model developed by Uphoff and Langholz (1998: 252), the legal, economic and socio-cultural aspects and considerations are taken into account when identifying how individuals and communities’ form their incentives that induce either resource conserving behaviour (hereafter referred to as conservation activities) or resource degrading behaviour (hereafter referred to as degradation activities). The most ideal combination of these three basic categories of incentives would be legal (L), profitable (P) and socially acceptable (A) yet ambiguities will arise when these incentives are unclear or when considerations are mixed and sometimes it will be realistic to give incentives different weightings (Uphoff and Langholz, 1998: 252). As all three are initially construed as equally influential on decision-making, therefore two considerations should therefore

outweigh the third. Hardin's 1968 model of the Tragedy of the Commons excludes the social factors and institutions from analysis and focuses purely on the private and public sectors. The Uphoff and Langholz model, however, places particular emphasis on the pivotal nature of social factors when choosing conservation activities or degradation activities (Uphoff and Langholz, 1998: 253). LED projects also place particular emphasis on the inclusion of socio-cultural factors for success.

The model is conceptually based on two major policies advocating environmental protection and biodiversity management in developing countries. The first is when governmental authorities declare certain ecosystems or areas to be protected and prohibit all degradation activities, yet the desired protection is not achieved due to limited legal considerations in most developing countries especially in the more remote regions (Uphoff and Langholz, 1998: 255). The economic and social constructs were neglected in this approach. The second driving force of the model is that many conservation projects are based purely on economic incentives to reward conservation and minimise degradation activities yet by emphasising the self interest aspects of participation undermined the community and social values for the ethical responsibility for preserving the environment (Uphoff and Langholz, 1998: 255). The resulting model notes the importance of social acceptance as a motivational factor for both RDC and conservation activities by integrating social and cultural factors into three main categories of incentives, where trade offs can be considered (Uphoff and Langholz, 1998: 259).

a) Extent to which an activity is legal (L) or non-legal (NL) in the Umthathi Africulture Project:

The Umthathi Africulture Project serves to address conservation issues within the South African National Biodiversity Strategy and Action Plan legal framework. Workshops are run which appropriate recognition of plant based rights and practices. Umthathi Africulture Project encourages the advocacy of ecology and traditional health care legislation with the aim to educate communities on what their rights as well as limitations are. This is particularly important, as it has been shown that legal systems in developing countries, like South Africa, often lack the institutional support that is necessary to enforce laws and inform as to what laws prohibit or require. The "limited salience and significance of legal considerations in most poor countries" can weaken influence of the legal domain on harvesting practices (Uphoff and Langholz, 1998: 254). It is also important to note that legality considerations in areas such as the Eastern Cape, may be negligible due to the expectation that violating conservation laws (by overharvesting) will not result in any penalties or court action and as the law enforcement officers are few, the court system may be clogged or ineffective. Thus there is little social stigma associated with the act of overharvesting and the social elements influence the legal domain.

The importance of social approval may vary widely depending on the consensus of the community on harvesting practices. If there is a focus on individual opinions or the community does not seem to care about resource harvesting practices, institutions may struggle to impose sanctions limiting resource collection due to the lack of public sentiment backing them. Some communities may be more "traditional" where collective thinking and expression exist as to what are acceptable practices of harvesting. This will have a stronger effect on harvesting behaviour, and can even deter practices that are profitable and legal yet socially unacceptable (Uphoff and Langholz, 1998: 254).

Again, the support and approval of the traditional healers for Umthathi Africulture Project practices is vital, as these are respected traditional community members who hold

great influence. With the increasing global heterogeneity and the modification of cultural symbols and values through the mass media, the strength of local opinion can be seen to be declining (Uphoff and Langholz, 1998: 25\$).

Traditional healers have the potential to serve as crucial elements in South Africa's comprehensive health care strategy yet the Traditional Health Practitioners Act, which is heavily influenced by Western medical norms and health practice has neglected the knowledge and voice of traditional practitioners, meeting much resistance from traditional practitioners (Richter, 2003: 10). It would be in the government's best interests to disseminate information regarding the Act and adapt it to traditional practitioners' principles, as the current system that aims to organise and regulate the practices of traditional practitioners is unrealistic to implement in reality. Groups such as the Traditional Healers Organisation (THO) and South African Traditional Healers Care Group exist yet the Umthathi Africulture Project has found that traditional practitioners rarely know such networks exist and often have no way of accessing them (pers. Comms M. Griffiths, Umthathi Africulture Project: 2009).

On a practical level it may seem easier for governments to strengthen formal institutions for law enforcement, thus heightening law enforcement aspects rather than strengthening social sanctions, even though behavioural incentives are more malleable through the latter channel. Weak and uncertain enforcement of laws that both prohibit degradation activities and encourage conservation activities can have an equally destructive impact (Uphoff and Langholz, 1998: 256). Yet it is clear that a wide context of government policy, which is in line with traditional knowledge and voices must be coordinated so that the intended effect of policy is streamlined and reinforced. This remains a huge challenging area the Umthathi Africulture Project and a long-term view has to be taken regarding progress.

b) Extent to which an activity is profitable (P) or non-profitable (NP) in the Umthathi Africulture Project:

The second motivation of profitability is especially important for the success of a project such as Umthathi Africulture Project due to its geographical positioning in the poverty stricken and largely unemployed Eastern Cape Province. This economic motivation operates through a series of market institutions that encourage or discourage certain actions based on their level of profitability (Uphoff and Langholz, 1998: 252). Due to the high poverty levels of the Eastern Cape, the seemingly zero marginal cost of harvesting wild resources is attractive, as the marginal benefits from received from exploiting the resource is higher than the costs. The thriving market for traditional African medicine in South Africa further encourages this behaviour making the overharvesting of natural medicinal resources profitable (P).

The Uphoff and Langholz (1998: 255) model indicates that when degradation activities very profitable, and the social and legal considerations combined are as strong as economic considerations, then economic incentives to engage in degradation activities will outweigh the legal and social incentives. At the very best, there can be indifference between engaging in degradation activities and conservation activities. This is the case in South Africa and as such, the most effective way to combat degradation activities is by creating economically attractive alternatives to the undesired harvesting practices as well as strengthening legal and social considerations in a positive direction.

The challenge for the Umthathi Africulture Project is to make their projects profitable and thus attractive as a method to acquire income that would otherwise have been gained through the overharvesting of natural medicinal resources. Primarily the economic aspects have to be viable for success to follow. Considering the recent loss of Thina Sinako funding (resulting from being unable to pay R450 000 of VAT on transfer fees), the project will have considerably less funding at its disposal to implement projects, which will be to its detriment.

Creating economic incentives and rewards for individuals as a reward for engaging in conservation activities can also be seen as tacit bribes to get people to adopt new practices. Umthathi Africulture Project must be aware that this creates dependence where the conservation activities hinge on continued outside infusion of resources. Sustainability is central to success. Uphoff and Langholz (1998: 255) emphasise that by focusing on material self-interest as a prime incentive for conservation activities, community values that affirm ethical and social responsibilities to conserve local environments are culturally undermined. It is problematic to rely solely on economic and material incentives, as cooperation may not stay “bought”.

By bringing the economic value of the wildlife and plant species trade to light, it has been argued that the illegal trade for medicinal plants has increased as has amounts harvested. Cultivation programmes, such as those offered by the Umthathi Africulture Project and similar nurseries, broaden markets by selling smaller plants to the public in attempts to be financially viable (Botha, 1997: 12). The association of economic incentives with medicinal plants can boost over harvesting and compounded by the combination of a lack of legal and institutional support as well as the disintegration of local harvesting control systems. Factors limiting cultivation include infertile soils, lack of propagation materials, lack of access to piped water, and inability to purchase plants from nurseries (even when prices are subsidised) (Botha, 1997: 13).

The rewards to participants in Umthathi Africulture Project may also be offset by the incentives available to non-participants, such access to more lucrative economic incentives e.g. cheaper access to plants. Tax incentives seem to offer little weight when changing degradation activities or conservation activities, as many rural communities do not pay a large proportion, if any, of their income towards taxes (Uphoff and Langholz, 1998: 255). Two incentives, although less direct, which were found to help were technical advice and assistance.

In the case of the Umthathi Africulture Project one must also consider the provision of the social goods of increased training of community members, access to nutrition, decreasing biodiversity loss, and building up a base of local sustainable knowledge and stock of plant resources among others. Thus, it can be argued that the funding to make the project sustainable should come from social funds, i.e. government revenue. As many of the goals of the project overlap with the aims of the local Makana Municipality, or will result in positive spillovers for the community, their support should be heavily employed.

c) The extent, to which the activity is socially and culturally acceptable in a specific community (A), is more likely to happen than if it is unacceptable by prevailing social and cultural norms (NA) in the Umthathi Africulture Project:

This domain is particularly broad and complex and is considered for the purpose of this study to encompass the opinions of friends, family, neighbours and the broader community. The importance of considering social and cultural incentives is especially

important when examining the use and harvesting of traditional medicinal plants due to the culture-laden nature of the goods. Uphoff and Langholz (1998: 255) emphasise that few resource management projects engage with local values. Umthathi Africulture Project has worked closely with traditional practitioners to identify specific plants that need cultivation as well as designing workshops specifically for each community that it works with. The Umthathi Africulture Project works with the targeted community for three years supplying training, plant material and basic equipment and offers ongoing mentoring and support when this period is finished. Social pressures by themselves will not be able to stop degradation activities that are both legally permitted and economically lucrative yet as a reinforcement of legality or profitability it can serve as an important factor that often is overlooked in policy or conservation planning (Uphoff and Langholz, 1998: 254). The Umthathi Africulture Project incorporates social values and has the valuable support of the traditional practitioners in the area. Also, regular meetings between the Umthathi Africulture Project and various community groups such as the traditional practitioners and the traders are helpful in coordinating interests, needs and acceptable ways to achieve the intended outcomes of biodiversity protection and traditional practitioners sustainable access to medicinal plants (pers. Comms M. Griffiths, Umthathi Africulture Project: 2009). Monitoring of such progress is costly and time consuming and is oft omitted from the planning process and identifying the indicators of status change can be complicated (Botha, 1997: 3).

Social hierarchies have to be acknowledged and incorporated so that the Umthathi Africulture Project gains the support of important interest groups that have not previously been involved in such processes. It is the traders rather than the traditional healers which are responsible for the majority of the over harvesting as and the Project has adopted a long run view to include the harvesters and traders in their projects and sustainable harvesting information sharing sessions are planned to honour traditional methods and skills with more scientific approaches (pers. Comms M. Griffiths, Umthathi Africulture Project: 2009).

Social factors are pervasive and can be moulded and reinforced through active education and discussion that can help influence and mobilise legal and economic actions in the long run. Methods of cultivation are kept as natural as possible so that they are easy for traditional healers to adopt and so that chemical substances produced by the plants are as they would be in their natural environment (pers. Comms M. Griffiths, Umthathi Africulture Project: 2009).

The success of South African outreach nurseries, especially those based on cultivating medicinal plants, is often based on the achievement of financial goals and less on social impacts (Botha, 1997: 3). Yet as many of the social goals are long term, financial solidity is necessary for an environment of stability necessary to achieve such goals.

It is important to recognise the simultaneous influence of the economic, legal and socio-cultural realms in the formation of individuals and communities incentives to engage in degradation or conservation activities. These considerations should be taken as interactive rather than independent yet the focus of the conservation project at hand e.g. Umthathi Africulture Project, will be slightly different depending on which incentive one is aiming to change. Incentives must be designed so that they are large enough to be taken seriously yet not large enough to distort or undermine the individual's intrinsic inclination to protect their environment (Uphoff and Langholz, 1998: 255). Any affective conservation and biodiversity protection programme cannot solely rely on only one

incentive structure. Finding a desirable balance between the “soft” social motivations and “harder” economic and legal aspects of incentives is a challenge. The three categories of incentives have to reinforce each other to minimise the extent of degradation activities. While short run solutions are viable through the alignment of two out of the three incentives, long run scenarios will be best when all three are aligned to motivate change in the same direction.

7. POLICY SUGGESTIONS

Projects survival depend on their financial and economic stability, and in the case of the Umthathi Africulture project, the provision of important social goods needs to be acknowledged at government level so that some sort of subsidisation occurs. The agency of traditional healers needs to be recognised for meaningful interactions and exchanges to take place.

Silverglen nursery, an established medical plant nursery in Kwa-Zulu Natal, has managed to balance financial objectives with their conservation and development goals through the diversification of their markets to include sales to the local municipalities and the horticultural sector. The creation and reinforcement of these linkages is indicative of an LED framework.

With the evident commercialisation of herbal medicine, traditional practitioners need to be able to benefit economically from such knowledge appropriation yet this is a complex challenge (Shava, 2008: 220). Shava (2008: 220) also notes that shifting land-use patterns in the Eastern Cape from farmland to game reserves has decreased accessibility to natural resources. Umthathi Africulture Project aims to develop collection areas for the traditional practitioners that should help provide areas for continued sustainable harvesting.

As the harvesters and traders are mainly responsible for over harvesting, it is important that they are included in the project. The nature of organisational structures for traditional practitioners, harvesters or traders is not synonymous with practices in the past that have tended to be more individualistic and as such many are weary of coming on board of the Umthathi Africulture Project and joining a coordinated group. Umthathi Africulture Project initially focussed on the traditional practitioners due to accessibility but have long-term goals to have input and inclusion of the other interest groups. This should be pursued wholeheartedly as the harvesters and trader’s actions at present are further destroying biodiversity in the area.

The integration of traditional practitioners into organisations and medical structures remains far from realistic under the Traditional Health Practitioners Act. The space for dialogue and negotiation in this area is imperative and traditional values need to be incorporated by policy makers (Shava, 2008: 220). Research into harvesting medicinal plants and sustainable practices should be enhanced, as it will benefit traditional practitioners, traders, harvesters, conservationists and resource management processes.

With the increased demand for traditional medicine, affordable cultivation of alternative sources of supply is essential to take pressure off wild stocks. Ultimately, traditional practitioners should be in control of growing their own plants relieving the dependence on the gathering wild medical plants as a source of income. In the long term, pressure on wild supplies could also be relieved through the development of pharmaceutical medicines with the same properties as their herbal equivalents.

Balancing the long-term and short-term outcomes of cultivation and ensuring that the correct incentive structures are in place, especially in light of financial sustainability, is a challenge that has to be considered (Shava, 2008: 220). Within the context of the above theories, incentive structures need to be carefully aligned for the tragedy for the commons and over-exploitation of resources to be avoided.

8. CONCLUSION

There are inextricable linkages between natural resource maintenance and the livelihood of marginalised communities due to the needs met through biodiversity. These interactions are beginning to be acknowledged more widely and a holistic approach with multi-goal initiatives that target biodiversity conservation and sustainable poverty alleviation are being incorporated into development strategies.

The combinations of LED, biodiversity management and incentive structuring to minimise the negative externalities created by the market failure incorporated by the tragedy of the commons, are central to community based resource management which stimulates self reliance among local groups, alleviates poverty and results in successful and sustainable development. South Africa has neglected to incorporate the conservation of indigenous resources in its rural development strategy and this neglect is a concern due to the large numbers of unemployed and rural households that place significant value on these resources. The potential cost of these resources if they were no longer available is roughly \$800 million per annum, which would have a substantial impact on the South African economy (Shackleton and Shackleton, 2004: 140). This figure is an indication of the magnitude and significance of the role of natural resources in South Africa.

Resources have substantial commercial potential as an income source and reflect an important social welfare function upon which poorer households heavily depend. If resources are not correctly managed through appropriate frameworks that incorporate cultural values, biodiversity will continue to decline and poorer households everyday survival will be severely impaired. Fundamental causes of biodiversity loss are rooted in social, institutional and economic factors and are more prone to depletion when the direct value of the resource is not realised. As explored above, a potential solution to the degradation of biodiversity, and in particular medicinal plants, lies in the creation of a market that incorporates sustainable development and replacement costs while balancing poverty alleviation with traditional and cultural values.

The alignment of legal, economic and socio-cultural incentives seems, in theory, to be the optimal grouping to minimise the overexploitation of shared resources by consumers in Tragedy of the Commons. Balancing these incentives is complex and often the economic element will be the most dominant in determining conservation activities or degradation activities yet the Uphoff and Langholz (1998: 225) emphasise the importance of incorporating traditional values in resource management programmes. As in the case of the Umthathi Africulture Project, if the conservation of resources is threatened by financial instability, then there is potentially a case for government subsidisation. Restructuring legal incentives, especially for traditional practitioners, will also impact the success of the Project.

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Appendix one:

Photo's of the Umthathi Africulture Project Nursery:



Shaded section of the Umthathi Africulture nursery from the driveway



Trays of labelled green seedlings inside



The length of the inside area



Young trees sheltered by shade cloth



Outside area of the Umthathi Africulture Nursery