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Household energy consumption behaviour in a pre-Saharan small town in Morocco

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There is a major omission in the now considerable literature on environmental problems and the general threats they present. Little is known of how the population in the South perceive these threats. Similarly, we have little understanding of people's attitudes towards environmental problems. The main purpose of this paper is to improve this situation. It draws on empirical material taken from a sample of 112 households in a typical Moroccan pre-Saharan small town: Guelmim. The setting of the study is formed by a high incidence of migration; former nomads going to town and international labour migration, generating a resource flow based on remittances. The aim is to identify inhabitants' attitudes toward environmental problems and also to find out the extent to which these attitudes and opinions are correlated with actual energy consumption. The result shows first a high level of concern about environmental issues, particularly among migrant groups. But closer analysis reveals that there is an inconsistency between environmental concern and actual consumption of household energy. This is explained by the fact that certain energy sources have been, and still are, crucial in people's lifestyles and thus are difficult to change.

Introduction

Background

One important response to the changing energy scene since the 1973 oil embargo has been a number of studies of public perception, attitudes, and behaviour with respect to energy consumption. These studies have addressed a variety of issues, including perceptions of energy scarcity, assessment of trade-offs between energy development and environmental conservation, and the awareness and adaptation of conservation practices.

Despite the recent fall in energy prices, which might have contributed to a decline in both public and academic concern about energy, the issue remains important. Energy availability, development, and use behaviour have been, and will continue to be, vital components of the economic, social, political, and environmental fabric of the less industrialised societies, as well as the focus of heated debate.

While experts generally agree on the dimensions and magnitude of the world's energy problem (Stobaugh and Yergin 1979), public and individual energy consumers in less industrialised societies stand on the sidelines of this debate wondering who to believe and what to do. Is there really a worldwide crisis? If there is such a crisis, who has really caused it? Are people in the developing countries also concerned about such a crisis? But are we all, irrespective of the cause of the crisis, going to be drafted into the "moral duties" to conserve energy? Will we all one day find ourselves "trembling in the dark" unless we begin to adjust our present and future consumption of energy to a sustainable environment?

Since the mid-1970s, there has been greater awareness of the importance of energy as a strategic input to the development process. But what is significant is the apparent concentration of research efforts in the context of countries in the more developed world, particularly North American and European environments (Saarinen *et al.* 1982). At the same time it has

become clear that relatively little is known about patterns of energy consumption in less developed societies, particularly the energy consumption patterns of urban households. In recent times many environmental studies have been concerned with ways of incorporating information on human behaviour and the values inherent in environmental experiences, meanings, and perceptions which people attribute to environment and the behaviour they display in diverse milieux (Krampen 1979; Lym 1980; Groat 1981; Potter 1985).

In less developed societies, however, concern over household fuelwood has been with us for some time now (Eckholm *et al.* 1984; Soussan 1988). Urban energy utilisation in less industrialised societies, in the context of household energy use behaviour, has received little attention in the literature.¹ In arid and semi-arid regions of less industrialised countries, the remaining forests and trees are being systematically cleared for woodfuel (i.e. fuelwood and charcoal) as well as for other purposes. As traditional woodfuel resources have been depleted in the arid and semi-arid regions, the energy to support vital basic needs is becoming increasingly difficult to obtain for millions of households (Allen and Barnes 1985; Williams *et al.* 1991). As a result, millions of families in these regions are forced to use lower quality fuels (including brushwood, crop residuals or animal dung) has to produce household energy.

At the same time, the growing demand for a modern household energy system is creating other concerns. In the Maghreb countries, domestic gas and electricity consumption has grown at over 30 percent a year since the early 1970s. In Morocco natural gas and electricity use in households has been growing at a significant rate in some areas of the country (about 65 percent in Wedinoon) during the last two decades. While this brings many benefits, it adds greatly to the pressures on scarce resources of capital and foreign exchange for the country. Urban areas are now accounting for a large part of the national energy

consumption in most North African countries.

In less industrialised countries, the data on energy consumption fall short of the ideal. A certain amount of data on commercial fuels exist, though rarely broken down to by end-users.² But the major difficulty is lack of data on non-fossil fuels. For example, in Maghreb countries very few estimates of traditional (biomass) energy use are available, and even when information is available there are major problems stemming from data accuracy, definition problems, and the choice of covering factors used to aggregate individual forms of energy on a comparable basis. Fuelwood and charcoal are frequently treated in the literature and government reports as "non-commercial" energy sources despite the fact that these fuels are extensively traded in most urban areas. Problems also exist for a number of normally non-commercial fuels, such as some crop residues, twigs, leaves and sometimes even dung, whose importance is impossible to measure satisfactorily except through careful detailed investigation of energy-using habits of households. Estimation of household energy consumption for societies which use large quantities of rarely commercialised fuel must therefore be considered highly approximate. It must be emphasised therefore, at the outset of the study, that much of the analysis which follows is somewhat speculative, based upon measures and values obtained from interview material which the author usually has not had the opportunity to review critically.

Urban growth and the energy problem in Morocco

Towns and cities, in most African countries today, are growing at unprecedented rates, transforming the economies and societies of the regions surrounding them (Gugler 1988). The urban growth is, to a large extent, due to rural-urban migration. Such urban growth is accompanied by a number of benefits, amongst them improved access to

services for large sections of the urban population. But urbanisation also creates a number of problems which often widen existing inequalities between various urban population groups (Lipton 1988). In addition, the growth of urban population is accompanied by an increase in demand for a number of goods and services (including energy) to meet the basic consumption of the urban population (Richardson 1987). In North Africa, where urban population is expected, by the turn of the century, to constitute over one-half of the total population (Troin 1982; Signoles 1986; Chaline 1989 and Wekwete 1992), urban household energy consumption is estimated to have already surpassed that of rural areas.³

Moving to a city opens up greater scope for many households, but life remains harsh particularly for poor households. Such a move gives new opportunities for urban households but at the same time creates a series of constraints. For well-off households the move into urban areas means easy access to a range of goods and services. Thus for well-off households, the move into an urban milieu can act as a ladder to material and social advancement. For poor household segments, the move means that they have to cope with urban constraints through survival mechanisms based on communal organisations which maximise the new openings available to them (Bromley 1988).

In addition, such a move may imply that essential household needs, such as shelter, water, food, transport, health, education and energy must all be found one way or another. Most of these items are usually cheap or free in rural areas, but in urban areas they are relatively expensive commodities which must be bought and paid for (Leach and Mearns 1989).

Given this short presentation of urban growth and the related environmental problems, two important questions present themselves: Can the increasing number of urban dwellers be provided with adequate energy and other basic need supplies? Will environmental problems have an impact on

their physical standard of living, thereby providing the impetus for slow urban growth, or will urban growth continue unabated? The demand for woodfuels by urban households in arid and semi-arid areas has come to be seen as a major cause of deforestation (Allen and Barnes 1985; Leach and Mearns 1989; Munson 1990; DeWees 1990; Soussan 1990; Williams 1991). Therefore, in order to relieve pressure on remaining trees in these areas, quick actions will be required in the urban areas in many of these countries (UNEP 1992).

Although there has been a relatively long tradition in urban planning and development in Morocco, industrial concerns have dominated energy and environmental issues. But as urban areas account for an increasingly large share of the population and economy, the problem of urban household energy will become more pervasive and integrally linked to that of industrial energy use. Rapid population growth and its concentration in urban areas means that urban energy and environmental problems will begin to assume an increasing importance in the future.

Because urban population growth in Morocco is mainly taking place in small cities and towns where industrialisation is limited, the associated environmental problems have until recently been negligible compared to those in large urban areas such as Casablanca, Rabat, Fez and Marrakech. However, environmental problems do exist and the situation is growing worse every day. Of course, urban energy and environmental problems are not the same everywhere. It cannot and should not be assumed that the problems of one urban area are identical to those of every other urban area within the country. The environmental and energy problems of urban areas in the South have similarities with and differences from those of urban areas in the North. Differences of environmental problems across geographical distribution and urban hierarchy clearly exist. Thus, different tools and solutions will be needed at different levels of urban hierarchy as well as between

different ecological zones within the country.

Given this somewhat precarious situation, the long term future of the urban household energy system is in question, while for many sections of the population the problems of scarce and high cost fuels are already apparent. The government has, of course, begun to respond to these problems. But so far responses have often been misdirected or fallen short of expectations, and have invariably been conducted on a scale that hardly touches the real and growing needs of thousands of urban households.

The energy problem has so far been dominated by the conventional demand-supply paradigm. Such a conventional energy paradigm has guided the views of most governmental agencies, the approaches of energy institutions as well as the thinking of decision-makers and planners. At the same time the potential of using energy more efficiently, and therefore of saving energy, has been more or less ignored. Also ignored is the environmental impact and whether the sources of energy being used are renewable, non-renewable or if they are used in renewable way or not. Nowadays, the lay public has become increasingly aware of energy problems and environmental issues, so no energy planners can get away with completely ignoring conservation and environmental impact.

The main thesis of this study is that appropriate actions cannot emerge until energy problems and environmental issues are better understood. Indeed, the most serious aspect of the urban household energy problem in most less industrialised countries is that we do not quite know what it is and so cannot devise effective remedies for it. Until we have a much better understanding of why particular groups of people in a given location use the amount and types of household energy that they do, how they might adjust these patterns as their circumstances change, how they regard these "natural" adjustments compared with interventions to alter their patterns of

woodfuel supply and use, most interventions—however well meant—are likely to be rejected or fail to meet the needs of the most threatened sections of the community, especially the poor households.

Concern over fuelwood and charcoal in developing countries has been broadly examined, but research has mainly concentrated on rural areas. It was not until recently that the scale and implications of urban fuelwood and charcoal use were put on to the agenda (Hughes-Cromwick 1985; O'Keefe *et al.* 1986), and as yet there are few studies of urban household energy consumption patterns (Sathaye and Meyers 1985). Reliable solutions for urban energy (whether commercial or traditional) problems are as yet poorly developed in most developing countries.

The decline in oil prices in the mid-1980s made commercial energy more attractive than it had been during the previous decade, but a number of factors have inhibited the switch from fuelwood and charcoal to commercial energy. The shift to modern energy is occurring only where conditions are favourable. For instance, in a number of Indian cities the change to commercial energy was very quick (Leach 1986). In areas where conditions are not favourable, it is though difficult to change consumers' preferences and attitudes towards traditional energy sources.

Woodfuels (fuelwood and charcoal) are still playing an important role in the energy economies of many urban societies in developing countries. In Morocco, they are used by a variety of small businesses and institutions (such as small factories, blacksmiths, bakeries, restaurants, bathhouses, colleges, mosques, ceremonies, festivals, as well as in other occasions) in most small and medium-sized cities. These urban consumers represent approximately between 30 and 40 percent of the total urban fuelwood and charcoal demand in the country. The largest sector of consumers are, however, urban households, and particularly the urban poor.

It must be emphasised that firewood and charcoal production is no longer a by-product of land clearance for agricultural purposes in many parts of North Africa. The latter has been observed mainly in those areas where trees have been removed long time ago. Personal observation in the study area suggests that in many areas—especially in the main region of firewood and charcoal production—trees are cut mainly with the intention to produce fuel. These areas are mainly located in the southern ranges of High Atlas and along the Anti-Atlas mountains which are unsuitable for agricultural purposes. In these areas the favourable *argan*⁴ trees are still available (see Figure 1) and the devastating felling of them also indicates that charcoal and fuelwood production is not necessarily linked to agricultural purposes.

Up-to-date research on household energy in most developing countries has predominantly concentrated on the supply side by looking mainly at economic pressures on poor rural households in need of woodfuels production and sales as means of cash-income and survival. There is no doubt that this focus on the supply side has substantially contributed to the understanding of the degradation problem. However, the other side of the coin, (the demand side), has almost totally been neglected. This paper addresses the demand side by looking at some of the factors and decisions which determine household charcoal consumption behaviour. In other words, the patterns of household energy use and consumer attitudes will be examined. Household behaviour energy research has been conducted by, for example, Hosier who has studied household energy use in Kenya (1985). Such an approach contributes to a more realistic vision of policy implications for natural resource management.

Patterns of household energy consumption are, however, not always explained by simple factors such as income and demographic variables. In this study, a cultural approach is also used to explain household energy use patterns in Guelmim.

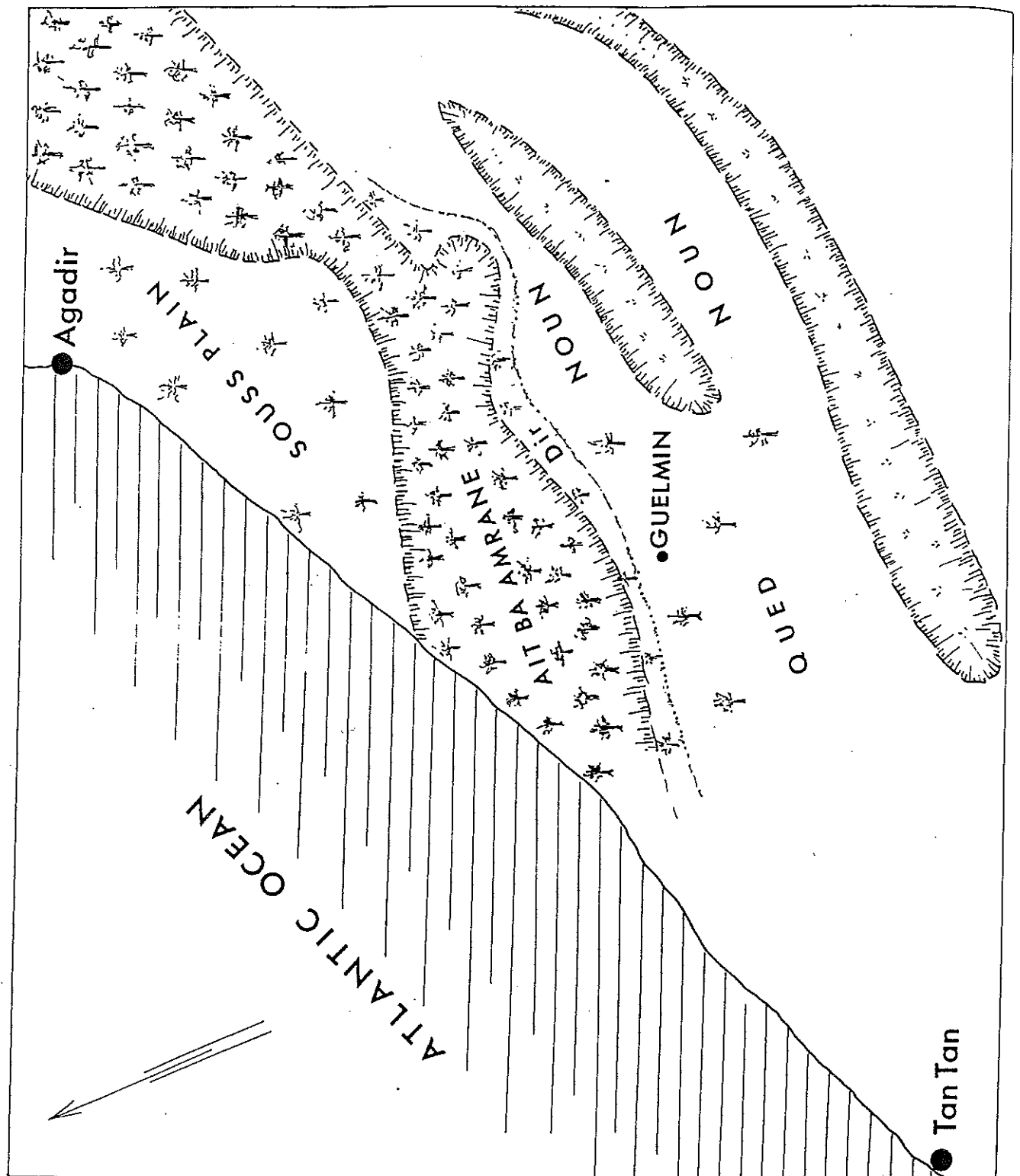
The approach involves the detailed cultural analysis of uniformities and variations between households: migrants' households and non-migrants' households (in terms of similarities and differences in dwellings, vehicles, appliances, energy use patterns and everyday routine). In order to explain why styles of life vary even within a little town like Guelmim, we need to understand why individuals act and choose in the ways they do. We know from anthropological and geographical theories that understandings and rationales vary between cultures, but we have little knowledge about how cultures internally treat energy and technology. Therefore we need to understand just what energy, technology, family life, membership, occupation, money and environmental mean in various "subcultures" of Tekna⁵ community in the area. Further, we need to evaluate the relative willingness of various consumer groups to shift to new modern energy, to alter behaviour or to pay for avoiding or mitigating the social and environmental impacts associated with various energy and environmental policies. This understanding can be gained only through detailed field research.

Aim of the study

The objectives of the analysis are: first, to examine differences among migrants' and non-migrants' household groups in their environmental knowledge, environmental attitudes, and opinion about environmental conservation; and second, to analyse and report on how these attitudes influence people's actual energy use behaviour.

The specific questions addressed are grouped accordingly with regard to these two objectives. First, does environmental knowledge have an association with international migration? What is the state of environmental knowledge and attitudes among migrants and non-migrants? Given the common assumptions, migrants are expected to have more knowledge about global environmental issues and thus be more positive than non-emigrants towards environmental issues.

Figure 1. Map of the region of Wedinoon (Oued Noun)



Second, what are the most widely used household energy use patterns in Guelmim? Does the household energy use pattern differ for the two categories of household included in the sample? Do migrants' households consume more energy than non-migrants' households? Do they use less woodfuels and more commercial energy than non-migrants' households? If so, is this due to housing standards, such as location and type of housing and household appliances? Do migrants' households have higher energy use which may be associated with differences in the way they use energy?

Methodology

This study of household energy consumption behaviour and environmental attitudes was started when the author was carrying out a series of annual household interviews to examine the role of international remittances on the transformation of the Tekna society in Morocco (see Figure 1). Questions concerning household energy consumption behaviour and opinions about environmental issues were not initially included in the original study but were added later in 1990. The initial question was: why people in the area continued to use woodfuel (i.e. fuelwood and charcoal), particularly when cooking mint-tea, instead of shifting to modern energy? By that time, it was thought that this question could be dealt with within the frame of the study of Tekna society. But as time passed, it was developed into a separate study of household energy use behaviour in Guelmim.

Official statistics do not provide any information about the distribution of energy use and household consumption behaviour in the region. Therefore deeper understanding of cooking behaviour is only possible through participant observation and interviews in the field. However, interviews can give misleading results, if the researcher is not familiar with the cultural background of the people under consideration. However, the author was born and grew up in the area and has also

carried out research in the area more or less continuously since 1978. As a result, he has a long experience of and familiarity with the culture and people in the area which has created a reliable research environment. Even so, there is a potential risk for misunderstanding.

Lack of telephones and the prevalent illiteracy made telephone or mail questionnaires impractical. Accordingly, personal interviews were conducted in people's homes, an approach with several advantages: less likelihood of questions being misinterpreted, especially when the author and his assistants are members of the same culture, and higher response rate than other survey approaches, especially in cultures in which hospitality is given high value, as in North Africa.

In order to get a fair representation of household consumption behaviour in different areas of the town the methodology had to ensure a broad cross-sectional coverage of the town as well a representation of migrants' households and non-migrants' households. To achieve this I chose to stop people at public places (such as governmental offices, market places, mosques, shops, etc.). This procedure resulted in a registration of 560 households (of which 347 were NMH, 153 AMH and 59 RMH)⁶ which all declared that they have nothing against being included in a survey. The list was then used to select a sample of about 25 percent of the total households registered, i.e. 140 households. Some of these households (28) were dropped during data analysis due to the inadequacy or lack of information. The remaining households are distributed as following: 40 non-migrants' households (NMH), 20 returned migrants' households (RMH) and 52 absent migrants' households (AMH), see Table 1.

This form of direct contact was not without problems. The most difficult one was winning the confidence of people and getting them to give information about household standard, consumption and income. To persuade people to release information about household members was

Table 1. *Type and distribution of households covered in the sample*

Type of household	Frequency	Percentage
NMH*	40	35.7
RMH	20	17.9
AMH	52	46.4
Total	112	100.0

NMH: non-migrants' household
 RMH: returned migrants' household
 AMH: absent migrants' household.

very difficult. For example, people were suspicious when asked to list items such as televisions, videos, refrigerators, in case such information might result in robberies.

To overcome these problems, young students who understood the object of the exercise and were locally known were engaged as interviewers. This was especially necessary when interviewing married women, who are usually not expected to speak to men from outside. Therefore two female students were engaged to interview women. In each household in the sample, women were interviewed about their cooking habits and fuel preferences (see Tables 2-4). This part of the study concentrated mainly on the households' energy consumption behaviour. A questionnaire was applied but the author used a conversational approach rather than a formal (question-and-answer) method.

The ways respondents feel about and value the quality of the physical environment, and how they feel about protecting environmental quality in Wedinoo⁷ have been treated separately and termed environmental attitudes, environmental concern and worldview. Those who place high value on the quality of the physical environment and feel that it should be protected are referred to as having a positive environmental attitude, being environmentally concerned, and having a more environmentalist global view. Two types of measures of environmental attitudes are

used in this section of the analysis: multi-item scales of global environmental attitude, and individual questions about local environmental attitudes (see Tables 7 and 8).

The questionnaire in this part of the study focuses on three categories of question. Each category measures the respondents' attitude toward: (a) human influence on the balance of nature; (b) limits to growth of human population; and (c) human control over nature. A list of statements was presented to respondents and they were asked if they "strongly agree," "agree," "disagree," or "strongly disagree" with each statement. The higher the score on this scale the more positive or negative is the respondent's attitude toward the environment. Data obtained from this part of the survey are based mainly on interviews with male household heads.

The measures of environmental attitudes are responses to individual questions about the local environment. Using fixed-response format questions, respondents were asked about their assessment of quantity and quality of the natural vegetation in Wedinoo as well as the level and the source of deforestation in the region. To measure respondents' *environmental actions*, they were asked several questions about their household energy use, type and quality. Finally, respondents were asked to answer several questions concerning their opinions about policy issues. These include questions to find out whether the respondents support conservation measures to protect the remaining natural vegetation in the region and particularly argan trees.

People in the different household categories in the sample have different histories, public images, and current economic and social conditions. Given the differences between these groups, the researcher might expect that these household categories will differ in environmental attitude, knowledge, and policy option.

The study site and its relatedness

The natural environment and the different forms of human life found within the region of Wedinoon constitute a complex set of interrelations involving numerous aspects of physical, social and cultural factors. This complex set of interrelations is a result of historical artefacts of human existence which are an integral part of the natural setting. Therefore neither the environment nor the way the inhabitants of this region have worked out their relations to the environment can be understood apart from one another. Analysis of the use of natural resources such as household energy is, therefore, more than a description of the impact of this use on the environment. It is also an exploration of the ways in which inhabitants have made their own social drama and how their cultural and social forms constitute a portion of landscape: Wedinoon.

Ecological zones

The Wedinoon is characterised by three major ecological zones, each of which contains a series of discrete micro-environments. The first zone, the plains where the climate, though subject to wide variations, affords relatively good conditions for intensive cultivation of grain. It is in this oasis-like zone that the larger settlements of the region—in particular, the town of Guelmin—are found (Najib 1985 and 1986). By contrast, the mountains zone of Anti Atlas, the land of *Ait Ba'amran* (see fig. 1), is far less intensively cultivated. Herds of sheep and goats graze throughout the zone, and small-scale farming is practised on the more accessible hills and plateaus. The general pattern of scattered settlements is broken where populations have gathered around stable sources of water. Between the mountains and the plains lies the piedmont zone, which is locally called *dir*. Running intermittently along the juncture of mountain and plain, the *dir* is more or less a

no-mans-land with very few settlements. As a consequence, herds (of sheep, goats and camels) not only from within the region but also from outside graze within the zone.

For each of these three zones—plain, mountain, and piedmont—the range of climatic variation, within a year as well as over different years, is significant. This extreme variability of climatic conditions has a spatial as well as temporal implication. Within the mountain zone, for example, it is not uncommon for one hillside or valley to receive adequate and timely rainfall, while adjacent areas receive insufficient or inappropriately timed amounts. In both the mountains and the plains, therefore, one can differentiate a wide range of micro-environments, each of which has its own distinctive qualities. Recognising these local ecological differences and the general climatic uncertainty, the people of Wedinoon have organised their technologies, their social ties, and their concept of the world accordingly.

Each of these zones forms an interdependent unit in which access to markets and the availability of different resources link people into a complex whole. Despite the differences of zones or niche, the problem of unpredictability is broadly shared, and the social arrangements by which people of the region confront this harsh situation. For this reason, one may speak of the entire region—Wedinoon—as an interacting whole.

Cultural and social identity

In most North African societies, the identity, attributes and actions of a particular individual are, to a great extent, understood in terms of the individual's membership and relations to the social groups within local society. In Morocco, for example, associations based on shared ethnic (tribal or sub-tribal) and/or spatial background often form close links and points of attachment that contribute to a person's overall identity and network of personal relations. At the same time these ethnic links and/or spatial

attachments constitute distinct cultural domains, which function as focal points for regional identities and recognised cultural values. Each of these cultural domains, in their turn, form a set of local or sub-cultural domains. It is appropriate, therefore, in trying to understand the region of Wedinooon as a field of social action, to look at the categories of affiliation that inhabitants themselves see as important, to attribute the contribution of each to individual identity, and to explore the mechanisms by which the components of social and spatial identity are used to shape networks of personal relations.

The social identity of a Tekni^s is constructed from a wide range of attachments, each of which is itself defined by a series of cultural criteria. These sources of personal identity can be attributed to concepts and features which are frequently referred to by the people of Wedinooon and whose particular components form a repertoire of relational possibilities. Here, I shall consider three of these conceptual criteria: *origin*, *locality* and *relatedness*.

A crucial aspect of an individual's social identity is embraced in the Arabic concept *min* (which means "from where" or "from which origin"). To ask, as Tekna people frequently do, from which brotherhood (tribe) a man is from (*min ay lakhout*) it is to inquire into his social background, in other words, his social identity. Thus, to speak of one's social background is to imply the social and physical context of one's nurturance, or that of one's ancestral line, and its influence on one's contemporary existence.

To which local or social group an individual's origins are traced varies, even for a single person, with the context and purpose for the issue. Because the concept of "origin" overlaps that of "locality" one's *asl* (origin) may be couched in terms of the place or kinsmen with whom one is linked.

This short description of cultural and social identity may appear irrelevant for the purpose of the analysis. The question is what has this to do with household energy pattern? Do group characteristics and

dynamics have anything to do with household energy use? The answer is "yes". Social groups (whether these are couples, families, tribes, cliques or firms) are naturally-occurring phenomena which exhibit their own observable dynamics. Social science research tradition has demonstrated that people's energy consumption levels, their likelihood of pursuing conservation, and their understanding of energy and technology all vary systematically among groups identified on the basis of social class, ethnicity, life cycle stage, gender, education, occupation, geographical location, and local culture (Olsen 1981; Throgmorton and Bernard III 1986; Lutzenhiser, Hackett and Shultz 1987). The social sciences tell us that cultures are organised in social structures, by means of which political and economic interests find expression. In social science theory, energy-dependent technology is taken to be a part of the evolving material cultures of societies (which also can include buildings, furnishings, clothing as well as other objects). Material culture is, in its turn, interwoven with roles, relationships, conventional understanding, rules, beliefs into the cultural practices of groups living in particular natural environments (Rosa and Machlis 1988). It follows, then, that an approach which only inquires about the material side of household energy consumption patterns will overlook cultural, ideological and economic dynamics that contribute directly or indirectly to the creation and/or maintenance of those household consumption patterns. Cultural identity is therefore important because it has some implications for the analysis and the understanding of urban household energy use behaviour and lifestyle of the Tekna people. The issue will therefore be further explored below.

The town of Guelmim

The household interviews were all conducted in Guelmim which is the provincial headquarters of the region and has the

largest periodic market in the area. Apart from that, Guelmim is a typical North African small town in its ethnic heterogeneity (Arabs and Berber), its rapidly growing population, and its emphasis on trading activities. It lies in the North African pre-Saharan contact zone which encompasses different products and people, and is one of the old end-points for the trans-Saharan traderoute (Najib 1985). The region of Wedinoon has a long history of trading and contact with other peoples. Not surprisingly trading and related activities continue to be the most common occupation (29 percent), followed by farming (27 percent), handicrafts and artisan work (16 percent), clerical (11 percent), tailoring and hairstyling (5 percent) and miscellaneous (12 percent).

Guelmim is also a typical North African town in having a large part of its population poorly schooled. Previous surveys revealed that over one-third of the total population had no formal education, 38 percent had elementary level schooling, 24 percent secondary, and 4 percent university or equivalent. More than two-thirds of the total population of Guelmim, then, had less than secondary school education.

Like many Moroccan small towns, Guelmim is experiencing a rapid population growth. The 1982 Census of Morocco gives the urban population as 45,000—just double that of 1971. In addition to the rapidly growing number of permanent residents a large number of people come to visit the weekly market of Friday–Saturday and Sunday.

The outstanding influence for the rapid population growth is the Guelmim Periodic Market, one of the large regional periodic markets in the region. Unlike local markets, the regional markets have extensive spheres of influence. In the past, the Guelmim Market has benefited from the trans-Saharan trade. People from distant areas—such as Mauritania and Senegal as well as from nearby areas such as Ait Baamran, Lakhsas, Sous, etc.—frequently visit the annual periodic market of Guelmim. Thousand

participants arrive at the annual market in June each year. Similarly, the market has benefited from the new roads constructed since independence (1956). Roads leading to the south, north, east and west bring traders from Western Sahara as well as from other areas. More recently it was estimated that, together with local inhabitants, about 1,000 people each month and some ten thousand each year attend the annual Guelmim market of Sidi-el Ghazi in early July every year (Najib 1985:59).

Originally, the market was scheduled only for Sundays, but now traders have started flowing in from all directions as early as Friday evenings. Trading activities continue day and night till Sunday mornings. Animals (including camels, cows, horses, donkeys, sheep, goats, etc.), goods (including food items, wood products, hardware, new and second-hand clothing) and services are sold and bought, people gambling, shaking hands, chatting, shouting and lotto forecasting.

Household energy use patterns

The result of the analysis of our data, presented in this section, attempts to answer some of the questions presented above. Notably, what are the most widely used household energy use patterns in Guelmim? Does household energy use pattern differ between the two categories of household included in the sample? Do migrants' households consume more energy than non-migrants' households? Do they use less woodfuels and more of commercial energy than non-migrants' households? If so is this due to housing standards, such as the location and type of housing and appliances, all of which might have an impact on household's consumption of energy? Do migrants' households have higher energy use which may be associated with differences in the way they use energy?

Food cooking and energy consumption

Table 2 gives various patterns of household energy consumption with regard to type of fuel used in cooking. Woodfuels clearly predominate. Electricity is not included here, since it is still rarely used to cook food.

Essentially, the analysis was undertaken to give an idea about the pattern of household energy use in Wedinooon and to

find out whether differences exist first between migrants' households and non-migrants' households and second, between returned migrants' households and absent migrants' households as far as energy consumption is concerned. It must be remembered that these categories are not homogeneous and that each category has different purchasing power.

Table 2. *Types of energy used to cook food by household category, percentages of households*

ITEM	NMH		RMH		AMH*		TOTAL	
	N	%	N	%	N	%	N	%
W**	16	40.0	2	10.0	5	9.6	23	20.5
C	10	25.0	10	50.0	23	44.2	43	38.4
G	6	15.0	3	15.0	5	9.6	14	12.5
W+G	4	10.0	1	5.0	5	9.6	10	8.9
C+G	2	5.0	2	10.0	11	21.2	15	13.4
Other combine	2	5.0	2	10.0	3	5.8	7	6.3
TOTAL CASES	40	100.0	20	100.0	52	100.0	112	100.0

*NMH: non-migrants' household; RMH: returned migrants' household; AMH: absent migrants' household

** W: wood; C: charcoal; G: gas; W + G: Wood and gas; C + G: charcoal and gas

The pattern revealed in the following tables shows different patterns of household energy use and consumption. First of all we can see that migrants' households (MH: RMH and AMH) are likely to use several sources of energy while non-migrants' households (NMH) do not. If we first look at single energy use (as can be seen in the last two columns of Table 3), charcoal is the single most used energy source by both household categories, followed by fuelwood and gas. As for the combination of energy use, the most common combination is charcoal and gas and finally wood and gas.

The different patterns of household energy users revealed in Table 3 have serious implications for household energy demand.

Amongst the category of households with no migrants abroad (NMH), cooking facilities tend to be limited mainly to traditional energy use, especially fuelwood. Nearly two-thirds of the households in this category use fuelwood and one-half use charcoal. Only one-quarter of this category use gas and very few use electricity when cooking their food.

The pattern is different when it comes to migrants' households (RMH and AMH). In this category the percentage of cooking facilities and gas appliances tends double or even triple that of electrical appliances (Table 5). Certainly, household characteristics (such as size, income and technology) extensively determine cooking

habits and other arrangements which in turn affect household energy use. In addition, migrants' households tend to use more than two fuel sources for cooking. This highlights a considerable inequality in household income influencing both demand and income elasticity with regard to energy. However, the elasticity of energy use depends on the types of fuel consumed as well as on their accessibility and their relative efficiency. These factors have serious implications for current and future energy consumption.

Another explanation for the apparent differences between the migrants' households and non-migrants' households is to be found in the type of houses occupied by these two groups. The majority of the non-migrants' households tend to live in old traditional dwellings which are more suited to the use of traditional energy fuels such as fuelwood.

As can be observed, (in Tables 2, 3 and 4) the most popular fuel for all three categories of households in the sample is charcoal. However, differences still occur in the degree of use. Gas is consumed by all household categories, but, once again, the share of gas shows different patterns of use with respect to household category. Migrants' households tend to use gas more frequently than non-migrants' households.

The most popular combination for migrants' households (RMH and RMH) is charcoal and gas, while for non-migrants' households (NMH) the combination of fuelwood and gas seem more important than any other combination. As for charcoals it was found that migrants' households use this energy source intensively. It is surprising, however, that the percentage of migrants' households using charcoal is higher than that of non-migrants' households. The comparatively high figures for charcoal use amongst both migrants' and non-migrants' households reflect—as will be shown in detail further on—cultural values attached to this energy source.

Migrants' households, therefore, tend not only to use several energy resources but also to use more energy than NMHs. As table 3 shows, the most popular fuel use amongst MHs is the combination of charcoal and gas but also electricity.

Part of the difference may be offset by increased electricity consumption by those households with access to electricity.

The increasing use of electricity, although at modest levels, is significant in terms of energy diversification. Other combinations are not very prominent but nevertheless, they account for about 6 percent in the sample.

Table 3. Types of energy used in cooking mint-tea by category of household, percentages of households

ITEM	NMH	RMH	AMH*	TOTAL
Charcoal	77.5	70.0	80.8	77.7
Gas	12.5	10.0	7.7	9.8
Charcoal/ gas	10.0	15.0	7.7	9.8
Charcoal/ electricity	0.0	5.0	3.8	2.7
TOTAL CASES	40	20	52	112

*NMH: non-migrants' household
RMH: returned migrants' household
AMH: absent migrants' household

The author is, however, keen on finding the importance of individual fuels use for various activities in the household. This is necessary to understand people's attitudes and preferences, to assist in policy formulation and to change people's attitudes toward particular fuels. Tables 4 and 5 show again variations between household categories with regard to cooking food and mint-tea.

While it is evident that modern (commercial) energy is increasingly being used, the relatively high use of fuelwood and charcoal use is cause for concern. This is particularly the case with regard to charcoal which is used by a large proportion of the households in all three categories in the sample. Although we knew that people in this region still used charcoal as household fuel, it was surprising to find out that the percentage of households using charcoal when cooking mint-tea was very high in amongst all households in the sample. This, perhaps, indicates that where charcoal is available, households will frown on commercial fuels as an inferior source of energy, especially when cooking mint-tea and/or grilling meat or using incenses. The latter is due to traditional habits and lifestyle in the area.

Naturally, this trend has some implications for pressure on natural resources, especially the remaining argan trees in the region. This finding is very interesting not only from an analytical perspective but also from a policy point of view because it indicates that effective and cheap commercial energy distribution is one possible way to encourage people to consume more of commercial energy and less fuelwood and charcoal; thus releasing pressure on argan trees.

Table 4 shows the household average use of woodfuel by each category of household. The average use of firewood per household for both types of household group in the survey amounts to approximately 1.1 kg/day or 378 kg/annum and 0.6 kg/day. Non-migrants' households use 2.5 time more of firewood than migrants' households. A major part of all fuelwood (68 percent or 256 kg) used by both types of household originates from argan trees. However, household uses of fuelwood account only for about two-fifths (44 percent) of all firewood used in Guelmim, while nearly three-fifths are used for commercial activities.

Table 4: Household average consumption (quantity) of woodfuels by household category

CONSUMPTION VARIABLES	NMH	MH	NMH&MH
A. Fuelwood use per:			
Average daily use (kg)	1.5	0.6	1.1
Average monthly use (kg)	45.0	18.0	31.5
Average annual use (kg)	540.0	216.0	378.0
Average annual use (kg)	320.0	192.0	256.0
B. Charcoal use per:			
Average daily use (kg)	0.4	0.8	0.6
Average monthly use (kg)	12.0	24.0	18.0
Average annual use (kg)	132.0	300.0	216.0
Average annual use of argan (kg)	93.0	270.0	182.0

Source: Based on data derived from our interviews

The average use of charcoal for both types of households is 0.6 kg/day or 216 kg/annum. More than eight (84 percent) out of ten kilos are produced from argan trees. Migrants' households use about twice as much purchased charcoal as non-migrants' households. This is because many households in the latter group use firewood when cooking food and as a result most of their need for charcoal is met by the use of firewood instead.

From the preceding information and data provided by tables 2, 3 and 4, it can be seen that fuelwood and charcoal household consumption figures in Guelmim vary at all levels, the social (migrants' / non-migrants' households), the temporal (daily/yearly) and also by sector (domestic/commercial).

The findings demonstrate that although urban households in Guelmim have begun to switch from traditional fuels to modern fuels, these transfers are heavily influenced by household lifestyles which create distortions in household energy consumption behaviour in the town. The charcoal of argan trees will certainly continue to supply a considerable part of urban households' energy needs for the foreseeable future.

The socio-economic status of different household groups of charcoal users varied, though the indicators were difficult to interpret. It seems safe to assume, however, that the users of charcoal from argan trees are more affluent than fuelwood and gas users. Fuelwood user households are found mainly among non-migrants' households and particularly in the poorer parts of the town.

Charcoal from argan trees is more expensive than other charcoal types available in the region. Yet it is preferred by most people because it stabilises and stays alight for between two and three hours, while charcoal from other trees in the region can retain heat only for a maximum of an hour and a half before it turns to ashes. As a result, argan charcoal is superior to all other charcoal types available in the region.

Charcoal from argan is used for cooking (especially, *tajin*⁹ and *mint-tea*), for roasting meat on charcoal and for the burning of

incense (i.e. perfuming the room with a mixture of aromatic gums and spices which, when burnt on charcoal, produces a sweet-smelling smoke. The incense is used occasionally when having visitors), in accordance with Tekna tradition.

The implications of these findings raise, however, some problems with regard to fuel supplies and subsidies. While the low income groups, for instance most of non-migrants' households in the sample, are associated with particular fuel combinations, other income groups like migrants' households also use these fuels. This will raise problems if the government attempts to subsidise a particular fuel type in line with a cost equity policy which is important in a marginal region like Wedinoon. However, the extent to which the equity problem can be addressed depends on how important the issue of environmental conservation is. For example, if the conservation objectives are primarily to discourage the widespread use of fuelwood and charcoal because of their negative impact on environment, then the problem of equity becomes irrelevant whether the poor or the rich are subsidised.

Household appliances

Other factors that influence household consumption, and in particular the type of fuel used, include the distribution and use of energy intensive appliances.¹⁰ Table 5 reveals the extent to which energy intensive appliances have penetrated into the households of each household category. First it can be seen that a wide distribution of appliances exists irrespective of household category. The reason is that the research covered all appliances not only those for cooking. But we can also see that there are more appliances in migrants' households than in non-migrants' households. This tendency further underlines the differences existing between the categories of households covered in the sample. Thus, the distribution of energy intensive household appliances among households demonstrates the degree of penetration by these goods in households (see table 5).

Table 5. *Spread of household energy appliances by household category, percentages*

ITEM	NMH	RMH	AMH*	TOTAL
Firewood-stove	80.0	20.0	19.2	32.1
Charcoal-stove	85.0	90.0	94.2	90.2
Gas-cooker	12.5	40.0	44.2	33.9
Electric-cooker	7.5	25.0	17.3	15.2
Electric-iron	12.5	60.0	59.6	41.1
Refrigerator	10.0	65.0	67.3	46.4
Washing machine	5.0	55.0	42.3	31.3
Transistor radio	50.0	90.0	75.0	68.8
Television	5.0	40.0	44.2	29.5
Video	5.0	40.0	30.8	23.2
Electric-fan	5.0	45.0	50.0	33.0
Other appliances	10.0	40.0	46.2	32.1
TOTAL CASES	40	20	52	112

*NMH: non-migrants' household
 RMH: returned migrants' household
 AMH: absent migrants' household

Some respondents say that they own certain appliances but they do not always use them. One plausible explanation is that these goods, apart from providing services, are also owned as status symbols. Although these goods could in most cases become necessities, they cannot always be used. However, we should not lose sight of the fact that this development has serious future energy implications in the region. In the light of the increasing growth trends in urban population, and the observed link between household income and energy demands, future household consumption of modern energy could greatly increase.

Apart from traditional cooking utilities (such as firewood and charcoal stoves), ownership of household appliances is very sparse among non-migrants' households, as indeed it is for well-off households. Among the poorest segments of the urban households, appliances are limited to a transistor radio, occasionally a gas stove, electrical iron, electrical cooker and some electric lamps.

As incomes have risen, the charcoal stove has remained the most common type of cooking stove, but has been supplemented by gas stoves and, at higher income levels, by gas and electric stoves. Again, as income rises, electric lighting is substituted for candles and kerosene lamps. With regard to other appliances, first transistor radios and irons are acquired, and then television sets/videos, refrigerators and air conditioners.

These findings indicate that the introduction of electricity may have reduced the relative use of traditional alternative energy sources. Electrified households are likely to use less of each major fuel but more fuel in total combined than non-electrified households. However, electrification seems, so far, not to have reduced the popularity of charcoal. A caveat for levels of charcoal usage is that whereas electrification increased in popularity for lighting and other purposes, it did not replace all charcoal usage because the latter is much more attached to the lifestyle of most families in the region than any other energy source.

Household energy budget

The relationship between household energy consumption and income at different income levels can also be analysed from a household budget perspective. In this study, household energy consumption is measured in value (i.e. budgetary) terms, which takes into account the use of more efficient and more expensive forms of energy such as gas and electricity. It is assumed that expenditure on fuel and light will increase as household income rises. The percentage of income spent on fuel and light will, however, decline as household income rises even further.

Typically, among migrants' households, expenditure on fuel and light is estimated to account for only a small proportion (16 percent) of household income, but for most non-migrants' households the proportion is estimated to be substantially high (29 percent). In some areas of the town,

especially where the majority of the poor households live, expenditure on fuel and light accounts for over one-third (34 percent) of total household consumer expenditure. At these levels, expenditure on fuel and light is second only to food and is virtually the only other major expenditure apart from food. However, this high proportion may not be typical of annual expenditure. Expenditure on fuel among poorer households is believed to be substantially lower when other forms of fuel (such as crop residues) are easily obtained.

It is worthwhile and important to calculate annual expenses and the burden on the budget of various forms of energy use. Table 6 illustrates average household budgets for the various household categories with respect to fuelwood and charcoal in comparison to gas and electricity which are high-cost energy sources. A fuelwood using household has an annual expenditure of about 240 dirhams (0.67 dh x 30 days x 12 months).

Table 6. Average budget for energy use by type of energy and household category

HOUSEHOLD CATEGORY - ITEM	VOLYME/ MONTH	MONTHLY COSTS DIRHAMS	ANNUAL COSTS DIRHAMS	%
Migrants' households				
fuelwood	-	20	240	9.2
charcoal	25.0 kg	63	756	28.9
gas	1.5 container	60	720	27.5
electricity	-	60	720	27.5
others	-	15	180	6.9
TOTAL		218	2 616	100.0
Non-migrants' households:				
fuelwood	-	45	540	33.3
charcoal	11	28	336	20.7
gas	0.75 container	30	360	22.2
electricity	-	15	180	11.1
others	-	17	204	12.6
TOTAL		118	1 620	100.0

Source: survey data

As can be seen in table 6, a charcoal-using household spends about 760 dirhams per year, while a household with a gas stove has to make an initial investment of about 150 dirhams (90 dhs for a small stove and about 60 dhs for gas container). The household then has to buy a gas container every month which costs between 40 and 50 dirhams. The total cost adds up to 750 dirhams per year. Over the first year of use charcoal is as expensive as gas.

While non-migrants' households (the typical fuelwood consumers) the majority have a monthly income far below the minimum wage¹¹) spend between 25 to 30 percent of their budget on fuel, migrants' households (the typical gas stove owners, who have an income of between 3000 and 6000 dirhams per month) spend only a small proportion of their income on energy.

The changing pattern of household energy consumption as incomes rise is thus confirmed by analysis of household expenditure on energy. For example, in non-migrants' households, fuelwood and charcoal account for a major part (54 percent) of the annual expenditure on household energy. The corresponding figure for migrants' households is significantly lower (38 percent). This pattern is reversed when it comes to expenditure on modern energy. Gas and electricity account for 55 percent of annual expenditure on energy for migrants' households, while for non-migrants' households, these energy sources represent only about one-third of their total expenditure on household energy. These findings suggest that traditional energy sources decline in relative importance as income increases, while modern energy sources gradually come to account for a substantial part of the total expenditure on household energy. This tendency, however, does not mean that the use of all traditional sources of energy decreases. Some of these sources, such as firewood, have been partially replaced by modern ones, while the use of others, such as charcoal, remains unchanged and even tends to increase with the inflow of modern energy sources. The

prominence of charcoal consumption, in both types of household, in this region can be attributed to habit and cultural values and thus merits more investigation.

Influence of social habits on charcoal consumption in the household

Why do people in Guelmim continue to use charcoal as an important source of household energy? Why do they prefer to use charcoal from argan trees rather than charcoal from other types of trees? Of course people buy and use charcoal because they get a good price, and because they consider charcoal from argan to be more useful than other types of charcoal. These factors evidently influence people's actions, but do not fully explain why people prefer charcoal from argan trees. Nobody buys and uses charcoal solely according to such criteria. People use the type of household energy that they and other members of their kin and society prefer. Nobody in Guelmim will use gas to prepare tea that he/she knows no household member nor guest will like. Instead, the person preparing mint-tea will do his/her best to make the best possible tea, considering the restrictions of price availability, variation, etc. If he/she succeeds, the guests and other members of the households will express their approval by asking for more and complimenting the tea-maker.

Thus, by focusing on the description and analysis of dietary habits and related changes in household energy use, this study tries to explain social practice in the context of Tekna society. More specifically, it seeks to elucidate how, in a situation where Tekna more than ever experience their way of life and cultural values to be at stake, Tekna food stuffs become a convenient and appropriate agent of mediation in a new symbolic context.

People in Guelmim and in the whole region of Wedinoon, use charcoal from argan to achieve social goals. The home is a

place for social activity, where social networks are established and maintained. Most Tekna people value social relationships, but some have a more positive attitude towards external social networks than others. Therefore those households with a more positive attitude toward external social relationships also receive more visitors or guests and, as a result, can be expected to consume more charcoal than those who do not receive many guests. Thus social considerations as well as more practical considerations cause variations in energy use among households as people achieve social as well as practical goals through their energy consumption.

The argument here is that people in Wedinooon invite and receive guests into their households to consume food that is cooked or prepared in a certain way because they believe that such energy use will bring social advantages and practical benefits. Some of the forces that motivate consumer behaviour are manifested in straight forward relationships where hosts are rewarded socially by the reciprocal consumption of goods and services. However, social advantages are not always of a concrete nature. Advantages can often be expressed in an abstract manner through gratitude, admiration, status, etc.

Thus, the use of charcoal from argan trees is intimately involved in various forms of the social life and culture of every Tekna-family. Even if one asks a Tekni teenager about the importance of charcoal from argan trees, he/she will explain how central and meaningful such an energy source is to the lives of families and social networks in Tekna society as a whole.

Tekna people actively distinguish themselves from members of other communities (tribes and social groups) through their language, clothes, consumption habits, social network, routines, etc. But even the possession and use of certain modern household equipment (like traditional Tekna dresses, cars, modern houses, gas/electrical heaters, gas/electrical cookers, videos and televisions) is also governed by

unwritten social norms and conventions. Just who can own and operate certain types of social equipment in Wedinooon is at present culturally regulated by ethnicity, class, occupation, gender, age, and other social status (Najib 1994). There are, of course, possibilities for deviance, and cultural standards do change, but the point here is simply that material culture is made up of socially-regulated and culturally-meaningful items, the use of which cannot be reduced to simple matters of utility, need or preference.

Cultural (lifestyle) analysis involves the empirical investigation of what various types of energy (including argan charcoal) mean for Tekna people, and how they are actually used in everyday life in Wedinooon. To what extent do these life-style variables influence household energy consumption? What barriers hinder households from completely shifting to modern energy consumption? We have noted that it is only the consumption of charcoal from argan trees that is considered prestigious. Why is it that only argan charcoal is preferred, not that of other trees?

As I indicated at the beginning of this study, people in Wedinooon are very much part of nature, dependent on the environment and natural resources of their livelihood. The argan tree has been shown to be systematically related to many other aspects of both environmental and social concern.

But while charcoal may be a useful proxy for other variables, both environmental and social, any discussion of "lifestyle" runs the risk of oversimplification. When discussing lifestyle (and human adaptation to arid environments) one must start from the basic premise of that lifestyle (arid lands).

Traditionally, Tekna (the inhabitants of Wedinooon) have relied on a combination of nomadic pastoralism, subsistence agriculture and trade to cope with low annual rainfall and periodic drought. People moved from one sphere to the other with little disorientation of ecological balance. Until recently, Tekna maintained a relatively good

balance with their local natural resources. They have always used charcoal from argan trees without depleting their environment. While charcoal is obviously an essential material consideration, a source of energy, it is also loaded with cultural meaning. Charcoal is not just a practical necessity; it has great symbolic value. Indeed, the whole stream of social life is seen to be analogous to the circulation of energy.

Meat and mint-tea not only serve the purpose of a "meal" or nourishment of the body, they also serve a symbolic function. Food is both a sign and a value; in other words, the symbolic and pragmatic are closely interwoven. The preparation, handling and consumption of mint-tea (the food) and meat is very important in social relations, and for the culture and identity of Tekna people. Furthermore, tea prepared, served and consumed as a "drink" in a specific context works as a forceful instrument to build up and reinforce personal prestige. In Tekna culture, the offering of food (especially tea and meat) and cosmetics (especially incense and perfume) is a code that conveys messages about degrees of social hierarchy, inclusion and exclusion, boundaries and transactions across boundaries.

The dimensions of meaning encapsulated in the values and ideas associated with tea and meat are of utmost importance in trying to understand why Tekna food habits and dietary rules so strongly favour the consumption of tea and meat. Tekna consume tea, meat, incense and perfume primarily out of cultural preference rather than nourishment or material necessity. All Tekni households, whether they are poor or rich, consume tea, sugar, meat and incense. Meat is not however, an everyday food in a poor Tekni household, but is served on special occasions.

Wealthy people tend to exploit this situation through lavish slaughtering whenever they have a celebration in their homestead. In this way, tea, meat, incense and perfume have become tangible demonstrations of wealth. From being first

of all a source of food for the family and a symbol of generosity when receiving visitors or in ceremonies, the serving of *shoa* (which refers to a whole roasted lamb) is currently becoming a symbol of rank and a manifestation of inequality. Such a big meal usually needs a lot of argan charcoal, and only a few people can afford that.

However, some people may now choose to buy a few kilos of meat at the local butcher and prepare a small feast, however, feasting upon a few kilos of meat from the local butcher is a very different matter to sharing meat from a slaughtered beast. Tekna social values manifest themselves in sharing and generosity and are often expressed precisely on such occasions that demand the slaughtering of a beast.

Such an event, more than any other, gives migrants the opportunity to communicate and confirm their identity as households and family heads, asserting that they too are "good Tekna men". The lifestyle of a Tekna household is changing. Purchased household appliances have become increasingly important not only for their utility aspect, but also as symbols of a new lifestyle advocated by the new wealthy households.

As for food, we have noted however, that only the consumption of certain foodstuffs (e.g. tea and meat) is considered prestigious. The consumption of these foodstuffs, which are quite expensive and beyond the means of the common man, has become a sign of prestige not only for the educated and wealthy Tekni, but also for the poor and uneducated Tekni. Thus, despite changes, traditional Tekna food in particular meat, continues to be a powerful symbol in the region. This is so irrespective of the fact that some traditional ceremonial contexts are disappearing, particularly some of the seasonal ones.

Meat, tea, incense and perfume encode new messages of hierarchical ordering, of inclusion or exclusion. Feast events, such as the circumcision of boys, marriage and other social networks, seem to have grown in social importance.¹² Migrants tend to invest a lot of energy and expense in these

celebrations, and in individual cases they have become veritable performances of conspicuous consumption. The extravagance displayed in many of these events tends to make wealth differences explicit and discloses the existing inequality, particularly between migrants' and non-migrants' households. This fact may explain why in general migrants' households tend to use more charcoal than non-migrants' households.

It is important to underline here that the process of change in Wedinooon is not uniform, and that it does not affect all Tekna people in identical ways. I have shown in an earlier study (Najib 1986) how some Tekna, particularly labour migrants, by pursuing new economic strategies, created not only new economic realities for themselves but also come to act as agents of change producing new socio-cultural realities for all Tekna (see also Najib 1994). By seeking work outside their local communities, Tekna labour migrants are exposed to a greater diversity of social influences. Nevertheless, certain Tekna traditions remain unchanged and even tend to be reinforced.

To participate in meaningful ways within the Tekna society, people must adjust to social identities acceptable to wider society. As many labour migrants originate from low-ranked Tekna, this process of adaptation to wider society is particularly crucial. To some extent, then, the dynamics of social change among the Tekna must be sought in this identity game, in the strategic adaptation by some Tekna to new environments with the primary aim of overcoming their marginal social position.

Therefore, in order to understand the distribution of cultural traditions among Tekna and how these traditions change, one must look at the processes affecting social identity. This requires analysis of how the various groups of Tekna are exposed to the external world and how this leads to differences in their worldview. Instances of group interaction provide ideal opportunities for analysis, since they might reveal

the basic processes shaping the development of new notions about the world. Detailed accounts of communications occurring within various types of encounter are therefore necessary to see how certain Tekna act as agents of change, thereby linking the processes of identity management to those of cultural change.

I argue that migrants (especially descendants of earlier slaves) behaviour and choice of dress and idioms to express social identity must be seen as the result of the way they adapt to the wider arena of the Tekna society. In this wider context, emigrants face certain handicaps: as absentees somewhere abroad for at least ten months of the year. As a result, they see themselves dislocated from their culture and social identity. One way of readapting to their cultural identity is, therefore, through reception of guests and conspicuous consumption. This life-style, in turn, has some implication for the type and the amount of household energy used in the region.

Having demonstrated some differences in household consumption with respect to energy use, as well as the habits associated with certain types of energy use, I now wish to assess how observed patterns can be attributed to people's attitudes and perceptions. How these attitudes and perceptions are influenced by external world and how does this lead to differences in Tekna worldviews?

Environmental knowledge and worldview

In this section respondents' environmental knowledge and their attitudes toward environmental issues will be examined. The respondents were asked to consider a number of statements presented to them. These statements were included in the survey to form an idea of respondents' attitudes toward the environment.

The main findings of this part of the study are presented below. The proportions of the individual samples that agree or disagree

with certain statements about environmental issues are set out in Tables 7 and 8. Items dealing with general environmental knowledge are listed first in Table 7.

As might be expected, migrant respondents were most likely to agree with items consistent with natural resource conservation and most likely to disagree with items consistent with further exploitation of natural resources, while the converse generally held for non-migrant respondents.

Table 7. Proportion of respondents in each sub-sample agreeing or disagreeing, percentages of household herds

STATEMENT	NM H			MH		
	A*	D	N	A	D	N
1. There is too much destruction of the natural resources of the region.....	20	23	28	60	21	19
2. Large scale environmental problems such as deforestation and desertification are caused by society in general - my actions are not important...	20	50	30	25	47	28
3. There is no obligation for me to do anything about these large scale environmental problems....	25	50	25	26	44	30
4. Humans have the right to modify the natural environment to satisfy their needs.....	88	8	4	73	14	13
5. If we continue to put pressure on our environment, we will be unable to sustain our present rate of consumption of natural resources...	80	5	15	72	13	15
6. We attach too much importance to economic measures of well-being in our society.....	22	38	10	42	44	16

*A: Agree/strongly agree; D: Disagree/strongly disagree; N: No information/indifferent.

What is more interesting was the pattern of responses to the questions involving the environment. A clear majority of the category "migrants" agreed that there is too much natural resource destruction in the region of Wedinoon. The situation is totally different when it comes to the category "non-migrants", 23 percent of them disagreed while only 20 percent agreed. There is, however, a clear rejection of the view that individual action are unimportant in solving large-scale environmental problems and that individuals have no responsibility to do anything about these problems.

Moreover, an overwhelming majority, in both sub-samples, agreed that humans have the right to modify the natural environment to satisfy their needs; similarly, an overwhelming majority agreed that if they continued to put pressure on their local environment, they would be unable to sustain their present rate of consumption of natural resources. A large proportion of both migrant and non-migrant respondents tended to view vigorous economic growth as the mark of a progressive and healthy society.

In addition, new environmental problems were seen to challenge economic growth with a large proportion of respondents agreeing that economic measures of wellbeing are overrated and that conventional development creates artificial wants. Surprisingly, a majority of non-migrant respondents still viewed vigorous economic growth as an indication of a healthy society.

The extent to which people's attitudes towards household energy use can be linked to environmental problems is illustrated in Table 8. Consistent with the hypothesis made earlier in this study, migrants are most likely to have positive attitudes towards the natural environment and thus would be more in favour of conserving natural resources than non-migrant respondents.

The pattern of the responses made by each category of households is again interesting. On the one hand, an overwhelming majority are in favour of maintaining the current rate of charcoal and fuelwood production (Item 1) and agreed that market forces work better than governmental regulation (Item 6). On the other hand, nearly two-fifths of respondents wanted the government to intervene and stop the felling of argan trees (Item 5). Nearly two-fifths of both migrant and non-migrant respondents (44 percent and 38 percent respectively) agreed that people in Wedinooon are rapidly using up their natural resources and therefore they should conserve some of these resources for future generations (Item 8). Few respondents were, however, willing to lower their living standards to conserve natural

Table 8. Proportion of respondents in each sub-sample agreeing or disagreeing, percentages of household heads

STATEMENT	NMH			MH		
	A*	D	N	A	D	N
1. Maintaining fuelwood and charcoal is more important than protecting the environment.....	63	13	25	33	33	34
2. We should increase fuelwood and charcoal usage to keep up with our needs.....	40	18	42	42	28	30
3. Most people do not waste much fuel in their household fuel use.....	78	10	12	56	39	5
4. We could not live a decent life without the use of firewood and charcoal.....	87	5	8	63	35	2
5. Government should intervene to stop the felling of argan trees.....	33	38	29	42	40	18
6. Market forces will allocate fuel supplies more efficiently than government regulation.....	20	13	67	35	44	21
7. There is no point making an effort to conserve trees if the end result is that others will consume more.....	72	15	13	67	28	5
8. We are rapidly using up our natural resources therefore we should conserve more natural resources for future generations.....	38	30	32	44	42	14
9. We should be prepared to lower our living standards in order to conserve natural resources.....	13	63	24	22	64	14

*A: Agree/strongly agree; D: Disagree/strongly disagree; N: No information/indifferent.

resources (Item 9). An over-whelming majority of both groups of respondents agreed that they could not live a decent life without using firewood and charcoal (Item 4); and that most people do not waste much fuel in their household fuel use (Item 3). On the contrary, about two-fifths of all respondents were willing to increase fuelwood and charcoal usage to keep up with their household needs.

Generally speaking, these responses indicate that all respondents are coming to accept that there are problems associated with current energy use patterns. While they want to continue meeting the demand for charcoal and using market forces to do so, they are realising that there are environmental problems associated with fuelwood and charcoal use, and that some form of sacrifice is needed to conserve argan trees. But few of them are willing to alter their behaviour in order to achieve this goal. They were, of course, worried about their local environment. But they were more worried about the effect that such a conservation policy would have on their living standards and the restrictions it would place on their personal freedom.

Only about half of both categories of respondents were willing to reduce their household consumption of charcoal and so reduce pressure on argan trees. There is a difference between migrant and non-migrant respondents with regard to this issue. Non-migrants are somewhat more reluctant (48 percent) than migrants (56 percent) to reduce their consumption of argan charcoal (Item 10). This difference can be attributed to the perceived difficulty of the change for people involved. Many non-migrants are more dependent on natural resources than migrants. Therefore there are apparent limits to how far these people are ready to alter their consumption patterns and lifestyles for the sake of environment.

Thus, concern about environment is one thing, but willingness to really make sacrifices is another. Environmental attitudes obviously require much closer investigation than they have usually received in the

literature. They are not explained by a simple "yes" or "no" or "agree" or "disagree". It is not only a question of a positive attitude toward environment but also really changing one's lifestyle in order to achieve certain environmental goals.

Although the pattern of responses from migrant and non-migrant samples shows more or less similar opinions regarding some environmental problems, there are significant differences regarding willingness to change lifestyle in order to decrease pressure on local natural resources. It seems that after years of media hype in Europe, most migrants are aware of a variety of environmental problems in many parts of the world, but are often confused about the severity of these problems, why they occur and what should be done about them.

Conclusion

The prime purpose of this study has been first to derive a pattern for household energy consumption habits of the migrants' and non-migrants' households in Guelmim, both as they are at present and as they are expected to develop. Second, to examine how such a pattern is consistent with respondents' awareness and attitudes toward the environment.

The extensive literature on environmental attitudes indicates consistencies within categories of age, education, urban residence, and political ideology. The socio-demographic consistency of environmental attitudes is described by many researchers (Buttel 1987; Dunlap and Catton 1979; Van Liere and Dunlap 1981). The composite indicates that younger, better educated, urban, liberal individuals are more concerned about the environment and have a more positive attitude toward the environmental movement than other categories. Further factors that have weak or inconsistent relationship to environmental attitudes include gender, income, and educational prestige. Income, education, gender, and environmental attitude have a

consistent positive association with public environmental knowledge (Arcury, Johnson and Scollay 1986; Arcury, Scollay, and Johnson 1987; Arcury and Johnson 1987; Lovrich *et al.* 1986; Maloney and Ward 1973; Pierce *et al.* 1989).

Previous empirical studies from the study area show that migrants are more urban, better educated, have higher incomes, and live in a more economically prosperous area of the town than do non-migrants (Najib 1986). The current study expected that migrants, unlike non-migrant respondents, were exposed to television and other media means in Europe and so could be expected to know more about global environmental issues, and to have more positive environmental attitudes. In addition, because migrants—in comparison to non-migrants—are more dependent upon remittances and less attached to local natural resources they were expected to be more inclined to support the institutionalisation of conservation policies in order to protect their local environment.

The non-migrants, on the other hand, being more attached to local natural resources were thus expected to know more about the local environment but less about global environment issues. Nevertheless, they were expected to be more opposed to policies that could adversely affect their access to the natural resources that provide them with additional income.

It would have been logical, then, not only to expect that people's attitudes towards energy use could be linked with environmental problems but also to the way they extract their income. While energy can be bought and sold like any other commodity, there are also social, cultural and environmental costs and benefits involved.

Increasing the supply of commercial energy in the region over the last two decades would have reduced woodfuel consumption and, as a result, slowed down the pressure on argan trees. Migrants, who have access to modern appliances, cash and experience of modern ways of life, would be particularly expected to use less

traditional household energy. Consequently, it has been hypothesised that people in favour of the conservation of the environment will tend to be more committed to conserving the forest and will support policies which promote the use of commercial energy.

On the other hand, it was expected that people living in Wedinoon would be more attached to their traditional values and thus would be less amenable to new consumption behaviour. It was therefore hypothesised for the purposes of this study that people with traditional attitudes would be less likely to shift to new energy sources, especially when these demand additional investments.

The analysis of our survey data confirms that there is a great difference between consumption patterns of migrants' and non-migrants' households. A substantial proportion of the total consumption of non-migrants' households consists of woodfuel (i.e. firewood and charcoal). While the majority of the migrants' households use modern energy sources (i.e. gas and electricity), charcoal still constitutes a large proportion of their energy consumption. Another remarkable observation is that migrants' households tend to combine more types of energy, and thus consume more than non-migrants' households. A somewhat surprising observation is that the vast majority of all households (i.e. both categories of households) in the sample continue to use charcoal as an important source of household energy, particularly when cooking tea, roasting meat and burning incense. The proportion of households using charcoal, particularly from argan trees, is much higher among migrants' households than among non-migrants' households.

This finding suggests that energy consumption differentials are not completely explained by either socio-economic characteristics (such as age, education, household size, income, etc.) or behavioural choices (e.g. type and location of the house, appliances ownership, etc.) of migrants' households. Indeed, the analytical approach

used above reveals that, while socio-economic and behavioural variables help to explain various household energy consumption patterns in Guelmim, there is also an indirect but very important relationship between lifestyle and consumption patterns of household energy.

Charcoal from argan trees is intimately involved in various forms of social life for every household in the region. It has therefore a central and meaningful value in the lives of families, social networks, neighbourhoods and the Tekna community as a whole. Households receive information, approval, criticism, legitimacy, and status-confirmation through their participation in social networks, and the extent of their participation is routinely subject to social critique and regulations.

The data strongly suggest that overall migrants' households are more demanding of energy, in terms of sheer volume, than non-migrants' households. Although both categories of household use charcoal from argan trees to achieve certain social goals, migrants' households appear to be more willing to spend resources and energy living a comfortable life; and are very concerned about maintaining and strengthening social relationships with their neighbours and kin. Thus, although many migrants' households rapidly adopt some key behavioural characteristics and new consumption patterns, most of them remain faithful to Tekna tradition.

This tendency adds a new dimension to Tekna society which is not easy to explain. This presents a challenge for further research on both traditional and modern energy use and the migration process. This study has shown that the energy use behaviour of households in Guelmim raise issues that add to the complexity of analysing local community in most developing countries. Important social and cultural consequences must be examined in addition to the direct implications of increased energy demand. This however, is not the place to consider this issue in detail, but I will simply note that various local communities' culturally-

meaningful uses of energy are of central importance in explaining different patterns of household energy use.

The advent of electricity use in Guelmim is another factor that has not been studied in detail but which is of clear importance for total household energy patterns in the region. The increase of electricity use is connected to rising incomes which will enable a larger proportion of the less poorer households to have access to electricity supplies. The following questions from this observation follows: What is the effect of the introduction of electricity on total energy consumption in the region? Will it substitute biomass energy sources and less efficient forms of household energy in the region? Will it perform the same range of services with less gross energy input? Will it lead to less deleterious environmental effect in the region, particularly upon argan trees, as woodfuels from argan trees would be replaced by electric power? Or, on the contrary, will it increase gross energy inputs of the households by extending the range of energy demands?

As for environmental knowledge, there is a slight difference between migrant and non-migrant respondents, knowledge about local environmental problems, environmental attitudes, and opinion about environmental conservation. Respondents from the two groups do not differ significantly in their attitudes toward environmental awareness. Nevertheless, there are some differences, which support the hypothesised relationships between migration and positive attitudes toward the environment. Migrants tend to have a more positive attitude toward the environment than non-migrant respondents.

For example, a majority of migrants believe that there is too much destruction of the natural resources of the region, while only one-fifth of non-migrant agreed with this statement (Item 1, Table 9). Nevertheless, a substantial majority of the two groups agreed that humans have the right to modify the natural environment to satisfy their needs.

What is more interesting is the pattern of responses to items involving the environment. A clear majority of migrant respondents agreed that there is too much environmental destruction and that the current consumption of natural resources is unsustainable. There is also an overwhelming rejection of the view that the benefits of production outweigh the environmental problems produced, that individuals were unimportant in solving large-scale environmental problems and that the individual had no responsibility to do anything about those problems.

The patterns in our data on environmental consciousness are perhaps not dramatically different from other recent studies in developing countries. It is fair to say that the majority of our respondents have a relatively high knowledge about their environment and in general have positive attitudes toward the environment. However, it is also important to point out that, although a high proportion of our respondents show positive attitudes toward the environment, those attitudes have little to do with how much they know about environmental problems, or how much they are willing to alter their behaviour and lifestyles in order to deal with environmental problems.

Therefore environmental awareness and positive attitudes toward the environment are attributes that require much closer investigation than one might expect. In other words, it is difficult to specify precisely what is meant by environmental awareness and positive attitudes toward the environment when these attitudes are not directly related to practical actions. Thus, one must be cautious in drawing general conclusions.

Our data show a general willingness among respondents to change their lifestyles. But, as mentioned above, that willingness depends on the perception of how difficult those adjustments are going to be for people involved. Non-migrants, for example, tend to be more reluctant to reduce pressure on local natural resources, probably because they would be more

affected by those restrictions than their migrant counterparts. Migrants have the advantage of receiving cash income through remittances from international migration and are thus less dependent on the local environment. It is fair then to conclude that our respondents are willing to make some adjustments in order to safeguard the local environment—as long as those adjustments do not require much in the way of sacrifice. There is therefore a dilemma between individual environmental awareness and the persistence of environmental problems in society.

Although the sample may have been limited in scope, it is fair to conclude that the current public interest in environmental issues in Wedinooon still does not have much depth. Despite superficial concern for the environment, the Tekna environmental perspective is based on the idea that natural resources exist solely to provide comfort to human beings.

It is now evident, at least for many researchers in the South, that environment and development are not only mutually inclusive concerns, but also mutually interdependent ones. The challenge thus lies in achieving development that is both people-centred and conservation-based, and uses natural resources in sustainable way. For Tekna people, this means that they have to see the local environment and natural resources as their "most valuable capital" and thus avoid eroding the wealth on which future generations will depend.

Detailed research at the level of current study has produced new knowledge regarding social barriers to the introduction of new energy-technologies, changing levels of technology use and energy consumption as well as unforeseen opportunities for energy and resource conservation in the shift to modern energy consumption. Further detailed field studies on household energy use at the local level are required to enable future large scale survey research to ask the right questions, and interpret patterns of energy-technologies and household consumption identified in that research.

Therefore, this field study makes it possible for us to raise further research questions (1) about the sources of contemporary energy problems in less industrialised societies, (2) about the comparative qualities of the sub-lifestyles in the region, (3) about the societal and institutional dynamics which govern various household energy consumption patterns. Thus, even if we have not been able to produce fully acceptable answers to all the questions raised in the course of research, the results are useful since they enable us to raise complex questions such as; how is social status in Wedinoon related to household energy use? What are the conspicuous consumption and equity implications of various ways of life in the region? How do lifestyles change in different sub-cultures of the region? Who is interested in changing their lifestyle, and why? Why is the consumption of one type of charcoal (argan) pursued and not another? Why do poor households not use more gas than they do? Should they be encouraged to use modern energy? Why are people in Wedinoon more interested in their socio-economic situation rather than thinking about global environmental problems? Some of these questions may serve as fruitful seeds for further research in Wedinoon and elsewhere.

Some of these questions require political decisions to be taken at local, national and international levels. Focusing the analysis on a local community or upon the subgroups therein does not mean merely turning attention inwards to the ways in which these groups are systematically linked to one another, but also outwards to regional and international institutions as well as related global environmental problems.

Notes

¹For a descriptive study upon urban energy utilization in Nairobi, see MacGranahan *et al.* (1980). For a more general idea about energy use in cities of the developing countries see Sathaye and Meyers (1985).

²This paper limits itself to household energy consumption, recognising that in many developing countries it is difficult, and perhaps not useful, to separate energy for direct household consumption from energy used by the household for productive activities.

³Alam and associates (1985) estimated that one third of all fuelwood used in India is consumed in urban areas. While in highly-urbanized regions such as Latin America this has been the case long time ago. Even in relatively less urbanized regions such as Southern Africa, rapid urban growth is causing a fundamental reassessment of national energy policies (ETC 1987).

⁴Argan tree (*argania sideroxylon* or rather *argania spinosa*) belongs to a tropical family of trees: *sapotaceae*. Argan trees only exists in the region around the High Atlas and in the Anti-Atlas in Morocco. Argan is the most remarkable tree in this region, both for its botanic interest and its economic value (Challot 1947 and 1949).

⁵The term "Tekna" refers to the tribal confederation of Tekna in Wedinoon. For a more elaboration on this confederation see Najib 1985, especially chapter 3.

⁶NMH: non-migrants' household; RMH: returned migrants' household; AMH: absent migrants' household.

⁷Wedinoon refers to the region of Wedinoon of which the town of Guelmim constitutes the provincial headquarters (see Fig.1).

⁸The term "Tekni" (Arabic adjective singular form) refers to any person who is a member of the Tekna confederation.

⁹Tajin is typical Moroccan stew-pot that is frequently prepared on charcoal.

¹⁰Data on household appliances was very difficult to get, probably due to security measures.

¹¹The minimum wage in 1992 was 1400 dirhams. But not all employers pay the minimum wage. Many employees in Wedinoon are still paid a wage far below the minimum wage level.

¹²During a visit to the area in April 1993, the author was invited to a ceremonial event, which was arranged in for honour of a Tekni who had escaped from a POLISARIO prison-camp in Algeria. On that occasion, 40 lambs were slaughtered, roasted and served in only one day.

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