

# The South African Experience of Conservation and Social Forestry Outreach Nurseries

Jenny Botha · Ed T. F. Witkowski · Jacklyn Cock

© Springer Science+Business Media, Inc. 2006

**Abstract** Outreach nurseries are favored conservation and social forestry tools globally, but, as with many integrated conservation and development programs (IC-DPs), they do not always produce anticipated results. A synopsis of the experience of South African practitioners is provided in this study of 65 outreach nurseries. South African outreach nurseries frequently include financial objectives, creating additional challenges in simultaneously attaining conservation and socioeconomic goals. Progress was hindered by biophysical problems (e.g., lack of water, poor soils, etc.) as well as the harsh socioeconomic conditions facing most communities in which nurseries had been established. Attaining financial viability was challenging. Business management skills were often restricted, and few viability studies included adequate market research. Costs to community participants were usually high, and benefits were limited. Conservation objectives were frequently lost in the struggle to attain financial viability. The management of social processes also proved challenging. Although small scale and relatively straightforward compared with many IC-DPs, nurseries usually require substantial institutional support, including a range of technical, business, and development services. Project time frames need to be reconsidered, as practitioners estimate that it takes 5–10

years for nurseries to start meeting objectives, and donors and implementing agencies often operate on 2–3-year project cycles. Detailed viability studies are essential, incorporating a social probe and an assessment of potential impacts of projects on community participants. Progress needs to be continuously evaluated to enable institutions and community participants to adapt to changing conditions as well as ensure that the spectrum of objectives are being achieved.

**Keywords** Ex situ natural resource management · Decentralized nurseries · Wildlife enterprises

## Introduction

Although overexploitation of natural resources is by no means restricted to excesses of the past century or industrialized states, people in developing countries have historically managed and conserved natural resources through a range of technical practices, cultural beliefs, and social responsibilities and restrictions (FAO 1985; Dove 1995; Abrams and others 1996). Ex situ natural resource management programs developed in conjunction with local stakeholders are also not new; state authorities have employed diverse strategies to address anthropocentric pressures on wild plant populations for at least 2000 years (FAO 1985). Early Chinese rulers, for example, promoted the planting of trees by citizens for food and timber and, at one stage, allocated public lands to people who would reforest them (FAO 1985).

Nurseries have been a favored tool for involving local stakeholders in the management of valued plants, particularly since the 1980s, although they have been used for this

---

J. Botha (✉) · E. T. F. Witkowski  
Restoration and Conservation Biology Research Group  
School of Animal, Plant and Environmental Sciences  
University of the Witwatersrand  
Johannesburg, South Africa  
E-mail: jenny\_botha@mweb.co.za

J. Cock  
Department of Sociology, University of the Witwatersrand  
Johannesburg, South Africa

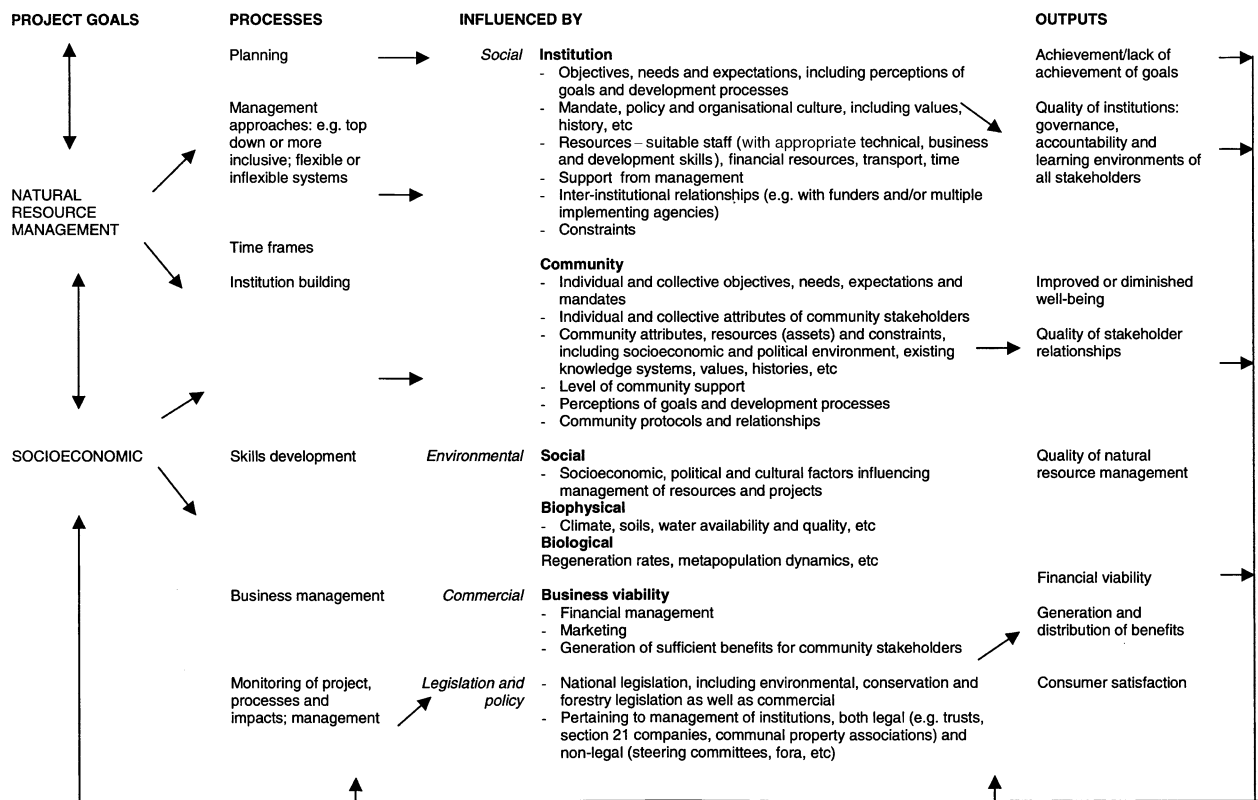
purpose far longer. In the late 1920s, for example, district-level councils in Kenya established nurseries to address timber and fuelwood shortages (Castro 1996). More recently, 245 decentralized nurseries were established with local stakeholders from 13 villages in North India as part of a reforestation program (Jagawat and Verma 1989). Böhringer and others (2003) recorded 657 nurseries in 3 districts in Tanzania, Zimbabwe, and Malawi during surveys conducted in 1998–1999; 1244 nurseries were logged the following year. In South Africa, over 75 nurseries were developed with local stakeholders in the early 1990s in attempts to ameliorate predicted fuelwood scarcities and provide multipurpose plants to impoverished communities (Reyneke and Dickson 1994). Nurseries established with local stakeholders are referred to as “outreach nurseries” in this article to distinguish them from those managed centrally by institutions (termed “centralized nurseries”) or private-sector enterprises.

A major motivation for developing outreach nurseries is to produce and distribute the species required at local level, despite planning, financial management, and monitoring usually being comparatively simpler and more efficient in centralized nurseries (Shanks and Carter 1998). Although more efficient at mass-producing seedlings for institutions such as forestry organizations or municipalities, centralized nurseries are often less responsive to local needs, as the range of species produced is limited through pressures to produce large volumes (Robinson and Thompson 1989; Kerkhof 1992; Shanks and Carter 1998). Economic benefits derived from centralized nurseries tend to be limited to the provision of jobs, but can be distributed more widely through decentralized outreach nurseries (Shanks and Carter 1998).

Despite the relatively small scale and straightforward nature of outreach nurseries when compared to most integrated conservation and development programs (ICDPs), many South African initiatives are struggling to survive or have failed. Although a few projects have attained financial viability, natural resource management objectives often prove elusive. Yet, outreach nurseries continue to be implemented, often with limited or no evaluation of the lessons learned by their predecessors. This problem is not unique to this sector. There have been calls for more rigorous monitoring, effective reporting, and dissemination of lessons in conservation and development programs worldwide due to the disappointing results of hundreds of projects (Castro 1998; Bedford and Tayber 2000). Material is available on the viability and impacts of outreach nurseries in other parts of Africa, Southeast Asia, and Latin America (Desmond 1989; Guggenberger and others 1989; Jagawat and Verma 1989; Kerkhof 1992; Shanks and Carter 1998; Böhringer and Ayuk 2003; Böhringer and others 2003), but there are limited data available on South African projects

within the public domain. Most South African outreach nurseries include financial objectives to ensure the survival of the project and generation of incomes for local stakeholders, rather than producing seedlings for subsistence use, as has occurred elsewhere (e.g., Böhringer and others 2003). This creates additional challenges, many of which are shared by more complex ICDPs, in which it has proven challenging to achieve either conservation or socioeconomic objectives (Brandon and Wells 1992; Botha and others 2004). A study was thus initiated in 2001 to assess the viability of outreach nurseries in South Africa. The assessment is limited to outreach nurseries that include conservation objectives.

Valuable lessons can be learned through *ex situ* natural resource management efforts of colonial administrators and officials in Kenya, which were documented by Castro (1996). Cultivation of communal woodlots to address fuelwood shortages during the early 1920s in Kirinyaga met with local resistance for several reasons, including the fear that tree planting could be a colonialist ploy to later appropriate land. Apart from the vast tracts of land that had already been appropriated by British colonialists, with insecure tenure of remaining land, this belief was based on a Kikuyu custom in which property boundaries were demarcated by planting trees. In the late 1920s, local councils established by the British administration played a key role in promoting tree planting at the household level through decentralized nurseries and seed orchards. The new willingness to plant trees was attributed to improved species selections that were better suited to local needs, as well as people being able to make their own decisions relating to planting. Individuals also knew that they would benefit once the tree was grown, in contrast to communal woodlots where ownership rights were uncertain. Initially, seedlings were distributed for free, but when fears again arose that this was a gambit to appropriate land, they were sold at low prices. High volumes of trees were distributed, but, as with many similar projects today, there were mixed reactions about the efficacy of the nurseries, with seedling survival rates being reported to be low by some agricultural officials while district administrators reported the opposite. A boom in *Acacia mearnsii* was experienced in the late 1930s and 1940s, due to its value as a multipurpose agroforestry species for both subsistence and commercial purposes through high international demand for tannins. The tannin industry collapsed suddenly in the 1950s when international prices fell sharply through competition from rubber and plastics for leather. This, combined with political turmoil, disruption in government services, and widespread deforestation during the Mau Mau uprising, led to a decrease in farm forestry and the closure of most nurseries. Farm forestry only revived again in the late 1970s (Castro 1996).



**Fig. 1** Conceptual framework depicting the often complex, interrelated dimensions of even relatively “simple” outreach projects

This case study illustrates the complexities and unpredictable nature of development interventions. Numerous disparate factors affect the process, many of which are beyond the control of participants, including the broader socioeconomic and political environments (Dove 1995; Alexander and McGregor 2000; Nesbitt and Weiner 2001). Fig. 1 provides a conceptual framework illustrating the interrelated dimensions affecting even relatively small-scale outreach projects. Stakeholders attempt to achieve various project goals through processes that are actively developed over time, but which can also take on a life of their own. These processes are influenced by social, environmental, and commercial factors, as well as legislation and policy. A range of project outputs and impacts are produced regardless of whether goals are attained, not all of which are positive or foreseen. The following key questions are addressed in this study: (1) What were the objectives of outreach nurseries and how did these affect outcomes? (2) What “successes” were achieved? (3) What were the main problems experienced? (4) What were the main factors influencing processes, outputs, and impacts? It is recognized that an evaluation is but a reflection of stakeholder and project experiences at that point in time. A more detailed analysis of the commercial viability of 10 case studies was undertaken by Botha and others (forthcoming a). The impacts of projects on community stakeholders and an

analysis of social processes are provided in Botha and others (forthcoming b) and Botha (forthcoming c).

In many developing countries, pressures on plant resources have arisen through people losing land and resource tenure rights through colonial and neocolonial policies (Peluso 1992; Alcorn and Molnar 1996; Castro 1996). In South Africa, challenges in implementing effective resource management projects are exacerbated by the legacy of apartheid (Butler and Hallows 1998). Massive social engineering carried out under legislation such as the Land Acts of 1913 and 1936 (which prevented blacks from owning land) and the Group Areas Act resulted in millions of mainly black South Africans being dispossessed of their land. Millions of people were moved to “homelands” in an attempt to control the migration of blacks to urban areas. Although legislation has been repealed, approximately 32% of South Africa’s population (12.7 million people) are concentrated in these former homelands, which comprise only about 13% of the country’s land area (Adams and others 1999). This, combined with minimal provision of basic social services under the past government, resulted in severe overcrowding, poverty, health problems, and environmental degradation (Cock 1991). Progress has been made in delivering amenities since independence in 1994, but there is still a substantial backlog, which is aggravated by

escalating urbanization. A high proportion of people living in areas in which the outreach nurseries were established are caught up in a cycle of poverty. Chambers (1983) identified five interlinked clusters of disadvantage: poverty, physical weakness, isolation, powerlessness, and vulnerability. Planners, decision-makers, donors, and practitioners often underestimate the effects of these and related attributes resulting from social disintegration on project processes.

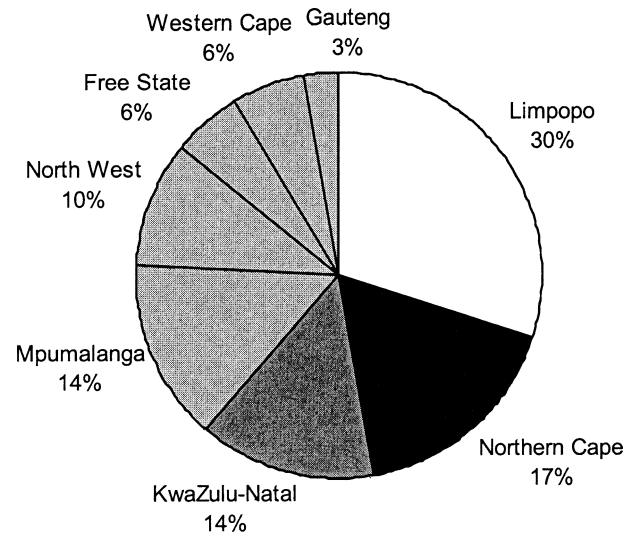
Ownership of most land in the homelands is vested in the state and was previously managed under a system of communal tenure that was administered by the chiefs (von Maltitz and Shackleton 2004). Usufruct rights are allocated to people, rather than private tenure, although this is currently under review and may include one or more of the following (Adams and others 1999): (1) rights to occupy a homestead, use land for agriculture, make permanent improvements, bury the dead, and have access for gathering fuel, grass, minerals, and so on; (2) rights to transact, give, mortgage, lease, rent, and bequeath areas of exclusive use; (3) rights to exclude others from the above rights at community and/or individual levels; (4) rights of enforcement of legal and administrative provisions to protect the rights holder. Land reform efforts since independence in 1994 have fallen short of official targets and public expectations (Hall 2004). There is still considerable confusion due to changing policies and, sometimes, conflict and tension over land rights in both urban and rural areas, particularly in settlements experiencing high influxes of people in search of jobs and state housing or after loss of their previous dwelling place. In many regions, however, people have day-to-day de facto tenure security and do not express concern over tenure rights (Adams and others 1999).

South African conservation has undergone a paradigm shift over the past decade from a strictly protectionist approach that served a privileged elite to a recognition that biodiversity needs to benefit a broader spectrum of people (Wynberg 2002). Most state agencies responsible for natural resource management now include a social dimension within their management portfolios, albeit with varying degrees of commitment.

The value of 1 US dollar (\$) was approximately Rands (R) 2.70 in 1999, R4.60 in 1997, and fluctuated between R12.37 in 2001 and R6.33 in 2003.

### Study Areas

The 65 nurseries were located in eight of South Africa's nine provinces (Fig. 2). All were situated in low-income areas: 58% in former homelands, 10% on farms, and 34% in urban areas. Most urban settlements comprised mixed



**Fig. 2** Distribution of outreach nurseries among the South African provinces

formal and informal housing patterns. One project was situated in an informal settlement.

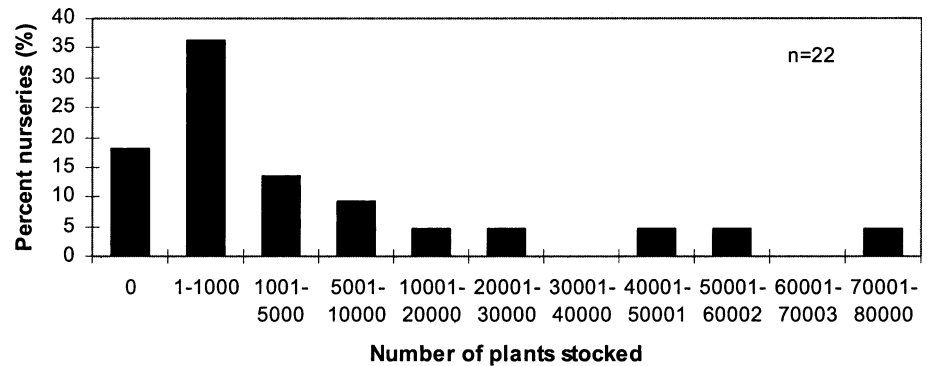
### Methods

Structured interviews were conducted with 16 practitioners who were or had been involved in the implementation of outreach nurseries. Data on the objectives, achievements, main problems experienced, environmental outcomes, rates of project survival, and lessons learned were also extracted from internal institutional reports and project evaluations (Clark and others 1994; Henderson 1994; Reyneke and Dickson 1994, as well as reports and internal correspondence provided by four institutions, two of which included multiple projects). Projects were included in the study if they incorporated conservation objectives and if most of the above data categories were available. Where data were unavailable, smaller sample sizes are used.

A *K*-means cluster analysis was conducted to compare trends in the types of business problem that were identified by 44 projects. Nurseries were partitioned into three clusters by means of a *K*-means algorithm, based on shared business problems within clusters and differences between clusters.

Results are being disseminated through (1) slide presentations to practitioners and community participants, (2) a report for community participants and field staff, (3) a business manual, and (4) academic papers, seminars, conferences, and presentations to staff and management of institutions.

**Fig. 3** Stock sizes of a sample of the nurseries for which data were available at the time of the evaluation



**Results**

The nurseries comprised a range of models, including schools (28%), individuals or small groups of entrepreneurs (28%), community groups (e.g., women’s groups and groups established to run the nursery (26%), village (6%), traditional healers (6%), and projects depending on volunteers (6%). In projects for which data were available, stocks ranged from 0 to 70,000 plants (mean ± SE = 10,773 ± 4412, n = 22) (Fig. 3). Several nurseries had only just been established when they were evaluated and had not yet produced stocks. Some nurseries lost stock through disasters such as fire or a tornado, or through a lack of maintenance after community participants gave up without notifying the institution.

Most projects (62%) received support from more than 1 agency (2.4 ± 0.3), with a maximum of 10 institutions providing different types of support in a project that had been established in compensation for loss of land through a development project. State institutions included the Department of Water Affairs and Forestry (DWAF) (41%), the Department of Environmental Affairs and Tourism (DEAT) (12%), and the Departments of Agriculture (36%), Health and Social Welfare (10%), and Education (5%). Support was also provided by parastatals (36%), nongovernmental organisations (NGOs) (29%), local administrations (14%), conservation agencies (13%), commercial nurseries (7%), religious organizations (5%), schools (3%), and consultants (3%). Community-based organizations (36%) and tribal authorities (7%) participated either directly by setting up their own nurseries, or through steering committees.

Material support ranged from provision of shade cloth, seed, seedlings and bags in smaller nurseries, to R1.2 million in funding. Technical advice, skills development, facilitation services, and marketing assistance were also provided.

**Objectives**

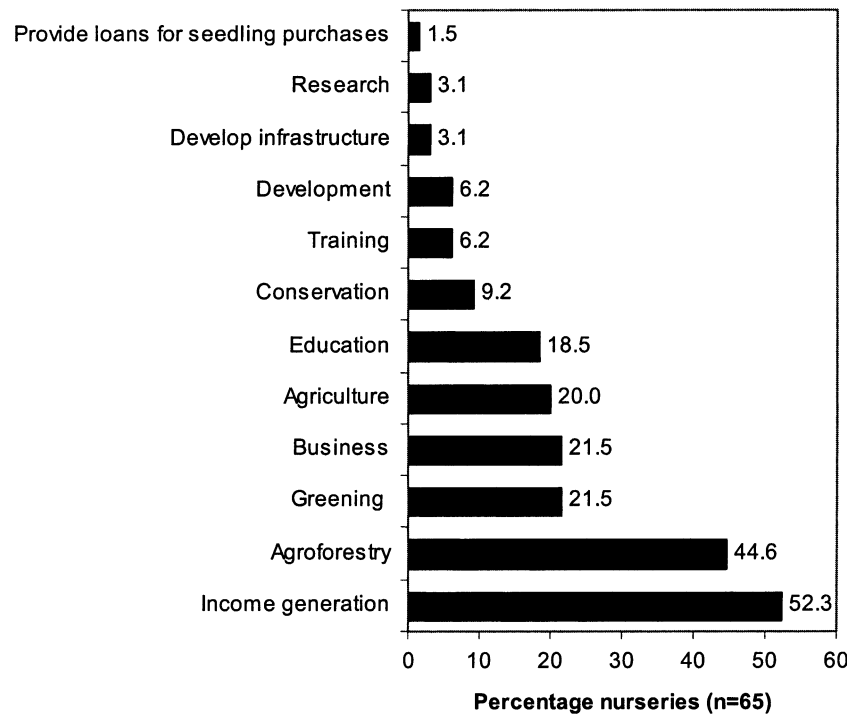
Most projects (74%) specified more than one objective. Agroforestry objectives included the provision of multi-

purpose species to various projects (32%), planting trees around communal gardens (3%) and production of plants for woodlot restoration (5%) (Fig. 4). Agroforestry and permaculture demonstration plots were also established (9%). Objectives grouped under “conservation” incorporated the cultivation of endangered species, species used in traditional medicine, and the production of seedlings for wetland and alien plant rehabilitation programs. One nursery sold seedlings to a gold tailings dam rehabilitation project. “Greening” activities were included in 22% of the projects. Research objectives included the assessment of the agroforestry potential of tree species, a survey of past buyers, and an evaluation of the survival rate of trees.

“Income generation” included individual and collective financial aspirations for a school or project (45%), job creation (8%), accessing agricultural funding for the community (2%), and developing a business to provide children with an inheritance (2%). Some projects aimed to enhance food security through vegetable production (14%) and “the promotion of agriculture” (6%). Skills development (nursery management, business, health) were only specified in 6% of the projects, but a further 19% (schools and colleges) aimed to use the nursery as an educational tool (19%). “Development” objectives included using the project as an anchor for different environmental and socioeconomic activities, presenting it as a showpiece to generate funding and promoting inter institutional cooperation.

Despite the focus on income generation, business objectives were stated in only 20% of the projects. These were generally nonspecific (e.g. “become a commercial venture” and “sell plants (or fruit trees/vegetable seedlings/multi-purpose trees) to the community”). Only two projects listed relatively specific business objectives (viz. “to sell plants at a 30% profit margin after buying them from a wholesaler” and “to sell fertilizer and fencing”). One project provided interest free loans to enable participants to purchase seedlings.

Conflicting objectives were sometimes apparent between supporting institutions and community participants (12%). For example, the main objective of some institutions was to

**Fig. 4** Objectives listed for nurseries

grow fuel wood and timber species, whereas community consumers wanted fruit trees. In two projects, institutional staff stated that income generation was not seen as an objective, whereas community participants identified this as important. Staff from several institutions acknowledged that their objectives differed from those of the community in that they were not focusing on income generation.

#### Achievements

Criteria defining “success” vary according to individual perceptions and development trends. Several practitioners believed that a “successful” project was one that was financially viable and independent of external funding. Others did not exclude the latter option. The enhancement of community participants’ incomes was often listed as important, although perceptions regarding the degree of improvement that should be achieved differed. Some believed that even small improvements help alleviate poverty, but one practitioner emphasized that a substantial increase was required to motivate participants in the face of alternate livelihood options. “Success” was sometimes measured according to stock and turnover levels, the ability to generate orders, the number of jobs created, the performance of the project against its objectives, the reduction of harvesting pressure on wild plant populations, the provision of a legal source of plants to the public, and greater participation by communities. Several practitioners defined “success” according to changed behavior patterns of community participants as well as improved relations

between the community and the institution. Two practitioners emphasized improvements in problem-solving and organizational skills, as well as the enhancement of individual dignity and confidence, acknowledging that these are almost impossible to measure. Donor and management criteria were frequently perceived to differ from those of field staff in that they required more tangible outputs, including the continued survival of the project, positive but quantifiable environmental and social impacts (e.g., changes in income levels, the number of jobs created, seedlings sold, etc.) and, sometimes, evidence of the effectiveness of institutions.

Considering achievements realized, practitioners from 3% of the projects felt that no successes had been attained. Only 23% of the projects identified business accomplishments, of which 28% related to sales levels. Additional business achievements included community participants understanding their markets and community needs, selection of species that were in demand, appropriate pricing levels, the community manager initiating marketing activities and listing the different ways in which the enterprise was marketed (through women’s groups, schools, pamphlets, posters, talks, videos, and word of mouth). A few projects were noted for having diversified products (12%) or activities (8%) (e.g., chopping firewood or bee-keeping). Community managers of 5% of the nurseries were credited for their business skills.

Further achievements included effective training programs, job creation (6%), the enhancement of community

participants' skills (8%), and improved understanding of conservation issues (12%). One practitioner felt that community participants had gained substantially through the development of linkages, enabling them to learn from people whom they would not otherwise have been likely to meet. A few projects (18%) were noted for having community participants and institutions who accepted responsibility, 4% in which the broader community was enthusiastic about the nursery and 4% were able to draw on community networks to enhance the project.

Few school projects mentioned the extent to which the nursery was meeting the educational objectives originally envisaged. Although two school principals felt that learners had gained through environmental education as well as developing responsibility by maintaining plants allocated to them, the incorporation of nursery activities into school curricula was referred to only once. One principal felt that a nursery was not producing benefits and had closed it down.

### Environmental Outcomes

Few ecological accomplishments were noted. One author noted that a school now had regular tree-planting days. Others (7%) believed that the number of local people who were planting trees had increased. Practitioners from greening projects identified more environmental successes than those from agroforestry or medicinal plant projects.

Quantitative data on seedling distribution was limited, as many projects had just started at the time of the evaluation. Although 1 nursery had sold 26,000 seedlings, these had been sold to the horticultural industry, with few seedlings being made available to the community for which the project was intended.

There were also little data on plant survival rates. Low seedling transplanting was sometimes ascribed to culture, as several communities were believed to be traditionally livestock farmers, rather than cultivators (6%). Concerns were raised in reports that tree planting was too limited to address the "fuelwood crisis". Practitioners were also concerned that only a fraction of the seedlings that were distributed by various institutions during Arbour Week had been planted out. Lack of aftercare or damage caused by livestock contributed to low survival rates. One project had addressed the former by encouraging local residents to take responsibility for the maintenance of seedlings rather than leaving aftercare to local councils.

### Problems

Many projects (41%) experienced difficulties related to climate or weather conditions, including being situated in arid areas, drought, frost, heavy rains or floods, and a

tornado. Biophysical problems such as lack of water, inadequate water supply infrastructure and/or poor quality water (22%), infertile soils (6%), and steep slopes (2%) hindered production, as did inadequate space (2%) and insecure tenure (5%). Where boreholes were available, there were no pumps or funds to cover diesel costs. A lack of fencing sometimes resulted in livestock destroying plants in nurseries (5%) and customers' (5%) gardens. Lack of propagation material hindered productivity, particularly in medicinal plant nurseries (8%).

Nurseries located in small communities had limited potential customer bases (11%), as customers with higher spending power were unwilling to travel long distances (3%), on poor roads (2%), and/or, in the case of whites, to predominantly black settlements (5%) due to a fear of crime. Poor telecommunications also inhibited progress.

The amended Conservation of Agricultural Pests Act (CARA) (Act No. 43 of 1983), which prohibits the planting of potentially invasive species, resulted in losses of stock and markets (5%). Practitioners and community participants from one region argued that certain prohibited species were not invasive in their area and were, in fact, one of the few tree species that were able to withstand the harsh biophysical conditions.

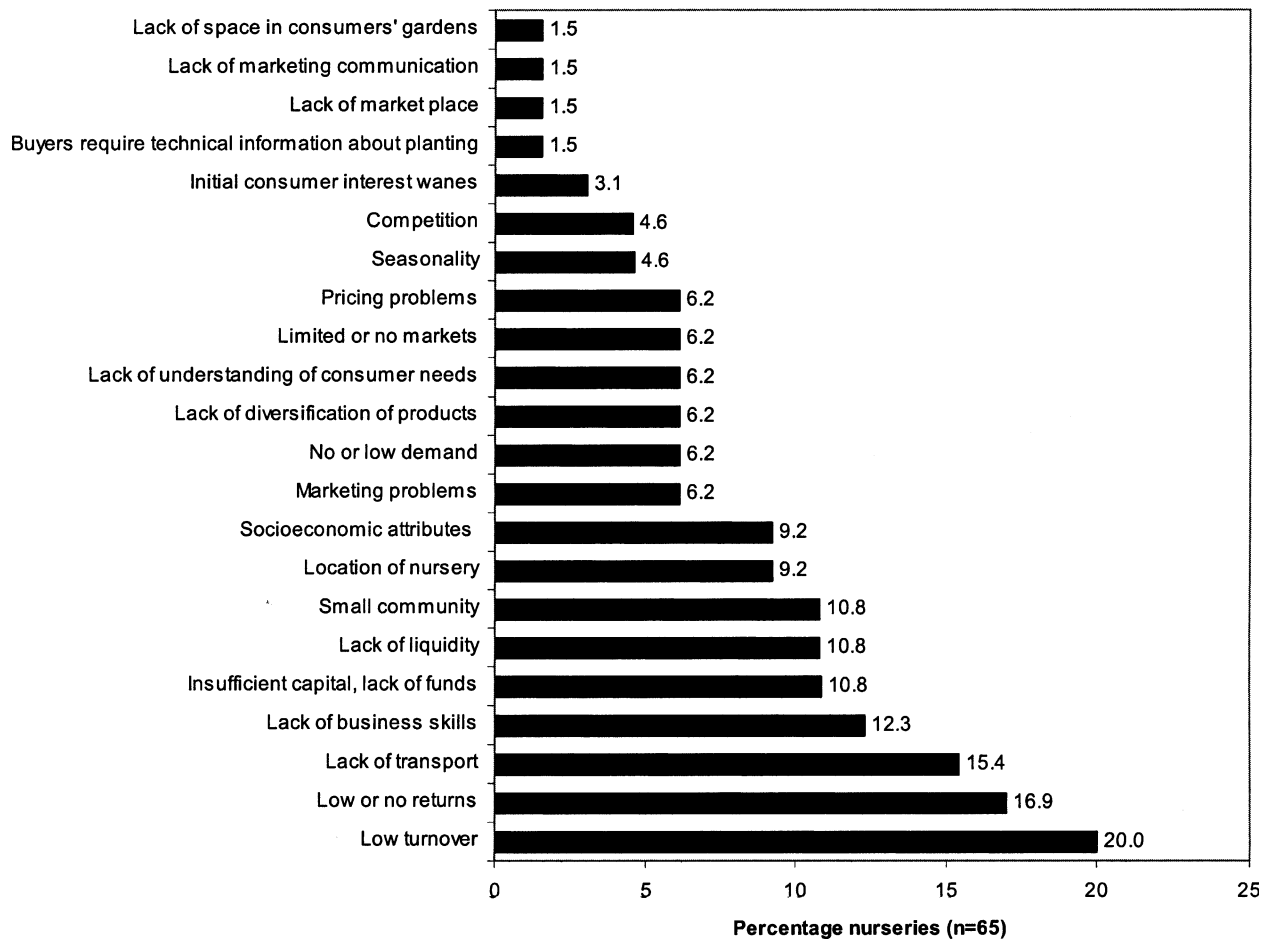
School projects that did not have permanent labor experienced difficulties in looking after stock during school holidays, with at least one losing the bulk of its stock after community participants living nearby failed to water the plants as they had promised. Learners were subsequently paid to tend the plants during holidays, which worked better.

The remaining problems are discussed under the following headings: business, problems relating to institutions and communities, and factors that were not anticipated by supporting institutions.

### Business

Business problems were identified in 68% of the nurseries, with most projects listing more than one problem (Fig. 5). Lack of business skills was noted in both community participants and staff from institutions, although the former was more frequently listed. The cluster analysis highlights how many of these difficulties were commonly encountered (Fig. 6).

Projects within each cluster were limited by inadequate resources and poor liquidity. Low turnover was regularly experienced in cluster 1 ( $n = 20$  nurseries) and cluster 2 projects ( $n = 10$ ); 5% of the nurseries had not achieved any sales. Low turnover was attributed to nurseries having been recently constructed and/or inadequate market research, sometimes due to tight project deadlines but frequently due to inexperienced project staff. Lack of transport hampered distribution.



**Fig. 5** Percentage of nurseries in which particular business problems were experienced

Poor turnover and lack of returns were not identified as problems for cluster 3 nurseries ( $n = 4$ ), suggesting that these projects had begun to sell more consistently. This did not mean that liquidity problems had been overcome, however. Seasonality, which also affected cluster 1 projects, contributed to cash-flow problems and, in several projects, hindered stock production. Competition was sometimes experienced from the private sector or other residents, who tried to start a similar enterprise when they perceived that the existing one was becoming successful. A number of cluster 3 projects lacked secure land tenure and/or the ownership of the nursery was contested.

All three clusters experienced marketing difficulties. The category “marketing problems” consists of unspecified marketing difficulties (Fig. 5). The size of markets was often limited through both the relatively small size of the population (cluster 1 and, particularly, cluster 2) and austere socioeconomic conditions. Although several community participants were credited with understanding their markets, few, if any, projects had conducted detailed market surveys, resulting in limited markets and a lack of understanding of consumer needs. For example, lack of

space in consumers’ gardens inhibited sales in cluster 3 projects, particularly those that had specialized in trees. This cluster was noted for its lack of product diversification. A lapse of initial consumer interest in some nurseries could also have been related to the market becoming quickly saturated through a lack of product diversification. Although there were instances of community participants taking the initiative and actively marketing their nursery, a lack of marketing communication was noted in projects in clusters 1 and 3. This included insufficient advertising and/or inadequate provision of technical information to customers regarding planting and maintenance of plants. Cluster 1 and 3 nurseries experienced pricing difficulties, with some projects in the former having limited stock. The prices of plants were frequently unaffordable for the local consumers for whom the project had originally been intended and/or too low to attain financial viability.

Nurseries in all three clusters experienced difficulties related to location, which affected business operations in different ways. Many were situated at a distance from more lucrative potential markets. Some were far from local customers and/or the homes of participants, both of whom



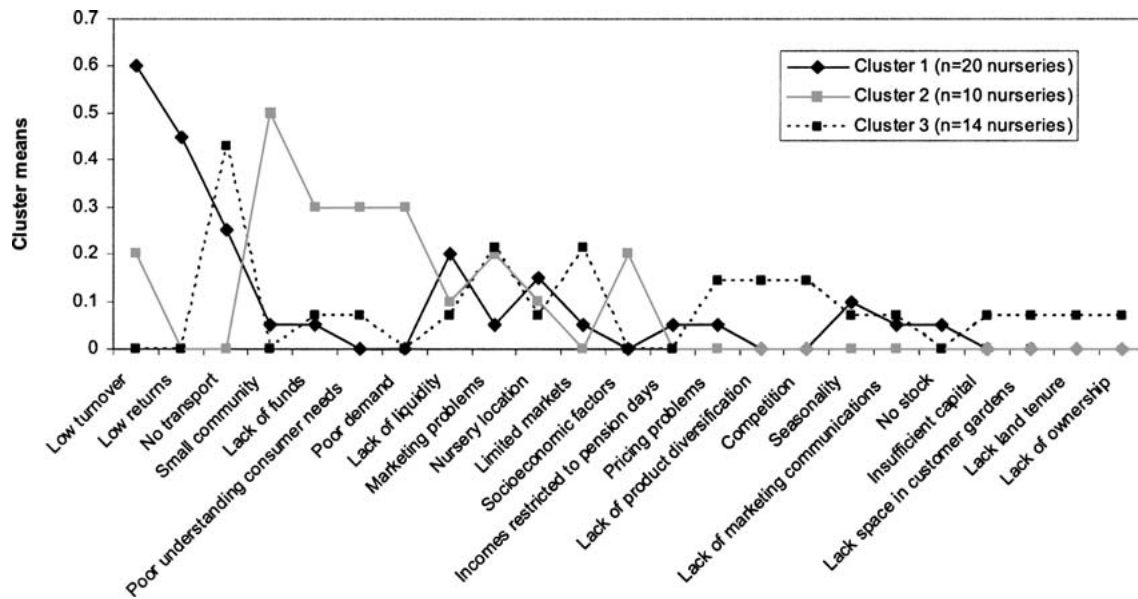


Fig. 6 Cluster means analysis depicting trends in the types of business problem experienced by nurseries across South Africa

invariably lacked transportation. Several nurseries had to be moved after they had been built, either due to conflict between community participants and other sectors of the community, or because interest had waned. Two projects were moved three times.

Problems Relating to Institutional Stakeholders

Problems relating to institutional support were identified in 37% of the projects. Poor service delivery (11%) was attributed to logistical difficulties and, sometimes, a lack of experience of staff and/or institutional commitment. Long distances, combined with having too many projects within their portfolios, hindered some personnel from delivering consistent services (e.g., projects were situated 600 km from their base). One institution was said to have contributed nothing to two projects located in different provinces, despite staff being based close by and previous promises of long-term support. Poor service delivery impacted negatively on community participants and staff (e.g., leading to low morale and a sense of defeat). Several practitioners felt that the poor service delivery of their projects was likely to negatively impact future outreach activities within the community.

Extension staff delegated to support projects did not always perform adequately (11%). Some were said to be unwilling to work with certain stakeholders (e.g., traditional healer) because of their personal belief systems. Others were said to be reluctant to work in the field, preferring office work. Lack of capacity, particularly business and development skills, also inhibited project implementation, as most personnel were specialized in the core function of the

institution (conservation, agriculture, or forestry). Staff sometimes initiated activities that competed directly with the nursery (6%). Male extension officers did not always cater to the needs of female participants or recognize their status as active partners. Community participants in 6% of the projects were precluded from active participation, as institutional staff took over all but the most menial tasks. Projects frequently depended strongly on the enthusiasm of one individual (9%), with the process collapsing if that person left the institution.

Differing objectives between institutions and community participants were raised again (6%), often based on divergent expectations of stakeholders. For example, community participants from one project had anticipated a large nursery with a sprinkler irrigation system, but the agency installed a small, hand-watered shade house. In another instance, community residents had previously received free plants as part of a food relief program and expected a continued supply of free seedlings. Several projects were said to have been initiated for window-dressing purposes. A partner was criticized for spending R80,000 on a hothouse that was not needed and subsequently not used, despite earlier recommendations not to build it. Differences between priority needs of the community and the role of the institution created challenges, as the latter was neither equipped nor had the mandate to address these needs (11%).

Although most South African institutions have developed a policy on working with community stakeholders, this is not always consistently applied or it has been repeatedly altered during prolonged restructuring processes. This has led to considerable problems in numerous

projects, as community participants received contradictory information or conflicting implementation approaches were followed.

A conflict of roles, management styles, and time frames sometimes inhibited progress when multiple institutions supported the same project. Community participants sometimes experienced difficulties in meeting their commitments, as they were involved in several projects. In several instances, conflict was created between staff from different institutions when community participants played them off against each other.

Field staff sometimes felt that top management did not support projects (8%). Slow payments by institutions contributed to liquidity problems (5%). This was ascribed to a lack of understanding of community needs by other sectors of the institution, as well as inflexible management systems that do not take the needs of small suppliers into account. Funding did not always materialize (5%), leading to loss of face of both staff and participants, dashed expectations, disappointments and, sometimes, suspicions by community members that money had not reached them. Staff were accused (by community participants) or suspected (by community participants and other institutions) of stealing in 5% of the projects. Conflict between institutions and community participants inhibited implementation (6%), and internal conflict within the institution spilled over to 5% of the projects.

#### Problems Relating to Community Stakeholders

Most projects experienced problems relating to community participants and/or the broader community (62%). Community participants were said to sometimes lack capacity, confidence, or imagination about the potential of nurseries due to limited business experience and restricted experience of the outside world. Lack of capacity included poor business and technical skills, as well as limited leadership and environmental knowledge (17%). There was sometimes insufficient clarity about roles, responsibilities, and financial issues (6%). Individuals and household livelihoods were strained through increases in already heavy workloads (5%) or through participants having to contribute financially or spend time on projects that clashed with other livelihood activities (22%). Participants living far from project sites incurred high traveling expenses.

Many projects failed to produce anticipated benefits. Benefits originally intended for the community sometimes ended up going to a different sector than the one that was originally envisaged (5%). Participants from several projects were said to be impatient, as they became disillusioned and demotivated when benefits did not materialize within several years. Lack or loss of interest by participants was experienced (11%), particularly when projects took

time to establish, leading to high turnovers of community participants (6%). Relying on volunteers created difficulties in long-term management, as they expected payment and became disillusioned when this did not occur (8%). Some practitioners felt that people were participating because they wanted to earn an income, rather than through an interest in plants, or that community leaders (particularly at schools) regarded the nurseries as showpieces rather than wanting them for their intrinsic worth, resulting in a lack of long-term commitment.

Conflict within the group (18%) and/or the broader community (9%) hindered processes and implementation, the former often arising over financial management and benefit sharing (6%), and/or contested power relations (6%). Ownership of the nursery was sometimes disputed by different groups or individuals (5%). The broader community occasionally expressed negative sentiments toward the nursery, in one instance, wanting to close it down due to a perceived lack of benefits and the levels of conflict associated with it. Numerous projects were hampered by politics and sometimes violent conflicts within the community that were unrelated to the nursery, particularly during power struggles prior to independence. In one region, violence that lasted for months was sparked by problems experienced at local circumcision schools, resulting in the region becoming a no-go area. Vandalism (9%) and theft by participants or other community members (17%) were experienced. Diminished community support in one project was partially attributed to the nursery caretaker being arrested for child molestation, as the project had been associated with him.

#### Factors That Were Not Anticipated by Institutions at the Outset

Many of the following unforeseen factors were experienced by a number of projects:

- Lack of transport, or high transport costs for community participants
- Distance and time constraints
- No access road
- Insecure land tenure
- An extension officer from a different sector verbally attacking the project and staff from the supporting institution during a public meeting, substantially decreasing morale
- Lack of continuity from supporting institutions
- Benefits going to a particular sector rather than to the community as originally intended
- Conflict between communities sparked by a councillor employing people from one community to plant trees in another — the latter later destroyed the trees

- The collapse of a project after the transfer of key staff members
- The extent of “normal” vandalism
- The disappearance of community participants when they saw that they were not going to get paid, leaving the plants to die
- The inaccessibility of the nursery due to local violence
- The high number of requests from the community for items unrelated to the nursery (e.g., monetary donations and coffins)
- Conflicts between project and/or community leaders
- A positive unforeseen factor was a visit from the state president.

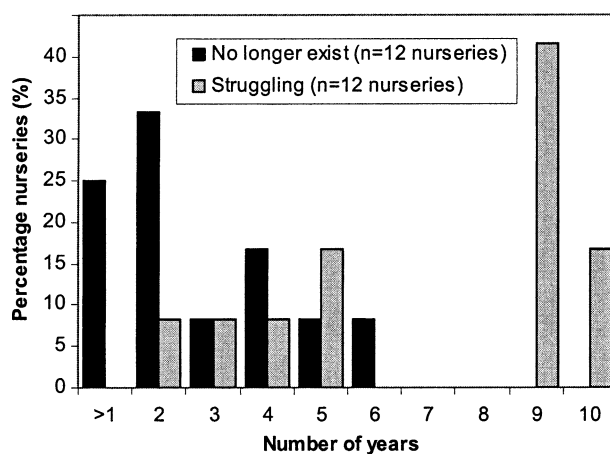
**Project Survival**

Data were available on the survival status of 48 nurseries. Of these, 54% are no longer in existence, 33% were just surviving, and 13% were considered viable at the time of the evaluation. Starting dates were available for 24 projects. Of those that did not survive, 58% had survived less than 2 years (mean ± SE = 1.9 ± 0.6; n = 12) (Fig. 7). Some were said to have failed due to staff having too many projects within their portfolios (13%). Others (9%) were closed down after evaluations by the institution, usually due to a perceived lack of interest from community participants. A few nurseries appeared to have had potential during previous evaluations, with several becoming financially viable, until an unexpected event had occurred. Several projects collapsed after participants were caught stealing. In other instances, key people were transferred, either institutional staff (17%) or community participants (15%).

Those projects that were struggling to survive had been established 2–10 years prior to the survey (7.0 ± 0.9 years; n = 12); 58% had been started 9–10 years previously. Business management difficulties hampered progress (54%), as did problems relating to the community (79%) and implementing agencies (66%). Poor water quality was said to have prevented 4% of the nurseries from becoming financially viable.

**Discussion**

Practitioners in this study believed that, despite the challenges, nurseries can make a valuable contribution to peoples’ livelihoods and well-being in communities in which high poverty levels are being experienced. However, achieving financial viability is extremely difficult, particularly where participants lack previous business experience. As with social forestry experiences in other parts of the world (Brown and others 2002), the levels and types of



**Fig. 7** The length of time that nurseries had been struggling to attain financial viability (gray shading) and the duration of projects that had closed down (black shading)

benefits generated through projects in this study varied substantially according to the sector and local context.

Unlike 426 nurseries surveyed in Malawi, Tanzania, and Zimbabwe, where the majority of farmers said that they had experienced no problems during the previous season (Böhringer and Ayuk 2003), a wide range of problems were experienced by community participants in this study. The main problems identified in Malawi, Tanzania, and Zimbabwe were, in descending order of importance: pests, scarcity of water, lack of adequate nursery space, livestock damage, lack of information, limited seed, high labor demand, transportation, and lack of markets. Lessons arising from the South African study are discussed under the main elements of the conceptual framework presented earlier (Fig. 1): social, environmental, commercial, and legislation and policy. This is followed by a concluding discussion on processes.

**Social Dimensions**

As with most successful community forestry projects globally (Brown and others 2002), high-profile South African outreach nurseries received extensive external support, but even small-scale projects required substantial inputs. Unlike nurseries in Tanzania, Malawi, and Zimbabwe, where support from state institutions was minimal, with NGOs providing most support (Böhringer and Ayuk 2003), state agencies played a major role in South Africa. In this study, many donors and implementing agencies planned 2–3-year project cycles, anticipating that community participants would be self-reliant after this. Field staff estimated that, apart from community and group processes, outreach nurseries take at least 5 years to become commercially viable under favorable circumstances:

The production of sufficient stock can take 2–3 years, whereas the development of dependable markets and capacity can take a further 1–2 years. This is not out of line with the time required to establish nurseries in the private sector, where conditions are usually relatively more conducive; it often takes 4 years to start generating consistent profits (South African Nurseryman's Association, personal communication, 2002). In contrast, nurseries developed as part of a forest management program in the Sahel, Sudan, received 2 years of intensive support, followed by limited assistance comprising mainly technical advice and restricted provision of materials and seed (Vogt and others 1998). Unlike South African projects, where seedling sales were usually low, nurseries in the Sahel were able to sell sufficient seedlings within local communities and nearby towns to make their efforts worthwhile (Vogt and others 1998).

As has occurred elsewhere, cuts in state funding have affected the operations of most South African institutions, and many are reducing their involvement in outreach programs. Concerns have been raised regarding this global trend at a time when community participants need concerted support to enable them to operate in increasingly complex environments (Brown and others 2002). Although the probability of continued survival of nurseries can be enhanced by implementing projects with low technological inputs (Guggenberger and others 1989), developing steady markets and effective social processes is time-consuming. Kerkhof (1992) suggested a commitment of at least 8 years for agroforestry initiatives if projects are to have a realistic chance of success.

Institutions and community participants did not always share the same views relating to the objectives, management, and impacts of projects negatively affecting processes and relationships. Whereas 19% of the practitioners interviewed in this study ( $n = 16$ ) felt that there had been no project successes, 43% of the community participants ( $n = 28$ ) interviewed during the assessments of 10 outreach nurseries believed that no successes had been achieved (Botha and others, forthcoming b). When asked to identify the most important benefits, 35% of the community participants said that they had not derived any benefits.

The relatively high proportion of projects in which a lack of interest from community participants was identified could be due to limited benefits and/or the project not being regarded as a need. Some institutions still offer single alternatives to communities (the choice lying in whether to accept or reject the offer), rather than identifying the most appropriate solution through participatory problem analyses. Similarly, as has occurred elsewhere (Robinson and Thompson 1989; Kerkhof 1992; Lawrence and Carter 1998), poor species selection was sometimes caused by institutions making assumptions about community needs without con-

sulting them or due to an enthusiasm for particular species. The attributes of community participants selected to manage the nursery are also important. Several practitioners felt that people joined because they needed jobs or were attracted by funding, rather than through an interest in plants.

Providing sufficient benefits to achieve goals and meet community participants expectations proved challenging. Some practitioners believed that a nursery either has to be small to improve the livelihoods of one to two entrepreneurs or generate a very high turnover to produce sufficient benefits for a group. Several felt that single entrepreneurs are more likely to achieve their objectives than groups, given the challenges in managing group dynamics and generating enough benefits. In Tanzania, Malawi, and Zambia, nurseries run by individuals produced significantly more seedlings than those run by groups (Böhringer and others 2003). On the other hand, operations in individually owned enterprises are sometimes constrained through restricted marketing networks and the limited number of participants available to contribute labor, although home nurseries can reduce labor and costs as nursery chores can be integrated into daily routines. In regions such as the Sahel in Sudan (Vogt and others 1998), communities with a strong tradition of cooperation elected to work as groups to spread labor. In Nepal, support groups were established to accelerate information flow and facilitate training among farmers who operated individually (Arens and others 1998). Voluntary farmer trainers facilitated regular meetings for group members, arranged visits between groups, assisted with training, maintained demonstration plots, and produced and distributed propagation material (Arens and others 1998). The current trend in South Africa is to work with single entrepreneurs or small groups; several practitioners suggested that the ideal size of a group is three to four people. Different models need to be assessed in conjunction with community participants, taking into account stakeholders' objectives, local conditions, and, if necessary, business potential. Models might also need to be adapted to changing circumstances. For example, in Nepal, the types and size of outreach nurseries were modified to cope with technical difficulties arising through a pest (Shanks and Carter 1998).

Community participants expect projects to enhance their lives or they would not be participating. However, expectations need to be in line with what can be realistically achieved. Several practitioners warned that it is important not to start the process until funding has been secured and the institution is reasonably confident that it can deliver, although this might contradict the participative approach and can prove logistically difficult because most funding applications require stakeholder involvement. Being meaningfully involved in the funding process also helps community participants to gain an

understanding of the challenges involved. A balance is required. Exchange visits to other projects are a useful means of enabling peers to share their experiences with community participants, which can contribute to more informed decision-making.

As has been experienced in other regions (e.g., Desmond 1989), the anticipated educational benefits of school nurseries did not always materialize. The impact of these projects needs to be more effectively evaluated and include the opinions of learners, who are often expected to provide free labor. Many young people in South Africa regard agricultural activities as inferior work. If this is not addressed, projects could be resented. Problems were also experienced in maintaining the nursery during school holidays, again a common problem (Shanks and Carter 1998).

Due to the seasonal nature of the business and the limited benefits frequently derived from nurseries, particularly during protracted development phases, it is usually preferable for people to diversify their livelihood activities to avoid depending solely on the nursery for income. Spreading a “livelihood security net” is a vital survival strategy in the subsistence sector (Bernstein 1992). The potential impacts of this diversification on participants and projects needs to be considered at the outset. Too heavy a workload can create difficulties in terms of time and energy commitments, intensifying pressure on people who are often already experiencing high levels of stress and affected by poor nutrition (Botha and others in press b). Women, in particular, usually already have heavy workloads.

The importance of relationship development and trust building was regularly raised in this study. Positive institutional qualities generally focused on the ability of staff to engender active participation and enhance the skills of community participants. Top-down management was unanimously found to be ineffective. Yet, despite “participation” now being one of the development clichés, it is still not always practiced or consistently applied.

However, power dynamics are not one-sided. In certain projects, confusion was created through community participants playing one institution off against another. This is not uncommon and is, in the words of Mavrocordatos and Martin (1995), “...a subtle paradox,” as in certain instances, community participants’ response to pressures to accept responsibility could actually become a tool for negotiating a better deal, particularly where institutions are under pressure to produce results on when inter-institutional competition is being experienced.

### The Environmental Dimension

A basic assumption in the development of outreach nurseries is that people will be willing and able to buy and plant

the seedlings produced. Land-use and cultivation choices are influenced by socioeconomic conditions, culture, value systems, environmental conditions, markets, and access to land and other resources (FAO 1985; Arnold 1995; Gilmour 1995). Cultivation also involves costs in labor, time, resources, and missed opportunities (FAO 1985). Furthermore, peoples’ needs are not static. Arnold (1995) proposed four main reasons for planting trees, which apply equally to other species: (1) to maintain supplies of valued plant products as stocks from wild populations decline or are no longer accessible; (2) to meet demand for plant products as human populations grow or new products or markets are developed; (3) to help maintain agricultural productivity by improving declining soil quality or reducing wind or water runoff, for example; and (4) to contribute to risk reduction and management.

As in Zimbabwe (Kerkhof 1992) and some nurseries of Tanzania (Guggenberger and others 1989), few projects in this study achieved their environmental objectives, although this tended to vary according to sector, with greening projects producing and transplanting higher numbers of seedlings than most agroforestry or medicinal plant nurseries. However, there are limited data on survival rates of these transplanted seedlings. Concerns were raised that seedlings were not always planted and that a lack of after care or damage by livestock resulted in high losses. Poor quality seedlings decreased survival rates in India (Alcorn and Molnar 1996), but this was not cited as a problem in this study.

Turnover in outreach nurseries is often low. For example, despite an annual production of about 3 million seedlings from 70 nurseries established in Zimbabwe during the late 1980s, only half of the nurseries sold more than 50% of their seedlings (Kerkhof 1992). Projects focusing on fuelwood species often face difficulties. Although some farmers have been willing to experiment with woodlots, fuelwood scarcities rarely provide sufficient incentive to plant trees (Kerkhof 1992; Ndulu and others 1998; Shanks and Carter 1998; this study). Farmers tend to prefer species for construction, poles, fruit, and other products, especially when these can be sold. Fuelwood is usually valued as a secondary product. In this study, where projects had developed regular markets after 5–10 years, most plants were sold to external markets. Levels of seedling transplanting in Malawi, Tanzania, and Zimbabwe were higher (Böhringer and Ayuk 2003). In Malawi, 1.88 million seedlings were produced in 256 nurseries and transplanted by 4718 people (Böhringer and Ayuk 2003).

None of the projects listed lack of access to land as a limiting factor in the establishment of nurseries. However, in many areas, small gardens limited the numbers of trees that could be grown. Furthermore, many nurseries were located in arid areas with inadequate water and/or water

supply infrastructure, and/or poor quality soils. Contrary to experience in India, where farmers were said to be prepared to water 10,000–20,000 plants using water sources located 0.5 km away from the nursery (Jagawat and Verma 1989), practitioners in South Africa felt that it was not realistic to expect people to water by hand when stock levels increased substantially.

### The Commercial Dimension

As with similar projects in Bolivia and Nepal (Shanks and Carter 1998), few South African nurseries attained financial viability. Most projects experienced a lack of liquidity, which was aggravated when labor or security needed to be paid for. Some projects “borrowed” resources such as water or existing labor from the school or institution, which lowered costs and simplified the process. However, this sometimes resulted in less ownership by the community and was sometimes withdrawn when budgets were tightened.

Despite cash-flow problems, several practitioners warned against securing too much funding, as this sometimes created dependency and reduced the incentive to become financially viable as quickly as possible. Nurseries constructed from recycled or natural resources such as reeds reduced construction costs and the threat of theft, were effective, and enabled community participants to build infrastructure without being dependent on external support.

There was a surprising lack of product diversification, both of plant species and complementary products such as compost. Practitioners ascribed this to a lack of willingness on the part of community participants to experiment as well as limited experience and a lack of knowledge about product diversification and/or consumer needs. Some projects found vegetables, fruit trees, shrubs, and ornamentals to be in demand, with vegetables being more profitable at the start of projects, helping to generate much needed revenue.

Although local consumers might be willing to buy seedlings, pricing frequently created difficulties (Desmond 1989; Ndulu and others 1998; Vogt and others 1998; this study). As in Nepal, where demand fell substantially if seedling prices rose beyond several rupees (Shanks and Carter 1998), potential customers within South African communities were either unwilling or unable to pay the prices required to achieve financial viability, despite these being far lower than prices within the private sector. Recommendations were made in several project evaluations to reduce prices to stimulate local consumer interest. However, the prices these outreach nurseries were charging were already at the same level as others that were struggling to attain financial viability. Moreover, if initial prices are set too low, it is often

difficult to increase them later, as consumer resistance sets in and people expect to continue to pay these low prices. In a Kenyan woodfuel and agroforestry program, seed was initially made available to people for free, with commercial interest in seed production by farmers following after the project started buying seed back (Carter and Bradley 1998). Market research and the evaluation of different production models are critical.

### Legislation and Policy

Although most institutions have developed policies stipulating the need to involve local stakeholders in programs, operational guidelines were not always clear and policies were not always consistently applied. High staff turnovers at management level have resulted in policies being regularly changed, severely impacting on projects. Some institutions had streamlined their systems to ensure timely payments to outreach projects, but payments were routinely delayed in others.

Apart from national and regional legislation pertaining to natural resource management (for e.g., the CARA Act, conservation and forestry legislation related to seed collection, etc.), knowledge of business legislation becomes necessary when projects start to generate profits. This is discussed in further detail in Botha and others (forthcoming a).

### Processes

As with other rural forestry interventions (e.g., FAO 1985) and ICDPs (Brandon and Wells 1992), planning was often inadequate and baseline research seldom conducted. Although institutions are often pressured to implement projects within funding deadlines, baseline research is critical in assessing whether a nursery is the best option under the local circumstances and provides data that could contribute to improved management and future monitoring. Most objectives were weakly formulated and lacked specificity, flexibility, and measurability. Although some of the unforeseen factors that were listed highlighted the unpredictable nature of development, the first four on the list might have been identified and mitigated against through more detailed prior planning with the involvement of community participants. Dudley (1993) suggested two questions to be asked of every intervention: What are we trying to achieve? How can it go wrong?

Often, neither the communities nor institutions had adequate combinations of skills. Apart from technical expertise, practitioners require business and development skills. Institutions implementing projects of this scale usually lack sufficient resources to be able to provide staff support in the form of multidisciplinary teams, as is often

advocated in development literature. In South Africa, most sectors are attempting to address skills deficits through training workshops and short courses and by incorporating development topics into tertiary-level curricula. However, problems still exist. Field staff often struggle to translate material learned during courses to field situations, as curricula seldom include sufficient experiential training to boost confidence levels. Adaptive management is an integral part of development, with some projects possibly needing to alter their approach or even focus at times. Project staff need to be allowed to learn from experience without pressure to produce immediate results (Kerkhof 1992; Dudley 1993). However, they should also be encouraged to assess the experiences of similar endeavors to minimize the repetition of common mistakes that could have considerable ramifications on community stakeholders' lives.

This study and others have shown the value of developing and maintaining good linkages between roleplayers from different sectors (Guggenberger and others 1989), including community institutions. A well-integrated multiskilled team can contribute substantially to a project, enabling expertise to be channeled according to specific needs. Apart from linkages among forestry, conservation, agriculture, and health sectors, several practitioners suggested appointing mentors from the private sector to support community participants. Although some commercial nurserymen view outreach nurseries as competition and would be reluctant to adopt this role, several have already made substantial contributions. Although it is beyond the scope of this article to evaluate these and other forms of public–private partnerships, as with any mentorship program, stakeholders need to be prepared for a long, gradual process. Mentors need to be made aware of the challenges involved in developing capacity within the subsistence sector.

Building effective linkages is usually far more difficult to achieve in practice than on paper. Apart from the fact that institutions often have different objectives and management styles, people do not always know how to work in a multidisciplinary manner (Dudley 1993). Confusion over roles and unwillingness to accept responsibility for aspects of project management are frequently experienced. Although a capable facilitator can greatly improve the management of these processes, development is strongly influenced by human nature with all its complexities and foibles.

Not all the projects that could be considered “successful” generated high profits or survived indefinitely. A school nursery with a stock of 1500 plants earned enough money to cover its running costs through sales, donations, and prize money; planted trees and ornamental plants into the school grounds; and contributed to local greening efforts. The projects in this study that had achieved their

goals were grounded in stable social environments, with adequate biophysical resources. Individuals and committees who were well organized were more effective in managing the technical, business, and social processes. Consistent and adequate-sized markets are critical in projects that aimed to enhance participants' incomes. Projects that had achieved this turned over large volumes through sales to external markets, including the supporting institution, other natural resource management initiatives, and the private sector.

Although there is agreement on the need for nurseries in resource poor communities, the levels of dedication and resources required by these and other relatively small-scale outreach projects are often underestimated. A thorough feasibility study needs to be conducted and projects need to be implemented on a businesslike basis if they are to become self-sustaining, taking into account local conditions, capacities, and resources of all stakeholders. Concurrent attention needs to be paid to the achievement of conservation objectives, as it is easy to lose sight of these in the struggle to attain financial viability. The hopes and aspirations of community participants need to be married with those of the institutions, not by “educating” the former but through effective collaborative processes. Community members take the greatest risks in any development process, having more to lose than external institutions that can move to another area or management cycle if the project fails. Attention to social processes is critical, both among direct stakeholders and the broader community. Projects need to be established in a positive, learning environment that is able to adapt to changing circumstances. The challenge is to translate lessons learned into more effective practice to improve the quality of projects and thus increase benefits to all stakeholders while enhancing natural resource management.

**Acknowledgments** The National Research Foundation (NRF2047368 and NRF2053690), the University of the Witwatersrand, and the South African National Biodiversity Institute are gratefully acknowledged for funding this research. The practitioners who participated in the study are thanked for sharing their experiences and knowledge so candidly. Rachel Wynberg and two anonymous reviewers are thanked for their constructive comments.

## References

- Abrams E. M., A. Freter, D. J. Rue, J. D. Wingard. 1996. The role of deforestation in the collapse of the late classic Copán Maya state. In L. E. Sponsel, T. N. Headland, R. C. Bailey (eds). *Tropical deforestation. The human dimension*. Columbia University Press, New York. pp: 55–75
- Adams M., B. Cousins, Manona S. 1999. Land tenure and economic development in rural South Africa: Constraints and opportunities. Working Paper No. 125. Overseas Development Institute, London

- Alcorn J. B., A. Molnar. 1996. Deforestation and human–forest relationships: What can we learn from India? In L. E. Sponsel, T. N. Headland, R. C. Bailey (eds). *Tropical deforestation. The human dimension*. Columbia University Press, New York, pp: 99–121
- Alexander J., J. McGregor. 2000. Wildlife and politics: CAMPFIRE in Zimbabwe. *Development and Change* 31:605–627
- Arens T., J. Carter, J. Ghimire. 1998. The Nepal Agroforestry Foundation home nurseries programme. In E. Shanks, J. Carter (eds). *The organisation of small-scale tree nurseries*. Rural Development Forestry Study Guide 1. Overseas Development Institute, London, pp: 37–48
- Arnold J. E. M. 1995. Framing the issues. In J. E. M. Arnold, P. A. Dewees (eds). *Tree management in farmer strategies: Responses to agricultural intensification*. Oxford University Press, Oxford, pp: 3–17
- Bernstein H. 1992. Poverty and the poor. In H. Bernstein, B. Crow, H. Johnson (eds). *Rural livelihoods. Crises and responses*. Oxford University Press, Oxford, pp: 1–26
- Böhringer A., E. T. Ayuk. 2003. Farmer nurseries as a catalyst for developing sustainable land use systems in southern Africa. Part B: Support systems, early impact and policy issues. *Agricultural Systems* 77:203–217
- Böhringer A., E. T. Ayuk, R. Katanga, S. Ruvuga. 2003. Farmer nurseries as a catalyst for developing sustainable land use systems in southern Africa. Part A. Nursery productivity and organisation. *Agricultural Systems* 77:187–201
- Botha J. Forthcoming(a). Social processes affecting the development of outreach nurseries implemented by forestry, conservation and non-governmental institutions in South Africa
- Botha J., E. T. F. Witkowski, J. Cock. 2004. A review of nurseries as conservation or social forestry outreach tools. *The International Journal of Sustainable Development and World Ecology* 11:280–297
- Botha, J., E. T. F. Witkowski, and J. Cock. Forthcoming a. The commercial viability of outreach nurseries
- Botha, J., E. T. F. Witkowski, and J. Cock. Forthcoming b. The impacts of conservation and social forestry outreach nurseries on community participants
- Brandon K. E., M. Wells 1992. Planning for people and parks: design dilemmas. *World Development* 20:557–570
- Brown D., Y. Malla, K. Schreckenber, O. Springate-Baginski. 2002. From supervising “subjects” to supporting “citizens”: Recent developments in community forestry in Asia and Africa. *Natural Perspectives Number 75*. Overseas Development Institute, London
- Butler, M. and D. Hallows. 1998. Poverty and environment in South Africa. In *Voices from the ground: People, poverty and environment in South Africa*. Environmental Justice Networking Forum, Pietermaritzburg, South Africa
- Carter J., P. Bradley. 1998. The Kenya woodfuel/agroforestry development programme. In E. Shanks, J. Carter (eds). *The organisation of small-scale tree nurseries*. Rural Development Forestry Study Guide 1. Overseas Development Institute, London, pp: 23–35
- Castro A. P. 1996. The political economy of colonial farm forestry in Kenya: the view from Kirinyaga. In L. E. Sponsel, T. N. Headland, R. C. Bailey (eds). *Tropical deforestation. The human dimension*. Columbia University Press, New York, pp: 122–143
- Castro A. P. 1998. Sustainable agriculture or sustained error? The case of cotton in Kenya. *World Development* 26:1719–1731
- Chambers R. 1983. *Rural development: Putting the last first*. Longman, London
- Clark, M. M., J. P. Evans, J. Berns, and T. Greyling. 1994. Biomass Initiative Production Element Report: Region 2—Northern Province. Biomass Initiative Report PFL-PRO-02. Department of Mineral and Energy Affairs, Pretoria, South Africa
- Cock J. 1991. Going green at the grassroots: environment as a political issue. In J. Cock, E. Koch (eds). *Going green: People, politics and environment in South Africa*. Cape Town University Press, Cape Town, pp: 1–17
- Desmond, D. 1989. Forest tree nurseries in agricultural high schools: An analysis of Ecuadorean experiences. Rural Development Forestry Network Paper 9c. Overseas Development Institute, UK
- Dove M. 1995. The shift of tree cover from forests to farms in Pakistan: A long and broad view. In J. E. M. Arnold, P. A. Dewees (eds). *Tree management in farmer strategies: Responses to agricultural intensification*. Oxford University Press, Oxford, pp: 65–89
- Dudley E. 1993. *The critical villager. Beyond community participation*. Routledge, London
- FAO, 1985. *Tree growing by local people*. Forestry Paper No. 64. FAO, Rome
- Gilmour D. A. 1995. Rearranging trees in the landscape in the Middle Hills of Nepal. In J. E. M. Arnold, P. A. Dewees (eds). *Tree management in farmer strategies: Responses to agricultural intensification*. Oxford University Press, Oxford, pp: 21–42
- Guggenberger, C., P. Ndulu, and G. Shepherd. 1989. After Ujamaa: Farmer needs, nurseries and project sustainability in Mwanza, Tanzania. Rural Development Forestry Network Paper 9c ODI, UK
- Hall R. 2004. A political economy of land reform in South Africa. *Review of African Political Economy* 31:213–227
- Henderson C. M. 1994. Biomass Initiative Production Element Report: Region 1—KwaZulu Natal and Transkei. Biomass Initiative Report PFL-PRO-03. Department of Mineral and Energy Affairs, Pretoria, South Africa
- Jagawat, H., and D. P. S. Verma. 1989. Nurseries in Gujarat, North India: Two views. Rural Development Forestry Network Paper 9d, ODI, UK
- Kerkhof P. 1992. *Agroforestry in Africa. A survey of project experience*. Panos Publications Limited, London
- Lawrence A., J. Carter. 1998. The CIAT agroforestry nurseries programme in Bolivia. In E. Shanks, J. Carter (eds). *The organisation of small-scale tree nurseries*. Rural Development Forestry Study Guide 1. Overseas Development Institute, London, pp: 9–22
- Mavrocordatos A., P. Martin. 1995. Theatre for development: listening to the community. In N. Nelson, S. Wright (eds). *Power and participatory development. Theory and practice*. Intermediate Technology Publications, London, pp: 61–71
- Ndulu P., C. Guggenberger, G. Shepherd J. Carter. 1998. The CARITAS village afforestation project, Mwanza region, Tanzania. In E. Shanks, J. Carter (eds). *The organisation of small-scale tree nurseries*. Rural Development Forestry Study Guide 1. Overseas Development Institute, London, pp: 67–77
- Nesbitt J. T., D. Weiner. 2001. Conflicting environmental imaginaries and the politics of nature in Central Appalachia. *Geoforum* 32:333–349
- Peluso N. L. 1992. *Rich forests, poor people. Resource control and resistance in Java*, University of California Press, Berkeley
- Bedford K.H., A. Tayber. 2000. Writing the wrongs: Developing a safe-fail culture in conservation. *Conservation Biology* 6:1567–1568
- Reyneke, P. G., and B. Dickson. 1994. Biomass Initiative Production Element Report: Nationwide Projects of the Department of Water Affairs and Forestry. Biomass Initiative Report PFL-PRO-04. Department of Mineral and Energy Affairs, Pretoria



- Robinson, P.R., and I. Thompson. 1989. Fodder nurseries and their central role in the hill-farming systems of Nepal. Rural Development Forestry Network 9a ODI, UK
- Shanks E., J. Carter. 1998. The organisation of small-scale tree nurseries. Rural Development Forestry Study Guide 1. Overseas Development Institute, London
- Vogt G., E. D. Fowsia, K. Ahmed, E. Shanks. 1998. The SOS Sahel/FNC EI Ain natural forest management project, Sudan. In E. Shanks, J. Carter (eds). The organisation of small-scale tree nurseries. Rural Development Forestry Study Guide 1. Overseas Development Institute, London, pp: 49–66
- Von Maltitz G. P., S. E. Shackleton. 2004. Use and management of forests and woodlands in South Africa. Stakeholders, institutions and processes from past to present. In M. J. Lawes, H. A. C. Eeley, C. M. Shackleton, B. G. S. Geach (eds). Indigenous forests and woodlands in South Africa. Policy, people, practice. University of KwaZulu–Natal Press. Scottsville, South Africa, pp: 109–135
- Wynberg R. 2002. A decade of biodiversity conservation and use in South Africa: Tracking progress from the Rio Earth Summit to the Johannesburg World Summit on sustainable development. South African Journal of Science 98:233–243