Chapter

Community Engagement: A Non-Formal Education Approach

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Abstract

Medicinal plant sellers primarily rely on trading medicinal plants at various medicinal plant markets as a source of income. Statistically, approximately 4000 tons of medicinal plant material is estimated to be used for medicinal plant purposes yearly. At the same time, the country is having to lose important medicinal plant species such as Warburgia salutaris. Notably, rising rates of unemployment have, additionally, facilitated the harvesting of medicinal plants for selling purposes as an alternative source of livelihood across many communities. The researcher had to intervene with capacity building om sustainable harvesting of medicinal plants. This chapter presents the challenges of propagating medicinal plants and compares indigenous and scientific ways of propagating selected medicinal plant species.

Keywords: medicinal plants, livelihoods, indigenous, propagation, marketing

1. Introduction

The research began in 2010 as a Doctor of Education research project. For ethical considerations and to promote rural community SD, the researcher kept working and collaborating with medicinal plant merchants post data collection sharing with them information on medicinal plant multiplication and cultivation in their respective gardens. One of the motives for growing medicinal plants in home gardens, as will be confirmed in later sections, was to keep women from collecting plants in risky locations distant from their houses. **Figure 1** illustrates such a perspective from which the need analysis was formulated before the engagement.

Figure 1 depicts how socioeconomic and sociocultural factors related to medicinal plant sustenance influence propagation of medicinal plants sustainably in supporting the livelihoods of medicinal plant sellers across generations.

The study invoked a participatory research approach, which has the empirical advantage of allowing participants to freely express their ideas about various methods of doing things at different stages of the study, including indigenous methods of propagation and the culture of medicinal plants. In the main, the study is essentially a cross-sectional analysis of the factors influencing medicinal plant sellers in rural communities of northern KwaZulu-Natal, with a specific focus on medicinal plant conservation.

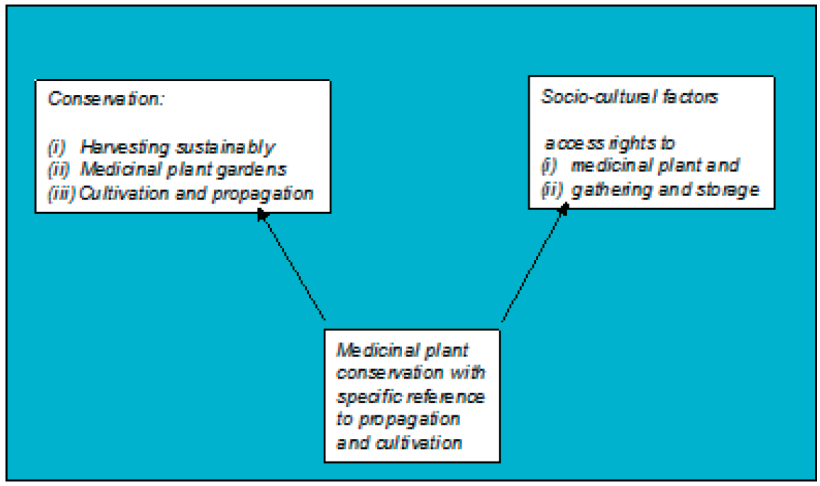


Figure 1.
Factors affecting conservation of medicinal plants.

1.1 Problem statement

There is a belief that science is well taught, conceptualised and learnt in a formal setting [1]. In this way, place (classroom, lecture theatre or science laboratory) is viewed as enabling the conceptualisation of science. There is little recognition of home as a place for learning Life Sciences. As ([2], p. 548) puts it, 'places are much more than just empty geographical spaces' as they contain 'spatialised, timed, sensed and embodied dimensions of nature.' Accordingly, [2] calls for 'place-based models of nature, culture and politics', which are therefore sources 'of facts, identities and behaviours'—incorporating 'notions of culture, local ways of life and human physical and psychological health'. In advocating that science learning often takes place through formal education, to Dib ([3], p. 1), formal education is a place where 'for the most part teachers pretend to teach; students pretend to learn; and institutions pretend to be really catering to the interests of students and that of the society'. He essentially disagrees with non-formal education in which two central elements guide the instructional process, namely (a) 'centralisation of the process on the student, as to his/her previously identified needs and possibilities; and (b) the immediate usefulness of the education for the student's personal and professional growth' ([3], p. 2). Distinguishing between formal and non-formal learning, [1] opine that the former is 'organised and guided by a formal curriculum, which leads to a formally recognised credential such as a high school completion diploma or a degree, and is often guided and recognised by the government at some level, while teachers are usually trained as professionals in some way'. Furthermore, he claims that, while the latter may be loosely organised, it 'may or may not be guided by a formal curriculum', and that it may be guided by either a qualified teacher or alternatively a more experienced leader.

The researcher opted not to walk away from the situation after observing the unsustainable harvesting of medicinal plants as this represented a need to help the sellers understand why and how their practices were impacting the ecosystem. It was determined that warning the sellers about the importance of harvesting plants prudently and considering future generations by taking remedial measures to prevent the extinction of many plants was important. Thus, the notion of sustainability was

established, which is simply defined as the smart use of resources and therefore medicinal plant species without negatively affecting the ability of future generations to benefit from the same [4]. In doing so, there was a need to consider the practices of medicinal plants for conserving medicinal plants, hence IKS and Natural Science ways of conserving the plants were integrated.

1.2 Theoretical framework

The theoretical framework of this paper constitutes formal, informal and non-formal education drawing from the Third Space Theory by [5]. The term 'third space' dates back to the popular cultural work of Homi Bhabha, and it essentially refers to the spaces between colliding cultures, a liminal space 'that gives rise to something different, something new and unrecognisable, a new area of meaning and representation negotiation'. In the context of this paper, home is regarded as the first space, while the community (church, print and visual media) is the second space and school is a third space. These were regarded as spaces where education of factors affecting growth of medicinal plants would be studied.

For instance, in its broadest sense, education 'is any act or experience that has a formative effect on the mind, character or physical ability of an individual' and represents 'the entire range of experiences in life through which an individual learns something new via formal, informal and non-formal learning' ([6], p. 75). 'Education, against this background', is defined as 'the deliberate intergenerational transmission of society's acquired knowledge, values and abilities from one generation through institutions and instruction' (formal, informal and non-formal) [6].

The idea of a home task was for the students to explore learning in a place they are familiar with, while offering a space for students to learn from their elders, siblings and one another. However, as a science teacher, I advocate that a formal classroom provides opportunities to explore science using scientific apparatus. This is supported by ([7], p. 15) in attesting that formal education is 'organised, guided by a formal curriculum, leads to a formally recognised credential such as a high school completion diploma or a degree, and is often guided and recognised by government at some level [and] teachers are usually trained as professionals in some way'. I came to my realisation that it is through formal education to accumulate credits that can make one employable. In this context, I relate the role of space and a place as aspects of developmental zones [8]. To me, scaffolding for learning science concepts should be both from parents (home) and society, and as a science teacher, I provide a framework to be followed by each part in building scientific literacy.

In a rather sarcastic tone, [3] posits that formal education is a place where 'for the most part, teachers pretend to teach; students pretend to learn; and institutions pretend to be really catering to the interests of students and of the society.' He disagrees this with non-formal education where the instructional process is guided by two key features namely '(a) centralisation of the process on the student, as to his previously identified needs and possibilities; and (b) the immediate usefulness of the education for the student's personal and professional growth' [3].

Envisioning non-formal education further, ([6], p. 335) sees it as organised education that take place 'outside the formal education system'. In a similar vein, [6] also see non-formal education as 'any organised systematic educational activity carried on outside the framework of the formal school system to provide a selected type of learning to particular sub-group in the population (adults, youth or children)'. Ceschin et al. [6] posit that non-formal education 'may or may not be governed by a formal

curriculum', even if it is led by a qualified teacher or a leader with formal experience; that no official credits are awarded in such learning. Further, ([6], p. 336) is of the view that in contrast to formal education, 'non-formal education focuses on needs of special groups such as women or adults'. In the context of the research reported in this paper, using the example of medicinal plants propagation non-formal experiences from home were brought to a science classroom, which is a formal setting.

While ([9], p. 2306) sees non-formal education as 'education that is driven by the objectives of the learners who often participate voluntarily'.

Latchem [8] adopts the UNESCO non-formal education definition, which states as follows:

> *'Any organised and sustained educational activities that do not correspond exactly to the definition of formal education. Non-formal education may therefore take place both within and outside educational institutions, and cater to persons of all ages. Depending on country contexts, it may cover educational programmes to impart adult literacy, basic education for out-of-school children, life skills, work skills, and general culture. Non-formal education programmes do not necessarily follow the 'ladder' system, and may have different duration, and may or may not confer certification of the learning achieved'.*

In terms of informal education, [6] claims that it 'occurs when mentors take responsibility for instructing others in more incidental or spontaneous situations, such as guiding them in learning job skills or in community development activities, without sustained reference to a pre-established curriculum'.

The European Commission (described by ([10], p. 9) as the type of learning that 'come from ordinary life activities relating to work, family or leisure'), which essentially supports the view of [3] on informal education. It is not structured (in terms of learning objectives, learning time or learning assistance) and does not usually result in certification. Informal learning can be purposeful, although most of the time it is unintentional (or 'random')'. However, as ([10], p. 11) opines, 'there is increasing acknowledgement that learning takes place on a continuum and that the boundaries between different forms of education and learning are porous' and that, therefore, the definitions of these terms should not 'suggest a rigid separation between them'. As a result, these unclear lines make it difficult to discern between these three types of schooling. While formal and informal education are typically considered as two sides of the same coin, non-formal education can sometimes be found in both formal and informal settings. As a result, a clear differentiation between the three groups cannot be made on the basis of location, manner of facilitation or assessment. Grade R teaching, for example, in South Africa, early childhood education takes place in a formal environment but is not formally assessed. It can be debated, in this regard, whether the education provided to grade R is formal, casual or non-formal in this scenario, especially because it follows a formal curriculum. In the current state of affairs, few would deny that learning occurs in Grade R. Apprenticeship in home-based care, on the other hand, can take place in any location, but it is examined and part of a certification process.

Ref. [6] also alludes to the fourth type of learning, which he refers to as 'self-directed or collective informal learning'—whereby people 'engage either individually or collectively without direct reliance on a teacher/mentor or an externally organised curriculum'. While realising that this is very important aspect of learning, this paper will not focus on this form of learning.

One of the most distinguishing features of non-formal education is that it usually does not focus on the pursuit of learning outcomes that will only be relevant in the distant future. Non-formal education, according to [7], 'is often considered more engaging, as learners' interests are a driving force behind their participation.' Thus, in the case of the research reported here. As [8] points out, the goal of non-formal education is 'to deliver both skills and jobs for wage-earning and entrepreneurship, along with an opportunity to open the social and political arena for greater access without discrimination and prejudice.'

With regard to the importance of non-formal education, [10] explains that it could, inter alia, be used to 'offer basic education, literacy and numeracy for those unable to gain entry to formal schooling and to provide post-literacy programmes for youths and adults'. Lortan [10] goes further and enunciates the other benefits as follows:

> *'It is needed to educate individuals, groups and entire communities in health, nutrition, family planning, child care and HIV/AIDS management. It is needed to empower communities and encourage and support development, to develop new knowledge and skills in such areas as agriculture, fishing, forestry management, construction, local handicrafts and computing, to provide paraprofessional training, and to help initiate and support local enterprises. It is also sometimes needed to help promote peace and reconciliation, and to facilitate post-conflict reconstruction programmes. ([10], p. 2)'.*

Non-formal education, in contrast to formal and informal education, consists of intentional instructional activities that take place outside of a formally organised educational context. Isaacs [11] agree that the distinctions between different types of schooling originate from the aim and circumstance in which they take place. As a result, these authors distinguish between formal, informal and non-formal education based on the context in which they are delivered. That is, formal education takes place in a formal setting, while non-formal education takes place outside of the formal setting, though it is planned and organised to some extent. Informal education, on the other hand, is haphazard and occurs without prior planning or organization. Informal education often occurs in people's homes, public spaces, social media, and other types of media such as newspapers, radio and television, as well as among peers. Furthermore, most informal education does not include any sort of assessment, whereas formal education takes place in formalised settings and includes formative and summative assessment, as is done in schools. To me, this raises the question of whether teaching, including evaluations, takes place in a location (setting) or in space (opportunity). Agunbiade et al. [12] stated that making science interesting and accessible to students is a major goal of scientific education. Incorporating IK into science teaching and learning helps to achieve this goal by focusing on relevance and sensitivity to learners' cultural backgrounds [4].

2. Research methods

The study used a combination of questionnaires, interviews and field observations, as well as survey and case study research designs. The intervention was mostly in the form of a workshop with a volunteer sub-sample of the survey's initial population. The study used a case study for this chapter. In total, 56 medicinal plant vendors took part in the research. For the purposes of this chapter, the results focus on the 12 medicinal

Challenges
What are the challenges related to the cultivation of medicinal plants in your home gardens
Cultivation
How do you cultivate medicinal plant species

Table 1.
Indigenous and scientific ways of propagating medicinal plants.

plant sellers that were selected based on their willingness to participate further in engagement with medicinal plant propagation and cultivation.

The case study also provides the researcher with a deeper understanding of the dynamics of a situation [11]. In addition, the case study offers a unique example of real people in real-life situations [10]. Case studies look at what it is like to be in a particular situation, and hence they are generally descriptive in nature [10]. In this case, the study aims at gaining insights into how the medicinal plant sellers propagate medicinal plants using indigenous knowledge and medicinal plants from the science literature. The task followed the criteria in **Table 1**.

3. Results

One of the impediments highlighted by the respondents was the plants' water requirements. Water scarcity was considered a serious issue that hampered and derailed the conservation of medicinal plants through cultivation. One of the group's medicinal plant vendors particularly noted the difficulty of getting water for their plants, and their inability to cultivate them on river banks or dams for fear of them being stolen.

One of the respondents' concern was about the plant's water requirements. Water scarcity was a major issue that also hampered medicinal plant conservation through cultivation. One of the group's medicinal plant sellers cited the difficulty to source water for their plants which was compounded by their inability to cultivate them on neither river banks nor dams on account of fearing plant theft.

The medicinal plant vendors mentioned resorted to, from their testimonies, buying water from time to time to irrigate their plants, which consequently leveraged and escalated the cost of plant management. In addition, this ultimately lowered the process their revenue generated from plant sales. Another interesting observation is that medicinal plant vendors are street vendors, which means they leave their homes for prolonged periods to sell medicinal plants on the streets. This means that someone else must care for the plants in their absence given the limited time that they can possibly devote towards the management of plants. Some of the sellers who constituted 2% of the sample complained about their plants being stolen from their homesteads while they are out in the streets selling.

A sizeable number of medicinal plant sellers (31 per cent) reported sluggish growth rates as one of the challenges confronting their business in relation to medicinal plant cultivation, according to **Table 2**. The slow growth rates of some plants acted as a huge impediment to cultivation because they would have nothing to sell while waiting for the cultivated plants to grow. This is consistent with [13] who backs up the concern that some medicinal plant species are slow growers, taking between three and eight years to reach maturity.

Nature of the problem	Percentage (%) of sellers
Poor soil quality	12
Sluggish growth	31
Irrigation and water challenges	17
Limited plant management time	14
Plants occasionally become weedy, e.g., *Calamus* spp.	2
Shortage of seedlings	6
Lack of access to land	4
Theft of plants	2
Limited healing power	12

Table 2.
Problems related to cultivation from 56 observations.

One of the difficulties faced in the cultivation process relates to the attitude that is associated with the healing power of the medicinal plants. One possible explanation for this is that cultivated plants are thought to be inferior to wild-collected specimens. This is due to the general belief that the ancestors have a crucial role to play in providing wisdom to traditional healers when it comes to selecting the right plant.

There is ample scientific evidence backing the hypothesis that cultivated medicinal plants are ineffective in treating ailments when compared to wild-collected medicinal plant species. The prevalence of secondary metabolites in medicinal plants is primarily a result of secondary metabolites that the plants require in their natural settings under stress and competition, and which may not be expressed under monoculture circumstances [14]. Fast-growing farmed medicinal plants have lower levels of active components, but wild populations can be older and have higher quantities of active chemicals due to their slower growth rates.

In Botswana, it was observed that cultivated material was undesirable in so far as it fell short of efficacy as material sourced from the wild. Plant activity, on the other hand, can be increased under controlled conditions [14], whereby the medicinal plant activity is stimulated by stressing the plants, causing them to convert their active metabolites into steroids [14]. Consequently, ecological determinants which may include slow germination and sluggish rates of growth, poor soil quality necessary for desirable plant growth, and the concomitant labour required in the weeding and irrigating processes were pinpointed in this analysis as key impediments to the medicinal plant sellers.

Despite the challenges of medicinal plant cultivation, medicinal plant sellers should be encouraged to grow medicinal plants in their own yards [15]. This saves money for medicinal plant sellers as well as the intensive physical effort required when harvesting the plants in the wild.

During the focus group discussions, the participants were also probed in relation to the issues linked with the cultivation of medicinal plants, and some of them reported that they had commenced medicinal plant gardens. They also claimed to have traded their plants for the purposes of buying food and groceries in general, clothing and toys for their children with a white man, who essentially used the same plants as seedlings for propagation. That, nonetheless, was a challenge in and of itself.

> *'It takes time for the white man with whom we batter medicinal plant seedlings to come and buy our seedlings. However, when he comes we get these toys for our children and groceries for our familie's.*

From the discussions evidently, the research participants shared common concerns regardless of their locations. In particular, the storage of medical plants was listed as the biggest issue, the medicinal plants were confronted with in their medicinal plant selling business, yet storage primarily impacts the marketing of the business which consequently influences their profits and therefore revenues. This is because storage affects the volume of sales that these sellers make in their business.

Other obstacles cited by the respondents were water, hygiene and security. Asked about their motivation in the medicinal plant business amid the myriad of challenges, the participants emphasised how the existing and testing challenges had made them stronger and more resilient in their quest to make a profit. Some participants stated that they desperately needed to succeed in order to use their proceeds to pay tertiary fees for their children.

Finally, medicinal plant sellers were asked to initiate and suggest solutions that they believed would help alleviate some of the issues, and the following is what they came up with:

> *'We require tanks to serve as water reservoirs, as well as sufficient infrastructure to serve as our marketplace'.*

On the significance of training, another respondent commented,

> *'Receiving training is making a big difference since we now understand that harvesting all of the barks around the tree is incorrect. Although we are unhappy with the certificate fees, we are aware that certification reduces unlawful harvesting'.*

It was evident from their comments that the medicinal plant selling business was vital to the sustainability and survival prospects of the communities. The government is also addressing some of the issues in the medicinal plant selling industry, such as capacity building in medicinal plant conservation. However, the government alone will not be able to overcome this obstacle.

Thus, to address the first empirical query about the challenges faced by medicinal plant sellers regarding storage, marketing and conservation of medicinal plant species, it was discovered that conservation and marketing were not the only issues that affected the medicinal plant business; other issues that affected the medicinal plant business included crime, sanitation and water scarcity. This necessitates collaboration among different organizations, such as public and private partnerships collaborating with medicinal plant vendors to address the aforementioned difficulties.

4. Conclusion

Taking into account current developments in South Africa that favour IKS and the application of Science and Technology, this study sought to provide further evidence aimed at preserving and preventing the possible extinction of medicinal plant species whose survival chances have, of late, been at the mercy of medicinal plant sellers. The researcher formed collaborations with medicinal plant merchants in order to begin

measures to safeguard the medicinal plant selling business's long-term viability. The medicinal plant merchants' participation in medicinal plant cultivation projects was critical in ensuring that they understood their role in maintaining the resources that support their livelihoods. Overall from the results, it was evident that the medicinal plant selling business, like any other business, has unique problems that must be overcome in order for it to be a sustainable endeavour.

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