MEDICINAL PLANT GARDENS: PROMOTING PLANT CONSERVATION OR RURAL ECONOMIC DEVELOPMENT

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Abstract

The use and trade in medicinal products in South Africa is a growing sector of rural development. In order to conserve these products and develop sustainable production, policies to promote domestication have been adopted. However, users view cultivated plants with scepticism. The key for policy makers is to understand how users respond to scarcity of species and whether domestication can be a solution. The main purpose of this paper is to give an overview of variables that influence the rate of uptake of gardens. The last discussion will investigate whether domestication of species is an appropriate solution to conservation, or whether the intervention should be promoted as a local economic development option.

The research took the form of a case study approach focusing on a specific area, with participatory and qualitative phases providing the basis for a semi-structured interview schedule, designed to assess the healer's acceptability of medicinal gardens, their comparative perception of grown plants and collected plants, and constraints in the establishment of medicinal plant gardens**.**

Results indicated that the type of healer influences acceptability of medicinal gardens; healers use medicinal gardens to supply urban demand and provide income; healer and client perceptions of medicinal plant potency influence acceptability of grown plants.

The paper concludes that:

- Local scarcity of medicinal plants alone does not stimulate demand for nurseries;
- Rituals associated with some treatments influence collection, storage and cultivation patterns; and
- Policy makers also need to promote domestication for commercial production and to investigate alternatives for propagating the wild populations of some plant species to cater for specific needs of healers.

1. Background

Concern regarding the depletion of medicinal plants species has led to calls for the cultivation of medicinal plants in gardens. The rationale for using cultivated plants is that as both grown and wild plants contain the same biological ingredients, it will reduce the rate of harvesting from the wild, reduce travelling cost and time for healers and finally plants from the medicinal gardens will provide alternative sources of income for healers. Despite traditional healers' support for this concept, there has been a very slow rate of adoption. Evidence, as highlighted by previous research (Mander, 1997, 1998; Cocks & Dold, 2000), shows that traditional healers still prefer to use collected species from the wild. It is here argued that whilst medicinal gardens may be an alternative source of supply income to healers, there is very limited use of grown plants in healers' practices. Added to this, a very limited number of different species are planted in homestead. Species grown in homestead are those used for treating common ailments and plants used for protecting houses against lightning. The ancestral belief system, which plays an important role with regard to what species to use to treat clients, has a greater influence of plant collecting behaviour than plant availability.

Given this apparent situation there is a need to capture and build on the ways in which different specialised interest groups respond to the problem of plant scarcity and the

opportunities they perceive from interventions, if extension is to be successful in promoting the cultivation of medicinal plants. This paper investigates the utilisation patterns of different sources of medicinal plants; key variables that influence healers' behavioural patterns and ultimately the role of medicinal gardens or mass production of plants in healers' livelihoods. The results are expected to provide extension agencies with appropriate responses to tackling the problem of promoting medicinal plant gardens in South Africa amongst the traditional healer community.

2. Methods and data sources

The research took the form of a case study approach, where a selected area was chosen for detailed study. The choice of the case study was made with consideration to:

- Sustainability i.e. extent of dependence on external inputs,
- Commitment to the project by beneficiaries. Some projects of this nature showed progress only because participants were members of the family and the major inputs to the project were from donors.
- There had to be equitable sharing of benefits and costs, such as employment and volunteering assistance in terms of labour when there is no income.

The sample population was stratified in terms of project and non-project members. A questionnaire survey was designed to assess the healers' acceptability of medicinal gardens, perception of grown plants; sustainability of medicinal plants in communal land and lastly to identify constraints to the establishment of gardens. A survey of 144 healers was undertaken.

3. Types of healers

There are two main types of traditional healers in South Africa, Sangomas and the Ngakas. According to Credo Mutwa's explanation (pers.comm.), a Ngaka is a person who undergoes training from a parent or grandparent. Ngakas use divine bones to decide on the treatment of a person and historically they were not allowed to charge a fee for their services nor to diagnose clients.

Sangoma is defined as 'of the living drum'. A disease called shaman's syndrome afflicts Sangomas when they are called to the profession. A Sangoma is defined as a diviner. Not all tribes had 'Sangoma' e.g. Southern Sothos called them Mathuela. They will, in most cases, employ drums, dancing and singing to diagnose a client. Most Sangomas are women. With the influx of western cultures, there is now a cultural confusion as traditional healing becomes more and more commercialised. Both types of healers now diagnose and dispense medicinal plants.

Gatherers are usually 'middlemen', who are knowledgeable about medicinal plants and would travel long distances to harvest plants for inyanga, Sangoma, herbalists and pharmaceutical companies. Some gatherers are trainee Sangomas or Ngakas. The herbalist usually trades in herbal medicines, they can be from either profession, and they are very knowledgeable with medicinal plants.

Central to the culture of traditional healers, is the whole ancestral belief system. This forms the basis in which healers operate. They operate under the guidance of ancestors through visions and dreams. Each type of healer is usually governed by rules and regulations, which were initiated many years ago and have been transferred from generation to generation. This ancestral belief system forms an integral part of traditional healing systems.

4. Source and use of resources

Medicinal plant species, when classified according to source, can be broadly categorised into those that are collected, grown and purchased. There was no significant chi-square association between number of species from different sources that was stored, and gender. Nor was there any association between capacity in the project and different sources of plants stored. This suggests that neither gender nor project membership influenced the source of

product that was stored. Significant associations were identified, however, between sources of plants and the healer type (Table 1).

Table 1. Distribution of Sangoma and Ngaka according to different sources of plants stored in healer houses

A: Number of species per source grown	Sangoma		Ngaka		Total	
	N	%	n	%	N	%
0-8	41	58	7	28	48	50
8-15	28	39	9	36	37	39
>15	2	3	9	36	11	11
Total	71	100	25	100	96	100
Chi square=21.0; d.f=2; P=0.00003						
B: Number of stored collected species						
1-100	8	7	16	42	24	16
100-200	18	17	6	16	24	16
200-300	16	15	4	11	20	14
>300	67	61	12	31	79	54
Total	109	100	38	100	147	100
Chi square =25.9; d.f=3; P=0.00001						
C:Number of purchased species						
<40	48	44	24	65	72	50
40-50	26	24	8	22	34	23
>50	35	32	5	13	40	27
Total	109	100	37	100	146	100
Chi square=5.9; d.f=2; P=0.05						

According to Table 1, 50% of healers stored less than 8 different species of grown plants, only 11% stored more than 15 grown species. Half the healers (50%) also stored less than 40 different purchased species in their houses.

Collected species were the most commonly stored source: 54% of healers stored more than 300 collected species from the wild, whereas only 16% stored between 1 and 100 different species. This predominance amongst stored species of species collected from the wild probably relates to the supply and demand dynamics of species. Healers do not need to store species that are readily available – either through purchase or from their gardens, whereas those species that are collected from the wild, and hence not easily accessible, are maintained in storage. However, the chi-square analysis reveals that the majority (58%) of Sangoma stored less that eight grown species, where as Ngaka were more likely to store greater numbers of species. Contrastingly, Ngaka stored smaller numbers of collected and purchased species.

This behavioural pattern may be attributed to the rules and regulations that govern each type of healer. Females are usually prohibited from coming into contact with certain species during certain periods, because it is perceived that they may render them powerless. This also sometimes applies to their female clients. Because of this taboo, they cannot grow nor keep certain species. A greater prevalence of females among the Sangoma could provide an explanation for the difference in storage patterns.

Healers will presumably purchase medicinal plants from traders when they are out of stock. With the relatively smaller numbers of grown compared to collected species, one would expect that the purchased species are most likely to be of the collected type. In such a case the same tendencies as with collected species could be expected. This is in fact the case, since Sangoma tend to purchase more plants than Ngaka (62% of total number of purchased species were collected by Sangomas as opposed to 38% purchased by Ngakas).

A Mann-Whitney analysis of variance between the location of purchased and collected species and first gender and then project membership, indicated no significant differences. Only between healer types were significant Mann Whitney differences established. These are shown in Table 2.

Table 2. Mann Whitney analysis of where species are collected according to the type of healer

Type of healer	Immediate[1]		Wider		Far away	
	Mean rank	No. of cases	Mean rank	No. of cases	Mean rank	No. of cases
(a) Collected						
Sangoma	72.79	106	81.57	109	80.18	109
Ngaka	69.73	37	52.28	38	56.26	38
Mann Whitney U=Z=-0.3886; P=0.6976			Z=-3.6711; P=0.0002		Z=-2.9888; P=.0028	
(b) Purchased species						
Sangoma	77.70	109	80.10	109	77.70	103
Ngaka	63.38	38	54.05	37	47.96	36
Mann Whitney Z=-1.7939;P=0.0728			Z=-3.2471;P=0.0012		Z=-3.8270;P=0.0001	

According to Table 2, there is no significant difference between Sangoma and Ngaka with regard to collected and purchased species from the immediate vicinity. However a significant difference occurred between Sangoma and Ngaka with respect to species that were collected from the wider vicinity and from far away. This suggests that Sangoma have a preference for species that are not found within the immediate vicinity.

This may be attributed to taboos that are associated with the healing power of some species, which means that even though there are herbal gardens, healers will still collect and keep medicinal species that are isolated from villages.

This presents a challenge to policy makers and interventionists, because whilst healers seem to adopt the concept of medicinal gardens, they use very few that they grow in their own practices. Secrecy surrounding what makes species effective is behind this. For example, they will very well reveal the use of all species, and warn the user not to grow nor use that species in her/his garden without guidance from a healer. This (as explained by the son of a healer who has been identified to take over from his father) is because certain rituals need to be performed first in order to communicate with ancestors and activate the power of the species. This suggests that although they grow and plant the species for commercial purposes, they are aware of the disadvantages of growing and using certain species in their homes. Added to this, certain cultural constraints and belief system acts as constraints to domestication of certain species. It looks like there is some logic (known only to healers) not to grow and harvest from within communities certain species for specific purposes. This mystery and secrecy not only applies to outsiders but they are known to affect people who are of family descent and have been identified to have the gift. One possible explanation (given by one of the son's of a healer) was that the healer fears the healer designate might challenge his power when he is still alive. The only way he may reveal how the magic works is through visions after he has passed away. This confirms the hypothesis that traditional belief systems are integral to traditional healers and anything that is not compatible is perceived as ineffective.

5. Trends in demand quantities

Healers generally give *muti* (medicinal plant mixtures) in powder form, mixed in some instances with some other unknown ingredients to give it "power". The previous section gave account of the purpose of species that healers harvest and keep in their houses. Not every client is given the same kind of *muti*. Healers mix different medicinal species to meet each client's needs. In some instances they even have to go and look for particular species unique for their client's problem. Thus the quantity and the number of species in a specific

[1] "wider vicinity" meant that healers would collect the species within the local area but not immediately around their homestead, whilst "far away" means collection from outside the village border, or even from neighbouring countries

prescribed mixture differs from client to client. There is a general concern that healers do not buy enough stock from gatherers, which results in some gathered stock being wasted. The healers estimated the quantities required per month.

Table 3. Distribution of Sangoma and Ngaka according to quantity of species dispensed per month

Quantity of species used per month									
Purpose	Sangoma		Ngaka		Total		Mann Whitney U		
	Ave. kg	%	Ave. kg	%	Total Ave.Kg	%			
Quantity of collect species									
Heal	41	42	25	39	66	41	W=2030	Z=-3.1	p=0.0018
Protect	32	33	21	33	53	33	W=1947	Z=-3.5	p=0.0005
Other	24	25	18	28	42	26	W=2043	Z=-2.9	p=0.0033
Total	97	100	64	100	161	100			
Quantity of grown species									
Heal	2	40	2	50	4	44	W=1645	Z=-0.44	p=0.6598
Protect	1	20	1	25	2	22	W=1491	Z=-1.5145	p=0.1299
Other	2	40	1	25	3	34	W=1182	Z=-3.4468	p=0.0006
Total	5	100	4	100	9	100			
Quantity purchased									
Heal	7	44	3	30	10	38	W=1931	Z=-3.7751	p=0.0002
Protect	5	31	3	30	8	31	W=2070	Z=-3.3092	p=0.0009
Other	4	25	4	40	8	31	W=2120	Z=-2.9674	p=0.0030
Total	16	100	10	100	26	100			

Table 3 shows for the Sangoma and Ngaka healer groups the quantity of plants of different sources of species used per month for different purposes. According to Table 3, the quantity of collected medicinal plants dispensed per month far outweighs the quantity from grown and purchased species. For example, of the total quantity of all muti dispensed per month, 82% of the mixture is from species collected from the wild. Of this 60% was the amount that was dispensed by Sangomas. It looks like larger quantities (62%) were dispensed for healing purposes as opposed to protection and other services. Sangomas collect significantly more from the wild than Ngakas, for both healing and protection services.

Both types of healer use similar amounts of grown plants for healing and protection. However Sangomas tend to dispense slightly a higher quantity for other purposes. This may be during ceremonial activities, which are more endemic to Sangomas.

Ngakas use significantly fewer amounts of purchased plants than Sangomas. This may be because they do not trust how those species were harvested and the environment in which they were harvested. Generally a larger quantity was dispensed for healing than any other treatment, whatever the source of the medicinal plants.

The above results show that healers have a preference to collect plants that are outside the boundaries of villages. There are two possible explanations for this: The first is that treatment for clients depend on ancestral guidance, which may suggest that healers have to collect only where they have been directed to go. As mentioned earlier, each type of healer has to perform certain rituals that are in accordance with rules and regulation. The fact that the rules and regulations influence each type of healer is different is supported by the findings that Sangoma and Ngaka have different harvesting and utilisation patterns for different sources of plants. For example, Sangomas have a tendency to collect most species from outside and they use more purchased than grown species in their practice, as opposed to Ngakas. Analysis of the results seems to indicate that the utilisation pattern is influenced by type of healer, but when healers were probed further about this, the logic seems to be more gender related than type. This did not come out from the statistical analysis however. The predominance of females in the Sangoma profession makes the rules and regulations for Sangomas more stringent than Ngakas. This suggests that medicinal gardens, whilst mostly appealing to females, as previously indicated, might not be compatible to the traditional belief systems because of taboos relating to females and certain medicines generally. These cultural taboos relate to rendering the magic power of species ineffective and therefore act as

constraint towards establishment of gardens for use of grown plants in a healer's practice. However, female healers are keen to adopt medicinal gardens for commercial (as opposed dispensing) purposes.

The second reason pertaining to non-adoption is associated with rituals that have to be performed before a species are harvested. The medicinal gardens are conducive to this when they are located within communities as some of the rituals are too private. Furthermore, healers have the perception that species toxicity is a function of the extent to which the plant is exposed to a harsh natural environment (including herbivory). The perception is that the more a species is protected from the natural environment, the more it becomes ineffective. This suggests that healers are aware of the disadvantages of species grown in gardens. If this is the case, both medicinal plant nurseries and herbal gardens may not be able to address healers problems of supplementing their declining natural stock. However, they can address gatherers' problems of trading in medicinal plants and healers can be used as a springboard to reach this sector.

Sangomas generally use less grown species than Ngakas. This means that some grown plants used especially for protection services are not fulfilling the fundamental needs of Sangomas because they are incompatible with their cultural and personal needs. The challenge for policy makers is to isolate the problem. For example, establish whether the problem is with the environment under which species are cultivated, or with the perceived magic power of a species. Following this, partnerships with healers will ensure that appropriate measures can be implemented to address healers' needs and aspirations as well as environmental issues.

Only low quantities of medicinal plants are used per month, confirming the healer's argument that they do not harvest species unsustainably. In this instance, partnerships between gatherers and healers is needed to first identify gatherers and target them to plant for commercial markets. Partnerships with gatherers will also ensure that healers communicate their needs and discourage gatherers from harvesting unsustainably when they do not have markets into which to sell their products.

The approach to promote cultivation of species needs to recognise the differences in utilisation patterns of each type of healer. If the objective of the intervention is to use healers as springboards to gatherers and other users, the current approach of promotion of medicinal plants is appropriate, however some fine tuning may be necessary. As long as users perceive that grown plants are acceptable to healers, they will start growing plants for commercialisation purposes. If the objective is to enlist healers to use grown plants, then the situation becomes tricky, as healers are reluctant to reveal problems associated with medicinal plants for fear of losing inputs. They instead pretend that they use the species when they actually need gardens for commercialisation.

6. Responses to medicinal plant gardens

Medicinal gardens in backyards and nurseries are established using seeds, seedlings and vegetative materials collected from local, wider and far away places. This section looks mainly at plants that have been grown in healer backyards. Table 4 shows that healers grow some medicinal plants using seeds, seedlings and vegetative material that have been obtained from local, wider vicinity and far away. The majority of inputs came from seeds obtained from local vicinities. This suggests that collecting seeds locally to propagate in gardens may be more convenient than collecting seedling and vegetative material. Furthermore, it suggests that if medicinal plants are grown from plant sources that are available locally, they are not addressing the conservation of hard–to-find and locally extinct species.

Table 4. Distribution of different inputs of medicinal gardens according to healer characteristics

Inputs per source	Average number of plant/type		
	Sangoma	Ngaka	Mann Whitney Analysis

	Mean Rank	No. of Cases	Mean Rank	No. of Cases		
Seeds						
Local vicinity	24.80	45	46.71	14	Z=-4.1975	P=0.0000
Far away	23.28	43	47.33	15	Z=-4.8066	P=0.0000
Seedling						
Local vicinity	32.32	56	52.41	17	Z=-3.4387	P=0.0006
Far away	30.78	52	46.59	16	Z=-2.8624	P=0.0042
Vegetative material						
Local vicinity	24.73	41	39.94	16	Z=-3.1528	P=0.0016
Far away	23.50	39	28.83	9	Z=-1.0685	P=0.2853

According to Table 4, which shows a Mann Whitney analysis of population variance between inputs in the garden and the type of healer, Ngakas seems to have significantly more medicinal plant species in their gardens as opposed to Sangomas. A significant difference between Sangoma and Ngaka confirms that Ngakas seem to be more receptive to domestication than Sangoma.

One would expect females and Sangomas to grow more plants in their gardens because they were those who were most concerned about species being extinct in the near future. The logic is that the financial constraints regarding purchasing from traders to supplement their declining stock and family responsibilities will act, as incentives to encourage more cultivation of medicinal plants species. However, it looks like rules and regulations prevent them from using too many grown plants. Also, traditional healing is a very competitive profession enshrined with many challenges and Sangomas cannot afford to endanger the lives of their clients by using species that are not accepted by their ancestors, a phenomenon which they fear may loose them clients.

7. Perceived power of medicinal plants

According to Simon (2000), there are various misconceptions about the effectiveness of plants from medicinal gardens, but he concedes that there can be differences in the biological action of medicinal plants depending on the environmental and genetic differences. He also argues that the way plants are harvested and when they are harvested can make a difference in their quality. It therefore requires a good understanding of the plants and the environment to assess whether a plant is of high quality. Traditional healers often have this good understanding.

A question about what it is that makes collected species more powerful or effective than grown plants resulted in responses as summarised in Table 5.

Table 5. Healers' opinions regarding the most critical aspect determining the effectiveness of medicine from plants

Methods	Percentage responses
The way they are harvested	35
Where harvested	7
Preparation	81
Rituals	7

According to Table 5, most healers indicated that it was the preparation, followed by the way a species is harvested that makes species effective. These results indicate that there are deeper issues that surround perceptions of what makes species powerful. These issues hinge on rituals, taboos, prohibitions that need to be performed in order to activate the effectiveness of a species. Preparation in terms of harvesting and preparing the mixture also plays an integral part. Whilst healers are aware that medicinal plants in their area are over exploited, the alternatives to supplement their stock are not compatible with their needs and

aspirations. This is reflected in that species grown are not rare ones but the commonly found ones locally. However they satisfy other needs, such as generation of income through job creation and selling of plants to other interest groups which may suggest that medicinal plants are not compatible with healers traditional belief systems. Added to this, healers use grown plants very little because grown plants are not compatible with their situation aspects i.e. cultural and personal.

It is surprising that very few healers indicated "muti" is given power by rituals and where the plant was harvested. This is contrary to the belief of both clients and healers that the power of species depends on where that species is harvested and how it was harvested. This represents further evidence of the secrecy surrounding the topic of traditional healers.

The discrepancy in healer response to medicinal gardens, especially with regard to what makes species effective is surprising and confusing. However the explanation may be twofold:

- The question was too general and not specific to a particular type of service. Generally clients visit healers if they think problems in their lives may have been caused by unexplained phenomena and enlist the support of a healer to ward off evil spirits. Healers will consult ancestors for guidance and will treat the client accordingly. The protection service usually is associated with taboos, rituals, rules and regulations and healers are very particular about how they protect their clients.
- The other reason may be that healers really wanted support for another medicinal garden project. They see medicinal gardens as an income generating option as well as a job creation opportunity for their families. Medicinal gardens in Kwa-Zulu Natal, Busbuckridge and Malelane are attracting a lot of tourists and healers see this as an income generating option. Secondly, their families are employed in the garden and they also get donor funding. One however should not dismiss the importance of growing for export markets and of gardens for other interested stakeholders such as plant gatherers and traders. Healers also use muti from gardens for healing ordinary ailments.

According to the explanation of a well-known sanusi in South Africa, Mr Credo Mutwa (pers. comm.), the location and environment is important in affecting plants' efficacy. Plants from the wild build their toxicity level over a number of years. Muti from these plants is perceived to be very powerful and no harm can befall their clients if used. Secondly, plants from the wild are inaccessible to communities and are not exposed to various taboos that might weaken their power. As such these are regarded as pure. In contrast, plants from gardens are always protected against various diseases and wild animals. He argues that muti for protection should never be grown in gardens because it is ineffective. Furthermore, he recommends that plants, especially those that are associated with taboos, should be grown in the wild because the toxicity of plants increases as the plant constantly competes with other plants and builds its immune system against natural attacks. Whilst healers are not against grown plants, he argues, they will like these plants to be grown in the wild away from communities where they will be exposed to the same environment as wild ones.

8. Policy implications

- From the interviews, all healers indicated that they favoured medicinal gardens, but the emphasis was on the value as an income generation option. Rural development agencies must therefore not assume that supply shortages will lead to an increased adoption of medicinal gardens.
- If policy-makers take this rural development (as opposed to species conservation) approach, they can promote domestication by assisting with start-up finances and marketing of the produce to urban or co-operate market.
- Addressing the depletion of medicinal plants requires policy makers to take account of the culture of traditional healing practices, which is usually surrounded by myths, taboos, rules and regulations. The strategy to cope with shortages must consider more than simply cultivation of species in nurseries for healers. In terms of rural development, cultivation and management of biodiversity may no longer be seen as supplementing

shortages of plants but as an economic and social issue which is one of the many productive activities that is incorporated into the economic system in rural areas.

- The results further indicate that extending gardens and even the plants provided in nurseries to healers *per se* ignores the large differences in behaviour and adoption attributable to traditional belief systems. Because of this, plants from the wild are seen as most effective because of ancestral linkages. By taking ancestral belief systems into account, interventions have a base from which to understand the prevailing social, cultural and economic conditions under which traditional healing systems operate. In this context one must take management techniques most suited to local requirement or, to mount effective action to reform attitudes of healers and perhaps users.
- With the acknowledgement of policy makers that there is a need for community based resource management, a new partnership approach appropriate to the needs of healers is needed for sustained conservation and management of medicinal plants. The findings of this research will assist in the design of different management systems that reflects a fuller understanding of the opportunities at the level of healers. It will be valuable for considering how future forest policy could influence more positively why and how healers prefer certain approaches to manage and utilise medicinal plants.

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