A comparative study of the access to and use of electricity by farmworker households in the Free State

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This study was undertaken for the Energy and Development Research Centre and forms part of the Case Study component of a project entitled:
The role of electricity in the integrated provision of energy to rural areas

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1 INTRODUCTION

1.1 Background

The case study was undertaken as part of the EDRC (Energy and Development Research Centre) project entitled *The role of electricity in the integrated provision of energy to rural areas* which aims to assist in the development of appropriate rural electrification (RE) policies for South Africa. It also aims to provide practical assistance to RE implementing and funding agencies.

The transition to political democracy in South Africa has resulted in unprecedented demands on policy-makers to deliver to the newly enfranchised majority and to overcome the backlog in service provision for the poor. The provision of energy, and specifically electricity, is one such area, along with other sectors such as housing, education, health, water and sanitation services. The Reconstruction and Development Programme (RDP) has prioritised the provision of electricity for the urban and rural poor and has set a target of 2.5 million additional household electricity connections by the year 2000. As a result, the rate of electrification has been accelerated by both Eskom and some local authority distributors.

Although rural demographic data is imperfect, and the definition of 'rural' is contentious, it has been estimated that there are over 4 million rural households in South Africa, of which about 21% have access to grid electricity (NER 1996). The percentage of farmworker households with access to electricity is similar to this figure (Hofmeyr 1994), but is likely to be higher than that found in the former homeland areas.

Even with rapid urbanisation, it is anticipated that the absolute number of people in South Africa's rural areas will remain more or less constant, thus indicating a relatively large, permanent rural population which will require adequate services and development.

Initial investigations and preliminary planning suggests that the electrification of rural areas is far more complex and costly than the electrification of urban areas largely owing to a lack of information on which to base policy and plans. However, this is not necessarily a problem in the case of commercial farms in South Africa, for although there is uncertainty as to the total number of workers and family members, the number and size of farms, their location and the typical size of the labour force is known - at least within the regions surveyed by Eskom and the RSCs/DCs (Regional Services Councils / District Councils). Land, agriculture and labour policies over the past 40 years - both legislated and ad-hoc - have resulted in few unemployed rural people living on commercial farm land. There is also information on the likely cost per connection of electrifying farmworker houses on farms with access to the network: a cost of less than R2500 per house has been estimated for 70% of houses (Hofmeyr 1994: 80) which is comparable to the average connection cost of just under R2000 per house experienced within the Free State RSC and Eskom's electrification initiative, where the easier (and cheaper) areas are being addressed first (Wilken 1996). Photovoltaic (PV) systems are currently being installed at a cost of about R2500 per house (Wilken 1996). One could therefore - within reason - estimate the number of dwellings to be electrified, the approximate connection cost and the numbers of rural people one might reach through a concerted farmworker house electrification drive. However, the current process is slow and depends on the efforts of farmers, Agrelek advisors and regional Eskom offices - no targets are provided by Eskom's national office.

Often, the motivation for RE in developing countries relates to the potential role of electricity in economic development. However, this does not apply to farmworkers where the benefits are largely social. Although some farmers may argue that productivity and profit improve if workers have electricity, for the beneficiaries themselves, electricity is purely for domestic use and does not provide economic development potential for workers and their families. They are not part of nodal development points, there are no opportunities for diversification of their economic activities, and raising productivity levels on farms is unlikely to impact significantly on their lives. There may be a slow 'trickle down' effect if the individual farmer is committed to improving the conditions of the workers on the farm. However, within the context of the strong social and political demands for rural electrification and the fact that the electrification of farmworker houses does not appear to present a vast unknown, there is an opportunity for overcoming some of the backlog in service provision for the poor by explicitly targeting this group when setting rural electrification targets. There is also equipment and infrastructure on farms (such as electricity supply points and roads) that could assist in the electrification process.

Yet despite this opportunity, the circumstances of farmworker families suggest there are likely to be constraints on the potential use of electricity by farmworker households, and consequently on how they may benefit from electricity. Important circumstances include: residence on farms, free cooking-fuels, very low cash incomes, and dependence on the farmer for access to resources such as housing, water, credit and household appliances, as well as to development initiatives. These circumstances - particularly the extensive use of fuelwood and dung by farmworkers - indicate that an electricity supply for farmworker households needs to be considered within an integrated energy planning approach and in this context the role of renewable and off-grid options, as well as limited-load supplies may be important.

Since the possible role of electricity in stimulating economic development is not an issue, the extent to which electricity has an impact on the quality of life of workers is the main consideration of this study. The key questions are: What role could electricity play in improving the lives of farmworker families? Which strategies could maximise these benefits?

The study has adopted an in-depth approach, with a small sample subjected to detailed enquiries. Therefore, the information generated cannot be generalised to the national level. The study does, however, reveal information and draw conclusions that have implications for future policy regarding the electrification of farmworkers' houses.

1.2 Research aims

The aims of the study focus on farmworkers' households and their access to and use of energy services as well as the role of the delivery agents and the delivery process. The primary aims of the study are:

- to identify the purposes for which electricity is used by farmworkers and its importance relative to other fuels;
- to explore the most important factors that impact on decisions concerning energy use in the household;
- to assess the relative importance of the level of supply available to households in determining electricity end-use; and
- to assess the perceived value of services provided by solar home systems, in comparison to grid electricity, and quantify this as 'willingness to pay'.

Secondary aims are:

- to assess the planning and implementation process of electrification – the role of Eskom, the RSC and the individual farmers;
- to examine whether the problems experienced by farmworker households can be related to inadequacies in this process;
- to assess the viability of the institutional and other arrangements in providing financial and technical support to users of PV systems, particularly in terms of the ongoing sustainability of such projects.

1.3 Research components

The research included investigations both on the level of the farm and at the household level. The aim of the farm-level investigation was to gain a descriptive understanding of the areas visited with respect to farming and farmworkers, and to understand electrification and energy issues within the local and regional context. Also, it aimed to understand social aspects on farms and the extent to which worker families form any 'community' cohesion.

On the household-level the focus was to understand energy and electrification issues and, in particular, the intra-household power relations and control over resources, and the impact this has on energy-service needs fulfilment.

1.4 Methodology and limitations of the results

For the farm-level study, the methodology applied was primarily qualitative and participatory in nature and made use of *participatory rural appraisal* (PRA)[1] techniques. Information was gathered from groups of women or men as well as men and women together. The household-level study relied on open-ended interviews with residents. Interviews were also held with farmers, Eskom personnel and staff of the Bloemfontein District Council (DC). Further details of the methodologies used and issues investigated, for each respondent category, are provided in Appendix One. The farm-level investigation and the interviews with farmers, Eskom and the Bloemfontein DC were undertaken by the author. The household interviews were undertaken by fieldworkers from the University of the Free State. This division of the research undertaking between two design and fieldworker teams resulted in a number of limitations:

- Issues that arose from the farm-level investigation did not inform the household study adequately and time was lost as the same ground was covered rather than extending the level of enquiry.
- The analysis of the information gathered was completed without input from those who undertook the household-level investigation. As a result the information is less easily contextualised and its potential value reduced.
- Those who undertook the household-level study were not familiar with energy issues nor with participatory methodologies and in depth household research. Contradictions and discrepancies in the information gathered were left unclarified; there was little follow-through on particular issues; and the same questions were not consistently asked of all respondents thereby reducing the potential for comparisons and conclusions. Furthermore, the interviews focused unduly on the man of the household.

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1 *Participatory rural appraisal*: a participatory technique for obtaining information.

- Limitations also resulted from difficulties in acquiring access to farms and workers, particularly as a result of restrictions imposed by farmers and by the work routine of workers.

1.5 Farms and respondents

The focus of the study was farmworkers residing on farms in the Free State that fall within the Bloemfontein Sales and Customer Service region of Eskom and the RSC's (now DC's) farmworker house electrification initiative. Details of this scheme, together with further background on the electrification of farmworker houses, are provided by Thom et al (1996). The farms studied fall into three categories: those with electricity, those without electricity and those with photovoltaic (PV) electricity. It was intended that all the farms studied should be situated in the southern Free State, involved in sheep farming, and that those with electricity should have been provided with a 40Amp supply at least four years ago (1991/2). It was also required that those without electricity would be electrified before the end of 1996.

The source list of farms was provided by Eskom, representing current or future customers. However, difficulties in contacting the farmers and their reluctance to participate resulted in limited opportunities for choice and selection. Further, a lack of prior information meant that there was uncertainty as to whether conditions on the farm complied with the selection criteria.

There was also little choice regarding constituent members for interview groups of farmworker woman, men, and households. Factors affecting this included: work commitments; the absence of women as a result of employment off the farm or trips to collect fuelwood; and, on three of the seven farms, there were no more than two or three households to choose from.

In the end, for the farm-level investigation, seven farms were visited and included the participation of eight farmers, four farmer's wives, twenty-one male workers, and twenty-one farmworker women. On the household level, two households on four farms were visited and individual interviews with the husband and wife of each household were conducted.

2 THE FARMING REGION AND CONDITIONS ON FARMS

2.1 Farming region

The farms visited were all within the Bloemfontein District Council jurisdiction and situated to the north, east and south of Bloemfontein. (See map in Appendix Three for the farm locations). The general topography of farms in this southern region of the Free State is plains with occasional koppies; the climate is semi-arid; and the vegetation is mixed bossies karoo (Nama Karoo biome) and grassland (veld). On the whole these areas - unlike other areas of the Free State - have not had good rains and have received little relief from drought. According to the farmers, even where it has rained, there has been uneven coverage.

The other two farms visited were north of Bloemfontein in Glen (farm i) and to the east on the Thaba Nchu road (farm vii). This region borders on the temperate eastern plateau and the vegetation is mainly veld. At the time of visiting there had been good rains, after a long period of drought, and the land appeared lush. The farm in Glen is in the district where the RSC first launched their farmworker electrification scheme in 1989.

The farming activities encountered included sheep (wool and meat), beef and dairy cattle as well as grains, and farm sizes varied from a small dairy farm of 60 hectare with 40 cows, to larger sheep and mixed farms of between 1300 and 2200 hectare. On the farm to the east on the Thaba Nchu road (farm vii) an abattoir is run together with other local farmers. For sheep farmers, business is not going well as the costs of running the farms increase each year while wool prices remain static.

Besides a 'very bad' telephone service, the social and physical infrastructure is, according to farmers, good and accessible to both farmer and worker communities. Most of the farms in the area have electricity. Two neighbouring farms were visited that did not have electricity. On one the farmer used a diesel generator (which also supplied workers with electric lights) and LPG; on the other both the farmer and worker families were living on a neighbouring farm. Two farms have access to surface water while the others rely on groundwater, and although the water table has fallen considerably over the last few years, this resource is considered secure.

2.2 Conditions on farms

The paternalism and patriarchy on commercial farms described in many studies on farmworkers, still dominates (Hofmeyr 1994). Workers are completely dependent on farmers and the only real difference between farms is the extent to which the farmer is involved in the workers' lives, how freely he provides certain 'goodwill' support like lifts to town, or includes services such as pensions in the employment packages. The workers must rely on the farmer for nearly all their needs including most of the schools and churches which are located on the farms.

Physical and social resource base

The farmworker houses are built of brick and either plastered with dung/mud or are without plaster. The condition of houses varies from bad - with leaking roofs (a common complaint amongst the workers) and crumbling walls, to new houses built of brick or newly plastered and repaired. Most houses have two rooms. On one farm the workers were not interested in electricity but wanted new houses. A farmer also complained that housing subsidies had been stopped and though he had sent in an application at the same time as his brother in the Goldfields District - who received a subsidy and had built new workers' houses - he has not yet received any response. According to the Bloemfontein DC, there are presently no new houses being built with DC assistance. Previously available subsidies are being held back while they examine the process and institute a new approach and develop new conditions, particularly those relating to possible tenancy arrangements for workers who reside in subsidised housing.

Farmworker houses are arranged in groups. The number depends on the number of workers employed on the farm and also appears to depend on whether workers play a role in siting and building houses. Small groups of dung plastered houses - up to three - are situated far apart from other small groups of houses on the farm and seem more randomly placed. Larger complexes are in neat rows and of new brick.

According to the workers, no one pays rent or has any form of tenancy or security of tenure. Housing is a consequence of employment even for those who have been on the farm for up to 15 years.

Limited access to land and animals was encountered. Generally, workers have a vegetable garden near the house that is looked after by the women or children - 'we work our gardens and keep them clean' (farm i); about half the women spoken to keep

chickens, a number of male workers (30%) have one or more horse/s, and on two farms some of the workers keep a few sheep.

On the farms to the north and east of Bloemfontein the fuelwood resource was considered adequate to good, especially after the recent drought which has resulted in a lot of dead wood. To the south fuelwood is very scarce. Good trees are being broken and the land is being denuded but 'workers can't be blamed - they rely on wood'. The lack of fuelwood was cited by farmers as one of the reason for wanting electricity. Another is because workers make fires inside their houses - especially during winter: 'it costs more to keep houses in good repair than to pay for the worker households' electricity use'.

On four out of seven farms water is provided on a stand outside each house. Exceptions are the farm where the houses are still being built - the intention is to install plumbing (bathrooms with hot and cold water), and two farms where under the DC scheme water is currently being installed. On both of these farms, electricity was provided in November 1995 - one from the grid and the other PV. The sanitation system is, in all cases, a long-drop serving between one and six households. (The farmer who provides only one long-drop between six households commented that workers tend to use the bush - it did not occur to him that this may be because there is only one long-drop).

Transport facilities for workers are extremely meagre. They are dependent on farmers for lifts - regular but infrequent e.g. once a month to town for shopping - or ad-hoc and dependent on 'goodwill'. One farmer commented how these 'goodwill' lifts would cease if workers started making demands, for example, wage demands. Some workers have horses and others bicycles while others have the use of the farm tractor, but none of these can cover the distances to town. Otherwise workers walk, sometimes for hours, to the nearest main road to catch a taxi - which 'when it does arrive is often full'. No workers had a telephone but seemed able to use the farmer's.

All farms are visited by a mobile clinic and although there is some uncertainty it seems to visit at between one and three monthly intervals. Its main function is to provide women with contraceptive injections and to immunise children. For other medical care, workers go to town - either to a doctor or clinic.

Access to the nearest store varies. Some have a store on the farm which provides a limited range of goods such as grains, soap, and candles, others have access to a local farm store (often used by a number of surrounding farms), while there are some that have to travel to town for any household goods besides the rations they receive.

It appears that a high percentage of farmworker children attend junior schools, in most cases a farm school but in some cases a school in town when the farm is close to town or when the children live in town e.g. with a family member. For children who do not live close to the town there is a problem with access to high schools. This impacts on the number of children that go to high school and affects the general level of education and literacy on farms - which is very low. On the farms visited, local children share farm school facilities. This indicates a change in a previously reported trend of farmers limiting general access to schools on their farms. There is at present a DC initiative for the establishment of farm schools - funded by the Department of Education. Transport for school children is also one of the areas being ear-marked as needing attention by the DC. On the whole, formal education levels vary from nothing to standard five and are similar for both men and women. The highest level encountered was a woman with standard seven who works as a domestic and earns R70/month. The women on the farms seem less proficient in Afrikaans than the men (some men speak Afrikaans rather than the locally used African language). None of the workers speak English.

Leisure activities amongst workers include television (in the house, or in one case at a community hall on the farm), radio/cassettes (belonging to workers or their 'brothers'), and soccer. Soccer seems more active amongst workers on farms where households are more co-operative. There are a couple of fields in a district of farms built by workers, and there is co-operation regarding the formation of teams and transport to matches. Weekend activities for the women include chores such as washing and ironing, which are generally done once a week. On Sundays workers go to church and visit family or friends, usually on the farm or a local farm.

One farmer, who previously worked as an industrial psychologist, has tried to introduce 'games' for workers but has been unable to maintain enthusiasm amongst them. A farmer's wife, who comes from another area and has previously worked on Rural Foundation projects with farmworker women, also commented on the difficulties of keeping activities alive amongst workers.

Work, income and development opportunities

The male workers interviewed are employed permanently on a full-time basis and tend to do general farm work, e.g. irrigation, mechanical repairs, ploughing, harvesting, herding and milking. On the whole all jobs are undertaken by all workers. Apart from drivers (tractor and truck), no particular skills were identified on any one farm. The cash income of male workers is extremely low - between R100 to R200 per month. (A cash income of R200 per month was encountered for a worker who pays for his use of electricity, receives meagre rations and has been on the farm for 14 years.)

Women's work comprises domestic or other cleaning work. They are permanently employed and work both part-time and full-time but their wages are less than half that of the men, varying between R60 and R80 per month. The exception is one farm (farm vii) where two women work in an abattoir (situated on the farm). One earns about R480 per month - the same as the men who work in the abattoir - earning more than double the wage of her husband who does general farm work. The other who is younger and has not worked in the abattoir for long, gets about R200 per month. Domestic work continues throughout the year and there are no periods where more work is experienced.

On the farms visited, wages are paid monthly and bonuses are paid after a harvest and/or at the end of the year. Wages vary according to the length of time workers have been employed on the farm or their level of skill (that is, whether they drive or not). In all cases workers expressed dissatisfaction with the cash wages they receive but are aware that if they complain they will probably lose their job: 'there are always others waiting for the opportunity to work and there is nowhere else to go'.

Because of the practice of payments in kind, still very much in operation in the areas visited, it is difficult to calculate the actual income of workers. On the whole rations are given to men and not women employees and as with wages, and perhaps even more so, these differ from farm to farm and can vary from a monthly mielie-meal ration to a regular supply of vegetables, milk and meat. Other goods provided (on three farms) included work clothing and liquor. Other components of the income package include free electricity-use, and a pension and an unemployment insurance scheme. Each farmer has his own system for calculating the value of payments in kind and for deducting this amount from what he intends as the total salary of a particular worker.

Only one household was encountered where there is any income to supplement that provided by the farmer or farm. In this case the husband's mother-in-law receives a monthly income, probably a pension or disability payment.

The daily work routine is similar on all farms: workers rise early (between 5am and 6am), wash, the men have coffee and then work for a couple of hours before returning home for breakfast. They have a lunch break and generally finish work between 4pm and 5pm and go to bed early - around 8pm. The women seem to rise first and prepare for their husbands. They also tend to finish work earlier.

The annual work routine depends on the farming activity. Either consistent work is experienced all year round, e.g. on the dairy, or times of high activity occur during the planting and harvesting seasons.

Periods when households experience the most stress relating to income and other shortages, are at the beginning of the year because of all the extra expenses at Christmas time - this appears to be the time they spend money on the 'many things' they need and because of January school fees and uniforms. These problems are experienced despite the end of year bonus which is received by most households. The other financially stressful time cited is winter when they need blankets and winter clothing. Food shortages are experienced much of the time, especially just before pay day. Apart from the single household which receives a remittance, the only source of extra income is acquired when a women sells a chickens or vegetables from her garden.

Hardships are experienced by both men and women and, apart from turning to the farmer for help, there is little they can do. Generally workers are able to and do borrow cash (interest free) from employers, of amounts of up to R50 or the value of wages: 'I go to the farmer he always helps.' This system is, however, now under threat, since new legislation prevents farmers from deducting moneys owed by workers from their wages - cash borrowed as well as moneys owed on goods bought at the farm shop. It is possible that this legislation, where enforced, will result in farmers withdrawing credit facilities and as such may be detrimental to the intended beneficiaries. Apart from financial stress, problems in households relate to specific ailments such as a woman who has problems with her kidneys, or problems with children's health, especially in the winter. No one mentioned respiratory illness from woodsmoke inhalation - though it is likely that this exacerbates winter related illnesses.

For the male head of farmworker families employment means everything, regardless of their living conditions or conditions of employment: 'I am happy here because I am happily employed'; 'The only good thing is that I can support my family'. For the women, their real role is to look after their husbands, the house and the children.

Women on farms do not consider themselves 'farmworkers' and on the whole the work they do is similar to their housekeeping role. The reason women undertake work on the farm or locally (as domestic workers in town) is to supplement the meagre household income. This extra income affects the extent to which worker families experience financial stress.

Generally the workforce on the farms was considered stable: periods of employment of longer than five years were quite usual and three out of eight individuals interviewed had been on the farm from birth or longer than forty years. Exceptions are two farms (farms iv & v) where farmers from the region mentioned the instability of the local workforce. Here, the workers do not stay on the farm for much more than a year. According to the workers they move from farm to farm for better wages. A farmer's wife noted that they have tried to stop this movement by equalising wages on farms in the district but this has made no difference.

Most farmers agreed that there were no unemployed workers hanging around farms and that the size of the workforce had decreased 'over the years', the unemployed leave the farms and go to town. On three of the farms women worked off the farm, either on a neighbouring farm or in the town, and this contradicts a previously reported trend (Hofmeyr 1994) of farmworker women not being allowed to undertake employment off the farm.

All respondents (farmworkers, farmers, Wilken from Eskom and Viljoen from the Bloemfontein DC), agreed that there are no development opportunities for the workers from the farms in the region. At present, the shearers employed on farms are seasonal workers and come from the local towns. Viljoen mentioned that there was not enough seasonal labour to go around and there are plans to establish a labour bureau to deal with this. This is, however, unlikely to impact on the general level of farm employment in the region.

Those workers who do leave farms and farm work invariably return. Reasons for leaving include low cash wages and that on the farm they own nothing. The reason for returning is the level of subsistence provided on farms as well as the absence of opportunities elsewhere.

According to the Bloemfontein DC a new process is in place for development on farms involving the participation of both workers and farmers in development fora. None of the workers spoken to were aware of, or had been brought into, this process. Though there may be farmworkers represented on these fora it was noted by the author that the minutes from a forum meeting - in Afrikaans - are unlikely to be read or understood by most of the workers encountered.

The impression was given, by both farmers and workers, that there are perhaps better opportunities for the children on farms than their parents. There was not much to support this, however, especially as there appears to be a problem with access to high schools. Farmers also indicated that there is no real need to develop worker skills on farms. Certainly no farms were encountered during the study that concentrate on developing the skills of workers or on providing any adult educational opportunities. There are also few off-farm employment opportunities: 'one worker has left the farm and now runs his own irrigation business – this is the exception – his brother still drives a tractor'.

Social structure and relationships

The number of workers on the farms visited varied from 4 to 16 with a 'community' size of between 9 and 35. There are fewer workers on dedicated sheep farms than on the farms where a greater variety of agricultural activities are undertaken. On the whole workers come from the area and, prior to being on the farm, were resident and working on another local farm. Both men and women spoken to said things were worse where they were before and the reasons for moving include: 'bad money', too much work, or because they experienced some form of abuse. Two women spoken to came from outside the area and moved to the farm because of their husbands' work.

Workers are housed and grouped as families, one per house. There is also invariably a number of family relationships between households on any one farm and/or between neighbouring farms. The farmworker family size varies from one to six and the average number of children between two and three. Two women-headed households were encountered - one single women and one with children - both employed in their own right. Single male employees lived either alone or if 'young' with a family – theirs or another.

Relationships between households differed considerably from farm to farm. On some farms households are close and supportive of each other, and on others it is a case of 'each to his/her own'. (It appeared as though their circumstances were so close to a survival level, that there was no time or inclination to help one another.) Contradictory statements from within a household on the character of relationships between households were also encountered: on one farm a male worker called other workers 'brothers and sisters', but his wife mentioned jealousy and fighting amongst households. On the one farm where soccer had been tried but abandoned, the workers' households are particularly independent. In the area where workers moved around from farm to farm they are becoming more interested in soccer and the number of fields developed and games played is on the increase. In this area, an unstable labour force has not prevented the sport from developing.

In contrast, a consistent picture emerged on most farms regarding the worker-farmer relationship: the farmer is extremely important to all workers as they depend on him for everything and turn to him when they experience food or money shortages or when faced with a 'crisis'. Although workers considered their relationship with the farmer 'good' on the whole and say that he is 'helpful', a problem all workers had with all farmers were the low wages earned. 'Bad' money means they will never really get on, 'there is no anger, only indifference'. On all farms visited communications between the farmer and worker households was primarily undertaken by the male farmworker. Although the involvement of the farmer's wife differed from farm to farm, on the whole this took the form of health-care support, such as providing lifts to the doctor or clinic, or supplying workers with medicines.

The church was reported as extremely important by respondents – even those who do not attend church on a regular basis. The main reasons for this (also repeated from farm to farm) was to give life some meaning, for the rituals of burial and christening, and for help with problems. Three women were asked if they contributed towards church funds and all replied that they contributed R10 per month.

Apart from the church there are no other support systems or development opportunities available to workers in the areas visited. There are no adult education initiatives, no Rural Foundation, no unions or visible local government. Some workers have heard about councils and unions, on the radio.

On three farms workers have a representative – chosen either by the farmer or the farmer and the workers. The reason for this practice is to help settle disputes. Workers on all farms visited felt there is the need for such a system – to help settle disputes between workers and with the farmer, and to assist them in case of dismissal.

The women also felt the need for organisation but had no idea how they could go about setting up such a system. Although unions are not present on the farms, farmers are fearful that 'they will mess up the special relationship on farms'. As much as there is a need for change to the modus operandi on farms, there exists a precarious balance and a real danger of making things worse for workers by attempting to improve their circumstances without a suitable process or protection in place. For example, the new legislation that prevents farmers from deducting moneys owed from wages may discourage farmers from offering credit facilities.

On the whole workers have limited contact with life off the farm. The 'local' township, though in one instance only a couple of kilometers away, is not considered an important part of their environment, even amongst those who have family living in the township. According to one farmer there are some who have started making inroads into the

townships by 'claiming' plots and setting-up a family base off the farm whilst still employed on the farm. A number of farmworkers or family members voted in the local elections (for a party not a person). However, they do not know how it is supposed to affect their lives.

Roles and relationship within households appear to be similar to the social norms. Women do most of the housework and child rearing, and men concentrate on earning a living and on how the household incomes should be spent and, while decisions on general shopping are made by both women and men, decisions around larger purchases such as furniture, appear to be made by men. Family 'issues' are discussed by both partners.

All of the eight men interviewed, see their primary role in the household as to 'work for' and/or 'support' the family (this was also one of the main reasons provided by farmworkers for the high value attached to employment). Another role or position in the household mentioned by workers is that of father. None mentioned being a husband. In one (out of eight households) visited, the husband who works to support his family also perceives that he owns everything and makes all the decisions and that his wife's role is to work for him. The role of women, as expressed by male respondents (women were not asked about how they perceived their role in the household or within the family), is to support the family - amongst those who do farmwork, and to clean, cook, fix things in the house (for example dung plastering and renewing dung floors), and to look after and make decisions regarding their children's needs. In three of the households women have the help of a family member - a younger sister, older daughter or mother-in-law.

In addition to the usual housekeeping and child-rearing chores, on four out of five farms women are responsible for collecting wood and dung. On one farm men appear to be involved and have the use of the farm tractor. In general women seem to accept this: 'it's not really a problem' (although it could take all day twice a week). 'I fetch (wood) late in the afternoons because it's not far from where we live'.

The daily routine of worker households is as follows: first to rise are the women; in winter the first energy service she accesses is light; she then heats water for her husband to wash and have coffee before work; and makes breakfast. Only one women (out of eight) also mentioned washing - this indicates that women think of heating water primarily for their husbands to wash - rather than that they themselves do not wash. Questions on the daily routine of workers which included energy use activities, clearly show that women are more involved in fuel-using activities than their husbands.

Coffee is drunk by men first thing in the morning and tea by women sometime during the day depending on her farm or housework schedule. Special foods, such as rice and meat, are cooked on Sundays or for gatherings. Otherwise households' staple diet is porridge and milk or plain porridge and vegetables like cabbage.

3 ENERGY USE ON FARMS

3.1 Introduction

This sections looks at the energy sources used by households for particular end-uses. It compares households supplied by different electricity sources, and with different levels of access. On a macro-level, the patterns of energy-use, and the reasons behind these, were found to be similar □ regardless of the differences in electrification status and source of electricity on the farms visited. There was unfortunately not enough detailed energy-use information nor indications of the household dynamics that may affect these, to develop an analysis of the households' energy-use patterns on this level.

3.2 Access to electricity

The electrification status of farms and services available to both farmer and farmworker households is shown in Table 3.1. The table does not show the services accessible to, or used by, workers. All farmworker houses with grid electricity have a similar level of supply (>/= 20A) and the same opportunities for use, i.e. a readyboard with one or two plug sockets and house wiring providing a light in each room, and an individual meter. Those with PV-systems have a single plug for radio or TV, and lights in each of two rooms. No users contributed towards the capital cost of their electricity supply and, except for households on farm i, none pay for their use of electricity.

Farm	*Electrification status*	*Electricity source & service available* to*	
		farmer family	*farmworker family*
Farm i	Electrified	grid - all	grid - all*
Farm ii	Electrified	grid - all	grid - all*
Farm iii	Non electrified	diesel - light & media	diesel - light & media
Farm iv	Non-electrified	not living on the farm	not living on the farm
Farm v & vi	Electrified	grid - all	PV - light and media
Farm vii	Electrified	grid - all	none - PV not working

* refers to services available but not necessarily used

TABLE 3.1 Electrification status of farms visited

Previous reports on farmworkers and electricity (Hofmeyr 1994) indicate that the policies of farmers result in different access levels among workers according to status. However, no such restrictions imposed by farmers were encountered in this study. The impact of the farmer on access to and use of electricity relates to the initial application for the electrification of worker houses on the farm, the provision of credit to purchase appliances, and payment for electricity use.

3.3 Fuel-choice and appliances used

Table 3.2 shows the first and second most common energy carriers used for the services undertaken by farmworkers. The list of services is prioritised according to the services undertaken by women, reflecting their regularity and frequency. (Men generally use only lights and media.) The preparation needed to undertake energy services is also largely affected by women □ such as collecting wood and making fires. In general, services used reflect the appliances owned.

Negative satisfiers[4] as discussed by Max-Neef (in van Zyl 1994) are central to the systems operating on farms e.g. the authoritarianism, charity and paternalism and there is a clear indication that the processes and structure by which workers attain material goods and services (electricity and other needs such as shelter, water and income), impact on the extent to which the service benefits the user. Electricity is made available to worker families, but they cannot afford it and are not supported by a process that ensures that they benefit. Another important aspect of satisfying needs, according to Max-Neefe, is the requirement that the beneficiaries have an 'identity'. Aside from poverty, the 'identity' of farmworkers is largely tied up with a lack of individual or collective power. These factors – together with those discussed earlier such as affordability – impact significantly on the benefit workers may derive from access to services (including electricity) within the current structure on farms.

However, the power of the farmer – as land-owner with property rights and as employer – is unavoidable, and there are no provisions for the particular circumstances of farmworkers (for example, their residence on the land of their employer and his responsibilities for the provision of essential services) in employment law.

Farmers apply for the electrification of worker houses on their farms, in response to DC motivation, and are instrumental in the affordability of electricity by worker families both directly – for example, by paying for the cost of workers' electricity use or supporting the acquisition of appliances by worker households, and indirectly, through the worker's cash wage. Yet there is nothing other than encouragement for them to respond to DC motivation, or play an enabling role in the use of electricity by worker households. In order for this opportunity to be more widely available there would have to be a national process which includes institutionalising the farmer's role in providing essential services and thereby reducing the workers' reliance on 'goodwill'.

And, in order for electricity to play a role in satisfying the needs and alleviating the burdens associated with energy consumption, it would have to be more affordable. The electrification process would have to supply workers with operations information and/or hardware that will enable them to use electricity optimally, as well as provide first-line maintenance support, particularly for solar home systems.

Summary conclusions

Unless the political, social and economic circumstances of worker households on commercial farms change, the benefits from electricity will continue to be limited.
Unless the electrification process changes to include user-information and service and maintenance back-up, benefits from an electricity supply will continue to be severely limited.
It is of dubious value to do further research into the socio-economic impact of access to electricity by farmworker households without addressing these issues.

[4] Satisfiers are the processes by which goods and services are provided.

3 ENERGY USE ON FARMS

3.1 Introduction

This sections looks at the energy sources used by households for particular end-uses. It compares households supplied by different electricity sources, and with different levels of access. On a macro-level, the patterns of energy-use, and the reasons behind these, were found to be similar – regardless of the differences in electrification status and source of electricity on the farms visited. There was unfortunately not enough detailed energy-use information nor indications of the household dynamics that may affect these, to develop an analysis of the households' energy-use patterns on this level.

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Farm ii	Electrified	grid – all	grid – all*
Farm iii	Non electrified	diesel – light & media	diesel – light & media
Farm iv	Non-electrified	not living on the farm	not living on the farm
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Service	*Energy carrier*	
	First	*Second*
Cooking	fuelwood / dung	paraffin
Lighting	electricity	candles
Ironing	fire (dung or wood)	electricity
Radio	dry-cell battery	electricity
Water heating	fuelwood / dung	paraffin
Space heating	fuelwood / dung	blankets
TV	electricity	car battery
Fridge	electricity	paraffin

TABLE 3.1 Services undertaken and energy carriers used

Electricity and electrical appliances

On the whole electricity is rarely used for services other than lighting and in some cases, for media. The reasons for this include the cost of electrical appliances, the cost of electricity use, and a lack of knowledge on how to make maximum use of either a grid or PV supply. On two farms, where various electrical appliances are owned, households reported that they cannot afford to use them. In one instance electricity use is paid for by the household; in the other they are afraid that if they use more electricity they will have to start paying for it.

Those that do not have appliances, would like them and would like to use them. They are aware, however, that they will probably have similar affordability problems, particularly in the context of low cash wages and the availability of free fuelwood and dung. During the household-level study, three households with access to grid electricity provided a list of electrical appliances owned. These are shown in Table 3.2. It is, however, not clear from the household research, to what extent electricity or batteries are used for radios (the farm-level investigation indicated that probably half the workers still use batteries despite access to electricity – see page 22), nor how often electrical appliances are used.

Respondent	*Appliances*	*Electricity cost*
Farm i-hsh 1	two-plate stove / kettle / iron / radio / TV	R24/mnth – worker pays
Farm i-hsh 2	two-plate stove / iron / radio / TV	R24 to R60/mnth – worker pays [1]
Farm ii-hsh 1	radio	R6/month [2]
Farm ii-hsh 2	none	-
Farm iii-hsh 1	none	-
Farm iii-hsh 2	hotplate owned but not used	-
Farm vii-hsh 1	none	-
Farm vii-hsh 2	radio / TV	[3]

TABLE 3.2 Electrical appliance used/owned (besides lights)

No household spoken to, with access to electricity, had an electric fridge. It is unclear to what extent the length of time workers have had access to electricity impacts on the amount of electricity used. On the farm where workers have had access to electricity for 6 years (farm i), one household out of eleven reported using electricity up to a maximum

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1 On this farm, workers are suspicious that the farmer charges for electricity according to the appliances owned rather than the meter reading.

2 In this instance the worker claims that he pays for the electricity, and so does the farmer.

3 A dry-cell battery is used and charged on the farm for no cost.

cost of R60/month, two were reported as having fridges, and about half have electric irons and/or a two-plate stove. But, according to the men and women interviewed in groups, the electric stoves are seldom used. Non-electrical appliances have been retained and are still used, particularly to save on electricity.

Whether electricity would be used to any greater extent if the electrification of farmworker houses in the region had provided for the inclusion of appliances (option 2), and had not been undertaken according to option 1 which provides a capital subsidy but no appliances (Thom et al 1995: 25), would largely depend on whether workers have to pay for the electricity used. One farmer wondered why workers do not make more use of the electricity supply. Workers reported they could not afford to buy appliances. At the same time he commented that, because of the good rations and housing he provided, the workers had no real need for cash. Without a significant rise in farmworker cash incomes, the only factors likely to impact significantly on the farmworker household's electricity use, is access to credit to acquire appliances and accessories, and for the farmer to pay for the cost of electricity use (or, of course, increased wages).

Other fuels and appliances

On the whole, the women make fuel/appliances choices for similar reasons and most of the activities requiring energy and the duties of women in the household remain unchanged by access to electricity: paraffin, wood and dung are used for cooking, water/space heating, and ironing. The main difference is probably that electricity makes light quicker to access on winter mornings. And for those that have electric stoves, there is something to fall back on when the wood is wet, or the weather prevents the use of the brazier outside. Other (non-electrical) fuels and appliances used by households are shown in Table 3.3.

Respondent	*Energy carrier*	*Appliance*
Farm i-hsh 1	wood / coal	woodstove / brazier
Farm i-hsh 2	wood	brazier
Farm ii-hsh 1	dung / wood / paraffin /candles	brazier / flame / fire / iron
Farm ii-hsh 2	dung	brazier / iron
Farm iii-hsh 1	wood / blankets	brazier / iron
Farm iii-hsh 2	wood	brazier
Farm vii-hsh 1	wood / paraffin / candles	brazier / flame / pffin lamp
Farm vii-hsh 2	gas / wood / paraffin / candles	gas stove / brazier / primus / iron / fire / paraffin heater

TABLE 3.3: Other energy carriers and appliances owned/used

Fuels are primarily used by women, and the way workers responded to questions on appliances indicated that there appears to be a sense of ownership tied up with use. More than one worker talked of his wife 'having' rather than using a stove (although this may result from language use or translation).

3.4 End-use analysis

Light and media

All workers spoken to have access to electricity for light except those on the farm where PV-systems that no longer work have been provided. Although one farm (farm iv) does not have electricity, workers in this case live on a neighbouring farm where they do have electricity used mainly for lighting because they do not have electrical appliances. Most farmworkers in the region are said to have access to electric light and accept it as the norm.

Although the use of electricity for media would make this service considerably cheaper, probably about half of workers still use dry-cell batteries for radios despite access to electricity. This is mainly because they do not have the means (hardware or knowledge) to connect the appliance to the wall socket, or the capital to buy a new radio or have their

radio converted, although this outlay may be recovered within a couple of months when compared to the cost of dry-cell batteries. Priced at between R6 and R9 and replaced every one to two weeks, the cost of batteries is significant in relation to the low cash income of workers. No farmers supplied batteries. Neither of the two families with working PV-systems owned a TV (on farm vii a car battery was used for a TV and the farm tractor is used to charge it), and a few other homes – though not visited – reported using electricity for TVs.

About half the worker households on the farms visited have a radio/hi-fi (fewer than the national average reported in Hofmeyr 1994), and about a third have a TV. The PV-systems on only one of three farms visited (incorporating two out of six households provided with systems) are still working but are used only for light.

Cooking

The most frequently used appliance for cooking is the brazier in which both dung and wood are burned. The brazier is kept outside in summer and sometimes brought in during the winter. One woman also has a woodstove in which wood and coal are used, and one incidence of gas-cooking was encountered. Paraffin is also used for cooking. Though unpleasant to use and paid for by workers, paraffin is reported to be more convenient to use than wood or dung and, as such, is a valued fuel. It is used less often than wood or dung, such as on special occasions, while stocks last, or when circumstances dictate e.g. on a Monday morning when in a hurry to get the children off to town for the school week, or when wood is wet. It is also used by those whose only other cooking appliance is a brazier and they need the extra hot plate for a particular meal. Both flame and primus stoves are used. The primus is fast but is said to burn food and make a noise. The flame is reported to be slow but quiet. An open fire is used to cook meals for gatherings. Few workers have electric stoves. These are used primarily when wood is wet or when weather prevents cooking from taking place outside. Most of the workers with electric stoves live on farm i where they pay for their electricity use.

The type of foods cooked are similar on all farms visited. Beans and samp (on five out of seven), and on all farms: maize porridge (on a daily basis – sometimes with cabbage), rice (on Sundays or special days), meat and vegetables (occasionally), and vet koek or bread (maybe monthly). Most cooking takes place on a brazier. Paraffin is often used to cook rice as this is usually cooked on special occasions.

Heating

Space heating is not often undertaken independently. Workers, who keep the brazier outside, reported bringing coals into the house during the winter. A number of workers reported using more wood and paraffin in winter. This indicates that cooking fires are lit more often, or allowed to burn for longer periods after cooking is completed. More paraffin is used, perhaps because workers are prevented from cooking outside because of the cold. Two workers have an electric heater but neither have been used. Both previously had access to grid electricity before moving to their current positions. One moved recently on to a farm with a grid supply, but during the summer, the other moved to a farm where electricity is supplied through a diesel engine and cannot be used for heating. One household (farm vii) uses a paraffin heater.

Refrigeration

When asked about keeping food fresh, workers responded that they cook and store food, or eat everything before it can go off. One wife makes biltong. One household has a paraffin fridge. On the day we visited paraffin was being transferred from the fridge to the stove. Stocks would be replenished at the end of the month in 10 days time, but paraffin for cooking was a higher priority. It was raining on that day, preventing cooking from taking place outside.

3.5 Factors affecting energy-use patterns

On a macro/farm-level, the most significant factor impacting on the energy-use patterns of farmworker households is the cost of energy carriers (and the appliances and accessories to use them), relative to the cash wages received. Secondary reasons are free access to fuelwood and dung, the weather (for example, the use of candles for light when

the electricity goes down and an electric stove when wood is wet), and special or particular occasions (for example the use of paraffin on Sundays and an open fire for gatherings). In the case of PV-systems, a lack of user knowledge affects the extent to which they are used and consequently impacts on the household energy-use patterns.

Apart from candles, farm shops do not sell the energy carriers used, and, since most workers have access to electricity for lighting, this probably has little impact on patterns of energy-use. However, the common use of candles as a back-up lighting fuel may be affected by this.

Factors such as the economic viability of the farm possibly affect the type of worker housing and level of access to electricity but, as cash wages are similar regardless of economic viability, it is unlikely to impact on energy-use patterns. Similarly, the amount of goodwill support the farmer provides, appears not to impact on cash wages or on the workers' use of electricity and other commercial fuels.

Both paraffin and electricity would be used more often if they were more affordable, but because of the level of poverty and dependence on farmers, there is little room for choice. All farms visited had similar access to transport, water and sanitation services, education and health facilities, a telephone, and electricity. Apart from electricity, which affects the use-patterns of lighting fuels, none of these factors impact on the affordability of energy carriers (and appliances) and therefore on fuel use patterns.

On a household-level, a number of questions remain unanswered. Is the amount of cash spent on paraffin for cooking or batteries for radios affected by the power dynamics within the household (since the former are used by women and the latter by men)? Is the amount of paraffin used or outside cooking taking place affected by changes in the household income and time constraints as a result of the women in the household being employed? Unfortunately answers to these questions are not available from the results of the household investigation.

4 PERCEPTIONS OF AND IMPACT OF ELECTRICITY

4.1 Worker perceptions and knowledge of electricity

On the whole workers reported that they would like to use electricity for everything. All workers spoken to appreciate electricity: 'there is nothing bad about it except when it fails – usually during rain storms'. Those who have made the change from using batteries for media purposes report that electricity saves money. It is also said to be quick and convenient: one can `get light by just switching a switch, you don't have to go out and buy candles' and one can `save having to continuously have the car battery recharged, every two weeks or so'. It is also reported to be clean and pleasant to use compared to other fuels. 'Our lives have really improved.'

Others, though they recognise important benefits, had more muted responses. For example, comments by (male) workers who use electricity for lights and radio, include: 'I do not see any difference except that it is cheaper' and 'no significant change except that it is quick'. Comments by women include: 'I did not know it would cost so much to use' (farm i), 'I thought it would be more useful' and 'electricity is the best but we can't afford to use it.'

There is complete satisfaction with electricity when used for lighting or media but dissatisfaction with the cost of electricity when used for anything else. One woman mentioned being happy with electricity only for light because she was sure that if she used it for cooking she would probably have to pay for it and would not be able to afford it.

Households that have electric lights from a diesel generator commented that grid electricity would probably be more convenient and would not only be on at certain times: 'visitors can stay later'.

Perception of the value of PV electricity depends completely on whether the systems are currently working and being used. On the farms where they no longer work, PV is considered useless 'die son is swak nie soos die batterei – hy's sterk' (the sun is weak not strong like the battery). As a consequence it is not worth paying for. For those where the

systems do work, it is considered precious – in one instance the user would not allow his friend to plug in the radio for fear of overloading the system.

Aside from being well aware of the difference in the cost of electricity for lights compared to cooking – especially amongst those who pay for their electricity use, the level of knowledge by users is extremely limited. All workers, who were asked whether they wanted information on electricity and in what form, replied in the affirmative. Replies include: how to use it – on the radio; how it works – on TV; how to be safe – from the employer; and, how to 'make it cheaper' – on TV in the evening.

4.2 Impact of electricity

On the whole responses indicate that electricity for light saves on the cost of candles and the cost and unpleasantness of paraffin. For those few that use it for media, money previously spent on batteries is also saved. On five out of six farms workers do not pay for their electricity use, while on all farms workers pay for candles and paraffin.

The two satisfied PV electricity users expressed a willingness to pay what they saved which was said to be R15/month on candles and R8 to R15 on paraffin (previously used for light). One household continues to spend R10 to R20/month on batteries. In the two households visited, if the system were to be used as designed, between R15 and R30 per month could be saved. One household, where the system was not working, commented that if the systems were working, food would be bought with any money saved.

For those with access to grid electricity, the main impact of electricity is that they have a choice and on rainy days could reduce the burden of cooking. However, because of the potential cost (of both use and appliances) they are unable to exercise this choice freely. On the one farm where electricity is used more widely, workers pay the use cost and any money they may save on candles or batteries, is reported to be cancelled out by the cost of using electricity for ironing and cooking. Apart from choosing to, on occasion, save time and effort when providing a meal and using an electric iron, there appear to be no significant changes to a worker energy-use patterns as a result of access to grid electricity as compared to PV electricity. Unless households' wages increase and electric appliances and the use of electricity for cooking become more affordable, this will probably remain the case.

On a macro-scale, farmworkers' lives are dominated by numerous daily constraints related particularly to the level of poverty they experience. Electricity does not seem to impact significantly on these. There are no income-generating opportunities or extra household income related to the availability of electricity, nor improvements or increased access to services such as education or health. No one mentioned a relationship between electricity and children's schooling, and the value of information received through radio or TV. This access to what may be considered informal education (e.g. knowledge about Eskom, the RSC, or unions), was provided by the use of dry-cell or car batteries (and still is, in the case of half those spoken to).

It is possible that the main beneficial impact of the Eskom/RSC scheme (Section 1.1) is the provision of water rather than the supply of electricity.

In the short term, the benefit side of the cost/benefit equation is rather limited and, except for electric light, workers on the whole carry on as before – largely reliant on unpleasant and time consuming fuels. In the long term, the current low levels of operations and maintenance support could be detrimental to the PV industry and on future use of solar home systems in fulfilling service needs. As far as grid electricity is concerned, there is little doubt that a lack of information and user affordability problems reduce the value of the supply and will undermine any cost recovery potential of a grid electrification programme.

In the long term, a more considerate implementation programme that provides user information and first-line maintenance back-up, together with a significant increase in worker household incomes, could change the balance of the cost of providing electricity and of benefit received.

5 THE ELECTRIFICATION PROCESS

5.1 The RSC/Eskom electrification scheme

Although Eskom is the main distribution agency involved with the electrification of farmworker houses, they do not motivate for this to take place: 'on commercial farms domestic use is not a main focus' (Wilken pers comm). Agrelek markets electricity to farmers but any impact on farmworker house electrification is coincidental. According to Wilken (1996) the original motivation for farmworker household electrification came from the Bloemfontein District of the South African Agricultural Union (SAAU) and the RSC scheme, with Eskom involvement, was launched in 1989 as a result. All farmworker houses visited for the purpose of this study fall within the Bloemfontein district and were electrified as a result of this scheme.

The DC (then RSC) provides a subsidy of R2000 per house for electrification and if water is not available within 10 metres of the dwelling, a further R500 per house is provided for water – both water and electricity are therefore dealt with under the same scheme. Eskom provides a subsidy of R400 per house and no appliances – the original version of Eskom's option 2 (Thom et al 1995: 25) which is still being honoured. 'The total subsidy is designed to cover the cost of connection' (Wilken pers comm). On the farms visited, the subsidy either covers the cost of electrification or a 'limited amount': 'probably less than R200 per house' was paid by the farmer.

The scheme is advertised by the DC through circulars to rate payers and through the local SAAU. According to Viljoen of Bloemfontein DC, 95% of farmers have responded. Applications to the DC are evaluated by Eskom. Subsidies, from the DC, are paid to Eskom who appoint and pay contractors. Electrification goes ahead according to the available funds within a yearly budget. The maximum number of houses allowed by the scheme on any one farm is 10, thus limiting the total amount spent per farm. There are also limitations on the reticulation distances for each house. Though initially either 40Amp or 30Amp was used, Eskom recently settled on a 20Amp circuit breaker.

Eskom originally approached contractors through invitation by public media. However, too many who were obviously not able to undertake the work, responded. As a result of this initial interest, however, five or six contractors were invited to tender. The tender provides for a fixed price contract and Eskom provides a hardware price list.

Conditions of the contract between Eskom and the farmer ensure that any cost in excess of the subsidies is the responsibility of the farmer who is responsible for the cost of electricity use by worker families on the farm (whether workers contribute towards this is up to him). Farm labour is required to dig holes and plant poles or dig trenches and lay cables. To date no application by a farmer has been turned down.

5.2 The electrification process and workers

On the whole, apart from planting poles or digging trenches, workers' involvement in the electrification process is limited to being informed by the farmer that electrification will take place, and on two out of seven farms, being informed by contractors about the safe use of electricity. Electricity is not marketed to workers and they are also not consulted by the RSC/DC or Eskom. According to Wilken, Eskom's Electrowise advisors who deal with providing educational information to consumers are not active on farms but pamphlets in various languages are handed out. On one farm visited, workers mention getting pamphlets in English. Otherwise Eskom's customer service send out brochures to farmers focusing on safety. No workers spoken to knew about Eskom or the RSC's involvement nor had they met anyone from these organisations.

Aside from the information on safety, encountered on two farms, workers are not provided with any information on how to operate or maximise the service provided. For example, there is no information on how to connect appliances (especially radios), or how to look after PV batteries or replace PV light bulbs.

The lack of maintenance procedures (especially for PV) has a significant impact on the farmworker households' access to and use of electricity. Apart from transformers, which are Eskom's responsibility, the responsibility for maintaining systems after installation (both grid and PV) lies with the farmer-owners. According to Wilken, it is the farmers'

fault that PV systems are not maintained: 'farmers get a manual for the PV systems but don't follow instructions'. However, on the farms where PV systems are installed but not working, farmers did not know how nor did they seem interested in how to operate and maintain the systems – not even so far as to supply the appropriate light bulbs.

On two farms the systems first went down when the light bulbs blew: these have never been replaced and the systems have subsequently fallen into disrepair. One farmer replaced the bulbs with normal '60W or 100W' bulbs. As a consequence the system did not provide light and, as far as the user is concerned, is useless. On the farm where the system is still working the farmer plays an active role in maintaining the system – workers 'do not touch it'.

Although it would not be true to say that workers experience problems because of the lack of an appropriate electrification process, their benefit from electricity is certainly limited by the lack of information, user-capacity and operations or maintenance advice, and on being reliant on the farmer. As far as PV is concerned, 4 out of 6 have lost the limited access they had, and with both grid and PV sources they significantly under-utilise the service.

6 SUMMARY AND CONCLUSION

6.1 Circumstances on farms

Work and conditions on farms

Although farms do not provide the rural poor with any real opportunities for development, farmworkers and their families are provided with a level of subsistence: rations – though meagre – ensure that they eat, and employment on farms means they have access to some cash, shelter, water and sanitation services. Young children attend junior schools and there is some form of medical support from farmers and visits by a mobile clinic. In some ways conditions are more stable and perhaps bearable than for many other rural dwellers – this was provided by one farmer as the reason why, when workers do leave the farm, they invariably return.

What makes conditions for workers particularly untenable is their dependence on farmers and the complete lack of any opportunity to improve their lives, including, for example, participation in initiatives that aim to provide for and empower the disadvantaged that are centred in local and regional government. The worker household's benefit from electrification subsidies depends on the farm owner taking up the initiative (though most do, there are those that do not), and only lasts while employed and resident on his farm.

Social structure and relationships

The farmworker households on farms seem to be either close, with strong family ties, or strongly independent of each other. Relationships within households conform to social norms: with men earning most of the income and women doing the home-keeping. The farmer is extremely important to worker families, providing them with everything they have and although on the surface they appear to get on with their employers, the relationship is soured by the low wages received. Besides the children who attend schools off the farm and those that attend off-farm churches, workers have little contact with the outside world.

All workers reported the need and desire for some form of organisation and/or representation, but do not know who to turn to and feel unable to organise themselves.

6.2 Energy use and supply

Use patterns

The majority of workers use electricity for light and about half use it for media purposes; otherwise fuel-use activities appear unaffected by access to electricity. Wood and dung, used in a brazier, is the primary cooking and heating fuel/appliance combination. Paraffin is a secondary fuel and electricity an occasional cooking fuel. After a radio, an iron is probably the next most commonly owned electrical appliance, followed by a kettle and two-plate stove and TV. Refrigeration is probably the least used energy service – electrical or other.

Most of the energy using activities, which are largely undertaken by the women in the household, remain unchanged regardless of the electricity available. The main difference is probably that electric light is cheaper, and quicker to access on winter mornings. Those woman who do have electric stoves have something to fall back on when the wood is wet, or the weather prevents lighting the brazier outside.

On the whole cost of energy sources and appliances is the factor which impacts most significantly on appliance ownership and energy-use in the household. Secondary reasons are free access to fuelwood and dung; the weather (for example, the use of candles when the electricity goes down in a storm and of an electric stove when the wood is wet); and particular occasions, for example, the use of paraffin on Sundays and of an open fire for gatherings. Both paraffin and electricity would be used more often if they were more affordable. 'Electricity is the best but we can't afford to use it.' Workers with PV systems expressed a willingness to pay for electric light what they saved on candles and paraffin. However, the level of poverty on farms is such that a willingness to pay may not always translate into an ability to pay. There may be more subtle forces at play but there is no doubt that circumstances on farms, including poverty, free fuelwood and dung, and dependence on farmers, are the reasons behind farmworker fuel/appliance choices.

Impact of electricity

Although Eskom and the RSC Free State initiative has been one of the few initiatives to electrify farmworker houses in South Africa, the impact of electrification on the lives of farmworkers appears very limited. This is mainly because of affordability problems, but lack of knowledge on the potential use of electricity, and in the case of PV, the complete lack of user operations and maintenance support, also play a role.

Changes to the affordability of electricity (use and appliances) could significantly increase the beneficial impact of electricity. Providing workers with information that would enable them to use electricity more widely for media appliances could also have an impact.

Equity and level of supply

For those farmworkers whose houses have been electrified, access is more or less equitable. No load limiting or regulations by farmers were encountered.

The numerous other constraints on electricity use cloud any attempt to assess the viability of load limited supplies. However, while electricity for cooking remains unaffordable, the use of PV systems and low-load grid supplies are, for worker households under the subsidy scheme, a cheaper and more convenient means of using lights and media appliances.

Electrification process

The electrification process does not involve workers (other than providing installation labour) nor does it provide workers with the support and information needed to enable them to maximise the potential benefits of an electricity supply, as indicated by the use of batteries for radios by at least half of those with access to electricity. On the whole, knowledge about electricity amongst workers is extremely limited.

Without a clearer and more effective management structure (operations and maintenance) for PV systems, they are not a viable electrification option.

6.3 Conclusion

Although this study was intended to be a comparison between farms with grid electricity, those with PV electricity and those without electricity, these are not representative categories. Similar circumstances, as well as similar energy-use patterns – incorporating a limited use of electricity, were encountered on all farms visited. Since 1989 electricity has become more readily available for farmworker families on Free State farms. However, widespread and dominating poverty, problems with the electrification process and limited user knowledge, have significantly reduced the impact of this initiative.

Negative satisfiers[4] as discussed by Max-Neef (in van Zyl 1994) are central to the systems operating on farms e.g. the authoritarianism, charity and paternalism and there is a clear indication that the processes and structure by which workers attain material goods and services (electricity and other needs such as shelter, water and income), impact on the extent to which the service benefits the user. Electricity is made available to worker families, but they cannot afford it and are not supported by a process that ensures that they benefit. Another important aspect of satisfying needs, according to Max-Neefe, is the requirement that the beneficiaries have an 'identity'. Aside from poverty, the 'identity' of farmworkers is largely tied up with a lack of individual or collective power. These factors – together with those discussed earlier such as affordability – impact significantly on the benefit workers may derive from access to services (including electricity) within the current structure on farms.

However, the power of the farmer – as land-owner with property rights and as employer – is unavoidable, and there are no provisions for the particular circumstances of farmworkers (for example, their residence on the land of their employer and his responsibilities for the provision of essential services) in employment law.

Farmers apply for the electrification of worker houses on their farms, in response to DC motivation, and are instrumental in the affordability of electricity by worker families both directly – for example, by paying for the cost of workers' electricity use or supporting the acquisition of appliances by worker households, and indirectly, through the worker's cash wage. Yet there is nothing other than encouragement for them to respond to DC motivation, or play an enabling role in the use of electricity by worker households. In order for this opportunity to be more widely available there would have to be a national process which includes institutionalising the farmer's role in providing essential services and thereby reducing the workers' reliance on 'goodwill'.

And, in order for electricity to play a role in satisfying the needs and alleviating the burdens associated with energy consumption, it would have to be more affordable. The electrification process would have to supply workers with operations information and/or hardware that will enable them to use electricity optimally, as well as provide first-line maintenance support, particularly for solar home systems.

Summary conclusions

Unless the political, social and economic circumstances of worker households on commercial farms change, the benefits from electricity will continue to be limited.
Unless the electrification process changes to include user-information and service and maintenance back-up, benefits from an electricity supply will continue to be severely limited.
It is of dubious value to do further research into the socio-economic impact of access to electricity by farmworker households without addressing these issues.

[4] Satisfiers are the processes by which goods and services are provided.

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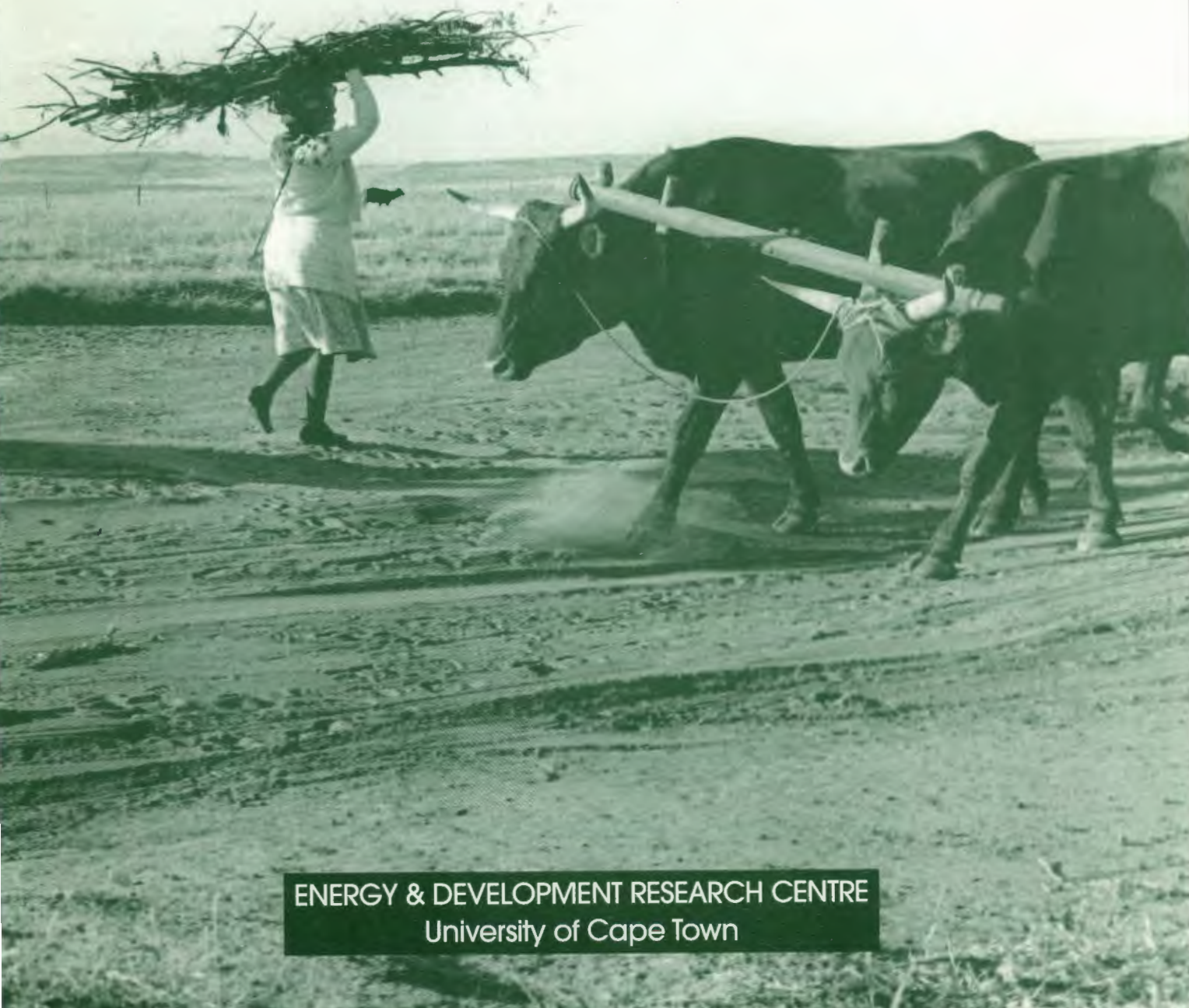

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