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Blowing the smoke out of the kitchen: core issues in household energy and gender

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1.0 Introduction

A literature search for papers on the theme “Household Energy” finds most researchers equate the term with cooking and stoves, issues strongly identified with women. However, a number of researchers have taken a broader definition (see for example Clancy, 1998, Klingshirn 2000) to encompass all the activities that take place within a household and the linkages to a much wider system of energy supply and demand. In addition, there are significant linkages between household energy and other sectors, for example, agriculture (agricultural residues as fuel source), health (lung and eye diseases, nutrition), education (children’s opportunity for after-school study) and income generation (cottage industries). These linkages also demonstrate that it is not sufficient to consider only women when addressing household energy issues but that men also play a significant role in decision making on household energy. This paper takes this broader definition as the framework in which to examine the issues around household energy from a *gendered perspective*.

Taking a gendered perspective means exploring and analysing an issue, in this case household energy, from the starting point that women and men have different roles, activities and responsibilities in their society which are allocated on the basis of their sex. These are known as their *gender role or relations*, which are socially determined and they vary according to time and place and are influenced by other social relations, such as class, race, ethnicity, etc. Within a given society, these relations can be mutually supportive with good cooperation between the sexes, at other times, they will be in conflict, and there can exist competition for household resources between men and women. Who makes the decisions about the allocation and use of household resources, including energy, is also based on gender. Decision making around household energy is not always as straight forward as it may first seem and taking a gendered perspective helps to bring out a number of issues, which if properly addressed will ensure better policy making, in the sense that it addresses both technical and non-technical household energy issues, and more sustainable projects, since it identifies who (that is which woman or man) makes decisions about what.

In addition, this paper aims to demonstrate that a gendered approach not only deals with the important issues of cooking and smoke in the household but also enables a valuable contribution to improved policy making for meeting development objectives in general. The paper is framed in terms of generalities and it should not be lost sight of the fact that there can be essential local differences. The gender approach is a useful tool for highlighting these differences.

It would not be unreasonable to say that there has been a certain disillusionment with improved cook stove programmes and other interventions, such as biogas and solar cookers, because they have failed to live up to their expectations. Over the last decade there has been declining support for stoves programmes amongst donors (for example, the scaling back of the GTZ Household Energy Programme) and national governments (for example, the Central Indian Government’s decision to hand over its stoves programme to state governments without financial support from the centre). This paper is aimed at development practitioners working in the fields of energy and poverty to demonstrate that reducing support for household energy programmes is short sighted. Such decisions are based on a lack of understanding of the reasons for the causes of failure of previous programmes, in particular many failed because of the lack of understanding of



the different roles of women and men in decision making around household energy issues and the interconnectedness with other sectors. By taking a gender approach and seeing household energy as multi-faceted with cross-sectoral linkages, more sustainable interventions are likely.

2.0 Household energy is a woman's concern?

Household energy is usually equated with cooking. In households where there are adult men and women, the gendered division of labour generally allocates to women the responsibility for household energy provision related to their spheres of influence in the household, in particular activities centred around the kitchen. However, men become involved in places where fuel has to be collected from long distances, fuel is purchased or there are social restrictions on women leaving their homes. Collection of fuel is only one part of a more complex system of household energy management. Dutta (1997) identifies an interconnected sub-system of six components: kitchen, fuel, device equipment, cooking, vessels and food. Men and women play very distinct roles in carrying out the activities and decision making around these six components. Understanding these roles is important for designing effective and sustainable interventions.

When energy has to be purchased, men enter the decision-making process, for example, in India, if a stove is to be purchased men will decide on the technology (Dutta, 1997). In South Africa, it was found that high expenditure on batteries was for young men to listen to taped music; in many cases female members of the household had no access to the equipment and no control of battery purchase (Makan, 1995). In some households, recreational equipment, such as TVs and radios, was bought before labour saving equipment for domestic chores. The male members of the household made decisions about what to buy and who owns it. The impact of such decisions on total household budgets should not be overlooked. Survey data from Uganda in 1996, showed that 94% of rural households not connected to the electricity grid used dry cell batteries and were estimated to be spending about US\$6 per household per month on batteries (quoted in Barnett 2000)¹.

Women and men have different perceptions about the benefits of energy, for example, men see the benefits of electricity in terms of leisure, quality of life, and education for their children; while women see electricity as providing the means for reducing their workload, improving health, and reducing expenditure. Access to modern forms of energy can also have unforeseen positive social benefits. For example, women have been found to benefit in terms of their self-esteem from access to television (impossible without electricity). In Nepal, it is reported that women's empowerment was enhanced when they could see pictures showing that they "don't have to remain as second class citizens" (quoted in Barnett, 2000).

Men can also influence the uptake of energy technologies in the women's domain of the kitchen. In Zimbabwe, men are reported to have rejected the use of solar cookers by their wives, since technology and its development are seen traditionally as a male preserve. Some men have also expressed concern about the use their wives would make of the time saved through using new stoves, while others saw it as an opportunity for their wives to undertake more productive activities (Wilson and Green, 2000). Women are also aware of the fact that savings in one area of drudgery can result in increased drudgery in another area leading them to reject "labour saving" devices)².

3.0 Giving new meaning to "household energy"

What exactly do we mean by "Household energy"? Perhaps we should first consider what we mean by "the Household". Social Scientists would consider it as a socially constructed grouping of adults and children, often taken synonymously with "the family". The family unit will vary from culture to culture but can consist of several generations of people connected by marriage. However, the household can be wider than

¹ Barnett (2000) points out that although such batteries are convenient, they are very expensive way of buying electricity, in terms of energy supplied, the electricity probably costs more than US\$400 per kWh.

² Work by Jackson (1997) in the water sector showed that some women deliberately adopt a non-participation strategy in projects to avoid increasing their workloads.



that and consist of a range of people whose relationship with the family varies, for example, servants, workers, visitors, paying lodgers etc. Each has their own role within the household with its own associated energy needs and behaviour as regards energy use. This is a neglected factor in household energy programmes.

Another important factor which influences options for addressing household energy needs, is that approximately 1.3 billion people are living in poverty³. Of this number, it is estimated that 70% of the adult population are women, many of whom live in female headed households in rural areas. The number of female-headed households is increasing due to armed conflict and also to male migration in search of employment. In sub-Saharan Africa, it is estimated that female-headed households constitute between 50 and 80% of rural households (Klingshirn 2000).

Household energy is usually taken to be synonymous with cooking and most development projects related to household energy have focused on the provision of improved cook stoves designed to use less energy and improve health through reduced indoor air pollution⁴. It is worth pointing out that it is not only the stove which influences these factors but also the location of the activity. Cooking can be inside or outside the building; for example, fuel efficiency is influenced by wind and draught and health is affected by poor ventilation creating inefficient smoke and particulates dispersal. A number of solutions have been advocated to address these issues, including adding chimneys to existing designs through to complete new technologies, such as solar cookers, requiring the cook to change cooking practices and sometimes location.

There is another way of looking at the household in terms of its energy needs: to think of the physical structure of the household itself. A house is built of different materials (depending on location) and the space is divided into different areas for different functions (depending on climate and tradition). The building provides shelter from the elements and there can be a need for space heating or cooling. It is not well recognised that space heating is a requirement of countries in the South. However, there are a number of countries, particular in the Himalayas and Andes, where space heating is essential for survival, here temperatures can have extremes ranging from 45°C in the summer to -40°C (for example, in the Northern areas of Pakistan, (Saleem, 1997)). This requires creative design solutions, since increasing the insulation around a stove for improved energy efficiency can reduce heat radiation used for space heating. Chimneys added to reduce indoor air pollution also conduct heat away from the space where it is needed. A regional workshop in Nepal noted that "mountain people have been largely overlooked in the design of household energy programmes and stoves" (Anon, 1997) and as a consequence space heating has never figured prominently in energy policy.

The construction materials for the fabric of the building can also influence the need for space heating (discussed above) or cooling, as well as ventilation and lighting. Poorly constructed homes can have poor air circulation and lighting, especially when cracks are blocked up to prevent icy draughts entering. Cooling requirements depend on building design and construction material. When electricity is available, a fan is a quickly acquired item. However, there are low energy cost solutions available, such as the incorporation of the principles of passive solar design into houses, for example, orientation of the building to achieve maximum winter insolation whilst minimising heat losses. This has been used successfully at altitudes of over 4000 metres in Bolivia (Anon, 1997). Window sizing and location are also important for ventilation and

³ Poverty here is defined in economic terms of consumption of goods and services. People were considered to be living in poverty if they consumed less than US\$1/day of goods and services. (UNDP, 2000)

⁴ There is a vast literature devoted to cook stoves and it is not the objective of this paper to review this material. Interested readers are directed to the Household Energy Network (HEDON) website (<http://ecoharmony.com/hedon/>), *Boiling Point* (the journal of the Intermediate Technology Development Group's Stove and Household Energy Programme and the Household Energy Programme of GTZ) and *glow* (the newsletter of the Asia Regional cook stove programme (ARECOP- <http://www.arecop.org>)).



lighting. In some kitchens, there may be no natural or artificial lighting. Poor lighting makes women's work in carrying out an essential task for their families' wellbeing difficult and it makes kitchen hygiene problematical.

There appears to be very little attention paid to ergonomic design of kitchens in low cost housing. The cooking process – from food preparation to dishwashing – consumes a substantial proportion of a woman's day. The kitchen may be a separate construction from the remainder of the house, as a safety precaution against fire or to minimise smoke irritation to other household members. Food preparation and storage can also be located away from the kitchen resulting in women having to go back and forth from the stove to other areas within the household as well as the need to collect water. Integrated kitchen systems would make food preparation easier and cleaner, lightening women's load, however, design has to take particular food and cooking habits into consideration (HEDON, 1995).

The kitchen and cooking are essentially women's domain, and they are able to take many decisions in this sphere. However, when important financial decisions are required men usually make those decisions and these can influence cooking and kitchen comfort, for example in the selection of the material for kitchen walls and roofing (Dutta, 1997).

However, the energy end-uses of the fire/stove within a household are more than the provision of the family meals. Another important end-use is lighting which allows productive and social activities to continue beyond sunset. Light is provided by a range of options, the fire, candles, kerosene, gas, and electricity. Each light source has its advantages and disadvantages, for example, convenience and cost, however, quality of light is important for good sight and influencing the quality of products. In terms of quality, electric light is the best source. Photovoltaic (PV) lighting has been enthusiastically promoted as an option where grid electricity is not a viable option. However, the upfront costs have proved a significant barrier to widespread access to this source and it is not clear to what extent PV electricity has been used solely for consumptive purposes, eg television rather than productive uses, thereby helping to offset at least part of the installation and running⁵ costs.

Household members are increasingly aware of a whole range of end-uses that can be made possible through the use of modern forms of energy, in particular electricity, for example, entertainment, food preparation and preservation. To respond to this demand, in some quarters there has been an attempt to shift the focus away from the technical approaches of oil, gas, and grid extension to one of the provision of *energy services*. Energy services are defined as the supply of the desired and useful products, processes or services that result from the use of energy, for example, illumination, comfortable indoor climate, refrigerated storage, transportation, appropriate heat for cooking (quoted in Woroniuk and Schalkwyk, 1998)

4.0 Household energy- a particular challenge for the Poor

Energy is one of the most essential inputs into sustaining people's livelihoods. At the most basic level energy provides cooked food, boiled water and warmth. What do we know about the type of energy households use to meet these needs? Most of the information available relates to rural households. There is a definite difference in fuel type based on household income. Low-income households use biomass. The fuel quality is low, burning with levels of smoke and particles that are recognised as having negative effects on health (see for example, Smith, 1999). Biomass collection, usually by women, can take up to several hours per day and so the time cannot be used for other livelihood activities. Although nearly all households in rural areas use some biomass, poor households rely most on this source and tend to spend more time searching than the households in higher income groups. Wealthier households will also purchase other, higher quality, fuels which will be used for a greater variety of end-users than in poor households. In urban areas, poor

⁵ PV is often portrayed as a "free" source of electricity (after the initial installation costs), however, if the electricity is required after dark, batteries are needed for storage. The cost of these batteries is not insubstantial and need replacement every couple of years.



people have to purchase cooking fuels, and they spend a higher proportion of their income than higher income households on fuels (ESMAP, 1999). Typically, a poor urban family may spend 20% of its income on fuels (Barnes, 1995). In rural areas, poor households will generally restrict fuel purchases to lighting uses (candles and kerosene – with their associated fire hazards). It is therefore possible to identify an energy dimension to poverty: *energy poverty*. Energy poverty has been defined as the absence of sufficient choice in accessing adequate, affordable, reliable, high quality, safe and environmentally benign energy services to support economic and human development (Reddy, 2000).

Poor households use less energy per household than wealthier ones in absolute terms. One consequence is that less water is boiled for drinking and other hygiene purposes. This increases the livelihood of water borne diseases, which in turn, reduces the ability of poor people to improve their livelihoods, by not only preventing adults from working effectively but also negatively affecting children's learning.

When multiple options are available, wealthier people will exercise choice in their energy carrier and may opt for the cleaner and more efficient “modern” energy carriers of electricity or gas (LPG or biogas). These modern energy carriers do not have the negative health and time effects linked to biomass. Wealthier people are also able to afford the appliances that make use of these modern energy carriers. In situations where they are reliant on biomass fuels, they are able to purchase more fuel-efficient stoves. The consequences for the poor are that precious cash resources are used on low quality fuels, which are then used at low efficiency, reducing their ability to accumulate the financial resources they need to invest in strategies for improving their livelihoods. This is despite the efforts of numerous programmes to produce low cost biomass stoves. Understanding the decision-making process within households when choosing energy services is important for designing effective interventions.

4.1 Who carries the burden of household energy?

In most societies, it is women's responsibility for household energy provision related to household survival, for example, cooking and lighting. In rural areas, women carry the burden (both physically and metaphorically) for biomass collection. This is a task demanding of both human energy and time. In urban areas, meeting family fuel needs can entail juggling tight household incomes to buy charcoal or kerosene; increased fuel prices result in less money for food and other essential items increasing household vulnerability. The responsibility for household energy provision affects women's health disproportionately to men's (for example, higher levels of lung and eye diseases due to the longer hours of exposure to smoke and particulates in smoky kitchens experienced by women compared to men⁶). Fuelwood collection takes a considerable amount of time (estimates range from two to twenty hours a week) and distances covered over difficult terrain can be substantial, for example in Nepal women can walk over 20 km per journey in search of wood (Sinha, 2001). This arduous work reduces the time women have available for contributing to other aspects of livelihood strategies, including rest for body recuperation. Women also suffer back problems from carrying heavy wood loads (20 kg are not usual) on their head as well as the less recognised threats of rape and beatings (Cecelski, 2000). Girl children are kept out of school to assist in wood collection. Water collection for the household has similar impacts.

Improved cook stoves can do much to reduce the pollution levels in the kitchen, as well as giving cleaner pots and kitchens. The latter also reduces women's work burden and gives them a sense of modernity and increases their sense of wellbeing. However, buying such a stove or attending a course to build your own stove requires access to and control over your own income or a sympathetic husband.

It is not only providing cooking fuel that are demanding in terms of women's energy and time, there are a whole range of tasks on which the household is dependent for its survival, such as water provision and food

⁶ Poorly vented cook stoves have been stated as having the same adverse health impacts as smoking two packs of cigarettes a day (quoted in UNDP press release *UNDP Pushes for Expanded Energy Services to Meet the Poor's basic needs*, 10 April 2002).



processing. Much of this drudgery could easily be reduced by the application of modern energy forms and appropriate technology. However, these are neglected areas of household energy.

4.2 Supplying households with energy

Energy use in rural areas differs significantly from that in urban areas. In the former, there is a particularly heavy reliance of households on biomass as an energy carrier for process heat. In addition, there is a lack of access to reliable supplies of modern energy forms at affordable prices.

Biomass is obtained at zero direct monetary cost, although there are time and environmental costs. Biomass production is integrated into local land-use management systems which balance ecological sustainability with the provision of a range of goods. To increase biomass supply therefore requires an integrated approach to providing solutions. Access to the production system is restricted by rules and regulations that govern the local management of common property resources. It is not a system which responds well to the supply driven, market orientated policies of increased fuel production. Control of, and access to, this system have a distinct gender dimension. In any society, women have different access to and control over resources than men which influences their ability to adopt strategies to respond to changes in their circumstances. For example, increased time to collect biomass for household needs could be addressed by planting trees for fuel, however, women do not usually own land and where they have access to land, they may not have control over what is planted. Well meaning measures to protect the environment by forcible closure of natural forests, for example in India, have had disastrous consequences for rural households. The traditional fuel supplies have been cut-off, and households shift to the lower quality fuels (in terms of calorific value and pollution relative to wood) of agricultural residues and dung, which has negative consequences for health and for soil fertility and erosion. Women adopt other strategies such as purchasing kerosene (costly) or they change the type food cooked from meals which take long, slow cooking to faster food which may have lower nutritional value (Sinha, 2001).

The current focus in energy policies and planning is very much on electricity and getting prices right. The implications of this focus for household energy have not been well thought out. Although electricity has many benefits, it does not help address the major energy problem that most women in areas face in terms of their practical needs: their daily cooking requirements. Cooking with electricity is not cheap in terms of either the energy itself or the stove. Stand-alone photovoltaic home systems are not capable of delivering sufficient power to cook family meals. Solar cookers seem to be undergoing a period of renewed interest with donors⁷ but the vast majority of past programmes have failed miserably. The long-term popularity of solar cookers with cooks has to be re-evaluated as new models and approaches are developed. The most serious objections to solar cookers, which have to be overcome, are that cooking at midday does not coincide with the time of eating the main family meal in many cultures (Mandhlazi, 1999). Many cooks prefer to cook indoors for social reasons (Wilson and Green, 2000). The cooking fire is seen in many societies as the social hub of the family, allowing the women of the household to socialise with their families. In solar cooker programmes in South Africa, it was found that the required shift to cooking outdoors can lead to a breakdown in this social web thereby weakening women's influence within the family (Green, 2001).

In the energy sector the emphasis is on deregulation and opening the sector up to outside investment. Do these changes benefit women and the household energy needs? The changes that have been most noticeable are in the electricity supply industry. Electricity is mainly an option for wealthy households, and for most women it is not an option for cooking or space heating and cooling. Petroleum supply has also been affected by deregulation, although generally governments still control kerosene prices. Women are able to buy this lighting fuel in small quantities, at reasonable prices, to match their cash flows. However, there have been reductions in subsidies on transport fuels, which has increased the cost of getting to work for women in urban areas and pushed up prices in general. The supply of traditional fuels such as wood (in rural areas and,

⁷ For example, Solar Cooking workshop organised in 1999 under the auspices of UNESCO and the European Union.



in Latin America, urban areas) and charcoal (in urban areas of Africa and Asia) for the local market is at present still largely based in the informal sector. Rural household fuels are still gathered informally at no direct monetary cost⁸ and when the wood is sold for rural enterprises or urban markets it is at prices well below the replacement costs of the trees. In the informal commercial woodfuel sector, women's roles and benefits are variable. For example, in West Africa they play a key role and can earn good incomes, while in sub-Saharan Africa they play only a small role in charcoal production but carry the burden of environmental damage caused by unregulated charcoal making.

5.0 The household as the centre of income generation

In most countries, the majority of informal sector enterprises are owned and operated by women, with women making up the largest proportion of the work force. Women-headed enterprises are frequently located in the home. These "cottage industries"⁹ tend to be concentrated in a relatively narrow range of activities, with disproportionately low rates of return compared to what men earn: beer brewing, knitting, dress making, crocheting, palm oil processing, soap making, hairdressing, metal working, pottery making, basket weaving, cane work, spinning and textile production and retail trading. Cottage industries play an important role by providing a significant range of products and services for the local market. Despite the low financial returns, women's enterprises provide important sources of household income, even in male-headed households. One of the advantages to women working from home is that allows the opportunity for combining business activities with other domestic responsibilities.

A large number of these cottage industries are energy intensive and rely on biomass fuels used with low efficiencies of energy conversion (compared to similar industries in industrialised countries), as well as having low productivity rates¹⁰. Constraints on energy availability, in particular fuelwood, availability threatens access to cash and family livelihoods. Even in rural areas, women may have to buy fuelwood to run their enterprises and these can run to substantial amounts of wood. For example, beer brewing in Zambia is estimated to use around 410,000 m³ of fuelwood, which is 25% of the total annual wood consumption (McCall, 2001). However, the role of energy in the sustainability of women's enterprises is not well understood. In food processing, it has been estimated that energy costs are 20 to 25% of the total inputs, which would suggest that technological interventions could increase the scale and profitability of these businesses.

Providing women with access to cash resources can help them to determine their own priorities and make choices about the energy forms for particular end-uses. When asked about priorities, women generally set a high priority on being able to earn some cash income. However, what is not clear is if the levels of income envisaged by those proposing income generating projects are the same as those of the women who are expected to undertake them. Women, particularly those in rural areas, undertake income generating activities simultaneously, and often strongly linked, with household and agricultural duties. These may be seasonal activities based on household tasks, such as food preparation and basket making, and they tend to be small-scale, labour intensive and predominantly in the informal sector. It should be kept in mind that women in male-headed households might not wish to increase their workload by becoming full-scale entrepreneurs, which can lead to project "failure" (if measured in terms of total numbers of take up). There are undoubtedly a significant number of female-headed households who would welcome the opportunity to earn levels of income that would move them out of poverty. However, this level of entrepreneurial activity needs more than a good idea to succeed. The energy inputs are often overlooked even though the availability of affordable sources is an important ingredient. A market for products and their transport (also with an energy component) are important aspects that may be overlooked.

⁸ There is of course an opportunity cost.

⁹ The people engaged in cottage industries are not to be confused with "home-workers", many of whom are women and children, who are subcontracting from other employers and are frequently exploited

¹⁰ This does not mean that cottage industries are unconsciously inefficient users of energy since evidence would suggest that they make efficient use of the available resources.



The special position of women as cottage industry entrepreneurs is easily overlooked, in terms of their ability to participate in training courses, due to restrictions (cultural or otherwise) in mobility and problems of access to investment in more efficient technology or taking up new processes (Clancy, undated). A broader definition of household energy (other than for cooking) would help to include these cottage industry activities in energy provision. Energy use within the household should distinguish between subsistence activities, such as family meal preparation, and income generating activities, for example, food preparation for sale at market. These distinctions are important because what initially may appear to be similar activities and therefore energy use could be improved through stove programmes, at a more detailed level might show that different technologies are used for subsistence and productive operations. Therefore, interventions that are more complex would be required to meet all needs.

As was stated above, the energy sector is focused on electricity supply. However, the extent to which electricity can contribute significantly to income generation based in the household is still not clear. Many women's income generating activities are based around process heat, for which electricity is not the cheapest option. Electricity in rural areas is mainly used for lighting, which can extend evening working hours. However, the extent to which electricity is used for cottage industries, and the health implications of extended working hours has not been systematically researched.

6.0 Conclusions

This paper has looked at the issues around household energy but has not prescribed solutions. It has indicated that the way to more sustainable energy interventions is through taking a broader definition of household energy. This definition recognises the central role of the stove in the household, while at the same time recognising that household energy is part of an energy chain in which men and women play different roles. This chain allows household energy to be used as an entry point for rural development in general and women's development in particular. Addressing household energy issues offers opportunities for time and labour saving, income generation, health improvements and social empowerment. From the supply side, the energy sectors needs to think in broader terms of household energy as supplying energy services, rather than cooking and lighting fuels, which offer choice of fuels/energy form, better quality fuels with improved availability and that prices are set to enable all households to meet their basic needs. Equipment and household, in particular the kitchen, design are important issues, but neglected areas, influencing energy use and women's work efficiency and health.



REFERENCES

1. Anon (1997), *Household energy in high regions*, Boiling Point No 38, April. pp3-4. ITDG, UK.
2. Barnett A (2000), *Energy and the Fight against Poverty*, Paper given as part of series of Economic Research Seminars at Institute of Social Studies, The Hague, 29th June 2000.
3. Barnes D (1995), *Consequences of Energy Policies for the Urban Poor*. FPD Energy Note No7, The World Bank, Washington.
4. Cecelski, E (1999) *The Role of Women in Sustainable Energy Development*, Report to the National Renewable Energy Laboratory, Bolder Colorado, USA.
5. Cecelski E (2000) Editorial ENERGIA News Vol 3, No 2
6. Clancy J S (1998), *Household Energy is more than Stoves*, Boiling Point No 41. IT Publications, London. Autumn 1998.
7. Clancy J (undated), *Cottage industries*, HEDON Discussion document. <http://ecoharmony.com/hedon/>
8. Dutta S (1997), *Role of Women in Rural Energy Programmes: Issues, Problems and Opportunities*, ENERGIA News No.4, p11-14.
9. ESMAP (1999), *Household Energy Strategies for Urban India: The Case of Hyderabad*, Washington.
10. Green M G (2001), *Solar Cookers as a Mechanism for Women's Empowerment*, ISES World Solar Congress, Adelaide, Australia. December 2001.
11. HEDON (1995), *Household Energy and Agenda 21*, HEDON Discussion Paper No1.
12. Jackson C (1997), *Gender, Irrigation and Environment: Arguing for Agency*, in "Gender Analysis and Reform of Irrigation Management: Concepts, Cases and Gaps in Knowledge". Proceedings of the Workshop on Gender and water, 15-19 September 1997, Habarana, Sri Lanka.
13. Klingshirn A (2000), *Integrating Household Energy into Rural Development Programmes*. <http://www.energia.org>
14. Mandhlazi W (1999), *A reflection on the impact of renewable energy projects on gender*, SAREIN News Flash, June.
15. Makan A (1995), *Power for women and men: Towards a gendered approach to domestic policy and planning in South Africa*, Third World Policy Review, Vol 17 (2).
16. McCall M (2001), *Beer brewing should be a hotter issue*, Boiling Point No 47, pp 23-25. ITDG, UK.
17. Reddy A K N (2000), *Energy and Social Issues*, in "World Energy Assessment", UNPD, New York. ISBN 92-1-126-126-0.
18. Saleem, M (1997), *Status of improved stoves in the northern areas of Pakistan*, Boiling Point No 38, April. pp13-15. ITDG, UK.
19. Sinha B (2001), *Timber ban and its effects on the Himalayan rural women and rural energy*, Boiling Point No 47, pp 30-32. ITDG, UK.
20. Smith K R (1999), *Indoor Air Pollution*, Pollution Management in Focus, Discussion Note No. 4, August. World Bank, Washington.
21. UNDP (2000), *World Energy Assessment: Energy and the challenge of sustainability*, New York.
22. Wilson M and Green J M (2000), *The Feasibility of Introducing Solar Ovens to Rural Women in Maphephethe*, Tydskrif vir Gesinsekologie en Verbruikerswetenskap, Vol 28, 54-61. ISSN 0378-5254
23. Woroniuk B and Schalkwyk J (1998), *Energy Policy and Equality between Women and Men*, SIDA Equality Prompt #9. Infrastructure Division, SIDA, Stockholm.