

Impact of electrification on small-scale farming

**A field study of the electrification process at
Nhlangwini in Southern KwaZulu/Natal**

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The aims of the study were to:

1. Assess impact on:

- livelihoods
- equity
- farming systems
- sustainability
- productivity;

2. Examine conditions needed to ensure that electrification brings benefits;

3. Compare benefits of electricity with other energy sources; and

4. Look at local involvement in, and problems with the electrification process.

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EXECUTIVE SUMMARY

The drudgery which rural women face can be lightened by the provision of electricity and water. Most Nhangwini women appear to be almost fully employed in survival and domestic tasks, having very little time for personal development or social interaction. Significant creative potential for productive activities will only be realised if electrification goes hand-in-hand with provision of improved educational facilities and of small business development activities. If policy strives in a practical way to empower rural communities, participative and accountable local government institutions need to be developed. They should have some power in deciding on local development priorities, and on the allocation of available resources. In terms of agriculture, local Farmers' Associations are needed to link in forming national structures which will be able to lobby in the interests of agriculture and rural development. Empowering rural communities in practical terms means that these organisations will represent not only the commercially active farmers, but also those rural people who have hitherto lacked access to resources and have not had the benefit of an accountable public administration.

Current energy strategies at Nhangwini use multiple sources (wood, paraffin, gas, electricity, candles, batteries) – and people are carefully balancing cost with convenience. The poorest households use the cheapest energy source, which is paraffin. Wood involves quite a high cost, for most people monetary, as few people now collect wood, which is scarce. Paraffin-only households have very little money, and do not have a separate kitchen building – which is necessary if wood is to be used.

At several meetings of the Nhangwini Community Development Project (NCDP) during 1988, local residents repeatedly identified three sets of energy-related problems: need for electrification, need for firewood and the need for diesel to be supplied in bulk. Some progress was made with bulk diesel and with woodlots. Eskom refused to put in a prepaid card system, but did connect up those who could afford the 'D' tariff to the grid in 1990-96. Most of these customers were surveyed, as well as those who still use generators and a sample of those with no electricity. One commercial farmer has made great strides thanks to electrification, including an electric hammermill, refrigeration, a store, trucks, tractors, etc. Another commercial farmer connected up a three phase supply but has never used it, in spite of having tractors, trucks and tractor-driven hammermills. Three shopkeepers were interviewed, who have used electricity for refrigeration, television for customers, security lighting, and an electric cash-register. Most other applications are lifestyle-related.

People see electrification and water reticulation as related, since 'government' has promised both. This perception arises from the uncoordinated planning processes, with many different meetings of different representatives. In frustration the Nhangwini Development Committee Water Subcommittee requested the KwaZulu Department of Agriculture in 1994 to help with this, and an engineering firm completed a study which recommends abstracting water from the Mzumbe River. People's expectations linking water and power mean that they are now highly frustrated, as most people (1366 households, 10 900 people) have access to neither.

Regarding electrification, the perceptions of local people at Ndwebu, Nhangwini, can be summarised under four headings:

- 1 When Eskom comes to us all, life will be easy and productive.
- 2 Electricity will somehow be associated with water supply.
- 3 Eskom and others treated us badly and misinformed us.
- 4 We want the card system, when is it coming?

The process of electrification did not address the need for power at local schools and clinics. One high school has recently been connected to the grid, but still has

few educational appliances. However, electrification has meant that the school is now used in the evenings for a range of activities.

Recommendations are that Eskom should target communities with democratic local government structures, should ensure participative consultation processes take place, should where possible follow water supplies, but at least pro-actively communicate with those involved in water provision, and should consider establishing rural service centres.

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1

Energy and agriculture: options for agricultural development

Energy is a major part of the lives of all people. On Earth, we are fortunate enough to have a constant stream of energy flowing into our system every day. The sun's light and warmth allows plants to grow through the energy storage process which we call photosynthesis. Although it is often not recognised, this process is at the heart of most of our energy production: coal and fuelwood both originate directly from plant material. Food production depends on the sun and the photosynthetic, nitrogen and hydrological cycles which it powers. Energy is the basis of agriculture, and its efficient use is an important part of agricultural development.

South African agriculture has been dominated this century by some 60 000 (mainly white) commercial farmers. Of these, about 15 000 have been able to use technology and management effectively to generate over 80% of South Africa's traded agricultural production (Huntley et al 1989). The development of the small-scale black farming sector in the coming century is imperative if rural poverty is to be alleviated.

This study examines the impact of electrification on a rural community at Nhlangwini in southern KwaZulu-Natal. Although many of the problems highlighted have already been recognised, and Eskom has made many changes as a result, there are many lessons to be learned from the Nhlangwini electrification process. The study assesses the process of electrification as well as electricity's contribution to meeting the felt needs of the Nhlangwini community, giving particular attention to the impact on agriculture. To do this, it examines Nhlangwini farming and social systems, drawing on participatory action research in the area over the past ten years (Dlamini 1990; Murphy 1990; Auerbach 1993). The link between institutional development and changes in farming practice are critically examined.

While many agriculturalists assume that a simple transition to commercial agricultural production using modern technology is both desirable and possible, experience in the rest of the developing world has shown that this cannot be assumed to be so. The 'green revolution' model of agriculture only works if certain requirements are met (adequate moisture, money, markets and management skills); it also has long-term impacts on both the human and natural environment which need to be critically examined (Chambers 1983; Conway & Barbier 1990).

Electrification in rural areas is often not the top priority of local people, but if the process of electrification is linked to helping communities to analyse their development priorities, it should be possible to use this process to assess the role of electricity and other complementary inputs in improving the quality of life of the broadest possible spectrum of rural people.

Technology, labour and food production

Agriculture is the name given to those human activities concerned with producing food from the fields; we use it here in its broadest sense, to include crop production, horticulture, animal husbandry, forestry and fishing. Managing food production has been one of the cornerstones of human endeavour throughout the centuries. In Egyptian times, 95% of the population were engaged in food production, leaving only 5% for cultural and architectural activities such as building the pyramids (Pimentel & Pimentel 1979)! Mechanisation has greatly reduced the need for human labour in agriculture. In the United States of America today, less than 0.1% of the population is involved in agricultural production.

American agriculture is highly mechanised, and one hectare of cropland requires only 12 hours of human labour, compared with approximately 1 000 hours for hand cultivation through a whole growing season (see Figure 1). The levels of

production per hectare are also dramatically increased in modern agriculture. (Average commercial maize production in South Africa rose from approximately one tonne of grain per hectare fifty years ago to over three tonnes per hectare by 1970, due mainly to increased fertiliser use and improved seed cultivars, as well as better tillage, earlier planting thanks to mechanisation, and improved weed control – see Mallett (1988).)

But this 'green revolution' has a cost. As can be seen in Figure 1, when compared with hand cultivation, animal cultivation requires one-and-a-half times the amount of energy, while tractor cultivation needs nearly three times as much. It is also well-documented that high levels of production can be achieved without fertilisers, pesticides and herbicides (Goewie 1997). In Europe, there is a growing trend towards ecological agriculture because of the environmental problems which modern agriculture is causing. In the developing world, however, the problem is not too much of everything but, rather, too little, and so the approach cannot be a simple transfer of European management-intensive eco-farming any more than high-input 'green revolution' farming technology. Effective low external input sustainable farming systems are needed which can help resource-poor farmers to take the step from desperate sub-subsistence agriculture into a situation where they produce surpluses and enter the market economy. This requires research, farmer support and joint community action. Building of institutions, and thus of the community's capacity to take joint action, must go hand in hand with the provision of infrastructure if economic growth and alleviation of poverty are to result from interventions. In South Africa, this is easier than in many other developing countries, because of the spatial co-existence of areas of highly productive commercial farms (with accompanying infrastructure), and areas of rural poverty and under-development.

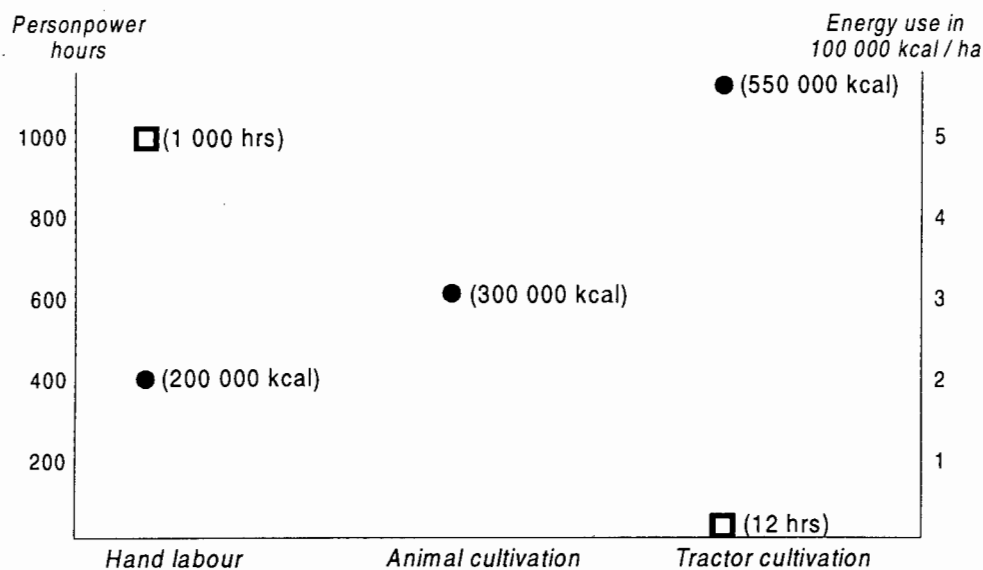


Figure 1: Relationship between mechanisation, personpower requirements and energy use in agriculture
(after Pimentel and Pimentel (1979))

Technology, labour and food production should not be seen only in one of two 'boxes': black subsistence farming or white commercial farming. Rather, the range of options between rural poverty and hunger and large-scale commercial production should be developed consciously, through the provision of support through research and infrastructure development. Dutch researchers are now doing this for farmers through the development of a range of research farms (Goewie 1997). One can optimise a farming system in terms of 'best technological means for short-term cost effective production', or one can optimise for 'best ecological means for long-term environmentally sound production' (see Figure 2). The debate around the long-term costs of agricultural pollution is more advanced in the developed world than it is in the developing countries. However, the

impacts of agriculture on South Africa's scarce water resources, both as a user and as a polluter, are a major source of concern to water managers (Water Research Commission et al. 1996). Since both food production and rural survival in South Africa are limited more by lack of water than by lack of electricity, ways of harvesting and conserving water, and water supply infrastructure are often higher priorities for rural people than electrification.

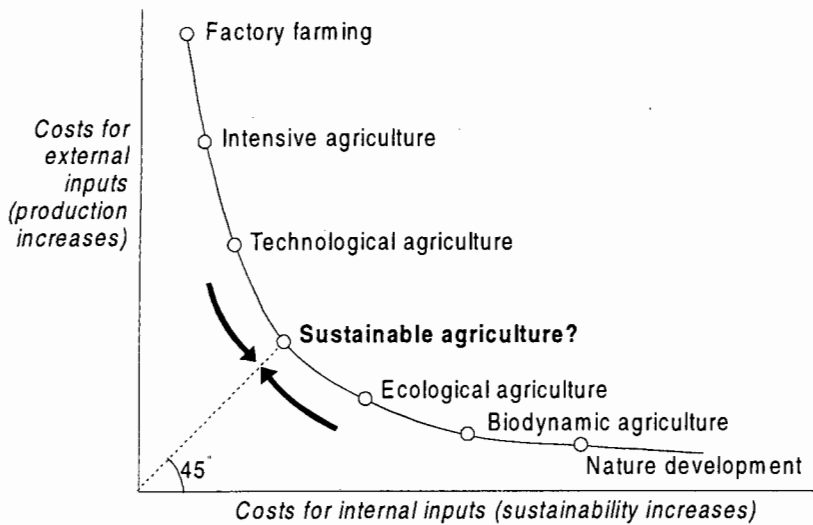


Figure 2: European farming systems
(after Goewie 1997)

Integrated catchment management (ICM) and integrated rural development (IRD) are two approaches which have been developed to express the need for understanding complementary inputs – ICM from a water management perspective, and IRD from a social one. Similarly, one hears of integrated energy planning (IEP). Although the three terms are evidence of a move towards interdisciplinary planning, in practical terms there is often little communication between energy, water, health and education planners. Certainly, at Nhangwini, water reticulation and electrification planning happened (and are still happening) in isolation from each other. In order to contribute to improving this situation, it is important to understand what is meant by sustainable rural development, so that the role of participatory development planning in empowering local communities can be better understood.

Sustainable rural development

Conway and Barbier (1990)¹ describe how trends in development have evolved in our time from a period after the Second World War, where economic development was equated with economic growth, expressed as sustained growth in real per capita gross national income. Realisation that growing numbers of people lived in absolute poverty in spite of overall economic growth led to the emphasis of growth with redistribution in the late 1960s: 'Agriculture became the priority sector, as it had the potential to eliminate malnutrition and hunger, absorb surplus labour and boost foreign exchange earnings'.

The argument presented at the 1976 World Employment Conference of the International Labour Organisation that absolute poverty cannot be reduced unless the essential needs of the poor are met resulted in the emergence of the 'basic needs' strategy. According to Conway and Barbier, this strategy recognised material and also non-material needs, and acknowledges that growth alone – even egalitarian growth or growth with redistribution – does not guarantee that basic needs will be met. A concern for sustainability, they argue:

¹ All subsequent references to Conway and Barbier are to this book.

represents the most recent shift in development thinking. In common with the 'basic needs' strategy, the emphasis is on improving the livelihood of the poor. However, this approach additionally argues that lasting improvement cannot occur in Third World countries unless the strategies which are being formulated and implemented are environmentally and socially sustainable; that is, they maintain and enhance the natural and human resources upon which development depends.

Incentives are required to induce environmentally rational behaviour which is sound in both the short and the long terms, although Boserup (1965) argues that population pressure will make this happen spontaneously. This in turn requires local knowledge and the full participation of the beneficiaries in the development process.

Sustainable agriculture

These shifts in the development process have been mirrored by similar concerns in the narrower focus of agricultural development. Conway and Barbier discuss these changes, ranging from the community development approach of the 1950s, with its emphasis on the village-level worker, to rising per capita food production made possible by 'green revolution' technologies, and later to concern about the impact of these technologies on poor communities and the long term sustainability of agricultural production. There is also increasing concern that much of the progress in agricultural productivity is only being achieved at the cost of long-term degradation of the biophysical and sociocultural environments (Bawden 1991).

In the early 1970s, Ben Farmer, working from Cambridge, became convinced that there was a need for a study in the villages and the fields of the impact of technology on third-world communities (Farmer 1977). Sir Joseph Hutchinson wrote in the Preface to *Understanding green revolutions* (Bayliss-Smith & Wanmali 1984):

It was characteristic of [Ben Farmer] that he brought his team together (in December, 1974) to discuss their findings and plan the outline of a publication, when the fieldwork was still incomplete. The book which resulted from this meeting was published in 1977; it remains one of the few integrated studies at village scale of the various social, economic and environmental changes that are taking place in rural south Asia.

This was the start of a growing flood of attempts at 'multi-disciplinary, multi-faceted, integrated agricultural development studies', symptomatic of a shift away from reductionist science as well as a concern for the long-term implications of agricultural development. Sustainable agriculture is understood in a variety of ways, however, depending upon the perspective from which it is viewed. As Conway and Barbier point out: most agriculturalists see sustainable agriculture consolidating the achievements of the 'green revolution' and equate sustainability with food sufficiency; environmentalists want a responsibility for the environment, a stewardship of our natural resources to be included; economists demand that scarce resources should be used efficiently, to benefit both present and future generations while sociologists argue that sustainability requires development and technology that is consonant with traditional cultures and institutions.

Sustainability also demands economic viability, however, which is intimately linked to political considerations such as access to land and farm size; Lyne (1990) points out that the variable costs of production may indicate that one system is more or less efficient than another, and the hourly return to labour may be more or less favourable, but unless the farm is large enough to produce a total annual income larger than the net total annual income available from outside employment, no migrant workers will be attracted back to the farm unit. While economic measures such as gross margin analysis can give valuable insights into comparative efficiency, the importance of fixed costs must not be forgotten; if a family member cannot get work elsewhere, or is tied to the rural area for other reasons such as child care, then it is valid to consider the value of re-allocating

labour from one duty to another. If, however, a choice has to be made between an off-farm job or working on the farm, then the annual income must be considered against total annual farm income. In such a case, Lyne argues, the fixed costs of farming include the loss of off-farm earnings. Fixed costs must be divided among the total number of hectares farmed; doubling the farm size from one to two hectares will halve the fixed cost per hectare. Lyne argues that farms of up to five hectares generally cannot attract semi-skilled workers back to the farm, but that once the farm unit exceeds five hectares, the economic returns become more favourable. In this regard Boserup (1970) cautions that it is often the women who are expected to carry out the extra work when larger areas are ploughed; unless extra help can be employed, women may be forced to reduce the amount of time spent on household tasks, or on social or leisure tasks. Lyne does allow for this increased burden by recognising the increasing value of leisure time as production or farm size increases.

These arguments serve to underscore the sensitivity of farm production to economic and political factors. Without commitment to addressing the problems of rural poverty by a re-allocation of resources and policies to support an affirmative action programme for small-scale farmers, change in the quality of life of rural people is not likely to be linked to agricultural development; more likely – if it does happen at all – it will be linked to industrial development, either in the urban-industrial areas or, if the example of Taiwan is followed, through a decentralised integration of the industrial and agricultural sectors (Erskine 1991). This latter case represents a possibility which integrated planning can attempt to address by strategic complementary input provision.

In his paper 'The role of investments in human capital in agriculture' (1978), Professor Finis Welch points out that farmers are averse to risk, and cannot afford to experiment much with uncertain production systems; experimentation is however, one of the main ways in which farmers gain knowledge about production. Welch points out that if improvements are widely accepted this in turn impacts upon the prices obtained in the area where they are adopted. Large-scale increases in maize production may also have the effect of saturating the local market for maize, and dropping the farm-gate price, unless a land-market can be developed which will allow farm size to increase without creating a landless class.

Lyne, Ortmann and Vink (1991) argue that the development of a land rental market would contribute substantially towards making Southern African agriculture more profitable and efficient, and thus more sustainable. They show that both the adoption of technology and the production of surpluses are positively correlated with farm size and the renting or borrowing of land.

Welch (1978) shows that education levels affect production and sales, and argues the case for the importance of such investments. Bawden (1992) points out that experiential learning links the process of 'finding out' to 'taking action': what has been found out affects what will be done, and what has been done will affect future ways of finding out.

Thus sustainability in agriculture is dependent upon adequate resources being made available to educate farmers as much as access to economically viable land units, food sufficiency and efficient use and stewardship of natural resources. Electrification, and energy in general, make up one aspect of the complex mosaic of factors which can enable rural people to break out of the cycle of poverty. Examining the efficient use of energy in agriculture will clarify the role of energy in the process of rural development.

Energy and agricultural production

Energy efficiency, expressed as the ratio of energy produced to energy used, declines as production becomes more intensive. Systems using only hand tools for cultivation typically produce five times more energy than they use; this ratio drops to about 4:1 when animal draft is brought in, and further to less than 3:1 when operations are mechanised. For intensive horticulture in the USA, twice as much

energy is used as is produced (energy efficiency ratio – 0.5:1 (Pimentel and Pimentel 1979)). Increases in production per hectare and per labour-hour must be measured against this drop in energy efficiency.

It has been estimated that almost half of the energy used by modern farmers goes into increasing yields, while most of the rest goes into reducing the need for labour. A person needs about 400 hours to prepare a hectare of maize using hand tools; Pimentel and Pimentel (1979) report that a pair of oxen can do it in 65 hours, and a 38 kW tractor takes about four hours (primary tillage). Research in South Africa (Auerbach, Nichol and Gandar 1991) indicates that in practice, given the small and scattered fields found in Nhlungwini where the research was carried out, a 38kW tractor requires five to seven hours to plough a hectare, while a team of four oxen require 10 to 30 hours (mean of 18 hours per hectare).

How should we proceed then in South Africa in the 21st Century? How can small-scale farmers be helped to become productive and escape from rural poverty without causing degradation of the resource base upon which we all depend? How can we avoid the errors which the Netherlands, the United States of America and eastern Europe have fallen into, but at the same time provide rural people with the infrastructure which will allow them to enter the market place? Finally, what is the role of the energy supply sector in this complex process? Animal draft, where it is available, can do the job as well as mechanised draft. Traditional approaches to crop rotation, soil fertilisation and water conservation also have a role. However, technology is important in reducing the drudgery associated with primary production, and it is the perception that farming is drudgery which causes many potential farmers to leave the land and seek work in urban areas, as is happening at Nhlungwini (Auerbach 1993).

If local government institutions are to empower rural communities, they must be participative and accountable, and should have some power in deciding on local development priorities, and on the allocation of available resources. In terms of agriculture, local Farmers' Associations are needed to link in forming national structures which will be able to lobby in the interests of agriculture and rural development. Empowering rural communities in practical terms means that these organisations will represent not only the commercially active farmers, but also those rural people who have hitherto lacked access to resources and have not had the benefit of an accountable public administration.

This has two main implications for energy policy: firstly, national energy policy will need to be linked to national development policy, and will need to address basic needs as well as policy instruments which aim to stimulate the economy more directly. Secondly, if local rural communities are to make informed decisions on the priorities for development and the allocation of resources at local level, a process of vision-building will be required (Auerbach 1996). A range of feasible development options will need to be presented to rural communities, as well as the likely results of various development emphases.

This study proceeds (Chapter 2) to briefly examine the need for institutional cooperation in rural development. Chapter 3 briefly reviews international experience of electrification and water provision and effects on rural development. Chapter 4 then looks at South African agriculture in more detail, examining the implications of our natural resource base (with only 14% arable and 3% irrigable land overall) and our agricultural policy (as expressed in agricultural and rural development white papers and discussion documents, and in the emergence of a Landcare movement). Chapter 5 then examines complementary inputs in more detail, giving attention to the important link between water and energy. In Chapter 6, the Nhlungwini area is described, while local expectations and the process of electrification are described in Chapter 7. Chapter 8 describes the research process in assessing post-electrification impacts, while Chapter 9 presents the results of the study. In Chapter 10, the impacts of electrification are analysed. Chapter 11 discusses the implications of a technological approach to rural electrification, in particular examining the lack of short term impact on improving the quality of life

of the poorer people. Chapter 12 summarises the main conclusions of the study, and Chapter 13 presents detailed recommendations.

2

Institutions for rural development: lessons from catchment management

In working with rural communities, those who come from outside need to be aware of the need to help develop local capacity for organised and sustained joint action at the same time as a particular aspect of infrastructural development is being implemented. A process which has been found useful is presented in Figure 3, taken from a paper on the Ntshongweni Catchment Management Programme (Auerbach 1996). Participatory action research requires that those who are intervening work together with local people at finding solutions to local problems. The process in this case started with the University of Natal's Farmer Support Group agreeing to help with a community garden fence. It then progressed to finding ways of getting resources from appropriate government agencies, to actually working with the gardeners at putting up the fence, to participatory rural appraisal, vision building and participatory land use planning. The community plan was implemented in parallel with a capacity building process which resulted in community training and establishment of EZakhiweni Farmers' Association.

Building on this process, three craft groups and two other community garden groups were able to start in the area within a year. This initiative forms part of an integrated catchment management programme, and the agricultural and craft activities are closely linked to the local school, where an Environmental Action Club has been started. Because of earlier work on building an Ntshongweni Development Forum, local people were able to negotiate with both Eskom and Umgeni Water, so that the area has electricity ('ready-boards') and water (household connections). Although there are political tensions in the area, the level of institutional organisation has enabled people to lobby for support, and to make use of the infrastructure provided. The newly elected local councillor has now been able to access funds from the local authority for development, and the organisations within the area are negotiating as to what this money should be spent on.

This particular example is fraught with problems of conflicting local interests, but what is relevant to the electrification process is that development has spawned a host of social organisations which are concerned about local issues, and are interactively negotiating about what local priorities are. This has not stopped the authorities bringing in another borehole without realising that reticulated water has been connected, and that the borehole (requested some years ago) was no longer a community priority. Someone, somewhere, put it on a list, and when it reached the top of the list, the work was carried out regardless. The borehole team arrived one day, and two days later a redundant borehole pump had been installed. Eskom no doubt also has lists and priority ratings.

Do the mechanisms exist for Eskom to consult with local communities about changing needs and priorities? How does Eskom interact with those responsible for agriculture, water, health, education and environmental planning? Is it possible for public utilities to communicate adequately among themselves and with client communities? These are key questions which need to be addressed, as the study of electrification at Nhangwini will show.

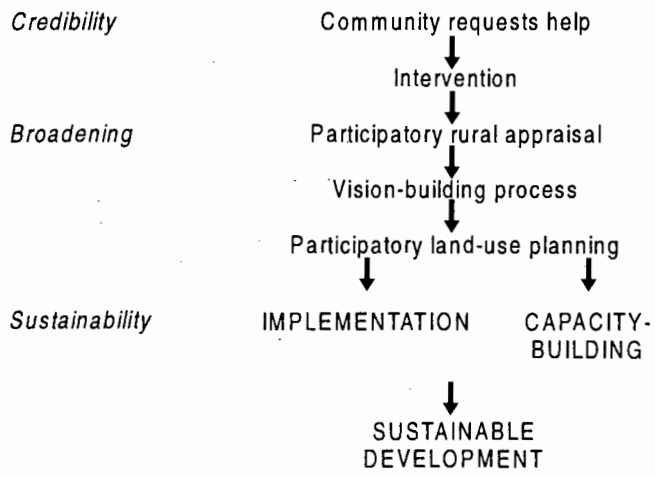


Figure 3: Model of a rural development process

3

The international context: Experiences in India and Zimbabwe, and their implications in the light of the economics of electrification

Rural electrification in India

Experiences with rural electrification in India, where two thirds of rural villages were electrified between 1960 and 1986, showed that, even where considerable irrigation potential exists to justify rural electrification economically, only the rural élites have been able to access electricity and its benefits (Byrappa 1987). The Indian government has now provided extra funding for special attention to a 'Revised minimum needs programme', where different criteria are applied to rural energy provision. In some cases (such as Kashmir), although there is little irrigation potential, widespread cottage industries mean that availability of electricity even for lighting would increase productivity through the possibility of a longer working day. Murphy (1990) has pointed out that in Nhangwini, women spend more than nine hours sleeping during the winter months, mainly because the cost of lighting using candles and paraffin is excessive. Byrappa claims that whether or not there are immediate short-term benefits, it has been found that rural areas that are electrified, developed much faster than similar areas not electrified.

On the other hand, it is not clear that electrically-powered pumping options are the most efficient (Davis, personal communication): diesel pumping can provide similar benefits, often at a lower cost. Nevertheless, Indian farmers do use electricity to a large enough extent to place considerable strain on local power supplies. In practice this means that 'brown-outs' and interrupted supplies are a common feature of Indian rural electricity supply. This in turn means that some farmers have opted to purchase diesel pumpsets as a back-up, to ensure that they are always able to irrigate. Such duplication of equipment, while not optimally cost-effective, demonstrates how important constant water supply is to farmers, and how their risk-aversion strategy concentrates on using available resources to prevent critical failures in the supply system. While some Indian farmers have been able to use electricity, domestic users have often been faced with high connection fee barriers, effectively keeping electricity out of their reach.

Zimbabwean electrification

Experience in Zimbabwe is also somewhat contradictory. Although the Zimbabwean Electrification Masterplan Report No 2 (1991) notes that electrification 'can unleash a spurt of development in productive and service activities which can lead to self-sustained growth at a rapid rate', it cautions that this is only likely to happen 'where the right preconditions and complementary factors exist'. A highly successful pilot study at Gokwe is described and the conclusion reached that, although Gokwe appeared an unattractive project in terms of economic viability and geographic isolation, the presence of water, human resources in the hinterland, public investment and political support meant that electrification could help it grow from a pre-independence small business centre of fewer than 300 people to a District Service Centre of about 9500 people in 1991. These four supportive factors may be criteria for electrification.

In contrast, Mahusekwa opted for electrification before water development, but the arrival of the grid failed to stimulate growth. The Masterplan Report argues that this is because water supplies were unreliable, the road is impassable during the rainy season and the proximity to Harare (50 km distant) means that many potential customers take their business there instead.

Although some 16% of centres in the communal or resettlement areas of Zimbabwe had grid electricity in 1991, only about 9 000 people (or 0.2% of the District

Council/ resettlement population) benefit directly from electricity. Overall, the commercial sector consumed about 68% of energy in seven of the pilot rural electrification programme centres, with 13% industrial and 19% domestic consumption. There was very little evidence of secondary development, such as irrigation schemes.

Should rural electrification be demand-driven or pushed by suppliers?

Davis and Horvei (1995), in discussing the economic analysis of energy projects, argue that it is important that 'projects be selected with due regard to the efficiency of resource allocation'. This requires that cost-benefit analyses should be carried out. In common with the Zimbabweans, however, they also point out that economic viability may depend on the presence of a sufficiently developed commercial sector in the locality. They argue that:

An adequate energy supply is likely to be a necessary but insufficient condition for economic growth in an area. Where it is absent, the potential for growth may be constrained and limited. Where it is present, opportunities are opened up for the development of a range of other options.

Davis and Horvei list the multiplier effects of electrification in terms of changes in household behaviour as: changes in real incomes (with higher or lower energy costs), induced expenditure on electrical appliances and redistribution of time allocation of household members, particularly women.

They report that the World Bank and UNIDO have experimented with an expanded system of cost-benefit analysis which incorporates the objectives of redressing poverty and of increasing the rate of savings and investment. Although it is often difficult to estimate social and economic spin-off benefits from an electrification project, and even more difficult to decide which can be attributed to the project and which to other causes, they develop some decision criteria as well as a 'social discount rate' which reflects the annual return achievable for investments. The rate for South Africa is estimated at 8%, and viability of projects could thus be measured against this rate. However, if a policy decision has been made to promote an activity such as rural electrification a much lower discount rate should be recommended for rural projects.

Davis and Horvei suggest that in many rural and informal urban settlements, water supply will often provide far greater social and health benefits than electrification. However, electrification may be linked to making water more easily available (pumping potable or irrigation water), and may also counter denudation, by providing an alternative source of energy for cooking to fuelwood, thus also freeing rural people (mainly women) to engage in productive rather than survival activities. They quote examples from Wallacedene in the Western Cape, where electrification benefits consumers, making their energy purchases cheaper. Subsidisation of capital costs (25%) was not enough, however, to make the supply of electricity viable for Eskom, and a further subsidy of 12 c/kWh is required to make the Wallacedene area financially viable in the short term. Growth in household consumption should eventually make the project financially viable.

A case study in the Eastern Cape measures benefits in terms of the willingness of consumers to pay for electricity. For Willowvale, this study estimates the price of electricity at 65 c/kWh for street lights, water pumping and commercial use, 35 c/kWh for urban domestic use and 30 c/kWh for rural customers. The Economic Internal Rate of Return for the project is estimated at 13.3%, and the project is thus considered viable economically. For the Mqanduli and Mount Fletcher studies, even using a social discount rate of 6%, they find that relocating diesel generators will not be viable. Grid electrification is marginally viable in the long term, however, more so if intangible benefits such as education, additional use of facilities after dark, improved security and better health and water supplies are taken into account (Davis & Horvei 1995).

Based on the Indian, Zimbabwean, and Cape examples, it appears that rural people are not in a position where they can sustain electrification without subsidisation in the short term. If there is real commitment to reducing rural poverty, the 'supply-pushed' approach will have to be adopted. It appears likely that in the medium term (ten to twenty years) these investments will begin to pay off, as rural economies pick up and educational investments bear fruit. Horvei and Dahl (1994) support this view in their study on 'Rural electrification in South Africa'. They conclude that '[i]ntroduction of electricity into rural society will not in itself induce economic change and incomes sufficient to pay the actual cost of the initial years of electricity consumption', adding that '[c]areful government planning must not optimise ... subsidies at the expense of other vital rural development projects.' They state, however, that '[t]he current structure of the electricity distribution industry in rural areas is an obstacle to a rapid and large-scale rural electrification effort.' They recommend that access to electricity should be subsidised (connections), not the use of electricity, although they recommend a national household electricity tariff which should be equal for urban and rural households (which means a cross-subsidy from high-consumption urban households to low consumption rural households).

4

South African agricultural development

In South Africa, the importance of allowing some local decision-making in terms of the allocation of development resources should be informed by the case of Mahusekwa in Zimbabwe, cited above, where the District Council's decision to reticulate electricity rather than water represented an ill-informed development investment strategy. A process of education and broadening the vision of local authorities will be required if they are to be expected to make well-informed decisions, but if such a process is not built into energy policy, then empowerment of local communities will remain a hollow ideal (see Chapter 2). This is not to advocate a patronising attitude to local government structures, but simply to make the point that local governments the world over make use of outside expert advisors on matters where they lack expertise. This becomes even more vital if central government has taken a strategic decision to support a 'supply-pushed' electrification option.

In rural areas, experts will have to learn how to present their insights from the perspective of the farmer, farm labourer or other rural resident, taking into account the whole system as it operates in practice, with its constraining factors and practical problems. Tackling the issue of energy in isolation from other pressing issues such as the provision of water and job creation would be pointless and counter-productive. Advocating technology, whether it be energy, agricultural or manufacturing technology, as the solution to rural development, is likely to benefit rural élites but have little if any impact on resource poor rural people. To understand why this is so requires an understanding of the nature of traditional low-input and modern high-input agricultural production systems.

Low-input versus high-input farming systems

While traditional low-input farming systems may not be very productive in terms of yield per unit of land, they are fairly efficient in energy terms, producing more energy than they consume (see Chapter 1). In comparison, high-input 'green revolution' agriculture with its high yield levels, uses large quantities of energy. If rural communities in South Africa are to be empowered, policy will need to reduce the back-breaking burden resting mainly on rural women, but it will need to avoid the trap of over-use of energy-inefficient technology. Inaccessibility to poorer people and the long-term environmental implications of green revolution technology will have to be weighed against the possible benefits of its use. Sustainable rural development will require farming systems which are more productive and less wearisome than traditional systems, but which are based on existing understanding of the local environment.

Given the history of South Africa it is hardly surprising that agricultural development has been drastically skewed in a number of directions: black citizens have been systematically deprived of title to land as well as access to land, and government policies aimed at maintaining political support in the rural areas have propped up inefficient farmers, while at the same time attempting to control the marketing of agricultural commodities through a range of control boards. These distortions have contributed to a situation where the country has perhaps three thousand good farmers (in commercial terms at least, as they produce some 40% of the total agricultural product). Another ten thousand farmers are surviving economically (producing a further 40%), while most of the rest of the white commercial farmers are in the grip of a debt crisis of frightening proportions (Huntley et al. 1989).

Only 12-14% of our 122 million hectares of land is arable, and about 3% of the total is irrigable. Rainfall in many areas is both low and unreliable, making the production of staples such as maize and wheat a hazardous undertaking in many areas. Vast areas of the country are best suited to extensive grazing of livestock, and this, in turn, has implications for the establishment of large numbers of small-

scale commercial farmers in areas where infrastructure would be very costly to provide, and where isolation and climate militate against the development of marketing opportunities for small operators.

From an energy supply perspective, this has been illustrated by the examples from Davis and Horvei (1995) quoted in Chapter 3, where even the electrification of rural towns such as Mount Fletcher and Mqanduli in the former Transkei is not economically viable in the short term. Rural economies in isolated areas suffer severe marketing disadvantages because of their location. The Zimbabwean experience at Gokwe, however, shows that if integrated infrastructural development takes place, with water, human resources in the hinterland, public investment and political support preceding electrification, dramatic economic development is sometimes possible in isolated areas, at least to the point where a market town develops to satisfy the needs of local people, for whom there is a comparative advantage because of the expense of travelling to far-off towns, where prices might be lower. These considerations are, however, linked closely to rainfall, soil and type of agriculture, as many of our isolated areas are areas where the range of options for agriculture is limited to extensive grazing, with its relatively low returns per hectare of land. In these areas, strategies for electrification should be linked to adding value to local products (processing and packing biltong, craftwork using leather or indigenous plants, eco-tourism).

In the past decades, the monetary policy of the government has inflated input prices, while food prices have been kept down by low consumer demand because of the recession. The removal of subsidies and the decrease in the political power of the rural lobby have also contributed to the worsening terms of trade experienced by commercial agriculture. Coupled with droughts and floods, this has affected red meat and summer grains particularly badly. Other commodities (especially those with substantial export markets, such as sugar, wine, deciduous and citrus fruits and some high value vegetable crops) have prospered, partly due to currency depreciation, and partly to the opening up of the export market to South African produce during recent times.

Government policies in the past allowed commercial livestock farmers to carry more stock than the land could support and, while these farmers profited from their heavy stocking rates in the good years, they were secure in the knowledge that they would receive help in times of drought. Black livestock farmers on the other hand, were harassed by a range of 'livestock reduction schemes' aimed at reducing their cattle numbers without offering any marketing support to ensure that they obtained a fair price for animals sold (Kockott 1993). Black farm labourers, too, were employed under whatever conditions white farmers wished to impose, and since farms are geographically scattered and farmers generally hostile to unionisation, this sector of the labour force is still the most underpaid, uneducated and socially fragmented of all. Access to energy for farm labourers, even though most farms (75%) are on the national grid, is only 22% (Hofmeyr 1994).

Perspectives on agriculture

These policies in this ecologically sensitive environment have led to the current situation, where most of commercial agriculture is not sustainable at present. This is true socially, economically and environmentally. While the total contribution of agriculture to the Gross Domestic Product (GDP) declined from 11% in the sixties to 4% in 1991, and food production has increased by only 0.6% per annum over the decade of the eighties, population has increased by 2.4% per annum over the same period (Bawden 1993). This has fairly dramatic implications for future agricultural policy in South Africa, and certain strategic choices will have to be made about resource allocation (Auerbach, in press). Policy can emphasise national self sufficiency, maximising food production through Goewie's 'best technological means' (see Chapter 1), while ignoring equity and environmental issues. This would involve more government subsidies for commercial farmers in order to ensure that the nation as a whole has enough food. The emphasis would be less on

land redistribution and more on helping efficient farmers to expand production. The socio-political perspective would emphasise equity issues such as household food security and access to the land. This would have cost implications for farmer support and land redistribution. If carried out efficiently, this approach would see long-term growth in food production but, in the short term, as inexperienced farmers replace experienced and established commercial farmers, food production could decrease with a corresponding rise in food prices. A third perspective is environmental conservation, emphasising long-term survival and the preservation of the nation's resource base. The emphasis would be on increasing revenue and job-creation from eco-tourism development and probably large-scale food imports. Again, long-term benefits would have to weighed against short-term costs and possible food shortages and price increases.

Reconciling these perspectives into a long-term, people-oriented approach to sustainable agriculture, means bringing more people into commercial agriculture while maintaining food-producing capacity. Such an approach to developing more sustainable farming systems must be done in a way which avoids the mistakes which Europe, Australia and the United States have made to their cost. Technology has a role to play, but local people must be left in control of their development and production options. Systems based on the needs of our thin and fragile soil skin must be developed with local people. The various perspectives are illustrated in Figure 4.

All three perspectives – production, equity and conservation – are important, but all have associated strong and weak points. Production technology is efficient, but often maximises production at the expense of people and the environment. Socially supportive approaches tend to take care of the poor, but are expensive and can result in the degradation of the resource base if they are not well-supported technically. Conservation is also expensive, and while it takes a long-term approach, it may also underplay the importance of people and the need for productivity. All three perspectives need to be taken into account in order to move towards sustainable agriculture. The national department of agriculture is attempting to do this in developing a National Landcare Programme.

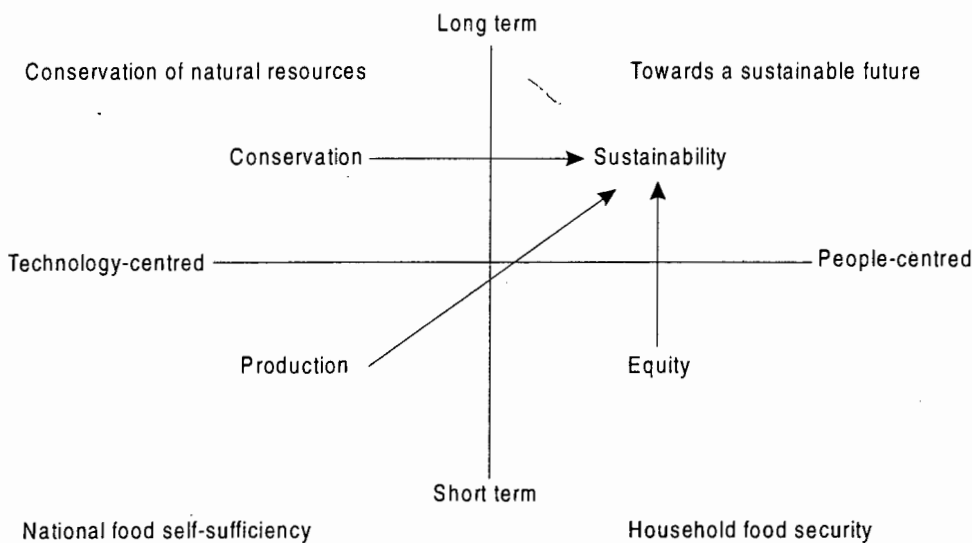


Figure 4: Perspectives on agricultural development
(Auerbach, in press)

5

The need for complementary inputs and community participation

Sustainable agriculture in the context of sustainable rural development is dependent on local ability to take joint action to access resources and manage them efficiently. For the energy sector to contribute to this process in isolation is virtually impossible.

Integrated infrastructural development, with water, support for human resources in the hinterland, public investment and political support preceding electrification, are required if economic spin offs are to lead to empowerment of resource poor rural people. Davis and Horvei (1995) comment that:

For most households, access to a clean and adequate water supply is probably more important than access to electricity. In many rural and informal urban settlements, investment in water supply would probably provide far greater social and health benefits than a similar investment in electricity.

They comment that electrical water pumping is cheaper, although Davis (personal communication) cites irregular electricity supply in India as a factor contributing to farmers still requiring diesel pumpsets even where they are connected to the grid.

Once water is supplied, Davis and Horvei point out, electrical water heating becomes possible and, if the water is cheap enough, irrigation may also be an option. Such uses can often make power reticulation economically viable when low electricity use would otherwise provide inadequate returns on capital investment.

Integrated rural development, integrated catchment management and integrated energy planning all recognise the need for a more holistic approach, and for participation of local communities in development planning. If this is to happen practically in the 'new' South Africa, local government institutions will have to develop in an appropriately responsive way. Agricultural extension has traditionally been very weak in influencing rural people, and an analysis of some of the reasons for this may inform the debate on complementary inputs and participation.

Technology transfer and agricultural extension

Although farmers will only adopt rapidly those innovations which they see as major improvements over existing methods, other factors such as cost, complexity and ease of adoption will influence the farmer's response to innovations (Bembridge 1991a). Røling (1988) points out that acceptance or rejection of an innovation is not a simple dichotomy of behaviour (accept changes or lack the resources to change). He calls this the 'transfer of technology' paradigm, and argues that extension should be a two-way process, a flow of information between the change agent and the target client. Røling argues that where innovations are appropriate and are seen to be so, traditional tribespeople adopt these to an extent 'that even the best anthropologist could not have predicted 20 years earlier'. Even the 'diffusion of innovations' paradigm, which examines the distribution of some variable that is indicative of the acceptance of change assumes that the innovation is an improvement, according to Røling. Differences between adoption categories are used to explain differences in change between them. The assumption that the innovation is beneficial is sometimes called the 'pro-innovation bias' in diffusion research.

Røling argues that extension has developed from an emphasis on technology transfer to the diffusion of innovations paradigm, and that it is now recognised that farmers are not homogeneous, and that only by recognising a range of target groups can the tendency to work only with the 'progressive elite' be countered. Extension science now accepts that the process of extension is part of a larger

system which includes farmers, researchers and policy-makers, and has begun to develop an 'agricultural information systems' paradigm. He summarises the above three approaches to extension as *do to*, *do for* and *do with*, arguing that only by asking the question 'How do I help people to achieve what they themselves want to achieve?' can small farmer projects become sustainable. However, although persuasion can be effective in changing behaviour in certain circumstances (such as advertising), Röling points out that extension is an attempt to encourage voluntary changes in behaviour. As in commercial advertising, the extensionist needs to categorise the target population and analyse the characteristics of people who make decisions about interventions. Access to resources is an important factor influencing innovativeness.

Working in the Transkei (Eastern Cape) with small-scale farmers under rainfed conditions, Bembridge (1991b) reports that, although some respondents in a survey have known about hybrid seed, stalkborer control and fertiliser for over thirty years, knowledge of these innovations has failed to 'trickle down' to less innovative farmers. While hybrid seed is used by less than half of the respondents, stalkborer control is now used by 60% and fertiliser by 88%. Bembridge cautions that new practices adopted are often not effectively implemented (too little is used). Many of the practices are not understood by those adopting them, nor is the fact that practices are inter-related understood. Weed control is largely inadequate (33% of respondents controlled weeds adequately) and very few farmers (15%) use cutworm control. Since rainfall in the Ciskei is often inadequate for reliable maize production, it is not surprising that farmers are averse to risking additional investments, and that labour is employed where it has the highest possible opportunity value (Low 1986).

Bembridge (1991b) concludes that fertilisation and weed control are the two practices most closely correlated with maize grain yield in the area studied, and that successful (and innovative) producers tend to employ family members to help with the maize production. His recommendation is that maize extension strategies should be directed towards grouping those farmers having similar resources or characteristics; in practice, this means a series of recommendation packages, rather than one blanket recommendation suited to the more 'progressive' farmer. Bembridge states that it is important to develop low-input technology for mixed cropping to improve the lot of the resource-poor small scale farmer, and to tackle the problem of inadequate labour for weed control. This can be done by providing practical information to farmers and extension workers on how to carry out various important practices; such information can best be obtained from approaches which harmonise the views of researchers, extension workers and farmers, such as the farming systems research approach.

Scientific method

The knowledge which small-scale farmers have developed over many generations is based on the farmers' understanding of the whole farming system – which consists of a complex web of human and economic activities. If it is to be useful to its clients farming systems research must respond to these activities in such a way that their interdependence is recognised. Farming systems research (FSR) represents a departure from traditional, discipline-bounded scientific research (Breen et al. 1991). In a broader context, FSR is part of a paradigm-shift, or change in approach, which is at present occurring in modern science (Kuhn 1962). In his discussion of 'The systems view of life' (1982), the physicist Fritjof Capra states:

The new vision of reality ... is based on awareness of the essential interrelatedness and interdependence of all phenomena – physical, biological, psychological, social and cultural. It transcends current disciplinary and conceptual boundaries and will be pursued within new institutions.

Indeed, physics, which traditionally was characterised by its predictable, logical, linear chains of cause and effect, has begun in the last twenty years to question the applicability of linear processes to the real world. The emergence of 'chaos theory'

as a discipline of physics which examines non-linear processes has prompted the *New York Times* Science Editor James Gleick, to write:

Where chaos begins, classical science stops. For as long as the world has had physicists inquiring into the laws of nature, it has suffered a special ignorance about disorder in the atmosphere, in the turbulent sea, in the fluctuations of wildlife populations, in the oscillations of the heart and the brain. The irregular side of nature, the discontinuous and erratic side – these have been puzzles to science, or worse, monstrosities. (1987)

In agriculture particularly, an integrated systems view of reality is often shackled by the lack of scientific tools commensurate with its complexity. This is because classical agricultural research has emphasised measurement and controlled manipulation of single variables, while FSR by its nature attempts to combine scientific rigour with an understanding of the broad context within which production takes place. Research approaches which take this whole farming system into account have developed over the past two decades, and are described as 'Farming systems research and development' (Shaner, Philipp & Schmehl 1982), 'Small farming systems research/extension' (Stilwell 1991) or simply the 'farming systems' approach (Norman, Simmons & Hays 1982).

Although much of agricultural development has taken little note of the foregoing considerations, perhaps the energy supply sector can learn from agricultural extension's failures: progress requires inputs which support the rural person holistically, so that the real constraints to production are eased or removed. In the Nhangwini community, an integrated rural development approach has been underway over the past ten years. Since electrification was one aspect of this development, the case of Nhangwini is useful in examining the practical difficulties of an IRD approach, especially where there is little commitment on the part of water and electricity suppliers to an integrated approach.

6

Nhlangwini in the context of KwaZulu/Natal and South Africa

The Nhlangwini Community Development Project (NCDP) was established jointly by the Planned Parenthood Association of South Africa (PPA) and the Institute of Natural Resources (INR) in 1987. This project aimed to address the issue of rural poverty in a practical way which would empower local people to take charge of the development process. The writer was appointed leader of this project in 1987 and initiated a cropping strategies project as part of the overall development programme (Auerbach 1988; 1993). In the course of consulting with the community and with senior agricultural officers of the KwaZulu Department of Agriculture and Forestry, development priorities and research domains were identified, using the FSR approach described in Chapter 5 (Shaner, Philipp & Schmehl 1982).

Physical resources

Location and climate

Nhlangwini ward is located near the Transkei border in southern KwaZulu/Natal, approximately 20km south-east of Highflats and 80km north-west of Port Shepstone (Figure 5). It lies between latitudes 30°00' and 30°15' east and longitudes 30°00' and 30°30' south. The ward is 7230 ha in extent, of which 18% (1303 ha) is arable. Rainfall is in the summer months of October to March and ranges from 700 mm in the valley bottoms to 1000 mm on the ridges towards Highflats. The nearest station monitored by the Institute for Soil, Climate and Water (Agricultural Research Council) is Station 1835 (E Lister), which recorded an average annual rainfall for the years 1987 to 1991 of 940 mm.

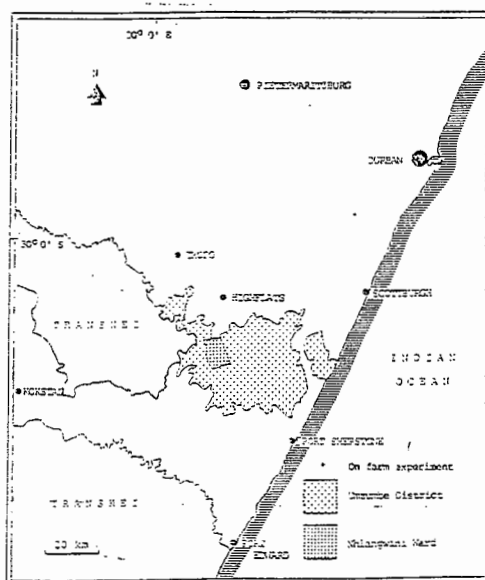


Figure 5: Location of Nhlangwini Ward in southern KwaZulu/Natal

Topography, bioclimates and soils

The topography consists of two deeply incised river valleys, the Mhlabashane and the Umzumbe (see Figure 6), which are separated by a flat-topped central ridge (Ndwebu), and flanked by a narrow eastern ridge (Nkalokazi) and a flat-topped western ridge (Pungashe). The altitude ranges from 300m to 800m above sea level. This affects the reticulation of electricity, as development and roads have tended to follow the ridges, and this has meant that reticulation of electricity is relatively straightforward. This study deals with the electrification process at Ndwebu, although Pungashe was electrified just before Ndwebu, and Nkalokazi has yet to be electrified.

Most of the study area falls into Bioclimatic Group 2 (Coast Hinterland), with some of the river valley areas being typical of the drier Riverine Lowland Bioclimate (Group 10, Phillips 1973). The Coast Hinterland is one of the four groups having the greatest production potential in KwaZulu/ Natal (Thorington-Smith, Rosenberg & McCrystal 1978; Lea 1991). Vegetation consists mainly of degraded Highland sourveld on the tops of hills, with *Aristida junciformis* predominating and Valley bushveld in the valley bottoms; the slopes are dominated by small trees and *Eragrostis plana* (Mander 1991).

The better soils in the area are mainly of the Hutton and Shortlands forms, according to the South African Binomial Soil Classification System (MacVicar et al. 1977), but there is a wide range of soils, including large areas of the shallow infertile Mispah form. The rock formations giving rise to the existing soil types are dominated by migmatite, gneiss and ultrabasics. The few occurrences of tillite, sandstone and shale (of older Table Mountain sandstone and Dwyka origins) are indicative of the highly incised nature of the terrain (Rogers 1982).

Water resources

The broken topography makes the reticulation of water from the Umzumbe and Mahlabashane rivers too expensive to be viable, but the area has many springs. These presently provide water for domestic use, although the quality of this water is poor because livestock have access to the springs (Rivett-Carnac 1990).

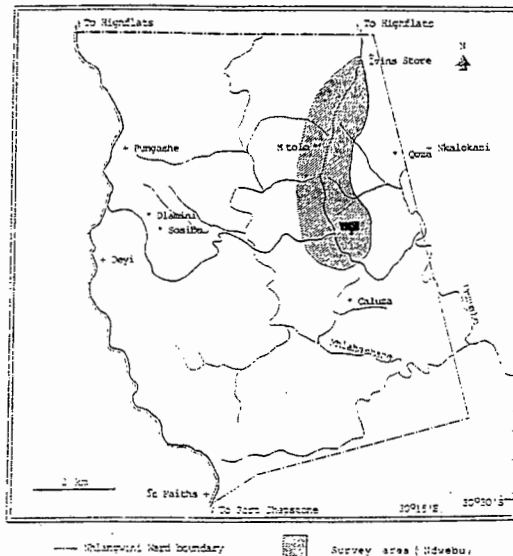


Figure 6: Nhangwini Ward

Very little spring development has been done through government agencies. The NCDP worked with local people to form Spring Committees, which attempt to protect the springs, usually using a V-box construction, with a sand percolation filter. In the past the KwaZulu Department of Agriculture and Forestry (KDA) assisted communities by supplying piping and stone for spring protection. Eight dams were constructed near community gardens on the recommendations of the Nhangwini Development Plan (Rogers 1982), but these were not being used for irrigation of the community gardens. The NCDP and KDA have completed reticulation of water from one of these dams to the Khanyisani Community Garden (Auerbach 1989).

More recently in 1994, the Nhangwini Development Committee (which grew out of the NCDP), formally requested the KDA 'to prepare a report for domestic water supply to the area of Ndwebu similar to the one that has been prepared for the Eluphenipheni Water and Sanitation Association, referred to as the Phungashe Domestic Water Supply Scheme' (Kotze 1994).

Land use and land use planning

The ward is divided into three distinct areas which follow the three ridges; Ndwebu and Pungashe are fairly densely populated while Nkwalokazi is steep and

sparsely populated. Overgrazing is a fairly serious problem throughout, and significant soil erosion has occurred on the steeper slopes.

In 1982, the 1485 households in the ward were recorded as having a residential population of 9 670 and a total population including residents and migrants, of 13 720. Of the resident population, 75% were women (Rogers 1982). The average arable land holding was thus 0.87 ha per family. Many of the families who acquired land more recently have only a residential site of 0.1-0.2 ha. Older established families have a residential site on which the homestead and some crop and gardening activities are located, as well as a field where maize, beans and taro (madumbes) are planted. In these fields the average area planted to maize is approximately one hectare. In addition, some of the women are involved with community gardens, where vegetables for home consumption and for sale are grown, often near a source of irrigation water. By 1994, the total population was 10 923. The number of households had decreased to 1 366 (Kotze 1994). It is not clear whether this represents real population shrinkage, or differing sampling methods or areas. Local people say the population has in fact increased over the past 15 years (H Dlamini, personal communication).

The Tomlinson Commission recommended in the 1950s that a class of black commercial farmers should be created by the provision of viable agricultural holdings, a process which was called 'betterment planning' (Yawitch 1981). This agricultural reform policy attracted widespread opposition, and was impossible to implement given the constraints of the Land Acts of 1913 and 1936. In practice, implementation of the policy became a compromise between facilitating planned agriculture and housing a burgeoning Bantustan population. 'Betterment planning' took place in the Nhlanguwini Ward during the 1980s and has had mixed results: while the concentration of human settlement on the ridges has facilitated the provision of services, considerable resentment has been engendered by the enforced relocation of households. Although compensation has been paid, some people are not happy with the amounts received.

The main recommendations of the Nhlanguwini betterment plan were that springs close to the proposed residential areas should be developed and that a rotational grazing system should be established; it was also recommended that existing residential sites of 0.06 ha should be enlarged to 0.25 ha to enable families to produce vegetables 'the reason being that not every kraal [homestead] will be allocated land in the designated arable blocks, simply because of the shortage of arable land' (Rogers 1982).

Pungashe, Deyi and Ndwebu were identified as growth points; spring development and demarcation of residential plots were to commence in these areas. All steep land was to be restricted to grazing only, with attempts to reduce the number of animals to an acceptable level (approximately a third of the existing number) through a stock reduction programme. Contour banks and woodlots were to be established by government, while a rugged area of some 600 ha was demarcated as a 'forestry reserve'. It was recommended that livestock sale pens be established to encourage the community to sell cattle.

As has been mentioned, the lands were contoured, and sites have been demarcated, although not always of the size recommended. This process has resulted in some active farmers losing part of their land, and has thus probably had exactly the opposite effect of that intended by the Tomlinson Commission. Attempts have been made by KDA to introduce a system of grazing management. One gum woodlot was established.

Institutional resources

During 1987, Colvin and Meyiwa spoke to some of the business and professional people in the area in an attempt to identify and describe local community organisations, services, businesses and farming activities (Colvin 1987). This rapid rural appraisal provided background information for NCDP.

The main findings of Colvin and Meyiwa were that considerable in-migration of people evicted from neighbouring white farms was occurring, but that this did not seem to be causing problems; that betterment planning was considered to have brought advantages through provision of roads, dams, fencing and convenient location of homesteads. Disadvantages included, as mentioned, inadequate compensation, uprooting of communities, dense settlement, small residential plots and reduced security in far-off fields.

A wide variety of voluntary organisations were identified, but no full-time commercial farmers and very few businesses were found. This was ascribed largely to the demographic profile of the area (60% of residents are below 17 years of age), and to the high level of dependence on remittances from migrant labour. With one exception, entrepreneurs had not made use of financial assistance from the KwaZulu Finance Corporation or other financial institutions.

Colvin's report recommended strengthening interest groups, improving communication and facilitating access to outside resources, and mentioned the 'tremendous scope for significant increases in the production of vegetables and cereals' (Colvin 1987). The need for broadening the institutional base of the area, especially by developing the Ndwebu area, was mentioned, while the Pungashe area was identified as the logical institutional 'growth node'.

There is a permanent clinic at Pungashe, and mobile clinics visit the Tribal Court at Ndwebu and Ivins Store just north of Ndwebu. There are two high schools at Pungashe and one at Ndwebu, as well as several primary schools in the area. A magistrate's court, police station and circuit inspector's office are located at Pungashe. The KwaZulu Finance and Investment Company set up a small scale business hall near Pungashe in about 1990.

Human resources

Dlamini (1990) examined the personal, psycho-social and economic characteristics of people living at Ndwebu, including schooling and literacy. Table 1 shows that over 50% of respondents and their spouses had completed less than four years of schooling and that, altogether, 70% had six years or less of schooling.

<i>Schooling</i>	<i>Respondents</i>	<i>Spouses</i>
0 – 4 years	57.5	50.0
5 – 6 years	12.5	20.0
7 – 8 years	17.5	20.0
9 – 10 years	10.0	2.5
> 10 years	2.5	2.5

Table 1: Education levels (%) of heads of households and their spouses
(after Dlamini 1990) [*n* = 40 (spouses total = 95%)]

In following up enrolment patterns and drop-out rates in South African schools, Dr Franz Auerbach (1978) found that although four years of schooling is generally accepted as a level beyond which functional literacy and numeracy can be expected, the poor quality of primary school education in southern Africa often results in six years of schooling being required to reach this level. This would mean that the literacy rate at Nhlanguini is likely to be in the order of 30–40%. However, as Table 2 indicates, Dlamini found that 62.5% of respondents claimed to be able to read Zulu, while only 20% said that they could not read at all. Dlamini defines literacy as the degree to which an individual possesses mastery over symbols in their written form, and comments that literacy enables a farmer to gain direct exposure to the print media. He concludes that 17.5% of respondents are potentially 'highly progressive' farmers, as they can read both Zulu and English.

Dlamini established that 82.5% of the de facto heads of households were women, that the population was fairly cosmopolitan (with all respondents having previously visited the nearest town, and 82.5% having visited Durban, 200km

away), and that most respondents wanted their children to become teachers or nurses, while agriculture and agricultural extension were not seen as desirable careers.

The fact that 75% of the resident population of the area are women (Rogers 1982) is largely the result of the Nationalist Party government's migrant labour system, which allowed only those members of the family who had jobs to move to the cities, and refused to grant them permanent resident status even then (Yawitch 1981). This means that much of the agriculture is carried out by the women, or by older men.

<i>Literacy</i>	<i>Language</i>		
	<i>Zulu</i>	<i>English</i>	<i>Afrikaans</i>
Could read	62.5	17.5	5.0
Read a little	17.5	22.5	15.0
Could not read	20.0	60.0	80.0

Table 2: Literacy rates (%) of heads of households at Nhangwini
(after Dlamini 1990) [*n* = 40]

Murphy undertook a study at Nhangwini as part of a broader INR 'Gender, agricultural production and rural service provision' programme (1990). She worked closely with NCDP staff, providing input into geographical, environmental and socio-economic aspects of the area, and helping to engage the local community in the process of problem identification and the design of development strategies. She subsequently took over NCDP leadership from the writer in 1992. Murphy aimed to develop implementable, sustainable strategies for upgrading living standards in a way which would accommodate the particular needs of women. Her methods included direct observation over a period of three months during which she lived in the area, key informant interviews, informal group discussions, use of contradictory paired statements, and surveys of farming practices, housing and time-use, the latter in co-operation with the Department of Dietetics and Home Economics, University of Natal (Green 1992).

Murphy's survey was carried out in the Ndwebu area. Her sample was selected by including all of the farmers who were known to be attempting to improve their agricultural production, and a random sample of other farmers. A similar sample was later used by Dlamini (1990) and Auerbach (1993). Murphy found that the work which women at Ndwebu do comprises survival tasks, household tasks and income generation. Survival tasks include subsistence cropping, fetching water and wood and manufacturing for home use and health care, while household tasks include the activities involved in maintaining a home (cleaning, washing, food preparation, storage and cooking). Income generation tends to contribute directly to the family budget.

Nhangwini women appear to be almost fully employed in survival and household tasks, having very little time for personal development or social interaction (other than that directly associated with the performance of essential tasks). On average women spent 9.5 hours sleeping, 7.0 hours on survival tasks (including subsistence farming), 6.25 hours on household tasks and only 1.25 hours on social and personal activities. The relatively large proportion of time spent sleeping is probably partly due to the fact that the survey was carried out in winter (July 1988), and partly to the high cost of providing lighting, using candles and paraffin.

The effects of women's 'triple workload' (domestic labour, subsistence farming and income generation) is expressed in some statements made by women in the study area: 'men will not cook or fetch water as this is a woman's job'; 'a man that does not have a woman does not know that women never rest - they are always doing work for the household'; and 'women have strength but they have much to do - it makes them old and tired' (Murphy 1990).

Murphy found that growing food crops, caring for children, fetching water, shopping and health care are survival tasks involving nearly all women but very

few men. As money for buying food is not available, food must be produced, but it is difficult for women to free themselves from survival tasks to attend courses, especially if these are held away from home or over prolonged periods. The physically demanding nature of fetching wood and water and of weeding crops, and the amount of time taken by these activities means there is little spare time or energy for any other activities.

Income-generating activities actually undertaken include craftwork, selling of secondhand clothes and food, and fortune-telling. One teacher and one cleaner were also included in the sample. Three-quarters of the women in the farming survey sell some of their agricultural produce, but this is mostly only very small quantities which are surplus to family requirements. The exception is the sale of poultry, which is an important source of income for a number of Nhlangwini women. Women acknowledge the marginal nature of their income-generating activities, and wish to gain skills concerning 'anything we can do with our hands to make money'. Less than half (41%) of the women interviewed had previously been in waged employment, while all of the men interviewed had previously been employed. There was evidence of more personal contact between men and agricultural officers than was the case with women, and although agricultural officers do work closely with community gardens, those not involved with the gardens see very little of the officers.

While Murphy points out that 'the only way women can gain access to land is through their relationship with men', it could also be said that men cannot gain access to land without women, as land is allocated to families with children. The tribal authorities are all-male, however, and, although it is possible in theory, Murphy found no cases where women had been granted land in the Umzumbe District. Access to capital was also very limited. Women are aware of these gender constraints; using contradictory paired statements, Murphy found that 63% of women felt that 'Times have changed. Women should no longer accept that they have to serve the needs of men', while only 37% felt that 'Women have always served the needs of men and should continue to do so'. Although very confident of their capabilities in the private sphere of their homes, the majority felt that women should not become part of the public tribal authority structure. This was not because of lack of capability, but rather because of the attitude of men ('men will not like to discuss things with a woman', 'men do not like women to be in charge') or because of lack of qualities required for tribal leadership ('women do not have the power to make people listen to them and to be afraid of them'). Overall, there was a desire for complementary work roles, and an acceptance of traditional gender roles. In order to cope with the work load, children helped the women extensively, especially with water and firewood collection. Most women (82%) were involved with community gardens, while 16% hired additional private land for growing maize, beans and potatoes. Poultry farming is a very popular agricultural pursuit (98% of women interviewed).

Murphy suggests the following strategies for easing gender constraints on women: water development, establishment of woodlots, communal laundry facilities, creches, improved clinic facilities, training (flexible to fit in with women's time-constraints) and improving access to credit for women.

Farming systems research at Nhlangwini

Identification of development priorities

The NCDP aimed to combine primary health and family planning considerations with other aspects of integrated rural development. Initially, while INR built up an understanding of the community dynamics in the area, PPA trained fourteen abasizi (primary health workers – literally 'helpers').

These women then started to work with their local communities, while INR's agricultural facilitator (Mr H B Dlamini) began to consult with, organise and advise local farmers. Part of the consultation with the community involved a series of workshops where the community was asked to identify local resources by taking

an imaginary flight over the area, and drawing what they saw which was useful to them. After this, they were asked to list what they would like to see in the area five years later (Auerbach 1991). The writer and Michelle Friedman, a rural sociologist, planned and carried out these activities in conjunction with PPA's training officer, Mr M A Hadebe, Mr Dlamini and the twelve abasizi. The exercise provided an opportunity for local people to comment on which resources were useful to them, and the methodology used made literacy unnecessary. Similar participatory rural appraisal techniques are now widely used in several developing countries (Mascarenhas & Pretty 1991). The results of the exercise were descriptions of local problems (Auerbach 1990; Friedman 1989; Friedman & Hambridge 1991).

Several exercises were carried out to assess felt needs (Auerbach 1991). It was clear that the main problems which the local women experienced revolved around the supply of domestic water; it was also apparent that one of the great needs was for the development of local management capacity, although this was not articulated. Agricultural needs came about seventh on the list behind water and other important requirements of rural life. The following were listed as prioritised needs:

- water
- roads
- schools
- clinics
- creches
- firewood
- agriculture

The project was subsequently organised around the idea of building management capacity through the establishment of water committees, and training local people to help with the protection of springs. Primary health care (including family planning education) was carried out by fourteen local women who had received in-place training through the Planned Parenthood Association of South Africa, who were partners in the project. The training included health care, oral rehydration, first aid, contraception, nutrition and vegetable production. The emphasis was on encouraging local ownership of the project, with the understanding that the Institute of Natural Resources would eventually play only a facilitating role in the area's development. It became apparent that the leadership of the project required a person whose primary focus was organisational development rather than agriculture. Activities were reorganised into three projects: Infrastructure development needs were addressed by NCDP, while the need for fuelwood was dealt with by the Agroforestry project and the Biomass Initiative. The Cropping Strategies project looked at farming systems.

With regard to agricultural development, the programme built upon initial work done by the facilitator, Mr H B Dlamini, who visited farmers at Nhlangwini and carried out inventory surveys for each farmer visited. In terms of livestock, great interest was shown in poultry production. The other common requests were for better input supply, access to advice, help with irrigation, and marketing facilities. Access to land, financial assistance and help with fruit trees were also mentioned.

Electrification request

Some months after the initial needs assessment, Mr Mzwamandla Dlamini approached Raymond with a request to help access electricity so that he could pump water from the river to his farm. Raymond responded that if Mr Dlamini could organise a group of people interested in electrification, a visit from Eskom's marketing man would be arranged, to discuss the possibilities of bringing electricity to the area. Local expectations and the process of electrification are discussed in Chapter 7. Raymond also surveyed the proposed water pumping scheme, and found that the distance (over 2km) and the altitude difference between the water source and Mr Dlamini's fields (over 200m) made the proposed pumping scheme uneconomical.

7

Local expectations and the Nhangwini electrification process

At several meetings of the Nhangwini Community Development Project (NCDP) during 1988, local residents mentioned three sets of energy-related problems (Auerbach, McIntosh and Breen 1988): need for electrification, need for firewood and the need for diesel to be supplied in bulk. The need for firewood and bulk diesel is very relevant to rural energy supply strategies, and was dealt with extensively (along with animal draft problems) in the EPRET paper by Auerbach and Gandar (1994). The issues are summarised below.

Firstly, the discussions made it clear that the poorer people were dependent on fuelwood and cow manure for cooking and heating. The wealthier residents purchased paraffin or gas. People complained that many of them had made representations to Eskom during 1986 and 1987, but that there had been no response to these. The scarcity of firewood since the nearby Natal Trust farms had been converted from timber to sugar cane was pointed out, and the hardship which people suffered through the fact that the only wood now available had to be transported from far away at great cost. Eventually, Raymond Auerbach and Herman Dlamini (the local NCDP agricultural facilitator) set up a meeting between a group of local residents and a representative from Eskom's Marketing Division in Pietermaritzburg (Mr Bolton) which took place on 17 September 1988.

After pointing out to the community that if all they required was a light, a cooking plate and a television, they would be far better off purchasing a good paraffin lamp, a two-plate gas cooker and a battery-powered television or radio, the Eskom representative gave the following details (NCDP 3rd Quarter Report, Auerbach 1988): Only 'D' tariff power can be supplied (Raymond Auerbach subsequently appealed in vain to higher levels of Eskom staff to put in ready-boards, some of which had just been approved for our sister Institute of Natural Resources project at Biyela in Zululand). The supply could be single-phase (16 kva) or three-phase (25 kva). In both cases, premises would have to be wired by an Eskom-registered wireman to Eskom's satisfaction. A deposit of R720 would have to be paid on signature of contract. A connection fee of R200 would be payable before power was connected.

Before Eskom would agree to proceed, at least one customer per two kilometres of line should have signed a contract and paid a deposit. At least seven customers would thus be required for the 14 km of line involved. After this, it would take two years to design the system, survey and construct the lines, inspect installations and finally connect them to the grid. Mr Bolton arranged to meet with prospective customers in order to sign contracts and collect deposits on 7 December 1988, but he refused to collect any cash, because of the security risk.

Once it had become clear that Eskom would only deal with those who could afford a 'D'-tariff installation, most of the poorer people stopped coming to electrification interest group meetings. The whole focus shifted, and within the wealthier group, most of whom eventually paid deposits and connection fees, several reasons were given for wanting electrification (apart from most of the people wanting electric light, television, radio, etc.). These are shown in Table 3. These aspirations mainly came from three farmers and three shopkeepers, except that the poultry and sewing machine plans were from three women, all of whom were primary health care workers for NCDP.

Table 3: Potential uses of electricity at Nhangwini
(Auerbach, McIntosh & Breen 1988)

<i>Use</i>	<i>No</i>	<i>Use</i>	<i>No</i>	<i>Use</i>	<i>No</i>
Pumping water:	3	Milling maize:	2	Refrigeration:	3
Welding:	2	Workshop tools:	1		
Poultry production:	2	Sewing machine	2		

At the December meeting, nine deposits were paid, and contracts signed. Raymond Auerbach took the money to the Eskom offices at Ixopo, where they were receipted. Herman Dlamini then distributed receipts to the local people. Two years later power was connected to the original nine customers plus one additional customer. Since then, an additional nine customers have been connected to the grid, three of these in 1996, including Elwazi High School. Ten local households still use generator sets, but most of these say they are awaiting grid connection (some say that they have been waiting for several years).

It is hoped that changes in Eskom's policy mean that the poorer people would no longer be excluded in future electrification processes, especially in areas of such dense settlement. However, although Mr Bolton did give a presentation on integrated energy planning, this was almost equivalent to an apology to the poorer people that they would not be able to benefit from 'D' tariff electrification. If any consultation with water or other planning authorities took place, it was certainly not relayed to NCDP staff. Almost no consumer education took place, and advice on entrepreneurial development possibilities was not offered.

8 Methodology

Raymond Auerbach was asked to revisit the area late in 1996 to assess the impact on agriculture of electrification (see Research Proposal, Appendix 1). He was able to enlist the help of several former Institute of Natural Resources staff members who had been involved with the Nhlungwini community during the process of electrification: Tessa Cousins (organisational development facilitator), Herman Dlamini (agricultural facilitator) and Nombulela Khumalo (development facilitator). Herman and Nombulelo are employed by the Nhlungwini Development Committee which grew out of the Nhlungwini Community Development Programme. Sikhumbuzo Gumede, a geographer with experience in surveying communities in Zululand for an electrification study, also helped with the survey.

The methods used were a semi-structured interview process followed by a participatory rural appraisal exercise (Mascarenhas & Pretty 1991). The interviewing schedules are given in Appendix 2. An attempt was made to interview all Ndwebu residents who had access to electricity, whether through Eskom or through generator sets. In addition, a group of low-income households which Nombulelo had been working with was chosen as being representative of those who could not gain access to electricity.

The interviewing process was designed by Tessa Cousins and the team. Each item on the questionnaire was put to the household, with as many people present as possible. Coloured cards of various sizes were used to indicate importance. If, for instance electricity was used a great deal for lighting, a large card was used. If it was used only a little for cooking, a small card was used. So, each use of electricity was allocated a white card according to its importance. Next to each, a new coloured card was used to record the answer to the question 'What did you use before?' Blue cards were used to record other energy sources and their importance (paraffin, gas, firewood, etc). Then orange cards were used to answer the question 'Do you use anything else now?'

This was followed by a listing of the main benefits and problems, trying to find out to whom in the household each problem applied. Other beneficiaries (or victims) were then identified, as well as what had changed in the household and how and for whom. Monthly spending on electricity was recorded. Other ways of making electricity useful to the household were investigated as well as ways of making electricity more useful to the community in general. Water was then discussed, (where it comes from, its links to electricity); and finally, agricultural issues were probed. A similar process was used for those without electricity.

The planned process for the participatory appraisal is set out in Appendix 3. This exercise had the dual aim of finding out with the people what the history of electrification had been in the area, and helping them to formulate their future interaction with Eskom. We planned to report back on our findings and workshop the next steps with the community, since a meeting between the community and Eskom was planned for the following week.

9

Results of the research process

Appendices 4, 5 and 6 summarise the comments and discussions with respondents concerning their attitudes towards electrification (being Eskom-electrified, generator-electrified and non-electrified homesteads respectively). Of the thirty-four respondents interviewed, ten are presented as Eskom-electrified homesteads. Three of these also owned stores. Respondent 1a refers to the homestead and 1b to the store, while respondents 7 and 18 did not have separated data for homestead and store. Respondent 34 is the one school in the area which has been electrified. The stores and school are discussed after the section on Eskom-electrified homesteads.

Eskom-electrified homesteads (n = 11 - 1 = 10)

Table 4 presents the results of the survey into energy use of households, stores and a school which had been electrified by Eskom. Of the total of eleven respondents, one (R9) was connected to a three-phase supply, and then decided not to wire his premises – his intention was to install an electric maize mill, but he cannot yet afford this. He has thus been included in the 'generator' section. He pays his monthly line-charge only. His wife is not pleased! His responses have been included under the generator electrified homesteads. Five out of the remaining ten respondents with Eskom power own no vehicle at all. The other five own three tractors, three motor cars, six bakkies (light delivery vehicles) and three trucks between them.

All households have electric radio, television and lighting. All bar one have an electric iron. All have fridges, but three have not yet changed over from gas, and the bottle store owner only has a fridge in her shop. Eight have electric stoves (one has a microwave only), while the other three are still using gas. Five have kettles. Seven have electric space heaters (two have gas, one has no heater other than firewood). Six have electric fans, three have welders, one has a hammermill. Two have hairdryers. Two have video recording machines. Only one respondent has a (petrol) water pump. There are no computers, geysers, or air conditioners. Surprisingly, there are no power tools, but one person has a hair clipper, one has a vacuum cleaner and one has a toaster.

One household (that of a retired senior agricultural officer and his highly competent farmer wife – R7) has installed an electric hammermill. They run two trucks, two bakkies, two cars and a tractor, and his farm is highly productive, including crops, cattle, a wattle plantation and a small store selling farm produce as well as bought in goods. One of the sons also studied agriculture at Fort Hare University.

Eskom electrified schools and businesses (n = 1 + 3 = 4)

Table 4 also includes a school (R34) and three businesses (R1a, R7 and R18). Respondent 16 runs a minibus taxi. The school has no vehicle; the businesses all have bakkies, and two of them have trucks. Respondent 7 (who is also a commercial farmer) also has a tractor. The school uses electricity for lighting and a kettle only, but hopes to acquire a range of educational electrical appliances, such as video cassette recorders, slide projectors, overhead projectors, etc. The bottle store has a fridge, radio, television, electric lights, a kettle and a heater, as well as an electronic cash register. Two other businesses are included with household surveys (R7 and R18).

Table 4 Summary survey data for houses electrified by Eskom

Reference	1a	1b	2	7	14	16	18	20	22	23	31	34
Metre read per phase 3/11/96	32117	1+17+2526	2580	2121+8518+22170	19312	0+627+30691	35388	1295	1202	86663	873	847
Date of elec	90	90	94	90	90	90	90	96	91	90	96	96
Radio	E	E	E	E	E	E	E	E	E	E	E	
Television	E	E	E	E	E	E	E	E	E	E		
Lighting	E	E	E	E	E	E	E	E	E	E	E	E
Freezer/Refrigerator	E	g	g	E	E	E	E	E	E	E	g	
Stove	E		E	E	g	E	E	E+mic	E	E	-	
Kettle	E	E	E	F	g	F	F	F	E	E	E	E
Water heat										F		
Space heat	E	E	E	E	E	E	E			E	g	
Iron	E		E	E	E	F	E	F	E	E	E	
Water pump	Petrol											
Computer												
Cash regist		E										
Welder				E		g						
Power tools												
Hammermill				E								
Sundry eqpt									T			
Hairdryer	E				E							
Fan	E			E	E				E	E	E	
Video				E	E							
Vacuum cl					E							
Tractor				*		*				*		
Motorcar				**		*						
Bakkie	*	*		**		*	*			*		
Truck				**		*						

E = electricity; B = batteries; Gen = generator set; g = gas; F = firewood; C = candles; P = paraffin; Vacuum cl=cleaner; mic=microwave; T = toaster; *=1 vehicle.

They listed the hammermill, lights and stove as the most important appliances, followed by TV, refrigerators, iron and welding machine. Respondent 18 has a refrigerator in the shebeen, security lights outside and television. Most important to him are TV, radio, refrigerators, lighting and the stove. Of two other general dealers in the area which were not included in the survey, one is known to be electrified with electric cash registers, refrigerators and lighting, while the other was wired at least twelve years ago, and a three-phase transformer installed, but the power here was also never connected, and paraffin refrigeration and lighting are still used.

Respondents 1a, 7, 16, 18 and 23 have all used over 30 000 kWh of electricity. All of these have electric stoves, refrigerators and space heaters. Respondent 23, who has used by far the greatest amount of power (86 663 kWh), only purchased a stove in 1993, and it is not at all clear where the power has been used. It has been assumed throughout that metres were installed with a zero reading. Eight out of the eleven Eskom-electrified homesteads have electric stoves.

Generator-set-electrified homesteads ($n = 6 + 1 = 7$)

Only one respondent owns no vehicle at all (see Table 5). One (R9 – the unused electricity situation) owns two tractors, two trucks and a bakkie; he is also a highly productive farmer, with the only bulk diesel tank in the area. One owns a tractor, a car and a truck, one more owns a tractor only, and the other three a bakkie only. The high ownership figure is not surprising, considering that bulk fuel is not readily available, as the petrol companies are very reluctant to enter into contracts with rural people. The farmer who has bulk diesel only has it because Raymond Auerbach spent six months pestering BP petrol company until they gave it to him. This means that the others need transport to fetch fuel (see Auerbach et al. 1993).

All respondents have radio and television, but only two radios and four TVs are run off the generator. Three generate power for lighting, the rest all use candles and paraffin. All have fridges, mostly fuelled by gas. Six out of seven use gas for cooking (some in combination with paraffin and or firewood). Two use the generator and three use gas for ironing, the other two still use a flat-iron on the fire. One respondent uses the generator for welding and power tools (drill and grinder), and also has an oxy-acetylene cutting and welding torch, one other runs a drill and grinder. The only other generator-driven appliances identified were one hairclipper and one fan.

Table 5: Summary data for houses electrified by generator sets

Reference	3	4	5	6	9	11	21	27	30	32
Date of electrification	Gen	Gen	Gen	Gen	Elec 92 Gen 91	Gen 94	Gen	Gen 93	Gen 94	Gen 93
Radio	Gen	B	B	B	B	B	B	B	Gen	B
Television	Gen	B	B	B	B	B	B	Gen	Gen	Gen
Lighting	Gen	C/P	C	C	C/P	C/P	C/P	C/P	Gen	Gen
Fridge/ freez	Gen		g		g	g	Gen	g	Gen	g
Stove	g	gPF	F(g)	CFg	F/g	F/P	gP	gPF	g	g
Kettle	Gen	P	F	F/g	F/g	F	E/g	g	F	Gen
Water Heat					F/g	F	g/P	gPF		
Space Heat			F		F	F		F	Gen	Gen
Iron	g	F	F	F	F	F	F/E	g	Gen	Gen
Water pump										
Computer										
Cash regist										
Welder					Gen					Torch
Power tools	Gen									Gen
Hammermill					Tr					
Hairclippers									Gen	
Hairdryer										
Fan									Gen	
Video										
Tractor	*		*		**	*				
Motorcar	*									
Bakkie					*		*		*	*
Truck	*				**					

E = electricity; B = batteries; Gen = generator set; g = gas; F = firewood; C = candles; P = paraffin; Tr = tractor

Non-electrified homesteads (n = 15)

The fifteen respondents between them have one tractor, a motor-car and two mini-buses (both owned by one respondent), as well as 2 bakkies and a truck (see Table 6). All have radios (battery-powered); there are nine battery-powered televisions (one not working) and one electric TV – this woman has been waiting to be connected for two years. She also has a fridge and a stove, as well as the only electric geyser in the district, all ready and waiting!

All use candles for lighting, though six also use paraffin; water heating is all done with fuelwood. Cooking is complex: two respondents have gas stoves, two have wood stoves, one has a coal stove and one, as mentioned, has an electric stove-in-waiting. Of the fifteen, one uses gas only, one paraffin only and two fuelwood only. Three use fuelwood and paraffin, five fuelwood and gas and the other three use fuelwood, paraffin and gas depending on circumstances. Ironing is mainly using a flat iron heated on a fuelwood fire (13); one uses gas to heat the iron, and one sometimes fuelwood and sometimes paraffin. At least four of the women have hand-operated sewing machines.

Perceptions of local people regarding electrification

(The planned process for the participatory appraisal is given in Appendix 3. Summaries of the interview records are given in Appendices 4, 5 and 6, while the actual participatory appraisal exercise is described in Appendix 7).

The perceptions of local people can be summarised under four headings:

1. When Eskom comes to us all, life will be easy and productive.
2. Electricity will somehow be associated with water supply.
3. Eskom and others treated us badly and misinformed us.
4. We want the card system, when is it coming?

1 When Eskom comes to us all, life will be easy and productive.

Almost all of the people interviewed were very positive about what can be done with electricity, about the fact that it is convenient, clean and efficient. Although it costs money, most respondents felt that it represents good value. There is a general fearfulness about using too much and then not being able to pay, and having the power cut off, with the resulting extra expense of re-connection charges. Some people are aware of the fact that the card system cannot supply power for major installations. Tessa Cousins says in her debriefing report:

It is clear that the energy strategies are to use multiple sources (wood, paraffin, gas, electricity, candles, batteries) – and people are carefully balancing cost with convenience. We [Tessa and Nombulelo] only saw one really poor household – and that was the only one that used only one source – the cheapest, which is paraffin. Wood involves quite a high cost, for most people monetary. Only one person reported that they still collect wood, and that was because her mentally handicapped daughter did it. The paraffin-only household did not only have very little money but did not have a kitchen building – which is necessary if wood is to be used.

Table 6 Summary of survey data for houses with no electricity

Reference	8	10	12	13	15	17	19	24	25	26	28	29
Date electrified	x	x	x	x	x	x	x	x	x	x	x	x
Radio	B	B	B	B	B	B	B	B	B	B	B	B
Television		E		B	B		B		B	B		B
Lighting	C	C	C	C/P	C/P	C	C/P	C/P	C/P	C	C	C
Fridge/freez	g	E					g	g	g			g
Stove	F/g	EFP	F/P	F	gPF	P	F/g	g	F	gPF	F/P	F/g
Kettle	F	F	F	F	F	P	F	g	F/P	F/P	F/P	g
Water heat		g/P	F	F	F	P	F		F/P			F/P
Space heat				F	F				F			
Iron	F	F	F	F	F	F	F	g	F	F	F/P	F
Water pump												
Computer												
Cash regist												
Welder												
Power tools												
Hammermill												
Sundry		sew	sew				sew		sew			
Hairdryer												
Fan												
Video												
Tractor												
Motorcar				*			** 2 taxis					
Bakkie		*		*								
Truck		*										

E = electricity; B = batteries; Gen = generator set; g = gas; F = firewood; C = candles; P = paraffin

This is in direct contrast to the pre-electrification perception reported in Chapter 7, which saw fuelwood as the cheapest source of fuel but pointed out that since the Trust Farms had gone out of timber production it was becoming more expensive. Most people still use fuelwood, but they no longer collect it locally. The rising cost of wood was already reflected in 1987 when locals told Raymond that their development priorities were water and fuelwood, ahead of creches, clinics, schools, roads-and-agriculture-(Auerbach-1993).-Subsequently some woodlot development did take place, but on a very limited scale. Most people have to pay between R500 and R2000 for one to three loads of wood per year. Although Tessa and Nombulelo report only one wood gatherer, Sikhumbuzo and Herman came across several.

This agrees with Wendy Annecke's findings (1993) in informal settlements around Durban, which show that especially poorer women purchase small quantities of relatively expensive fuel according to their daily income. She found that the cost of fuel was an important but not a determining factor in decisions made about food, and she comments that: 'However much the ten women disliked paraffin, it is doubtful whether, under their circumstances, they would be able to afford unsubsidised electricity or appliances'.

Tessa continues:

While most of the people reported not having clear information from Eskom on costs of electricity, their sources of information were relatives in the city.

This seemed quite a reliable source actually – i.e. other users! Looking at what they report spending on fuel presently and what they say they would have available for electricity, it seems quite realistic, and that in fact electricity would be a saving in terms of both direct costs and time for many, and time is not an abundant resource. What was unexpected to me was the value people placed on having electricity in order to make their homes and community a place their children, and young people, would want to visit and live in.

This certainly seemed to be reflected in many of the comments, and in the participatory appraisal (see Appendix 7).

2 Electricity will somehow be associated with water supply.

There is a lot of confusion on water pumping and water supply in general, and Tessa comments:

On talking of agriculture people almost invariably connected it to provision of water and saw the big potential use being for irrigation. It was not a thought through thing, where that quantity of water would come from, costs and returns etc. – seemed to come more from the experience of dependence on uncertain rain being the big constraint to more productivity.

Several promises have also been made by Umgeni Water, KwaZulu/Natal Province and engineers who recently completed a water feasibility study for the then KwaZulu Department of Agriculture and Forestry (Kotze 1994). The study was carried out in response to a formal request from the Nhlanguwini Development Committee (for which Herman and Nombulelo now both work). The NDC Water Subcommittee requested the KDA to 'prepare a report for domestic water supply to the area of Ndwebu similar to the one that has been prepared for the Eluphepeni Water and Sanitation Association referred to as the Phungashe Domestic Water Supply Scheme'. The engineering firm Willcocks, Reed and Kotze was commissioned on 29 August 1994 to 'conduct the necessary planning of the scheme'.

Their report (Kotze 1994) gives demographic details made available by Herman Dlamini showing that the current population of Ndwebu is about 10 900, made up of 1 366 households (average eight per household). They comment that water is desperately needed by the local people, and recommend that either the Mzumbe or the Mhlabatshane Rivers should be used to pump water to the community. Neighbouring Phungashe (with 8 000 people) has also recently been electrified, and is also seeking a water supply scheme, and the engineers recommend that if possible the stronger Mzumbe River should be used for both communities (Phungashe had planned to use the Mhlabatshane River, which has only just enough water for the present population of Phungashe). By the year 2010, however, even the stronger Mzumbe River will probably not be able to cope with projected demand from the two areas combined.

Clearly, the water and electrification processes have been continuing with little or no contact between water engineers and Eskom, and it is no wonder that the local community is confused about who is doing what where and when. All of these authorities and experts are lumped into the general category 'government' in the minds of local people, and 'government' has been told again and again that water is more of a priority than electricity. so what does 'government' do? They give electricity to the wealthy people, and nothing to the poor! This gives rise directly to the third perception:

3 Eskom and others treated us badly and misinformed us.

This was reflected in many comments, in particular during the participatory appraisal exercise (see Appendix 7). Names have been taken on several occasions, and promises made. People are frustrated because they have been told by many that their community has a dense enough population near to the central road to justify the card system, and yet they have not been able to connect up to the grid, which already serves the wealthier sector of their community.

Sikhumbuzo Gumede comments in his debriefing report that:

There has also been little cooperation between these community structures and Eskom. The latter has the tendency of not working closely with the people at the grass roots level. There is therefore a need to establish close links between these community organisations and Eskom.

He also comments on general confusion about the card system.

In comparison with one of the other studies in this project (Post-electrification at Loskop (Annecke 1996)), where the card system was introduced, it would appear that here too the first connections were 'D' tariff in 1987, but that Eskom then approached the community in 1990 and offered to install the card system (60 amp). Electrification eventually happened between 1993 and 1995, with an installation cost of R30 to R45.

4 We want the card system, when is it coming?

The frustration is very close to turning to anger, and the group which has formed around electrification issues commented that they are tired of endless meetings with officials which lead nowhere. The sad thing is that it is so very difficult for a group of rural people to lobby effectively at higher levels. While one appreciates the government's commitment to 'Growth, Employment and Redistribution' rather than 'Redistribution and Development', all the fine commitments to uplifting the poor and levelling of playing fields come to very little if the people of Ndwebu cannot keep their bright young people because of schools which are so dreary that they lack even an electric light bulb, let alone libraries, laboratories or computers.

Annecke (1996) found that the card system at Loskop did generate economic growth, and it seems that the wider spread of availability of electricity has given rise to the growth of many new small businesses. Such a development has not been possible at Nhlangwini. However, she also sites as a negative development an increase in the consumption of cooldrinks by children and of beer by the youth, partly because of the increased availability of refrigeration, and partly because of the increased availability of television, which appears to stimulate a 'couch potato' syndrome!

10

Analysis of the impact of electrification

The previous chapter reported on the results of electrification, both in general and in terms of agriculture, while Chapter 7 looked at the earlier expectations of the Nhlanguwini community. This chapter analyses impacts on livelihoods, equity issues, farming systems, productivity and sustainability.

Impacts on livelihoods

Those who have been connected to the grid have undoubtedly benefitted, with lighting, refrigeration and television three of the most valued benefits. Local businesses in particular benefitted from these three aspects. However, in the short term the most that can be said is that these businesses were able to expand the range and improve the quality of services offered to local people. The case of Respondent 7, a commercial farmer, is the one where a major impact was noted in terms of livelihood, but this is dealt with under farming systems which follows.

Impacts on equity issues

Tessa comments in her debriefing report that she was struck by the fact that:

a number of the people we interviewed were slightly better off, and reported that at present they use 'cheap labour' which seems to be very poor women, to collect their water and help them with time-consuming chores. They reported that once they had the convenience of running water and electricity they would no longer need them. The one very poor woman we interviewed reported that her income was from doing 'cheap labour'.

She raises the concern that reticulation of water and electricity may cut off the source of income for these very poor people, and suggests that it will be important to look at projects to help them stay alive, such as community woodlots, since wood is such a scarce local resource. This potential negative impact must be taken into consideration if authorities are serious about addressing the needs of the very poor in rural areas.

Wendy Annecke (1993) concludes one of her studies with ten women who live in the Durban area and do not have access to electricity with the comment that:

Electrification schemes may not be viable unless both the energy and the appliances are subsidised, and unless methods can be designed whereby users in the category of the ten Canaan households are enabled to make payments in small, regular amounts as currently happens with the purchasing of wood and paraffin.

Although many of the people living at Nhlanguwini are not as poor as those with whom Annecke worked, it is clear that, without access to the card system, the vast majority of residents will continue to be excluded from the benefits of electrification. The comments made by Sikhumbuzo Gumede concerning the failure of Eskom to provide energy to schools, creches and clinics in the area underline the fact that these people are not even benefitting in the secondary sense of having improved facilities for their children.

The answer certainly does not seem to lie in the imposition of flat-rate tariffs, such as that at Tambo in the Eastern Cape (James and Ntutela 1996). Here, 2.5 amp connections to 161 of the 366 households involved had already been disconnected by August 1996, and a further 140 were to be disconnected after 5 September, leaving only 65 able to use their power supply. They point to the inflexibility of Eskom's approach to payment as one of the contributing causes. Families who could afford to do so have opted for a 20 amp supply, where they have to pay a R200 connection fee, but only pay for electricity used thereafter, using pre-payment cards. On the other hand, those who have opted for the flat-rate 2.5 amp connection are not in a position to pay connection fees or to save for appliances.

However, the very poor at Tambo were happy with what the 2.5 amp supply could offer them; they only objected to the inflexibility of the flat-rate system of charging.

Impacts on farming systems

The expectations of local people are that they will be able to get up earlier and go off to the community gardens having cleaned the house early, cooked breakfast and disposed of the many time-consuming chores of the rural household. In practice, Respondent 7 has seen a revolution in terms of agricultural production and food processing, but there appears to be little effect on any other farmer's production.

It is highly significant that Respondent 9, who is a major commercial farmer in the area, has not even made use of his electricity supply, and still uses his old generator. He repairs his tractors and trucks, plants and processes his crops and contracts out his ploughing and cartage services without the benefit of Eskom, which he has available if he only wanted to use it. It appears that his concerns are around the use of electricity for what he describes as 'luxury uses' – meaning domestic uses. He does not appear to value his wife's time as potentially productive, but it is difficult to know whether we have really come to understand his reasoning. Certainly, as can be seen from the interview summary (Appendix 5), his wife is not at all pleased with him. He is the same farmer for whom Raymond Auerbach was able to secure a bulk diesel tank after prolonged negotiations with fuel companies. Since that time he has purchased another tractor and truck, so that it would appear that his business enterprises are going well.

However, it must be acknowledged that what has happened to Respondent 7 would have been highly unlikely without electrification. Here, a retired agricultural extension officer was able to come home and work with his wife and his family (one of whom has a degree in agriculture), to build up a thriving agricultural production and processing business. This farm is cast in the mould of modern commercial agriculture the world over. High input usage, high production, but coupled with a very shrewd approach to marketing. This is the 'green revolution' seen in its most positive light. Whether Respondent 9 has adopted a cost-limiting strategy because of the lack of an extended family, pension, housing subsidy or other support networks is not clear. Certainly the socio-economic circumstances of the two are very different: Respondent 7 lives in a modern home, with telephones, motor cars in garages, garden around the house, in short, what one could describe as an affluent western lifestyle. Respondent 9, on the other hand, still maintains a very small house and only working vehicles, no garden, motor car or any other visible luxuries, although he would be classed as 'wealthy' by most members of the local community.

It is difficult to assess whether the expectations of the poorer people regarding the potential benefits of electrification are justified or not. Tessa Cousins remarks that:

for women, who are caught in a grinding activity day, it does seem that if the time of the poorer-women-is freed-up, there is likely to be a qualitative shift in their experience of life. This will create potential for other more productive uses of time, but they are likely to need other inputs to realise this.

These comments are critically important in assessing the impact of electrification on agriculture. What would be very interesting is to follow up this case study if the card system is introduced, and experiment with different forms of support, to establish how people can best be helped in the post-electrification phase of development. How much of this process can legitimately be expected of Eskom is debatable. Agrelek is the Eskom branch tasked with assisting agriculture, and certainly some marketing and support could help to increase the usefulness of electricity.

Impacts on productivity

Current impacts on productivity have seen the rich get richer and the poor get frustrated. Although the importance of money circulating more in the local area should not be underestimated, the Ndwebu electrification process can hardly be seen as an exercise in rural empowerment. If developments at Loskop (Annecke 1996) have seen a proliferation of small business development, there is every reason to believe that at least as much would happen at Ndwebu and Nhangwini District in general. The work of Byrappa (1987) in India, and the Zimbabwean Electrification Report (1991) cited in Chapter 2 are particularly relevant here.

Putting a somewhat contrasting point of view, Mike Muller writes on Rural infrastructure and farmer support programmes (Muller 1995) that although provision of cheap and efficient sources of energy has been important in agricultural transformation in other countries, this is not so in South Africa, because the availability of water for pumping is not determined by pumping capability. He concludes that without such productive users, electricity provision in rural areas is seldom economic and only justified when population density rises to the point that biomass fuels are exhausted and electricity reticulation costs are reduced. Muller concludes that the key issue in rural infrastructural provision is to ensure that consumption and production requirements are dealt with in a coherent, goal-oriented development planning process. His conclusions are rational in terms of World Bank Structural Adjustment thinking, but do not seem to coincide with experience in practice in rural development in India and Zimbabwe. If affirmative action is not undertaken to correct the historical lack of infrastructure in the black rural areas of South Africa, they will remain the poverty traps which they became in the apartheid years. The Tomlinson Commission and current World Bank thinking have put forward the model of 'green revolution' development illustrated by the success of Respondent 7 in using high levels of technology to increase production and generate wealth along the lines of the first world model of mechanised high external input agriculture. Consolidate the land into economic farm units, and strive for high levels of production, runs the theory.

Van der Ploeg (1993), however, has shown how this approach excludes the majority of rural people from participation in rural development. He points out that this is a recipe for rural civil war. Goewie (1997) has also shown how Europe has taken the production paradigm to the point where the resource base is so severely degraded that farmers are now being penalised for excessive pollution and even for production. He shows how ecological production systems are proving themselves to be productive and viable at high production levels, without the negative effects on the resource base.

Impacts on sustainability

The lack of impact on the quality of life of local people raises concerns for the sustainability of electrification systems. The Nhangwini community has already had substantial donor funding poured into it over a period of years to support various development initiatives. While there do appear to be many productive results flowing out of this, the replicability of such projects is always a question. Raymond refused to call for the establishment of a Nhangwini Development Committee in the early stages of the Nhangwini Community Development project, arguing that such a body would be hollow and bureaucratic unless grassroots community structures such as spring committees and farmers' associations had already been established on the ground. This aspect of the development philosophy appears to have worked reasonably, as the Nhangwini Development Committee which did eventually come into being is a reasonably democratic organisation, responsive to the needs of its members.

Capacity building is a delicate process, however, and many differing analyses of the current situation and varying scenarios can be made. In the future, the provision of water is without doubt the major priority, but this will need major capital investment. Kotze (1994) estimates that capital costs of water provision will be about R7.2 million for Ndwebu and Phungashe combined, which represents a

cost of R520 per head. However, this will result in a water cost of approximately R2 per kilolitre, which is 4 cents per 20 litre container. Since people currently pay about R1.50 for a 20 litre container if it is fetched from the spring (see Appendix 6, Respondent 5), it can be understood why local people are so motivated to help bring about water reticulation.

This investment appears justified in terms of the capacity of local people to use their time creatively for a range of wealth-producing activities. A further small investment in electrification infrastructure should help this creativity to be broad-based, rather than only being accessible to those who have accumulated relatively large amounts of capital, which is the case at present. Investment in a community such as this, where local government structures have gradually developed over a period, is likely to be more sustainable than in a community where there is little experience of cooperative democratic processes. Although the integrated rural development model was effective in social terms at Nhlanguwini, it does not appear to have been very effective in terms of coordinating infrastructural development. The early attempts were able to launch a spring development programme and to bring the grid to Nhlanguwini. Reticulating water and broadening access to grid power would seem to be the logical next step, but the question of stimulating growth in the local economy still needs to be addressed.

A participatory catchment-based approach to working with rural communities at Ntshongweni was illustrated in Figure 3, Chapter 2. This approach, based on integrated catchment management, was given as an example of engaging with rural communities and building institutions which can lead to sustainable development (Auerbach 1996). In general, participatory action research requires that those intervening work together with local people at finding solutions to local problems. The Ntshongweni development process started with the Farmer Support Group agreeing to help with a community garden fence. It then progressed to finding ways of getting fencing materials, to actually working with the gardeners at putting up the fence, to participatory rural appraisal, vision building and participatory land use planning. The community plan is being implemented in parallel with a capacity building process which has resulted in community training and the establishment of the EZakhiweni Farmers' Association and several craft groups.

In the case of Nhlanguwini, although there were attempts to integrate the infrastructural development, neither Eskom nor government was open at that time to an integrated approach. Funding was not available for more equitable approaches to electrification and water reticulation, nor was the political will present to ensure that this happened. The situation was not dissimilar to that in Zimbabwe's Mahusekwa (see Chapter 3), where electrification took place without sufficient human capital, investment backing or political support, and where the absence of water was also a limiting factor. The project has thus been organised around the idea of building management capacity through the establishment of water committees, and training local people to help with the protection of springs. Primary health care (including family planning education) is carried out by fourteen local women who have received in-place training through the Planned Parenthood Association of South Africa, who are partners in the project. The training has included health care, oral rehydration, first aid, contraception, nutrition and vegetable production.

With the emphasis on encouraging local ownership of the project, progress has been slow but steady in spite of funding and staff constraints, and it is hoped that the Institute of Natural Resources will eventually play only a facilitating role in the area's development. It has become clear that the leadership of the project requires a person whose primary focus is organisational development rather than agriculture.

11

Implications of the process of electrification at Nhlungwini

The theoretical discussion in the previous section was brought in under productivity in order to broaden the perspective on this often short-term topic. Muller (1995) is quite right that, in the short term, investment in rural electrification is not economically justified. He is also right in pointing out that even where there is pumping capacity, our water resources often do not stretch to crop or pasture irrigation, as our groundwater resources are limited. However, if one then concludes that the rural areas should be abandoned, or that investment in infrastructure should only take place where there is already capacity to generate goods and services, one is condemning the rural areas to poverty for the foreseeable future.

Rural people are already penalised by taxes and other barriers which militate against marginal producers. They pay value added tax on purchases; they pay a premium for all consumer goods because of the costs of transporting these to the rural areas. Work opportunities are limited, and usually carry the cost of transport or the need to run and maintain two households. Local government structures are weak and parochial, and poor communication networks make it difficult for local people and outside organisations to interact effectively. As pointed out in Chapter 6, the women carry a triple burden; making up 75% of the population, they are involved in survival tasks, household tasks and income generation. Carol Murphy's finding that most Nhlungwini women appear to be almost fully employed in survival and domestic tasks, spending 7.0 hours on survival tasks (including subsistence farming), 6.25 hours on household tasks, 9.5 hours sleeping and only 1.25 hours on social and personal activities is highly relevant to electrification policy. If people can do little but survive and sleep, development prospects are grim. Even creativity in the evenings is constrained by the high cost of providing lighting, using candles and paraffin. It is this drudgery which rural women face which can be relieved by the provision of electricity, and even more so by reticulation of water.

The creative potential which can be released for productive activities is significant, but will only be realised if it goes hand-in-hand with provision of improved educational facilities and of small business development activities. Even if these are not provided, however, experience shows that where there is rural infrastructure, especially in relatively isolated areas, growth potential in the medium term can be surprisingly good.

Educational under-development in rural areas is reflected in the educational profile presented by Dlamini (1990) and reported in Chapter 6. The same is true of health services. In terms of sustainability, an affirmative action programme which undertakes to electrify all rural schools and clinics, and to enrich facilities by providing extra training and equipment will probably do more for the long term development of these areas, and for the support of agriculture, than most other initiatives. During 1996, plans to do this were confidently released to the press by the Department of Mineral and Energy Affairs, and REFSA (Rural Energy Fund for SA) was launched to undertake these activities. However, there appears to have been little to date. Unless the energy sector makes good its promises, the rural areas will feel betrayed and abandoned.

12

Summary of the main findings of the study

Expectations

Nhlangwini people believe that electrification (card system) will make life easier. Cooking, cleaning and subsistence will take less time, money and human energy. Drudgery will be reduced, and especially the women feel that they will have more time for productive and profitable activities. Lighting will enable them to start the day earlier and finish later, expanding their capacity for production. It is expected that water will also be reticulated, since 'planners' have asked so many questions for so long. Water and electricity will then make watering of home gardens and perhaps also irrigation of fields possible. The cost of irrigation (particularly with treated water) has not been generally understood.

The electrification process

The original beneficiaries are fairly satisfied with the way electrification proceeded. Their main complaint is about the high reconnection fee if one falls behind with payments. Some 'D' tariff customers would prefer to be on the card system for this reason. As pointed out on p.13, Davis & Horvei list as 'multiplier effects' the redistribution of time allocation of household members.

The current negotiations have had several phases. Local people mention putting their names down for prepaid installations on at least three occasions in the past four years. There is widespread frustration about the delays and confusion about the costs and about what one can do with the various installation options.

The benefits of electrification

Lighting in the home has had three major benefits: people can do more in the early morning and at night, organised activities can happen (especially now at the school) in the evenings, and security has improved (street lights could make this even better). Television and radio are electrically operated in all electrified homes. Refrigeration has meant that meat can be kept longer, and it seems that those who have fridges do help those who do not have them at times, especially when there are social functions which require major catering. Electric irons have made ironing much easier, according to those who have them (eight out of ten households), though no washing machines are functioning electrically. There are electric kettles in five homes and the school, and space heaters in seven homes. A range of other appliances have appeared.

One farming family has used electricity to revolutionise their production system. An electric hammermill, refrigeration at the store, lighting, and stoves to process crops, have all contributed to modernising the farm. On re-interviewing this farmer in May 1997 in order to try to understand the differences between this household and other commercially oriented households in the area, no clear reasons for the differences could be identified. Since the interview, a small geyser and a cash register have been purchased. The original assertion that education may have been a factor appears to be justified, although it seems possible that one reason for Respondent 9 not purchasing an electric hammermill could be that the two homesteads are not far apart, and the market for milling is relatively small. Staying with tractor-powered mills enables Respondent 9 to mill at two more distant locations.

Although the school has yet to make full use of electrification, the potential here is enormous, but again requires support to be realised. Staff list the following needs: developing skills using electrical tools, setting up laboratories where experiments can be conducted, introducing Home Economics as a subject, and purchasing video equipment.

13

Recommendations

Recommendations for Eskom

In summary, then, Eskom should take a pro-active stance in helping to coordinate the supply of electricity with the supply of water. Where possible, Eskom should prioritise supply of electricity in areas where water has already been reticulated. Where this is not possible, Eskom should interact with those responsible for water supply in order to coordinate activities, and to promote maximum spin-offs in terms of productivity. It should be clear Eskom policy to work in areas where there are democratic representative local government structures. Nevertheless, Eskom needs to communicate with communities using participatory techniques to ensure that there is a broad process of communication. Very often, at present, a meeting is called and addressed, which comprises the wealthy and influential local people. This leads to frustration and anger in the long term, as has happened in Nhlanguini. Clear, written information in the local language should be distributed concerning the costs and benefits of the card system, and its limitations.

Where electrification does take place, provision should be made for those who are not wealthy to gain access to supplies. Where possible, 20 amp prepaid supplies should be made available; where this is not economically feasible, public access to power should be broadened through supplying power to schools, clinics and creches. A further possibility is the provision of rural service centres, where basic services are available to local people at a reasonable charge.

Agrelek should assist farmers with newly electrified farmsteads to develop appropriate skills and select appropriate equipment to enable them to use electricity more effectively.

Eskom should also arrange demonstrations in newly electrified areas concerning the safe use of electricity, replacing plugs, safe and unsafe insulation materials, child safety and economical use of power.

Recommendations for South African rural development

A more rational approach to rural development requires the evolution of a national rural development strategy. The Office of the President has released various discussion documents, and there is a general awareness of the need for affirmative action, and for an integrated approach. However, unless people and money become available specifically for ensuring that local structures develop, become accountable, and are able to access appropriate expertise and funding for infrastructure, integrated rural development, integrated catchment management and integrated energy planning will remain merely fashionable terms used by academics in reports.

Policy must support practical steps which help rural people to reduce drudgery in their everyday lives. Power for rural areas, especially for schools, clinics and creches, will help the poorest rural women and will open opportunities to the most disadvantaged rural children.

A change in the portrayal of farmers by the media, emphasising farm success stories and the role of agriculture in building up the rural economy, will help to change perceptions about farming as a career.

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APPENDIX 1: PROJECT PROPOSAL

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Four (4) pages including this one

Energy and Development Research Centre **Attention: Bronwyn James**
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EDRCMAIN.597

16 October 1996

PROPOSAL: ELECTRIFICATION'S IMPACT ON SMALL SCALE FARMING

Raymond Auerbach

Background and problem statement

In the course of working with EDRC on the paper 'Energy and Small scale Agriculture', it became apparent that there is a strong link between the provision of water and the provision of electricity. According to experience of the Zimbabweans, where electricity is provided before water, the spin-offs in terms of job-creation and development in general are not likely to be nearly so great as electrification of those areas where water has become available.

In India, much electrification was undertaken in rural areas around the provision of pumpsets, providing pumps for the shallow wells from which fields are irrigated. Spin-offs were not as great as had been hoped, and the development tended to benefit mainly the élite, who could afford to purchase pumpsets and equipment, as well as hybrid seeds, tractors and fertilisers.

Few parts of South Africa have sufficient groundwater to be comparable to the Indian situation, and the number of applications of electricity in agriculture is fairly limited. The main potential applications are: milling of grain, refrigeration (where there is also a retail outlet), heating of poultry brooders, and some irrigation under those fairly rare circumstances where it is feasible.

Research area

Although it would be preferable to select a range of sites, only the Nhangwini area (near Ixopo in southern KwaZulu-Natal) will be studied initially. Here, two members of the team helped 28 people in the community to gain access to 'D' tariff power in 1992, where water was not reticulated but some boreholes and springs had been developed; Eskom refused to supply Ready-boards, so that only those who could afford a R950 deposit and about R1 000 for wiring premises to Eskom standards qualified for reticulation of power (= élite access to water and electricity). Farming systems in the area were studied in 1982 and again over five years from 1988 to 1992. It will be interesting to see how things have changed after four years of electricity, but only very limited water improvement (water reticulation is now receiving attention).

Aims

As in terms of reference: assess impact on livelihoods, equity, farming systems (& sustainability) and agricultural productivity; examine conditions and inputs needed to ensure that electrification brings benefits; assess comparative benefits of electricity compared with other energy sources; look at local involvement in, and problems with the electrification process.

Issues to be investigated

Changes in farming system: what links are there between water and electrification?

Changes in lifestyle: what are the effects on lifestyle (is there an increase in capacity for production because of less time spent on survival tasks – water, firewood, cooking, lighting, crop processing; is there a change in use of money, control of money, who benefits or suffers)?

What are the barriers in gaining access to electricity?

What are the hindrances in applying potential benefits of electrification practically?

What linkages are there between electrification, agricultural potential and rate of change in farming systems?

Research methods

Initial (pre-electrification) data will be matched with current data to see whether the original motivation for electrification has been justified in practice. The emphasis will be on analysing the effects of change as well as the potential effects. The emphasis will be on semi-structured interviews aimed at understanding what choices people have made and why, and what the practical results of these choices has been. Methods will include:

- rapid rural appraisal using observation and key informant surveys;
- semi-structured interviews with individuals (community, NGO and Eskom);
- a participatory appraisal workshop.

Outputs:

Research report.

Research team: who does what?

Raymond Auerbach (researcher): Visit Nhangwini with local contact persons and survey officer, carry out RRA and key informant interviews, design and schedule semi-structured interview formats, develop reporting schedules, help with interviews and analysis, co-plan participatory workshop, help execute/analyse, write research report.

Tessa Cousins (PRA facilitator) co-plan semi-structured interviews and participatory workshop, help execute and analyse, comment on and contribute to draft report.

Sikhumbuzo Gumede (survey officer): Visit Nhangwini with researcher and local contacts, give insights into Maputaland energy use, help with RRA and interviews, help with participatory workshop, comment on and contribute to draft report.

Herman Dlamini and Nombulelo Khumalo (Nhangwini local contacts): provide insights into development and reasons for choices (including their own choices) about energy strategies; help to schedule interviews and workshop.

Timeframe

- Prepare and carry out interviews and workshop during October.
- Analyse and write draft report during November and December.
- Re-work final report in January!

APPENDIX 2.1: QUESTIONNAIRE SURVEY

QUESTIONS FOR ALL RESPONDENTS: ENERGY USE October 1996

Name: Interviewing team: T N H S

Address: Interview number: M T W Th F

Date installed Date installed Date purchased Cost

Electricity? 25 kva 3 phase..... 25 kva single phase..... Generator.....

Cost of Eskom installation: Deposit..... Connection fee Cost of wiring

Appliances:	Source of power	Year acquired	Rough cost
Television?
Radio?
Refrigerator?
Lighting?
Water heating?
Kettle?
Cooking (Stove/micro)?.....
Heater?
Iron?
Water pump?
Computer?
Air conditioner?
Welding machine?
Power tools (drills etc)?
Hammermill for maize?
Any other machines/ appliances?			
Do you own any of the following? Tractor..... Motorcar Bakkie/ truck			

APPENDIX 2.2: SEMI-STRUCTURED INTERVIEWS FOR THOSE WHO HAVE ELECTRICITY FROM ESKOM

October 1996

Name: Interviewing team: T N H S

Address: Interview no: M T W Th F

What have the main benefits been?

.....

.....

What have the main problems been?

.....

.....

.....

How could electrification be made more useful to you?

.....

How could electrification be made more useful to the community?

.....

Who in the household used to fetch firewood?

Do they still fetch firewood?

What has changed?

What are the main uses of electricity for you?

How much do you spend per month on electricity?

What about collection of water?

Is there a link between electrification and water?

Is there a link between electrification and agriculture?

APPENDIX 2.3 SEMI-STRUCTURED INTERVIEWS FOR THOSE WHO HAVE THEIR OWN GENERATORS

October 1996

Name: Interviewing team: T N H S

Address: Interview no: M T W Th F

What have the main benefits been?

.....

What have the main problems been?

.....

.....

Why do you not have Eskom power?

.....

.....

How could electrification be made more useful to you?

.....

How could electrification be made more useful to the community?

.....

Who in the household used to fetch firewood?

Do they still fetch firewood?

What has changed with the generator?

What are the main uses of electricity for you?

How much do you spend per month on the generator?

What about collection of water?

Is there a link between electrification and water?

Is there a link between electrification and agriculture?

APPENDIX 2.4 SEMI-STRUCTURED INTERVIEWS FOR THOSE WHO HAVE NO ELECTRICITY

October 1996

Name: Interviewing team: T N H S

Address: Interview no: M T W Th F

What do you use for cooking?

Do you use firewood?

How much do you spend per year? On firewood..... On paraffin

Who in the household fetches firewood?

How often do they collect, and for how long?

What has changed?

What have the main problems been?

.....

.....

Would electricity be useful to you?

Why do you not have electricity?

How could electrification be made more useful to you?

.....

How could electrification be made more useful to the community?

.....

What would you use electricity for?

How much could you afford to spend per month on electricity?

What about collection of water?

Is there a link between electrification and water?

Is there a link between electrification and agriculture?

APPENDIX 3: PROCESS OUTLINE FOR PARTICIPATORY APPRAISAL

TO BE HELD AT NHLANGWINI (NDWEBU SCHOOL) ON SUNDAY 3/11/1996

Aims: assess impact on livelihoods, equity, farming systems (& sustainability) and agricultural productivity; examine conditions and inputs needed to ensure that electrification brings benefits; assess comparative benefits of electricity compared with other energy sources; look at local involvement in, and problems with the electrification process, triangulate results of the week.

Process outline:

Exercise 1 – Timeline Priority: A

(Facilitator – Raymond, Time chart writer – Sikhumbuzo, Recorders TC+NK, HD)

Raymond to thank community, explain purpose of study, also its limitations, sketch involvement KDA 1982 betterment planning (BJ Njokwe).

1988 PPA/ INR project, Mr Hadebe/ Pam Kozik, *Abasizi*, Herman Dlamini, Phakamani Maize Farmers Association, Carol Murphy, Michelle Friedman, Tessa Cousins, Nombulelo Khumalo, Nhlangwini Development Forum. Electricity Group 1988 met with Eskom, seven paid deposits (R750). Tried to get card system, Eskom refused. First transformers installed 1990.

Now let us trace the history – start where? Woodlots? Betterment plan?

Exercise 2 – Feedback on electricity use at Nhlangwini Priority: B

(Facilitator – Sikhumbuzo (Tessa to bring drawings: Domes, business, agric), Recorders: NK, RA)

Tell people what we found out this week, how it looks to us.

Priority: A

Exercise 3 – Feedback on comparative use of energy (wood, gas, paraffin, electricity).

(Facilitator – Sikhumbuzo, Tessa to prepare sheet, Recorder: Herman)

Priority: B

Exercise 4 – Group exercise to tell Eskom how to ensure effectiveness in future electrification

(Facilitators for each group: one local [HD, NK, Mavis], one visitor [TC, SG, RA])

Groups being: 1 Older people; 2 younger married people; 3 Younger unmarried people.

Each group to prepare the questions and suggestions which they would want to put to Eskom at the meeting on 8/11; present to plenary as role play. (Raymond – Mr Eskom, Recorders SG, TC)

Exercise 5 – Action Issues – Summary (Raymond, Herman, Nombulelo) Priority: B

APPENDIX 4: NHLANGWINI HOUSEHOLDS WITH ESKOM

1a/1b MRS E DLAMINI AND HER BOTTLE STORE

Benefits

Everything is quick and clean – Light is better and things are easier to do (at night)

Who benefits from this?

Me – as I clean and cook. My children, with the TV

Neighbours children from TV, to see soccer

Neighbours use my fridge to keep foodstuff, especially when there are big occasions, they also ask for cold water. They also benefit from my lights so they are not afraid to move around at night

What has changed?

Not using paraffin keeps the house cleaner, don't need to clean and paint

There is a big demand for electricity in the neighbourhood

Pay R330 – 500 a month. The cost is higher in the holidays. People use the fridge more in summer.

I would like to use it in future for a welding machine, for charging batteries, a washing machine. I'm still waiting for them to come and put in 3 phase so I can do these things. I have already paid.

For the community:

people are interested in the card system. If there is electrification young people can play at night. There should be street lights for better security. There could be church services at night - more activities can happen. There should be electricity in the public buildings

Water?

I pump it from the river. At home I use it, and for irrigation, but the pump for the shop is not working. The water situation is not satisfactory but I don't know what else could be done.

I started using a generator in 1982 for pumping water. Electricity is cheaper for pumping because petrol is expensive, but I need the 3 phase for this.

Agriculture?

I grow maize, cabbage, beans, potatoes, all for my own consumption. I irrigate using the pump.

Firewood?

I use it for the kitchen for customary purposes, and in summer we sometimes cook maize on a fire. There is little I use it for. I buy the wood; a 2-ton truckload is about R600 or more. It lasts me a whole year.

2 Mr J K HADEBE

Benefits

* There is light *Easy to use *Good for ironing clothes

* Like to watch news on TV as there are pictures – Every member of the family benefits

Problems

I see no problems and I have never heard of problems. In fact it is good to prevent lightning strikes.

Others who benefit

* Children come from the neighbours to watch TV * Neighbours benefit from our lights

* No one has ever complained about anything

Changes Electricity has made life easier, liking ironing. Also we get more knowledge

Costs

It depends on how much you use. They are increasing. Now about R100 per month. There is not a difference in winter or summer.

How can it be made more useful I am satisfied. I do not need to grind.(maize?)

Benefit to community if electrification comes

Those who need it can benefit (they can do things on their own).

Firewood

Firewood is still used on special occasions. Tractor load is R450.

No-one here fetches wood anymore. The load lasts us a year.

Water

Is collected far away, from the spring. We hire people to get it for us. If we get water and electricity it will be much better. People can get light and see the path (at night). Water can be pumped. One can be in a position to get clean running water from a pipe.

Agriculture

Grow beans, maize, potatoes, pumpkins. If there is plenty I sell. With profit from potatoes I used to buy cattle. The home garden is a problem due to lack of water. The mother is old. Can produce chickens they get light and food. To improve agriculture we need electricity. Chickens need a lot of water. If there is electricity it will be a great help. People can cultivate at night. With water and electricity it will be easy to plant and irrigate. Winter production can then go on. The problem to get Electricity is the cost – it is very expensive. We have heard that this main (cable) system is very expensive, I'm not sure if we can change to the card system. I don't know what its power is.

People here have long been promised electricity (have been registering), water, roads.

7 MRS B MSOMI (FARMING, MILLING MAIZE, SHOP)

Firewood

Collect from own forest. Enough for 4 months – 1 tractor load. Pay labourers in firewood (R400 a tractor load). Wattle grove for own use and as payment for labourer. Approximately 1 acre.

Electricity

Life is easier and fast cooking – less effort and less time. Studying at night is easier. Facilities are there for young people. Comfort – cold in hot weather, warm in cold weather.

a) Husband gets money from the mill – it pays for electricity. Children and friends to be entertained. Self – easier cooking.

b) Expense only (said half-jokingly):

c) Neighbours get mealie meal! With electricity it is quick and clean and finer.

d) No more smoke to affect eyes. Life is MUCH easier.

4. R300 for the house – now about R400 with mill.

5. a) Electricity should be supplied to the community. b) It would solve the problem of firewood as we do. c) It can help the schools and school children studying at night and getting ready in the morning.

Water

a) Comes from rain tanks. In drought times we collect from rivers.

b) I fetch it myself with the tractor and trailer and fill my containers.

c) Cooking, washing, drinking, cleaning and building.

- d) At times of drought we run out, boreholes are far from my house. Like to see a water pump to get water in houses with taps like people in towns.
- e) Like to see electricity used with water to pump.

Agriculture

- a) Maize (white and yellow), beans, potatoes, madumbes (no vege gardens).
- b) Consume and sell and give to friends and the poor and labourers.
- c) Agricultural advisors. Credit from KFC to fence fields – to keep stock out.
- d) To pump water for irrigation; electric fences; irrigation for community gardens; poultry farming needs heat and light.

14 MRS D DLAMINI (PENSIONER/ FARMING)

Cooking

Firewood

- a) Used in rare cases b) Cooking , warmth (heater), cooking for functions
- c) From the forests, hire a bakkie (R100) d) R350 + R100

Gas

Used if electricity is off – For cooking – Buys every 2 to 3 months – About R20 per 7kg.

Electricity

- 3.a) In domestic uses Easy cooking, used in TVs, Radio and in storing food (Fridge)
Everyone benefits equally, TV and Radio for all.
- b) Has not experienced any problems, even in terms of the bill, Eskom send the amount that has been used.
- c) Helps neighbours to store food (fridge), neighbourhood children come and watch TV, neighbours get outside light at night, help them to bake in the stove. No problems have been noted
- d) Now living better, electricity useful for cooking, bright lights, radios
- 4) R280 to R300 per month.
- 5) It can be improved by installing a Card System because it is easier to use (pay) 'One buys what one can afford'. Business community can benefit, Butchers can start operating. Agricultural people can benefit by having their irrigation schemes improved and they can store their produce.

Water

- a) From the River (1.5 km) b) Physical collection
- c) Domestic use – Washing, Cleaning, Cooking.
- d) Water is fetched from a remote distance.

Improvements by installing water pipes at homes like in towns.

- e) Can live a luxurious life, can irrigate flowers and vegetables.

Agriculture

- (a) Crop Farming, cultivating maize, beans, potatoes
- b) Only potatoes are for commercial use and only if it is a good harvest.
- c) Irrigation improved, market can be established
- d) Don't have any idea but, thinks can help those who have an interest in it. Can probably help in irrigation of vegetables.

16 Mr M SHIBASE (TAXI OWNER/ FARMING)Cooking

Firewood:

- a) Not much, b) For warmth and cooking if there are functions,
c) From Highflats, c) R700

Electricity

Brings bright lights, storage of food. Every member of the household benefits equally.

It is very expensive, no explanation is given as to why it costs so much by Eskom. Thinks of changing to Card System which is not standardised . Costs range from R500 to R600. Accordingly not much of electricity is used at this house. Welding machine is no longer used but the costs remain high. That is the reason for recommending Card System since it is cheaper. It is the Head of the house that is highly affected.

Neighbourhood children come and watch TV, they get outside lights, keep food. No complaints from neighbourhood. It is really good, lights brought change, criminals really find it difficult. Since they have recently cut some electricity uses, the bill has dropped to R260 but still very unsatisfactory.

The improvements can be met by installing Card Systems and almost all the members of the community can benefit, lights, storage of food, improved agricultural activities for those involved in it.

Water

- a) From the River (EPitoli 1 km)
b) Physical collection – Children and women
c) Domestic uses and would like to irrigate
d) It is really difficult to get water. Improvements can be to bring running water to the community and also the possibility of bringing water to homes of those who can pay.
e) Life can really be easy . Thinks of cultivating potatoes for commercial purposes. Can cultivate both in winter and in summer. At present buys potatoes from the market and sells them to local communities. Would be much better to produce potatoes and sell them. Water is greatest problem, the nearest community hand pump has not been working for months.

Agriculture.

- a) Crop farming
b) For both consumption and for commercial purposes
c) Water and electricity can improve agriculture as is the case with successful White farmers. Electricity can be of great help in Agricultural Poultry Projects since – get adequate water and electricity for warmth of the chickens.
d) Yes, Irrigation can really improve -

18 Mr E MEMELA (SHOP OWNER)Cooking

Firewood Much; Warmth and cooking for special functions;

From his small forest; None

a) Has been helped in a great way, they have fridges at home and at the store. everything has become much easier to use. They have bright lights. All the members of the household benefit. Children study very well. Neighbours get outside lights.

b) No problems have been experienced.

c) Good life, happiness, light and electric stove, TV, easy ironing. In the past these were a great expense. No candles used now. Neighbourhood gets outside lights and they also keep their food in the fridge.

- 4) R600 (For store and household use combined) – this varies in terms of usage.
- 5a) Lights can prevent thieves. But this would have broader application if there was a Card System which is more affordable. 'Card System' is like a Battery Radio in the sense that if it is finished you wait until you have money to buy.
- b) Can help since there is a great problem with firewood. Electricity can greatly relieve this Nhangwini Community.

Water

- a) From his water tanks at home (River and Rain water).
- b) Uses the bakkie to fetch it from the River (UMzumbe River).
- c) Domestic purposes.
- d) River water is very dirty. Community hand pumps are ineffective, water is scarce in this community while it is greatly needed for various uses. Water is like electricity. The mother recalls that while the river had clean and adequate water she used to irrigate her crops. But now she has to use water tanks for irrigation of her crops. Water tanks are used chiefly for domestic purposes. Water pipes at homes or at places where community can have easy access to water. The father does not want to have water inside the house since he believes it can spoil children, and they can become irresponsible. The mother on the other side sees that she is very old and then she wants water inside the house. The father sees a need for community stand pipes before water can go to individual homes. There has been a great problem with hand pumps, at time water is dirty and at present the pump is not in operation. Local people believe that this hand pump harbours a big snake (inkanyamba).
- e) The two go together, life can greatly change for this community. Irrigation schemes, Poultry Projects.

Agriculture

- a) Crop Farming – Maize ; Potatoes for sale on good harvest; Beans.
- b) Consumption and for Commercial purposes.
- c) Irrigation Schemes makes things easier. As an old man he has turned to the plantation of Gum tree which easy to monitor. People need agricultural advice.
- d) Yes, as he has stated above.

20 MR MZIZI (TEACHER)

Cooking

Firewood

- a) Not much (when it is cold) b) Cooking, warmth, cooking for functions
- c) Buys from Highflats d) R700 lasts for 1 year

Storage of food – lasts for a long time. Easy cooking, clean pots. TV no longer need to take a battery for charging. Children learn a lot from the TV programmes. Bright lights for studying. Even those with eye problems are helped. Electricity benefits everyone. No problems have been experienced – power was only installed a month ago.

Neighbours get outside lights. This actually makes them to have a desire for installing theirs. No problems have been mentioned ever since the installation. Accordingly they all need electricity.

According to her, she is more bright than before. Helps to bring electric fridge that she had never had before, they are no longer buying steelwool since pots remain clean. They eat meat everyday which stored in the fridge. Time is saved, no need to chop firewood which takes long. They have not paid any bills yet {newly installed}.

Business community can benefit. They can have lights, buy electric stoves and fridges. Children can be encouraged to study harder. That can mean development of the community.

Water

- a) From the River (UMdoni) b) Physical collection c) Domestic uses

d) They have to wake up at 4am, long queues, they have to wait for water. Fetch 6 x 25 litres. Water is a great problem. A lot of time is spent in fetching water and everything comes to a standstill. Improvements, bring water nearby, to have water – community stand pipes, at homes, inside houses. Life can be easy. Pipe water for the whole community.

e) With water and electricity life can change. Can have much to do for her school work and household work. Much time can be saved (don't have to spend 2hrs at the River) Can plant more vegetables for commercial use – the community can get fresh produce.

Agriculture

a) Crop farming

Home Garden for consumption but can definitely sell if there is water.

b) Consumption

c) Bring water and have large land for commercial garden, they can also start Poultry Projects because of light, warmth and water.

d) Yes, Poultry, livestock. They can have local Butchers and Dairy Cattle.

NB IT TOOK 3 YEARS FOR THE APPLICATION TO BE PROCESSED.

22 MRS MVUNI (MSANI) ORDINARY MEMBER, HUSBAND – PLUMBER – DURBAN

Cooking

1. Firewood: a) Less firewood b) For cooking Samp (hard food), for warmth, and for cooking on big functions. c) Buys from local Community (Business) d) R700.

Electricity

a) Light is no longer a problem, don't have to charge batteries. Baking on the stove. Children study well on bright light, fridge stores food for a long time. Children learn to speak English by mimicking on TV. They also watch stories and movies which enlighten their minds. All the members of the household benefit. b) No problems have been encountered as long as it has been paid for. There has been an occurrence of hitting the transformer by a traditional weapon or by a stone. c) Neighbours bake on the stove. Teachers come and do their hairstyles. Neighbours store their food in the fridge. Children from outside come and watch TV. There was once a complaint from the neighbour that outside lights got through to the house at night. As a result outside lights are switched off at 21h00. d) Great change, easy to make tea, bakes, does not have to buy bread. Studying is no longer a problem for children. They can do everything at night since lights brighten everywhere. 4. R93.60 in 10/10/96 It is not more than R100.

5. Meter system is very expensive. One can cook without having money to pay the full amount. The Card system is better because one uses the amount that is on a card. When it finished, it is finished. The Improvement can be to have card system. b) Thinks community can benefit if they can have electricity as she has in her home. They can live a better life like she does. Their lives can be easier and it is important.

Water

a) Community Hand Pump. b) Physical collection. c) Domestic uses. House has flushing toilet. d) Great problems, Mvula Trust once promised to put waterpipes but the local person who was liaising with Mvula passed away and the project collapsed (Mr Mcandi). Water is one of the greatest problems of this community. Water is scarce. It is fetched from far away. Community hand pumps serve a number of people and they are ineffective. Improvements: Bring water to her home – then she can start to use a bathroom. A Community should not have to get water from far away. When the Community hand pump is not operating they are forced to go to EMandwaleni about 4 km away. e) There can be a great difference in their lives. She has a home garden which can function throughout the year (Winter & Summer). The home garden only functions during the Summer at present. She can sell poultry to the community.

Agriculture

a) Crop Farming: Maize, AMadumbe, Potatoes for commercial uses, Beans, Pumpkins.

b) Chiefly for Commercial use, also for consumption. c) Water can improve Agric. She can produce more, she can cultivate spinach, butternut, squash, etc. This helps her to supplement

her husband's income. Improvement by bringing adequate water for irrigation, community can expand their home garden. The other members of the community can benefit. Community gardens can improve more. d) Yes, bright lights to combat criminals. Electrical engines can pump water for irrigation. Poultry can get light and warmth and they can be fed day and night.

23 MRS THEMBI CHIYA (Farmer)

Cooking

Old lady who lives here uses other kitchen. Uses firewood for cooking and heating. She prefers this. Use fire when have special occasion, e.g. to make Zulu beer.

Firewood

a) I use fire rarely – but more in winter. b) I pay for some people to cut and collect the wood with the tractor. There is a man using a chain saw. He charges R6 per tree (4 or 5 trees, 2 or 3 times a year, including old lady's wood). c) Have own wattle plantation for wood, bigger than one soccer field. Our forest is only for our own use. I need wood.

Benefits

Quick and easy to use as electricity is always available. It is good because it meets many needs from one source (convenient). Me and my children benefit most.

Problems

This system is expensive – more than card system. They do keep us informed if they will be working on the line. The reconnection fee is very expensive if you are cut off through not paying. I would prefer to transfer to the card system. They come once after 3 months to check the meter and then confuse me about payment. My husband complains about expense always – he is responsible for payment. c) I help my neighbours by storing items in my fridge. We don't use outside lights at night – for fear it will disturb our neighbours. d) It helped a lot because I have no problem of collecting firewood now. We live like people who are living in town. Everybody is really interested in this card system. People spend a lot of money on firewood. 4. System of estimating costs per month, checking meter after 3 months. R150 – R200.

5 a) Improve delivery by bringing card system to those who want it in the community. Lights in the community centres will allow us to have night activities. I'd like the Eskom people to do the checking monthly. b) Afternoon classes and night schools could take place at schools. Night activities – now people have to hire hall at Highflats but there are political centres that could be used here. Increase people satisfaction – outsiders look down on us when they come here. Some have bad places but they feel proud because of having electricity. Competition and pride in own place. Children want to settle in town – they become reluctant to come home to visit if they want to watch TV all the time and turn against people who try to restrict use (the battery will run out).

Water

a) Rainwater and from the spring when no rainwater left. b) Sometimes I collect by myself; Gogo pays people to get her water R1.50/ 20 litres. c) Washing, cooking, cleaning, bathing, drinking. d) It is very far and we stand in queues. Sometimes the water is dirty and this worries us. The spring water should be clear – fencing might help. Water sources are scarce so we flock to the same source – if we can make more water sources there will be less time wasted in walking there and waiting there. Piped water would be best. e) The standard of living would be improved. in winter we get sick (water is scarce) and that would be better if we had piped water.

Agriculture

a) Maize, Beans, Potatoes, Madumbes, Pumpkins. b) Madumbes, Beans, Maize, sell ½, keep ½. c) I don't have enough land. People need more information on planting and how to improve. I have heard we can make money on sugar cane but we do not have enough information. d) I don't know.

31 MRS Z M NDLOVU (Teacher)

Cooking

Gas, Paraffin, Firewood. Applied late in 94, came late in 95.

Firewood

To prepare Zulu beer, for slow-cooking food. Buy R450 tractor load – lasts 3 years.

Benefits of electricity:

a) Easy to do everything. Increased security – its safe – don't walk in the dark. It help to save money. I benefit most, then my children to do homework in bright light.

b) No problems. c) They get light go nicely from my electricity. Those who hang their washing wait for the light. d) My life has changed – I'm proud of it. Everything is easier.

4. R100 more or less.

5. a) I heard the card system is cheaper, but I don't have full information about it.

b) Electricity would solve the problem of firewood, that is so expensive. We'll be like people who are living in town. Like to have street lights.

Water

a) Spring.

b) Children fetch it and I use it.

c) Cooking, washing, drinking (household).

d) Spring is far, stock make it dirty. Would like piped water to taps in houses.

e) We would live a better life. Use lots of water to clean the house. Because I work I use a little water for cooking and special washing.

Agriculture

a. Maize, beans, potatoes, pumpkins.

b) With good harvest I sometimes sell – mostly for home use.

c) Like poultry farming for meat and eggs. For eating and some selling.

d) Need more light for poultry. Even with my electricity I am scared of going out when I hear somebody disturbing my goats.

34 ELWAZI SCHOOL (MR ZG CHILIZA)

Use Teaching and Leasing out.

We do not have the following – I am trying to get these: Video, duplicating machine, photocopier, overhead projector, sound system, computer.

Studying in the evenings – their homes re not conducive for study, some lodgings have no furniture and desks so they rely on the school.

Heating Water for teaching staff for tea. Also for community meetings.

The school is open in the evening, however, it is vandalized by community. We need a strong fence to prevent access to the school as it is not used properly for the pupils. We need a night watchman – but he would need a fence to keep him safe.

Weddings, or chief's meeting – they make use of the school. It is open to any requests since it is for the community. Need increased school fund to pay for electricity.

Changes

Children are using it for study. They do come in the evening. I see the improvement, a little, in their tests.

I had to raise money from the community to get electricity. We need more money to renovate further. The response is slow, but parents do not have much resource. This is why I have applied for funding from many sources.

Benefits to the community

If equipment was in place – they could use it for the benefit of the whole community.

Cooking, for evening, stop thugs moving up and down in the dark. Kids who are high school age seem to retard any progress. I am sure it is they who are vandalising.

Quality of life could improve, using paraffin, firewood is expensive.

This could have positive impact on school. the school could initiate progress – but if place kids come from is not doing that, the child will be divided – good quality at school but difficult at home divides and has negative impact.

Cost

R123 per month – this will go up if we get more equipment.

Water

We rely on rainwater in summer. In dry winter we suffer. Kids go to river to fetch water in buckets. I have been thinking of boreholes.

Agriculture

We are thinking of offering agriculture next year – have made an appeal for a teacher

APPENDIX 5: NHLANGWINI HOUSEHOLDS WITH GENERATOR SETS

3 Mr BUKHOSI MEMELA (Shopkeeper)

Firewood

Buying firewood, getting it from a different place, like Highflats. R700 a truck load. It lasts a year because of having other sources of power.

Benefits

It helps everyone in the family. Everything is easy and very fast instead of spending more time. I use it to repair machines (vehicles?). Life is becoming better. Neighbours get help with baking.

Problems

The generator makes a lot of noise so I switch it off earlier at night so as not to disturb other people.

Why not Eskom? It is not easy to get it as my place is far from the main road.

Cost

I save petrol by switching off the generator. I fill it with 15 litres and that lasts a week.

There is a need of electricity (from Eskom). I close the shop early and we use candles. I want electricity for lights and fridges at the shop. Even at home I would (rather) use electricity. The community will benefit because all the machines (appliances) are easy to use with electricity.

Agriculture

Electricity will be beneficial especially for poultry. Can grow more with light and water.

Water is very far, from the spring. Electricity could be used to pump water to households, and for irrigation for good harvest.

4 (INDUNA) GUMEDE, SINA GUMEDE (WIFE) answered .

I use less gas as it is expensive. I buy firewood. A truck load lasts 11 months or so.

I also collect firewood with the children, for about 30 minutes every day.

Paraffin

Disadvantages

Creates a lot of smoke – its dirty. It doesn't work well on long cooking foods

Advantages

25 litres lasts a month – costs R30.00 – Also use it for lamps. I can cook while seated.

I use paraffin to make floor polish.

Gas

It is easy for cooking. Good for ironing as it keeps clothes clean.

But its expensive. R80 per tank, it lasts me half a month.

Electricity

We registered long ago. People were taking our names. We are waiting for electricity.

I can have a stove, fridge to store meat if we have slaughtered a cow, radio, TV, iron.

We want the card system. We don't have much information about electrification.

Can spend R200 per month. We heard costs depend on how far away the pole is.

Community

We need water first. They can say all but water is most important. I have a home garden but I can't sprinkle it. I hire people to fill my 100 litre tank for the garden. Need it for washing and domestic use. I do not know if electricity can help to bring water for irrigation, and piped water.

Agriculture

Grow cabbage, onion, spinach, tomato, beetroot. Sell cabbage. Certified seed potatoes in the hot season need water. If water comes I can irrigate my vegetables. At the moment I can't cultivate my whole garden because water is too expensive.

5 MR J MKHIZE (Farmer)

Cooking

Use gas and firewood, mostly gas, a little wood.

GAS: Disadvantages – Expensive, Only get it at Highflats which is far.

Advantages – Quick, nice, clean food is made; Good for iron (clean), Can bake.

Cost: R68 + transport R10 = R78 per month.

FIREWOOD: We buy the firewood and it is expensive. A tractor load is R350 from the forest near Highflats from those selling it. This lasts about 3 months. When younger wife collected – stopped due to ill-health.

Electricity

a) We don't have it as no-one will help us to put it in; people took our names but we are still waiting. We are interested in card system. Then you do not pay for reconnection when your money runs out. You don't build up big bills that you can't pay later.

b) Would use it for grinding stone for sharpening tools, welding. House – iron cooking lights washing machine (laughter) vacuum cleaner TV radio fridge.

c) Can afford to pay R60 a month or more, it depends how much we use.

d) No information on what costs are. We have heard from people in town that the card system is better.

e) Its better first to have full information so you can pay for the delivery of electricity

f) Having lights would prevent theft of fowls at night- with lights around we will not be afraid of the night. Also good for poultry farming.

Water

a) get it from the spring. b) Pay people to fetch it – R1.50/ 20 l. Use 5 x 20 litres per day.

c) cooking cleaning drinking washing. d) Would like to have flush toilets but water problem prevents this. Do not have enough water for washing, home gardens. e) Great demand of water for household use and to get clean water means good health. Cleaning would be easier with a washing machine, also irrigation would be possible.

Agriculture

a) Maize beans potatoes madumbes pumpkins vegetables. b) Sell potatoes, madumbes, beans. The rest is for ourselves. Maize is for making Zulu beer. c) A place to get diesel and petrol and tractor parts, Markets to sell crops, there are many farmers here so lots of competition – we need a good market outlet; Irrigation in times of drought. d) Easier to pump water for irrigation and household purposes, Fridges to store vegetables that we grow. Security, Irrigation, Welding, drilling, sharpening tools.

Poultry farming for meat and eggs – I am interested in doing this.

6 AGNES PHUNGULA (Farmer)

Cooking

Gas: It is quick only, I do not like it. Transport is a problem to get gas. R70 per 19kg, lasts 2 – 3 months.

FIREWOOD: it gives warmth as well as cooking. The problem is getting the firewood. I buy it, R700 a load from Springs (50km away). This lasts for 6 months. I also fetch firewood with children on Saturday. If we had electricity & water things would be better.

Electricity

a) If we could have done this ourselves we have it Neighbours who have it are kings while we are just dogs. We have been registering but nothing happens. We want card system. We heard it is better. One uses the amount on the card. b) Cooking, lights, and if it goes with water, for irrigation. Can simply have my own home garden.

c) Can afford R100 a month. I am a pensioner. d) People say the card system is better.

e) it can be a release to the community, brightens it. Children sent at night, can enable poultry farming. Water must also be there. Water is a priority.

Water

a) Handpump 1 km away. b) 20 litre x 10 for washing. use for washing bathing children cooking. c) Water is a big problem – Handpump does not satisfy our needs. We wake at 3 am to collect water. If I can get water I can cultivate at home. d) If water and electricity come I can think I have died (of happiness)! Everything will be easier.

Agriculture

a) Beans, maize, potatoes (but misty rain brings disease). c) if there will be irrigation scheme it would be better. Even though I do share with my neighbours. d) I can plant yellow maize to feed my poultry. I can keep poultry, they need water and electricity for warmth. This can be for commercial purposes. [She thinks she will probably die before all this comes. She has a hope because of seeing 'white lady' (new person) and community development representatives]

9 MRS MEDRINAH DLAMINI (Husband (Mzwamandla, farmer) joined at end)

(We thought they had electricity and were surprised to discover that although the transformer was there, they do not use it, so the questions went a little differently)

1. **Cooking** – Firewood big, gas small. Firewood: There are no advantages to firewood, I am not happy using it. It is only good for special occasions when we have to cook for many people. It is also good to roast maize. It is difficult to get as it is scarce, we go near Ixopo. Its expensive – a load R300 – R400, my husband was furious. He now collects from the forest and a load lasts about 3 months. It makes lots of smoke that hurts the eyes, and I have to kneel down to blow on it. It takes lots of time to heat water – it wastes my time. I do not need its warmth as I am always busy, I have no time to sit by the fire! Its awkward to change the pots around all the time.

Gas: Advantages: It is fast to get children to school, good for ironing, Late Mother-in-law used it for warmth. Disadv: Expensive – R20 a week – cooking; R70 for ±3 months – fridge (I turn it off when I don't have meat.

2. Electricity

a) We were going to have electricity before by my husband had it turned off. it was too expensive he said. I am not happy about this! my daughter is also not happy. He did not want to pay for the connection. I do not make decisions about money and knows nothing of money affairs. My daughter will bring back electricity – she is in Empangeni. We went as a big group to people taking our names to get electricity by cards – but nothing happens yet. My husband wants electricity by card system. b) Household use

f) May improve security, there will be no housebreakers. Someone screamed last night and we could not go and check. Can attend church service at night. People are asking for the card system as they know its cheaper. people need it for household purposes. The main thing will be if it can be used to bring water.

Water

a) Handpump. b) I and children fetch, sometimes use the bakkie to load. c) Household. d) I'd like taps at our homes, it is hard to turn the pump handle. e) I will establish my own garden here. it is far to the community garden. My husband thinks of brick making. We would need to collect money and get a pump system, a pump, engine, tank.

Agriculture

a) Potatoes white and red; maize traditional and hybrid. b) Sell some and consume some. c) I have a piece of land that if I could get water and fence I could grow tomatoes. d) it could help with irrigation. And poultry.

11 T.M. MTAMBO (Pensioner)Electricity

a) They have applied for electricity and wired up the house but there is a delay in getting connected. Applied to Eskom in Pmb by their daughter. Told to wait by a guy who came to fix the cable and told they'd get the card system. Then someone else told them that man did not work on the card system. They are unclear. They heard about the card system at an imibizo and names were taken and were told it is coming. The wiring was done by the builder when the house was built. Because its been such a long time we'll take whatever comes first, card or cable. A letter from Eskom came promising they will come and fix the cable for them. Gave the letter to the guy fixing the cable to get help, still hoping. In the past used a generator but it developed a problem so stopped in 94 deciding to go to electricity. d) Can afford R200 a month. I have heard the card system is like using a battery – when you have no more cards you get no more electricity. f) I expect big changes – people need electricity for businesses like welding. The firewood problem is a big one and can be overcome. Old persons cannot afford to collect firewood. Make things to sell e.g. storing meat, milk, drinks etc. Poultry farming needs electricity. Lights for the community – along the road so people can move at night. its good for big parties to have lights.

3. Water

a) Spring. b) 20 litres, the children fetch. c) Household only. d) In winter water is scarce and they spend a long time in queues. Great need of water its the main source of living. Want flush toilets but need water in the house. Like taps in homesteads. if it can be pumped to the homes – even inside the houses. e) Can try to have small businesses. Home gardens even in winter. Poultry needs electricity and water and can be sold.

Agriculture

a) Maize beans potatoes pumpkins. b) own use. c) Be very useful to farmers for welding, repairing tools and vehicles. Electric fencing – especially for security. Sometimes ploughing is delayed as tractors breakdown and there is no nearby place to repair them. With electricity everything will be easier. We will stop going so much to Highflats. Even car owners need repair places.

21 MR J KHUMALO (Wife teaches)

Borrowed a generator – did not buy it – especially for the fridge – for about one year.

Ready to do wiring – have all the material. ready and I'm about to do it. (At the point of change over) waiting for Eskom. Use gas 2 x 19 kg R78.80; Paraffin 10 l/ month.

Advantages – all my things are for electricity. I can pay once a month – more convenient. Cheaper. I can use all these appliances – convenience. My wife would benefit most. No problems seen so far.

Electricity

a) I have applied – waiting for Eskom to come. I want the cable. b) All appliances.

c) R500. d) I don't know about costs – but I prefer cable because I have many things in the house so I need a strong supply. e) Clinic, schools, street lights should all be electrified. f) Problem here of firewood – and so for cooking and ironing and everything. We can then open projects like sewing, candle making, welding. Electricity is holding possibilities for good projects.

Water

a) Problem I use my bakkie to fetch water from far away. b) to help my wife and children to get good clean water. c) Washing, cooking cleaning. d) Scarcity of water restricts home gardening. Be good to get a windmill – others can try others means to improve water. We can even make contributions to get water nearby. e) Home gardens at home. I will work at home by keeping drinks in the fridge to sell if I can stay at home. Also sell vegetables and meat.

Agriculture

a) Beans, maize, potatoes (no veges). b) I'm also keeping pigs and fowls so its all for own consumption. c) Like to grow vegetables – but I need water. Also then wall needs fencing. d) Want an electric pump but who will get it and pay for it. The people can take it away. IRRIGATION has to look after the water pump.

27 MRS ROSE KHUMALO (Housewife, husband works in Durban)

Generator Worked for 3 years. Broke 3 years ago – not fixed as hoping for electricity

Cooking

Wood Stove (large): Gives warmth to the house. Can put many pots on.

Open fire: Gives warmth. Good for big pots. Difficult to get wood – R600 – R800. All this money for only two reasons. Not good value ... for so much money. Lots of work to chop and saw. Lasts 7 – 8 months. In old days it was a lot of work to get wood!

Gas (medium): Good for meals. I'm on my own. No hard work. Quick for visitors. Expensive – R78 for 19kg plus R10 (for gas too) 3 months if by myself. On holidays more often. Paraffin (small): If gas is out I use paraffin and for lighting. It is cheap.

Electricity

a) I don't know where to go for electricity. I want card system. b) TV, fridge, radio, stove, lights. c) R50. d) I heard from rumours connection is about R140.

e) Where they put a pole will all connect so could go to every room – I'd like that here.

f) the children will like better to come home and visit here longer. We like to stay with our children but they run away from us with this situation. Electricity is something that will help us save – you can do all the help with only R10 (radio, TV, fridge, lights).

Water

a) Far away. b) Pays for it R2 for 20 litre – sometimes if I can afford I'll get or else 2.

c) Household – but it is not really enough. d) Do not do everything properly because we don't have enough water, want taps at home. e) I'm planning to build another house and extend this one, but am restricted by water. Want bigger home garden.

Agriculture

a) Spinach, vege, maize, beans, potatoes, madumbe. b) With good harvest I sell and keep some for household. c) Because of my ill health I don't think to improve or extend my agriculture. d) With electricity life will be easier. From fields come home tired. Coming home to easy electricity would make life easier.

30 Z HADEBE (Teacher)Firewood:

a) Less of firewood

b) Cooking when there is a big function

c) Buys from Highflats

d) The normal costs R1000 per annum

Benefits of A Generator

a) Time is no longer wasted, everything is quick. It saves money and time. Does not have to buy batteries since the generator stands for every item of the household. Studies very well, there are bright lights even during cloudy days. Everyone benefits.

b) Problems- Petrol is very expensive. It costs R300 per month. Electric can cost less. Benefits of electricity. One the has been electrified the community can in the first place have clean air (with no smoke). A number of jobs that need electricity can be started for the survival of the people ie welding, those that are skilled in agriculture, wiring, hardware, carpet etc.

Change- Bright lights for studying , no longer carry batteries for TVs to be charged.

Water

- a) From the river
- b) Physical collection
- c) Domestic utility and for irrigation of crops.
- c) If there is a dry season they hire bakkies to fetch water from far away, on big rivers
- d) Life can greatly improve in various ways ranging from agriculture to domestic utilities. There is a direct link between water and electricity.

Agriculture

- a) Crop Farming
- b) Consumption and for commercial purposes (Potatoes only)
- c) Improved irrigation scheme
- d) Yes, Electricity can pump water from the river for irrigation schemes

This interview was conducted at a school, the teacher had few minutes for us and we did not have specifically a questionnaire dealing with the people with generators.

Agriculture

- a) Crop Farming
- b) Consumption and for commercial purposes (Potatoes only)
- c) Improved irrigation scheme
- d) Yes, Electricity can pump water from the river for irrigation schemes

32 MR MAZIBUKO (DEVELOPMENT FACILITATOR)Cooking

Gas most Firewood less

Firewood

a) Advantages: It is good in cooking for functions like weddings. Disadvantages: It is time consuming and it is difficult to get. b) About R700 per annum

Gas

a) Advantages: It is easy to use. It saves more time because it is quick. Disadvantages: Generally, it is dangerous to use. A number of death cases because of gas have been reported. It is expensive because one has to take it to Highflats. b) R60 per month.

Firewood

a) Buys b) More than a year. There is a scarcity of firewood in the area.

Electricity

- a) Have applied but no response
- b) Domestic uses
- c) Any amount
- d) Knows a lot as has been liaising with Eskom
- e) Belies card system can really do it
- f) Community getting something that makes life easy, would love to see every house electrified .

Water

- a) From the river
- b) Physical collection
- c) Domestic purposes

d) Water is great programme, there is no water at this place, Improvement can mean the provision of clean running water.

e) The lives of the people can greatly been improve.

Agriculture

A Crop Farming

b) Consumption

c) Improved agricultural instruments

d) YES, it can help those who have great dreams about it.

APPENDIX 6: NHLANGWINI HOUSEHOLDS WITH NO ELECTRICITY

8 PHUNGULA, Z (Induna)

House is permanently built and is wired completely

Cooking: Gas (large) firewood (medium), paraffin.

GAS – Advantages: use it at any time, rainy or sunny days, easy to use, even he himself can use the gas.

Disadvantages: Expensive R20 per 10kg lasts a month, Experienced no difficulties with exception that one has to pay much on taxis since the Highflats is far away.

FIREWOOD – Women gather firewood from farmers and hire a car to collect it. He pays money for the hired truck. Advantages: Makes fire for cooking warmth during winter seasons and is less expensive. Disadvantage: Takes too long to make a fire to cook but it is part of the life of the rural areas. Other people say it is expensive to collect firewood. If one has not collected it is R700 a load which last for about a year.

PARAFFIN – Used for cooking and lights. No disadvantages. 20 l lasts for a long time. Using 3 sources of energy allows one to save a lot. Gas is easiest to use and is quick

Electricity

a) They have long been wanting electricity and have been promised. Would like the card system. It was supposed to come in 1995, but nothing happened 1996 nothing has happened They have now pointed to 1997. Even possible to delay further.

b) Household : cooking, will buy a stove; lights; Recommend card system, son working in Durban also says so: he says it is cheaper than meter system. Has told himself if this development goes slowly he will get the meter system installed as one guy from Eskom encouraged them to continue applying for electricity.

c) Can afford anything – amount paid can be affordable. d) Can make us lead an easy life. e) Those who need it can benefit. They can greatly benefit from seeing what I am having. Fridge, TV which can give us knowledge.

Water

a) community handpump. b) Women and children. c) household.

d) Adequate but can appreciate piped clean running water right at the home.

Agriculture

a) This can be of great help because you can do whatever you want to do. Water can help to improve home garden. Plant madumbes, maize, potatoes, beans, and these can be irrigated at any time. If there can be water they can cultivate at any season. b) Now grow madumbes, potatoes maize beans for commercial use depending on harvest. If its a bad year its for consumption. c) There can be a great improvement in cultivation. Poultry was once tried but failed on the grounds of water. and electricity. A poultry project can go very well.

Electricity is everything, – easy irrigation.

10 MRS DLAMINI

Cooking

PARAFFIN (large) FIREWOOD (medium) Gas is not used at all, it is dangerous

Paraffin:

It is quick and I am a busy person. I use it on a heater. I am busy, feeding poultry, it has no problems. Cost is R35 for 20 litres and lasts about 20 days (3 weeks).

Firewood:

Good for cooking sorghum beer – traditional beer. Helps with water for bath, functions.

It is expensive at R800 / 2 ton load, lasts a year. There is no firewood in the area now. No-one collects any more, it takes much time – purchased. One has to chop the wood.

Electricity

a) I have heard that electricity is very good for those who have it. I do not know, I have applied in 1994 at Eskom in Ixopo. b) Cooking, lights, freezer, stove, TV, radio, poultry, warmth. c) We will afford whatever it is costing we have no problem. d) heard it is expensive, it depends on how much you use. Card system has little power so I prefer the main system. it is costly but very useful. e) If Eskom can bring the card system since people don't have equal resources that can suit almost the majority. Community can benefit in development. Sewing can buy electric machines, can use it in shops, can form women's projects. Some husbands don't allow use of gas. Candles are very dangerous in burning. At present the community sewing project needs electricity and need a shelter.

Water

a) it is difficult to get water. get it from handpump. b) My husband fetches it in the bakkie. c) Household, watering garden, watering livestock. Use 50 – 75 lt per day

d) I recognise the problem of other people who do not have cars. Even pupils at school have a problem. it is a great problem. We cannot cultivate during winter. If we had water we could cultivate at any time of the year. Oranges, apples, naartjies For consumption and commercial, mainly for commercial. e) Need water at home, running water, to use in the house, toilets, domestic use and irrigation. f) Then I can have an excellent life. I am a business person, I can sell meat (butchery). I can help my husband by selling to supplement my husband's income. Can sell ice blocks to pupils.

Agriculture

a) Crops: Madumbes, potatoes, maize, beans, pumpkins, vegetables (cabbage spinach pepper tomato) . Livestock only poultry. b) consumption and commercial but mainly commercial. c) Irrigation can help in crop farming. Poultry can go very well. At present I make firewood to warm the chickens and that consumes a lot of firewood. With electricity that would not be a problem. d) yes in enormous ways as I have pointed out above on crop farming (irrigation) and poultry.

Comment: Not employed, they need such self help projects. If we form community self-help projects some can get jobs.

12 MRS M. MSIYA (CRECHE TEACHER / FARMING)

Cooking

Firewood (large) Paraffin (Medium)

FIREWOOD: Advantages : helps them in cooking .

Disadvantages : It is dangerous to children. Takes too much of their time.

Costs : R700.00 (2 Tonnes) which lasts for 5/6 Months.

PARAFFIN: Advantages. It is quicker/ easier to use as compared to firewood. It is easy to obtain it from local business. One does not have to travel.

Disadvantages: It is dangerous to children (poisonous when children drinks it). Paraffin Stove are dangerous, it can burn a house. It makes a lot of smoke that can create chest diseases.

Firewood: No one fetches. Buys from Highflats . One load lasts for 5/6 Months.

Firewood is becoming a great problem to get as it had been previously . It was little bit better .

Electricity

a) Does not know where to get it but can need it if it is available .

b) Cooking , Radio, TV, Warmth, Poultry, Sewing (Electrical). Can grow crops potatoes, beans, maize for consumption. Can use electricity for pumping water to produce more.

c) R100 but Card System is better, has heard that with card system one buys what one can afford. So say people from Town who are actually using it. Cannot afford to pay more than R100.

d) Does not have much information about costs of electricity but really needs it.

e) Can be improved by installing Card system which is much better but nothing at present.

f) There is a lot, pump water, grow and irrigate vegetables, TV/ Radio. Life is becoming much easier.

Sewing Projects and every domestic work to be easier to every one. Poultry projects to greatly improve .

Water

a) River (2km away). b) On head. c) Household use. d) Water is very scarce – Not clean and that water causes disease, diarrhoea and cholera. Get water in our homes.

e) 'Oh what a pleasure' Life can really change. Growing vegetables, poultry since chickens can get water and light and we can get more profit to supplement income of household.

Agriculture

a) Crop farming eg potatoes maize beans pumpkins. b) Consumption. c) Vegetables, water, – irrigation at all times, in summer and winter. Increase in poultry project – will need to build another house for poultry.

d) Yes, irrigation. Poultry. Lights can increase. Comment: A question, can there be any help with regards to this study? Ans Yes, used for future planning and policy making.

13 DORIS PHUNGULA (Farmer)

Cooking

Used gas for a short time but then had problems so stopped using it. Use open fire.

Wood

Is difficult to get – buy from truck owners – only source. Expensive – R700 per load. Lasts for a year. In the past I collected wood in nearby forests. Had a problem getting truckloads. Had to do cheap labour in order to get rights to collect wood. Now that people sell it, it's easier to buy.

Electricity

We took our names to the chief hoping that something will happen. Some key figures asked us to give them our names. Still waiting. I think it will be cheaper than getting firewood and it will save time. I want it mainly for cooking and lights. R200 per month.

We didn't know what kind of electricity it will be. People in towns tell us the card system is cheaper. Would like to have electricity in our houses to plug in appliances. If I can get it I will first buy a stove – it will be easier for me for cooking. Would like to have lights on road so we can walk at night without fear. Have problem with children who don't want to stay here with us because it is dark. If we have electricity they will be happier to stay with us. They like TV and radio. They way if this place had electricity they would build here and not go to town. My daughter-in-law will not stay her – she is afraid of the dark I have to accompany her from the to her house. They only come in December holidays. They want fridges – they bring food but it gets rotten.

Water

a) From hard pump – it is far. It takes more than an hour and you wait in the queue.

b) I get the young children to help carry it. c) Washing, cleaning, cooking. d) Pump is far and it takes too much time. We do not get a lot, only a little because it is difficult to get. I would like taps in our homes. Then I could have a nice building for a flush toilet and bathroom. e) Poultry farming – I would start this for selling to get more money.

Agriculture

a) Beans, maize, pumpkin, madumbes, potatoes. b) Sometimes I do sell when I get a good harvest. Food is expensive so i keep most for home consumption. This helps my income

(selling). c) Does not want more land as it as much as she can manage due to ill health – otherwise she would ask for more land. I would like my children to help me but they are lazy to work in the fields. Even those work for cheap labour – some are not good for working (LABOUR her big constraint). d) With electricity I could start work earlier as there would be light earlier. It will give me more time to rest – I would finish early, but I could do more work in the fields. e) Can give light to chickens as they need the warmth. I am very interested to do this. Poultry farming is easy because I don't have to go far to the fields.

3.b Maize is main selling crop – She sells most of her maize and keeps a little. Potatoes – sells about ½ crop and keeps half. Beans – gets 2 or 3 bags – sells half.

Pumpkin – I don't sell – I keep and give to those who need. Cabbages from com garden for own consumption.

15 MRS G MAKHATHINI (Crèche Committee; Pension for disabled daughter)

Firewood

No advantages. I cannot collect on my own because I have a chest problem. Can't collect without spending money. If someone collects for me it is expensive. My daughter (born 1961) goes with a group of women to fetch it, gets a bundle. She goes with a group so it is not very often. Twice a week, or once after two weeks – it depends on the bundle. She is mentally disturbed, so does not get good wood. Usually get a chance in winter because in summer we are afraid in the forests. There is thick undergrowth and we are afraid of snakes. In summer it thunders – it takes a long time, and if thunder comes in the forest it is dangerous. Leave at 7am and return at the end of the day.

Paraffin

In summer use paraffin. I use it for cooking and lighting – it is quick when you are hungry. Problem is money. I really struggle with cooking.

Gas

In summer use gas. No advantages. It is expensive – to take it to Highflats, paying for it in the kombis. The cylinder is empty. With electricity, if I count all the expenses and trouble, it will be better to spend on one thing and it will be cheaper.

Electricity

a) Main problem is I don't know where to go. I am willing to be amongst the group that applies as I really need it. We all ran to the chief's place as we heard someone was taking names of those interested in electricity. First in 1993 and last year and ... we were told to give our name at the tribal count. We didn't know who is responsible for it or what will happen after that. We want the card system – we heard it is better in terms of charges because you buy the card according to what is in your pocket. b) Cooking, lighting, ironing, radio and TV – to get news. c) R100 per month. d) I am not clear about costs. I understand I'll have to try to save and use it for important things. e) If we can be informed before we get the card system so we can prepare and save so we can plan for costs. f) – Like to see lights on the road – we are scared of walking in the dark. Then as women we can attend evening church services. Can use fridges to store things to sell and so make an income. With my pension I would like to make more income. We are warned about theft at night. Once I had nice poles I struggled to collect from the forest and they were stolen at night.

Water

a) Spring. b) My daughter gets it. c) Washing, cooking, building, cleaning. d) – In winter the cattle make the water dirty and we only get a chance late in the afternoon – then it is not so dirty. Spend a long time waiting in queues. We are not happy – we use it knowing it is not clean – but we have no choice. Once we heard there are means to pump clean water to our homes but nothing is happening on that. e) – Pleased to see pumped water to tanks – then we can connect to the tank – would like to see that happening. Electricity and water can improve my house, try other means of getting income – like selling something as I always struggle. In this way I could try to make my life better. Like to learn to make candles. Like to sell soap, cigarettes, matches, etc.

Agriculture

- a) Potatoes, maize, beans, pumpkin.
- b) use at home but sometimes when I am short of money I do sell.
- c) Tractor, fertilizer, good seeds – need help to get there.
- d) Those who have tractor could go to the fields at night.

17 MRS C DLAMINI (Cheap Labour)

Paraffin

Use only paraffin for cooking as I have no kitchen to use firewood. The problem is not having a kitchen so I can't use fire. Paraffin takes up little space. 25 litres a month – costs R28 from Highflats. If I could choose I'd use electricity because it is very difficult to get firewood.

Electricity

- a) If I can get clear information I could try to get money to pay for electricity, and how much are costs on cable v card.
- b) lighting, cooking – try to get fridge and iron.
- c) R200 – but more than that I could not manager.
- d) I heard the card system is not as expensive as the other one.
- e) Lights on road for fear of those who can be dangerous to us. Especially housebreakers. If you hear something at night you can't go and check because it is dark.

Firewood

The community will benefit because of this problem of firewood, and we pay a lot of money for firewood now. In the past we could go to land owner with plantation and could get firewood. There are no plantations nearby any more so now it is far and expensive.

Water

- a) Hand pump
- b) Myself and children
- c) Washing, cooking, cleaning.
- d) No problem as the pump is nearby to me.
- e) Like to have taps at home – Water & Electricity can get that to happen.

Agriculture

- a) Maize, potatoes, pumpkins, beans.
- b) For own consumption.
- c) Problem is money – need to pay for tractor, getting seeds and fertilizer.
- d) I don't know. With lights can work until late so we can have more time in the fields.

19 MRS ALEXIA MEMELA (Husband is taxi owner)

Cooking – Firewood and gas – equal use.

Firewood

No advantages. Expensive – R700/ truckload last a year. (Always did that since I came here in 1986). Can't bake. Changing pots – it is a trouble. Hate kneeling down and blowing the fire. If just for warming it would be OK but not for cooking. I'd prefer a better life like people in town (eThekweni). I have sewing machines – I'd prefer to be able to use electric machine if we could only get electricity. I have one in Durban. I sometimes go there – but I need it at home. It wastes my time – that I would rather use for sewing, to get money.

Gas

Advantages – Food is clean. Quick to cook. Can stand to cook. Its better for making guests a cup of tea. Disadvantages – You must be careful – put it away from the children. It is expensive – I

get it from Highflats. Lasts 1 ½ weeks R14 for 7kg because I cook only quick-cooking things on it.

Electricity

We gave our names for electricity but have heard nothing. Told about card system – Mr Madada said we must make a list. We all flocked there. A member here was nominated to count people who wanted the card system. people come and ask and we can't answer. b) Cooking, lighting, sewing, TV and radio, fridge, iron (my husband will be very pleased – he promises to help with ironing if we get electricity). My husband likes to do welding. Also could do repairs on the vehicles – with light there would be enough time. c) R200 (I could try). d) Card system is cheaper. If you don't buy the card, electricity is off – get a card – use it again. I'd like that kind of electricity. e) Like plugs in all my (7) houses – but I'll have to look at costs. f) Everybody will be very happy. Be very proud of this place – we'll look like people living in town (eThekweni) (laugh). Be better – everybody is interest in the card system.

Water

a) Spring. b) I and other family members staying here. Sometimes I pay other to fetch it for me (Maid R150 a month). c) Washing, cleaning, drinking, cooking. d) Problem I even struggle to get someone to help me – I'm busy with young children – it can be a problem to run out. I have big demand for washing with children and I do attend church services – life would be easier with more water. Like taps in our homes. e) I would stay without a maid – I'd use that money to pay for electricity and water but I'd not need her.

Agriculture

- a) Potatoes, beans, maize, vegetables in community garden.
- b) Sell beans if harvest is good – potatoes (31 pockets sold) – I plant enough potatoes to get income. I save more beans for my consumption and to keep seed.
- d) Poultry farming – we have no butcher around here.

24 MR MFUSI (FARMER)

Cooking

Gas most Firewood less

Gas: a) Advantages, can put four pots simultaneously. It is quicker than firewood. They don't use because they like but they are forced. Disadvantages, Gas is expensive. It is filled in Highflats which is far away.

b) 14 kg is R50.50 X R10 (return) + R5 for gas) = R65.50 for transport .

This lasts for a month on the stove and it only lasts for 2 weeks in the fridge. This is close to R200 per month.

Firewood

a) Adv. They fetch firewood around and they don't pay for it as others do. It helpful if there are functions (cooking). Firewood provide warmth. Disadv. It takes too much time.

Firewood

a) Women. b) It is always there in the forest but they at sometimes buy if there will be a big function, Maybe for R. Shortage of firewood forces them to use other alternative source of energies.

2. a) He needs electricity but there is not much that Developers or the Authorities are doing. They have been registering their names but nothing has happened.

b) Cooking, storage of food, can use it in irrigation of crops as he is presently irrigating by Gravity flow. With electricity he can put a booster to pump water quickly for irrigation.

c) Can hardly fail to pay electricity. Can manage very well to pay the bill. d) Does not know much about electricity but can real afford to pay because electricity is a necessity. he prefers card system since one buys what one can afford. Accordingly Metre system is problematic if one does not have enough to pay.

e) It can be improved by installing a card system, if not the community can have something to pay towards the installation of the power lines. It can then be improved.

f) One can do whatever feels to do. It is blocking job opportunities. Irrigation on fields, Poultry can really improve. Electricity is blocking numerous opportunities.

3. Water

a) Springs. b) Physical collection by women and children. c) Domestic purposes and for irrigation from Gravity flow. d) It wastes a lot of time. It a great job to go and get water.

Improvements, It can be good if they can get water at their homes. And also community standpipes to enable those who could not afford. to draw water at their homes. e) Life can change, everything can be easy, clean water, Crop farming improved. With his two Sprinklers, he can irrigate and can get fresh produce.

4. Agriculture

a) Crop farming. b) Chiefly for commercial and also for consumption. He supplies local business and outsiders with his fresh produce. c) Irrigation(water). Electricity to improve the irrigation and also to start community projects with the help of electricity. d) Yes, irrigation can be fast, Poultry which is i great demand. Perhaps stock farming can really be practised eg Dairy. They can milk and sell the produce.

25 MRS GLADYS MTHEMBU (Sewing)

Cooking

Firewood – stove and open. Paraffin Primus.

Open fire doesn't use as much wood like the stove does. the problem is to save firewood. I don't want to use firewood but we are still waiting for electricity. It wastes time. Struggle to get it, we have to pay for it R700 a truckload. this lasts less than a year (June – April). Collecting wood is no good as you can't get much. It doesn't last long. It can last for one day. I do collect small bundles to save the big load. Perhaps twice a week. After getting electricity I will only use fire for big parties and customary occasions.

Paraffin – I use it for speed when I'm busy. Spend more because we buy it. 5 litres lasts for 1 week (R10 per week).

Batteries for TV last 2 days and then needs recharging in Highflats. R10 battery R10 transport each week.

Electricity

a) We are still waiting since taking our name to the tribal court. This has happened several times. There was a lady, Mrs Pungula who took our names. b) Cooking, ironing, TV and radio, lighting, fridge. c) R100 per month. d) I have no information about costs. I am interested in card system – it depends on how you use it – if you don't have money it will stop and not get you into debt. I saw card system in Umlazi at one of my relatives. They told me you can buy a card from R5 upwards. e) Like to have plugs in all my buildings. f) Lights on the road – will prevent theft of our fowls. One can easily catch them. We are afraid to go out in the dark when we hear the fowls making a noise. Night services can be more successful. After the service we have to wait until morning because it is dark.

Water

a) Spring.

b) I fetch it – 5 x 25 litres a day. Wake up at 5am. Can come back late because of queues. c) Cooking, washing (household use), cleaning, drinking. For building purposes I pay people to bring water to me. R10 a drum of 100 litres. It might be more. Poor women fetch water for us. d) Water is not always enough so you have to wait for the pool to fill up. Water gets dirty from cattle – especially in winter. I'd like a tap in my house – I'm getting old and cannot continue to carry water. e) Life would be easier for me, I'd save a lot of time. I'd spend the extra time on my sewing and in my fields.

Agriculture

a) Beans, Maize, Potatoes, Madumbes, Peaches sometimes.

Firewood and Paraffin are mostly and equally used

Firewood

a) Advantages of firewood: It had an advantage while still available from local forests. Important for warmth and for cooking. Disadvantages of firewood: Very difficult to get/ fetch from local forests. They have been finished. b) There are no normal costs since they only buy if they have money. They have not been buying for years and therefore costs can not be remembered.

Paraffin:

a) Advantages : It makes cooking easier (Primus stove). Disadvantages : It is very expensive. It dangerous & poisonous to children, ie to her grandsons/ granddaughters.

Firewood Children fetch it, if schools are closed. They go and work for firewood on the farms. They do not last for a long time. They maybe last for 2 months. The change has been that firewood is very scarce.

Electricity

a) does not have enough money for electricity but she needs it. b) can use it for cooking, light, and any other uses of electricity, her children can tell much on how electricity can be used. c) She can try if electricity doesn't cost much. She can really like to have it and she can afford up to R100 per month. d) They say the metre system cost too much. it is the card that is said to be better. e) By Connecting what people can afford. f) Community can get light, easy cooking. This can be of great help since this community has no firewood.

Water

a) From the spring. b) Physical collection. c) Domestic use. d) Water is very scarce in this community, and it is fetched from far away. She can hardly carry a container of water therefore she goes and fills in water in the container and wait for her granddaughters to come from school to fetch it from the spring. At times people steal water from the containers. Improvements, if they can have water inside their houses. She can easily open the tap at her kitchen. e) She sees pleasure, she can have her hoe garden improved because she easily irrigate her crops.

Agriculture

a) Crop farming

b) For consumption purposes only, not in large bulks.

c) She in now powerless but she thinks irrigation can really improve agriculture.

d) Though she doesn't have much details but she thinks irrigation can be improved . If she had been in her early ages she would have used this great opportunity.

SHE CAN HARDLY USE GAS – IT IS DANGEROUS.

29 NOMBULELO KHUMALO (Interviewer and community development worker)

Cooking

Gas - Clean, fast, baking. Easy to use, variety of cooking methods, roasts, baking, frying etc.) Disadvantages: Expensive R70 x 19kg – about 2 months. Goes up during holidays. I use fire to cook large cooking to save.

Fire – Woodstove: don't use it because of problem of getting firewood. less efficient than open fire. Open fire: good for long-time cooking food. Good for parties when use big pots. Disadvantages: Expensive – woman sells bundle at R6, usually twice a week. We used to collect firewood from neighbouring farm but plantations were cut down for sugar cane.

Electricity

a) Waiting to get card system. We did try some men to get it, but we are misled by people who told us to take our name to tribal court with no picture of what comes next.

b) Cooking – lighting. I like reading at night and candles are dangerous – fall asleep. Radio and TV to watch news. Got family in town and want to follow what is happening. Want to keep the standard so my children will want to spend time here. Iron – better than flat irons. You can't do

much ironing with gas – trying to save. Planning to get washing machine as I'm busy at work. Now I pay somebody to do it. c) R200 is fine.

d) I heard from Umlazi from card system users, the connection is about R300, while connection of cable is about R1000. Aware that card is not as strong as cable, but it should be enough for me. e) I'd like plugs in all rooms, outside lights, and connection to outside buildings. My son is very interested in carpentry. He is planning to do carpentry and I'd like to have tools for him to use in carpentry. f) Electricity at assembly points: church, schools – I like to work with young people but we need an evening gathering place. Also for evening meetings and church services.

Water

a) Spring. in summer rain water. b) I fetch it but mostly pay someone to fetch it. 25 litres is R2.50 for the day. c) Cooking, washing, cleaning, bathing. d) I'm not happy with this water – I'd like a home garden and my animals like water. I'd like to have more fowls as meat is expensive and this way I can save instead of buying chicken all the time. Piped water with taps. My kitchen and bathroom are ready for this. Building is a problem as you need a lot of water to build. We pay R50 for a tractor for a day to get water. e) We very pleased as we have been struggling and some have tried against us as we have been trying to help with this and we are losing respect. People are angry. We tried to get help to get water from big rivers but without electricity we cannot pump.

Agriculture

a) Maize, Beans, Potatoes, Pumpkin. b) For consumption. c) Water for irrigation. Fencing – I like to plant early as food is expensive. Gardens and potatoes and maize are a problem with stock here. d) During planting season we are delayed by tractor owners. They have a problem repairing tractor – they want to get help from Highflats. Need a local workshop to repair tractors. With lights you can start earlier. If you start early you can do more.

APPENDIX 7: THE PARTICIPATORY RURAL APPRAISAL EXERCISE

Appendix 3 gives the planned PRA process. Unfortunately, as sometimes happens, things did not go as planned. The community had to attend a funeral of the local *Induna* on the day set for the PRA exercise, and so it started several hours late. People were also adamant that what they wanted from us was advice about what to say to Eskom in the meeting which they were scheduled to have a week later. They were not impressed by our suggestion that what we should do was to help them think through the process, analyse their situation and come up with a balanced understanding of how electricity could benefit them in the short, medium and long term. What they were saying loud and clear was 'We know what we want: we want the card system, and we want it now. You told Eskom in 1988 that we should get the card system, and they said 'No'. Since then dozens of communities have got the card system. Help us get it too.

In view of this very rational approach as well as time constraints, we truncated the process radically, and what happened is described below.

Time-line related to electrification

Initially, Raymond thanked everyone for their helpfulness with the survey, reviewed his involvement with the community briefly, as well as that of Herman, Nombulelo and Tessa, and commented that his involvement with electrification at Nhlangwini had started as soon as he met the community, when he was asked for help in 1987.

Those present then identified milestones, dividing history into the period 1960 to 1986, when there were extensive government forestry plantations in the area to which they had access 1986 to 1988, the time of acute firewood shortage, and post-1988, when the community was actively involved in lobbying for electrification, and was given a string of promises by various people about the imminent arrival of electricity (card system) and water (standpipes at each homestead). None of this materialised, and people are more than a little annoyed about the way promises have been broken, and deadline dates, have constantly been changed (see Figure 1 for Time-line).

Feed-back on electricity use at Nhlangwini

Due to time-constraints, this was limited to a brief overview from Raymond.

Feed-back: comparative use of wood, gas, paraffin, candles, batteries, electricity

Sikhumbuzo and Raymond mentioned some of the findings regarding wealthier people using gas and electricity, but much cooking still being done with firewood.

Group exercise to tell Eskom how to improve electrification process

Not done due to lack of time. Could be summarised by saying: Don't mess us around. Give us clear parameters to work with, and good information about timing, cost, and numbers of people needed to qualify for the installation of the card system.

1960 to 1986 1986: Government starts to plant sugar on Natal Trust land	We used wood from government farms, where many of us worked in low-paid wage employment; this was our main source of energy for cooking and heating. Paraffin and candles were used for lighting.
1988	We started to register with Eskom for connection to power grid.
1990	Eskom started putting in powerlines.
1992	We put down our names: Tribal Court for electricity and water (specifically for the card system & standpipes at our homes.
1994	Eskom took our names again, but the process failed because of strikes of Eskom workers; in 1994, Eskom said 'Its coming in 1995', in 1995
1996	'1996', but still nothing today.

A time-line for the electrification process at Nhlanguwini

Action Issues

This turned into a strategic discussion on how to present the community case for the card system to Eskom. Raymond spent some time explaining the real cost of electricity and water, and the uneconomical cost of irrigating with treated water. He had brought with him accounts from his farm, showing what he pays for water and electricity in a month. He compared the figures from the research, which indicated that the average household spends about R10 to R30 per month on paraffin and candles, and about R500 to R1500 per year on firewood, with the real costs of electrification. He gave the cost to Eskom per installation as follows:

5 amp supply R3 000 capital cost

20 amp supply R3 500 capital cost

60 amp supply R4 000 capital cost

He explained that this money does not come back to Eskom unless people use fairly large amounts of electricity. He outlined Eskom's electrification plan for 1992 to 1998, which aimed to make 1 million connections. Of these, 600 000 had already been done, but 500 000 were urban. He suggested that the community needed to devise a plan showing how they would use the electricity to generate income, as this would provide a strong incentive to Eskom to hurry up the process. The present expectations of what electrification could do for the community are unrealistic. Cheap water will not arrive, and electrification will not provide a magic wand to generate money. People will have to work at gaining and using skills to provide goods and services, which are the backbone of wealth. Those present discussed how this could be done, and appointed a strategy development committee to pull together some ideas before the meeting with Eskom. The meeting closed at about 18h00.

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Impact of electrification on small-scale farming

A field study of the electrification process
at Nhlangwini in southern KwaZulu/Natal

RAYMOND AUERBACH



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