What'll We Do With Wattle? The Dualistic Nature of *Acacia mearnsii* as Both a Resource and an Alien Invasive Species, Swaziland

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Introduction

Within southern Africa, Black wattle (*Acacia mearnsii*), an indigenous tree of south-eastern Australia, hereafter referred to as wattle, is perceived differently depending upon country and stakeholder. The species was first introduced to the southern Africa region through South Africa in the 1860s, and systematic plantation establishment began in the early 1900s (Chaunbi 1997). The main attraction of this fast-growing alien invasive species was its commercial value within the timber and tannin industry and lack of indigenous forest species within southern Africa for commercial and subsistence use. During the 1950s it is estimated that wattle plantations in South Africa covered 360 000 ha, these supplied tannins which lead to the development of an extremely competitive tanbark industry particularly in South Africa (Kull & Rangan 2007). However, wattle has the capacity to spread outside of plantation areas, and has established self-reproducing, invasive populations in natural ecosystems, and thus the call for management and control of the species. The negative impacts of the species relates to reducing indigenous biodiversity (van Wilgen *et al.* 2007), increased water

use, and the conversion of communally managed grazing areas to bushland by encroaching wattle excluding grasses and herbs (de Neergaard *et al.* 2005), and a negative impact upon ecosystem goods and services (Richardson & van Wilgen 2004).

Societies with distinct economies, politics and environmental sensibilities receive and react to introduced plants in different ways, and perceptions of these species vary (Kull & Rangan 2007), depending particularly on wither they are viewed as a beneficial resource (fuelwood, construction timber, medicinal use etc.) or as detrimental to the environment (loss of biodiversity, competition with 'natural' species etc.). In 1995 the South African government introduced the 'Working for Water' programme, through activities to control invasive species, employment opportunities have been created for the rural poor communities. The programme receives US$ 50 million annually and is Africa's largest environmental programme (van Wilgen 2004 cited in de Neergaard *et al.* 2005), in which activities to control invasive species created employment opportunities for rural poor communities.

In South Africa, the government classifies wattle as a category two invader plant, and it may not occur on any land other than a demarcated area or a biological control reserve (CARA Act No 43 of 1983). The estimated cover of *Acacia* species infestations in South Africa is 719 950 hectares (Versfeld *et al.* 1998), with the greatest threat within the endemic rich Cape Floristic Kingdom (fynbos), savannah and grassland biomes of South Africa (Richardson & van Wilgen 2004).

Although the official perception of wild invasive wattle is as an alien invasive plant (AIP), at the local scale there may be alternative viewpoints, thus as is argued within this paper, the issue of scale and utilisation of the species influences one's perception of the species as either a undesirable alien or a necessary resource. Wild invasive wattle populations have been integrated into rural livelihoods, and exploited locally for construction material and fuel (de Neergaard *et al.* 2005; Shackleton *et al.* 2007). For the majority of rural stakeholders, it was reported (Shackleton *et al.* 2007) that the positives derived from direct use of invasive populations outweighed the negative costs. Thus, a conflict of interest may arise; at the national scale the government seeks to eradicate invasive populations to reduce negative environmental effects upon water resources, biodiversity,

and ecosystem services, however, at the local scale communities may seek to maintain populations and their associated positive benefits.

In Swaziland, wattle introduction, plantation establishment, and invasion (the word is preferred to spread as, by its very nature, wattle out-competes indigenous species and 'takes over' the landscape) into the natural landscape is comparable to the process described above for South Africa. It is assumed that the species was introduced to Swaziland during the 1920s, when large-scale commercial planting of wattle was undertaken in the nearby district of Piet Retief, South Africa (Sherry 1971). The spread was greatly increased in the late 1940s, when there was a fuelwood shortage, and the colonial government in Swaziland issued taxpayers with wattle seeds to be planted around homesteads to create woodlots to supply fuel. Small areas of wattle were also established by large-scale exotic forest plantation owners, who extracted tannins from the harvested wattle bark. Thus, initially wattle was introduced under controlled conditions as a homestead or plantation species. The practice of planting and harvesting for fuelwood by homesteads in Swaziland continues today (Allen 2004). Wattle spread from designated areas, such as woodlots and commercial plantations, into the surrounding landscape and established self-reproducing populations is very self-evident and, as in neighbouring South Africa, seen as an environmental crisis. These wild invasive populations tend to be found on hillsides and along river courses, thriving in areas above an altitude of 650 metres, with rainfall between 900 to 1 400 millimetres, and with deep, well-drained loam soils (Sherry 1971). Cover estimates of invasive wattle populations range from 26 440 to 28 839 ha (FPGP 2002).

The Swazi governments' perception of wattle can be traced through reference to relevant legislation. As early as the 1950s the planting of wattle was regulated; the Natural Resources Act 1954 prohibited planting along stream banks (Swaziland Government 1954) and the Control of Tree Planting Act 1972 prohibited the planting of wattle for commercial purposes on agricultural land without permission (Swaziland Government 1972). Harvesting activities were also specified under the Wattle Control Act 1960; wattle was classified into immature plantations, where harvesting was prohibited, and mature plantations, where bark harvesting was permitted (Swaziland Government 1960). The Wattle Bark Control Regulations of 1962 stipulated the quantities of bark and ages of tree from which bark could

be harvested and also required that a permit was obtained for harvesting and processing (Swaziland Government 1962).

Within Swaziland, an integrated and comprehensive forest policy and legislative framework has been an obvious omission and only as recently as 2002 has the National Forests Policy (NFP) come into being (Swaziland Government 2002). The preamble states that 'wattle harvesting … has become problematic' (Swaziland Government 2002:iii) and within the NFP there are four aims relating to wattle; to improve commercial wattle management through sustainable practices and improved organisation of the growers, to control the spread of wattle by proper management and remove wattle from ecosystems where they are a threat, to enhance wattle forests on communal land through improved management practices and distribution of systems, and to define the user rights of wattle trees that have spread over communally used Swazi National Land. However, the NFP is incomplete as it fails to incorporate relevant old Acts. Thus, the presently proposed National Forest Action Programme will include wattle growing, wattle management, relevant Acts, and so rectify this oversight. Like its South African counterpart, the Swazi government seeks to limit the future spread of wattle where it is a threat to natural ecosystems. However, where wattle has already spread into communally used Swazi Nation Land (SNL) the government aims to define user rights and enhance the management.

This article, through interaction with the various stakeholders with an interest in wattle in Swaziland, describes this resource, which in itself is not 'natural' to the ecosystem, and debates how this resource is perceived as both a pest and an important commodity, creating a serious environmental dichotomy.

Methods

A series of semi-structured formal and informal interviews were carried out with wattle stakeholders from the Swaziland Government, a consultant, the Wattle Growers Co-operatives, and three private forestry companies. The positions these individuals occupied within the stakeholder groups is outlined below.

Government

- The Commissioner of Co-operatives from the Ministry of Agriculture and Co-operatives.
- Senior Forestry Officer.
- Forestry Officer.
- Assistant Forester in the Hlathikhulu area.

Consultants

- Advisor to the Department of Tourism, Environment and Communication.

Wattle Growers Co-operatives

- Shiselweni Wattle Growers Co-operative (approximately 48 members): 1 Chairman, 7 active members, 2 in-active members, and 1 member who resigned.
- Hhohho Wattle Growers Co-operative (approximately 20 members): Secretary of Executive Committee.

Private forestry companies

- Managing Director of a local Swaziland Forestry Company.
- Public Affairs Manager of a multinational forestry company that has a paper mill in Swaziland
- Development Services Manager: A southern African marketing co-operative for timber growers

Interviews were conducted in SiSwati or English depending upon the medium the interviewee was most comfortable with. The interviews were designed to elicit information on the history of wattle, its management and yields within naturally established 'wattle jungles' and plantations. Issues relating to trading and the commercialisation of wattle products were discussed, as were the positive and negative impacts of wattle on the environment. The role and benefits of, and problems within, the wattle growers co-operatives were discussed, and respondents were asked to list their own issues (i.e. not provided with a predetermined list). Actions that the government and other organisations and individuals could take to

improve the outlook for wattle growers, harvesters, and traders were debated.

Our findings are placed within the conceptual framework for interpreting the impacts of Invasive Alien Species (IAS) on rural livelihoods as outlined by Shackleton, *et al.* (2007).

Results

The Production and Utilisation of Wattle in Swaziland

Interviews with a senior forestry officer and wattle growers revealed the following background information on wattle production; wattle grown from planted saplings can be harvested at approximately 8-10 years old, yields typically range from 100 to 150 tonnes ha^{-1} for timber and 15-20 tonnes ha^{-1} for bark. Method of harvesting is selective felling which takes place on an annual basis. If stems with a diameter greater than 8 cm are selected, such a system can provide 70-80 tonnes ha^{-1} over an eight year period, or 9-10 tonnes ha^{-1} y^{-1}.

The bark and wood is harvested; bark is obtained from felled timber for tannins and adhesives; wood for building construction and fuel, and pulpwood for papermaking. Pulpwood is produced by chipping and the products are used in hard paper and other paper products.

Wattle Stakeholders in Swaziland

The Ministry of Agriculture and Cooperatives (MOAC)

The Ministry recognises the contribution of wattle to improving the economic and social welfare of the people as well as the negative impacts upon the environment. The Forestry Department of this Ministry perceives wattle as a commercial species that can be used for its economic benefits, but at the same time attempts to prevent its spread into undesirable areas. Within this premise, there is a growing concern that forest resources in Swaziland are being heavily exploited and commercialised to meet the needs of society and sustain livelihoods of rural households. The MOAC attempts to accommodate all concerns and interests regarding wattle forests management, either as a cash crop or an invasive weed and are developing

strategies to further agricultural production activities and protect land resources. The programme of wattle forests management, as described by the forestry extension officers, includes the following:

- the use of saplings or hybrid seedlings that produce sterile seeds to avoid spreading of wattle jungles on arable and grazing areas,
- registration of wattle growers and grower cooperatives for coordination and monitoring purposes,
- introduction of wattle planting and management loans to individuals, and
- provision of an extension service for wattle growers.

The Swaziland Environment Authority (SEA)

The SEA is a Government Department within the Ministry of Tourism, Environment and Communication that is responsible for overseeing and monitoring all environmental management activities within the country. SEA regards wattle as a weed in the higher rainfall and altitude regions of Swaziland as it is invasive and interferes with natural species growth. It classifies wattle as 'problematic' as although it is an alien invader and detrimental to biodiversity it is also recognised as a cash crop. At present, there is no programme for wattle management and the Department is developing a database of invasive plants however the focus is on the invasive *Chromoleana* and *Lantana*.

An increasing concern, mentioned by SEA, is the position of land tenure, in particular within the context of ownership and management responsibilities surrounding and within which wild invasive populations of wattle grow. Most of the present wild invasive populations are found on Swazi Nation Land (SNL), which is land held in trust for the Nation by the Swazi King, with locally-based traditional leaders being *de facto* responsible for its administration. The perception from interviews with community members is that these leaders feel there is insufficient SNL for food production and grazing, thus they perceive the establishment of wattle on SNL as encroaching upon these land use types. Thus, wattle is viewed as an alien invasive species that shades out other plants, in particular palatable grass species, which results in poor quality and reduced grazing. The

traditional leaders claim wattle has a high water demand and it dries out streams in riparian areas and it has been alleged that in some cases, wetlands are intentionally destroyed for wattle growing.

Wattle Growers and Harvesters

The term wattle growers and harvesters refers to small-scale wattle growers. In the past these individuals belonged to the wattle co-operatives, however, recently some members have left. Thus, the growers and harvesters may or may not be co-operative members. The wattle growers, who are practising small-scale forestry, do not perceive wattle stands as detrimental to the environment. Although they accept that wattle encroaches onto grazing areas, they state that wattle can help reduce soil erosion by providing cover. The growers believe wattle is an important resource with a wide range of uses at the local level, such as fuel wood, construction timber, fencing poles and livestock feed. The growers suggest that the MOAC should grant them permission to use under-utilised government farms to grow wattle. They envisage this would increase the production of wattle and as the plantations would be in demarcated, agricultural areas this could reduce conflicts over wattle on SNL.

Local Companies

The local companies exporting timber and bark to South Africa consider wattle growing a worthwhile venture although they are aware of its destructive properties to the environment. Local companies believe the country should expand wattle production to take advantage of the existing international markets particularly in South Africa, Japan and China and provide much needed export revenue. As a solution to the invasive nature and associated encroachment of the species they advocate the use of sterile seedlings.

Wattle Co-operatives

The first Co-operatives Proclamation was introduced in Swaziland in 1931, followed by the Proclamation of Co-operatives Societies Act No. 28 of 1964

(NCDP 2000). There are presently 130 registered co-operatives including wattle co-operatives (Ginindza pers. comm.). Of the four administrative regions in Swaziland, three, Shiselweni, Hhohho, and Manzini, have registered wattle grower co-operatives. The basis for co-operatives formation is the belief that if people have a common problem they will co-operate to work against that problem. The organisation and administration of a co-operative is decided by the members of the co-operatives based on agreed terms, which are guided by the basic rules of co-operatives formation specified in the Co-operatives Act of 1964.

By way of example, the Shiselweni Wattle Growers Co-operative (SWGC) terms include; that the executive committee is nominated by the members, members must be Wattle growers, have land and an ability to work with others. Members pay a joining fee (approximately US$8), an annual subscription (US$8) and shares can be purchased (US$60 each). A minimum of three shares qualifies one for full membership and eligibility to vote.

Benefits

The benefits of co-operatives were outlined by executive, active and in-active co-operative members (Table 1). The active members listed numerous benefits, the most important being that the co-operative membership improves applications for bank loans, allows for regular timber deliveries to buyers and that the co-operative has a permit for South African export.

Table 1. List of benefits provided by active, inactive and resigned co-op members

Co-operatives		**SWGC**		**HWCG**
Benefits	Chairman (n=1)	Active members (n=7)	Inactive and resigned members (n=3)	Secretary of Executive Committee (n=1)
Co-op assists in selling		1		
Opportunity to work with others		1		
Co-op has export	1	3	1	1

permit for SA				
Co-op assists in obtaining loan	1	6		
Co-op can secure cheaper transport costs for timber as large quantities transported	1			
Co-op allows regular supplies of timber to be delivered to buyer and therefore bonus payments obtained		4		1
Co-op obtained higher prices per tonne than an individual, because can supply larger quantities	1	1		
Payment for timber is assured through the co-op		1		
Co-op is a direct member of purchasing company				1

Key: SWGC—Shiselweni Wattle Growers Co-operative; HWCG—Hhohho Wattle Growers Co-operative

Limitations

Table 2 provides a tabulated list of the limitations as expressed during the interview process with the co-operatives and its members. Limitations cited by the ordinary members included; executive members allegedly embezzling funds from the co-operative, and due to the cost few are able to purchase full shares and thus become executive members. The majority of members were ordinary members, and as they are unable to vote the perception is that, as a consequence of their limited power, the executive members did not acknowledge their opinions. Mistrust and a poor understanding of business

administration and financial processes was a commonly held concern. Consequentially, members were sceptical of actions of the executive committee and most respondents identified a need to train co-operative members in business management. The co-operatives constitution is perceived as a factor that has contributed to failure within management of the co-operatives, as the constitution stipulates that the office term for the executive committee should be three years. However, this period is viewed as too short for planning and implementation of activities in line with the committees' vision. Lack of land and tenure thereof is also a serious concern, members have insufficient land for growing trees that leads to poor yield of timber and subsequent failure to service loans. They also stressed that Government support in the form of land is required.

Table 2. List of problems within co-operatives provided by active, inactive and resigned co-op members

Co-operatives		**SWGC**		**HWCG**
Problems	Chairman (n=1)	Active members (n=7)	Inactive and resigned members (n=3)	Secretary of Executive Committee (n=1)
Members supply small quantities of timber, these amounts are insufficient for the purchasing companies	1			
Executive Committee embezzling funds		3	2	
Ordinary members (those with less than 3 shares) cannot vote, they have no 'voice'		1		
Co-op requires immediate loan repayment once it has sold timber to		1		

companies			
Members lack commitment	2	1	
Members sell timber direct to companies, not always to the co-op	1	1	
The 3 year term for the committee is too short	2		
Lack of trust amongst members	3		1
Members have no land upon which to establish plantations	1		
Loans are not repaid	2		
Executive members hostile to new members		1	
The co-op accepts harvested wild timber but has not managed these areas. Over-harvesting has occurred and now a lack of supply	1		
Co-operative transport of timber is unreliable	1		
Co-op does not address Title Deed land issues	1		
Co-op members also members of Forestry Companies, leads to conflict of interests		1	

Key: SWGC—Shiselweni Wattle Growers Co-operative; HWCG—Hhohho Wattle Growers Co-operative

Accessibility to land for wattle growing was a major issue; with individuals opting for a variety of strategies to overcome this limitation. For example,

for two members who did not have access to land for planting wattle; one harvested wattle from private plantations on surrounding farms, and supplied the farmer with the timber and kept the bark for himself. Whilst the other member approached the owners of a wattle plantation on Title Deed land and paid them for access to their wattle.

For the two members with access to Swazi National Land, one had established a 2 ha wattle plantation, whilst the other was in a group of families that had been allocated SNL for grazing by their traditional leader. A portion of this land had a wattle stand, so the member had come to an agreement with the families to fence off the area, allow harvesting, and to share derived income. However, a concern is that the traditional leader is now asking for a commission which will cut the profits dramatically and make the venture un-economical.

In the past, the wattle co-operatives had been allocated tonnages from a South African forestry company for wattle timber, for example Hlathikhulu region in the Shiselweni co-operative had an agreement to supply 500 tonnes of wattle timber per month. However, the Shiselweni Wattle Growers Co-operative can be considered non-active as at all its meetings in 2005-2006, only the three executive members attended. Furthermore, the Hhohho Wattle Growers Co-operative has not sent timber since 2003, and only the Manzini Wattle Growers Co-operative is currently supplying. Although, two of the three co-operatives are no longer supplying the company directly, the volume of wood the company buys from Swaziland has remained relatively constant, indicating that wattle is traded via a different route. Some co-operative members who have the resources, now trade directly with forestry companies, others who cannot supply sufficient tonnages, or lack the means to pay for transport and tax, trade their timber with middlemen or private companies, who then pass along the supply. This process, of by-passing co-operatives, has been made possible by the change in legislation, which now allows individuals to trade directly with timber companies as opposed to working through a co-operative which used to hold the trading licenses. From observation and interviews it was evident that the co-operatives are in the process of closing down and membership has dramatically declined in the last 5 years.

Private Companies

Co-operatives are quick to point out that they have created a niche that private companies have been able to exploit. For example, one private company that has monopolised the wattle market realised, by chance, that they could encourage suppliers to deal with them rather than the co-operatives for a number of reasons. Thus, during a holiday period when the co-operative was closed, suppliers who normally utilised the co-operative, sold their wattle direct to the private company. The company offered cash-on-delivery whilst the co-operative could only offer payment after delivery of the wattle to South Africa, which could entail a wait of a month or longer. The suppliers, including some co-operative members, were eager for instant cash payments and therefore many continued to supply the private company once the co-operative was re-opened after the holiday period. The private company therefore increased the amounts of wattle it was processing and was able to increase its quota. Thus, benefiting from the classic economies of scale and are able to send more timber to the market and thus elicit higher prices per tonne and benefit from bonuses offered by the timber companies for meeting quotas on time. This has lead to a feeling of animosity and resentment from certain sectors of the industry; however others have seen it as an advantage and good business management.

Private companies are aware that wattle growing on SNL is insecure and that many individuals will not risk waiting for the wattle to reach the desired age and size. Therefore people will harvest timber earlier which provides less of an income but a quicker return period. The company also have their own plantations, thus when bought wattle supplies are insufficient to meet monthly quotas, the company fells its own wattle to ensure that quotas are met. The ability to meet monthly quotas ensures that the private companies receive a supply financial bonus. Due to the economies of scale and the ability to meet quotas, the private companies are able to achieve a higher price for its wattle than a small-scale individual with intermittent supplies. By way of example, a single dominant company currently has approximately 400 suppliers in Shiselweni and 300 in Mbabane who supply timber, bark and charcoal, and trades approximately 6 000 tonnes of wattle timber per month to timber companies in South Africa. Recently, as stated above, the regulations regarding selling timber to South Africa have changed; in the past only the co-operatives and private companies were

allowed permits, however now individuals can acquire permits and trade directly with timber companies. Thus, there are now some individuals who are members of these South African timber companies and supply them directly. Currently, these individuals are few and the supply minimal, however it is a potential avenue of economic opportunity which could place further pressure on the remaining resource, leading to either smaller timber being harvested to satisfy the market which leads to increase pressure on the land or with increased demand further planting or encouragement (change in land use practices) of wattle.

Commercial Value

The potential contribution of invasive wattle populations to commercial trade can be estimated from comparing published sources of information relating to the area of wattle cover and the volume of wattle products traded. A mail questionnaire of timber growers and processors in 1995/6 indicated that man-made wattle forests covered 1 706 ha (Anonymous 2005). Estimates of utilisation of these wattle forests suggest that 36% was used for pulpwood, 8% for fuel wood, 7% for sawlogs, the remainder was unspecified (Sibandze *et al.* 2000).

In South Africa Theron *et al.* (2004) suggested that the by-products of wattle that are removed under AIP programmes could be utilised to off-set programme costs. They assessed the biomass of wattle on the Cape coastal plains and reported that the total woody biomass was approximately 10 Mt or 12 million m^3, an amount equivalent to the annual roundwood intake of pulp, paper and board mills in South Africa (Theron *et al.* 2004). Working for Water initiated the Value Added Industries programme, one of its aims was to maximise positive economic benefits by creating extra jobs in the harvesting and processing of alien plant material. Currently under this programme there are four companies in South Africa which utilise wattle to produce garden and household items for sale (WFW 2008). Thus, within South Africa the potential trade value of products derived from wattle infestations is gradually being recognised.

This could have implications for resource economics calculations for alien invasive plants as the majority of these studies have concentrated upon negative impacts such as water, species, biodiversity losses and more

recently changes to ecosystem goods and services (Turpie 2004). The studies of de Neergaard *et al.* (2005) and Shackleton *et al.* (2007) illustrate the value of wattle infestations to local livelihoods, and suggest that the positive values of wattle and other AIPs should be incorporated into future resource economic calculations.

Discussion and Conclusions

As with any resource, the market for wattle timber has fluctuated. Initially, in the early 1990s producers struggled to sell wattle timber and timber companies restricted the amounts they would purchase from suppliers. As prices improved the timber companies engaged in a marketing campaign and increased processing capacity so that they could market 100% of the timber their suppliers produced. In 2001-2003 wattle timber supplies from Swaziland to South Africa peaked at approximately 40 000 to 60 000 tonnes annually. However, with the increasing demand and good prices the Swazi producers over-harvested the older wattle stands and currently most wattle infestations can only supply 3-4 year old material, thus a situation exists where there is an undersupply of wattle in relation to its processing capacities (Dlamini pers. comm. 2005). Due to the continuing demand for timber, there is overexploitation of plantations / infestations as producers often harvest young and small diameter trees to meet quoted tonnages figures from buyers. Hence we see the development of a new market in which entrepreneurs are buying from rural areas and selling on, acting as middle men, as the market exists and rural individuals are often unable to bear the costs of harvesting and transport in isolation and with the collapse of the co-operatives this is the only avenue available to them, appreciating the economies of scale.

The benefit that individuals derived in the past from trading products from wild invasive populations of wattle and the positive impact upon their livelihoods is illustrated by the case described in Box 1.

Box 1. Wild invasive wattle populations as a commercial resource

Mrs Mhlanga has never planted a wattle tree yet wattle has transformed the lives of her children. For the past thirty to forty years, together with her late husband she harvested wattle products from the wild invasive wattle

populations surrounding her homestead. Initially, they harvested bark and sold it to companies in South Africa. The cash income generated allowed Mrs Mhlanga to send her children to school. Each co-operative member had a quota of tree bark, she used the permits of those who did not harvest bark and was able to trade larger quantities. The family has long recognised the value of wattle and they had hoped to purchase land for wattle plantations. However, due to the land shortage and discouragement from her traditional leader, who perceives wattle as a threat to grazing lands, they have not been able to set up their own plantations. Her children are interested to continue trading wattle, but currently the co-operative offers no support structure and they do not have the necessary equipment to begin harvesting and trading.

Source: Mhlanga, personal communication (2005).

The value of wattle products has changed in relation to the ability to utilise these products. Initially, in the late 1800s and early 1900s wattle was valued principally for its bark that produced tannins for the leather industry. Later, technological innovations in the pulping and paper-making industries lead to an increased demand for wattle which had a high density pulpwood. The common pulping species, *Eucalyptus grandis* has an approximate density of 440 kg/m^3 and a total pulp yield of 51%, whilst wattle has a density of 630 kg/m^3 and a total pulp yield of 58%, its higher density improves pulp mill digester productivity and allows higher stowage levels to be achieved on ships, thus it is a preferred pulping species (Norris 2005). In the early 1990s demand from South Africa for Swazi wattle pulpwood was limited by the processing capacities for the woodpulp. As capacities increased, so the demand for wattle woodpulp grew. Individual wattle growers and wattle harvesters and traders responded to this increased demand by increasing harvesting rates and by harvesting smaller diameters of wattle. Wattle harvesting peaked in 2001-2003, however the wattle resources were harvested faster than the rate of regrowth, thus the potential harvestable resource of wattle has declined.

Timber company representatives believe that the current demand rates for wattle are stable (demand is stable as production is maximised and producers cannot produce more) (Rijkenberg pers com. 2005). The government, timber companies, wattle growers and harvesters realise that the invasive wattle populations provide a valuable resource and that recently

they have been over-harvested. It is imperative that these areas are better managed so that they can continue to provide wattle into the foreseeable future. The Swazi government and buyers both recognise this and together have started an initiative aimed at alleviating some of these problems. They envisage that the invasive wattle populations should be converted to managed plantations, which can be achieved by harvesting the current areas and then planting improved commercial wattle seed in the areas with associated management. Foresters have been trained in this methodology, and manuals and seeds have been distributed. Activities started in mid-2004 and 20 ha have so far been planted. The overall response from the farmers has been a positive one.

The trading of wattle has undergone several changes in recent years. Initially co-operatives were established to facilitate small-scale producers and harvesters so that they could benefit from the economies of scale. In addition, co-operative members benefited as the co-operative held an export permit that allowed them to sell wattle to South Africa. However, there have been various limitations in the co-operatives functioning with issues such as lack of accountability, limited power of ordinary members, corruption that has led to mistrust amongst members. Furthermore, the payment method took several weeks for products channelled through it, and although prices were reasonable some co-operative members preferred to sell their products outside the co-operative and receive instant payments. The benefits of trading wattle in the co-operatives would theoretically have been more equitable and the individual benefited relatively more in the co-operative than selling direct to a private company.

Some local companies have been able to take advantage of the poor functioning of the co-operatives and have offered cash-on-delivery, but allegedly at lower prices than the co-operatives. The companies have access to greater capital and resources than small-scale producers and it has utilised these to increase its share of the wattle market and to increase its supplies to timber companies in South Africa. By supplying large quantities of wattle the companies are able to meet monthly quotas and benefit from incentive bonus payments.

The inability of Swaziland to process its own wattle products means that it has to look beyond its' boundaries to South Africa with its markets and processing capabilities. Individuals or organisations within Swaziland

who wish to sell raw wattle products to the South African-based buyers must therefore be able to access the means by which they can deliver the products in the requested quantities, timely and adhering to legal aspects such as border tax payments. These requirements tend to prevent individuals trading who can only supply small quantities on an irregular basis and who have limited capital to cover transport and tax costs. Thus, the main suppliers to South Africa are private companies who have access to capital and organisations, such as co-operatives that bring together individuals to benefit from economies of scale.

The Swazi government, timber companies in South Africa and growers, harvesters and traders alike all acknowledge that the invasive wattle populations in Swaziland have been over-harvested and that the co-operatives are generally no longer functioning effectively. Recently, some initiatives have been put in place to overcome some of the problems faced by the small-scale wattle growers and harvesters. These initiatives include diversifying access to secure land for wattle plantations ('Traditional leaders should be made to sign agreements with wattle growers if they locate land to avoid confusion and cheating of growers'—Dlamini, pers com, 2005), simplifying the export procedure so that individuals may trade directly in South Africa, and devising strategies so that the current wattle jungles can be converted to managed plantations.

A note of caution must be sounded here. It is assumed that the growers are actual farmers and we believe this is often a misnomer. A new 'market' is developing where business minded people are buying from rural areas and then selling on, acting as middle men, as the market exists and rural individuals are often unable to bear the costs of harvesting and transport in isolation and with the collapse of the co-operatives this is the only avenue available to them, appreciating the economies of scale. Furthermore, rural dwellers often do not have land tenure and are often at the whim of traditional leaders and more powerful local leaders who are able to appropriate the resource if its market value becomes high and it is perceived as a good cash crop. Therefore to attend to a wattle stand and allow it to reach a greater size is not always desirable, which in terms of resource sustainability and land management creates many difficulties. This points strongly to the need for a social construct of the resource as opposed to perceiving the resource merely as a biophysical variable to manage.

There is a need to attempt to incorporate these complexities to the benefit of rural communities, the greater the perceived benefit the greater the opportunity to develop a management plan that communities will accept and adhere to. This goes to the notion of community based natural resource management and a collaborative management approach as advocated by Fabricius *et al.* (2004) in which a range of approaches are possible depending on the increasing expectations of stakeholders and proactive involvement of communities. For example, the development of a stronger, more trusting, relationship between harvesters and companies in which companies will only accept a certain quality of timber, thus ensuring non-utilisation of small sized timber and thereby improving sustainability of the resource. Better management of existing wattle plantations as in comparison to large plantations the same area of small sized woodlots will have a larger perimeter to area ratio with the natural vegetation, and thus favour the further spread of AIPs such as wattle (Le Maitre *et al.* 2004). In South Africa it has been suggested that the promotion of the utilisation of AIPs products, such as the development of an informal economic sector based wattle, may actually help limit the extent of invasions (Le Maitre *et al.* 2004).

One of the major issues is that of access rights to infestations on SNL. There is a call, through the NRF, to utilise SNL for wattle production and to work proactively towards developing an integrative and participatory management strategy, similar to Forestry Participatory Management as utilised within the mangrove forests of South Africa (Traynor & Hill 2008). Two alternative approaches that need investigation is: to improve the organisation of growers and possibly to revise the ideals of the co-operatives; and to study the potential for setting up value-added industries for wattle in Swaziland, thus add value to wood products.

Shackleton *et al.* (2007:113) suggest that the use of invasive species by rural communities as part of a livelihood strategy is ‘little understood and rarely factored into Invasive Alien Species control programmes’. Thus, we have a dichotomy of perceptions in which certain stakeholders see wattle as an alien which impacts on the environment and biodiversity and is to be controlled, although not removed due to its economic status and others that consider the wattle a vital resource and playing an important role within rural livelihoods. This resource role needs to be better understood if an acceptable management strategy is to be developed, as is evident from this

paper Swaziland is attempting to 'be all things to all people' and please all—trying to incorporate black wattle as both a resource and an invasive alien species which needs to be eradicated—this will not be successful! In South Africa, according to de Wet et al, (2001) the impact cost of wattle is 2.5 times greater than the positive aspect borne from rural usage, which does swing the balance towards eradication projects. However, and again echoing the words of Shackleton *et al.* (2007), we believe it is premature to make a similar stand with regards to Swaziland where wattle is not only important to rural livelihoods, but also supports a small scale industry with a number of middle-men acting as facilitators between industry and rural communities and individuals. The perception is well encapsulated by the comment 'wattle is only a weed when people are not using it—irrespective of extent—as long as management is ok, its not a weed' (Lukhele, pers com. 2005).

Shackleton *et al.* (2007) from their study on both black wattle and pricky pear in South Africa conclude that the 'effects of invasive alien species on rural livelihoods are complex' (page 121). Own field observations in Swaziland with regards Black wattle and *Chromolaena odorata* (Triffid weed) concur as although both species are recognised and often treated as invasive aliens they both do serve rural communities as a dependable resource. We are faced with the difficult scenario of either acting as ecological purists and removing the species as aliens or taking cognizance of their role as a rural resource and attempting to manage and control as opposed to eradicate.

This begs the question of who will facilitate this process and the role that can be played by local, traditional leaders who have such a strong proactive authoritative position within many rural communities. As has been described by Twine *et al.* (2003) and Kirkland *et al.* (2007) there are many difficulties regarding institutional support and the roles and responsibilities of traditional authority, which creates confusion within rural communities resulting in apathy and no vision to move forward. One needs to include in the equation here the role and responsibilities of co-operatives, as is evident from the case study the co-operatives have had, initially, a significant and positive influence on rural livelihoods, however, either through lack of support (both from participants and government), poor governance or competition from other more financial secure ventures their influence has diminished. Therefore, we need to overcome the ambiguities of authority as

well as look towards a more laudable and long term impact and attempt to reduce the burden of poverty upon the rural poor, thus placing less pressure upon our resources.

This article demonstrates just how difficult this dualistic role can be and calls for environmental management policy to consider the usefulness of the invasive alien species or deal with the question as posed to myself whilst undertaking field work for this paper 'Why is government stealing our resource and leaving us with no income?'—in response to the eradication of wattle jungles from upland river catchments. We do appreciate the environmental impact that invasive alien species have upon our natural ecosystems and recognise the necessity for control. However is there not place for management that is inclusive of the needs of rural communities? We support working in collaboration through strategies such as participatory forest management forums. We can create a process that includes the opportunity for rural communities to be part of the management process and, through skill development, be involved in utilising this resource in a manner conducive to the environmental and social needs of the region.

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