The impacts of rural electrification: exploring the silences.

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1. Rural electrification and rural development

Given the current political imperative for rural electrification in South Africa it is worthwhile reflecting on the role rural electrification has played in rural development in the Third World. While the impact of rural electrification programmes on the development of rural areas is determined by specific conditions in each country, a number of valuable insights regarding these impacts have been advanced in the international literature. However, the assessments of rural electrification programmes remain notably silent on the inequalities evident in the implementation of rural electrification programmes.

The primary objective of this paper is to explore both the 'known' and silenced impacts of rural electrification programmes, with a view to proposing an alternative approach to rural electrification and development. To achieve this, the paper begins with a discussion of the rural electrification objectives expressed in various programme assessments and reviews of rural electrification in the Third World. It will be argued that these objectives are determined by particular development assumptions that equate development with economic growth only. The underlying development assumptions of rural electrification funders, policy makers, planners, implementors and evaluators will be explored in some detail.

Following a review of literature concerning rural electrification impacts, the links between the underlying development assumptions and these impacts will be examined. It will be argued that, because rural electrification impacts have been measured against narrowly defined economic objectives rural electrification professionals have failed to take account of the inequalities which arise as a result of their programmes. Particular attention will be given to the way in which rural electrification professionals have obscured and silenced these inequalities in their analyses. Inasmuch as these analyses form the basis of rural electrification policies for funding, planning and implementing agencies, the inherent inequalities of rural electrification programmes are not accounted for. Finally, therefore, the paper will propose an alternative analytical framework for a more holistic approach to development and rural electrification.

1.1 The rationale for rural electrification

Rural electrification programmes are rationalised on the basis of a range of perceived rural development benefits. The expected benefits that may arise from a rural electrification programme can be categorised broadly into those which result in improved social and environmental conditions and those that lead to economic development. Less explicitly stated, but often the intended objective of rural electrification programmes for governments, is to ensure political stability and/or guarantee re-election by providing services, such as electricity, to rural constituencies. However, 'in practically all cases the overall goals for RE is to bring about increased economic development and higher incomes to the people living in the regions to be electrified'(Schramm 1984:503).

The most frequently stated objectives are summarised below. Although there is obviously a relationship between social, economic, political and

environmental objectives, they have been delineated as such in keeping with the reviewed literature.

Economic objectives:

- To act as a catalyst for, stimulate and/or encourage diversity of agricultural, industrial and commercial development in rural areas.
- To replace more costly energy sources, such as kerosene for lighting, diesel for individual motors, irrigation pumps and generators.
- To improve the standard of living of the rural poor.

Social objectives:

- To improve the quality of life through such means as improved quality of light and use of domestic appliances, resulting in time savings particularly for women.
- To improve health care, education and community facilities.
- To stem migration from the rural to urban areas.
- To address urban/rural bias and correct regional imbalances.

Political objectives:

- To improve security and political stability

Environmental objectives:

- To reduce indoor air pollution from fires and stoves.
- To reduce deforestation by replacing firewood or charcoal.

(adapted from Schramm 1984)

It must be noted that the political objectives of rural electrification programmes in various countries do provide a major impetus for the allocation of funds to rural electrification programmes. Also, politicians and governments may well have agendas which are different from those of rural development programmes. Although the paper does not attempt to explore the way in which the objectives of politicians interact with other development objectives it is important not to lose sight of the role of politics in rural electrification programmes.

1.2 Rural development assumptions underlying rural electrification policies and programmes

> Becoming part of the modern world is fundamentally what development means. (Foley 1990: 159)

The history of rural electrification and development should be understood as a continuum: some development paradigms have persisted over time and space, while others have shifted enormously since the origins of rural electrification in Third World. This section will trace the broad trends of rural electrification and development, arguing that its origins are embedded within modernisation theory and the complementary liberal economic development approaches. The assumption that rural electrification is an effective tool for modernisation has not shifted. However, the failure of 'trickle down' and 'redistribution with growth' approaches saw the emergence of neo-classical economic perspectives to rural electrification. The failure of rural electrification to achieve its expected benefits within saw the emergence of neo-classical economic

perspectives to rural electrification in development. Within international debates concerning Third World development, alternative ways of conceptualising development, which challenge the privileged status of economic approaches to development as well as the assumptions of modernisation, have emerged. These 'post-modern' development approaches have not had a significant influence on rural electrification thinking, although elements of this discourse have emerged in recent rural electrification policy debates.

The origins of rural electrification: modernisation and economic growth

Based on the analyses of Western growth and industrialisation, modernisation theory perceived development as a linear process of change which took societies from their pre-modern or traditional status through a series of stages towards the final destination of modernisation. Implicit in this was the transformation of cultural, institutional and social conditions which were believed to inhibit economic growth. The lack of rational self-interest, and the associated socio-economic structures in which such values could thrive had resulted in the 'backwardness' of the Third World (Kabeer 1994).

Central to the modernisation project of the 1950s and 1960s was the transfer of capital and technology, predominantly through development aid and multinational investment, to Third World countries. International development aid prioritised government support for capital-intensive industrial and agricultural production in order to accelerate growth (Moser 1989). Capital intensive technologies were considered appropriate tools for solving development 'problems'. Progress was, in fact, considered to be dependent on technology (Stamp 1989).

Within this paradigm, the rural electrification programme in the United States had proved to be successful in transforming the conditions and economy of the rural areas.

> Once the goal was reached, rural life [in America] improved remarkably. The benefits of electrical technology, such as running water, refrigeration, radio and sanitation lifted farm life out of the preindustrial life conforming to the standards of an industrialised society... [E]lectricity provided...mechanised power for farming operations [and]...could be brought into the home for personal use. Because of its versatility, electric service was the single most important development responsible for ending the drudgery and toil of farm life... (Clayton Brown 1980:x).

Based on the successful experience of the rural electrification programme of the United States 'as evidence that the welfare of people in the rural areas would be improved' (USAID cited in Fluitman 1983:22), funding for rural electrification programmes in the Third World was made available from funding agencies, such as the World Bank and USAID, in the early 1970s. The attitudes towards the role of rural electrification in modernising the rural areas of America were echoed in the Third World:

> Electricity is a potent instrument for inducing modernisation...it strengthens the force of change in stagnant attitudes and responses to opportunity of the rural folk (SIETI cited in Cecelski and Glatt 1982:39).

Firmly embedded within the modernisation paradigm, where development was equated with economic growth, it was believed that benefits of economic growth would 'trickle down' to the poorest (Conway et al 1990). Elements of this approach within rural electrification

programmes are found in the belief that economic growth and increased productivity will indirectly lead to the accrual of benefits, such as employment opportunities to the poor, even if they do not have electricity (as in Barnes 1988; Munasinghe 1987).

In keeping with the values and attitudes of modernisation, the main beneficiaries of economic growth strategies were men (Kabeer 1994; Moser 1990; Stamp 1987). Deeply entrenched western stereotypes regarding the structure of Third World households and the sexual division of labour within them have informed these values and attitudes. Households were considered to consist of nuclear families, where men engaged in productive work stemming from their role as 'breadwinners'. Women, on the other hand, were considered to be engaged in reproductive and domestic work arising from their central role of child bearing and rearing (Moser 1987). As a consequence, mainstream economic development interventions at this time excluded women. The assumption that women's primary role is reproductive, continues to persist in rural electrification programmes.

> Women have better lighting for working and reading and appliances may well eliminate some of the drudgery involved in housework. Rural electrification is one of the few development programmes not aimed specifically at women and children which nonetheless have very favourable consequences for them (Barnes 1988:152).

Dominant paradigms of rural electrification: equity and economic growth.

Increased despondence due to rising poverty, unemployment and inequality saw the rise of equity development objectives with a shift towards a 'redistribution with growth' development perspective of the 1970s. Redressing poverty, inequality and unemployment *within* a growing economy were the central aims of this approach. However, in the late 1970s the 'basic needs approach' argued that it was impossible to redress poverty unless the essential needs of the poor were met. Although it was embedded within an economic development framework, this approach argued for increased government intervention to meet the needs of the poor and for a 'reorientation of growth so that the deprived participate' (Conway et al 1990:18). The basic needs approach focused on providing services such as health, education, housing, sanitation, water supply and adequate nutrition (Thirwall 1972).

Elements of the redistribution with growth approach are evident amongst those rural electrification researchers concerned with the equity dimensions of rural electrification. The objectives of addressing regional imbalances and/or urban-rural biases, and addressing poverty and raising living standards, can also be located within this development approach. In keeping with equity objectives subsidisation policies which specifically target the poorer regions, villages and households are advocated (as in Munasinghe 1987).

As a result of the emerging Women in Development (WID) theorists' critique of development the 1970s also saw shifts in the approach to women in development. Women's productive roles, it was argued, had been ignored by focusing exclusively on their reproductive roles. As a result of neglecting to take account of women's productive roles, development interventions had had a negative impact on women (Kabeer 1994; Moser 1987). Working within this paradigm Cecelski (1992) notes

that agricultural mechanisation, of which electrified pumpsets were an important component, displaced women's wage labour.

Linked to this perspective, WID theorists argued that women's poverty was a result of underdevelopment. Increasing women's productivity was considered to be an important component of alleviating women's poverty (Moser 1987). One of the perceived benefits of rural electrification for women is that improved lighting has led to an extension of their working hours and enabled them to engage in productive work (Barnes 1988). Given that there are concerns about the impact of the extension of working hours on women's health and well-being (Cecelski 1992), it is worth noting that the 'benefit' outlined above is possibly more concerned about the impact of productivity on economic growth, rather than on alleviating women's poverty. Also, with the exception of Cecelski (1992), women are only given cursory attention in the literature concerning rural electrification.

Recent shifts in rural electrification: efficiency and economic growth

As a result of the Third World debt crisis of the 1980s, lending agencies were raising doubts as to whether 'RE was either economically sound or particularly beneficial for the rural populations it was designed to help' (Schramm 1993: 503). Funding for rural electrification from lending agencies, such as the World Bank was cut. Third World countries were forced to curtail their expenditure on energy. Following urgent requests from various Third World countries for funding the World Bank and USAID jointly undertook to review existing projects with the view to identifying key failures and successes for future projects (Schramm 1993). Decisions to fund rural electrification projects, from this point on, were largely based on the economic efficiency of the intervention.

The efficiency approach attributed underdevelopment to poor resource allocation due to incorrect pricing policies and too much state intervention. Greater reliance on free-market forces to allocate national resources were considered the most efficient route to economic recovery. For rural electrification this meant that project selection was determined by the Economic Rate of Return (ERR), only areas which are economically viable should be electrified and subsidies should be eliminated (Schramm 1993, Ramani 1992).

The central question these neo-classical rural electrification professionals asked was 'how to satisfy the variety of energy needs of the population of a given area over a given period of time most efficiently and at least cost. Electrification, and particularly network electrification, should be considered as only one of the available options to satisfy these needs' (Schramm 1993: 510).

Because not many evaluations of rural electrification projects with efficiency objectives have been undertaken, most of the literature available is located within equity frameworks. More recent works, however, have begun to draw on neo-classical arguments, such as removal of subsidies, in their conceptualisation of alternative rural development frameworks for rural electrification (Ramani 1992).

Alternative visions for rural electrification

There is no doubt that electrification has important and efficient productive uses. That in favourable conditions it may well stimulate economic growth

through increased productivity in rural areas, is evident. However, the assumption that rural areas, characterised by poverty, deprivation and vulnerability, will be transformed primarily through economic growth, has been the subject of much debate and criticism of development thought in recent years. A wide range of alternative, and arguably more progressive, development approaches to policy and planning have been advocated. Common to these approaches is the shift away from economic/production centred development to development which starts with the priorities of the poor, and values '... people as the primary development resource,...[considers] their material and spiritual well-being as the end that the development process serves' (Korten et al 1984: 201) and enables the poor 'to demand and control more of the benefits of development' (Chambers 1983: 147).

By the 1980s feminist development theorists and planners were beginning to advocate for development with a gender perspective. While WID theorists had been successful in highlighting the inadequacies of focusing exclusively on the reproductive roles of women in the development process, their exclusive focus on productive roles of women had resulted in an equally impoverished view of women's lives (Kabeer 1994). By advocating that women be integrated into mainstream economic development WID theorists had defined women's economic agency as equivalent to men's and had disregarded women's domestic and familial responsibilities (Kabeer 1994). Proponents of the various gender perspectives of development argued that improving the condition and position of women was contingent on the transformation of the structural inequalities which underpin women's subordination. It is evident form the reviewed literature that rural electrification professionals, from funders to evaluators, have yet to view their development interventions from a gender perspective.

Although aspects of a people-centred development approach, such as participation, are being articulated, there is little evidence to suggest that there has been a shift towards conceptualising rural electrification within this framework for rural development theory and practice. Within his proposed framework, Ramani (1992) argues that participation is one of the basic considerations for rural electrification. However, modernisation and its associated economic growth objectives, which imply a top-down technicist approach to development, continue to inform his understanding of participation.

> Efforts undertaken in India have encountered situations where participation in the *promotion* of smokeless stoves was mainly an outcome of these being provided free of cost; women respondents in a survey linked investment priorities to an improved irrigation system rather than to alternative cooking fuel; and solar cookers were used to store clothes, with the mirror being used for shaving! ...[This] negative experience signif[ies] that, however much one may wish otherwise, there would be situations where participation could become a ritual and a hindrance rather than a positive contribution (Ramani 1992: 57, italics added).

Ramani's selection of this anecdote to argue that 'participation' may prove to be a hindrance is revealing. Participation in this instance involves women attending a meeting where outsiders are promoting/imposing their particular solution to a development problem. The women have not participated in the planning or design of the programme. They have not participated in identifying the problem which the particular programme

seeks to address. Rather than proving that participation can be a hindrance, this example reflects what happens to development resources which are allocated without 'real' participation.

The financial and economic constraints under which rural electrification programmes operate, and the failure of these programmes to achieve their expected objectives have led to the following policy conclusions. If rural electrification is to be successful:

- it should be integrated into rural development policy and planning (Barnes 1988; Ramani 1992); and
- it should be integrated into national energy plans (Munasinghe 1987).

What rural electrification professionals mean by these conclusions is that rural electrification cannot take place in isolation. What is curious, however, is that rural electrification professionals have not begun to question the validity of the dominant development paradigms in which they seek to integrate their programmes. In order to understand why such an exercise is necessary, the links between the impacts of rural electrification programmes and these development perspectives must be examined. Following a review of the impacts of electrification, these links will be explored.

2. The impact of rural electrification on economic growth

There has been little consensus over whether or not rural electrification has achieved its expected development outcomes. Since the late 1970s there has been a shift in attitude towards rural electrification programmes. Optimistic attitudes towards rural electrification were replaced by a more cautious and sceptical understanding of the role of rural electrification in rural development. Assessments and reviews of rural electrification programmes started to suggest that the expected benefits of rural electrification had not been realised (Barnes 1988; Cecelski and Glatt 1982; Fluitman 1983; Foley 1990; Munasinghe 1987; Pearce and Webb 1985; Ramani 1992; Schramm 1993). A move towards a more qualified assessment of rural electrification suggested that 'the availability of electricity supply can therefore be seen as a necessary but not sufficient condition for development beyond a certain point' (Foley 1990:95) and that the impact of rural electrification is dependent on the level of development in that area.

This reassessment has predominantly centred around the role that rural electrification has played in economic development, particularly through programmes aimed at increasing productivity and growth in agriculture, commerce and rural industry; as well as increasing income to households. Each of these aspects of economic development will be discussed in turn below. Silences and gaps in the assessments will be examined, with a view to developing a more appropriate way of understanding the relationship between rural development and rural electrification and thus, our evaluation of the impacts of rural electrification.

2.1 The role of rural electrification in agricultural development

The central question surrounding the controversy about the role of rural electrification in agricultural development is 'whether rural electrification stimulates agricultural development and, if it does, whether an alternative energy programme could achieve the same ends at less cost'(Barnes 1988:

38). The arguments presented in a range of assessments and reviews will be summarised below.

Agricultural production can be affected by rural electrification in three ways:

- Electric powered machinery can be utilised directly in the process of agricultural production, for example, water pumps, fodder choppers, threshers (Barnes 1988).
- Electricity can affect agricultural mechanisation in diffuse ways such as through enabling access to agricultural information through television or through reading by means of improved lighting (Barnes 1988).
- Electricity can be used for agro-processing in rural areas (Barnes 1988), thereby adding value to agricultural products and creating rural employment (Williams and May 1994).

Most of the studies which attempt to evaluate the impact of rural electrification on agricultural development focus on the utilisation of electric water pumps for irrigation. Cursory attention has been paid to other uses of electricity in Third World countries, such as Costa Rica, where it was found that only in dairy, pig and poultry farming was there significant use of electricity. Milking machines, electric fencing, refrigerated storage, warming for piglets and hens, pumped water for feeding, washing and cooling animals were found to be enhanced with the availability of electricity (Fluitman 1983).

India has received the most attention because it provides the richest example of benefits to agricultural productivity (Pearce and Webb, 1985) and because of the comparatively high electricity consumption in the agricultural sector (Cecelski and Glatt 1982). However, it is important to bear in mind that the impacts discussed below must be viewed in light of the specific conditions under which rural electrification took place in India. The lack of any substantial impact in other countries may well suggest rural electrification has a limited application in agriculture in the Third World.

India's rural electrification programmes cannot be examined without locating them in the context of the green revolution of the 1960s and 1970s. The green revolution focused on three interrelated actions:

- breeding programmes for staple cereals that produced early maturing, day-length insensitive and high-yielding varieties;
- the organisation and distribution of packages of high pay-off inputs, such as fertilisers, pesticides and water regulation; and
- implementation of these technical innovations in the most favourable agroclimatic regions and for those classes of farmers with the best expectations of realising this potential (Conway et al 1990).

Also, India's policy of subsidising rural electrification has had a positive impact on agriculture. In contrast to India, oil-exporting countries such as Indonesia and Ecuador, where diesel power is heavily subsidised, have not experienced a growth in electricity connection and consumption rates in agriculture (Barnes 1988).

The impact of rural electrification on agricultural production operates through the role it plays in shifting agricultural practice (Barnes 1988;

Barnes and Samanta 1987). Based on their study of India, Barnes and Samanta (1987) argue that once a village is connected to the grid, diesel pumpsets and traditional methods of irrigation are replaced by electrical pumpsets. With more land irrigated, cropping is intensified and agricultural innovations such as fertiliser, hybrid seed, pesticides are used. Ultimately this leads to increased productivity.

To further support the argument that electric pumpsets provide a stimulus to or result in agricultural innovation, Barnes (1988:61) suggests that 'previous levels of agricultural innovations are not strong determinants of the subsequent number of agricultural [electricity] connections, which would mean that rural electrification may be an important cause of agricultural innovation'. In other words, agricultural innovations such as pesticides, hybrid seeds and fertiliser are used subsequent to the installation of electric pumpsets.

An increase in crop yields, on the other hand, cannot be solely attributed to rural electrification. Barnes (1988) suggests that it is more accurate to consider multiple cropping, agricultural innovations and irrigation as an interrelated set of farm practices associated with high agricultural yields. Drawing on evidence from his study of Indonesia and Colombia, Barnes suggests that the absence of associated agricultural innovations such as hybrid seeds will result in the failure of electrified pumpsets to achieve the expected increase in agricultural productivity.

Coupled with an increase in the use of agricultural innovations, access to credit, communication facilities, printed agricultural matter and agricultural markets were found by Barnes to be crucial for realising increased agricultural production. Comparing his evidence from India with that from Colombia and Indonesia Barnes suggests that in order to increase the productive impact of rural electrification concentrated effort may be needed to co-ordinate rural electrification with other relevant programmes.

There is consensus in the literature that irrigation does result in increased agricultural productivity, and that irrigation using either diesel or electric pumpsets is more efficient than traditional methods of irrigation. India has promoted the use of electric irrigation pumps as part of the green revolution package since 1966. Credit schemes for electric pumps and subsidised tariffs have succeeded in increasing the number of electric pumps in India from 500 000 in 1966 (Foley 1990) to 10 million in 1992 (Sadaphal and Natarajan 1992).

Fluitman (1983), however, argues that it is problematic to mistake the number of pump connections for an impact of electrification. Pumpset growth figures are misleading as they do not take account of pumps that are not used, stolen, unserviceable or disconnected. This observation is related to the unresolved issue of whether the benefits from irrigation can solely be attributed to electrification. Diesel engine pumps have almost the identical benefits of electrical ones. Lift irrigation can also be accomplished cost-effectively using diesel motors (Barnes and Samanta 1987; Cecelski and Glatt 1982; Cecelski 1992; Pearce and Webb 1985). Even in India where electricity tariffs for irrigation are one-tenth of those for commercial use, many farmers may choose to retain diesel pumps or at least use them as a back up. The reasons for this lie with the unreliability of electrical power supply, as well as the fact that diesel pumps can be moved from field to

field, have a small investment cost and low connection cost (Cecelski 1992). The dissatisfaction of farmers with electrified pumpsets is reflected in the growth of diesel pumpsets (Fluitman 1983). Interestingly, farmers who use both diesel and electrical pumps have the best return per acre under irrigation. The availability of diesel as a back up becomes important in the context of an unreliable electric supply (Cecelski and Glatt 1982). Clearly, using both diesel and electricity for irrigation must be viewed in light of the overall cost to the farmer and the Indian economy.

Three important points arise from the conclusions of the various studies undertaken on rural electrification's role in agricultural development:

- rural electrification may have a significant impact on agricultural productivity when it is part of a broader agricultural programme and strategy;
- while increased irrigation has a significant impact on agricultural productivity, it is unclear whether this can be attributed solely to rural electrification; and
- there is little evidence to suggest that electric power for irrigation is better than diesel powered irrigation.

2.2 The impact of rural electrification on small-scale industry and commerce

Rural electrification programmes expecting to achieve diversification and an increase in the growth and productivity of small-scale industry and commerce, have also come under criticism for being less successful than expected.

Where new rural industries in India have been established after electrification, they have been the same as those already in existence. Rural commercial and industrial enterprises include agro-processing, such as grain milling, flour milling, rice husking, cotton gins and oil expellers; retail shops, such as restaurants, general stores, and savings and loan companies; manufacturing firms, such as furniture, tailors and pottery; and services, such as repair shops, battery chargers and sawmills (Barnes 1988). These businesses are small and the sector is characterised by a high turn-over rate. It is argued that electricity is one factor which may give businesses the advantage they need, thereby ensuring their survival (Barnes 1988). By far the greatest productive users of electricity in this sector are the agro-processing firms, especially flour mills, oil presses, cotton gins, rice husking and ground nut crushers (Cecelski 1992; Munasinghe 1987), with little manufacturing activity taking place (ILO 1986). Rural electrification professionals agree that there is little diversification of rural commerce and industry after electrification is introduced into an area.

Further, there is consensus amongst observers that while electricity may in fact stimulate growth, the impact varies significantly from one locality to the next. However, there has been a systematic tendency to overestimate expected productivity gains in the industrial and commercial sectors during the pre-electrification appraisal of rural areas (Munasinghe 1987; Jain in Fluitman 1983). The expectation that rural electrification will lead to an 'explosion' of rural business is likely to remain unfulfilled. A summary of the main points related to growth of rural commerce and industry is given below.

An ILO (1986:60) study of India found that the there 'is no link between electrification and setting up of rural establishments, its impacts on establishments could at best be termed as positive but weak'. Retail enterprises dominated in the study area and only a small percentage of both rural commercial enterprises and industries used electric power, whereas a significant number used non-commercial sources of energy. Similarly an ILO (1984) study of Malaysia concluded that the benefits of rural electrification on commercial and industrial activities were not significant. Very few industries exist in the rural areas in Malaysia and the predominant commercial activities are retailing and coffee shops which can operate easily without electricity. Noppen et al (1990), in their survey of the rural town of Babati in Tanzania found that the use of power for productive activities such as welding and grain milling appears to be limited.

Barnes (1988), however, found that rural electrification does have an impact on the development of small-scale industries and commerce. Rural industry growth rates were noticeably higher for villages with electricity, although the number of businesses in rural areas remains low. He noted that in India most of the businesses had come into being in the last five to ten years. Even though electricity for business is not subsidised to the same extent that it is for agriculture there are a significant number of industries using electricity. During the five years after electrification over thirty-eight percent of the village industries operating in 1980 were established. An assessment study of Costa Rica showed that while there was no 'sudden burst' of enterprise following the introduction of electricity, a few enterprises related specifically to electricity, such as electrical repair shops, were set up gradually over the years that followed electricity supply (Orozco 1992).

However, it is important to note that these findings may well reflect a positive bias. Munasinghe (1987) argues that while rural electrification appears to stimulate agro-industrial and commercial activity, the direction of causality is not clear. Those areas which are 'ready for sustained growth' are likely to be selected for electrification. The access to markets, market conditions, adequate labour supply, levels of literacy, access to credit, access to raw materials, and effective transport and communication systems are also important (Barnes 1988; Cecelski 1992; ILO 1986).

Despite finding that rural electrification is not sufficient to stimulate the growth of rural commerce and industry, the ILO (1984:50) study of Malaysia suggests that with time it is possible that rural inhabitants would be able to take advantage of the opportunities provided by the introduction of electrification by 'co-ordinating its rural entrepreneurship and other rural development programmes with its programme of rural electrification '.

Productive use of electricity by rural households has also been minimal as rural 'cottage' industries are labour intensive and require little or no source of energy (Cecelski 1992). However, studies of Thailand (Cecelski 1992), Indonesia, Colombia and India (Barnes 1988) have shown that the availability of electric lighting in the household enabled household industries to increase working hours which led to increased output and income.

There is concern, however, that the introduction of more capital intensive industries with electricity might lead to the demise of labour-intensive household or cottage industries. Barnes (1988: 79) does not seem to test this assumption but draws the conclusion that 'while this may occur in the long run, the comparisons made between cottage industries with and without electricity reveal that electricity seems to benefit household manufacturing'.

The ILO (1986) study of Malaysia also found that the availability of electricity for already established commercial enterprises resulted in longer working hours and/or enabled the use of additional machinery which increased outputs and profits. Electrification of businesses in Indonesia led, not to a significant increase in employment, but to extended working hours. Barnes (1988) argues that because of the close employer-employee relationships workers are not substituted by machinery or extra hiring of other workers, rather the salaries are increased.

While it may be more profitable for flour mills in India to operate by means of electricity many owners of these mills who had switched from diesel to electricity experienced a decline in the output because of the poor quality of electrical supply (Fluitman 1983). Barnes (1988) found that the subsidisation of diesel in countries such as Indonesia and Ecuador has resulted in very few shifts from diesel to electric power. Many businesses and industries in his study of Indonesia do expect to shift to electricity.

In conclusion, there is evidence to suggest that rural small-scale industry and commerce is enhanced by electrification programmes. Stimulating growth and productivity of the rural business sector has long term effects and depends on a range of socio-economic conditions which exist at a local, national and international level. It is not possible to attribute the growth in rural business solely to electrification.

2.3 The impact of rural electrification on household productivity

Besides the impact of electricity on household industries, a number of studies have argued that the provision of electricity for rural households can result in increased productivity. This can be achieved through three mechanisms. First, improved lighting in Thailand (Cecelski 1992) and India (Barnes 1988) resulted in the extension of women's working hours in agriculture as the preparation of the evening meal could be delayed. Secondly, in the very few households where modern cooking technologies [such as the *bijuli dekchi* of Nepal (Nafziger et al 1994), rice cookers in Thailand (Cecelski 1992) and hot plates in Colombia (Barnes 1988)], are used in conjunction with improved lighting, electricity plays an important role in extending productive working hours. Thirdly, improved lighting enables people, especially women, to spend the evenings involved in income generating work such as the making of handicrafts (Barnes 1988).

A number of studies drew attention to the fact that the number of hours spent sleeping had been reduced as a result of extended working hours. However, it is only Cecelski (1992:154) who suggests that the increase in productivity as a result of extended working hours may well have negative impacts on the health and human well-being:

> Can the reduction in sleeping hours from 7½ to 5½ hours really be considered as an unmitigated benefit for these households?

3. The impact of rural electrification on the social and environmental conditions of rural areas

Consistent with the broad equity and efficiency objectives of modernisation, rural electrification programmes are expected to result in improved social and environmental conditions for rural people, in conjunction with stimulating economic growth. While not all social objectives are perceived of as arising from economic growth, they are coupled with anticipated economic objectives.

3.1 The role of electrification in transforming the social and environmental conditions of rural areas

Arising from the objectives of rural electrification programmes, assessments have focused on the impacts on the poverty; equity; quality of life; social infrastructure; migration; regional imbalances; and deforestation.

3.1.1 Quality of life

The targeting of households continues to be a major impetus of rural electrification programmes. While social benefits of household electrification have fallen short of expectations, there is consensus in the literature that the quality of life for households which can afford electricity has been improved.

This is achieved through access to improved lighting and appliances. As mentioned earlier, these benefits are thought to be enjoyed primarily by women and children as they spend more time in the home. In most households, lighting is the exclusive use of electricity, as few households can afford to buy appliances and/or pay for the electricity. Cecelski (1992:146) argues that 'the amenity value to rural households of improved lighting should not be underestimated, even at low consumption rates'. She notes that in the countries reviewed in Asia, both higher-income and low-income households are willing to pay more for electricity than their paraffin expenditures indicate. The benefits of improved lighting include studying for children; reading for women, men and children; and domestic work for women (Barnes 1988; Fluitman 1983; Cecelski 1992; ILO 1986; ILO 1984; Munasinghe 1987). The use of electricity for fans, televisions, radios, irons and even refrigerators is found in higher-income rural households who can afford these appliances (Cecelski 1992). Barnes (1988) argues that appliances and lighting have eliminated the drudgery of household work for women. In Colombia this has meant that women have more time for leisure activities. He suggests that this is in conflict with the expected productive benefits of electrifying rural households:

> While in homes without electricity women anticipate doing more productive work in the evenings once they adopt electricity, these positive expectations are not fulfilled. Women seem to work less in the evening and spend more time on leisure activities' (Barnes 1988:144).

3.1.2 Migration

Foley (1990) asserts that one of the persistent myths regarding rural electrification is the belief that it will put an end to rural-urban migration. In fact, it is argued that the reverse may well be true. In India, Barnes (1988) found that villages with electricity had higher permanent out-migration and lower-seasonal out-migration. Seasonal migration was found to be lower because of the increased demand for labour due to multiple cropping and higher crop yields. While out-migration for

education was significantly lower in areas with electricity, migration for employment was higher.

Barnes (1988) attributes the higher permanent migration for employment to an increase in the standard of living of those found to be moving to the cities to find employment, particularly as civil servants. On the other hand, rural-urban migration may well prevail when agricultural development, through increased mechanisation and land consolidation, reduces people's employment opportunities in rural areas and they move to the cities (Foley 1990). Furthermore, Schramm (1994:506) attributes the increase in migration to increased information which points to 'greater opportunities elsewhere'.

In Colombia, however, Barnes (1988) found that areas where electrification had taken place were predominantly in the coffee-growing region of the sample. Here more in-migration was taking place, possibly as a result of the employment opportunities. Very little out-migration occurred. He argues that the impact of rural electrification on migration would be an 'indirect impact through the creation of jobs'. This would seem contrary to what Barnes argued earlier in his study: that the effect of electricity has not had a significant impact on agricultural and industrial productivity in Colombia.

In conclusion, where rural electrification has contributed towards agricultural development, there may well be a shift in migration patterns, either through increased employment opportunities for seasonal workers, or through labour displacement due to agricultural mechanisation. The impact of rural electrification on productivity and employment creation in rural areas has not been significant and so it is unlikely that rural electrification has a substantial role to play in reducing rural-urban migration for employment. It is impossible to come to any conclusion about the direct casual link between migration and rural electrification. Attempts to do so obscure the complex and inter-related social, economic and political conditions in specific localities which may well result in migration to and from other centres.

3.1.3 Social infrastructure

The use of electricity for street lighting, water pumping and public buildings; and by rural schools, health clinics, hospitals and community organisations are also mentioned as important benefits of rural electrification programmes.

Improved security as a result of street lighting is perceived as a major benefit to rural villages (Cecelski 1992; Fluitman 1983). However, in India and Pakistan, rural villages have been unable to sustain the operating costs of street lighting and so this benefit has not materialised (Cecelski 1992). Improvements in the supply of water for domestic use, through more efficient pumping, were also perceived as a benefit of rural electrification by respondents in the ILO (1986) study in India. The electrification of schools facilitates the establishment of night classes and adult literacy programmes (Cecelski 1992).

However, rural electrification assessments and reviews give only cursory attention to the impact of electrification on social infrastructure. This probably stems from the experience that the use of electricity in social infrastructure has seldom materialised (Cecelski 1992). The reasons for this are threefold. First, this relates to the uncoordinated manner in which

provision of rural electrification for social infrastructure occurs. Where social infrastructure is co-ordinated, the benefits derived from electricity are great. For example, in the Philippines electrified communal water systems and health infrastructure played an important role in lowering infant mortality and improving health. Secondly, government departments, local governments and institutions cannot afford the cost of connections, equipment and operating costs associated with electricity. Thirdly, schools are often not electrified because classes occur in the daytime and funds are not available to finance the electrification of schools (Cecelski 1992).

3.1.4 Deforestation

Another persistent myth is the belief that rural electrification will reduce deforestation. From the studies reviewed, it is evident that this objective of rural electrification has been dethroned.

Besides the fact that the relationship between woodfuel and deforestation is not particularly well founded, very few households using electricity can afford to purchase cooking appliances or the operating costs associated with using them (Barnes 1988; Cecelski 1992; Foley 1990; ILO 1986; Nafziger 1994). Even in households where electric cooking appliances are used, only a portion of the woodfuel consumption is substituted with electricity. Certain foods are better suited to fuelwood cooking, cooking appliances may not be available or in disrepair and pots may not be suited to electric cooking appliances (Cecelski 1992; Nafziger 1994).

3.1.5 Equity

The objectives set for early rural electrification programmes of addressing poverty, and reducing urban/rural biases and regional imbalances have been the subject of much criticism. Rural electrification was then perceived as an effective instrument in redressing the regional inequalities in Third World countries. Urban biases inherent in the allocation of resources would be reversed. Also, at the village level, increasing the productive uses of electricity would 'narrow the gap' between the poor and the rich by creating new jobs and improving the standard of living of the poor (Barnes 1988).

However, assessments of rural electrification programmes soon pointed to the fact that 'there was a marked tendency for rural electrification to accrue mainly to better off and influential people' (Munasinghe 1987:10) and that electricity predominantly reached more prosperous farms, businesses and villages (Fluitman 1983).

Barnes (1988) contends that existing regional inequalities have not worsened as a consequence of rural electrification, as in both 'advanced' and 'less advanced' villages rural electrification is associated with improved farming practices. Agricultural innovations are associated with rural electrification, whether villages are poor or wealthy. However, the percentage of the population electrified in poorer countries such as Tanzania is a mere 10%, consisting of high-income groups in towns and larger villages (Foley 1990).

In the short term rural electrification benefits initially accrue to the relatively wealthier people in rural areas. Rural electrification has benefited medium and large farmers, while remaining beyond the reach of small farmers and landless labourers (Fluitman 1983). Wealthier households are

able to afford connections first, and are also more able to exert political influence over which villages will receive electricity first (Cecelski 1992; Barnes 1988). Also, distribution of appliances favours relatively wealthy rural dwellers (Barnes 1988). It has been argued that subsidies (which are often aimed at the poor), have in fact benefited the relatively wealthy sectors of rural communities (Fluitman 1983).

Barnes (1988) asserts that the long-term benefits of rural electrification seem to be less inequitable. In areas which have been electrified for long periods more low-income households have been electrified. Also, in India some poor farming areas which have improved their crop yields as a consequence of electrification may well continue to increase their productivity. While the equity problems associated with rural electrification may be temporary in countries aiming to reach 100% household electrification, where income differences are great and the cost remains high relative to incomes, it is likely that this situation will persist (Cecelski 1992).

The issues concerning inequality outlined above are dealt with in relation to broad categories such as region, village and household. However, women generally receive a 'special' mention in sections dealing with equity in the literature. The positive impacts of rural electrification on women are usually espoused, with few authors suggesting that impacts may be negative.

> Recent literature on agricultural development and women's participation in the labour force concludes that agricultural development can have an adverse impact for rural women, but women and children are apparently prime beneficiaries of rural electrification. Lights and appliances can have a significant impact on household work (Barnes: 144).

Barnes (1988) suggests that the loss that women experience through displacement in the labour force is compensated for by the benefits experienced through household electrification. However, Cecelski (1992) suggests that the effect on women's overall work and income cannot be assumed as it varies from one locality to another. It has been found that women may benefit from a reduction of their workload through access to electrified grain and food processing facilities. However, in Indonesia and Bangladesh women's wage labour in rice production was found to be displaced through mechanisation (Cecelski 1992). These issues, however, are not explored fully in the literature reviewed and a clear picture of the differing impacts of rural electrification on men and women does not exist.

In conclusion, in the short term rural electrification has resulted in inequalities between regions, villages, farms and households. While there is some optimism that these inequalities will dissipate over time, there is little guarantee that this will occur. Inasmuch as the analysis outlined above raises some important points concerning equity, there are resounding silences. These silences will be explored in the next section.

4. Silences in the assessment of the impact of rural electrification

> What we do in the world reflects what we know about it, and what we know depends on how we go about knowing, or in other words when thinking about change we should start by thinking about thinking (Bawden and Macadam cited in Kabeer 1994).

Thus far this paper has located rural electrification within different development paradigms. The various understandings of its impacts on economic development, as well as on the social and environmental conditions in rural areas have been discussed. In order to move towards a more holistic understanding of rural electrification as rural development, it is necessary to begin to flesh out the links between these development perspectives and the rural electrification impacts, both those 'known' and those which remain hidden.

Setting objectives and realising benefits: whose agenda?

Before attempting to explore these we need to briefly remind ourselves of what rural electrification professionals 'know', namely; that electrification is an effective instrument for modernising the rural areas of the Third World through changing attitudes and transforming behaviour in order for economic growth to occur. Within the broad framework of modernisation, equity, and, to a lesser extent, efficiency objectives of economic development ideologies have shaped rural electrification policies and programmes.

It is logical to begin with the objectives of rural electrification programmes as it is against these that the impacts of these programmes are assessed. Clearly, the question which needs to be asked here is: what development 'ends' are to be met in rural electrification programmes?

The principle objective of modernisation and economic development, be it equity or efficiency, is economic growth. While there is acknowledgement that economic growth in itself is not the development 'end', it is the priority of rural electrification programmes. Economic growth needs to occur before the real 'ends' of rural electrification programmes; that is, addressing the living standards or improving the quality of life of the poor, are met. Clearly, expanding economic activity is important in alleviating poverty. However, as Kabeer (1994) argues, 'the preoccupation with maintaining the conditions of economic growth has detracted energy and resources from attempts at redistribution to meet the basic needs of all'. Hence, the 'ends' and 'means' are conflated.

It follows then that if rural electrification planners and policy makers are preoccupied with economic growth, programme objectives will be set to meet these interests, rather than those defined by the rural poor. Coupled with this, the belief that electricity is an effective modernisation instrument, results in the imposition of technical solutions to development problems. In the language of Robert Chambers (1983), rural electrification policy and planning reflect one of the central biases of development, namely, that priorities and objectives are set by outsiders, planning is 'top-down' and the technologies of, and the attitudes and values embodied in the modernisation project, are imposed on rural people.

This bias has been central to the failure of numerous development interventions to meet the needs of the poor on the one hand, and failure to realise specific development objectives, on the other. The promotion of fuel-efficient stoves by outsiders and the rejection of these technologies by rural women is but one example which bears testimony to this. By failing to understand the livelihood strategies, needs and priorities of the poor, scarce development resources have been squandered on programmes which proved 'astonishingly erroneous' (Chambers 1994).

The values inherent in such a bias are also evident in the analyses of rural electrification impacts. For example, rural electrification professionals assert that the absence of complementary programmes aimed at creating conditions conducive for the development of small businesses has resulted in the failure of rural electrification to realise its full potential (Barnes 1988; Munasinghe 1987). Their analysis fails to interrogate whether the establishment of small-scale businesses is in fact a priority of rural people in the localities in which rural electrification programmes are implemented. By assuming that economic growth will ameliorate the conditions of poverty in the rural areas, rural electrification professionals have imposed their priorities and solutions without any acknowledgement that their priorities may well be out of kilter with the priorities of many rural people. Perhaps the failure of rural electrification programmes to realise their objectives lies more with this reason than with the absence of complementary programmes which also seek to set priorities for the rural poor.

The 'error' and silences implicit in such an approach have been debated at length amongst rural development professionals of the 1980s and 1990s. Drawing on the major debates from both this literature as well as feminist development literature, the following section will attempt to address the inadequacies of the current analyses of the impacts of rural electrification.

The privileged status of economics

Inasmuch as the rural electrification controversy stems from the fact that it is an expensive development intervention, and that national resources in Third World countries are scarce, economics is certainly important in the analyses of rural electrification programmes. However, the problem with the current analyses relates more to the privileged status given to economics within development, rather than whether or not it has a role to play in our analyses of these programmes (Kabeer 1994). Examination of the method of inquiry, the criteria for assessment, the information sought and the values, attitudes and beliefs that underpin each of these components of analysis: in short, *how* rural electrification professionals 'go about knowing', becomes crucial if we are to realise the implications of the privileged position of economic perspectives in development.

How rural electrification professionals 'go about knowing' '

> [The] reductive approach to knowledge implies that the complexities of...society can be broken down into constituent parts and analysed separately from each other (Kabeer 1994:73).

Reductionism is one of the most significant ways in which the rural electrification professionals have 'gone about knowing' the impact of their interventions. There are two levels at which a reductionist approach is evident: first, impacts are assessed according to economic conditions and criteria only; and secondly, only causal links between economic conditions and rural electrification are made.

For example, where assessments concern the impact of rural electrification on agricultural productivity, only economic factors which determine an increase in productivity are accounted for. The central research questions include: 'have electric pumpsets led to agricultural innovations?' or 'do electrified pumpsets increase crop yields?' or ' when comparing diesel and electrified pumpsets, which form of energy leads to an increase in the value of output per hectare?'. However, by focusing exclusively on the

economic factors which determine an increase in productivity, the other equally significant factors such as the political, social and institutional factors are not accounted for. In other words, the path, rather than the process of economic growth is analysed, with the result that the critical issues of power and inequality remain hidden (Kabeer 1994). Questions such as 'what are the social relations of power which determine rights, obligations, access to and control over productive resources?' remain unasked.

Further examination of the way in which this essentialist analysis has obscured the complexities of power and inequality will follow with particular attention paid to the way in which equity is defined and societal institutions are conceptualised.

Conceptualisations of household, farm, village and community

'Community', 'village', 'farm' and 'household' are the units of analysis in rural electrification assessments. They are conceptualised within an economic framework, as units of production or consumption, and from the 'top' or supply perspective, as clients.

With the exception of differentiating between 'wealthy' and 'poor' villages, communities, farms, and households are aggregated units. However, the terms 'wealthy' and 'poor' are equally as aggregated. They are defined in narrow economic terms according to those which can afford connections and appliances (wealthy) and those which cannot afford them (poor). It follows that these units, besides their economic status, are assumed to be homogenous. Other factors, such as the social, cultural, institutional and political, which together with economic factors, interact to produce the social relations of power within and between units, are ignored. Conflict of interest and inequality which stem from the social relations of power remain hidden from the analyses.

Other social science studies which frame their analysis within a social relations framework, have, for example, shown there is evidence of increased social tension between the beneficiaries and non-beneficiaries of an irrigation scheme, for example, in the village of Chityal in Andrah Pradesh. Tensions have arisen because households previously of the same economic, class and caste status occupy different positions within the village because of their access to irrigation (Groverman et al 1984).

The analysis of the benefits of rural electrification is particularly disturbing at the household or farm level. None of the analyses attempted to analyse the impacts of rural electrification within the household. The absence of this analysis is significant because the household is the 'basic unit of society in which the activities of production, consumption and reproduction' take place (Roberts 1991: 62). Hence, it is from the position of household, that interaction with societal institutions occurs. For those working within a social relations framework, interaction is conceptualised more broadly to include the complex web of political, cultural, social and economic reality.

On the other hand, for those working within a narrow economic perspective, this interaction would occur between the household and the economic reality. From this perspective, households are perceived to be homogenous units, where economic choices are made by individuals within the household in order to 'maximise family welfare' (Evans 1991), for example, whether or not to allocate resources to an electricity

connection for the household. It follows that benefits are assumed to be uniformly felt. Such an analysis obscures the significance of power relations, especially of gender, in influencing economic and social behaviour (Evans 1991) and assumes that household members share the 'fruits' of production equally (Wilson 1991).

As Groverman and Van Walsum's (1994) study reveals, within the small and marginal households comprised largely of 'lower' castes and classes which do have access to irrigation, there has been a shift in the gender division of labour. Women are responsible the 'traditional' food crops while men have control over 'modern' cash crops. Coupled with this, men have gained control over productive resources, such as credit.

It is clear from this example that the social relations of gender, which are mediated by class, caste and economic status, have influenced social and economic behaviour. The gender division of labour has shifted as a result of access to irrigation, and women and men within households have differential access to the productive resources. It cannot be assumed, then that the benefits of rural electrification will be felt equally within households.

The discussion above raises the question of what it is that rural electrification professionals understand by equity.

Rural electrification definitions of equity

As shown above, rural electrification professionals are unable to take account of power relations within their analyses because of the reductionist methodologies of aggregation. Therefore, the meaning which is assigned to equity can only be a partial one.

The predominant meaning assigned to equity is related to access to electricity and its concomitant benefits across broad aggregated categories such as regions, villages and households.

Where attempts are made to take account of criticism concerning the equity dimensions of agricultural mechanisation, such as the resultant inequalities in land ownership, the analyses are impoverished. For example, Barnes' argument that there is no positive association between land concentration and rural electrification is based on the assumption that land concentration should only occur after the year in which electrification takes place.

The attempt at determining causality between rural electrification and land inequality fails to acknowledge that rural electrification is but a component of the larger agricultural package of agricultural development. Furthermore, emphasis on land ownership reflects a narrow understanding of land equality. The social relations of power which determine different people's rights, obligations, access to and control over land are not accounted for. For example, even in India where the women have legal title to land, the social relations of power operate in a myriad of ways to subvert this legal right (Argawal 1988). Or, as many social scientists have pointed out, men and women from lower caste households, who don't have access to irrigation and other agricultural 'innovations', may become so marginalised through shifts in agricultural practise that they leave their land fallow and labour on others' land (Groverman et al 1994).

The only instance where the meaning assigned to equity is not related entirely to access to electricity and its concomitant benefits, is in the cursory attention given to women. It is worthwhile noting that Barnes (1988) and Cecelski (1992), mentioned the fact that women may be negatively affected by agricultural mechanisation. However, Cecelski does not disaggregate the term women, nor does she locate her analysis in a social relations framework. As a result of treating women as an homogenous group there is no sense of sets of social relations which determine which particular women are displaced through agricultural mechanisation.

Valuing women's work

The assumptions concerning women's roles have been explored elsewhere in the paper. As a result of the emphasis on economic growth, rural electrification professionals have either disregarded women because their roles were assumed to be reproductive, or they have promoted their productive roles in order to achieve increased productivity. Both perspectives offer an impoverished view of women's lives. Equally significant, however, they ignore the contribution of women's unpaid labour namely, their reproductive work to economic activity and human development (Bakker 1993).

Arising from the fact that women's reproductive work cannot be enumerated in conventional economic analyses, it cannot be assigned a value by the market. Following the axiom of 'if it can't be counted it doesn't count', reproductive work is given secondary status in the resource allocation of development programmes. As a result, 'the care and reproduction of human beings, undertaken largely outside the marketplace, will always be excluded from any planning framework which relies solely on the market to determine values '(Kabeer 1994: 79).

The finding that the use of electricity for social infrastructure such as schools, water pumping, hospitals and clinics has seldom materialised bears testimony this. Rural electrification programmes prioritise economic objectives in order to increase productivity, with the result, those dimensions of Third World women's lives which contribute towards caring for human well-being are not catered for. While subsidisation policies may exist for electricity use in agriculture, for instance, the same does not often apply for social infrastructure. As Cecelski (1992) notes, government departments, local governments and institutions cannot afford the associated costs of electricity.

Furthermore, Bakker (1993) argues that the assumption that reproduction lies outside of economic inquiry has obscured the asymmetrical allocation of these resources. With the exception of Cecelski (1992), few rural electrification professionals mentioned the impact of electrification on social infrastructure.

Conclusion

Thus far this paper has argued that the rural electrification policy and programmes embody the values, attitudes and objectives of modernisation and economic growth. Electrification is considered to be an effective instrument in redressing poverty, inequality and unemployment through economic growth. Hence, the primary objective of rural electrification programmes is to increase productivity and income levels. While rural electrification programmes have enjoyed some success in increasing

productivity and income levels, as well as improving quality of life through access to lighting and appliances, objectives of redressing poverty and inequality have fallen short of expectations. The benefits of rural electrification programmes have accrued mainly to wealthier regions, villages and households. The analyses reviewed remain particularly silent on the inequalities evident in the implementation of rural electrification programmes.

Rural electrification impacts are measured against defined programme objectives which privilege economic growth. As a result, the impacts have been evaluated almost exclusively according to economic criteria such as productivity and income. Where benefits fall outside of the parameters of economic growth, rural electrification professionals find it difficult to measure them. In many instances, they too, are evaluated in terms of their impact on productivity for example, where access to improved lighting extends hours available for productive work.

The result is an impoverished and reductionist analysis of rural electrification impacts. Herein lies the central contradiction for rural electrification professionals who seek to address poverty and inequality through economic growth. Their analysis does not take account of the broader social, political, cultural and institutional contexts within which programmes are located. These factors, together with economic factors, interact to produce the social relations of power which ultimately determine different people's choices and behaviour. By failing to take account of the social relations of power, the inequality which rural electrification professionals seek to address is obviated from their analyses and their understanding of reality and therefore, their policies and plans.

The point of the arguments outlined in this section is not to discard economic analysis and perspectives, but rather to reverse the privileged position it has within rural electrification policy debates. Furthermore, the insights and perspectives of political economy theorists have not influenced these debates. It is evident that the attempts by these economists to incorporate concepts of power and inequality into their analyses (for example, Sen 1981) have not informed rural electrification policy and practice. Feminist economist perspectives, which acknowledge that it is impossible to understand reality through an economic guise only, and suggest that both economic and social relations analyses are important (for example, Wilson 1991) have also had little impact on the way in which rural electrification professionals understand the impact of their interventions.

5. Conclusion: Towards a more holistic approach to rural electrification and development.

How then, can electrification play a role in redressing the poverty, deprivation and inequality which characterises rural areas? That electrification presents significant benefits for rural people is not in question. However, rural electrification professionals need to reconceptualise their definition of development if rural electrification programmes are to move beyond generating and perpetuating social inequalities. Reconceptualising development requires reversing the values and attitudes embodied in its meaning, as well as the behaviour that these values and meanings give rise to.

Reversing the agenda

The first 'reversal' necessary for a transformed development perspective on rural electrification concerns the privileged position of economic growth in rural electrification policies and programmes. Such a reversal would imply that economic growth is not the 'end' of the development process. Rather, economic growth would be considered as one of the mechanisms through which rural needs and priorities can be met. After all, 'while...investment in human welfare is not possible without economic growth, it is also the case that economic growth requires - and is intended to achieve - the health and well-being of people'(Kabeer 1994: 84).

Coupled with this shift in perspective, the second reversal pertains to the notion that electricity is an effective tool of modernisation. Instead, electricity would be considered to be one of many forms of energy that could meet the different needs and priorities of rural people. This requires that rural electrification programmes are defined within the parameters of integrated energy planning which approaches energy provision from the perspective of the needs and priorities of the rural people and prioritises and co-ordinates supply-side options to fulfil these needs.

Reversing priorities and needs

Flowing directly from this shift in perspective, the third reversal necessarily implies placing people and their needs, rather than economic growth, at the centre of rural electrification policies and planning. As we have argued, development priorities and objectives which have been imposed from the 'top' by outsiders have more often than not, failed to address the needs and priorities of the poor.

It is by enabling different rural women and men to define their needs and priorities, and ensuring that these needs and priorities are understood, that rural electrification programmes are more likely to achieve the overarching development goals of redressing poverty and inequality. Understanding the needs and priorities of the poor require that the values of the 'top' and the relations of power are reversed (Chambers 1994). This does not imply a 'full revolution...from one powerful orientation to the another which is equal but opposite, but rather a weakening of the top-down field, freeing and enabling lowers to assert their priorities, to interact and learn laterally from colleagues and peers, and to make demands upwards'(Chambers 1993: 25).

Reversing the 'way of knowing'

> If the professional ego of planners had been less concerned with reductionist calculations, and more with the empirical field reality, they would not have been so misled. The redefinition of professional ego implies change to eclectic pluralism, embracing error, acknowledging complexity and diversity, and learning through successive approximation. The lesson is to link professional prestige and ego with doubt, critical self-awareness, and enabling others (Chambers 1994: 25).

In order to facilitate an understanding of different rural people's needs, the fourth reversal is concerned with reconceptualising 'reality' and the factors which determine people's behaviour and choices. Rather than a reductionist analysis of 'reality', an alternative perspective would acknowledge complexity.

This presupposes that the choices and behaviour of people are not mediated by economic factors exclusively. Instead, the social, cultural and

political factors interact, together with economic factors over time and space, to produce the social relations of power which ultimately determine the choices and actions of different individuals.

Reversing modes of analysis

Furthermore, an analysis within a social relations framework ensures that the inequalities of gender, race and class inherent in rural electrification interventions are made explicit, rather than subverted and hidden. The fifth reversal, therefore, requires a change in the mode of analysis of rural electrification professionals in order to make inequalities and power more explicit. Rather than assuming that villages, communities and households are homogenous units of analysis, an alternative analysis would treat them as socially constructed. This signifies that social relations of power operate within and between these 'units' to produce inequalities and conflict of interest. Rather than aggregate groups such as 'the poor', 'the wealthy' and 'women', an alternative mode of analysis would acknowledge the diversity of needs and interests, which are shaped by social relations of power, within these groups. It is only by disaggregating groups, seeking out difference and diversity, and making visible the conflicts of interest that exist, that rural electrification professionals can begin to understand the reality of people's lives and therefore define their actions accordingly.

Revaluing reproductive work

The sixth reversal requires a shift in the way in which rural electrification professionals value productive work above reproductive work.

> If the satisfaction of human need rather than the exercise of market rationality is taken as the criteria of production, then clearly a much more holistic view of development becomes necessary.... Activities which contribute towards the health and well-being of people would be recognised as productive regardless of whether they are carried out within the personalised relations of family production, the commercialised relations of market production, or the bureaucratised relations of the state (Kabeer 1994: 84).

In other words, it is necessary to conceive an extended framework, which acknowledges the contribution to *economic* activity of the aspects of women's work which centre around caring for human well-being and the reproduction of life. Implicit in such an approach is an understanding that economic growth is contingent on the health and well-being of people. It is only by assigning equal value to reproductive and productive work that rural electrification professionals will allocate resources to include activities which contribute towards caring for human-well being and reproduction of life.

Redefining equity

Clearly, the reversals discussed above require an alternative definition of equity for rural electrification professionals. As we have argued, the meaning assigned to equity by rural electrification professionals relates to access to electricity and its concomitant benefits, across broad disaggregted units of analysis, such as regions, villages and households. Their analyses fail to take account of the rights, obligations, access to and control over these resources, within these categories. Thus, the meaning of equity is a partial one. An alternative definition of equity would take account of the social relations of power which determine unequal access. Empowerment strategies to address these unequal power relations would be at the centre of such a vision of equity.

Aspects of empowerment concerned with building human capacity to challenge the social relations of power which result in powerlessness and subordination, such as strengthening organs of civil society, be they formal or informal groupings of men and women, clearly cannot become the responsibility of rural electrification professionals.

Within an alternative approach to development, however, rural electrification professionals are able to meet some of the aspects necessary for empowerment. First, empowerment begins by enabling marginalised and silenced women and men to identify their needs and influence the course of development. Secondly, rural electrification professionals can contribute towards the empowerment of those without access to and control over resources if they are critically aware of the *process* of their development intervention. By asking such questions as, 'Who is likely access the benefits and resources which flow from this intervention?'; 'Who is likely to control and manage them?'; 'Who is likely to lose from such an intervention?' resources are less likely to compound and generate inequalities. Thirdly, programmes which aim to allocate their resources so that they do not compound or generate the inequalities will ensure material needs necessary for empowerment. Lastly, the use of participatory methodologies may build marginalised women and men's capacity to analyse and evaluate their subordination.

Enabling methodologies

For rural electrification professionals to acknowledge diversity, difference, and complexity, and to place people at the centre of programmes and policies, it is essential that participation of rural people is enabled. Inasmuch as power mediates differential access to and control over development resources, it follows that access to, and participation in development processes is also unequal. For this reason it is critically important that rural electrification professionals facilitate the participation of the traditionally marginalised and silent rural women and men.

An alternative participatory rural electrification planning, implementation and evaluation can be facilitated at a local level through the use of participatory methodologies:

> Participatory development methodologies implicitly challenge hegemonic strategies by encouraging multivocality and tolerating ambiguity. In other words these approaches recognise that the question of power is at the heart of social process; that there are many more than one right answer to every question; that anyone who holds out for one has a particular interest in control; that both questions and answers depend on whose voices are heard; and that by having enough different voices stating and restating a problem we go some way towards changing things (Crawford Cousins *et al* 1994:7).

Equally important, however, is participation in the national policy making and regional planning processes:

> Alternative development strategies...all require significant participation in macro arenas. Without it development strategies will be simultaneously undemocratic and ineffectual. Without the development participation of non-elates, even political democracy will be largely a sham (Goulet 1989:176).

Institutional arrangements

Although an in-depth exploration of institutional arrangements necessary to facilitate an alternative approach to development is beyond the scope of

this paper, it is important to note that there are undoubtedly implications for institutional change. Decentralisation of power, resources, skill and capacity to a local level are crucial. Equally important is that institutional arrangements enable rural electrification professionals to move away from their desks to active engagement with rural people in the 'field'. It is only through building effective institutions that a reversal in decision making and planning can take place.

Conclusion

> ..development, in its best sense must be about the development of the well-being and creativity of all members of society... A 'reversed' development which starts from the priorities of the poor places human life and human well-being at the forefront of the planning process, so that the 'means' of the development process are valued in terms of their contribution to this goal (Kabeer 1994: 83).

In sum, an alternative approach to rural electrification and development requires that we reverse the processes of knowledge production and understanding which inform our policies and planning. This requires that we move away from privileging the position of economics towards a more holistic approach, which includes not only economic factors, but also the social, political, cultural, and institutional factors, to understanding 'reality' and our analysis of it. We should ask questions which reflect a critical awareness of the inequalities which exist and may be perpetuated or generated through our development interventions.

Furthermore, an alternative development perspective requires that our policies and programme plans reflect an understanding of the diversity of needs and interests in rural areas. We should move away from attitudes and beliefs which assert *our* priorities over the priorities of the men and women in rural areas. In short, we would begin with the priorities of the poor.

There is little doubt that the potential benefits of rural electrification are significant. Community facilities such as schools, clinics, hospitals, and water supply can be improved through access to electricity. Electric lighting can improve living conditions for household members. The use of electricity in agriculture, small-scale industry and commerce can enhance working conditions and productivity. However, the decisions concerning which application is more likely to meet the development needs of the poor cannot be imposed from above. Rather, within broad development and energy programmes, rural electrification professionals, together with different groups of rural people, should determine the role electrification has to play in meeting the needs of the rural poor.

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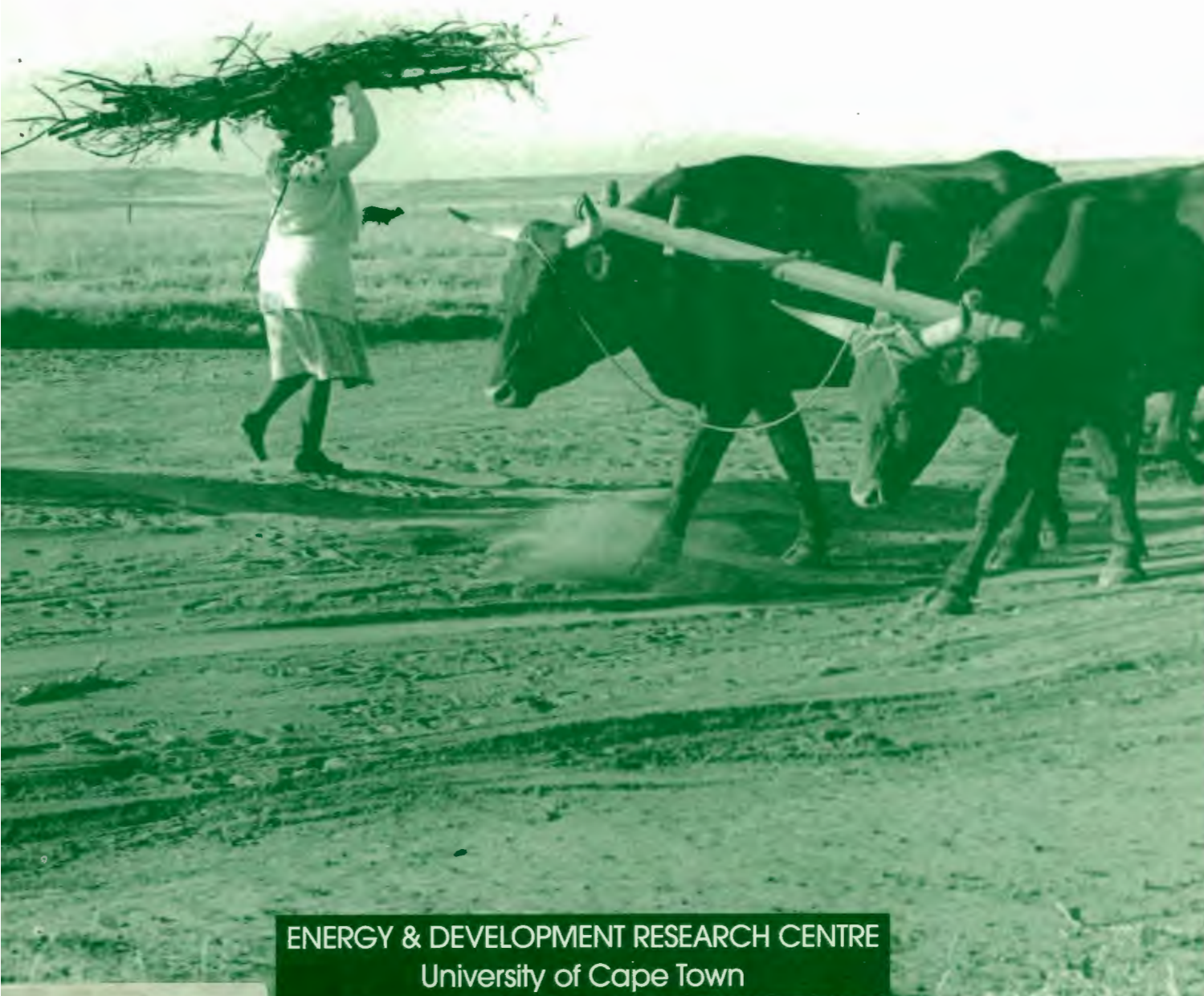

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