TRANSFORMING COMMUNITIES THROUGH AGRICULTURE: DEMONSTRATION PLOT SEEDCANE MODEL IMPROVES THE LIVELIHOODS OF SMALL-SCALE SUGARCANE GROWERS

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Abstract

The small-scale farms in the communal areas of Noodsberg mill supply area, KwaZulu-Natal Province, South Africa, were not productive for many reasons, including a lack of resources, knowledge and access to finance and high food insecurity. An innovative extension approach was required to uplift communities and ensure the success of agricultural projects at a small grower level. Thus the "Demonstration Plot Seedcane Model" was initiated and developed. The project was a multi-stakeholder, private-public approach which aimed to improve the agronomic knowledge and skills of small growers while raising awareness of the high potential of the area's natural resources for sugarcane production. Through this extension methodology, growers could become aware of the value of scientific research for their livelihoods. Key agronomic skills and knowledge transfer would include understanding differences in varieties; the importance of soil sampling, approved, locally available seed cane and pest and disease monitoring. In addition, environmental sustainability and good farming practices form the basis of the extension and technology transfer activities and promotes improved farmer co-operation and community coherence. The "Demonstration Plot Seedcane Model" allows for highly scientific information to be transferred and adopted in an accessible manner. The project, spanning 11 years, has resulted in vastly improved yields, increased area under sugarcane and improved livelihoods in the community. The contribution to the local economy is significant as is the increased stability of sugarcane supply to the local mill. This has, in turn, created job opportunities and reduced poverty at both household and community level. The model is repeatable in other regions, can be extended to other commodities and results in improved skills adoption, income generation and job creation.

Keywords: extension, rural development, sugarcane small growers

1. Introduction

Smallholder farms represent more than 95% of Sub-Saharan Africa's agriculture. However, with foreign aid and investment in Africa declining due to the global economic crisis, it is more critical than ever to assist small farmers to become economically successful and sustainable. Historically, small grower projects are viewed as a poor investment and have generally not remained sustainable once investment and support is withdrawn. Extensive investment capital has previously been channelled into KwaZulu-Natal (KZN) Province, South Africa small grower projects with little or no long term success. Several reasons for these failures have been identified, including a lack of capital, resources and technology, poor natural resource management and complex issues of land tenure and security. A lack of understanding of local socio-economic conditions and cultures has also been a challenge. The South African sugar industry is under pressure to stabilize the supply of sugarcane to the mills and some mills are currently operating below capacity. In addition, commercial grower production levels are beginning to plateau due to a loss of agricultural land

to non-agricultural development such as residential estates, industry and mining, expansion onto marginal land and increases in production inputs. Land available for significant future expansion for sugarcane production exists primarily within communally owned areas where large tracts of high value land are underutilized. Small scale growers number about 48 000 and currently produce 12% of the total South African sugarcane supply (SACGA, 2005), with farm sizes of 30 hectares or less. Sugarcane as an industry offers a unique opportunity for rural development, job creation for unskilled and skilled labour and income generation. The industry currently employs 11% of South Africa's agricultural labour force and has been shown to accelerate social and infrastructural development in rural KZN, as well as developing emerging farmers and supporting land reform initiatives (Blom, 2011).

To improve production in communal areas, an extension methodology is required that addresses the numerous constraints and challenges, develops skills and builds financial independence. Such a methodology must result in effective and sustainable improvement in sugarcane yields of small grower farmers. In the study area, Noodsberg, KZN Province, South Africa, much of the land available to small growers is highly suited to the production of sugarcane but lies fallow due to many challenges that face small growers. However, the sugar industry is well organized to accept and support new growers in that the local mill is able to accept additional cane, contractors are available to assist growers with land preparation, planting, harvesting and transport, the price per ton is guaranteed and no marketing is required. This presents a unique opportunity for these new entrants to the industry to become successful.

2. Background

Prior to 1999, the communities of Noodsberg communal area were involved in mixed farming including small plots of maize, sugarcane, household vegetables and livestock. In 1999, funds were released by government departments to assist the small sugar growers with planting two sugarcane demonstration plots to show the viability of sugarcane as a commodity, offer agronomic training and showcase the high potential of the natural resources. Agricultural development in these areas was challenging as homesteads traversed the landscape for thousands of hectares, land parcels were small and soil conservation management such as contours and waterways were difficult to implement due to scattered settlements, informal road networks and gravesites. Sugarcane production was decreasing, growers displayed a low level of technical knowledge and there appeared to be no structured system of knowledge transfer. In addition, growers lacked resources such finance for inputs, fertilizer, seedcane, transport and other equipment and struggled with ineffective and/or insufficient extension support and guidance. Most small growers depend on contractors for harvesting and transport since very few own or have access to equipment and machinery. However, many of the contractors offer poor service quality (Meyer & Nothard, 2005) and pricing is not standardised. Other complex issues such as political infighting, land tenure and security remained stumbling blocks to agricultural productivity. Thus, the small growers remained trapped in economically non-viable activities, were food insecure and highly vulnerable to risk. Sugarcane was not viewed as a viable economic alternative as income levels were low due to poor production practices, ageing ratoons (regrowth after harvesting) and a lack of access to low cost disease free seedcane (vegetative plant material).

In the Noodsberg Mill supply area, a lack of access to finance for suitable seedcane was an important limitation to sustainability and the potential of the communally owned areas was not being realized. The use of demonstration plots for training, technology transfer, evaluating varie-

ties under local conditions and as seedcane nurseries, needed to be expanded. Since small growers were reluctant to replant fields due to the expense of purchasing and transporting seedcane long distances, the demonstration plots offered a practical opportunity to close the seedcane gap and introduce new varieties to local growers.

While the demonstration plots were very successful for showing the economic viability of sugarcane in the region, as well as the high potential land resources the communities resided upon, expansion remained stagnant. In 2002, an additional demonstration plot was implemented which also produced high yields under local conditions, but crop losses, fires and a lack of security led to no income being realised until 2005, even though the traditional leadership was very supportive and allocated land for new plantings. Detailed natural resource surveys undertaken in 2005 by extension staff finally raised awareness of the extremely high potential of the area for all forms of agriculture.

The Noodsberg area falls into the top 1% of South Africa's land potential categories ie. deep, apedal, well-drained humic soils, high rainfall, moderate temperatures, wind and frost free and gently sloping terrain. Additionally, the area was in close proximity to the local mill, local contractors were available to harvest, plant and transport sugarcane, there was a guaranteed market and good road infrastructure and most dwellings had access to potable water and electricity. Another advantage of the area was that growers were well organized with grower group representatives. An innovative approach was needed to ensure the successful adoption, implementation and sustainability of this development project; a methodology which would capacitate growers and extension officers and increase the involvement of the local mill and other roleplayers in the project. If this could be achieved, the project would become a vehicle for rural development, job creation and income generation for the communities as well as remaining self-sustaining into the future.

3. Methodology

A new methodology, developed to address the above mentioned issues, was implemented in 2005 in the Noodsberg communal area (KZN Province, South Africa) (Figure 1).

This methodology offered a structured and highly organized approach which insisted on commitment from relevant roleplayers including financiers, millers, research organizations, extension support, cooperatives and contractors with clearly outlined tasks and responsibilities for each organization and/or individual. Previous projects had failed where the growers, in particular, were not involved in the planning process, a factor that had been recognized by Hart (2001). It is important that the planning stages are participatory and that the roleplayers were in agreement and had committed resources to the project, the newly developed methodology followed a stepwise process outlined below for each additional demonstration plot planted:

1. Community consultation with growers and leadership to select a co-operator (successful grower) who will become a seedcane merchant for the next two crops.
2. Acquire finance for the project.
3. Selection of land with suitable land potential (Camp, 2001) which is of uniform and representative soil type for the area, accessible by car, weed free, approximately two hectares in size and fenced.
4. Regular (monthly), monitored field training days and meetings (Bembridge, 1997) were organized according to the agronomic calendar which covered all aspects of sugarcane agronomy from soil classification, soil fertility, land use planning, runoff control, weedicides, herbicides, choice of variety, planting, pest and disease control, fertilization, harvesting etc. As each training day progressed through the growing season, the relevant action was implemented on

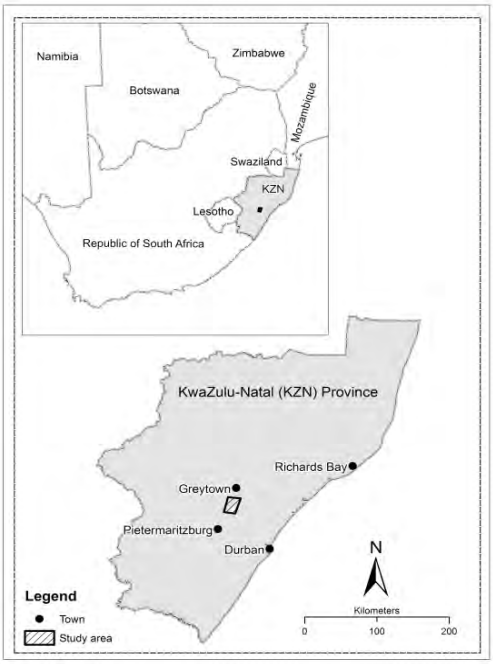

Figure 1. The locality of the Study Area of Noodsberg, KZN Province, South Africa

or before that day eg hand planting of sugarcane (the norm for small scale growers) would be demonstrated on an already prepared field and then undertaken by the attending growers under the supervision and direction of the extension officer and/or field scientists.

5. Land use planning surveys were undertaken to ensure correct land use management and compliance with legislation ie waterways, contours, sugarcane extraction routes, soil sampling for fertility correction. A detailed natural resources survey and data sheet must be completed with the grower and roleplayers at which the link between the soil type, yield potential and potential income is explained and quantified.
6. Arrange for inputs to be supplied and delivered timeously (seedcane, transport, land preparation, planting).
7. Agricultural Extension Officer (AEO) and the grower agree to a site management plan (weed control, topdressing, firebreaks, fencing) and sign an agreement which commits both to undertaking various responsibilities throughout the life of the project. This includes detailed record keeping for each plot by the grower and AEO. The co-operator agrees to allow unrestricted access to the plot by roleplayers, make available its use for training and undertakes the ongoing management of the plot.
8. The AEO's work programme must include two critical areas: the annual planting of additional demonstration plots and issuing and pricing of seedcane. The AEO must also ensure an increase in the number of local growers, the number of hectares planted and technology transfer on e.g. good agricultural practices, business skills, forward planning, environmental stability (Gillespie & Mitchell, 2006 & 2009).

9. The selected site will only be used as a seedcane nursery for the plant and first ratoon crop in accordance with pest and disease control regulations, after which it reverts to commercial cane. A higher profit can be realised for seedcane sold locally to neighbouring growers since transport costs are lower. From the second ratoon crop, the grower will then be paid by the mill for subsequent crops, as it can no longer be used for seedcane. Growers in the area are not allowed to buy seed cane from their neighbours unless the seed cane has been approved by the local Pest & Disease and Variety Control Committee.
10. A new seedcane merchant is identified each year so as to continue the growth of the industry and sustain the demand for seedcane due to expansion.

4. Results and discussion

4.1. Growth in demonstration plots and knowledge transfer

To date 20 demonstration plots have been planted varying in size from 1 to 2 ha and totalling an area of 24.6 hectares. From these demonstration plots, the Noodsberg communities have adopted new technologies, converted their fields to more suitable higher yielding varieties and improved the sustainability and productivity of their crops. Since 2006, 105 field training days were arranged to which all growers were invited. Attendance at these training days was never fewer than 13 but often exceeded 70 people. This is indicative of the renewed interest in sugarcane as a cropping option since the start of this project in the area.

4.2. Resource optimization

This extension methodology has exposed the high potential of natural resources in Noodsberg communal areas and the economic viability of sugarcane as a crop. The communal area planted to sugarcane and supplying Noodsberg Mill has increased by 87% since 2006, expanding from 537.2 hectares to more than 1026 hectares in 2013. A further 8000 ha remains available for future expansion. The total tons sugarcane delivered to the mill per year has increased by 158% from 16466 tons in 2006 to 42600 tons for 2013 (Figure 2). This indicates that the Noodsberg small growers have embraced sugarcane as a viable cropping enterprise and have become successful technically competent growers.

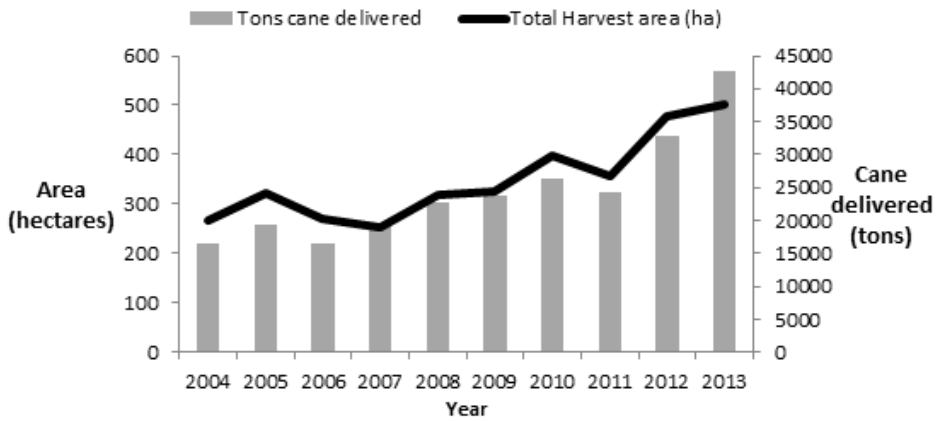

Figure 2. Increase in small grower sugarcane yield and area planted in Noodsberg, South Africa

4.3. Income generation

With the success of this methodology, funding and investment has become increasingly available in recent years to plant additional areas to sugarcane, which has further stabilized supply to the local mill and resulted in job creation and significant income generation within the area. Individual growers have amalgamated into group farming systems (cooperatives) which enables greater control, bargaining power for reduced input costs and more effective management. The project currently has 9 trained and capacitated seedcane merchants who can meet the needs of future growers by supplying locally accessible seedcane. The yields on the demonstration plots are excellent with some achieving in excess of 150 tons per hectare, representing an income of R37 750 per hectare to the seedcane merchant. The number of growers delivering to the mill has more than doubled in 7 years, from 231 (2006) to 477 (2013). Due to improved production and technology transfer, average yields have increased dramatically from 61 tons per hectare (2006) to commercially comparable levels of 85 tons per hectare (2013). This improved production relates to a direct increase in income generation. Total revenue (at current price per ton) to the community has almost tripled: in 2006 gross income was R6.497 million, while in 2013, gross income had risen to R16.819 million (Figure 3).

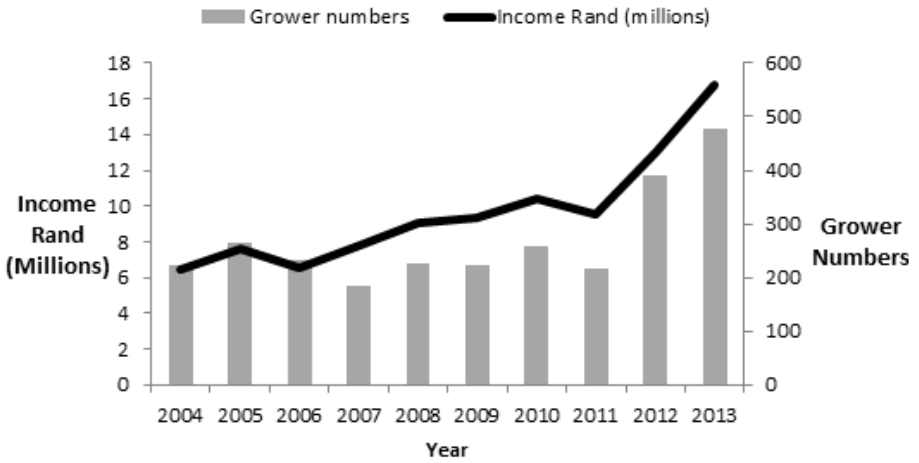

Figure 3. Project impact in terms of increase in small grower numbers and income in Noodsberg, South Africa

4.4. Adoption of new technologies

The link between growers, extension services and research scientists is critical yet is often tenuous. This methodology allowed complex scientific concepts to be related at an appropriate level and in the relevant language. Scientific research results were delivered through on-site training to growers who adopted new technologies within land use planning, soil fertility, production potential, site/soil specific varieties and good agricultural practices to achieve commercial level yields. Three new varieties have been planted in Noodsberg and are being assessed in terms of their productivity in the area when compared to older varieties. Land use planning has been implemented throughout the project area and payment for services such as laboratory testing

for fertilizer recommendations and pest and disease monitoring has been adopted. The value of continuous weed control and the use of herbicides have been accepted. These technologies have enabled growers to realise higher yields and income. The link between good site management, yield, area and income has been clearly recognized.

5. Conclusions

Land resource assessments have had significant value in identifying and optimizing natural resource potential in Noodsberg Mill supply area. Demonstration plots planted as seedcane nurseries have motivated small growers to adopt better farming practices, offered greater access to cheaper disease-free seedcane and have resulted in significant increases in sugarcane supply to the mill. The plots have resulted in an awareness and adoption of new varieties and served as a technical training facility. Relationships between local growers, technicians and the miller, as well as the link to scientific research, have been strengthened. Growers have learnt valuable business skills and have learned to be more cost-effective in their management and production activities. The demonstration plots have acted as a catalyst for development, job creation and higher economic returns, resulting in sustainable and improved livelihoods. The methodology has been documented in a detailed manual for use by extension staff and other development agencies. Growers in the Noodsberg area have participated and benefitted from this project methodology, resulting in improved yields, increased income, food security and levels of knowledge that lead to sustainability of the growers themselves, making them less dependent on support. This methodology can be easily repeated in other areas, and can be applied to other commodities.

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