Barriers to the adoption of efficient energy strategies in Northern Ghana
1. EXECUTIVE SUMMARY ................................................................. 4
1.1 KEY BARRIERS AND MESSAGES REGARDING THE USE OF IMPROVED STOVES .............. 6
1.2 KEY BARRIERS AND MESSAGES REGARDING PLANTING OF WOODLOTS .......................... 7

2. INTRODUCTION ........................................................................... 8

3. BARRIERS TO IMPROVED ENERGY USE ...................................... 10
3.1 GENERAL DISCUSSION OF THE PROBLEM ........................................... 10
  3.1.1 Introduction .................................................................................. 10
  3.1.2 Policy development and external factors ......................................... 11
  3.1.3 Technologies ............................................................................... 11
  3.1.4 Energy Saving Options .................................................................. 12
  3.1.5 Strategies ..................................................................................... 13
  3.1.6 Changing Behaviour ..................................................................... 14
  3.1.7 Education and awareness - an essential element .............................. 15
  3.1.8 The need for another tool .............................................................. 17
  3.1.9 Participation vs regulation .............................................................. 19
  3.1.10 Gathering opinions and reasons why ............................................. 20

4. DISCUSSION OF THE GHANAIAN CONTEXT .................................. 22
4.1 ETHNIC CONFLICT AND DISPLACEMENT ....................................... 22
4.2 THE 1994 CONFLICT - ‘THE GUINEA FOWL WAR’ .............................. 22
  4.2.1 The Conflict Event ....................................................................... 22
  4.2.2 Tribes involved in the conflict ......................................................... 22
  4.2.3 Causes of the Conflict .................................................................. 23
  4.2.4 Konkomba Perspective ................................................................. 24
  4.2.5 Dagomba Perspective ................................................................. 24
  4.2.6 Role of the Government ............................................................... 24
  4.2.7 Conclusions .................................................................................. 25
  4.2.8 Response to the 1994 Conflict ......................................................... 25
  4.2.9 Current Situation .......................................................................... 26
  4.2.10 Developmental needs of the area .................................................. 26
4.3 GHANA’S’ MAIN ENERGY SAVING STRATEGY ................................. 27
  4.3.1 Charcoal ....................................................................................... 27
  4.3.2 Alternative fuels ............................................................................ 28
  4.3.3 Improved wood cookstoves ............................................................ 28
  4.3.4 Establishment of fuel woodlots ....................................................... 28
  4.3.5 Sustenance of production and use of Firewood ................................. 28
  4.3.6 Other activities on the energy strategy ............................................. 29

5. RAPID ASSESSMENT TOOL ............................................................ 29
5.1 DIFFERENCE BETWEEN POLICY AND PEOPLES DECISIONS ............... 29
5.2 BASIC THEORY OF THE TOOL ........................................................ 30
5.3 METHOD OF USING THE TOOL ....................................................... 32

6. FINDINGS ....................................................................................... 34
6.1 APPROACH ..................................................................................... 34
6.2 SAMPLE CHARACTERISTICS ............................................................. 35
6.3 Overview of the TORA Variable Findings for the Three Behaviours ........................................ 36
  6.3.1 Behaviour .......................................................................................................................... 37
  6.3.2 Intention .......................................................................................................................... 37
  6.3.3 Attitude ............................................................................................................................ 37
  6.3.4 Subjective norm ................................................................................................................. 38
6.4 The TORA Correlations for the Three Behaviours (Table 3) ............................................. 38
6.5 Presentation of Individual Behaviour Findings - Firewood Collection .............................. 41
  6.5.1 TORA Variable Readings and Correlations ................................................................. 41
  6.5.2 The Attitudinal Construct ($\Sigma b_i*e_i$) ......................................................................... 42
  6.5.3 The Attitudinal Components Relationship to Behavioural Intent .................................. 43
  6.5.4 Differences in the Attitudinal Component of Those Forcibly Displaced ..................... 44
  6.5.5 The Normative Component ......................................................................................... 45
  6.5.6 Difference Between Comparative Groupings Regarding the Normative Component ........ 46
  6.5.7 Summary of Firewood Collection .................................................................................. 46
6.6 Improved Stove Use ............................................................................................................. 47
  6.6.1 TORA Variable Readings and Correlations .................................................................. 47
  6.6.2 The Attitudinal Construct ($\Sigma b_i*e_i$) ......................................................................... 48
  6.6.3 The Attitudinal Component’s Relationship with Intent to Use Improved Stoves ............ 49
  6.6.4 Differences in the Attitudinal Component of Those Forcibly Displaced ..................... 50
  6.6.5 The Normative Component ......................................................................................... 51
  6.6.6 Summary Regarding the Use of Improved Stoves ......................................................... 52
6.7 Woodlot Planting ................................................................................................................ 53
  6.7.1 TORA Variable Readings and Correlations .................................................................. 53
  6.7.2 The Attitudinal Construct ($\Sigma b_i*e_i$) ......................................................................... 54
  6.7.3 The Attitude Component’s Relationship with the Intention to Plant Woodlots ............ 55
  6.7.4 Differences in the Attitudes of the Displaced ................................................................. 56
  6.7.5 The Normative Component ......................................................................................... 56
  6.7.6 Summary of Woodlot Planting .................................................................................... 57

7. Analysis .................................................................................................................................... 58
  7.1 Key Barriers and Messages Regarding Sustainable Fuel Wood Management (Collection) ................................................................................................................................. 59
  7.2 Key Barriers and Messages Regarding the Use of Improved Stoves ............................. 60
  7.3 Key Barriers and Messages Regarding Planting of Woodlots ....................................... 60

8. Conclusions ............................................................................................................................ 61

9. Recommendations .................................................................................................................. 62
  9.1 It is recommended that the application of the educational messages by the Extension Services of Northern Ghana be supported and monitored. ..... 62
  9.2 It is recommended that DFID promote the results of this project within DFID. ................ 63
  9.3 It is recommended that DFID promote the results of this project within other agencies. ...... 63

10. Appendices ............................................................................................................................ 63
1. Executive Summary

The project demonstrates a new rapid assessment tool for use in any emergency or development intervention. In this case the tool has been used to address the barriers to the adoption of specific domestic energy strategies within refugee communities.

The report considers the recent work of agencies such as UNHCR with refugees regarding energy and the environment. The literature illustrates how much of the work is focussed on the external context of the refugees. Agencies see policy and technology as their main instruments for changing the behaviour of refugees.

However the “main reason for “wrong” decisions in environmental management was found to be lack of communication and insufficient “right” information for decision makers.” The literature does indeed mention some actions to address the internal motivation of the refugee. It acknowledges the important role of dialogue with the refugees and local communities, and of the need for adequate knowledge of their priorities and socio-cognitive processes. Participation and dialogue are key processes. One document recommends multiple entry points for awareness raising and the need to build upon existing knowledge.

The survey techniques quoted in the literature for finding the existing knowledge and the entry points for awareness raising, are open ended interviews and PRA techniques. The latter in particular has been used to define the “what, where, when, who and how” of energy strategies. However, little attention has been paid to the “why”. Why do people behave as they do - what motivates them, what reasoning fuels their decisions? The open ended interview surveys have asked the question why. However the following application of the TORA tool explains the relationship of these different expressed attitudes on the decision to adopt improved practice. It therefore helps isolate the key issues that may be acting as reinforcers or barriers to positive behaviour. *The added value of the TORA rapid assessment tool is its use of the second more formal survey to give statistically validated findings.*

The new rapid assessment tool is based on an application of the Theory of Reasoned Action (Ajzen and Fishbein, 1980). Prior to this project the Theory has been applied to a wide variety of issues in Northern Countries (e.g. politics and voting intentions, birth control, consumer food choices, career choices, as well as land management practices within the agricultural and forestry sectors in North America). In the last few years it has been applied to environmental and natural resource management decisions in South America. Its use in this project is believed to be its first application to an “emergency and development” situation. It is used as an innovative “transfer of technology” applying it to the problem of refugee energy management.

The TORA is best understood as a series of hypotheses linking (1) behaviour to intentions, (2) intentions to a weighted combination of attitudes and subjective norms (social referents), and (3) attitudes and subjective norms to behavioural and normative beliefs. If one accepts the causal chain illustrated in the diagram, it follows that behaviour is ultimately determined by one’s underlying beliefs. Therefore changing behaviour is primarily a function of changing this underlying cognitive structure. The
TORA rapid assessment tool is a means to capture the strength of the underlying beliefs and social referents for a particular behaviour and thus provide valuable information for constructing and targeting educational and physical interventions.

The project was conducted in Ghana. The ethnic conflict in Northern Ghana of 1994 resulted in over 2000 deaths and displacement of large sections of the population. The interviews were taken in an area that is still restricted access because of the potential of ethnic conflict. Over 60% of those interviewed (randomly chosen from the general population) had been forcibly displaced in the last five years. These displaced are not international refugees (they did not cross and international border) and are not in camps but are interwoven with the local communities. Nevertheless they present many of the same conditions as the refugees in Tanzania - displacement, new and/or temporary settlement, increasing environmental pressure on dry land resources. Communities include urban, peri urban and rural areas. Each community has been approached with alternative energy strategies from Government and Non-Government agencies in the area. The Government has designated the area as one of the most environmentaly sensitive in Ghana, and is undertaking projects to alleviate pressure on the environment. The project was undertaken in collaboration with the University of Ghana. The development of the tool and data collection involved experienced local extension agents working in the targeted area from a number of agencies.

The method for the TORA assessment tool is a series of open ended interviews with approximately 50 interviewees (individuals and groups) followed by a more formal questionnaire. In this case the questionnaire was split in two to make each interview more manageable, so 440 interviews were conducted.

Seven behaviours were identified and data gathered for all seven. From a preliminary analysis three behaviours were identified for detailed analysis. The report presents the findings regarding three of the seven behaviours identified as critical to fuel wood management within the research area, namely,

- firewood collection,
- improved stove adoption.
- wood lot planting.

The other behaviours studied but not reported below are alternative fuel adoption, fuel efficient cooking methods, cooking utensil selection and fire management.

The study particularly seeks to identify differences between members of the population regarding the TORA variables and their relationships:-

- those who have, or have not, been forcibly displaced due to war or civil unrest.
- As well as exploring the influence of displacement, other social groupings are also identified and compared:-
- differences between Dagbani and Gonja language groups and
- urban and rural residents.
- those that had been exposed to extension demonstrations regarding improved practice of the different behaviours under review
- those who are exposed to radio messages.
The key barriers to more sustainable fuel wood management (collection) behaviour are related to:
- The overriding perception that there will not be a problem with future access to firewood;
- The existing social pressure to continue current practices;
- The low self-perception amongst women regarding their tree harvesting capabilities;
- The rejection of many of the traditional taboos and beliefs regarding the effect of certain types of wood on their health;

Messages aimed at encouraging more sustainable practice therefore will need to:
- Raise the awareness of the possible destruction of the fuel wood resource;
- Build a positive self-perception regarding tree harvesting via demonstrating and reinforcing good practice, i.e. the appropriateness of women’s involvement;
- Reinforce some of the traditional taboos that have an actual physical basis for their existence, e.g. the effects of some types of wood smoke on the health of the family.
- Regarding those not displaced, messages emphasising and reinforcing appropriate collection behaviours, i.e. appropriate management of live tree harvesting such as pruning should be received.

Channels that need to be used for encouraging more sustainable practice of firewood collection:
- it will be important that education should be done through groups, which included local friendship networks, with little emphasis on individuals
- involve the appropriate social referents and gain their endorsement of the messages proposed.
- With respect to the whole group these are the local extension agents and the local chief.

The most influential beliefs supporting firewood collection decisions, regarding the whole sample, are related to the strongly held opinion that God will not permit the destruction of the trees and that they will always be able to gain access to areas with firewood. In constructing messages aimed at encouraging more sustainable firewood collection behaviour, the messages should seek to make the subjects more aware of the possible loss of both trees and therefore limited future access. The displaced are likely to respond more positively to these particular messages given their higher awareness of the limits. However, with the displaced it will be very important to impart these messages through natural social groups, which include both friends and family.

1.1 Key barriers and messages regarding the use of improved stoves

The key barriers to more use of improved stoves are related to:
- a strongly neutral attitude towards using improved stoves, i.e. no convincing rational attitude that prompts use of the improved stoves
- a much strong attitude towards the traditional stove
- a strong propensity to keep the traditional cooking pots and cooking methods
relating back to firewood collection, the overriding perception that there will not be a problem with future access to firewood, and therefore that fuel efficiency is not valuable

Messages aimed at encouraging more use of improved stoves therefore will need to:
- focus on the possible destruction of the fuel wood resource and raise awareness in this area
- address the perceived limited utility of improved stoves (see below)

Channels that need to be used for encouraging more use of improved stoves:
- the husband (as a strong social referent for this behaviour) needs to be included in the approach on the use of improved stoves.
- family presentations may be more effective than isolated demonstrations for women
- radio should be used to reinforce messages
- demonstrations should be used as part of message delivery by extension workers

The displaced appear to be more open to considering the choice and have a closer correlation between their intention and attitude toward improved stove use. However, they do express a significantly lower intention than those who are not displaced.

It must be noted that there is a very strong opinion about the suitability of the existing proposed designs regarding the use of various cooking pots. The general attitude is that the improved stoves cannot use the variety of pots traditionally used. There is a need for the design team of the improved stoves to re-examine this aspect of the stove design. They either need to adjust the design to cater for all the pots, or if they believe the stove can use different pots and it is a matter of skill, then they need to specifically demonstrate the stoves with all the different pots.

1.2 Key barriers and messages regarding planting of woodlots

There is a very strong positive intention to plant trees in woodlots. There are few influential socio-cognitive barriers were identified when the sample is taken as a whole. One of the most interesting findings is that the women appear to have overcome some of the traditional taboos to more planting trees. The key barriers identified applied specifically to the displaced:
- social and practical support
- the practical problems of theft, animal damage, drought.
- security of future utility

In future extension and education, in the light of the existing positive attitude to planting woodlots (given the opportunity), one should be careful not to repeat messages that are already accepted, i.e. fall into the trap of “preaching to the converted”. Messages should be aimed at accompanying practice and consolidating the learning process. Messages for planting of woodlots therefore will need to:
- be accompanied by facilitation and organisation of the community to release land
- be accompanied by facilitation and organisation of the community to protect any proposed woodlots
be accompanied by small incentives such as seeds or seedlings
be focussed on the practicalities and best practice of tree planting

Channels that need to be used for encouraging planting of woodlots:
- the Chief, especially for rural people, and particularly the non displaced.
- The family unit needs to be the focus, especially for non-displaced
- the issue of creating social contracts between land-owners, chief and displaced
- Government extension agents who will lend authority and security to the proposed actions, particularly regarding the displaced.
- groups and communities developing ideas and working together

The key finding is that against what might be logically expected, the displaced are more likely to adopt more sustainable fuel wood management practices if the conditions are favourable. This may reflect their greater awareness of the limitations of fuel wood resources. It may also reflect a greater value placed on this resource due to the experience of having their access threatened or removed. This would correspond to observations of forcibly displaced migrant farmers’ more positive intentions toward forest conservation in Central America (McKemey 1996).

Specific recommendations have been made regarding extension practice based on the findings. The report concludes that the TORA is a useful tool for identifying the internal motivation of community members (both displaced and non-displaced) and could be widely used in the energy sector and beyond. The tool is appropriate for environmental programmes, technology transfer and health programmes. The report recommends that the results of this project be widely disseminated to agencies working in the energy and refugee sectors, and other relevant programmes. Where an understanding of the internal motivation of the participants will assist planning of interventions, the TORA rapid assessment tool would be useful.

2. **Introduction**

Theme number : E4

Theme title : Improve access to and efficient use of domestic energy

Project Title: Adoption barriers for efficient domestic energy in refugee sites.

This technical report forms the main outcome of Project R6849 funded by the Department of International Development (UK) under the Knowledge and Research programme.

The project demonstrates a new rapid assessment tool for use in any emergency or development interventions. In this case the tool has been used to address the barriers to the adoption of specific domestic energy strategies within refugee communities.

The project can be thought of as bringing together two components:-
1) an applied decision making theory and
2) the use of alternative domestic energy strategies in refugee sites.
The new rapid assessment tool is based on an application of the Theory of Reasoned Action (Ajzen and Fishbein, 1980). Prior to this project the Theory has been applied to a wide variety of issues in Northern Countries (e.g. politics and voting intentions, birth control, consumer food choices, career choices, as well as land management practices within the agricultural and forestry sectors in North America). In the last few years it has been applied to environmental and natural resource management decisions in South America. Its use in this project is believed to be its first application to an “emergency and development” situation. It is used as an innovative “transfer of technology” applying it to the problem of refugee energy management.

Regarding 2) a number of organisations, specifically UNHCR, ACORD, ITDG, Christian Outreach and Care, amongst others, have investigated the use of alternative energy strategies among refugee communities. Most have found problems with adoption of the alternatives. Take up rate varies. Much of this work has revealed the need for a greater understanding of the social, cultural and attitudinal aspects of the community to develop appropriate educational messages to facilitate rapid widespread adoption of the alternative energy strategy.

It should be noted that originally the project was to be in Tanzania working with refugees in that area. In Feb 98 changes were made to the outputs. After a number of difficulties in Tanzania (obtaining all necessary permission, flooding, food pipeline breaks that caused refugee stress) the project was redirected to Ghana.

The Department of Agricultural Extension, collaborator on the project in Ghana, has undertaken participatory community studies among environmental refugees in Ghana, and agencies have tried a number of coping mechanisms. Both the Ministry of Mines and Energy and the Ministry of Agriculture note some difficulties in their activities on energy saving (improved stoves, woodlot planting, etc).

Collaboration in the field for the project is with the Dept of Agricultural Extension, University of Ghana (Legon). Arrangements were made to conduct the study with displaced persons in North Ghana (Tamale). The refugees have been forcibly displaced, principally through ethnic conflict during early 1994 (and to a small extent through floods in 1990). They present many of the same conditions as the refugees in Tanzania - displacement, new and/or temporary settlement, increasing environmental pressure on dryland resources. Communities include urban, peri urban and rural areas. Each community has been approached with alternative energy strategies. Improved charcoal stoves, LPG stoves, woodfuel stoves, replanting of trees and alternative cooking methods are among the strategies introduced by the Ghana Government and collaborating NGOs. Extension workers say they have had limited impact on the communities, and they are actively interested in identifying the barriers to adoption.

The innovative element of this project is the application of the rapid assessment tool to identify the social and attitudinal influences on behaviour, to the problem of adoption of alternative energy strategies. By rapidly identifying the barriers to adoption, the numerous activities of many agencies in this sector could meet with more success.

The terms of reference and logical framework for the project are appended.
3. Barriers to improved energy use.

Before moving on to the method and findings of this project, this section discusses some of the justification for the problem, and notes some of the relevant literature.

3.1 General discussion of the problem

3.1.1 Introduction

In the recent Rwandan crisis, fuelwood use by refugees for domestic energy has been a very significant problem. The large numbers of people in Tanzania and Zaire have resulted in an environmental destruction that will impact the host countries for many years to come. UNHCR, Care and Christian Outreach, among others, have undertaken action in Tanzania to address this critical need. While Rwanda is foremost in our minds, the need of refugee communities for domestic fuelwood and the resulting negative impact on the surrounding environment is common to nearly all complex disasters with migrating populations (ref Conference Documents ITDG, East Africa Workshop on Refugees, Energy and the Environment, Nov 1995, UNEP). It also fact that environmental refugees are found throughout Africa and environmental degradation has become a serious threat to the livelihood of the displaced persons.

In 1992 UNHCR set up an environmental unit which has invested heavily in acquiring understanding of the “refugee and environmental” question. Perhaps the single most important and relevant document to appear in the last few years is “Refugee operations and environmental management - selected lessons learned” June 1998. This reference document summarises the lessons learnt from the TSEMPRAA activity - “Towards Sustainable Environmental Management Practices in Refugee Affected Areas”. This programme identified the lessons from ten case studies (see map). This sourcebook hopes to encourage environmental considerations at all stages of activities with refugees, from the emergency phase through to rehabilitation.

Nevertheless, actions by agencies have been limited in many situations by a lack of understanding of the socio-cognitive influences on decision making within the displaced communities. For example, Christian Outreach were actively involved with solar cookers in Sudan with Eritrean refugees in the late 80’s early 90’s. The cookers were able to cook food effectively, and yet they were never accepted by the refugees. They now attribute the lack of adoption to socio-cultural and attitudinal factors.

In refugee situations it is necessary to identify these factors rapidly and effectively. There are a number of established techniques used generally in poverty alleviation that allow sociologists and anthropologists to understand the decision making processes within a community. However most of these techniques require considerable lengths of time.

This project, if successful, would demonstrate a method that could rapidly identify socio-cognitive barriers to the adoption of domestic energy alternatives. This could open the way for agencies to introduce strategies for reducing fuelwood demand, and/or increasing fuelwood (biomass) supply and/or introducing alternative fuels.
these alternative domestic energy strategies are implemented there would be a valuable and significant positive impact on both alleviation of poverty among refugees and protection of environment.

There are a number of domestic energy strategies available for refugee situations, these are discussed below. Much has been achieved regarding the development of these alternatives but only a proportionally small amount of attention has been given to the issue of socio-cultural and attitudinal barriers to the adoption of these technically feasible innovations.

3.1.2 Policy development and external factors.

Environmental problems have been increasingly on the agenda of UNHCR and other agencies working in refugee situations. “The impact of refugees on renewable natural resources is particular concern as this can have lasting effects on human welfare.” Caring for the Future, UNHCR 1997. The environment unit was established in 1993, and the following year they published Interim Guidelines on the Environment (approved policy in 1995 and final publication in 1996). Since then this unit of UNHCR has commissioned a considerable amount of work ranging from baseline surveys in emerging refugee situations through to working with field stations and NGOs on energy saving interventions.

3.1.3 Technologies

In particular the publication “Environmental Guidelines – Domestic Energy needs in Refugee Situations” (UNHCR July 1997), outlines the range of responses possible. In terms of action and technology the list looks as follows:-

- **Firewood** – is the most commonly used refugee fuel. Consumption depends on a range of factors, the most important of which is availability.

- **Charcoal** – lump wood converted to carbon by burning in a restricted supply of air; traditional kilns are crude and inefficient so around 60% of the original energy in the wood is wasted. It has advantages over wood in terms of energy density (high energy content per kg weight), efficiency of burning (heat transferred by radiation rather than convection), and harmful emissions.

- **Agricultural waste** – e.g. sawdust, seed husks and shells etc. Fires need close attention as material burns quickly and produces a lot of ash. Availability is seasonal, and material may have a valuable use as fertiliser or animal feed.

- **Briquettes** – made from agricultural wastes (sometimes charred) by compacting. Although expensive as it requires specialist machinery, they overcome some disadvantages of agricultural wastes – high energy density, slow burning with lower emissions.
• Cow dung – needs to be dried before burning. It produces smoke and has value as a fertiliser, but can help diversify fuel mix in refugee situations.

• Peat – not commonly available in warm climates, it produces a lot of smoke and requires careful handling if it is to burn properly.

• Biogas – when animal (or human) waste or vegetable matter is digested in the absence of oxygen (anaerobic digestion) it produces a gas (methane and carbon dioxide) and a slurry which is a high quality fertiliser. With special appliances, the gas can be used for cooking or lighting.

• Solar cookers – food can cook slowly inside an insulated box placed in the sun; higher temperatures can be achieved by the use of a concentrator. The main problems are that they are not suited to certain types of cooking e.g. frying, cooking times may not coincide with mealtimes, and they are expensive.

• Kerosene – specialist equipment offers more efficient cooking than wood, but fuel is expensive and must be imported, and training is required to minimise the risk of explosion.

• Liquid Propane Gas (LPG) – not suitable in most situations due to the cost of bottled gas and appliances.

• Electricity. Diesel and petrol generators are useful in the short term although they are expensive, polluting and fuel must be imported. In a suitable wind regime, wind generators can be erected (50 W to hundreds of kW) but they are expensive and require careful maintenance. Solar photovoltaics (PV) require less maintenance, but are more expensive. Micro-hydro systems are relatively cheap but require professionally engineered civil works and careful siting.

3.1.4 Energy Saving Options

In addition, demand for energy can be reduced by a range of technical and policy related interventions:

• Food. The most significant factor in energy consumption is the food itself, and UNHCR aim to provide food with a low fuel consumption for cooking.

• Improved stoves. Mudstoves include a range of designs that can be built by users. Improvements over the traditional three stone fire are building a clay/straw/soil wall on two sides to prevent through draughts, and pot rests whereby pots become enclosed by the stove. They can achieve energy savings of 20%. Savings of 20 – 40% can be achieved with fabricated stoves, but manufacture requires metalworking and pottery skills.
• Collective cooking. Introduce collective shelter arrangements more conducive to cooking and social interaction. Greater interaction is also more likely to increase the spread of innovative cooking practices.

• Preparation of firewood. Cutting into correct sized pieces (3-5 cm diameter) helps provide complete combustion and good fire control. Burning wet wood produces smoke and energy is lost in evaporating water – savings of 20-25% can be achieved by burning air dried wood.

• Fire management. Simple shielding using readily available materials can achieve savings of 30 – 40%. Savings can be made by controlling the air supply – fires need to be well ventilated on lighting, but burn better with reduced air supply once established. Food cooks just as quickly when simmering as boiling rapidly – savings can also be made by removing fuel before cooking is complete, using residual heat in the fireplace and stove to complete cooking. If fires serve no purpose other than cooking, savings of 15 – 20% can be made by extinguishing fires rather then letting them die out.

• Food Preparation. Savings of up to 40% can be achieved by soaking hard grains and beans prior to cooking, but this requires extra pots and attracts complaints regarding flavour. Cooking times can be reduced by milling or crushing hard grains and beans. Savings of 20-30% can be made by cutting food into small pieces so that it cooks quicker. Cooking times of some foods can be reduced by adding tenderisers e.g. rock salt, bi-carbonate.

• Utensils. Metal pots retain little heat so they are suited to boiling fast cooking foods like rice, whereas clay pots are better suited for long cooking times. A tight fitting lid can save 20% by reducing energy loss through convection and radiation. Blackened pot bottoms are good for absorbing radiated heat, but thick layers of soot impair heat transfer, so surface layers should be scraped off.

3.1.5 Strategies

All energy saving options will be more likely to succeed if fuel is difficult to obtain, and has a cost to the user (financial or otherwise).

The emphasis is on planning especially at the emergency phase, so that provision can be made for refugee wood requirements at minimal env. impact. e.g. estimate consumption, carry out wood supply assessment.

Firewood – managed firewood distribution programmes can supply wood under controlled conditions. Harvesting involves clear felling or selective cutting. Disadvantages include - programmes are expensive, free fuel gives confusing message, demand likely to increase, and deterrents needed to prevent additional wood use. These can be addressed be offering fuel as payment for work, introducing vouchers for fuel “purchase”, providing fuel at remote location so that collection
attributes a value. There must be effective control of access to resources for a programme to be effective.

Charcoal – if fuel needs to be transported over long distances, it can be more efficient to transport charcoal rather than wood because of its high energy density. However, charcoal is friable, loosing 10-20% to dust during transport. Managed plantations can be used as the fuel source, and improved stoves must be made available to burn it.

Income generating activities. Refugees tend to resort to low investment activities based around wood, such as charcoal production, wood fuel harvesting. Planned fuel supply strategies providing employment can help regulate such activities. Manufacture of improved stoves can provide a useful income generating activity. Maintenance and regeneration activities can provide employment.

Wood supply and harvesting plans. Plans ought to be developed during the Emergency phase as soon as wood supply assessments have been carried out. They will set out policy for wood fuel supplies e.g. supervised harvesting by refugees, or centrally managed supply. Plans will need to be continually revised as the situation changes. Any policy must contain provision for enforcement of policy.

Tree planting activities can be initiated during the Care & Maintenance and Durable Solutions phases. This can involve a range of activities e.g. tree nursery, agroforestry (trees mixed with other agricultural practices), reforestation (encouraging natural regeneration), and afforestation (establishing cover where previously there was none).

Technologies must be properly promoted and disseminated if benefits are to be realised. Free or heavily subsidised distribution of hardware is not sustainable, but may be appropriate during the Emergency phase. Some success has been achieved through commodity exchange systems whereby stoves are given in reward for some service e.g. work, planting seedlings etc.

3.1.6 Changing Behaviour

The UNHCR guidelines emphasise the value of preventative planning to minimise the environmental damage sustained by refugee activities, and the role that UNHCR can play in co-ordination. Although the guidelines present a useful range of methods and practices for reducing energy consumption and diversifying the fuel mix, the issue of how best to modify the behaviour of refugees to accommodate these suggestions is not addressed.

The guidelines highlight the impact of socio-economic factors relating to refugees. They point out that refugees, with no interest in the land where they are settled, are less likely to respect good environmental practices than local people. They note that the energy saving practice of multi-household cooking depends on social traditions, and cannot be influenced significantly by external agents. The extent to which grouped shelters can be introduced for social integration, including cooking, depends largely on social traditions.
The guidelines note three phases of a refugee-returnee situations, - Emergency, care and maintenance, and durable solutions (repatriation, the most common solution, local settlement or resettlement in a third country). They note that during an emergency situation, the refugee’s immediate welfare is UNHCR’s primary concern. Although there is often no time to find an ideal location for a camp site, environmental factors are increasingly being taken into account during contingency planning. During Care and maintenance UNHCR often ensures that refugees are provided with all their basic requirements - food, water, building materials and firewood. This is “an expensive and not always effective undertaking. Until December 1995, UNHCR spent about $US2.5 million providing fuelwood to refugee camps in Kagera region of Tanzania. Experience has shown that supplying firewood can lead to higher rates of consumption and may have very little positive effect on the local environment since refugees may still collect wood from nearby forests for sale.” Ref 1. One of the key findings from their evaluation of these interventions “has been the need to provide clear incentives - economic or otherwise - to promote efficient use of firewood.”

The following expands this last point and presents the role of policy instruments. “Many factors affecting energy consumption and production can in principle be affected through policy. They become policy instruments. ...... Some instruments are economic in nature (e.g. use of fuelwood prices to affect average fuelwood consumption) while others rely on command and control to achieve the same or similar objectives (e.g. physical control on access, bans to achieve certain practices, etc.). Use of a mix of economic and non-economic instruments, rather than command and control tools mainly, is usually required to achieve pre-determined goal efficiently.” Discussion paper 1997.

So we see that the core of the current approach is the external context for the refugees. If the context - provision of technology coupled with policy instruments - is appropriate then refugees will change their behaviour to fit the intended energy and environmental strategy.

3.1.7 Education and awareness - an essential element

The section above perhaps exaggerates the dependence on policy to make a point. The literature does indeed mention some actions to address the internal motivation of the refugee. It states that “at the heart of the longer term actions for energy saving are the range of community services provided by UNHCR and its NGO partners.” These are intended to :-

- provide information on many subjects, including measure which may be adopted to care and maintain the local environment;
- encourage refugees to participate in environment-related projects and activities;
- facilitate interactions between refugees and local populations;
- identify refugees with particular skills in environment management
- environmental education and income generating activities.

Another section states:-
Environmental activities should be based on dialogue between refugee and local communities, the host government at appropriate levels, UNHCR, implementing partners and, as appropriate, donor agencies in all aspects of planning implementation and evaluation.

This dialogue requires participatory structures. Where such structures already exist, full integration of environmental activities should be attempted. Only in the absence of such structures should appropriate new structures be established.

These participatory structures and systems must be genuinely responsive in both form and content, the expressed needs of refugee and local communities especially women and vulnerable groups of those communities.

Participation in problem identification, planning and evaluation (i.e. the decision making process) should not necessitate the provision of material or financial incentives.

The lessons learned (ref) documents has a section on local participation. It notes that:

- Given assistance and direction, local communities are effective managers of natural resources.
- Local participation in projects is best assured if environmental strategies are presented as being a development programme.
- Formation of joint refugee/local management committees can prove effective mechanism for conflict resolution and enforcement.
- Trained facilitators are required to implement and guide local participatory projects.
- Participatory planning and project implementation should be transparent and should not raise false expectations.
- Local communities should be empowered to undertake monitoring and evaluation themselves.

Regarding the local communities the suggestion is that; “Local people can exert a surprising degree of control over access to resources. If suitable, local natural resource management practices can be identified and collaborative efforts made to have refugees comply with these under agreements with the local population.” They also state that “Participatory approaches, including PRA, allow identification of roles, responsibilities, weaknesses and strengths in a community becoming involved in natural resources management.”

Finally, section 3.6 (ref) discusses the role of environmental education.

- Targeted environmental awareness campaigns are useful in developing appropriate environmental practices.
- Integrating environmental concepts in existing school curricula may be more readily accepted by teachers than adding a new subject.
- Environmental education should be used to strengthen ongoing or planned environmental activities in associated projects.
- Multiple entry points exist for environmental awareness raising.
- Environmental awareness raising targeting local communities must be accompanied by appropriate capacity building measures for local resource management.
Regarding behaviour the section states: “early targeted environmental awareness campaigns are valuable in setting the parameters for sound environmental behaviour.” “Environmental education should build upon existing ecologically sustainable knowledge and skills”.

Here we catch a glimpse of the important role of dialogue with the refugees and local communities, and of the need for adequate knowledge of their priorities and socio-cognitive processes.

The recommendations quoted above say that there are:-

- **Multiple entry points for awareness raising** - how will the agencies know which is the most effective entry point - radio, extension agent, chief? Which social referent is the most effective in influencing behaviour?
- **Build upon existing knowledge** - what is the existing knowledge? How will the agency capture the most important points quickly so as to develop relevant educational messages?

3.1.8 The need for another tool.

So why then does this project talk about “barriers to adoption”? And why does it suggest the need for a new rapid assessment tool?

The agencies working with the refugees in Eastern Zaire and Tanzania found a number of difficulties in their work on energy saving technologies. The paper Ref 2 (Household energy use...boiling point) summarises some of these experiences. These have been reduced to the following table:-
### Action taken
### Stated Difficulty
### Potential value of knowing more socio-cognitive details

<table>
<thead>
<tr>
<th>Action taken</th>
<th>Stated Difficulty</th>
<th>Potential value of knowing more socio-cognitive details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organising the refugees collection of wood</td>
<td>unexpected increase in numbers, higher-than-estimated consumption rate, collection of building materials.</td>
<td>Why do refugees not value the wood, why the higher than estimated consumption rate.</td>
</tr>
<tr>
<td>Alternative fuels - coffee bean husks, cotton seed residue, sawdust, charcoal briquettes</td>
<td>exist in limited quantities, are seasonal, costly to produce, located far from the camps.</td>
<td>None</td>
</tr>
<tr>
<td>Alternative fuel - Peat</td>
<td>produces more smoke, unhealthy working conditions for extraction, transportation difficult, limited locality, water levels during the rains.</td>
<td>None</td>
</tr>
<tr>
<td>Improved Stove construction and dissemination</td>
<td>results difficult if built by implementing partners, need for awareness-raising programme, no information on the use of stoves (only distribution and construction figures available)</td>
<td>Why do the partners find difficulty in implementing, barriers to marketing stoves? What do people not know about energy saving? What are the critical awareness messages? How do people use stoves? What do they value in a stove?</td>
</tr>
<tr>
<td>training in fuel efficient cooking methods (pre soaking beans, covering pots, extinguishing fires)</td>
<td>strategies often take time to be adopted as they are not always part of traditional food preparations techniques.</td>
<td>What are the main features of traditional cooking? Who are the main social referents for deciding how things are cooked?</td>
</tr>
<tr>
<td>Supply of fuelwood (Zaire)</td>
<td>in some cases increased supply actually leads to increased consumption as refugees continue to collect a “free” resource</td>
<td>Is the collection of wood for purely economic reasons or is social contact critical? What messages could be used to change collection behaviour?</td>
</tr>
<tr>
<td>Firewood drying (Zaire)</td>
<td>None stated.</td>
<td>None</td>
</tr>
<tr>
<td>Improved stoves (Zaire)</td>
<td>breakage, need regular maintenance, where wood is easily available the stove has little impact on wood consumption</td>
<td>What features of the Stove are most critical? Why do people not do regular maintenance? What factors influence wood usage?</td>
</tr>
<tr>
<td>Communal cooking (Zaire)</td>
<td>for cultural and economic reasons communal cooking is not easily accepted by refugee families.</td>
<td>Why is communal cooking not acceptable?</td>
</tr>
</tbody>
</table>

It should be noted that each of these strategies produced some energy saving, and had some impact as intended. However, the honest paper details many of the difficulties.
associated with each intervention. It is at this point we can evaluate what is required to address these difficulties. The final column of the table suggests some questions that if answered would have helped the planners address the difficulties. Most of the questions concern the decision making processes of the refugees. What factors, cognitive, cultural and social, are influencing the decision to adopt the proposed behaviour? Agencies are offering alternatives to traditional cooking methods, firewood collection, etc. - yet what are the socio-cognitive barriers that caused difficulties in these programmes?

It is important to note that these questions and their answers would not have solved all the difficulties. The Peat extraction had a measure of success, and its greater use was hampered by technical and external factors. The dried peat offered to the refugees was used, and their seemed to be no particular cultural barriers to its adoption. The difficulties stated in the paper are to do with its extraction and its availability. No amount of understanding of the refugees will overcome these difficulties.

However there are difficulties encountered where a greater understanding of the socio cognitive decision making processes of the refugees would have helped.

3.1.9 Participation vs regulation

In most intervention actions in recent years, agencies have stressed the participation of the refugees and to some extent local communities in planning and decision making. In refugee camps there can be a seeming contradiction between participation and regulatory measures. Some feel that “realistically, regulations to protect the environment are not in the refugees’ immediate interest as they do not perceive the surroundings as their environment. In the situation of large unsustainable camps it was regarded crucial to fully inform refugees why and how regulatory measures are carried out in an attempt to make refugees understand and accept the necessity of such measures.” In the case of a refugee setting of a longer term nature, the opinion of some is that “regulatory measures need to be designed and carried out in collaboration with the host government, refugees and locals to be accepted by all stakeholders.“

This discussion by practitioners (ref) concludes that the “main reason for “wrong” decisions in environmental management was found to be lack of communication and insufficient “right” information for decision makers.” They emphasise the importance of opening channels for the flow of information between the target group and agencies.

These statements bring us to the question of participation and representation. In most development situations there now exist some means of representation. The target clients are given channels through which they can voice their opinions. These may be development committees, environment committees, community meetings. These participatory structures are the subject of much discussion. The literature is full of innovative methods to ensure adequate representation. One of the most famous of these methods has been given the generic term PRA which can be Participatory Rural Appraisal or more recently Participatory Reflection and Action.
PRA methods such as wealth ranking, mapping, and seasonal calendars have helped a lot in the understanding of agencies of their clients. In Refugees and Energy in Kagera (1997) Owen presents Intake surveys and Household Surveys. The data is based on a combination of joint UNHCR-EU research and surveys carried out by the Care Environment Programme. While these surveys relied on the co-operation of the subjects, they are not presented as participatory per se. However in terms of wood collection, either an enumerated survey or a participatory mapping exercise by a community, can clearly illustrate the what, where, when, who, how of collecting fuelwood. In terms of kitchen behaviour, either observation of cooking practice or focus group exercise to generate a typical timetable of women’s work can greatly inform external agencies about the behaviour of the clients.

However the surveys as conducted or PRA exercises as they are currently used (in refugee situations), rarely reveals why things are done. This may come out in conversation, but even when it does the external agency has no measure as to how important the stated reason is to the current behaviour. For instance in a focus group discussion someone may say (as they did in Ghana) that they believed that God would never let all the trees be cut down. This comment by an elderly man received a general murmur of acceptance. However without actually stopping the flow of the meeting and attempting some sort of vote on this comment, the agency has no idea whether this represents a commonly held view, or whether this is an isolated comment which people are too polite to contradict.

A further example is given by the UNHCR TSEMRRRA work (ref). When discussing a case study in Nepal, the report notes: - “Overall this programme (of mini investment in projects) has assisted in easing tensions between refugees and local people, and between UNHCR and the Nepalese Government. ..... This example makes it clear that problems that seem to stem from environmental damage need to be carefully investigated before a response is introduced. As in this case, dissatisfaction may be expressed as a concern about environmental damage, but closer investigation reveals broader ill feelings associated with disproportionate levels of service, loss of jobs to refugees, or other more general problems”.

This is where the projects rapid assessment tool comes into play. The TORA as a tool quantifies the strength of opinion (belief, values, attitudes and intentions) to overcome the “main reason for “wrong” decisions in environmental management” i.e. lack of communication and insufficient “right” information for decision makers. With the TORA rapid assessment tool, the agencies have the means to gather the right information in a participatory way and with sufficient statistical validity to ensure decision making that fits the socio-cognitive status of the refugee and local community clients.

3.1.10 Gathering opinions and reasons why.

The TORA tool is not unique in attempting to answer the question why do people behave as they do. Some recent work has attempted to look at the perception of clients to energy saving strategies.
In the surveys conducted by Wallmo and Jacobson (1997) they looked at improved stoves found in Uganda. They conducted adoption and impact survey (AS) and a Kitchen performance test (KPT). The survey included 81 users and 84 non users in the AS. This adoption survey used informal interviews to find out data on:-
1. the source of hearing about the stoves
2. the reasons for adopting the stove

The analysis of the data was by frequency of response. Table [] presents the data from the paper. This is of relevance for comparison with the Findings presented later in this report. The sources of hearing about the stoves are the social reference. However, there is no value given to the importance of the social referent.

In conclusion Wallmo and Jacobson suggest that the “AS provided insights into peoples perceptions of Lorena stoves and three stone fires. As with all survey data, it is possible that a response bias occurred in this study; however, the consistency of the data suggests that this effect was limited.”

Here we see the advantage of the TORA process. The Wallmo and Jacobson adoption survey is based on informal discussions, and results in a number of perceptions voiced by the respondents. This is identical to the first step for the TORA rapid assessment. However, these interviews alone do not reveal how strongly each opinion is held, and whether there is a statistical correlation between that opinion and behaviour. The 2nd formal survey of the TORA rapid assessment tool fills this gap and results in a greater confidence in eliminating bias, quantifying the insights and identifying the links between attitude, social referent and behaviour.

Black & Sessay present a similar study. Looking at the forced migration in the Senegal River valley, they conducted household survey and direct measurement of woodfuel use. From these surveys they conclude that “little or no evidence is found to support the expectation that refugees use more wood for fuel than local people, or that they are more destructive in their collection or use of wood.” The survey of open ended interviews elicited various opinions. For example “Animal dung is generally regarded as an inferior fuel due to the low heat obtained and its smell, whilst straw is seen as a fuel of last resort if other fuels are largely unobtainable.” Opinions on tree planting, preferred fuels, cooking etc. were gathered from 120 households.

Here we see two studies that begin to answer the question why. The opinion about animal dung is supported by a reason. However in Black and Sessays study there were identified behaviours for which there were no reasons given. “It was interesting to note that in the village of Koundel, ‘improved’ mud stoves had been promoted by a development agency linked to an association of migrants from that village living in France, but that, in this case, virtually all these mud stoves had fallen into disuse as they cracked and collapsed and had not been replaced.”

These surveys which are based on open ended interviews certainly gather important information, and such a general dialogue should always take place prior to planning an intervention. **However the added value of the TORA rapid assessment tool is its use of the second more formal survey to statistically validate the open interviews.**
By examining the beliefs, values, intentions and social referents, the tool goes that one step further to offer answers as to why people behave in a certain way. It can then be used to provide guidance for appropriate environmental awareness campaigns.

4. Discussion of the Ghanaian context

4.1 Ethnic conflict and displacement
The following gives a brief summary of the recent conflict that has forced displacement of people from their birthplace. The depth and nature of conflicts varies throughout the world. The Ghanaian situation resulted in large migrations of people from one area to a new area. As such they show the typical characteristics of refugees - a desire to return to their homeland when security is assured, and a feeling that to create something of permanence (like tree planting) is in contradiction to that desire.

While the Ghana situation did not have the intensity of the Central African conflicts of recent years, and the resulting large scale refugee camps. Nevertheless, the situation remains in a care and maintenance phase, edging into durable solutions. As such it has proved a suitable testing ground for the rapid assessment tool.

4.2 The 1994 Conflict - ‘The Guinea Fowl War’.

4.2.1 The Conflict Event
The 1994 conflict was sparked by an incident between a Konkomba and Nanumba at the market of Nakapayili town, Bimbilla District on the 31st January 1994. The incident involved an argument over a black guinea - fowl, hence the conflict is known as ‘the Guinea fowl war’. This conflict between two individuals of different tribes in which the Nanumba tribesman was shot, quickly spread to other areas. By the 4th February all the tribes of the area had become involved and conflict had spread to the Regional Capital of Tamale and engulfed the Eastern part of the Northern Region, about 40,000 Sq Km in area. The two sides comprised those tribes with ‘land paramountcy’ (control) and those without. The non-paramountcy tribes comprised the Konkomba’s, Basari’s, Naawuri’s, and Nchumru’s with the Dagomba’s, Gonja’s and Nanumba’s on the other side. The conflict lasted ten days and in that time over 2000 people were violently killed and an estimated 20,000 displaced. Over 150 villages were destroyed by fire. The weapons used were predominantly locally made and included bows and arrows and hand-made guns.

4.2.2 Tribes involved in the conflict
The main tribes involved in the conflict were the Konkomba’s on one side and the Dagomba’s and Gonja’s on the other. The Konkomba’s are a farming tribe who generally live in remote rural villages and are dedicated farmers, particularly of yams. As a tribe they are viewed by others as ‘primitive immigrants’ and are despised. Traditionally they have no Chieftain structure and therefore were not allocated chieftain land rights by the British and were therefore put under the administrative authority of tribes such as the Dagomba who did have a chieftain structure. The Konkomba have traditionally been resistant to Islam and responsive to Christianity.
Saboba is the main Konkomba district in the area and is the area of origin of the Konkomba. However, over many years they have spread over a wider area particularly to the South and West. There is no evidence to support the Dagomba view that they are immigrants from Togo, although the Saboba area was originally part of German Togoland. The Konkomba’s have a reputation of being aggressive, and it is said that the first thing a Konkomba male acquires is a gun and a bicycle, known as a war-horse. Others put this down to their victimisation in the past. The estimated population of the Konkomba’s varies but official figures suggest that they are the second largest tribe in the Northern region after the Dagomba’s. Claims that they are an insignificant tribe in terms of their numbers are inaccurate.

The Dagomba’s and Gonja’s are predominantly Muslim and inhabit the towns and villages of the Eastern part of the Northern region rather than the remote rural areas. Although they are involved in agriculture they have also taken to trade and other occupations. Both tribes, together with the Nanumba’s, were allocated administrative control over land by the British as they had an existing chieftain structure. They are generally seen as being more ‘progressive’ than the Konkomba. It is interesting to note that the Konkomba’s and the Dagomba’s consider themselves to be related because the present Ya Na’s (Dagomba Paramount Chief) grandmother was a Konkomba.

4.2.3 Causes of the Conflict

The conflict was essentially between the ‘chiefly groups’ and the ‘non-chiefly’ groups, those who were granted ‘land paramountcy’ by the British and those who were not. Traditionally the non land-owners had to pay their respects to the land-owners by paying a portion of their crop, the hind leg of any livestock slaughtered to their resident Chief. They were also expected to work in the fields of the chief. Although these practices have long since ceased, they are still given as reasons by the Konkomba’s for the war.

The major underlying causes of the conflict are the issues of land ownership or tenure (paramountcy) and political representation. Although the more obvious signs of repression which existed in the past no longer occur, the more subtle political repression and non representation are major issues for the Konkomba. This problem was re-enforced in 1978 by the Ghanaian government when a law was passed vesting all Northern lands in the ‘chiefly’ peoples. The Konkomba’s claim that this law was pushed through primarily by high level Dagomba representatives.

The lack of respect and representation of the Konkomba were issues felt particularly by the educated elite. Partly to address this issue the Konkomba Youth Association (KOYA) was formed to educate the Konkomba and raise their political profile within the North and within Ghana as a whole. In response to the formation of the KOYA, other tribes also formed their own youth associations and these played a major role in mobilising the different tribes involved in the conflict. The lack of respect shown to the Konkomba’s was less of an issue to the local population than to their educated leaders who wanted to see them freed from this repression. In some areas Konkomba villagers seem unable to give a reason for their involvement in the conflict except that they found themselves caught up in it.
Despite the fact that there are significant differences in the religion of the two sides, this was not a religious war. However there are stories of the Church getting involved in the conflict. These range from the churches helping Konkomba’s to escape from Tamale, to the unsubstantiated claims that a particular Catholic Mission tried to supply ammunition to the Konkomba’s. The Christian Church has done a lot of work among the Konkomba as the level of poverty and illiteracy among them is very high. For this reason claims that the Christians sided with the Konkomba’s and the Muslims with the Dagomba’s are not uncommon. It is likely that the Dagomba’s played a major role in preventing the conflict from becoming a religious one despite the Konkomba’s attempts to accentuate this aspect of the tensions... Continued

Konkomba claims that there is an underlying religious element to the War may partly be attempts to attract further help from the Christian Church. Despite the religious element the 1994 and previous conflicts have been essentially along tribal rather than religious lines.

4.2.4 Konkomba Perspective

It is commonly asserted by the Konkomba’s that the Muslims within Ghana are trying to gain the North of Ghana for themselves. As one of the major non-Muslim tribes in the area they are seen as a threat by the Muslim tribes and this is given as an underlying reason for the conflict. The Konkomba’s also claim that they attempted to resolve the land issue peacefully by approaching the Ya Na and requesting Paramountcy. This request was rejected outright and therefore left few peaceful options open to the Konkomba.

4.2.5 Dagomba Perspective

The Dagomba’s reason for rejecting the approaches made by the Konkomba to the Ya Na was due to the very insulting language used in the application. This prevented the application from being considered. The Dagomba’s claim that the Konkomba’s had been planning for this conflict for a number of years and had collected weapons in preparation. This enabled them to mobilise very quickly once the conflict had started. The very swift and organised mobilisation of Konkomba troops does suggest that the Konkomba’s were not unprepared. Other evidence cited includes the finding of a map with targeted Dagomba towns marked on it. The Konkomba’s, including senior members of the KOYA, publicly denied that they had any violent intentions up to the outbreak of the conflict. Due to this ‘betrayal’ the Dagomba’s find it very difficult to trust the Konkomba leadership and there is still deep seated animosity between certain leaders.

The Dagomba’s also believe that the government supported the Konkomba’s and had given them a certain period during which they could claim as much land as they could before the Government intervened.

4.2.6 Role of the Government

The rumour regarding the support of the Konkomba’s by the government through non-intervention for 10 days was confirmed in people’s minds as the army did not get involved until the 11th day of the conflict. The army were then stationed in major towns in the area and carried out a number of attacks on villages thought to be the
aggressors in those particular areas. The tribal origin of the villages varied in different areas, but Konkomba’s are thought to have been the main targets.

The main area of the survey continues to be under the protectorate of the army and special permission had to be acquired to enter the area.

4.2.7 Conclusions
The events and causes of any conflict of this nature are extremely complicated. However there is little doubt that the primary cause of this conflict lies in the lack of respect between tribes in this region. This lack of respect manifested itself in a degree of repression of the ‘acephalous’ tribes by the ‘chiefly’ tribes and this has also been the main cause of the numerous conflicts in this area. There seems little doubt that in 1994 the Konkomba’s were the initial aggressors and that there was a degree of planning involved. Although many died on each side, the Konkomba’s are generally seen as being the victors of this particular conflict. The Konkomba’s can therefore be identified as the ‘repressed aggressors’ and the Dagomba and Gonja as the ‘repressor victims’. The exact role of the Government is unclear but there is a strong opinion among the people that the bloodshed would have been less serious had troops intervened sooner, and more serious had they not intervened when they did.

4.2.8 Response to the 1994 Conflict
Government: - The Government’s response to the Northern Conflict involved the setting up of the Permanent Peace Negotiation Team (PPNT) to mediate and resolve the disputes between those involved in the conflict. It is widely agreed that the PPNT has on the whole been inefficient and ineffectual and has done little more than claim responsibility for progress made in the peace process by other agencies. Efforts have however been made to negotiate between the different groups and the President has been involved in this process.

In some areas it is believed that politicians are keen to maintain the tension in the North as they gain advantage from the instability of the area, for example by appropriating relief supplies.

NGO’s: - The main efforts made towards peace have been through the Inter-NGO consortium based in Tamale. This consortium approached the Nairobi Peace Initiative (NPI) and instigated a mediation process between all sides involved in the conflict. This involved identifying ‘bridge builders’ or ‘voices of reason’ from each of the groups involved and facilitating them to reach a ‘negotiated settlement of their differences to ensure peaceful co-existence in the future’. Workshops and Peace education took place at both national and local community level. These attempts resulted in the signing of the Kumasi Accord by all groups involved in the conflict with the exception of the Naawuri’s. This settlement outlined the issues over which agreements were reached as well as highlighting issues of outstanding contention and agreeing to reach these through a process of dialogue rather than conflict. A further result of this work was the formation of the Northern Region Youth and Development Association (NORYDA), a coalition of the former tribal youth associations.
No NGO’s currently appear to be encouraging communities of different ethnic groups to work together and it was apparent that indigenous CBO’s were primarily set up along ethnic lines with the objectives of assisting their own tribe.

### 4.2.9 Current Situation

Despite the progress made through the efforts of the NGO consortium and NPI, the current situation in the area is still one of tension and distrust. No Konkomba’s are resident in Tamale or Yendi and although they can enter these towns they are afraid to stay overnight for fear of reprisals by Dagomba’s and Gonja’s. Dagomba’s with Konkomba friends are also reluctant to allow them to stay overnight, indicating their fear is not without reason. This fear is partly due to the lawlessness within Tamale itself caused by the existence of a number of youth gangs. Konkomba’s also fear to go to Educational institutions in these areas though they are in theory open to them.

An on-going area of conflict is the Kpandai area south east of Salaga. The Gonja community in this area were driven out by the Naawuri’s and this issue has not yet been resolved. All attempts at mediation by the Government and others with the Naawuri’s have been rejected.

The general consensus among those involved in the peace process is that due to the mediation work that has been done and the on-going military presence in the area it is unlikely that the conflict will occur again. However, in the words of one person “....if conflict breaks out again it will be terrible. The Dagomba’s cannot accept to be defeated again”.

### 4.2.10 Developmental needs of the area

It is likely that in future with the increasing population density in the area, the conflict over land will intensify. As land as a resource becomes scarcer the conflicts over it will increase. This will particularly be a problem for the Konkomba’s who practice a shifting cultivation farming system on a 6 (3 - 4 year fallow) year cycle. Increasing the recovery rate of the land allowing a shorter fallow period will be a key requirement to minimise declining yields and reducing conflict over land resources. This is a long term developmental objective, however there are other more short term objectives required to rehabilitate communities in the rural areas affected by the conflict. Specific needs include the rebuilding of schools, protection of water resources (guinea worm is a problem) and assistance with agriculture and literacy.

A number of International NGO’s are based in Tamale including OXFAM, World Vision (Salaga area), Christian Children’s Fund, and ACTIONAID, together with a large number of Ghanaian NGO’s. These include the Ghanaian Institute for Linguistics, Language and Bible Translation (GILLBT) actively involved with Literacy work with the Konkomba and other tribes, ISODEC (Institute for Social Development Centre), Assemblies of God Relief and Development Services. There are also a large number of indigenous Community Based Organisations (CBO’s).

Although important steps have been made towards ending the conflict through negotiation, the overall atmosphere is still one of underlying distrust and it would be dangerous to assume that the problem is solved. The distrust caused by this and
previous conflicts is still very prevalent and the underlying causes have not been completely addressed.

The main area of on-going outright hostilities is the region of Kpandai where unresolved issues exist between the Naawuri’s and the Gonja’s. However, over the area as a whole, despite the existence of peace as defined by a ‘lack of conflict’ there are underlying tensions and distrust which cannot be overcome through negotiated settlement. Rumours of weapons being stockpiled and on-going actions demonstrating suspicions and distrust demonstrate the need for an active and creative peace in which the different sides of the conflict actively work together. This is possible only through the long term building of relationships between communities of different ethnic origin through encouraging them to work practically together.

It is unlikely the forcibly displaced will return home within the next five years.

4.3 Ghana’s’ main energy saving strategy.
Ghana has been actively working on energy saving strategies for more than a decade.

4.3.1 Charcoal
In 1985 the improved Charcoal Stove Project funded by the World Bank, ESMAP and the Dutch Government, and undertaken by the Ministry of Mines and Energy was a significant step forward for the country. Charcoal was identified as being mainly used in urban areas, having low-efficiency end use devices, encouraging increasing environmental degradation in production areas, and experiencing increasing prices resulting from scarcity of wood. The project carried a major survey of Charcoal use, a baseline on domestic energy consumption. This survey included both the actual use of fuel and some simple reasons for use by the householder.

The programme then went on to select eight models of appropriate charcoal stove design and attempt to investigate their potential. Artisans were trained to develop local capacity for fabrication. Laboratory testing added to the information base and the resulting five approved stoves were field tested. 700 households were chosen and 2300 stoves were produced. The programme monitored the stove use and presented average savings which varied between 18 to 43% for the different stoves. A stove preference survey attempted to catch some of the opinions surrounding the stoves, but this was not an in depth socio-cognitive survey.

These original tests were conducted in and around Accra. In 1992 a nationwide dissemination of the Ahibenso coalpot occurred and it is reported that more than 30,000 stoves have been sold. Artisans were set up in regional capitals including Tamale, thus there has been some impact of this project on the North. There are some issues surrounding the artisans and their need for capital and matching supply and demand.

However the team also identified some issues that arose regarding the promotion of the improved stove (education and awareness). Promotional activities included posters, stickers, handouts, a television drama, and cooking demonstrations. Issues identified by the programme team included a lack of knowledge by households - the
team claim that most households are not aware of the financial and environmental benefits of using the coalpot. The traditional coalpot is cheap, easily available and has a longer lifespan than the improved stove so understanding the balance between initial capital investments and running costs is critical.

The review of 1996 ends with a recommendation to increase promotional activities as well as increasing production, supply, availability and quality control of the improved coalpot.

4.3.2 Alternative fuels
Woodfuel substitution or alternative fuels. The Ministry of Mines and Energy suggest that proven alternative fuels include LPgas, electricity, kerosene and biogas. They say that most of these project have passed the demonstration stage, however large initial costs of end use devices and unreliable supply has hindered widespread adoption. This is particularly true of rural areas where fuelwood is seen as a free resource.

4.3.3 Improved wood cookstoves
The Rural Energy Planning Project identified the Upper east region as the most degraded and deforested region in the country and undertook a needs assessment. The analysis of user groups “revealed that the acceptance of new cookstoves will be high”. The report then identifies the benefits of the proposed stove and assumes that these will be obvious and persuasive to the general population. As will be seen in the findings section below - the stoves have had little impact and there are ongoing barriers to widespread adoption.

4.3.4 Establishment of fuel woodlots
“The option of facilitating woodlot cultivation generated a lot of positive response especially in the Boltanga District. 15 Communities and groups liaison with the District forestry office and collected seedlings.” In the 1994 some seedlings were bought from private suppliers indicating that there was the beginning of an acceptance for the benefits of woodlots.

4.3.5 Sustenance of production and use of Firewood
The Ministry of Mines and Energy, and the Ministries of Agriculture and Forestry, see the above activities as an integrated strategy to “intensify efforts at :- i) enhancing fuelwood supply; ii) management of demand through improvements in wood conversion and use (stoves) and; iii) introduce effective pricing and monitoring of fuelwood resources.”

The Ministry of Mines and Energy is currently seeking funding for further work on its strategy. If it receives this funding it sees that the major implementation phase will consist of :-
• educational and promotional campaigns
• supply of seedlings/other inputs
• training on building of stoves and cooking demonstrations.
The target outputs for this project would be use of improved stoves by at least 50% of households covered, cultivation of 4 acres of woodlots for fuel by each community covered, and improvement in social and economic life.

4.3.6 Other activities on the energy strategy
The above outlines the actions and further plans of the Ministry of Mines and Energy, the main Ministry responsible for the energy strategy. This main strategy has worked with a number of other ministries in the country and with NGOs. Although the MME discusses the North East sector, one can find activities on energy saving in almost all areas. In the area under study, Tamale and the North West, there are over 20 NGOs operating, both local and international. Along with the local extension services they have conducted demonstration programmes for improved stoves, training for women on cooking methods, and encouraged woodlots. Energy saving strategies are incorporated in general community development programmes.

5. Rapid Assessment Tool

5.1 Difference between policy and peoples decisions
As we have seen above - most actions that have addressed the challenge of improving energy strategies in poor domestic households have focused on the external aspects impinging on the refugee’s behavioural context. Sometimes the immediate action on the context is at the expense of attention being given to the refugee’s own rationalisation within their context.

This attention to the external structural context as opposed to the individual psycho-social reality of the refugee has tended to:

- Group the refugees into socio-economic homogenous strata that predict the expected degree of degrading behaviour (Annis 1992);
- Identify the ‘poor’ refugee as a ‘foe rather than friend’ of the environment incapable of positive response (Broad 1994);
- Exclude the refugee from active participation in the remedial process (Cox 1992);
- Neglect their potential as spontaneous conservationists (Broad 1994);
- Overlook the impact and persistence of traditional culture within new environments (Jones 1990);
- Impose external evaluative assumptions which may not represent the values, attitudes and interests of the refugee or equate to their own knowledge systems (Redclift 1992:24);
- Neglect the individual’s historical context (Broad 1994);
- Lead to a reliance on explanatory generalisations moulded by theoretical and ideological stances, which neglect the complexity of the individuals’ own rationalisation of their behavioural context (Blaikie and Brookfield 1987; Long and Ploeg 1994; Utting 1994).
5.2 Basic theory of the tool

“As the name implies, the theory of reasoned action is based on the assumption that human beings usually behave in a sensible manner; that they take account of available information and implicitly or explicitly consider the implications of their actions. The theory postulates that a person’s intention to perform (or not perform) a behaviour is the immediate determinant of that action. Barring unforeseen events, people are expected to act in accordance with their intentions” (Ajzen 1988:117). The intention to undertake a particular behaviour is defined as the individual’s overall attitude towards the behaviour and the perceived normative influences (subjective norm - social pressure) that relate to the behavioural decision. Attitudes and subjective norms are made up of a small number of key beliefs known as salient beliefs. The salient beliefs are those that are most readily brought to mind by the subject when a particular behaviour is considered. Those beliefs which are most common to a community or specific population are referred to as ‘modal salient/normative beliefs’ (Beharrell and Crockett 1992).

Ajzen and Fishbein (1980: 5) reject the concept that TORA represents an aspect of behaviourism and stress that action is based on an evaluative process. They argue that people consider the implications of their actions before they decide to engage in a given behaviour. “For this reason we refer to our approach as ‘a theory of reasoned action’.”

It is suggested that differences in an individual’s socialisation and personal history will result in different evaluations and therefore behavioural decisions regarding the natural environment, although the context of the behavioural decision remains the same for the population of a specific area. It is assumed therefore that individuals, depending on their beliefs and values, may behave distinctly to changes within that environmental context, i.e. to the imposition of the rules and regulations pertaining to the collection of firewood.

The constructs employed by the TORA are fundamentally motivational. The theory claims that the immediate antecedent of any behaviour is the intent to perform the behaviour in question. The stronger the intention, the more the person is expected to try and therefore the greater the possibility that the behaviour will actually be performed (Ajzen and Madden 1986). The theory is therefore primarily concerned with identifying the factors underlying the formation and change of behavioural intent (Fishbein and Manfredo 1992). Intention is often treated as the dependent variable under the influence of two independent determinants - the attitude and subjective norm - related to the behaviour in question. “Attitude and subjective norm, each weighted for its relative importance, are assumed jointly to determine behavioural intention.” (Ajzen and Madden 1986: 454).

TORA therefore states that a person’s intention to behave in a certain way is based on; a) their ‘attitude’ toward the behaviour in question; b) their perception of the social pressures on them to behave in this way, termed ‘subjective norms’. The relative contribution of attitudes and subjective norms may vary with the context and the individual. Attitudes are determined by the beliefs about the outcomes of performing the behaviour and the evaluation of these expected outcomes. The subjective norm is
dependent on beliefs about how others feel the individual should behave and their motivation to comply with these ‘others’ (Ajzen and Fishbein, 1980; Carr, 1988: 33). The TORA is summarised in the diagram, Figure: 4.1.

Figure: 4.1. The Theory of Reasoned Action (Ajzen and Fishbein 1980)

The TORA according to Fishbein and Manfredo (1992: 30-31) is best understood as a series of hypotheses linking (1) behaviour to intentions, (2) intentions to a weighted combination of attitudes and subjective norms, and (3) attitudes and subjective norms to behavioural and normative beliefs. These hypotheses are represented in the figure above by the solid arrows between the adjoining columns. Therefore if one accepts the causal chain illustrated in the diagram, it follows that behaviour is ultimately determined by one’s underlying beliefs. Therefore changing behaviour is primarily a function of changing this underlying cognitive structure.

The theory asserts that the likelihood of an individual performing a behaviour depends on the strength of their intention. Intention, in turn, depends on two independent factors – their own attitude, and the subjective norm (their perception of social
pressures on them). Attitudes depend on beliefs regarding the outcome of performing this behaviour, and a value attribute to this outcome. A person’s subjective norm is a function both of their normative beliefs regarding how they feel others (e.g. mother-in-law, chief, extension workers, radio) would expect them to behave, and of their motivation to comply with these “others”. In order to change behaviour it is necessary to change either attitudes or subjective norms by changing the underlying beliefs. Once the structure of beliefs and values/motivation is understood, educational messages can then be developed to address the most influential beliefs.

The strength of the relationship between the variable constructs within the theory are measured using the correlation coefficient. The multiple correlation coefficient \( R \) serves as an index of the extent to which behavioural intention can be predicted from the simultaneous consideration of attitude and subjective norm. In computing \( R \), weights \( w \) representing the contributions of attitude and subjective norm toward prediction of the behavioural intention are obtained. These weights are indicative of the relative importance of the variables’ contribution to the prediction of intention (Ajzen and Fishbein, 1980; Debar, 1993: 6-7).

5.3 Method of using the tool

To apply the theory of reasoned action one first has to identify the behaviour(s) of interest. How these behaviours are identified and defined is important to the future structure of the enquiry and the subjects' response. The behaviour(s) can be drawn out from the subjects through open elicitation, identifying those activities they most associate (salient) with the topic or issue under study (e.g. Carr 1988). This will help insure that the behaviours chosen are considered relevant and of interest to the subjects. In practice however, behaviours are often pre-selected by the researchers. In the case of this project the behaviours under study were a mixture of those raised by recent literature (UNHCR, etc.?) and those talked about in open interviews.

The first interviews were conducted in March 98. Locations in and around Tamale were chosen and two (three?) teams of interviewers conducted a series of individual and focus group discussions. The profile of the interviewees is shown in the Findings.

After gathering the text of the interviews, the team identified groups of behaviour brought up by the respondents on the subject of domestic energy strategies. These were then compared to the literature and the behaviour categories studied were:-

- Use or adoption of alternative fuels
- Firewood collection
- Woodlot planting
- Cooking methods
- Fire management
- Use and or adoption of improved stoves
- Use or adoption of fuel efficient cooking utensils

Each behaviour category was identified with ten behaviours that together would form a measure of behaviour. These behaviours are presented in Appendix 1. [1]. It should
be noted that each phrasing of the behaviour had to undergo translation, from the tribal language of the interview into English and back again. The translation both creates a strength and weakness for the process: - translations forces the team to clearly define each statement although it also opens the process to mistakes in the use of words. [The behaviour set was accompanied by the intention statement for behaviour.]

These first interviews were also used to identify the most salient social referents regarding each of these behavioural regimes. It should be noted that different behaviours may have different social referents and the influence of these will differ according to the behaviour or practice under review. For instance, the Firewood collection may be strongly influenced by the husband, and hardly at all by the Chief of the village. For woodlot planting by far the most influential social referent is the Chief.

Finally the interviews were broken down into statements of belief regarding the behaviour. Each belief statement had to be phrased to both be a belief and evaluative statement. These numbered approximately 20 to 30 per behaviour. The full questionnaire is appended.

The large number of beliefs statements per behaviour produced a questionnaire that would take too long with each respondent. The team decided to double the number of respondents and to split the questionnaire with only half the behaviours. Thus for each behaviour there are the targeted 210 respondents, although for the social profile there are 440 respondents.

The interview team was made up of male and female (Extension workers) from the Ministry for Agriculture, from the mile ’7’ programme (NGO) (Women’s animators) and from the Ecumenical Training and Consultancy centre (ETCC - an NGO which co-ordinates work between NGOs and Government). The survey was conducted in displaced communities in the Upper East Region in Northern Ghana, a triangle from Tamale to the Eastern border. The communities were identified during the initial phases of the project. Dr McKemey used the contingency airfare to supervise the field testing of the questionnaire and to ensure suitable quality of data.

The initial interviews (Stage 2) provided the general beliefs and attitudes. This informal interview left the interviewer with an impression of the subjects that concern the interviewee. The results of first survey are predominantly qualitative and subjective. The second survey provides a quantitative element to these impressions. The interviewees score each belief on a scale between “strongly disagree” to “strongly agree”. To inculcate this scoring into Northern Ghana the interviewees were asked to use scooped holes in the ground and stones (similar to the traditional African game).

- Examples of behaviour statements (Firewood collection):- “Buying wood cut or gathered by others” “Pruning trees without killing them” “Have been forced to cut down or ring bark live trees with taboos”.
- Example of Intentions (Firewood collection):- “How strongly do you intend to collect only dry wood during this year?”
6. Findings

6.1 Approach

This study has applied the Theory of Reasoned Action (TORA) to key behaviours related to fuel-wood management within northern Ghana.

Seven behaviours were identified and data gathered for all seven. From a preliminary analysis three behaviours were identified for detailed analysis. The report presents the findings regarding three of the seven behaviours identified as critical to fuel wood management within the research area, namely,

- firewood collection,
- wood lot planting,
- improved stove adoption.

The other behaviours studied but not reported below are alternative fuel adoption, fuel efficient cooking methods, cooking utensil selection and fire management.

The study particularly seeks to identify differences between members of the population regarding the TORA variables and their relationships:

- those who have, or have not, been forcibly displaced due to war or civil unrest.

As well as exploring the influence of displacement, other social groupings are also identified and compared:

- differences between Dagbani and Gonja language groups and
- urban and rural residents.
- those that had been exposed to extension demonstrations regarding improved practice of the different behaviours under review
- those who are exposed to radio messages.

This last distinction was determined by households that owned a radio and those who did not.

The rational for this choice of groups for study is firstly to contrast the differences observed between the states of displacement and both culture and location, specifically urban and rural. Secondly, given the intention of this study to identify appropriate educational messages, the analysis identifies the influence of previous
exposure to deliberate extension demonstrations and/or the media to actual behaviour, intentions, attitudes and social influences and the corresponding beliefs that support these.

The description of the sample based on the five comparative social categories is presented first. An overview of the different TORA variables for each of the behaviours is then given before examining each of the behaviours in turn.

6.2 Sample characteristics
The findings are drawn from data gathered from the application of a structured questionnaire, which was split and applied, simultaneously to two samples acquired via random cluster sampling. The sample within each cluster being divided equally between the two halves of the questionnaire, ‘A’ and ‘B’. Within the reported findings three of the behaviour data sets are drawn from questionnaire ‘A’ the fourth, cooking methods, from questionnaire ‘B’. 30 communities within North-eastern Ghana, including sectors of Tamale formed the bases of the sampling frame. (See map).

Only women who were responsible for, or shared the management of a household hearth were sampled, one respondent per each identified household. A total of 240 households per questionnaire were sampled, which yielded 227 usable cases regarding questionnaire ‘A’ and 221 with respect to questionnaire ‘B’. Table 1 shows the proportions of the five social categories, which are addressed, in the following analysis.

The area of research has been exposed over the past decade to civil unrest and inter-tribal conflict leading to large-scale human displacement. **62% of the respondents claim to have been forcible displaced due to war and civil unrest.** A further 16% claim to have left their traditional areas to marry. Only 1% of respondents claims to have migrated in search of employment. All those who claim to have been forcibly displaced remain displaced. Of all those who have left their traditional areas only 2% have returned. Of those forcibly displaced approximately half intend to return to their places of origin. All displacement occurred within the last ten years\(^1\), the majority 53% in the last 5 years.

Sampling took place across urban, peri-urban and rural communities. Of the combined sample, 18.5% of respondents live in urban contexts as opposed to 65.5% being rural and 16% peri-urban residents. Although, the larger proportion of the forcibly displaced sample was resident in rural communities, there was a tendency toward urban residency.

The sample included several language groups. However, the two predominant language groups represented were the Dagbani, 31% and the Gonja, 50%. A notably larger proportion, 72%, of the Gonja respondents were displaced in comparison to 30% of the Dagbani.

---

\(^1\) The survey was carried in mid 1998.
Regarding the means of influencing public opinion only 36% of the subjects claim to have attended any form of extension demonstration. On this issue there was a marked difference between questionnaire ‘A’ and ‘B’, 42% of ‘A’ respondents compared to 24% of ‘B’ respondents. A similar proportion, 36%, of the sample claim to have radios. Understandable the forcibly displaced population registered a lower access to radios, 29%, in comparison to 48% of those not forcibly displaced.

The picture presented by this sample’s configuration indicates that a considerable proportion of the population of North-eastern Ghana is displaced due to war and civil unrest and this has occurred relatively recently and still remains for many a situation without resolution. Whether these respondents qualify as ‘refugees’, i.e. people who have crossed an international boundary in the process of their displacement or whether they are only regarded as internally displaced, would appear to make little difference to their management of natural resources, particularly fuel-wood use. Do, and more importantly will, displaced households tend to manage the increasingly scares fuel-wood resource more negatively than those who have not experienced forcible displacement? This sample description demonstrates the appropriateness of North-eastern Ghana for the reallocation of this research.

6.3 Overview of the TORA Variable Findings for the three behaviours

Table 1 presents the mean, median and inter-quartile (IQR) range for each of the main TORA variables related to each of the behaviours understudy, i.e. behaviour (B), intention (I), attitude (∑b_i*e_i), and the subjective norm (∑m_j*b_j). Alternative readings for intention, (probability), attitude and the subjective norm are also given. Alpha coefficients of reliability are shown for all variable readings that are calculated via scales made up of more than one item. An Alpha reading of .6> is usually taken as an indication of reliability.

Behaviour reading is calculated by taking the sum of negative or positive responses to 10 related activities (e.g. Table 4 for firewood collection and Table 41 for improved stove use), i.e. +1 if the behaviour has been recently or is being performed, and –1 if the behaviour has not been performed.

Probability is a reading of the subject’s opinion regarding the likelihood of their performing the behaviour. It therefore forms a comparative measure of intention.

The attitude (∑b_i*e_i) variable represents the sum of the products of the different outcome beliefs and attributed values (b*e) regarding the specific behaviour in question. In this sense the (∑b_i*e_i) measure of attitude can be termed the cognitive measure of attitude. An alternative reading of attitude is also presented which is taken from their attributed value to the specific behaviour. This attitude can be taken to represent a more affective expression of attitude as opposed to the cognitive (∑b_i*e_i) measure. The theory of reasoned action states that these separate readings should correlate closely with each other if both are responding to the same behaviour within the same context. This also applies to the two separate measures of the subjective norm discussed below.
Similarly, the \((\sum m_j \times b_j)\) measurement of the subjective norm, represents the sum of the products of strength of motivation to comply and the subjective belief with respect to each of the most pertinent social referents regarding to each behaviour. The alternative reading of the subjective norm represents the respondent’s perception of whether those who are most important to them would approve or disapprove of their undertaking the particular activity in question. This reading of the subjective norm allows the respondent to select their own most relevant social referent rather than a series of referents being suggested.

6.3.1 Behaviour
Note should be taken that the alpha coefficient of reliability for the behaviour regarding firewood collection and cooking methods are very low, .0 and .1 respectively (Table 2). The possible range of the score regarding behaviour was from –10 to +10. The readings for both firewood collection and cooking methods are very neutral. However, the readings regarding recent or actual improved stove use (mean of –6.33) and wood-lot planting (-7.00) are strongly negative, indicating little use of improved stoves and very little involvement in the process of tree planting to secure fuel-wood for the future. It should be noted that intention reflects environmentally appropriate behaviour.

6.3.2 Intention
This variable measures the expressed strength of intent to perform the particular behaviour within a specified future period of time. The possible range of score on this variable is from –2 to +2. The stated intent contrasts with actual behaviour, particularly regarding improved stove use and planting wood-lots. It is important to bear in mind that the respondents are women and culturally it has been inappropriate, if not a taboo, for women to participate in the planting of trees. There appears to be an interest in adopting more fuel-efficient forms of cooking although the intention regarding this issue is marginally the weakest regarding the four behaviours. The strongest expressed intention is to continue to collect firewood (IQR of 1 to 2 in comparison to wood lot planting, 0 to 2).

When the probability readings are compared with stated intent, there appears to be the greatest difference regarding wood-lot planting, which suggests a higher degree of doubt exists regarding the ability to achieve this behavioural intention in contrast to the others. As would be expected the difference is lowest regarding the perceived probability to continue collecting firewood. Although it appears logical that a continuation of current practice would present the least perceived problem, the correspondence between intention and probability may also indicate that future access to firewood is not considered a problem and could compound continued negative behaviour. This issue will be explored further in the analysis of the firewood collection attitude construct.

6.3.3 Attitude
The \((\sum b_j \times e_i)\) readings have a possible range of –80 to +80. Each behavioural \((\sum b_j \times e_i)\) reading was the sum of the products of 20 salient outcome beliefs. All these readings
registered .6> alpha coefficient of reliability. The behaviours which registered the most positive ($\sum b_i*e_i$) scores were fuel-efficient cooking methods and wood lot planting. The attitude toward improved stove use was also positive\(^2\). In none of these 3 behaviours did the lower quartile reading register a negative score. The ($\sum b_i*e_i$) reading for continued firewood collection was almost neutral with the lowest quartile slightly negative. This ($\sum b_i*e_i$) reading for firewood may indicate a degree of dissonance between the perceived need to continue collecting fuel-wood in a non-sustainable fashion and the perception of appropriate practice. However, the neutral reading may also indicate that firewood collection is basically habitual and no opinions have developed regarding this practice.

The alternative, or more affective, expression of attitude, registered strongly positive readings with respect to all the behaviours, particularly wood lot planting and also continued firewood collection. In all four cases the alternative attitude reading is more positive than the ($\sum b_i*e_i$) reading. The difference between the ($\sum b_i*e_i$) and alternative attitude reading for firewood collection may actually underpin the concept that this behaviour is habitual. Access to sufficient wood has not as yet become an issue demanding deliberate reflection. This question will be explored further in the analysis of the firewood collection attitude component.

### 6.3.4 Subjective norm

The ($\sum m_j*b_j$) has a possible range of −24 to +24. It represents the sum of the products of 6 different social referents for each behaviour. These sets of referents were identified as being pertinent to the sample. The Alpha coefficients of reliability for each behaviour regarding the ($\sum m_j*b_j$) are all .8>. The ($\sum m_j*b_j$) readings are positively and almost equally supportive of the different behaviours, particularly wood lot planting. The alternative reading of the subjective norm corresponds closely to the ($\sum m_j*b_j$) reading with regard to firewood collection and wood lot planting but is slightly less positive regarding fuel-efficient cooking methods and the use of improved stoves. This suggests that the respondents believe that their most important social referents are supportive of their intention to plant wood lots. However, there may be a strong normative pressure to continue the more, environmentally detrimental methods of firewood collection.

### 6.4 The TORA correlations for the three behaviours (Table 3)

The analysis has applied non-parametric tests to the data. It is felt that the intervals on the Likert scales used to measure the different TORA variables, cannot be assumed to be of equal proportion, therefore the application of the non-parametric tests, similar to the approach taken by others such as Tait (1983), Carr (1988) and McKemey (1996) when applying the TORA construct to environmental management behaviours.

The most important correlations regarding the theory of reasoned action are the correlations between attitude and the intention and between the subjective norm and intention. TORA states that where the attitude and normative components correlate

\(^2\) An adjusted attitude reading is also shown in Table 2 for improved stove use. This was to address the influence of 3 statements, which produced attitude readings, which were considered counter intuitive.
closely with the stated intention then it is very likely that the intention to perform a particular behaviour will be realised, i.e. the stronger these correlations the greater the predictive power of the model. It is rare that both attitudinal and normative components correlate equally with the intent. Intentions to behave are usually influenced by either the attitudinal component or the normative component. In other words people will act in accordance with their own experience and attributed value to the expected outcomes, or they will tend to act in accordance with the perception of social expectation and their wish to comply with these.

Table 3 presents the correlations of the TORA model regarding the four behaviours. As can be observed the theoretical relationships proposed by the TORA are supported by the findings regarding three of the behaviours. This suggests that there is a strong likelihood that the respondent community will act in accordance with their stated intention regarding cooking methods, improved stove use and wood lot planting.

With regard to firewood collection there is no correlation between the attitudinal component, \((\sum b_i * e_i)\) and intention, also there is only a very weak correlation between the \((\sum m_j * b_j)\) normative reading and intent. However, both the alternative measures of attitude and the subjective norm correlate strongly with the intention to continue collecting firewood. This may be due to the fact that many of the beliefs are related to outcomes associated with spiritual or supernatural powers, particularly with respect to the types of wood which can be collected and the effect of these on women if used in cooking. This would suggest that this element may have a strong affect on the normative and attitudinal component, which is captured in the more ‘affective measures of attitude and subjective norm’.\(^3\)

The only behaviour, which demonstrates a slightly stronger correlation between the attitude component and intention as opposed to the normative component, is wood lot planting. The normative component appears to have greater influence on the decision to carry out the other three behaviours.\(^4\) With regard to these, for educational messages to achieve change regarding firewood collection, fuel-efficient cooking and improved stove use, the channel and perceived source of the message is of probably greater importance than the content of specific messages. It will be important if addressing these communities as a whole to educate and then use the most salient social referents as the channels of education. For instance in order to achieve a change in fuel-efficient cooking or improved stove adoption it may be more effective to educate or target the husbands before the wives. This is not to downplay the importance of the content of the educational message, particularly were there is also a strong correlation between expressed intention and the attitudinal component, but to emphasise the influence of the relevant social referent with respect to achieving a change in the particular behaviour.

---

\(^3\) The \((\sum m_j * b_j)\) reading did not address any spiritual referents. However, these more subjective outcome beliefs were addressed in the measure of attitude to firewood collection.

\(^4\) TORA measures the intention to carry out a particular behaviour; it is not measuring the intention or probability of achieving the objective of the particular behaviour. The possible achievement of specific objectives, or outcomes is captured in the measurement of the attitude construct. For example the behaviour many be the ring-barking of live trees. It is not the acquiring of firewood, achieved via the ring-barking process. The belief that ring-barking will provide future firewood is an associated outcome belief which would possible form part of the attitude construct regarding the ring-barking.
Correlations between the recent or current practice of the particular behaviours and intention are also presented (Table 3). Where there is no correlation it suggests there may be a degree of dissonance regarding current behaviour and therefore a possible greater openness to change, although the tendency may not necessarily be positive with respect to sustainable management of the fuel-wood resource, i.e. firewood collection.

Regarding firewood collection and wood lot planting there is no (I vs. B) correlation. With respect to firewood this finding may indicate that the community are dissatisfied with their current firewood collection behaviour and actually wish to collect more aggressively in future. However, note should be taken of the very low alpha coefficient of reliability regarding the behavioural reading for firewood collection.

In the case of wood lot planting the lack of a (I vs. B) correlation is logical given the almost total absence of previous wood lot planting practice. However, the strong intention to plant wood lots is supported by both moderate (\(\sum b_i e_i\) vs. I), and (\(\sum m_j b_j\) vs. I) correlations. This appears to be a fairly new behaviour for the women, and they feel they may have the limited social support to undertake it, although the normative components also correlate with the previous behaviour.

I and B correlate significantly with respect to adopting fuel-efficient cooking methods and improved stove use. Given that attitudes toward fuel efficient cooking methods were strongly positive one many conclude that the community is fairly content with their current cooking behaviour and that achieving further fuel-efficient change in their cooking methods may be difficult. However, neither the attitude nor normative components correlate within recent cooking behaviour, and although the (\(\sum b_i e_i\) vs. I) correlation is weak, the (\(\sum m_j b_j\) vs. I) is strong, suggesting that decisions to change cooking methods will rest heavily on the opinions of the most important social referents.

The explanation of the I vs. B correlation for improved stove use, is more difficult given the lack of previous or current use of improved stoves and the reasonably strong intention to use them in future. However, as noted above the correlations of the normative components with intention to use improved stoves are far stronger.

Overall the correlations presented in Table 3 suggest that the decisions to perform the various behaviours will depended to a greater extent on the subject’s perception of what is deemed correct behaviour by those who are important to them, particularly regarding changing cooking methods. The identification and involvement of these key social referents will be important to any educational initiative, which seeks to change particularly cooking behaviour or improved stove use. However, their own beliefs and values regarding the expected outcomes are also influential, particularly with respect to wood lot planting. To encourage greater participation in wood lot planting if addressing the female community as a whole, it will be necessary to have greater understanding of the beliefs and values on which their attitude is based.
6.5 Presentation of individual behaviour findings - Firewood Collection

The presentation of the findings for each of the specific behaviours presents the findings for the sample as a whole and then compares the differences between those that have and have not been forcibly displaced, as well as other social groupings noted above.

6.5.1 TORA variable readings and correlations

The overall readings for the different TORA variables have been discussed above. Table 9 gives a comparison of the differences regarding each of the TORA variables. The Mann-Whitney U test has been applied to identify significant differences between the different social groups. The greatest number of significant differences occurred between the Dagbani and Gonja, followed by those forcibly or not forcibly displaced.

With regard to recent behaviour the only significant difference recorded was between urban and rural residents. As would be expected the urban residents reported a far lower incidence of firewood collection (mean of -.73 as opposed to a mean of .38 for rural residents). No significant difference was noted between those who had or had not been forcibly displaced. The only significant difference in stated intention was between the Dagbani and Gonja, the Gonja expressing the stronger intention. A significant difference was also recorded regarding probability between those with and without radios.

Those forcibly displaced demonstrated the greatest and most significant difference regarding attitude toward continued fuel-wood collection. Those who had not been forcibly displaced expressed a more positive attitude while the displaced attitude was basically neutral. The Dagbani also demonstrated a significantly more positive attitude compared to the Gonja respondents. The forcible displaced also demonstrate a significant difference regarding the alternative subjective norm reading again those not displaced registering a more positive reading. This difference is also mirrored between the Dagbani and Gonja, the Dagbani being more positively inclined.

When the TORA correlations are compared across the five comparative social groupings (Table 10), one pattern of correlation does appear regarding the normative \((\sum m_jb_j) vs.I\) correlations. It would seem that there is a linkage between the influence of the subjective norm on behavioural decisions and the social insecurity and or isolation. The displaced, Gonja, rural residents, those without radios and those who have not attended demonstrations all registered a significant \((\sum m_jb_j) vs.I\) correlation, while their counterparts did not. This suggests that different educational or extension strategies are needed for the displaced as opposed to the more socially secure. The involvement and endorsement of the key social referents in transmitting and supporting the educational messages is probably critical to achieving the intended behavioural response with the displaced. The issue of rural residency may also mean that people are more culturally bounded and therefore the normative component tends to reflect more accurately their behavioural intentions. In both cases the involvement of the key social referents will be important. A failure to take account of this issue in constructing extension and educational strategies amongst these groups may lead to a
rejection of the messages if these require responses that fall outside their current normative and attitudinal beliefs.

6.5.2 The attitudinal construct ($\Sigma b_i*e_i$).

The scale developed to measure the attitudinal construct consisted of 20 of the most salient outcome belief statements regarding firewood, gathering practices. These were obtained from a prior survey held amongst women in the same area as the sample of survey reported here. These were the most often repeated belief statements in open-ended interviews. Table 5 lists these beliefs and gives the mean and median readings registered by the whole sample.

These salient outcome beliefs can be broken into five basic groupings, i.e. access, superstition, sanction, gender and methods of collection. The largest number of beliefs is related to the issue of access, fc2, fc3, fc9, fc14, fc15, fc17 and fc20. These beliefs relate to the issue of future access to areas from which to gather wood and its availability.

Five beliefs fall into the category of superstition, i.e. belief statements that are related to outcomes dependent on a spiritual or supernatural element. These beliefs are fc5, fc12, fc16, fc18, and fc19. During the open interviews many beliefs of this nature were stated regarding which types of wood were considered taboo and the resultant negative consequence to the households if burned. Some of these beliefs are grouped under more inclusive statements, e.g. fc18 and fc19, which deal with the consequences of using particular types of wood\(^5\). During the open interviews the issues of taboo were one some of the most frequently mentioned, or salient.

Three of the statements, fc1, fc6 and fc13, relate to the issue of women’s ability to gather wood because of their gender. These statements reflect both a pragmatic issue of distance and related danger, and cultural normative beliefs regarding the perceived appropriate role of the woman with respect to firewood collection activities, i.e. – Women should not collect firewood because they will destroy the trees (fc13).

The fourth group of beliefs relates to the possibility of sanction resulting from inappropriate or unsustainable collection behaviour, fc4, fc7 and fc8. The statements fc10 and fc11 also relate to a specific gathering practice, the pruning of live, wild trees for firewood, but do not have the inference of sanction but rather the appropriateness of the practice.

As can be observed in Table 5, the strongest held positive attitudes (b*e) regarding firewood collection refer to fc16 – *God will not permit the destruction of all the trees,* fc6 -*Only the men within the household can now collect firewood,*\(^6\) and fc15, -*We

---

\(^5\) In order to capture the majority of the most salient beliefs within a scale that did not become to long beliefs, which were similar in meaning were grouped under more inclusive statements. This is in keeping with the recommendation of Ajzen and Fishbein (1980), the authors of the TORA approach.

\(^6\) Fc6 does appear to be counter-intuitive. The resulting product of this statement may result from the drudgery associated with wood collection and the relief of transferring or sharing this chore with the men.
will always be able to gather firewood. Of the most 6 most strongly held positive
attitudes 3 are related to the issue of access.

The most negative attitudes refer to: fc18 -Using the wood from trees such as the Goa,
Zubetia, Shindazugri, Pulinpung, Sampaglia, Tuaaa, Kasali, and the Dazuli trees for
cooking will lead to ill health and problems within the household-, fc1 –It is
dangerous for women to collect firewood form the more distant area-, fc3 –One
headload will normally maintain the cooking needs of the household for less than
three days-, and fc2 –People are now collecting less wood than they used to.
The negative attitudes are dominated by the concepts of both spiritual and physical
danger related the gathering practice. The other issues relate to the inability to meet
the fuel needs of the household.

6.5.3 The attitudinal components relationship to behavioural intent.
The TORA claims that those elements, which most closely correlate with the stated
intention are possibly the most influential on the decision to act. Table 6 gives the
correlations of the attitude components with intention and behaviour. Only those
elements that demonstrate correlations, which have a significance of <.05 are shown.
As can be observed the attitude statements that correspond most closely with the
stated intent ((b*e) vs.I) are relate to access, fc15, -We will always be able to gather
firewood, fc17 –It is dangerous for women to collect firewood form the more distant area- and fc20 –Future access to firewood will not be a problem for the children of
this household.

Two spiritually based attitudes (b*e) also correspond closely with the stated intent to
collect only dry wood in future, fc16 –God will not permit the destruction of all the
trees suitable for firewood- and fc12 –Stealing wood will bring evil on the house of
the thief.
Fc7 also demonstrates a close (b*e vs.I) correlation indicating that the threat of
sanction does influence their firewood collection decisions. Apart from fc12, fc13
and fc20, all the attitudes (b*e) which presented significant correlations with intent
were also supported by significant belief ((b) vs.I) and all apart from fc15, ((e) vs.I)
correlations.

Fc1 –It is dangerous for women to collect firewood form the more distant area-, fc12
–Stealing wood will bring evil on the house of the thief-, and fc13 -Women should not
collect because they will destroy the trees-, present negative (b*e) vs.I) correlations.
It is suggested that these statements represent the salient issues, which may deter more
aggressive fuel wood collection behaviour when addressing the whole sample.
However, to achieve a reduction the likelihood of the more unsustainable firewood
gathering practice it will be necessary to alter their perception that able to gather
firewood and that future access will not be a problem. The attitude attributed to fc16,
God not permitting the destruction of the trees, is more problematic as it is also
supported by a stronger value (e vs.I) correlation. Values are considered more deep-
rooted than beliefs and therefore more difficult to change.

---

7 Fc1 is included, here although it is gender related it is also closely related to the subject’s perception
of their own ability to access the collection areas.
Attention is drawn to the positive attitude registered by fc20 – _Future access to firewood will not be a problem for the children of this household._ (Table 6). This positive (b*e) product is considered counter-intuitive given the fact that the mean belief (b) regarding this statement was negative as was the mean value (e) score (Table 5). This statement could therefore been taken to intuitively have a negative product. If taken in this manner it suggests that there is an underlying awareness of possible long-term problems with access to firewood. However, it does not appear to be sufficient to alter the attitude significantly regarding the decision to collect wood in the short term. This is demonstrated by the response to statement fc2 were the respondent felt it was a good thing that people were collecting more wood than before.

The significant differences regarding 7 of the 20 attitude statement values between those who had or had not attended extension demonstrations related to fuel wood management, indicates that it is possible to change the attitudinal construct of this behavioural intent through education (Table 11). However, it would be presumptive to imply more without knowing the quality and content of the extension messages the respondents were exposed to.

### 6.5.4 Differences in the attitudinal component of those forcibly displaced

A significant difference recorded on 11 of the 20 attitude statements between those who had and had not been forcibly displaced (Table 11). When compared to differences between the Dagbani and Gonja or urban and rural residents, displacement appears to have a greater impact on the attitudinal component. It is therefore suggested that the educational messages aimed at changing fuel-wood gathering behaviour needed to address different beliefs and values within their objective groups.

Of the five attitudes attributed the highest value, either positive or negative, by the displaced and those not, only two are common to both sets.Fc16 – _God will not permit the destruction of all the trees suitable for firewood_, and fc1 – _It is dangerous for women to collect firewood from the more distant area_. The displaced attributed the highest values to fc16, fc18, fc2, fc1 and fc3, four of which have negative values. In comparison those not displaced valued in order of strength, fc16, fc15, fc1, fc6 and fc20, only one of which had a negative value, fc1. It is evident from the above that the displaced are less secure regarding firewood collection and their ability to gather sufficient. In contrast those not displaced appear to display a greater sense of security regarding future access, although they do share the same concern regarding security for women collecting from more distant areas. The mean (b*e) values attributed to many of the positive beliefs by those not displaced was significantly stronger, e.g. fc16. It is therefore interesting to note that the intention to collect was in contrast, stronger by those the displaced. This suggests that there are other factors that are influencing the firewood intention.

---

8 The positive attitude registered on this statement can be considered counter-intuitive, i.e. it could be read as an opinion which weights against the practice of firewood collection. It has not been switched here has it appears not to relate to immediate behaviour and may in fact encourage more aggressive competition for a limited resource.
The comparison of the attitudinal components ((b*e) vs. I) correlations between the two groups demonstrates a marked difference (Table 12). With regard to those who have not been displaced several of the attitudinal statements (b*e) correlate significantly with their stated intention to collect, seven in all. Of these four present negative correlations, fc1, fc5 – *if young women use the wood of fruit trees for cooking it will effect their future fertility*, fc12 and fc13. Apart from fc16 the next most strongly correlated (b*e) statement was fc13 – *Women should not collect firewood because they will destroy the trees*. The interesting factor is the large number of these correlations, which relate to the issues of taboos or supernatural related outcomes. This may indicate that these issues are still influential to their decision making process regarding firewood collection and could be addressed in education strategies to influence fuel wood collection behaviour with those that have not been displaced. Note should also be taken of the significant, although weak, correlation registered regarding the attitude associated with fc20 by those not displaced. If the counter-intuitive direction of this attitude is taken, it indicates that an underlying concern regarding long term access is present. This could indicate that a reinforcement of this could help make future collection sensitive to sustainable methods. However this group failed to register a correlation between the sum of the attitudinal component (\(\Sigma b_i*e_i\)), and their stated intention regarding this behaviour.

The forcibly displaced only registered one ((b*e) vs. I) correlation, fc15 – *We will always be able to gather firewood*. Following the Theory of Reasoned Action, the lack of correlation between the different elements of the attitude construct and their stated intention suggests the decision to collect is not governed by their attitude. This may indicate a state of insecurity regarding their perceived ability to act as they intend. This may be one of the reasons why the perception of social pressure, the social normative component, appears to have greater influence over their reasoning regarding fuel wood collection.

### 6.5.5 The normative component

Six salient social referents were identified regarding firewood collection, i.e. those entities that have influence over the subjects decision making process. This influence can be through the perceived power of sanction the entity has, or respect of their knowledge of the issue, or social or familial loyalty. A social referent can be an individual, a group or a medium of information. The six social referents were the chief, extension agents, friends, family, landlord and radio.

Table 7 gives the mean, median and IQR values attributed to the elements of the normative component regarding each social referent. The (m*b) value for the chief is the highest registered followed by the extension agents and family. Friends and radio are given the lowest (m*b) value. This ranking is maintained across the different elements except in the expressed motivation to comply with family over extension agents.

The correlations of the different normative elements with intention to collect firewood for the whole sample are presented in Table 8. The strongest correlation ((m*b) vs. I)
is associated with the extension agents. This social referent is also supported by significant correlations regarding both motivation and belief. The chief registered only a weak \((m*b)\) vs.I correlation and a lower \((m)\) vs.I, correlation. Friends may in fact be more influential than the chief given the \((b)\) vs.I correlation, which is absent regarding the chief.

The implications from these finds are that the extension agents will have the most influence regarding firewood collection and the chief to a lesser extent. However, if education to change behaviour is carried forward regarding fuel wood collection the extension agents should be the principal channel of communication, but should seek the chief’s endorsement of the messages which will entail an initial educational thrust aimed at these leaders before addressing the wider community. It would also seem appropriate that the training or education strategy should address existing social groups where friends will be involved and learn together.

### 6.5.6 Difference between comparative groupings regarding the normative component.

Tables 9 and 15 present the supporting data regarding this section. As can be noted from Table 9 the only significant difference regarding the overall measure of the subjective norm \((\sum m_i*b_j)\) is between those that have and have not attended extension demonstrations. The alternative reading of the subjective state registered a significant difference regarding this comparative group gives weight to the finding above regarding the possible influence of the extension agents with respect to firewood collection. However the alternative subjective statement also registered significant differences regarding displacement, and tribal affiliation. Those not displaced registered a higher score regarding the displaced on this alternative reading.

Regarding the values attributed by each of the groups to the normative element \((m*b)\) for each social referent (Table 15), the only significant differences related to whether respondents had attended extension demonstrations. Attendance increased the \((m*b)\) value attributed to all the referents, apart from the family and landlord. The Gonja also placed significantly more value on the extension agents’ normative influence.

However, when a comparison is made of the normative component’s elements \((b,m\) and \(m*b)\) correlations with stated intention, a marked difference can be observed between the forcibly and not forcibly displaced. (Tables 10 and 16) The displaced register a \((\sum m_i*b_j)\) vs.I) while those not displaced do not. With regard to the displaced the referent registering the strongest \((m*b)\) vs.I is family and then friends followed by the landlord and then the extension agent. This suggests that different channels of communication and strategies, which put more emphasis on the involvement of family and friends, will need to be used when developing educational strategies and messages for the displaced. It appears logical that the landlord will also have a greater influence on the displaced given their greater dependence on others’ land and good will.

### 6.5.7 Summary of Firewood Collection

[Social pressure to collect more.]
Firewood collection decision making is dominated by normative rather than attitudinal considerations. Therefore any educational strategy will have to involve the appropriate social referents and gain their endorsement of the messages proposed. With respect to the whole group these are the local extension agents and the local chief. However, education should be done through groups, which included local friendship networks.

The most influential beliefs supporting firewood collection decisions, regarding the whole sample, are related to the strongly held opinion that God will not permit the destruction of the trees and that they will always be able to gain access to areas with firewood. In constructing messages aimed at encouraging more sustainable firewood collection behaviour, the messages should seek to make the subjects more aware of the possible loss of both trees and therefore limited future access. The displaced are likely to respond more positively to these particular messages given their higher awareness of the limits. However, with the displaced it will be very important to impart these messages through natural social groups, which include both friends and family.

With respect to those not displaced, apart from addressing the issue of God not permitting the destruction of all trees, this group appears to be particularly sensitive to the traditional beliefs and taboos regarding women’s wood selection, collection and use. Messages emphasising and reinforcing appropriate collection behaviours, i.e. appropriate management of live tree harvesting such as pruning will address issues that are salient in their current rationalisation of fuel wood collection. This group appears to be less susceptible to social pressure than those who are displaced and the local extension agent may well be the most effective channel of communication.

6.6 Improved Stove Use

6.6.1 The TORA variable readings and correlations

Table 46 gives the differences\(^9\) between the values attributed to each of the TORA variables by the comparative groups. As can be noted there are differences regarding the strength of intention to use new stoves between those displaced and those not, those not displaced registering a higher intent. There is also a significant difference regarding the alternative measure of the subjective norm, the displaced registering a lower value on this variable. It is logical to expect that the displaced would register a lower intention to acquire or use improved stoves.

98 or 43% of the respondents claimed to have attended demonstrations of improved stoves. Attendance of demonstrations appears to have resulted in a significantly more positive attitude toward the use of these stoves. The Gonja when compared to the Dagbani also registered more positive readings regarding the alternative measures of attitude and intention. There was no difference regarding urban and rural residents,

---

\(^9\) The application of the non-parametric Mann Whitney U test to demonstrate significant differences. Only those with a p value of <.05 are shown.
which is a surprise. An alternative measure of the attitudinal component removing the statements referring to gas stoves is also presented with the idea that this would register a difference between the urban and rural residents.

Table 47 presents the TORA variable correlations across comparative groups. Behaviour and intention correlate significantly regarding the displaced, the Gonja, rural residents both those with and without radios and those who have not attended improve stove demonstrations. These correlations are difficult to explain in that the previous behaviour regarding improved stove use is very negative regarding each of these groups (Table 46 and Table 10) and that the overall intention is strongly positive. However, apart from the duel correlation regarding radio ownership it would seem logical that these groups would tend to have less experience of improved stoves and lower intentions to practice, although not necessarily significantly so as with the issue of displacement.

Those not displaced, the Gonja, those without radios and those who have attended demonstrations of new stoves registered slightly higher \((\sum b_i^*e_i)\) vs.I) correlations than \((\sum m_j^*b_j)\) vs.I correlation indicating the previous experience influences their decision to use improved stoves more than perceived social pressure. However, the attitudinal and normative components’ correlations with intent are closely balanced across most groups. The only distinction is with respect to those who have attended demonstrations; here the normative component does not present a significant correlation with intent. This reinforces the concept of experience of improved stoves lowering the influence of social consideration in stove choice. However, given the high correlations of the subjective norm with intent any educational programme aimed at increasing the adoption of improved stoves will have to involve the most influential social referents as well as understanding the beliefs which underpin the attitude toward stoves.

6.6.2 The attitudinal construct \((\sum b_i^*e_i)\)

The Table 42 presents the 20 most salient beliefs drawn from prior open interviews with a sub sample of the drawn from the population understudy. These beliefs can be grouped under five basic sub-headings, utility, versatility, availability, fuel efficiency and risk.

The largest number of beliefs falls under the utility grouping, s1, s3, s10, s13, s15, s25 and 34. These relate to two main issues the suitability of the stove for the pots of the household and its ability to cook. The issue of the matching the stove to the pots commonly used by the household is an important one when dealing with stove choice and design for this target group.

Five beliefs can be grouped under the versatility heading, s4, s6, s9, s17 and s36. These basically relate to the issues of mobility, durability and stove management. Two of the most frequent statements made during the open interviews were the importance of being able to move a stove and use it in the dwelling, and the issue of being able to cook quickly.
Four of the statements address the issue of fuel-efficiency, particularly the issues of reducing fuel use and expense. The other groups, risk, and availability had no more than two statements linked to each.

As can be observed from Table 42, the 5 attitudes (b*e) with the highest attributed value, when considering the whole sample are, s25 – *The traditional three stone stove is best because it can be adjusted to the type of pot being used*, s17 – *Coal pots can be used within the house*, s20 – *The owner of the house will not permit the use of wood burning stoves within the house*, s13 – *Coal pots are only suitable for cooking sauces* and s15 – *Improved coal pots are better for cooking*. Apart from the initial reference to the flexibility of the traditional three-stone-stove, the other highest valued attitudes relate to the versatility of the improved coal pot and the problem of burning wood in the dwelling.

Note is taken however, regarding statements such as s25 and s13 whose resultant positive attitudes are considered counter-intuitive. Switching the sign of the belief element on these two statements would put these two statements as a negative as opposed to positive attitudes and therefore intuitively correct.

Two of these higher valued statements, S25 and s13, are counter-intuitive given that the people actually believed the three stone fire was best and valued its versatility (Table 41). The same applies to s13 where the respondents belief is a negative statement and think it is a good thing that coal pots are only suitable for cooking sauces. Switching the sign of these two statements belief (b) elements results in their registering negative (b*e) attitudes. This many indicate that these are issues that have an impact on the attitude component and if they similarly correlate strongly but negatively with the stated intention to use improved stoves, they could be considered blockages to adoption.

Many of the negative attitudes related to the gas stove. However, these only registered low value readings and may have little influence on the overall attitude toward the future use of improved stoves. This may be due to the fact that the concept of an improved stove is usually associated with charcoal burners, ‘coal pots’ and in the more rural areas improved wood-burning hearths made out of mud, which are meant to reduce the amount of fuel used.

6.6.3 The attitudinal component’s relationship with intent to use improved stoves.

Table 43 explains the relationship between the attitude component’s elements with the stated intent regarding improved stove use. A comparison is given of the effective of changing the belief element sign on the counter-intuitive attitude readings statements, i.e. regarding statements s13, s25 and s36. Changing of the belief element sign does not alter the strength of the correlation of these statements’ ((b*e) vs.I) correlations but does alter the overall measure of attitude (\(\sum b_i*e_i\)). Although the positive strength of the attitude (\(\sum b_i*e_i\)) is reduce by this adjustment it still remains positive and correlates strongly with both stated intent and the alternative attitude measure.
The attitude statements (b*e) which correlate most closely with intent relate to utility for example issues such as s13 –Coal pots are only suitable for cooking sauces-, s1 –The improved stove will be able to cook the pots this household uses for cooking- s25 –The traditional three stone stove is best because it can be adjusted to the type of pot being used-, s10 –The household will be able to cook its preferred foods on an improved stove- and more weakly, s15 –Improved coal pots are better for cooking.

As noted in the previous section, the S13 and s25 attitudes (b*e) correlate negatively with intention. It is suggested these represent issues which are influential in the decision regarding stove choice and use. These negative correlations probably are blockages to adoption, which need to be specifically targeted in an extension or education programme, which addresses the whole female community.

Statements related to versatility also correlate significantly with the stated intent, e.g. s4 –You can move an improved stove-, s9 –Improved stoves are easier to light and push- and s17 –Coal pots can be used within the house. The issue of being able to use the stove within the dwelling is also emphasised by the strong correlation regarding the owner of the house not permitting wood burning stoves within the house.

Emphasis will need to be given to the ability of the stove to cook the pots which the people normally use. This also has implications regarding the design of improved stoves. In the minds of the subjects it appears that it is the stove, which has to be adaptable rather than the type of pot. An understanding of the rationalisation behind the choice of cooking pots is possibly one of the keys to the introduction of improved stoves.

The issue of fuel efficiency and economy, surprisingly, appear to have little influence on their choice of stove. Raising the awareness of the issues of fuel scarcity and the advantages of improved stoves from this perspective may encourage greater acceptance. However, as demonstrated when considering fuel wood collection behaviour, the subjects do not believe there is or will be a fuel wood shortage. This demonstrates the needed to take into account their rationalisation regarding other closely, interrelated behaviours.

6.6.4 Differences in the attitudinal component of those forcibly displaced.

Table 48 presents the differences regarding the different belief statements between the displaced and others. As with firewood collection the state of being displaced appears to result in a significantly different attitude component. In all, significant differences are noted on 8 of the 20 possible attitude (b*e) statements. The beliefs on which the forcibly displace registered a significantly weaker attitude than those not displaced was with regard to s28, the concept that everyone will eventually have to acquire a non-wood burning stove due to the increasing scarcity of wood. They hold significantly stronger positive attitudes regarding s2, s4 and s10. These differences indicate that the displaced may have had greater experience of alternative stoves than those not displace. This may be due to reduced access to fuel wood, increased mobility and being forced to adapt.
Other beliefs registering a significantly less negative response than those not displaced referred to s13, s25. Many of the displaced may no longer have access to their traditional utensils and therefore this is less of an issue for them.

It is interesting to note that with those forcible displaced, the attitudinal component ($\sum b_i e_i$) correlates with their stated intent Table 47. This is not the case regarding those not displaced. This suggests that the displaced are possibly more open to consider improved stoves and slightly less influenced by social pressure in contrast to those counterparts.

The attendance of demonstrations regarding improved stoves also led to a significant difference regarding 7 of the statements’ (b*e) products. Regarding all statements this exposure resulted in a stronger attributed positive value. However, there was not a corresponding correlation between the attitude component and intent regarding either of these comparative groups. Overall, social pressure appears to be more influential than individual attitudes regarding stove choice.

6.6.5 The normative component

Table 44 gives the mean, median and IQR values attributed to the six most salient social referents, husband, extension agents, community members, family, landlord and radio. The husband followed by the extension agents and family have the highest readings regarding motivation and subjective belief, however, when the product of these two elements is taken into account, i.e. the subjective norm, the extension agent achieves the highest ranking followed by the husband and family.

Table 45 gives the normative components’ correlations with intention and behaviour. When the different social referents’ subjective norms (m*b) are considered those that most closely correspond to their respondents’ stated intention are radio, extension agents and community members. Corresponding motivation and belief correlations supports all these. In accordance with the TORA, this would support the concept of the extension agent being a significant referent regarding improved stove choice.

As with education directed at changing firewood collection behaviour, the extension agent is an important channel for encouraging stove adoption. However, it will be important to also address the husbands and seek to gain their endorsement of the educational messages. Therefore, the whole household should be addressed as a unit. In order to do this effectively it will be necessary to distinguish the difference in beliefs and values regarding stoves between the men and women and who really is responsible for the decision. This study focused only on the women, the rational for this was that the initial interviews revealed that the women actually made the choice and sort confirmation from the spouse and other family members.

The appropriateness of the radio as a means of communication is questionable even though there is a high ((m*b) vs.I) correlation regarding this medium. However, it is noted that those with radios were significantly more aware of the availability of improved stoves and valued this. It is suggested that the radio may be a possible channel of education to support a more inter-personal correspondence between the extension agent and the family.
When comparing differences regarding the subjective norm and the condition of displacement, the displaced attributed a significantly lower value to the influence of the husband (Table 49). This may be due to the higher predominance of widows amongst the displaced. This variant was not addressed during the survey. However, the opposite effect is noted regarding those who have attended demonstrations of improved stoves. The claimed influence of the husband is markedly higher with this group.

6.6.6 **Summary regarding the use of improved stoves.**

Although the expressed intention to use improved stoves is moderately strong, the attitude toward this proposed use is relatively neutral\(^\text{10}\). People are still very attached to the traditional forms of cooking, particularly the three-stone-stove. The rationalised need for an improved stove is not very evident. There is no real concern expressed regarding issues of fuel efficiency or cost, therefore the argument for the improved stove is not sufficient to pursued them to adjust, abandon their traditional stove or more importantly, change their cooking utensils.

Programmes that seek to encourage the use of more efficient stoves will have to raise the awareness of pending fuel wood shortages and the adaptability of the improved stove to the existing cooking utensils.

The fact that the need for improved stoves may not be an important issue means that the social referent will have greater initial influence, particularly the extension agent. However, it will be important to also persuade the husband, who may rationalise the issue differently to his wives. There is a need to take into account this social referent's own opinions.

The displaced appear to be more open to considering the choice and have a closer correlation between their intention and attitude toward improved stove use. However, they do express a significantly lower intention than those who are not displaced.

Any extension programme should address the family as a whole but recognise that the woman is probably the one who will make the decision and therefore, their beliefs and opinions most be addressed. Radio should be used to endorse messages first delivered in person.

The key barriers appear to be the strong preference for the traditional stoves, cooking, methods and utensils. Also the perceived limited utility of improved stoves. These appear to be compounded by absence of a felt need for change.

---

\(^{10}\) Once the adjustments for counter-intuitive attitudes are applied.
6.7 Wood lot Planting

6.7.1 The TORA variable readings and correlations

Table 55 gives the mean values attributed to each of the TORA variables and identifies those on which significant differences occur between comparative groups. The main differences relate to previous behaviour. Table 50 gives the break down of the behaviour measure. Approximately 15% of the respondents claim to have participated in some form of wood lot planting and tree care during the past year.

Although all groups registered negative behavioural readings those not displaced, those who have attended previous demonstrations regarding tree planting and respondents with radios registered a significantly lower negative behaviour (Table 55). It is logical to expect those not displaced to have had greater opportunity to plant trees. However, extension demonstrations do appear to have altered the behaviour positively, although there is not a corresponding difference in the attitude construct. Those exposed to demonstrations are more open to perceived socially correct behaviour.

As would be expected the rural residents have a significantly more positive attitude toward their future involvement in wood lot planting schemes than their urban counterparts. They also believe it is more socially acceptable. The rural residents also expressed a stronger intention though not significantly so.

Recent behaviour was the only significant difference regarding displaced status. However, it is interesting to note that the displaced also expressed the strongest intention to plant wood lots. This is counter to what might logically have been expected given their greater degree of insecurity regarding current status of tenure. The stronger intention may reflect their greater awareness of the limitations of fuel wood resources discussed in the firewood collection section. It may also reflect a greater value placed on resources due to the experience of having their access threatened or removed. This would correspond to observations of forcibly displaced migrant farmers’ more positive intentions toward forest conservation in Central America (McKemey 1996).

When the TORA variable correlations are considered certain patterns do emerge (Table 56). Those groups which demonstrate a correlation between attitude ($\sum b_i e_i$) and intention are those not displaced, the Gonja and rural residents. Having a radio or attending a demo did not appear to influence this correlation as both parties in each group registered significant correlations. The attitude of the displaced also correlated, but very weakly. Regarding rural residents, who are probably within land-managing households, and those not displaced, their attitudes match closely their stated intention and social considerations have a markedly lower influence on the decision to plant.

In contrast the displaced demonstrated the highest ($\sum m_j b_j$) vs. I) correlation and therefore appear to be more influenced by social normative considerations. In this instance the displaced clearly feel that their most important social referents would endorse their decision to plant wood lots. This may reflect a degree of insecurity on
the part of the displaced. Although their stated intent is high the personal commitment may follow changes in their reading of social expectations. In contrast the stable resident’s decision to plant is based on their own rationalisation of the possible advantages and disadvantages and not to the same degree on their reading of public opinion. The stable resident’s behaviour will therefore be more dependent on reasoned arguments regarding the pros and cons of this activity. This has clear implications regarding education messages aimed at encouraging or changing wood lot planting behaviour. The understanding of their attitudinal construct and which beliefs and values dominate it are important to the development appropriate arguments or educational messages.

6.7.2 The Attitudinal Construct ($\sum b_i e_i$)

Table 51 presents the mean and median scores regarding the salient outcome beliefs for wood lot planting. The majority of these statements can be grouped under two main headings, those that relate to wood lot management and those related to ownership and future access. Three of the statements also refer to traditional beliefs or taboos regarding wood planting.

The beliefs, which are grouped under the management heading are related to: wp15, wp16, wp18, wp21, wp28, wp29 and wp30. These relate to two primary issues, the support and care of the planted trees and the threat of damage due to animals and theft. The issue of women being able to plant and if they will receive adequate support was frequently mentioned in the initial interviews. This is also associated with traditional taboos regarding negative consequences regarding tree planting e.g. wp4, wp7 and wp8.

The other main group concerns the issues of access particularly to land on which to plant, wp1, and the future ownership or access to the trees planted, wp12, wp13, wp14, and wp19. Several issues were raised during the open interviews regarding the woman’s right to land and the ability to own the trees planted. Concerns were also voiced regarding the erosion of the traditions of tree ownership. The tradition within the area recognised the ownership and right of access to trees regardless of the tenure of the land on which the trees stood. However, this was not necessarily inclusive of the women. Traditional social normative considerations and taboos tended to mitigate against the woman’s involvement in many aspects of tree management.

As can be observed from Table 51 the most highly ranked positive attitudes ($b_i e_i$) are wp28 – We will plant trees if we are supplied with the saplings-, wp6 – The men will support the women who want to plant trees-, wp19 – Planting wood lots will mean our children will have firewood in future-, wp12 – Trees will always belong to the individual or family who plants them-, wp1 – Women in groups will be able to acquire land on which to plant trees- and wp30 - The people of this community will be prepared to water the newly planted wood lots through the first year’s dry season-. All of these are attitudes considered to support the future planting of wood lots. This set of most valued attitudes illustrates that the women have already broken with many of the traditional restrictive normative gender roles regarding this behaviour. They clearly belief that they will have access to land and will receive support from the men.
The most negative attitudes relate to wp29 — *In this area planted saplings will die if not watered regularly*, wp2 — *women cannot plant trees alone*, and wp16 — *people will steal from the communal wood lots. However these negative attitudes are ranked in the lower median of the total number of attitudes measured (Table 51). Clearly the respondents do expect theft to occur but it does not appear to be a significant issue. It is noted that the resultant attitude \((b*e)\) regarding wp4 appears to be counter-intuitive\(^{11}\). The observation of the correlations between these attitude statements and the intention to develop wood lots will indicate which are the most influential to the decision to plant.

### 6.7.3 The attitude component’s relationship with the intention to plant wood lots.

Table 52 presents the correlations between the different outcome belief statements and the stated intent for the whole sample. It is assumed that those attitudes, which correlate closely with the stated intention are those which are influential in the decision process.

The attitudes, wp1 — *Women in groups will be able to acquire land on which to plant trees*, wp30 — *The people of this community will be prepared to water the saplings through the first years dry season* and wp28 — *we will plant trees if we are supplied saplings* correlate most strongly and positively with the intention to plant trees. These attitudes are also amongst the most highly rated (Table 51) and they are supported by significant belief \((b)\) and value \((e)\) correlations reinforcing their role within the process of deciding to plant. The attitudes related to the beliefs that they will receive support from the men and that people will look after the communal wood lots also reinforce the positive intention.

If the correlations with the alternative measure of intention are taken into account the only negative correlation is related to the possible loss of the sapling due to drought\(^{12}\). These findings suggest that the respondents’ intentions are supported by a strong attitudinal construct which holds few contradiction. However, it is important to also recognise that this construct is based on limited prior experience, which may affect its stability until more experience is acquired to ground it.

It is therefore important to facilitate the conditions, which will enable the subjects to carry out their intentions. Education programmes, which do not incorporate the means to facilitate wood lot planting, will be basically preaching to the already converted. The opportunity to practice is required to help consolidate existing positive behavioural intentions. Extension programmes therefore need to be to be designed which will accompany the actual practice and reinforce best practice regarding wood lot management.

---

\(^{11}\) Given the stated belief and attributed value this is in fact a negative attitude toward wood planting.

\(^{12}\) Probability tends to produce a slightly lower measure of intent as it takes into account the subject’s perception of possible constraints. It is considered that taking into account the most salient issues arising in open discussion captures these.
6.7.4 Differences in the attitudes of the displaced.

Table 57 presents the differences between the social groupings on the outcome statements’ attitudes (b*e). Overall little difference is noted between the different groups. Significant differences between the displaced and not displaced occur on only three of the statements, wp16 –People will steal from the communal wood lots-, wp17 –Trees planted in wood lots will be used for construction and fruit rather than for wood (fuel)- and wp18 –People will look after the trees if we plant them in communal wood lots. The displaced tend to believe more strongly in the possible theft from communal wood lots. Those not displaced believe more strongly that trees will not be used for alternative purposes other than fuel and have greater confidence that people will look after the wood lots. It appears that although the displaced expressed a strong intent they are more pessimistic about the good intentions of their neighbours. Given their current displaced state this is not surprising.

When the correlations with intent are compared between the two groups (Table 59) three negative ((b*e) vs. I) correlations are identified. These refer to the statements, wp15 animal damage, wp16 theft and wp29 the loss of plants due to drought. Those not displaced only present a negative correlation regarding wp15. These issues could be considered barriers to the displaced not participating in wood lot planting. And should be addressed in extension programmes aimed at gaining the greater involvement of the displaced.

However, it is important to bear in mind the normative component appears to be more influential on the decision of the displaced regarding fuel tree planting.

6.7.5 The normative component

Table 53 gives the values attributed to each of the social referents regarding the elements of the normative component by the whole sample. The chief, extension, agent and family register the strongest normative readings (m*b). When these norms are compared with the stated intent, the chief, family and then the extension agent are prioritised as referents (Table 54). The only difference is with regard to the stronger correlation with the radio as a social referent. The only referent not to present a significant correlation with intention was the landlord.

As in the case of introducing improved stoves, extension and education should be aimed at involving the whole family. It appears important to gaining the chief’s endorsement if not as one of the principal channels for the education messages. This will require a complementary educational strategy to enlist the chiefs and community leaders as part of the extension process.

When the differences in the normative attributed values are compared between the different comparative groups significant differences are noted between rural and urban residents and those who have or have not attended demonstrations. Those from rural areas tend to place greater value on community members, landlords and radio in contrast to those from an urban context. Those who have attended extension demonstrations place a higher value on the extension agents, community members, family and radio than their counterparts. It is interesting to note the higher value both these groups place on the radio as an influential social referent, demonstrating that it
is a respected medium of information for certain sectors of the society. It is therefore a valid educational channel for these particular groups.

No significant differences were noted between the displaced and not displaced regarding the subjective norm (m*b) for each of the referents. However, if the values attributed to motivation (m) and subjective belief (b) are compared significant differences underlie the subjective readings (Table 82). The displaced are significantly more motivated to comply with the extension agents and strongly believe that these agents would approve of their planting wood lots. The displaced are also more motivated to comply with the landlords. This is logical if they are depending on access to land owned by others.

Given the normative consideration appears to have a greater influence on the displaced decision process regarding this behaviour, the observation above would indicate that the extension agent is a key referent for promoting wood lot planting by the displaced.

6.7.6 Summary of Wood lot planting
The respondents registered a positive attitude toward wood lot planting and a strong intention to carry out this behaviour. The supportive relationship between both this positive attitude, the perception that it is socially acceptable behaviour and the strong expression of intent suggests, that given the appropriate opportunity, many will participate in the planting of wood lots. Regarding this behaviour the respondents own rationalisation of the benefits and obstacles has greater influence on their decision to act than perceived social pressure.

Previous extension efforts have had a positive impact on the behaviour of the few who have been exposed to wood lot demonstrations. However, the experience of this activity still appears to be relatively new to most. Previously for women to be involved in wood planting is counter to many of the traditional beliefs and social norms. However, a very positive attitude exists which presents few salient cognitive barriers. This positive attitude is primarily based on the confidence that they will receive the social support necessary, access to the land required and that people will respect their ownership. However, the lack of experience on which to ground this positive attitude may affective its stability until more experience is acquired.

It is therefore important to facilitate the conditions, which will enable the subjects to carry out their intentions. Education programmes, which do not incorporate the means to facilitate wood lot planting, will be basically preaching to the already converted. The opportunity to practice is required to help consolidate existing positive behavioural intentions. Extension programmes therefore need to be to be designed which will accompany the actual practice and reinforce best practice regarding wood lot management.

It is surprising that there is such a strong intention and attitude towards woodlot planting which is not supported by previous voluntary practice. The main examples to date of woodlot planting in the area at the community level, are project run and facilitated by agencies. This emphasis on “projects” may be discouraging
spontaneous individual initiatives. Extension workers should send a clear message that it is acceptable and appropriate to undertake planting outside of specified projects.

The displaced demonstrated the strongest intention to participate in wood lot planting. This decision, in contrast those not displaced is dependent on their perception of appropriate social behaviour and not to the same degree on their own attitude to the activity. Their strong intention to plant trees for fuel is therefore supported by a strong perception that this is socially acceptable behaviour. However, the displaced are more pessimistic regarding the support of their neighbours, and their attitude to tree planting did reflect some salient cognitive barriers regarding issues such as theft, animal damage and the risk posed by drought. These issues are to do with management and the collaborative response of the community. These barriers are real issues and cannot be addressed through educational messages alone but through their inclusion in appropriate programmes that will give greater security, such as moral contracts between the displaced, the landlord if relevant, the chief and the extension agency. The involvement of the extension agent is particularly important for the displaced as it may provide the concept of added security via the participation of a respected representative of authority.

Extension programmes should aim at reinforcing the existing positive attitude by facilitating the actual practice of wood lot planting and providing supportive instruction on best practice as experience is being gained.

For those not displaced the chief and family are key the key social referents. For the displaced and the more experienced, the extension agent is also a highly valued referent. The chief should be involved as one of the extension channels. This is important for all groups but particularly so for rural residents. The focus should be the family unit.

The key finding is that against what might be logically expected, the displaced are more likely to adopt more sustainable fuel wood management practices if the conditions are favourable. This may reflect their greater awareness of the limitations of fuel wood resources. It may also reflect a greater value placed on this resource due to the experience of having their access threatened or removed. This would correspond to observations of forcibly displaced migrant farmers’ more positive intentions toward forest conservation in Central America (McKemey 1996).

7. Analysis

The findings provide a presentation of the beliefs, values, social referents, intentions and behaviours. For each behaviour we suggested the socio-cognitive barriers identified and the educational approach recommended to overcome the barrier. This section summarises the resulting analysis and clarifies the proposed recommendations for educational extension.
Each of these barriers may seem self evident from experience elsewhere in the world and with the deduction of hindsight. However the strength of the TORA tool is that the stated barriers are based on a statistically valid correlation and the deductions are not based on intuition but on the quantifiable findings.

7.1 Key barriers and messages regarding sustainable fuel wood management (collection)

The key barriers to more sustainable fuel wood management (collection) behaviour are related to:
- The overriding perception that there will not be a problem with future access to firewood;
- The existing social pressure to continue current practices;
- The low self-perception amongst women regarding their tree harvesting capabilities;
- The rejection of many of the traditional taboos and beliefs regarding the effect of certain types of wood on their health;

Messages aimed at encouraging more sustainable practice therefore will need to:
- Raise the awareness of the possible destruction of the fuel wood resource;
- Build a positive self-perception regarding tree harvesting via demonstrating and reinforcing good practice, i.e. the appropriateness of women’s involvement;
- Reinforce some of the traditional taboos that have an actual physical basis for their existence, e.g. the effects of some types of wood smoke on the health of the family.
- Regarding those not displaced, messages emphasising and reinforcing appropriate collection behaviours, i.e. appropriate management of live tree harvesting such as pruning should be received.

Channels that need to be used for encouraging more sustainable practice of firewood collection:
- it will be important that education should be done through groups, which included local friendship networks, with little emphasis on individuals
- involve the appropriate social referents and gain their endorsement of the messages proposed.
- With respect to the whole group these are the local extension agents and the local chief.

The most influential beliefs supporting firewood collection decisions, regarding the whole sample, are related to the strongly held opinion that God will not permit the destruction of the trees and that they will always be able to gain access to areas with firewood. In constructing messages aimed at encouraging more sustainable firewood collection behaviour, the messages should seek to make the subjects more aware of the possible loss of both trees and therefore limited future access. The displaced are likely to respond more positively to these particular messages given their higher awareness of the limits. However, with the displaced it will be very important to impart these messages through natural social groups, which include both friends and family.
7.2 Key barriers and messages regarding the use of improved stoves

The key barriers to more use of improved stoves are related to:
- a strongly neutral attitude towards using improved stoves, ie no convincing rational attitude that prompts use of the improved stoves
- a much strong attitude towards the traditional stove
- a strong propensity to keep the traditional cooking pots and cooking methods
- relating back to firewood collection, the overriding perception that there will not be a problem with future access to firewood, and therefore that fuel efficiency is not valuable

Messages aimed at encouraging more use of improved stoves therefore will need to:
- focus on the possible destruction of the fuelwood resource and raise awareness in this area
- address the perceived limited utility of improved stoves (see below)

Channels that need to be used for encouraging more use of improved stoves:
- the husband (as a strong social referent for this behaviour) needs to be included in the approach on the use of improved stoves.
- family presentations may be more effective than isolated demonstrations for women
- radio should be used to reinforce messages
- demonstrations should be used as part of message delivery by extension workers

The displaced appear to be more open to considering the choice and have a closer correlation between their intention and attitude toward improved stove use. However, they do express a significantly lower intention than those who are not displaced.

It must be noted that there is a very strong opinion about the suitability of the existing proposed designs regarding the use of various cooking pots. The general attitude is that the improved stoves cannot use the variety of pots traditionally used. There is a need for the design team of the improved stoves to re-examine this aspect of the stove design. They either need to adjust the design to cater for all the pots, or if they believe the stove can use different pots and it is a matter of skill, then they need to specifically demonstrate the stoves with all the different pots.

7.3 Key barriers and messages regarding planting of woodlots

There is a very strong positive intention to plant trees in woodlots. There are few influential socio-cognitive barriers were identified when the sample is taken as a whole. One of the most interesting findings is that the women appear to have overcome some of the traditional taboos to more planting trees. The key barriers identified applied specifically to the displaced:
- social and practical support
- the practical problems of theft, animal damage, drought.
- security of future utility
In future extension and education, in the light of the existing positive attitude to planting woodlots (given the opportunity), one should be careful not to repeat messages that are already accepted, ie fall into the trap of “preaching to the converted”. Messages should be aimed at accompanying practice and consolidating the learning process. Messages for planting of woodlots therefore will need to:
- be accompanied by facilitation and organisation of the community to release land
- be accompanied by facilitation and organisation of the community to protect any proposed woodlots
- be accompanied by small incentives such as seeds or seedlings
- be focussed on the practicalities and best practice of tree planting

Channels that need to be used for encouraging planting of woodlots:
- the Chief, especially for rural people, and particularly the non displaced.
- The family unit needs to be the focus, especially for non-displaced
- the issue of creating social contracts between land-owners, chief and displaced
- Government extension agents who will lend authority and security to the proposed actions, particularly regarding the displaced.
- groups and communities developing ideas and working together

The key finding is that against what might be logically expected, the displaced are more likely to adopt more sustainable fuel wood management practices if the conditions are favourable. This may reflect their greater awareness of the limitations of fuel wood resources. It may also reflect a greater value placed on this resource due to the experience of having their access threatened or removed. This would correspond to observations of forcibly displaced migrant farmers’ more positive intentions toward forest conservation in Central America (McKemey 1996).

8. Conclusions

The analysis shows a number of interesting results. Comparison with reports such as UNHCR’s “Energy strategy for refugee affected areas of Kagera, Kigoma regimes Tanzania” M Owen & I Ruzicka UNHCR & EU, 1997, or work by R Black in refugee usage of fuelwood within Senegal (1997), shows that the method has captured the majority of the key items normally discussed regarding fuel for displaced persons. The method has not only brought to the surface beliefs which strongly influence fuel use, but has given quantifiable statistics as to the strength of that belief. Typical participatory techniques allow the community to vocalise concerns. However the strength of these concerns is often only documented according to the vehemence with which they are presented. The subjective language of a group discussion gives only qualitative ideas as to strength of the belief. The value of the current method is its ability to put a quantitative figure on the strength of belief through a statistically valid sample of the general population.

The analysis has revealed why people behave as they do. This stands in contrast to typical PRA tools that discuss the how, what, where, when and who of behaviour (in this case energy strategies). By discussing why people behave as they do, the tool has presented clear guidance for educational messages (and channels) that will contribute to changed behaviour. The analysis is not a substitute to survey and PRA tools, since there is still a need to know the physical data of energy strategies (fuelwood
collection, wood consumption, etc). The TORA tool complements data gathered by other survey techniques.

The analysis has shown how the internal and social motivation of people affects their behaviour (in this case of energy strategies in Northern Ghana). The resulting educational messages are not a substitute for policy and interventions. On their own they will have a limited impact. The targeted educational messages prevent extension agents from delivering messages through inappropriate channels and with inappropriate content. However, the messages can only complement and enhance policy and intervention actions. If improved stoves are not made available, and seeds are not available for woodlots, if the economic conditions are not in favour of fuel optimisation, then the messages can have only limited impact. In the analysis we have seen that the improved stove has serious perceived limitations in terms of use of cooking pots. It is vital that the design of the stove be re-examined and adjusted to address these perceptions.

9. Recommendations

The project purpose was to demonstrate a means of rapid identification of the barriers to adoption of different domestic energy options in refugee situations. From the findings and the analysis in the sections before we can see the identification of the barriers, and the proposed targeted educational messages that should overcome those barriers.

The educational messages are in themselves a recommendation to the extension services of Northern Ghana. In addition, the following recommendations are made regarding the purpose to Goal for this project.

9.1 It is recommended that the application of the educational messages by the extension services of Northern Ghana be supported and monitored.

The project has achieved its purpose of demonstrating the rapid assessment tool. In order to encourage the use of the tool, it is recommended that the application of the educational messages by the extension services of Northern Ghana be supported and monitored.

The services as such do not need additional support in order to apply the findings of this project. However, given the wide and diverse range of agencies involved in energy strategies in Northern Ghana, there is a need to ensure that the educational recommendations of this project are given a common understanding and implemented with a reasonable quality.

It is therefore recommended that additional funding be found to:-
- hold a workshop for briefing the relevant extension agents on the proposed messages (and channels).
- monitor initial use of the messages (and channels)
- hold a second workshop to receive feedback and refine the delivery of the messages
• evaluate the impact of the messages by reconducting the survey (on the behaviours addressed).

This action would validate the tool and the actions it has proposed. Further validation of the tool will encourage wider use of the tool and work towards fulfilment of the project Goal.

Nevertheless the project has demonstrated the rapid assessment tool. It is therefore recommended that there be widespread dissemination of the results of this project. The project team have identified a number of publications including:-

9.2 It is recommended that DFID promote the results of this project within DFID.
DFID should consider alerting other departments to the results of this project. The rapid assessment tool could be used to identify the socio-cognitive backdrop for virtually any behaviour change. The tool could predict the acceptance of any technology innovations and suggest the best educational approach for widespread dissemination. As such it has particular application to technology based programmes. It also can be used to identify critical salient beliefs in health work. This could be particularly useful in HIV programmes which seek to change behaviour. Suitable pipeline projects include:-

9.3 It is recommended that DFID promote the results of this project within other agencies.
Given the recommendation above, and the application of the tool to more than one type of project, DFID should also introduce the tool to other national and multinational agencies.

10. Appendices

To understand the context of village life for the respondents. It is important to note that the respondents were not a homogenous cultural group. There are a mixture of tribes, of refugees and non refugees, and of urban and rural. Nevertheless in order to put the research into some context it is important to have an overview of the ownership of resources, the use of resources (decision making, control, problems). Table follows the concepts used by ETCC and is based on their work supplemented with first interview data.
<table>
<thead>
<tr>
<th>Resources</th>
<th>Ownership</th>
<th>Control</th>
<th>Decisions</th>
<th>Access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farm land</td>
<td>M</td>
<td>M</td>
<td>M&amp;W</td>
<td>For HH</td>
</tr>
<tr>
<td>Grazing land</td>
<td>C</td>
<td>C</td>
<td>M&amp;W</td>
<td>For HH</td>
</tr>
<tr>
<td>Refuse dump</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>For HH</td>
</tr>
<tr>
<td>Bullocks</td>
<td>M</td>
<td>M</td>
<td>M&amp;W</td>
<td>For HH</td>
</tr>
<tr>
<td>Plough</td>
<td>M</td>
<td>M</td>
<td>M&amp;W</td>
<td>For HH</td>
</tr>
<tr>
<td>Ridger</td>
<td>M</td>
<td>M</td>
<td>M&amp;W</td>
<td>For HH</td>
</tr>
<tr>
<td>Carts</td>
<td>M</td>
<td>M</td>
<td>M&amp;W</td>
<td>For HH</td>
</tr>
<tr>
<td>Storage Barns</td>
<td>M</td>
<td>M</td>
<td>M&amp;W</td>
<td>For HH</td>
</tr>
<tr>
<td>Hoes</td>
<td>M</td>
<td>M</td>
<td>M&amp;W</td>
<td>For HH</td>
</tr>
<tr>
<td>Cutlasses</td>
<td>M</td>
<td>M</td>
<td>M&amp;W</td>
<td>For HH</td>
</tr>
<tr>
<td>Sickles</td>
<td>M</td>
<td>M</td>
<td>M&amp;W</td>
<td>For HH</td>
</tr>
<tr>
<td>Grains</td>
<td>M</td>
<td>M&amp;W</td>
<td>M&amp;W</td>
<td>For HH</td>
</tr>
<tr>
<td>Vegetables</td>
<td>W</td>
<td>W</td>
<td>W</td>
<td>For HH</td>
</tr>
<tr>
<td>Cooking Utensils</td>
<td>W</td>
<td>W</td>
<td>W</td>
<td>For HH</td>
</tr>
<tr>
<td>Souping ingredients</td>
<td>W</td>
<td>W</td>
<td>W</td>
<td>For HH</td>
</tr>
<tr>
<td>Knife</td>
<td>M</td>
<td>W</td>
<td>W</td>
<td>For HH</td>
</tr>
<tr>
<td>Borehole</td>
<td>C</td>
<td>C</td>
<td>W</td>
<td>W collect</td>
</tr>
<tr>
<td>Wells</td>
<td>M</td>
<td>M</td>
<td>W</td>
<td>W collect</td>
</tr>
<tr>
<td>Dams</td>
<td>C</td>
<td>C</td>
<td>W</td>
<td>W collect</td>
</tr>
<tr>
<td>Drums</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>For HH</td>
</tr>
<tr>
<td>Basin Bucket</td>
<td>M</td>
<td>W</td>
<td>M&amp;W</td>
<td>For HH</td>
</tr>
<tr>
<td>Calabash</td>
<td>W</td>
<td>W</td>
<td>W</td>
<td>For HH</td>
</tr>
<tr>
<td>Pots</td>
<td>W</td>
<td>W</td>
<td>W</td>
<td>For HH</td>
</tr>
<tr>
<td>Man</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>For HH</td>
</tr>
<tr>
<td>Women</td>
<td>W</td>
<td>M&amp;W</td>
<td>M&amp;W</td>
<td>For HH</td>
</tr>
<tr>
<td>Boys</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>For HH</td>
</tr>
<tr>
<td>Girls</td>
<td>W</td>
<td>M&amp;W</td>
<td>M&amp;W</td>
<td>For HH</td>
</tr>
<tr>
<td>Schools</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>For HH</td>
</tr>
<tr>
<td>Literacy classes</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>Adults</td>
</tr>
<tr>
<td>Herbalist</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>For HH</td>
</tr>
<tr>
<td>Drug merchants</td>
<td></td>
<td></td>
<td></td>
<td>For HH</td>
</tr>
<tr>
<td>Skills</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carving</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>For HH</td>
</tr>
<tr>
<td>Sooth saying</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>For HH</td>
</tr>
<tr>
<td>pottery</td>
<td>W</td>
<td>W</td>
<td>W</td>
<td>For HH</td>
</tr>
<tr>
<td>building/roofing</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>For HH</td>
</tr>
<tr>
<td>plastering</td>
<td>W</td>
<td>W</td>
<td>M&amp;W</td>
<td>For HH</td>
</tr>
<tr>
<td>Firewood</td>
<td>W</td>
<td>M</td>
<td>W</td>
<td>For HH</td>
</tr>
<tr>
<td>Kerosene</td>
<td>M&amp;W</td>
<td>M&amp;W</td>
<td>M&amp;W</td>
<td>For HH</td>
</tr>
<tr>
<td>Stalks/Cowdung</td>
<td>W</td>
<td>W</td>
<td>W</td>
<td>For HH</td>
</tr>
</tbody>
</table>

**Key** M= Men, W= Women, C= Community, HH= Household

These are summaries of averaged participatory exercises, and so as a generality the table must be treated with caution. However, the important feature to note it the apparent control of the cooking by the women, and the mixed response for the energy section. It is said that women can own the firewood, but it is the men who control the
use, although women decide when and how to use it. A lower grade resource such as Stalks/Cowdung are completely within the women’s domain, while higher grade resource such as kerosene is handled by a mixture of ownership and control by both the man and the woman.

The other element that should be noted is the control of the food resources. The man owns and controls the unprocessed grain. He then gives to the woman, who may process it for cooking or store the processed grain in pots or baskets. From this point on she has control, and even “ownership” of the food, and she decides how and when to serve to the household. The exception to this process is where the man gives his wife some land. In this case she is the “owner” and controls its production. She then owns and controls the unprocessed grains, and of course the subsequent cooking process. Trees which are found on farm lands are owned by the household, but those which are not on anyone’s specific farm land are owned and controlled by the community.

The details of these processes of control and decision making, particularly this question of social reference is explored in the findings of the second survey below.