Practising and Promoting Sound Environmental Management in Refugee/Returnee Operations

Papers Presented at an International Workshop
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UNHCR
United Nations High Commissioner for Refugees
Haut Commissariat des Nations Unies pour les Réfugiés

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Summary

In October 2001, the Environment Unit in UNHCR's Engineering and Environmental Services Section (EESS) organised a four-day workshop in Geneva. The workshop was entitled "Practising and Promoting Sound Environmental Management in Refugee/Returnee Operations".

The objectives of the workshop were to:

- share and collate experiences of environmental work in refugee situations;
- determine new lessons learned, both positive and negative;
- develop specific, achievable recommendations for future action; and
- provide guidance on where gaps exist in current tools and guidelines.

The workshop was attended by representatives of UNHCR, non-governmental organisations (NGOs), research institutions and donor organisations.

The workshop comprized two days of individual presentations and group work on five technical themes, followed by two days of plenary deliberations to reach common agreement on lessons learned and recommendations. The main deliberations and outcome of the workshop has been captured in a number of ways:

- a Workshop Report, which outlines the main issues discussed, lessons learned and recommendations coming from the meeting;
- technical input to a range of guidelines and handbooks being prepared by UNHCR, in collaboration with many of its implementing partners;
- a revised edition of the widely accepted *"Lesson Learned"* document; and
- this volume, which is a consolidated collection of selected papers presented by participants in the thematic working groups, in a slightly edited and standardised form.

As with its other documents, the Environment Unit welcomes feedback on its publications, and acknowledges the considerable input it receives from a very large number of partner organisations worldwide, helping it to reformulate existing and prepare new policies, as well as practical guidance to better support field and headquarter operations.

Disclaimer: The expressions made in the following papers are those of the respective authors and do not necessarily reflect the opinion of UNHCR or its implementing partners.

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1 Institutional Arrangements

Integrating Refugee-Hosting Areas in National Environmental Planning in Kenya: The Current Situation and the Way Forward

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Executive Summary

Environmental legislation is well developed in Kenya, the most recent and notable example being the Environmental Management and Co-ordination Act (1999). Official government policy supports a structured process of environmental planning from district to national level which is based on a hierarchy of Environmental Action Plan Committees. However, these committees do not yet exist in many districts. Even where formal environmental planning is taking place, refugee-hosting areas are generally overlooked – in spite of the significant refugee populations located at Kakuma and Dadaab in Kenya's arid and semi-arid lands. The paper proposes the establishment of District Environmental Action Plan Committees in both districts where refugees are located, and the inclusion of UNHCR and other refugee support agencies in these committees to ensure that issues relevant to refugee programmes are properly integrated.

Kew Words:

- ✓ *Environmental policy*
- ✓ *Environmental planning*
- ✓ *Kenya*
- ✓ *Dadaab*
- ✓ *Garissa*

1. Introduction

Economic development in Kenya, coupled with a high rate of population growth, has exerted high demands on available resources, thus increasingly subjecting them to degradation – and in some cases total destruction. The government has introduced development strategies that use nature's resources sustainably. This has been articulated in various policy statements, directives, sessional papers and development plans.

The government's commitment to proper environmental management is demonstrated by the adoption of the National Environment Action Plan (NEAP) and the establishment of public environmental institutions. Notable among these are the Ministry of Environment and Natural Resources, National Environment Secretariat, Kenya Wildlife Service, Forest Department and Commission on Soil Conservation and Afforestation. The government has established the posts of District Environment Conservation Officers and has posted these officers in most districts. District Environmental Committees have also been revitalised. Capacity requirements are provided by national universities and other educational institutions that offer qualifications in environment-related fields.

One of the major achievements in Environmental Management in Kenya was the enactment of the Environmental Management and Co-ordination Act 1999. It was enacted by Parliament on 15 December 1999 and received Presidential Assent on 6 January 2000. The Act establishes guidance and coherence to good environmental management. It further deals with cross-sectoral issues such as overall environmental policy formulation, environmental planning, protection and conservation of the environment, environment impact assessment, environmental audit and monitoring, environmental quality standards, environmental protection orders, institutional co-ordination and conflict resolution. The Act also calls for an institutional framework for environment management in Kenya. The government is in the process of operationalising this Act.

The government recognises the important role played by both non-governmental organisations (NGOs) and the private sector and has provided support and encouragement to their environmental efforts. The government also values the support of the United Nations and its agencies as well as foreign governments and organisations. It is in this regard that the government joined the world community in the

search for a global approach to the protection of the environment by participating in the first United Nations Conference on Human Environment in Stockholm, Sweden in June 1972. This conference led to the creation of the United Nations Environment Programme (UNEP) now headquartered in Nairobi.

Kenya has developed a large number of initiatives in the environment and natural resources sector. However, there had been no strategic approach integrating environmental concerns in the development planning process until the adoption of the NEAP in 1994.

2. Background

Kenya has been hosting large numbers of refugees due to civil strife in neighbouring countries, particularly Sudan and Somalia. There are two main refugee locations in Kenya, Kakuma in Turkana District and Dadaab in Garissa. There is also a small group of refugees at Shimoni in Kwale District.

Kakuma refugee camp was established in 1992 to cater for about 22,000 unaccompanied minors from southern Sudan. By 1994 the population was estimated at between 20,000 and 46,000 refugees. This increased to about 50,000 in 1997 and now stands at over 62,000 (UNCHR). Dadaab hosts around 110,000 refugees, the majority from Somalia.

The Government of Kenya, with assistance from UNHCR, has initiated environmental activities in the two main refugee sites. They are located in the ecologically fragile arid and semi-arid lands that are characterised by low rainfall, poor soils and a general scarcity of natural resources.

The risk of environmental degradation arising from refugee settlement remains a major concern to the government unless mitigating measures are undertaken in a concerted manner. Currently there are numerous interventions being undertaken on the ground by a range of actors.

There is a need to harmonise these initiatives with the prevailing legal and policy framework of the country.

3. The Way Forward

In appreciation of the need for a co-ordinated approach in management of the environment in its refugee hosting-areas, the Kenyan government (through the Ministry of Environment and Natural Resources) constituted a National Committee on Environmental Impact on Refugee Settlements in Kenya. This includes government ministries, United Nations agencies (UNHCR and UNEP) and NGOs such as GTZ.

In order to integrate environmental concerns into the overall planning and management process, the Government has proposed the establishment of District, Provincial and National Environment Action Plan Committees. This is provided for in Section 4 of the Environment Management and Co-ordination Act.

These committees will prepare a NEAP. The preparation processes will start with the District Environment Management Committees, which will be submitted to the Chairman of the Provincial Environment Action Plan for incorporation into the Provincial Action Plan. The provincial chairman will forward his plan to the National Environment Action Plan, which is supposed to be tabled in Parliament every five years for consideration and approval.

The members of the District Environment Management Committee include:

- District Commissioner;
- District Environment Conservation Officer;
- District Agricultural Office;
- District Water Officer;
- District Warden;
- District Fisheries Officer;
- District Planning Officer;
- local authority representative;
- local farmers' representative;
- representative of business community; and
- two representative of NGOs engaged in environmental management programmes in the district.

UNHCR and relevant NGOs such as GTZ should be members of the Garissa and Turkana District Environment Management Committees. At these forums they can insist that environmental planning activities for the refugee areas are incorporated in District Environmental Action Plans.

These district-level plans include:

- an analysis of the natural resources for the District with an indication as to any pattern of change in their distribution and quantity over time;
- an analytical profile of the various uses and values of the natural resources, incorporating considerations of inter- and intra-generational equity;
- recommended methods for building district awareness through environmental education on the importance of sustainable use of the environment and natural resources for national development;
- operational guidelines for the planning and management of the environment and natural resources;
- actual or likely problems that may affect natural resources and the broader environmental context in which they exist;
- trends in the development of urban and rural settlements, their impacts on the environment and strategies for minimising their negative impacts;
- guidelines for the integration of standards of environmental protection into development planning and management;
- policy and legislative approaches for preventing, controlling or mitigating specific as well as general adverse impacts on the environment;
- prioritised areas for environmental research and methods of using research findings; and
- proposed modifications to the district environment action plan to time to incorporate emerging knowledge and realities.

4. Recommendations

The Kenya Government should gazette District Environment Management Committees for Garissa and Turkana.

The preparation of District Environment Action Plans for Garissa and Turkana should be initiated.

UNHCR and NGOs involved in environmental activities with refugees in these districts should be gazetted as members of the District Environmental Committees.

The government should post a District Environment Conservation Officer to Garissa – there is already one in Turkana.

Proposal on How to Achieve Better Integration/Co-operation Between Agencies to Monitor, Publicise and Respond to Protected Areas in Times of Conflict

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(This paper was taken from Proceedings of International Symposium on Transboundary Protected Areas, Bormio, Italy, May 1998, organised by IUCN and the World Commission on Protected Areas. This paper has been written by various participants.)

Executive Summary

This paper summarises the deliberations of one of the working groups at the 1998 International Symposium on Transboundary Protected Areas. Based on a case study of the Virunga Volcanoes region and the various conflicts impacting upon it, six lessons are presented. These relate to inter-agency co-ordination, monitoring and dissemination of environmental information, the role of armed forces, integration of environmental concerns in other operations, the difficult role of non-governmental organisations and protected area agencies during conflicts, and the need for an environmental "Code of Conduct".

Kew Words:

✓ *Transboundary protected areas*
✓ *Parks for Peace*
✓ *Virunga*

1. Preamble

The group adopted a working definition of "conflict" as encompassing military conflict between states, guerrilla incursions in and nearby transboundary protected areas, civil unrest or instability and any other factors which either directly impact protected areas or result in the mass movement of people and indirectly impact protected areas. Conflict may result in a breakdown of civil obedience and lead to an escalation of activities such as illegal hunting or logging, but these activities were excluded from the general definition of conflict.

What are the concerns and what are the key lessons?

1.1 A Case study – the Virunga Volcanoes region

The nature of the issue was explored by examining the example of the Virunga Volcanoes Region, which includes a World Heritage Site and a Biosphere Reserve. This area is home to one of the two surviving populations of mountain gorillas, as well as to a rich biological diversity typical of Afromontane forest habitats. This conservation area, covering approximately 300km^2, is shared by Rwanda, Uganda and the Democratic Republic of Congo, although there is a separate management structure in each country The region has passed through a number of years of civil strife with associated inflow of refugees which contributed to a humanitarian crisis in the region. As a direct result of the civil strife and associated movement of human populations there have been significant negative impacts on the environment and protected areas. The group drew a number of lessons (see below) inspired from this example which were of direct relevance to the topic, while noting that the example of Virunga is an extreme case.

1.2 Lessons Learned

***Lesson 1:* Mechanisms for co-ordination between different agencies are essential**

Many agencies were involved in the Virunga issue, including:

- humanitarian organisations and NGOs (including UNHCR and CARE);
- international, national and local environmental NGOs (WWF, IGCP, and others);
- development agencies (UNDP, GTZ, EU, and others);
- protected area and government agencies (UWA - Uganda, ORTPN - Rwanda, ICCN, MBIFCT); and
- the armed forces.

There was limited co-ordination between these bodies and often the interests of different groups were not articulated and, sometimes, they were in fact hidden. As a generalisation, there were many groups, with many objectives. The exact mandate of different groups was unclear, and in many cases, groups would not be aware of the activities of other groups.

A mechanism for co-ordination is essential in such situations. This is especially true for the environmental impacts, the effects of which may persist long after the immediate civil emergency has been addressed.

***Lesson 2:* Monitoring and dissemination of information on environmental impacts and issues is important**

The natural environment was an important but secondary issue during the crisis. The lead government agencies for protected area management were unable to protect the areas during times of conflict. Many NGOs worked on environmental aspects but their level of influence and effectiveness was variable, and individual groups were not able to consider the impact of their actions outside of their areas of responsibility. Information regarding the infiltration of military refugees, cutting of fuelwood and killing of

animals was available, but the overall nature of environmental impacts was unclear. The lack of consistent monitoring and collation of information both before and during the crisis, as well as the breakdown in communication channels and the introduction of many new role-players underlines the key role for a consistent approach to information-gathering and communication.

Lesson 3: The armed forces have a dominant role and efforts should be made to seek their co-operation in relation to environmental issues

The level of influence of different groups was not equal and the military played a dominant role, while the protected area agencies were severely inhibited or incapacitated. This mirrors the situation in most conflict situations, where the actions of the military are the major determinant on a range of factors including impact on the environment.

Efforts to liaise with the armed forces and develop a joint understanding of the environmental concerns should be explored. It was noted that armed forces in a number of countries include an environmental division, and that a co-operative approach could lead to the achievement of both military and environmental objectives, both during and after immediate emergency periods.

Lesson 4: Responses were mostly issue-specific and there was inadequate integration

The responses to conservation issues in the Virunga case were often conducted at an issue and site-specific basis. It is essential that a more holistic, integrated approach be adopted to ensure linkage among different sectors. For example, fuelwood collection and decisions relating to this issue often have major implications in relation to the overall conservation status of the protected area.

There is a need to define responsibilities and seek the best combined outcome.

Lesson 5: Protected area agencies and NGOs may be unable to perform adequately, both during and after conflict

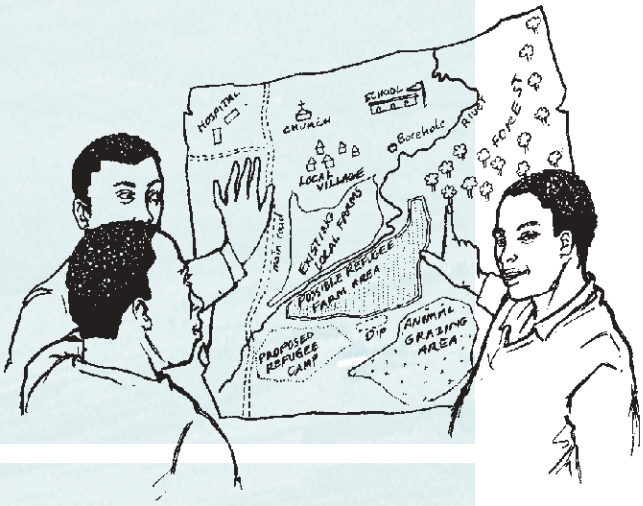
In many cases, protected area agencies require assistance to undertake their responsibilities, even in the absence of externally-driven crises. In conditions of instability, they can become completely marginalised. The opportunities to develop or maintain linkages with communities and to deliver benefits from protected areas are undermined, and tourism revenues decline or disappear. The protected areas may themselves become bases or transit routes for armed forces, both regular and irregular, and sources of fuel and food for armed forces, displaced communities or neighbours unable to pursue their usual activities. Nevertheless, the protected area agency has to recover the situation once the emergency has passed, and rebuild an operational management programme.

Lesson 6: The existence of a "Code of Conduct" or "Management Guidelines" relating to the protection of significant areas in times of conflict would assist the situation

The development of a Code of Conduct and "Management Guidelines" (as being developed by this workshop) would have benefits for protecting sensitive areas in times of conflict. While non-binding, such instruments would provide a useful framework for site-specific action. Guidelines should build on existing guidelines such as those prepared by the UNHCR and other agencies in relation to environmental management. Any Guidelines and Codes of Conduct should be widely disseminated to key target audiences, and discussions between relevant organisations should be facilitated to improve their quality and likely adoption.

2

Environmental Assessment, Planning and Monitoring



Rapid Data Collection: The Need to Transfer Rapid Estimation Skills to Local Agencies and to Maintain Databases Accessible to Other Organisations

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Executive Summary

Methods for rapidly estimating populations, water and sanitation coverage and other epidemiological statistics are not entirely new. Non-governmental (NGO) and international organisations (IO) have employed various estimation techniques over the years in an effort to tailor their responses to specific emergency situations in a timely fashion. As a result, the time delay between emergency and response is minimised and resources are effectively prioritised and deployed to the field.

Traditional methods for conducting rapid field assessments in areas where NGOs and IOs have had little to no presence generally follow the steps outlined below:

- **decision by the agency to respond to an emergency;**
- **deployment of a small contingency team to the emergency site;**
- **rapid assessment and data collection;**
- **formulation and co-ordination of an adequate response; and**
- **implementation of the response.**

This sequence of events generally assumes that: there is insufficient capacity on the ground to conduct required estimates, and that previously collected data is unavailable or inadequate. Improvement in the ability of organisations to respond to emergencies in a timely and appropriate fashion must include strategies designed to correct these deficiencies. It is understood that first-hand verification of estimates and data collected by others will always exist. However, improving local capacities and maintaining shared databases can only serve to enhance the response to the emergency situation.

This paper promotes the transfer of rapid assessment skills to local organisations and the development and maintenance of a shared database of critical indicators and statistics.

Kew Words:

- ✓ *Water and sanitation*
- ✓ *Rapid data collection*
- ✓ *Field survey techniques*
- ✓ *Uganda*

1. Background

The development and utilisation of viable rapid assessment techniques has considerably improved the ability of the emergency response community to provide adequate relief. However, rarely have these skills been transferred to local organisations. Furthermore, while sharing of data has occurred among NGOs and IOs at the outset of an emergency, it has not been common to have systematic sharing on a routine basis between organisations during non-emergency periods.

The continuing crisis in northern Uganda has illuminated the inability of the local government to conduct rapid assessments during emergencies. In two specific instances, responses were unacceptably delayed.

The first instance involved the migration of the Karamojong during a localised drought in May 2000. During this migration, the Karamojong entered an adjacent district, stole livestock from local farmers, abducted and raped women collecting water, killed over 100 local citizens and caused approximately 80,000 displaced persons to converge on six trading centres. During the initial stages of this emergency, meetings among NGOs and local government officials were held frequently over a four-week

period in order to co-ordinate an adequate response. The needs involved shelter, security, water and sanitation. The response that did finally occur was not co-ordinated by the government, but by NGOs working in the affected regions. This independent action was a result of frustration and the lack of direction coming from the local government. Surveys conducted by the government agencies involved a one-hour visit to the site of internally displaced persons (IDP) influx, speaking with local leaders and talking to groups of IDPs. Essentially, these visits had more of a political aim than of collecting hard data that could be used to formulate and direct appropriate interventions. Furthermore, the government had no particular method of determining affected populations and their needs other than by simply asking local officials. Other than relying on incoming IDPs to report to government offices for counting, the local officials used no statistical estimation methods.

The second instance involved the Ebola outbreak of October 2000. In one of the affected Districts, the response of the local government was similar to its response during the Karamojong situation. While frequent and lengthy meetings were held among stakeholders, the effort to determine affected populations, critical needs at health centres and other viable information was thwarted by ineffective leadership. Again, this forced NGOs having strengths in specific sectors to independently assess the needs, co-ordinate responses and inform the government of their actions.

These two situations, the Karamojong migration and the Ebola outbreak, revealed a need to train local government agencies in rapid assessment techniques and responses. As northern Uganda is rife with micro-emergencies resulting from the Lord's Resistance Army, Karamojong marauders and drought, the local District government clearly understood the benefits to be derived from learning and employing these techniques.

While the above examples reveal a need for data-collection tools on a local level, there also exists a more global need to store, maintain and share data among various co-ordinating and implementing bodies of NGOs, IOs and governmental organisations. While most organisations maintain data and many make this data available via websites, there is neither a single source nor standard format for agencies to access. The SPHERE project has gone a long way to define and standardise certain performance indicators. A next step would be to develop a centrally managed databank that includes a variety of well-defined indicators that are commonly accepted. Discussions concerning feasibility, funding and responsibilities of such an undertaking should be initiated towards that end.

2. Audiences

Training of local stakeholders in rapid data collection methods involves participants at both ends of the spectrum. NGOs and IOs with these skills must be willing to invest resources (time, personnel and funds) in the training and periodic evaluation of local agencies in order to ensure proper skills transfer. This training may take place in a development setting, post-emergency setting or during an emergency setting when conducted in conjunction with actual assessments.

Local governments must identify agencies (District Planning Offices, Public Health Officials, District Water Offices, etc.) and local community representatives (Community Health Workers, Community Outreach Workers, etc.) most likely to be called upon to conduct rapid field assessments during emergencies. As well, one central agency within the local government must be the focal point for initiating data collection, managing data collation and presenting data to the governmental decision-makers. The need for accurate, uninflated data estimates must be emphasized to all stakeholders. Government agencies responsible for co-ordinating the collection of this data must possess the skills and capacity to analyse the data, store it for future use and disseminate it to other organisations.

In terms of the development of a global database, a more co-ordinated and consolidated effort would be required. Such an idea might even be considered utopian and naïve given the variety of methodologies and philosophies employed by emergency- and development-oriented organisations. This is evident in the philosophical arguments that still surround the SPHERE project.

In short, the principal players for development of a database would include NGOs, IOs and governmental agencies. One IO should be tasked and provided with resources to serve as the focal point for collection and management of the database. NGOs and governmental agencies would be responsible for providing data in a universally acceptable format to the manager of the database. This data would be made globally available via the Internet. Governmental agencies would be responsible for monitoring country specific information and providing input to database managers as necessary.

3. Problem Analysis

In terms of solutions to the two problems presented up to this point, the author has been involved in solutions only for the former – transferring rapid assessment skills to local agencies. Therefore, from this point forward discussion will focus solely on such a skills transfer and the latter problem will remain to be addressed during the Environmental Refugee Operations workshop.

As alluded to earlier, the inability to co-ordinate and conduct rapid field assessments in Northern Uganda manifested itself in slow and uncoordinated responses by the local government to emergencies in its areas of influence. It is understood that rapid data collection is only one aspect to the problem. In order to appropriately respond, the local government must be able to:

- recognise the existence of an emergency;
- organise stakeholders to discuss and resolve to respond to the situation;

- assess and prioritise the needs in the target population;
- develop a co-ordinated response plan based on these assessments;
- communicate the needs for external resources critical to implementing the plan;
- implement the response plan; and
- continually evaluate the response plan's ability to achieve established targets.

Required in every step of the above process is the initiative and leadership of the local government. As well, the importance of data collection, analysis and management cannot be overstated.

Interwoven in almost every step of the process is the ability to manage and analyse data from the target population. The recognition of an emergency implies the understanding that critical indicators (e.g., water consumption, incidence of diarrhoeal morbidity, incidence of cholera, population numbers, etc.) have changed for the worse. This may be easily recognised (e.g., the convergence of thousands of IDPs on an ill-equipped trading centre). On the other hand, the existence of an impending emergency might be difficult to spot (e.g., the general increase in cholera mortality where the reporting system is poorly managed). Furthermore, appropriate responses to any emergency hinge on the stakeholders' abilities to perform the 3rd step of the process: "Assess and prioritise the needs in the target population."

In the case of Northern Uganda, the first two steps of the process were generally carried out in a prompt fashion. While resources were available from NGOs and IOs, a co-ordinated response to the emergency situation was consistently delayed due to the inability to organise a rapid assessment plan. The problem was not only in directing the assessment, but there was never a generally agreed-upon method for conducting these assessments. As a result, the stakeholders found themselves in the middle of emergency situations contemplating the best ways to collect and analyse data from the affected communities. This type of co-ordination must take place as part of contingency planning prior to an emergency – not in the midst of it.

Immediately following the responses to the two emergency situations described in the background, the International Rescue Committee (IRC) Environmental Health team in Uganda held meetings with the District Public Health Inspector, District Water Officer and the Community Development Office in order to determine a strategy aimed at streamlining the assessment phase during the numerous micro-emergencies that arise in that area.

In combination with implementing District water and sanitation programmes, IRC had been using numerous rapid and long-term data collection methods in the District employing a variety of techniques. Methods were focused on the collection of population data, water and sanitation coverage and basic epidemiological data. Technologies employed for rapid techniques were generally simple. However, long-term data collection methods involved GPS devices and GIS software aimed at developing decision-making tools for the District offices.

As a result of the meetings, it was recommended by all parties that rapid field assessment workshops be held for those governmental agencies most likely to be involved in collecting and analysing data during emergencies. These agencies would include the District Planning Office, District Public Health Office, District Water Office and Community Development Office.

4. Methods Used to Address the Problem

Two three-day workshops were conducted for the four agencies mentioned above. At the end of the workshop it was expected that each participant would be able to:

- estimate water & sanitation coverage, population data and health statistics for a specified area;
- utilise spatial and systematic sampling techniques; and
- conduct a statistical analysis of the data collected.

The workshops were conducted using the following format:

- *Day 1 (Classroom Instruction):* Workshop purpose; Pre-test; Administrative Estimates; Spatial estimates around a water source; Systematic surveys; Simple uses of GPS; Organising collected data; Analysing and evaluating data.

- *Day 2 (Field Practical Exercise):* Travel to IDP camp; Conduct spatial estimates; Complete data forms; Analyse data.

- *Day 3 (Field Practical Exercise):* Travel to IDP camp; Conduct systematic survey; Complete data forms; Analyse data; Course Post-test; Course Evaluation.

Abbreviated descriptions of the skills transferred are provided below. For more detailed explanations, please refer to the paper listed in Section 7.

Estimating Water Consumption: Topics covered included administrative estimates, spatial estimates and systematic surveys:

- *Administrative Estimates:* In cases where the actual quantity of water provided to a community on a daily basis and the population of that community are known, a simple administrative estimate of water coverage involves simply dividing the quantity of water by the population to arrive at a litres/person/day (l/p/d) estimate. This is relatively simple in instances where water is metered or in cases where water is tankered. However, in cases where water is delivered from wells or tap-stands, water quantities must be estimated.

  To estimate water yields around wells or tap-stands, the following procedure may be used. First, if a source has a relatively constant rate of production, one can estimate over a fixed time period (e.g. 15 minutes) the amount of water taken away from the source by its users – this does not include wastage or spillage at the source. The users are then asked to describe the timeframes during each day the

source is used. With a yield/time and the daily hours of operation, one can calculate the yield/day of the source.

Difficulties arise when the source is used at infrequent time periods. In such cases, it is best to estimate yields for a set time period at frequent intervals throughout the day (e.g. for 10-minute periods at every hour during the day) in order to achieve more accurate estimates.

- *Spatial Estimates:* Refer to the form in Annex A. The spatial estimate is based on the assumption that water source yield and its distance from the population restricts the number of people using the source. Therefore, by assessing water consumption strictly among those residents around the source, water consumption can be estimated. In this type estimate, radials from the source are randomly selected. The person conducting the estimates selects an interval at which he will select houses along this radial for interviews. This interval is generally a function of the density of the user population (i.e., the greater the density, the shorter the interval). Once the interval is selected, it should be maintained throughout the survey. Between 10 and 20 household interviews per source have proven to be sufficient for conducting water coverage estimates.

  Starting at the source, walk in the chosen direction, stop at the specified interval and ask the questions stated on the form in Annex A. Minimum questions include: (i) whether the interviewees get their water from the source being assessed; (ii) the number of people who were in the household the previous day; and (iii) the quantity of water collected the previous day. Continue in the direction until approximately two or three respondents in a row state that they do not get their water from the source being evaluated.

  When a series of houses in two to three radials have been evaluated, the data can be analysed. Sum the total number of household occupants and the total water collected. Total water collected divided by the total household occupants will result in the average water consumption (l/p/d) for users among that specific water source.

- *Systematic Surveys:* Two simple methods were transferred to the district agencies. The first involved selecting a representative sample in a camp setting where all households are represented (such as a ration site). In this situation, a rapid and representative survey can be done by going through the queue and asking every 10th or 20th person about water collection the preceding day and how many people were in the household on that preceding day. Summing water collected and dividing by the total occupants in the interviewees' households will result in the average daily water consumption.

  In many situations, there are few opportunities to use the method described above. In those instances, a systematic survey based on the camp's geography can be conducted (refer to the form in Annex B). Visiting every 10th or 20th family in a systematic fashion is usually a fairly rapid and representative way to determine water consumption. This method will also help to identify areas where there are particularly acute water shortage problems.

Estimating Sanitation Coverage: Again, topics included administrative estimates, spatial estimates and systematic surveys:

- *Administrative Estimates:* The population is divided by the number of latrine slabs or other latrine-specific items distributed. Coverage in communal latrine programmes is usually assessed by an administrative estimate.

- *Spatial Estimates:* This method requires counting the number of households or huts and the total number of latrines in the area. Following this, a random selection of households is interviewed to determine the average number of people per household. Latrine coverage (people per latrine) is then estimated by the "average number of people/household" times the "total number of households" divided by the "total number of latrines".

- *Systematic Surveys:* Again, refer to the format in Annex B for conducting this type of survey. This involves the same methodology as previously discussed in water consumption. However, it is important to account for latrines shared among families through fractional representations. Visual verification of the latrines is also recommended.

Population Estimates for Water Consumption or Sanitation Coverage: Data collected from the surveys above are useful in estimating population sizes. The general equations used to make these estimates are as follows:

$$\frac{\text{Daily Source Yield (l/d)}}{\text{Average Water Consumption (l/p/d)}} = \text{Population Served by Water Source}$$

$$\text{[Est. Latrine Coverage(people/latrine)]} \times \text{[Total Latrines in Camp]} = \text{Camp Population}$$

$$\frac{\text{Total Latrines in Camp}}{\text{Est. Latrine Coverage (\%)}} \times \text{Avg H'Hold Size (people/household)} = \text{Population}$$

The 1st equation is used in the form provided in Annex A. In the latter equation, estimated latrine coverage is the number of households interviewed having a latrine divided by the total number of households interviewed. Both the 2nd and 3rd equations are possible for population estimates in camps where an established latrine programme is operating and accurate records documenting latrine slab distributions are maintained.

Transcribing and analysing data collected: Refer to Annexes A and B. These offer fairly organised methods for collecting the data and the mathematical tools for analysis.

5. Observations and Key Lessons Learned

The training described above was conducted in January 2001. A total of 15 government officials attended the workshops. Respondents found the skills transferred useful and relevant to the emergency situations that frequently arise in the district. A follow-up with the programme will be conducted after one year to determine how often these skills have been used by those trained in the conduct of their work and the level of knowledge they retained from the training.

Although conducted rapidly, the assessments described entail much physical activity. In that light, individuals more inclined to office work should not be selected for this type of training. Furthermore, those interested in simply completing the forms and returning home are much less likely to acquire accurate data during the surveys. And finally, individuals involved in these types of surveys must possess basic mathematical skills in order to analyse the data collected.

References and Further Reading

Roberts, L. 1999. *Strategies for Documenting Water and Sanitation Coverage and Numbers of Beneficiaries: Guidelines for quantitatively assessing and evaluating program requirements and accomplishments.* Health Unit, International Rescue Committee, New York, N.Y.

Annex A: Water/Sanitation Spatial Estimate Around a Water Point

Date: _____ **Sub-County:** _____ **Village:** _____

GPS: Lat _____ **Long** _____ **Data Collected by:** _____

Household Number	Distance from Water Source (metres)	Number of Occupants in Household	Number of Huts in Family	Water Collected (litres)	Number of Latrine Stances	Number of Cases of Diarrhoea	Collection Capacity (litres)	Remarks
Total								

Procedure:

1. Go to water source and estimate yield (litres/day) by timing amount of water collected over a precise time period. Include only water collected and taken away from source by user.
2. Ask those collecting water what general timeframes the source is used throughout the day.
3. Select 2 or 3 precise radials from the water source for interviewing respondents. Determine a pre-selected interval that you will maintain between households throughout the survey (between 20 and 100 metres).
4. Start on first radial from water source. Upon reaching first household, ask questions beneath and record data. Proceed on radial to subsequent households at pre-determined intervals. Ask questions and record data. If no one is available at the household selected, move to the nearest household on the radial where occupants are present.
5. Upon reach 2-3 households consecutively which do not collect water at this source, return to source and start on a new radial. Radials should be separated by at least 90 degrees.
6. Continue until you have interviewed at least 15 households. Note that once you begin a radial, you must continue until you reach the point where respondents no longer collect water from this source.
7. Total up columns and calculate statistics using formulae below.

Summary Formulae:

1. Source Yield (l/d) = [Water Collected/Time Period] x [Daily Hours of Operation]
2. Average no. of people per family = Total no. of Occupants in Household / no. of Households Interviewed
3. Average no. of huts per family = Total no. of Huts / no. of Households Interviewed
4. Average Daily Water Consumption = Total Water Collected / Total no. of Occupants in Household (l/p/d)
5. Average no. of people per latrine stance = Total no. of Occupants in Household / Total no. of Latrine Stances
6. Percentage Cases of Diarrhoea = (Total Cases of Diarrhoea / Total no. of Occupants in Household) x100
7. Collection Capacity per family = Total Collection Capacity / no. of Households Interviewed
8. Population of Source Users = Source Yield / Average Daily Water Consumption

Questions:

1. Yesterday did you collect water from the source in question?
2. How many people are in your family? How many slept here last night?
3. How many huts are in your family?
4. How much water did you collect yesterday?
5. Does your family have a latrine? Show me your latrine? (For verification)
6. With how many families do you share that latrine? How many stances are in the latrine?
   Note: If a family shares a latrine, they should be given partial credit for latrine ownership. For instance, if the family shares a latrine which has 2 stances with 2 other families, they should be given credit for 2/3 of a latrine. That is, 2 stances shared by three families.
7. How many cases of diarrhoea have you had in your family within the past week?
8. How many jerry cans do you have for water collection? What are the sizes?

Population: .....

Occupants/household: .....

Huts/family: .....

Water consumption (l/p/d): .....

Latrine coverage: .....

Per cent cases diarrhoea: .....

Collection capacity (l/family): .....

Annex B: Water/Sanitation Systematic Survey

Date: _____ **Sub-County:** _____ **Village:** _____

GPS: Lat _____ **Long** _____ **Data Collected by:** _____

Household Number	Number of Occupants in Household	Number of Huts in Family	Water Collected (litres)	Number of Latrine Stances	Number of Cases of Diarrhoea	Collection Capacity (litres)	Remarks
Total							

Procedure:

1. With assistance of community member, map out village and divide into manageable survey sectors.
2. Start at some initial reference point and proceed systematically to 10th household. Have community member assist in counting households.
3. At 10th household, assign team member to ask questions beneath.
4. Team leader moves on to 20th household and posts a second team member to ask questions. As team members complete questioning, they catch up with team leader to provide responses to questions. Team leader records responses on form.
5. If no one is available at the 20th house, for example, proceed to the very next house. Then record it in the log above as the 21st house. Afterwards, proceed to the 30th household, not the 31st, and continue with the survey.
6. A team that includes a leader and three members is optimal.
7. Total up columns and calculate statistics using formulae below.

Summary Formulae:

1. Average no. of people per family = Total no. of Occupants in Household / No. of Households Interviewed
2. Average no. of huts per family = Total no. of Huts / No. of Households Interviewed
3. Average Daily Water Consumption = Total Water Collected / Total no. of Occupants in Household (l/p/d)
4. Average no. of people per latrine stance = Total no. of Occupants in Household / Total no. of Latrine Stances
5. Percentage Cases of Diarrhoea = (Total Cases of Diarrhoea / Total no. of Occupants in Household) x100
6. Collection Capacity per family = Total Collection Capacity / No. of Households Interviewed
7. Population = (Total no. of Households) X (Average no. of People per Family)

Questions:

1. How many people are in your family? How many slept here last night?
2. How many huts are in your family?
3. How much water did you collect yesterday? From which source?
4. Does your family have a latrine?
5. Show me your latrine? (For verification)
6. With how many families do you share that latrine? How many stances are in the latrine?
   Note: If a family shares a latrine, they should be given partial credit for latrine ownership. For instance, if the family shares a latrine which has 2 stances with 2 other families, they should be given credit for 2/3 of a latrine. That is, 2 stances shared by three families.
7. How many cases of diarrhoea have you had in your family within the past week?
8. How many jerry cans do you have for water collection? What are the sizes?

Population: .....

Occupants/household: .....

Huts/family: .....

Water consumption (l/p/d): .....

Latrine coverage: .....

Per cent cases diarrhoea: .....

Collection capacity (l/family): .....

3

Refugee Camp and Settlement Establishment

The Use of Environmental Housing Guidelines in Emergency Relief Situations: Honduras Case Study

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Executive Summary

The Environmental Guidelines for USAID-financed Housing Projects were prepared for USAID after Hurricane Mitch, one of the most destructive hurricanes of the 20th century, destroyed large areas in Honduras. More than 10,000 died and more than 1.5 million people were affected by floods and landslides. Thousands of homes were partially or totally destroyed.

Temporary shelters were set up and after about six months, several NGOs began to construct permanent housing for the refugees. Municipalities donated land and the construction began. However, when USAID carried out an Environmental Assessment of the projects, it was discovered that many consisted only of the construction of the house itself and the well-meaning organisations had not taken into account environmental considerations such as water availability and quality, latrine construction, sewage disposal for large housing projects, solid waste disposal, and social issues arising from living in new groups and non-traditional housing.

As a result, USAID prepared the present guidelines, which are now required for all USAID-funded housing projects. The full guidelines are included in the paper.

Kew Words:

✓ *Environmental housing guidelines*
✓ *Post-disaster housing guidelines*
✓ *Refugee housing*

1. Introduction

1.1 Audience

Government institutions or private organisations in charge of constructing permanent housing for disaster victims or refugees can use these environmental housing guidelines to ensure the environmental and social sustainability of the projects.

1.2 Problem Analysis

In 1999, many NGOs began to construct permanent housing for the thousands of Hurricane Mitch victims in Honduras. An environmental assessment of these housing projects was carried out for USAID, a major donor financing the housing projects, several months after construction was begun. Major findings of the environmental assessment included:

- the NGOs concentrated on the house itself and did not take into account potable water sources, latrines and sewage systems and solid waste disposal;
- none of the NGOs had taken into account the need to include community development plans to control possible contamination and facilitate the social integration of the community;
- soil erosion, water contamination and deforestation were being produced by the construction of the projects; and
- NGOs had a unique opportunity to improve environmental conditions and social conditions of the beneficiaries through community environmental education and the implementation of measures such as improved cooking stoves.

1.3 Addressing the Issue

As a result of the environmental assessment, the Environmental Housing Guidelines were prepared. Each subsequent project financed by USAID in Honduras is required to comply with the guidelines. The guidelines consist of two parts, a Social Questionnaire and an Environmental Questionnaire and Checklist. Their use permits the identification of environmental impacts and the proposal of mitigating measures.

Some of the most important environmental concerns include an adequate uncontaminated source of water, grey water disposal, sanitation facilities, solid waste disposal, contamination of water and soil, deforestation and soil erosion.

The Environmental Housing Guidelines have proved so successful in Honduras that they are now being required and used in many other countries.

1.4 Observations and Key Lessons Learned

After a major disaster or in a refugee situation, well-meaning NGOs immediately want to help. However many times when problems such as lack of housing for victims arise, solutions are not well thought out in the haste to help with the crisis situation.

Utilisation of standard guidelines such as the Environmental Housing Guidelines for permanent housing settlements for disaster victims and refugees contributes to the environmental and social sustainability of the projects.

2. The Guidelines

2.1 Introduction

The environmental guidelines for housing activities are designed to incorporate environmental considerations and mitigation measures in all the stages of housing projects, including site selection, design, construction and habitation. This will help ensure that the projects are sustainable from both the environmental and social point of view and at the same time will not have a significant negative effect on the environment.

The guidelines have been divided into two parts:

- Social Questionnaire; and
- Environmental Questionnaire and Checklist.

The Social Questionnaire is designed to collect information from the beneficiaries of the project (10 per cent minimum) and also the inhabitants of the area surrounding the project. Their habits, needs and perceptions of the projects should to be taken into account in the design and implementation of the project.

The Environmental Questionnaire and Checklist is designed to analyse the environmental impacts of the project so as to be able to incorporate mitigation measures into the design and implementation of the project. Some of most important environmental concerns include an adequate uncontaminated source of water, grey water disposal, sanitation facilities, solid waste disposal, contamination of water and soil, deforestation due to pressure for fuel wood, and erosion and access to roads and public transportation.

The environmental questionnaire and checklist is divided into the following sections:

- general project information;
- site identification and selection;
- site layout and design;
- construction; and
- habitation.

2.2 Use of the Guidelines

These guidelines should be applied for each housing project. Their use permits the identification of environmental impacts and subsequent proposal of mitigation measures for each significant negative impact identified.

2.3 Types of Impacts and Mitigation Measures

Environmental impacts can be classified in several ways. The following categories will be used in these guidelines:

- Negative Impact: an impact that will produce an adverse effect on the surrounding environment, including the social environment.

- Significant Impact: an impact expected to produce a high level of environmental damage. For each significant impact a mitigation measure must be applied.

- Moderate Impact: an impact that will not have a strong or lasting effect on the environment. For moderate impacts, recommendations will be proposed.

Table 1 presents a summary of some of most common negative impacts and their mitigation measures.

Table 1. Negative Impacts and Possible Mitigation Measures for Housing Projects

Potential Negative Impact	*Mitigation Measures*
Change in land use pattern	• Ensure that present land use at proposed project site is not critical and the present activities can be carried out on nearby land before the site is selected.
Destruction of ecological, archaeological or historical critical areas	• Evaluate site to verify that it is not critical for biodiversity, conservation of endangered or endemic species or critical ecosystem before the site is selected. • An alternative site should be used if the area is identified as critical.
Contamination of soil and water from sewage and solid waste	• Install adequate sewage and solid waste disposal systems
Risk to residents due to possible natural dangers	• Ensure that project site is not located in the following areas before it is selected: – Subject to landslides – Subject to flooding – With slopes over 20 per cent • If the site is in an area subject to natural dangers, an alternate site should be used.
Risks to residents due to human activity near site	• Before the site is selected: – Ensure that project will not be located within the area of influence (normally 1km) of pollution/hazardous sources including factories, mines, military base, etc. – Ensure that project is not downwind of contamination source – Identify sources of noise pollution • Use alternate site if risk to residents is high.
Excessive use and pressure on existing facilities such as schools and health centres	• Include the expansion or construction of necessary infrastructure in the layout and design of the project, if needed
Deforestation in order to implement project	• If forest is dense or forms part of a critical habitat, an alternative site must be found. • An area equal in size to one and half to two times the area deforested must be established and maintained. The location and ultimate use will be established in coordination with local municipal authorities. • For each tree cut in a sparsely treed area, 20 must already be planted 6 months after the beneficiaries have moved in.
Excessive use of fuelwood as an energy source	• Alternative energy sources such as gas, electricity and solar should be encouraged. • Require all residents to use improved stoves if they cook with fuelwood. • The planting of fuelwood plots using local species must be included in the project layout and design if this is the dominant energy source.
Houses not adequate for local climatic conditions	• Ensure that the design takes into account local climatic conditions and uses local materials if possible.
Health hazards due to lack of sanitation facilities (water, sewage and solid waste disposal)	• Ensure that all sanitation facilities are installed and running by the time the beneficiaries move in.
Improper use of environmental and sanitary resources within the project	• NGO must provide environmental and sanitary training for all residents before they move in. Training must include: – environmental education in schools; – care of domestic animals; – reforestation in green areas; – proper use and maintenance of latrines; – social interaction in housing projects; – proper use and conservation of water; – construction and use of improved stoves; – fuelwood plot management.
Erosion during construction of houses and access roads	• Soil conservation measures must be included in the design and implemented during construction. The exact measure will depend on the site and the severity of the impact.

Social impacts within and around the project site	• A social diagnosis of the beneficiaries and the communities around the proposed site must be implemented before the design of the project. • If the social conflict is too significant an alternative site must be selected. • Community Development Programmes must be implemented in each community after the beneficiaries have moved in.
Lack of compliance with mitigation measures	• Sign binding agreements with the cooperating organisations collaborating with the project before the project begins. • Each NGO must have a Monitoring and Evaluation Plan, to assure compliance with the mitigation measures.

2.4 Questionnaires

2.4.1 Social Questionnaire

The purpose of the Social Questionnaire is to determine the customs and concerns of the beneficiaries of the housing projects and as well as the neighbouring population.

The questionnaire is divided into two parts for more efficient data collection.

Social Questionnaire No. 1
(for the Beneficiaries of the Housing Project)

This questionnaire will help collect data in the field from the project beneficiaries.

The questionnaire should be completed for at least 10% of the beneficiary families, with a minimum of 20 families surveyed, even for small projects. Group interviews are acceptable.

General Information

Name of the Project: .....

Date: .....

Location: .....

Name of Surveyor: .....

Type of Consultation: Organized Group ❑ Non-formal Consultation ❑

Number of Persons Consulted: .....

Question 1:

In your opinion, what are the most important benefits of the project?

Question 2:

In your opinion, what are the problems associated with the project?

Question 3:

Is there evidence of archaeological sites in the area of the project?

No ❑ Yes ❑ (You must notify proper local and national authorities)

Question 4: (based on the place of origin of the beneficiary)

What did you cook with?

Fuelwood ❑ Kerosene ❑ Gas ❑ Electricity ❑

If the answer is fuelwood:

Where did you get the fuelwood? .....

What species did you use? .....

Who collected it? .....

Question 5:

Which of the following did your previous house have?

Electricity: Yes ❑ No ❑

Running Water: Yes ❑ No ❑

Tap: In home ❑ Community tap ❑

Latrine: Yes ❑ No ❑

Question 6:

What was your house made of?

Adobe ❑ Concrete blocks ❑ Wood ❑ Other ❑ (specify) .....

What was the floor made of?

Tile ❑ Dirt ❑ Cement ❑

Question 7:

What was the source of water in your community?

River ❑ Stream ❑ Spring ❑ Well ❑ Other ❑ (specify) .....

Question 8:

What are the most common diseases?

Respiratory problems ❑ Diarrhoea ❑ Other ❑ (specify) .....

Question 9:

How many people live in your house? .....

Do the children attend school? Yes ❑ No ❑

Social Questionnaire No. 2

(for the Inhabitants of Communities within 1km of the Project Site)

This questionnaire should be completed for a representative sample (10 to 20 families) in communities (more than 50 houses) within a 1km radius of the project site. The sample should include representatives of municipal authorities, water board members and teachers. The questionnaire can be administered individually or in groups.

General Information

Name of the Project: .....

Date: .....

Name of the Community: .....

Distance from Project: .....

Population (approx. no. of inhabitants): .....

Name of Surveyor: .....

Type of Consultation: Organized Group ❑ Non-formal Consultation ❑

Number of Persons Consulted: .....

Question 1:

Are you aware that a housing project will be constructed nearby for people affected by Hurricane Mitch?Electricity: Yes ❑ No ❑

Question 2:

In your opinion, what are the most important benefits of the project?

Question 3:

In your opinion, what are the problems associated with the project?

Question 4:

What is the source of water for your community? .....

Is water scarce in the dry season? Yes ❑ No ❑

Do you think there will be enough water for your community and the new project? Yes ❑ No ❑

Question 5:

What do you cook with?

Fuelwood ❑ Kerosene ❑ Gas ❑ Electricity ❑

Fuelwood is: Abundant ❑ Scarce ❑

Question 6:

Does your house have a latrine? Yes ❑ No ❑

What type? : Simple pit ❑ Composting ❑ Hydraulic ❑

Question 7:

What are the environmental and social problems in your community?

Deforestation ❑ Scarcity of Water ❑ Scarcity of Fuel Wood ❑ Fires ❑ Sewage ❑ Lack of Latrines ❑

Solid Waste ❑ Standing Water ❑ Soil Erosion ❑ Landslides ❑ Contamination of rivers or well water ❑

Proliferation of Disease-Producing factors ❑

Disappearance of fish and wild animals ❑ Which ones?: .....

Delinquency ❑ Others ❑ .....

2.4.2 Environmental Questionnaire and Checklist

Environmental Questionnaire and Checklist

General Project Information

Please fill out the following information for each housing project.

Name of Housing Project: .....

Date: .....

Location: .....

Person responsible for questionnaire: .....

Executing NGO: .....

Type of project?: Self-Help/Auto-Construct ❑ Hired Workers ❑ Food for Work ❑ Other ❑ .....

Payment: Donation ❑ Monthly Fees ❑ Labour ❑ None ❑ Other ❑ .....

I. Site Identification

I A. The following information must be determined before the checklist (Item B) is filled out:

1. What is the present land use? .....

(Change in land use can cause conflict, e.g. if the land is currently being used for grazing by a neighbouring community, planting crops or as a source of water, etc.)

2. What was the previous land use? .....

(Activities such as hazardous waste dumping can endanger the community)

3. Did Hurricane Mitch affect the area? Yes ❑ No ❑

4. Is the area vulnerable to:

Flooding After Mitch Yes ❑ No ❑

Hurricanes Yes ❑ No ❑

Landslides Yes ❑ No ❑

Earthquakes Yes ❑ No ❑

Forest/Brush Fires Yes ❑ No ❑

Drought Yes ❑ No ❑

Contamination from external sources (industry, agricultre, animal farms, etc. Yes ❑ No ❑

(If the answer is yes to any of the above questions, mitigation measures must be applied or an alternative site used for the project)

5. What is the current land tenure status? .....

(There must be a guarantee that the project site will not encounter legal difficulties)

6. What organisations will you be working in cooperation with (specify)?

None ❑

Municipality: .....

Financial Institutions: .....

NGOs: .....

Other: .....

7. Are the responsibilities of each of the parties involved clearly defined and spelled out in a written agreement? Yes ❑ No ❑

(A written agreement must be signed if another NGO, municipality, FHIS, etc. is providing services for the project)

8. Do you have an established work schedule? Yes ❑ No ❑

(Important to make sure that the housing project has all the necessary facilities running smoothly by the time the families move in)

9. Are there any NGOs working on housing projects in the proposed area? Yes ❑ No ❑

(Social development projects must work in cooperation with other organisations to assure uniformity in the area)

10. The foreseen water source and flow for the project is:

Well: Source..... Flow.....

Surface water: Source..... Flow.....

Spring water: Source..... Flow.....

Communal source: Source..... Flow.....

11. Is the foreseen water source currently being used (explain)?

Yes ❑ ..... No ❑.....

(It is important to determine if the water source will cover all needs)

12. What is the lowest water flow during the dry season? .....

13. What is the amount of water/person/day estimated for the project? .....

14. Is there an alternate source of water? Yes ❑ No ❑

(Important in case the primary water source is rendered useless)

15. Does the water quality meet the standards for human consumption established in the "Norma Técnica Nacional para la Calidad del Agua Potable"?

Yes ❑ No ❑ Unknown ❑

16. What is the depth of the water table? .....

(Important in design considerations for water supply and waste disposal systems, such as wells and latrines)

17. Are there any superficial, seasonal and/or sub-superficial water courses (specify depth and location) in the project area?

Yes ❑ Describe: ..... No ❑

18. Soil Characteristics:

Permeability .....

Composition .....

Depth of Bedrock .....

(Important design consideration in waste disposal systems)

19. What is the average slope of the site? .....

(According to the "Reglamento de Zonificación, Urbanización, Lotificación y Construcción" no urbanisation projects should be located in sites with a slope greater than 20%)

20. What is the distance? To the nearest transitable road: ..... To public transportation: .....

(The community must have proper access to work, school and health centres)

21. Is there a community within a 1-km radius? Yes ❑ No ❑

Name of the Community	Distance	Approximate Polpulation

List the facilities these communities have including hospitals, health centres, schools (specify levels), waste disposal systems, churches (specify denominations), recreational centres and government offices.

Name of the Community	Facilities

22. The site must be marked on a topographical map with a scale of 1:50,000.

(This enables you to locate the site within watersheds, its distance from bodies of water and roads, as well as its average slope and elevation)

I B. Site Identification Environmental Checklist

Put an X in the appropriate column.

Where significant impacts are predicted, mitigation measures must be proposed. If a moderate impact is predicted, a recommendation should be proposed.

Mitigation measures are obligatory while recommendations are not binding.

Issue at hand	Yes		No
	Moderate impact expected if no mitigation measures	Significant impact expected if no mitigation measures	
1. Is the area located in or near (< 1km):			
Airport			
Military Zone			
Protected Areas or buffer zone			
Nuclear Zone			
Biological Corridor			
Archaeological/Anthropological/Historical Sites			
Forested Area			
Watershed			
Important Flora/Fauna Habitat (e.g. wetlands, tropical rain forest, mangrove, coral reef)			
2. Will the project have an effect on:			
Biodiversity			
Endangered Species			
Endemic Species			
3. Is there any unresolved land tenure issue?			
4. Are there any hazardous or contaminating activities taking place or foreseen in the surrounding areas?			
5. Could the previous land use put the future population at risk?			
6. Will there be a need to create or rehabilitate an adequate access road?			
7. Will there be a need to provide access to electricity?			
8. According to the project's estimated water needs for present and future populations, will there be a need to search for complementary water sources?			
9. Could the slope of the site (more than 20%) cause a negative impact due to:			
Erosion			
Landslides			

II. Site Layout and Design

II A. Fill out the following information pertaining to the project. It must be taken into consideration when designing the project.

All design criteria must adhere to the specifications found in the "Reglamento de Zonificación, Urbanización, Lotificación y Construcción"

1. Total Area: .....
2. Lot Size: .....
3. Estimated Number of Houses: .....
4. Estimated Number of People per House: .....
5. Estimated Total Population: .....

6. Does the project design include the following?:

(a) Potable Water: Communal Taps ❑ Yard Taps ❑ House Connections ❑ Community Well ❑ House Connections ❑
Rainwater Collection Systems ❑ *No Potable Water Systems ❑

(There must be environmentally safe systems designed before construction begins)*

(b) Source for Lighting:

Street: Electric ❑ Solar ❑ None ❑

House: Electric ❑ Solar ❑ None ❑

Street and House: Electric ❑ Solar ❑ None ❑

(c) Cooking Energy Source: Firewood ❑ Kerosene ❑ Electricity ❑ Propane Gas ❑ Source has not been identified ❑

Other ❑ (specify) .....

If firewood is the foreseen cooking energy source, has there been an efficient firewood stove component integrated into the design? Yes ❑ No ❑

(If the answer is no, a training component on improved stoves be incorporated into the project)

(d) Solid Waste Disposal (including construction waste): Collect/Transport ❑ Final Disposal ❑ Incinerator ❑ Landfill ❑

Other ❑ * No Disposal System has been Foreseen ❑

*(*There must be environmentally safe systems designed before construction begins)*

(e) Waste Water Disposal (following the discharge standards of the "Normas Tecnicas de las Descargas de Aguas Residuales a Cuerpos Receptores y Alcantarillado Sanitario") systems are included for: Grey Water ❑ Rainwater Drainage ❑ Sewage ❑ * No System has been Foreseen ❑

*(*There must be environmentally safe systems designed before construction begins)*

(f) Basic Sanitation Facilities (must be chosen according to soil characteristics and water table depth):

Pit Latrines ❑ Composting Latrines ❑ Hydraulic Latrines ❑ * None Foreseen ❑

7. Predominant weather: Average temperature..... Average rainfall.....

(Hot weather must be considered when designing a house so it may have proper ventilation)

8. Predominant wind direction: .....

(Important for ventilation and the location of waste disposal systems)

9. Were the building materials chosen according to average weather conditions?: Yes ❑ No ❑

(Some building materials retain heat more than others do)

10. Will the house design be consistent with that of other housing projects in the area?: Yes ❑ No ❑

(Social problems may arise from the differences in quality of the houses and services provided)

11. Area designated for:

Internal roads ____%

Green areas (parks and forested areas) ____%

Social and recreational areas (school, community centre soccer field) ____%

Transportation considerations (bus stop area, transport to and from a city centre) ____%

12. Does the design take into account expansion?: Yes ❑ No ❑

(Future growth must be taken into consideration in order to allow individual house expansion, future service connections and to estimate the availability of natural resources in the area for the future population)

II B. Site Layout and Design Environmental Checklist

The following checklist summarises the information from section II A and permits the rapid identification of impacts. If the answer is yes, no further action is needed. For each significant impact a mitigation measure must be implemented and for each moderate impact a recommendation should be presented.

	Yes	No	
		Moderate impact expected if no mitigation measures	Significant impact expected if no mitigation measures
1. Given the project population and site area, will you be able to follow the spatial requirements specified in the "Reglamento de Zonificación, Urbanización, Lotificación y Construcción"?			
2. Does the proposed potable water system provide the estimated amount of water for the present and future population?			
3. Does the potable water quality meet the standards established in the "Norma Técnica Nacional para la Calidad del Agua Potable"?			
4. Has the lighting source and distribution been taken into account in the design and layout of the project?			
5. Is the availability of cooking fuel proportional to the demands of the community?			
6. Has a solid waste disposal system been designed for the site?			
7. Will the solid waste disposal meet USAID standards and will it be designed with future growth in mind?			
8. Has there been a sewage/grey water disposal system included in the design?			
9. Will the effluent from the water disposal system meet the standards in the "Normas Tecnicas de las Descargas de Aguas Residuales a Cuerpos Receptores y Alcantarillado Sanitario"?			
10. Are the building materials adequate for the average weather conditions?			
11. Has the predominant wind direction been considered in the design of the project houses?			
12. Has the predominant wind direction been considered in the design of the waste disposal and sewage systems?			
13. Does the design and layout include:			
• Internal roads			
• Green areas			
• Social and recreational areas			
• Prevention of fire hazards			
• Transportation needs			
14. Is expansion possible?			

III. Construction

This section should be filled out for the activities related to the construction of the project.

III A. The following impacts must be taken into consideration during construction.

Erosion:

when the earth is left barren, after the site is cleared, levelled, filled in and compacted it becomes susceptible to erosion, caused by wind or water and aggravated by strong slopes.

Water Contamination:
consequence of erosion or the dumping of excess soil from the levelling of the terrain into watercourses (sedimentation), on-site maintenance of machinery (change of oil, gas, washing) and lack of adequate on-site sanitary facilities for the workers.

Air Contamination:
caused by uncovered lightweight construction materials and the loosening of the soil from digging activities.

Resource Depletion and Destruction:
from the use of local natural resources, such as sand and rocks from riverbeds, as well as wood from neighbouring forests.

Social Impacts:
such as delinquency, social clashes, noise pollution, traffic increase and spread of disease due to stagnant water.

Landslides:
caused by loss of hillside stability, removal of vegetation and water saturation.

Visual Contamination:
due to construction waste (including trash produced by workers) not being disposed of correctly.

III B. Construction Environmental Checklist

If the answer is no, no further action is needed. For each significant impact a mitigation measure must be implemented and for each moderate impact a recommendation should be presented.

	Yes		*No*
	Moderate impact expected if no mitigation measures	Significant impact expected if no mitigation measures	
1. Will construction activities produce:			
Social Impacts			
Erosion			
Sedimentation			
Water Contamination			
Air Contamination			
Deforestation			
Loss of Habitat			
Hillside Instability			
Landslides			
2. Will there be an impact due to construction waste?			
3. Will on-site water resources be used to satisfy construction needs?			

IV. Habitation

IV A. Towards a Lasting Impact

During the habitation stage of a housing project the long-term impacts (beneficial or adverse) for the beneficiaries, surrounding communities and environment will develop. Careful thought must be given to ensure that the project will have a lasting positive effect in the area.

The following are recommendations which will greatly contribute to the social and environmental sustainability of the projects.

A complete Community Development Plan (CDP) should be designed (by the NGO, local government, etc.) and should include, but not exclusively, the following broad categories:

- Provision of Standard Services and Maintenance: this should include potable water, sanitation facilities, solid waste disposal systems, transportation, cooking, educational and health facilities.

- Provision of Social Services: community counselling in aspects such as adapting to change and how to live in a community, communal organisation services (aid in the formation of patronatos, water boards, etc.) and educational services oriented towards the construction, use and maintenance of fuel-efficient stoves, latrines, water storage, health and nutrition, as well as job assessment programs that will include training and placement.

- Establishment of a Coordinating Committee: it is imperative to establish a functional group of people that have the technical, organisational and administrative capacity to execute the development plan. Ideally, the committee should include a representative of the NGO, community representatives, local school representative, a social worker and a municipal authority.

- Supervising and Monitoring Programme: this should include on-site visits, surveys and quality testing of the facilities to ensure proper functioning. The Coordinating Committee should also oversee this activity.

Please answer the following questions.

1. Indicate who will provide for each of the following services:

Potable Water: Local government ❑ Community managed ❑ NGO ❑
Solid Waste: Local government ❑ Community managed ❑ NGO ❑
Sewage: Local government ❑ Community managed ❑ NGO ❑
Electricity: Local government ❑ Community managed ❑ NGO ❑

2. Will there be a basic service fee? Yes ❑ No ❑
(Important to ensure the sustainability of the basic services)

3. Will all the project children be able to attend a school within a 1km radius? Yes ❑ No ❑
(If the project design does not include a school, the nearest accessible school must be able to accommodate the project children. If it is not able to accommodate them a school expansion plan must be implemented.)

4. Will all the project population be able to attend a health centre within a 1 km. radius? Yes ❑ No ❑
(If the project design does not include a health centre, the nearest accessible health centre must be able to assist the project population. If it is not able to assist them a health centre expansion plan must be implemented.)

5. Are there jobs available in the area? Yes ❑ No ❑

IV B. Habitation Environmental Checklist

Mark the answer that will best fit the project characteristics. For every "No" it is recommended that a clearly defined plan be designed and ready to implement before the houses are officially given to the beneficiaries.

	Yes	*No*
1. Will there be a management for the community once the houses have been handed in?		
2. Will the basic facilities (latrines, potable water, grey water and solid waste disposal) be ready for use by the time the houses are handed in?		
3. Will there be any training for the project population in the use of these sanitary facilities?		
4. Have the responsible parties for the operation and maintenance of the facilities been identified and trained?		
5. Is there an established basic service billing system?		
6. Has the responsible party for the billing system been identified and trained?		

Permaculture in Refugee Camp Rehabilitation in Macedonia: Useful Lessons and Ongoing Challenges

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Executive Summary

Cegrane refugee camp in the Former Yugoslav Republic of Macedonia hosted up to 43,000 Kosovo refugees during 1999. After their repatriation, it was agreed to rehabilitate the site according to permaculture design principles. A two-year project was initiated and undertook extensive physical works and construction on the site, stabilising the soil, reducing water run-off and erosion, establishing productive ecosystems, and building various structures for environmental training, education and demonstration. Environmentally sound design principles were closely adhered to.

At the project's mid-way point, however, donor funding ran out and there was a premature and hasty handover to recently formed local NGOs. The project fell foul of local politics and lack of sustainable management structures, resulting in looting of material assets and unclear long-term status for the site and its remaining structures.

While permaculture was shown to be a viable and appropriate land design system for environmental sustainability, important questions of donor commitment and long-term management were highlighted. These have important implications for other camp rehabilitation situations.

Kew Words:

✓ *Permaculture*
✓ *Camp rehabilitation*
✓ *Macedonia*
✓ *Sustainability*
✓ *Local handover*

1. Background

The Former Yugoslav Republic of Macedonia (FYR of Macedonia) was nearing the end of a decade of change when the Kosovo refugee crisis presented a new humanitarian challenge. Refugee arrivals, beginning in March 1998 and peaking during early 1999 prompted the establishment of 10 campsites within the country, of which eight were fully occupied. At the height of the influx in June 1999, 261,000 refugees were receiving assistance. Some 57 per cent were located with host families, 42 per cent in eight tented camps and less than 1 per cent in collective centres. Subsequent repatriation, establishment of additional collective centres, and ongoing support to host families allowed for the closure of all refugee camps by the end of 1999. Camp operation and support to host families generated a number of environmental issues and challenges. These were outlined in a 2000 UNEP Post-Conflict Environmental Assessment – FYR of Macedonia which was undertaken with the involvement of UNHCR, roughly one year after the return of refugees to Kosovo.

This paper assesses the use of permaculture to rehabilitate the Cegrane refugee camp site, while also addressing the potential for permaculture as a tool in the design and management of emergency human settlements. Suggestions are made to enhance environmental management within refugee operations, based on observations drawn from the Macedonia experience.

2. Cegrane Refugee Camp

The Cegrane refugee camp was one of the first camps established within the country in response to the Kosovo crisis. It was located directly next to the town of Cegrane/Forino, a majority Macedonian Albanian area with an estimated population of 18,000 people. Host families also housed up to 4,000 people. The number of refugees in the camp reached approximately 43,000 people at its peak.

The camp was located on sloping ground next to the town. It measured 53ha in area and was situated at the base of Rudina Mountain. The land use in the 50 years prior to the establishment of the camp had moved through various phases – from viticulture to cropping and then occasional grazing as the land degraded in quality. At the time of camp establishment, the site was used as rough grazing ground on the outskirts of the town, with part of the site included in an unofficial village garbage dump. Two valleys ran beside the campsite, leading to significant water flow during peak rainfall events. It was located within a secondary zone of environmental protection for the Rasce spring. The underlying geology consists of limestone and includes a spring line surfacing within the town below the camp site at the base of the hill. This spring line and various wells were used for drinking water by residents.

The central government (Office of the President, Office of the Prime Minister, Ministry of Interior and Ministry of Urban Planning and Construction) selected the site without consulting the Ministry of Environment, municipal level authorities or local NGOs.

3. Cegrane after Camp Closure

The Cegrane Refugee Camp spawned a close relationship between refugees and town residents due to proximity. Many local and government agencies became involved with camp operations. CARE International had camp management

responsibility, with a large number of agencies involved in ongoing refugee support. As the refugee management moved into rehabilitation with the closure of the camp, the number of key agencies reduced significantly, the main ones being:

International Donors:
- US Bureau of Population, Migration and Refugees (BPRM) – US State Department
- Austrian Government
- United Nations High Commissioner for Refugees (UNHCR)

Implementation:
- CARE International
- CARE Australia
- CARE USA

FYR Macedonia Government:
- Ministry of Urban Planning (later became part of an expanded Ministry of Environment and Physical Planning)
- Ministry of Environment

Local Stakeholders:
- Village Councils of Forino and Cegrane
- Municipal Council and Mayor's Office
- Albanian political parties
- Local residents
- League of Albanian Women
- Permaculture and Peace-building Centre (PPC)
- Association for Democratic Initiatives (ADI)
- Permaculture Development Centre (PDC)

The village of Forino/Cegrane (actually two separate villages that have grown into each other) is a traditional Albanian village, despite its large size, where family and extended family networks continue to be significant in culture and human relationships. All residents are Islamic. It is characterised by a large number of males who leave seeking work in Europe for extended periods. Remittances from such activity had a significant impact on the local economy. Women were expected to fill traditional family roles, although many younger women seek higher education. Most families practice some agriculture, following fairly traditional patterns where animal manure and bedding is returned to the fields. This activity was normally an adjunct to other sources of income and livelihood.

Significant local rivalry existed between the residents of the two villages, although this was secondary to wider political affiliations and family connections. As a minority within Macedonia, the Albanian population of the village were generally suspicious of central government agencies and motives. They were supportive of the agencies that had provided material assistance to the refugees.

4. Problem Analysis

The Cegrane site was extensively modified in order to provide for the needs of a tented refugee camp. With the departure of refugees, there were immediate environmental problems to be addressed:

1. Gravel: Gravel roads had been established throughout the site, and the lower half of the site terraced to provide level camp sites. An estimated 12,000 tons of gravel was used on the site for road base and as a base for tent sites.
2. Vegetation removal: Vegetation had been removed from most of the site, leaving the area vulnerable to erosion
3. Water flow: Water from one of the valleys flowed through the centre of the site during peak rainfall. The engineered solution concentrated water down a central drainage channel dug perpendicular to the contour and directed through the camp – and into the local school.
4. Landscape modification: Terracing of slopes for tent sites, construction of roads off contour, and significant earthmoving for latrines, showers, water points, pipelines and other structures in the camp had significantly degraded the landscape.
5. Soil degradation: Soil on the site had generally become degraded through removal of vegetation, years of unsustainable agricultural practice and erosion processes due to the slope.

On a broader local level, there were both environmental, social, and livelihood issues. Some of the major issues were:
- lack of local waste management system. *Ad hoc* dumping by residents around the town and in local rivers and streams;
- use of unlined septic systems, adjacent to drinking wells;
- lack of sustainable local economic development strategies and minimal opportunity for young people – leading to labour out-migration; and
- generally low level of environmental awareness, as evidenced by the burning of waste with significant plastics content outside local schools and shops.

5. Project Identification

The project was identified during the rapid return of refugees to Kosovo. It was obvious that there was no clear plan for rehabilitation from either the local community, or agencies involved in the emergency. UNHCR supported the early initiative through organisational meetings with government ministries, donors and other NGOs to discuss the broad issues associated with rehabilitation.

It was determined that, in order to address the physical camp rehabilitation, a permaculture design system would be implemented (see below for a definition of permaculture). This would address the rehabilitation of the site through a process that included participatory learning and permaculture education. Such information would give people a range of skills and strategies to tackle other pressing problems in the region. The site would develop into a permaculture education centre serving the immediate area, the country and the wider Balkan region. It would also promote new business ventures based upon available local resources and identified needs.

Once the broad scope of the rehabilitation was identified, it was presented to the mayor and presidents of the village council for feedback and comment. The general position of Cegrane village authorities was that any strategy that was supported with funding, leading to successful completion would be welcomed. They were not confident that the land could be returned to any productive use, especially related to agriculture.

Presentation of the project was completed following a visit by Geoff Lawton, a highly experienced permaculture designer and teacher. The visit allowed for the completion of a technically appropriate design and implementation strategy. Due to the slope and water flow issues, earthworks played a key role in the design in order to manage this resource. Presentation of the final design to potential donors generated strong initial support.

The project was divided into five phases. The first three phases were designed to complete key physical site works related to rehabilitation – earthworks, establishment of vegetation systems, construction of key buildings and infrastructure, and development of local knowledge and management systems. The final two phases were designed to cement sustainability through development of appropriate small business income streams.

6. Why Permaculture?

Developed in Australia in the 1970s by Bill Mollison and David Holmgren – permaculture (derived from the words "permanent" and "agriculture" or "culture") has subsequently been applied across a full range of climates and scales. Documented projects around the world provide valuable knowledge and experience from large scale farms to small urban balconies. Much that has been promoted under the permaculture auspices is a rediscovery of traditional approaches to working within climatic constraints and cultural variables. At the core of permaculture is the understanding that a sustainable system is one that, over the course of its life, provides all the resources required for its establishment and maintenance.

Permaculture is an integrated design science that emphasizes a holistic view, and the integrity of natural systems. It aims to provide people with an overview of design considerations, a framework, within which to consider local needs and problems. This information is normally disseminated through courses that provide an overview upon which to build based on existing skills, interest and need. Along with specific information on the function of natural systems, more specific strategies and techniques are included - along with consideration of specific needs in relation to particular climate zones (temperate, dry lands, sub-tropics and tropics).

7. The Rehabilitation Plan

The plan divided the site into four zones, related to the amount of human use expected in each zone:

- Zone 1 was located at the base of the site and contained the buildings and structures, as well as intensive gardens;
- Zone 2 was located around and above Zone 1. It contained the fruit orchards and other broad scale fruit systems;
- Zone 3 extended up to halfway up the hill. It contained forage tree, nut and timber crops, interspersed with areas of native pasture vegetation; and
- Zone 4 extended to the top of the site. It was focused on bands of high value timber species, along with forage species for bees.

8. Remediation Process

The zonal system was integrated into a series of roads and swales (ditches running on contours) that provided for essential water management. Roads were left where they ran perpendicular to the slope, while those running across slopes were repositioned to run on the contours. Roads were re-dressed with excess gravel taken from the site. Other areas of gravel were scraped and stockpiled in the old camp warehousing area. This process, along with the development of the swales accommodated the excess gravel of the site without the cost of removal to areas off site.

Some 7.5km of swales were developed on the site, positioned with an 8m vertical fall between swales. They were consequently positioned closer together higher on the site where slope was steepest. Swales act to stop water flowing across the landscape, and to hold it so that it can infiltrate. They are not designed to run water off the site – often the traditional method of dealing with water. Swales instead restore the water-holding capacity of the site, enabling and accelerating revegetation while stopping erosion and flooding.

The swale system was established using bulldozers and a backhoe. The system was designed to withstand a "100 year" rainfall event. Based on local information, the system was designed so that, if filled, it could hold 30 mega-litres of water. Inter-swale segments were ripped using a bulldozer with ripping tines to decompact and open the soil to water penetration. As a result of the swale construction, all flooding of the village below the site stopped immediately. The system held surface flow and permitted re-absorption.

The major earthworks were completed within two months – during October and November of 1999. The earthworks were followed with the sowing of a range of seeds and grasses, and the planting of 13,000 trees. Trees were dressed with compost and deep mulch during planting. A mix of species were planted according to local advice from the forestry department – not all of which proved to be reliable. The average survival rate of trees through the first winter was 80 per cent, but all the pines on the upper slopes of the site died.

An important element of the revegetation strategy was the mixing of legume and other species. Legumes are typically found as fast growing species that act as pioneers in

disturbed areas. They provide significant soil enhancement through nitrogen fixation and often die out of the system once other species are established. A carefully timed revegetation strategy using legumes can mimic natural successional patterns – speeding the rehabilitation process.

The process of earthmoving to re-establish roads and create swales allowed for re-configuration of the landscape into a more natural pattern. The key to this process is following contour lines in the landscape. Thus, within the first few months of the project, the core environmental issues of the site had been addressed. The spring of 2000 saw a good vegetative cover established on a stable land pattern.

This landscape stabilisation and revegetation was a clear success. A major liability, flooding and erosion, was resolved in an efficient and timely manner. This led to enhancement of the local environment and resolution of the recurrent flooding of the town centre due to inappropriate land management. Other aspects of the project objectives were more complex, tied as they were to local community processes and agendas.

9. Broader Issues

Effective education is one of the key tenets of permaculture. A permaculture design course (PDC) normally requires 72 hours of teaching to cover key material. Students become co-owners of the word "permaculture" and have the right both to use it to describe their skills, and to teach it if they feel comfortable with the material. This education model is designed to self-propagate and disseminates the knowledge contained and developed in a local area or bioregion.

Courses were held within the first months of the project, initially in English for those with the strongest translation skills. Subsequent courses were held by foreign teachers and translated into Albanian. Local teachers took over full teaching responsibilities early in 2000. Through such courses, several hundred students graduated in the first six months of the project. Interest was partly due to the feeling that jobs were dependent upon the completion of a PDC course.

Part of the reason for providing courses was to stimulate local interest in overcoming identified problems associated with waste management, sewage systems, etc. It was envisaged that the development of appropriate local solutions to such issues would be the focus of research associated with a newly created Permaculture Research Centre.

10. Project Management

Once funding was confirmed, the process of staff selection became quite politicised. All local authorities attempted to leverage their relatives, friends and associates into positions of influence in the project. Luckily, the presence of staff from the emergency time allowed a measure of balance and for capable people to be retained, regardless of background. It was necessary to strike a measure of geographical balance between staff selected from different regions within the immediate villages (Cegrane and Forino), Korito and the nearby larger town of Gostivar. Trusted staff with proven capacities from the refugee phase of the camp were retained and put into positions of management within the new project management structure.

Inclusion of women on staff, including implementing ground staff, was promoted as a key project principle. The percentage of women on the project increased continually over the life of the project. Women work teams were initially mixed with men, until women complained that the men spent a significant amount of time watching them work, rather than fully participating. Women-only work teams proved highly effective, motivated and skilled, and developed a number of original techniques in relation to straw bale construction.

Early development of a project management committee was an important priority of the project. It was determined that this committee would be broadly representative of the whole community, and that they would take over eventual management of the project. This was envisioned as a gradual process, with acceleration of significant handover in the second year (phase 4 and 5) of the project. Initial selection included the mayor and leaders of both Cegrane and Forino village councils. ADI and Ecco Ambiente were also selected as local NGOs based in the nearby town of Gostivar. Subsequently, the local chapter of the Albanian Women's Union was also invited to join the management committee. Additionally, a representative of project staff was included as a non-voting member, along with the CARE project manager.

The project management committee was slow to take any strong initiatives in the project, despite guidance and encouragement from the project manager. When it came time, during phase three, to implement the official committee charter, the real interests quickly became apparent. Several members who had displayed minimal involvement in the project suddenly looked to take significant positions of leadership and authority – with the apparent interest in access to project assets. At the same time, project staff who had been developing into competent managers and participating in an increasingly participative management process felt as though their interests were likely to be marginalised by the project committee process. This process was subsequently abandoned as unworkable and potentially divisive within the community.

11. Early Project Closure

At the end of phase two of the project, CARE International finished their official presence in FYROM, and the project moved under the management responsibility of the CARE International Kosovo office. CARE Kosovo clearly had other priorities and a large programme. Despite promising developments with UNHCR funding, CARE determined to discontinue involvement with the project at the end of phase three.

The decision by CARE that the third phase would be the final one necessitated a rapid handover to the local community at the halfway point of the planned two-year project. Awareness within the local community of imminent CARE departure led to scramble for resources, and disruption of the process of developing a strong, politically-supported local NGO. Local elections at this critical juncture saw new village councils, and a new mayor – with corresponding changes in local patterns of patronage.

Staff members close to the new mayor took the initiative to register a new NGO at this time, and wrested official local political support away from an inclusive, broadly representational management model. Instead, members of staff who had developed an NGO structure to assume control of the project were ostracised and a new NGO based on political lines was identified as the vehicle for future development of the project. This was unacceptable to CARE and the donor, leading to a withdrawal of support for some ongoing funding options at the site, and disbursement of project assets between the two local NGOs. This clearly weakened the potential for future sustainability and led to the resignation of key competent staff. Members of this group have subsequently continued permaculture activities under the banner of the Permaculture and Peace-building Centre (PPC) in Gostivar.

A visit to the site five months following CARE International's departure confirmed looting of the site. Local and regional ethnic instability in the early part of 2001 was used as an excuse by local former staff members to raid the site, with compliance from now unpaid 'security' staff. The damage to the site was extensive in relation to built structures. However, the two key buildings – a two-storey straw bale library building and similar, but smaller, office building on the site – were not affected by this, in apparent recognition of their value to the community. There was no clear plan by the community to use the site, and no subsequent confirmation of a change in the project status.

12. Observations and Key Lessons Learned

What specific lessons can be drawn from this experience? Consider different levels of response, e.g. community, institutional, policy and legal frameworks. Also consider broader social, economic and political implications.

a. Long-term projects that bridge emergency, through rehabilitation to development, require strong agency support. They are complex to fund due to the issues associated with accessing different pots of donor money. Assuring a smooth flow of funds through different phases is not simple. A failure to fulfil the planned project term will almost certainly result in poorer project outcome.

   In the case of refugee camps, clear responsibility for camp management agencies to complete an appropriate rehabilitation should be part of the contract from the outset.

b. Projects aiming to enhance local environmental management or awareness require strong bonding with established agencies or institutions in the environmental field. This secures acceptance within government structures. Otherwise they are easily dismissed, regardless of accomplishments .

c. Local anthropology, especially in regards to political affiliations and processes needs to be well understood. Securing the support of current (and potential future) decision makers can help to avoid a new group defeating existing initiatives in the immediate wake of their ascension to power. This is normally the period when favours are being dispensed, and vulnerable assets being raided. The most complex part of any project is the establishment of appropriate local structures for project guidance and ideally, project management.

d. Appropriate camp site selection and design can make the task of establishment immensely easier. Life cycle assessment of camp sites from initial establishment design should consider eventual end use. Use of permaculture design strategies and appropriate environmental engineering can significantly cut total costs associated with the camp life cycle. In the case of Cegrane, much initial engineering had to be reversed in the rehabilitation phase. This represented considerable cost. If appropriate earthworks for water management had been incorporated into the initial design and roads placed on contour – the camp would have functioned more comfortably for the clients and service providers, and lifecycle costs for the site would have been significantly decreased.

e. Refugee camps, if considered as integrated systems, typically require significant inputs, and generate large quantities of waste. Closing loops on waste streams would allow value to be captured from these resources. Currently, sewage and garbage management is only as good as the infrastructure of host countries allows. If refugees are in isolated areas, there may be little existing infrastructure. Infrastructure based on popular western-engineered systems fails to capture the value of the resource.

   It appears that significant opportunities exist to design and operate appropriate scale, biological systems to deal with garbage and sewage. Certainly, all organic, natural fibre and human waste can be managed using a combination of composting and vermiculture. This process allows for the transformation of these items into rich, pathogen-free compost. This provides an ideal resource for local agriculture and can replace expensive and damaging inorganic fertilizers.

   Such an approach may help camps become better neighbours to surrounding communities. Appropriate technology could be transferred to local areas where appropriate. At a minimum, it would enable refugees to engage in production, even on marginal lands. This could contribute to cost reductions, increased self-reliance and perhaps assist refugees gain tools for enhanced food security upon their return home.

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Concepts and Potential Benefits of Permaculture at Household Level in Refugee Situations

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Executive Summary

This paper describes the potential benefits of permcaulture design systems at the household level. The experiences summarised have been extracted from experiences by the Southern Alliance For Indigenous Resources (SAFIRE) with permaculture in refugee and refugee-hosting communities in Zimbabwe since 1998.

The first section explains why permaculture is suitable for refugee settlements. Common problems that refugee environmental practitioners encounter in the course of their work are outlined and possible solutions proposed. The author then shows how permaculture addresses such problems in a holistic manner by trying to turn problems into solutions and by using common sense. The section ends with a definition of permaculture as a design system for creating sustainable human environments. Emphasis is put on creating working, supportive and enduring relationships between elements (or resources). A distinction is made between permaculture and organic agriculture.

The second section describes the permaculture implementation process that SAFIRE believes is key to the success of a project. The emphasis is on beneficiaries' full participation in design, implementation and monitoring.

In the third section a number of actual permaculture practices are described that have been successful in refugee and refugee-hosting settlements. Details are given on recycling and use of water (including rain water and household waste water), better use of household waste, use of plant oils such as *Jatropha curcas* for lighting, kitchen garden designs, and vegetable, herb and tree production. A number of methods for natural pest management are also explained, with a few examples given on problems encountered in the design process.

Kew Words:

✓ *Permaculture*
✓ *Camp design*
✓ *Zimbabwe*

1. What is Permaculture?

1.1 Introduction

This paper is an endeavour to share SAFIRE's experiences in Zimbabwe on the potential benefits of permaculture at the household level. The experiences are based on permaculture projects that SAFIRE has implemented in refugee and refugee-hosting communities since 1998.

Before delving into the actual benefits of permaculture at the household level, it is useful to outline the concepts or principles of permaculture. The best way to do this is by taking people through something they are already familiar with. In this way it is emphasized that in permaculture we are not talking about a completely new idea. In UNHCR language, permaculture is not an 'add-on' activity or an 'environmental issue.' In fact, it's what we as UNHCR partners ought to do in accordance with the laid-down UNHCR environmental guidelines. In permaculture, there are issues of integrated approaches, local participation, cost-effectiveness and, of course, prevention before cure. Permaculture adds value to environmental assets and practices, and can ensure more sustainable exploitation and use of locally available natural resources.

1.2 Why Permaculture in Refugee Situations?

People working with refugees often find during the design process of a refugee camp that there is :

- zero shade in the camp (no trees);
- acute water shortage;
- excessive soil erosion and land degradation;
- shortage of seed or other necessary inputs for agriculture;
- very small pieces of land for farming or even vegetable production at the household level;
- unbalanced diet; and
- death or serious burning due to excessive use of chemicals (fertilizers, pesticides, etc.).

Permaculture offers solutions to these problems.

Coming closer to what permaculture can actually do, we need to ask the following key questions:

- how best can practitioners have shade and trees for windbreaks and of course fuelwood in refugee centres? Which tree species and where in the landscape would one plant them?
- are there any possibilities for water harvesting, water recycling and use of 'grey water' in refugee centres? How can refugee camps be designed so that there is minimal to zero soil erosion?
- what can be done to save seed or use available local resources in refugee farming activities?
- how can we maximise yields on tiny pieces of land that we allocate to refugee families?
- with very small pieces of land available, how can refugee families grow a variety of crops/vegetables, with minimum to zero application of fertilizers and pesticides? Have refugees been affected by chemicals – soil infertility; pesticide burns etc.?

- how best can refugees benefit from their locally available resources and recycle these to get maximum benefits in a short space of time?
- how can elements/resources be linked together to support the whole ecosystem and the refugees themselves?

Permaculture tries to answer all these questions with one holistic system. In Zimbabwe, farmers say permaculture is about turning problems into solutions. Some local farmers and refugees refer to permaculture as 'common sense'. It is *design* of the systems by which we can live. The word design is emphasized here because this is what permaculture is all about; designing systems for sustainable human settlements.

1.3 Permaculture as in Permanent Agriculture

Looking at etymology, permaculture comes from the words "PERMAnent" and "agriCULTURE". In Latin, permanent means enduring or persistent; culture is any of those activities that support or distinguish human communities.

It is therefore easier to understand permaculture through a subset of words like 'agriculture'. When a teacher says the word agriculture, children (and perhaps some of us) think that is the great activity that produces food for the community – they are wrong, and we are also wrong. Today, conventional agriculture is an activity that produces food for international markets. It is perhaps the most destructive of human activities.

Food produced by agriculture is truly unsafe for us all. Bill Mollison, the founder of the Permaculture movement, reminds us of the word 'agricolagenic diseases' – diseases caused by conventional agriculture.

1.4 Permaculture Defined

Permaculture is a design system for creating sustainable human environments. On one level permaculture deals with plants, animals, buildings and infrastructure (water, energy, communications). However, permaculture is not about these elements themselves, but rather the relationships that one creates between them by the way they are placed in the landscape, in this case at the household level.

Refugees and local farmers in Zimbabwe have understood permaculture simply as a way of looking at the available resources and 'designing' better environments. Designing means joining the different resources and elements of the environment (water, soil, plants and animals) together like a puzzle so that they can work better for us and produce a food-rich environment.

1.5 What are the Principles of Permaculture?

The following are some of the principles of Permaculture:

- relative location: every element (house, pond, road, kitchen garden, poultry run, tree, etc.) is placed in relationship to another so that they assist each other;
- each element performs many functions;
- efficient planning for house and settlement (zones and sectors);
- emphasis on the use of biological resources over fossil fuel resources;
- energy recycling on site (both fuel and human energy);
- using and accelerating natural plant succession to establish favourable sites and soils;
- polyculture and diversity of beneficial species for a productive, iterative system; and
- use of edge and natural patterns for best effect (Mollison, 1993).

It is important not to confuse permaculture with organic farming. Organic farming is only one of the many permaculture techniques. Organic farming is better defined by a formula: The use of locally adapted varieties + reduction of nutrient losses + the use of locally available organic materials and green manuring + a wide rotation + fostering natural balance + mechanical and weed control = No Need for Synthetic Inputs.

2. Household Level Permaculture Design Process

Steps in implementing permaculture:
1. Land observation;
2. Goal formation;
3. Landscape (home) designs;
4. Implementation of designs; and
5. Monitoring and evaluation.

Usually, these steps are followed in sequence, although no. 5, monitoring and evaluation, could really begin after no. 1, land observation. Please refer to the *Refugee Handbook for Sustainable Land Management* (SAFIRE/UNHCR, 2001) for details of the recommended permaculture design process.

3. Potential Household Practices

3.1 Introduction

In situations where host governments and implementing agencies agree on the encampment option, some problems can be alleviated through better planning of refugee settlements. Site plans can limit settlement densities, while efficient provision of infrastructure such as water points, clinics and facilities for waste disposal can go a long way towards making life more sustainable at higher densities. Research has also shown that better settlement design can reduce or eliminate features that have a negative impact on the situation of woman. The literature suggests that it is high densities of refugees in resettlement areas, rather than the presence of large number of refugees *per se,* that leads to the most serious environmental damage.

From SAFIRE's practical experience with permaculture since 1998, it is evident that the implementation of permaculture in a refugee setting requires designs at a number of different levels. First the landscape as a whole needs to be

examined – watersheds, prevailing wind direction, soil type, slope and aspect of land, the nature of surrounding communities and environment, as well as any infrastructure already in place. Second, designs need to be targeted at the different areas within the settlement. Design should then be undertaken for individual plots and kitchen gardens. Finally, permaculture designs need to look at the home dwelling and other infrastructural elements that need to be improved and made more sustainable and conserving of energy.

In the discussion below, household practices that have been implemented in the SAFIRE permaculture project in Zimbabwe are highlighted. Descriptions are also given of potential practices that can change both the environment and people's livelihoods.

3.2 Water (Rainwater, Roof Water and Household Waste Water)

At the household level, water can be harvested or recycled, as successfully demonstrated by projects in Zimbabwe. Rainwater for household consumption can be harvested from roofs using gutters which feed into pipes, emptying into simple tanks (either communal or at each homestead) fitted with a tap.

Household waste water (from cooking, washing dishes and clothes) can be piped directly to fruit trees and into the vegetable-growing areas of 'Zone I' in the permaculture design. In areas where water is in short supply, people mostly use buckets to shower. Water from showers can be collected in the following two ways:

(a) The shower area can be constructed from a few wooden slats that overlay a shallow pit filled with pebbles, small stones or crushed brick particles. All sorts of organic materials such as paper, twigs, banana leaves and inorganic materials such as ash, lime and dolomite can be added above the stones. The pit can be surrounded by a live fence made of bamboo and sugar cane with banana and pawpaw trees with a ground layer of sweet potatoes in raised beds to soak up the water. Alternatively, a surrounding fence can be constructed from grass, sticks or wire mesh on which creepers and various vines such as granadilla are grown. The compost can be dug out at regular intervals and replaced by new materials that need to decompose.

(b) Where showers have been built as brick cubicles, water from the outlet pipe can drain into a patch of banana and pawpaw trees. Again, raised beds of sweet potatoes can cover the surface so that the exposed water where mosquitoes and flies can breed, is reduced. However, sweet potatoes do not tolerate water-logging and should be grown in raised beds. It may be useful to add a neem tree *(Azadirachta indica)* and *Pyrethrum* daisies to the assemblage to reduce flies and mosquito populations. Creepers can be grown along the side of the cubicle and onto the roof. A useful creeper for this is granadilla which loves water, keeps the building cool and produces a large crop of edible fruits.

3.3 Waste Products from the Home

Fruits and human waste: High population densities and close living conditions of refugees do not allow disposal of human and animal waste products in the reed bed tanks which are normally used in permaculture situations. Instead, Blair latrines may be used. These are designed to trap ball flies and dispose of unpleasant fumes through a special outlet pipe. The pits may be used at a later stage to grow heavy-feeding fruit trees such as mangoes. Mango, avocado and other fruit trees can also be grown next to a Blair pit latrine so that the roots may benefit from the sewage.

Kitchen waste: All other home waste products such as food scraps, maize cobs, banana peel and groundnut husks may be thrown into the poultry area for recycling.

Plastic materials: All plastic bags can be collected. Smaller bags can be used for seedlings and larger, stronger bags can be used to grow vegetables and herbs. Paper can be used as a mulch or can be thrown into a compost heap together with tins.

Glass and plastic containers: All glass bottles should be used as containers or collected in a central collecting bin. Larger glass bottles with narrow necks such as wine, beer or oil bottles and one- or two-litre plastic bottles may be used upside-down and filled with water to drip irrigate individual plants, or may be spaced evenly throughout the vegetable garden during dry periods. The bottles can be refilled every third or fourth day when they dry up. This is a useful watering method during the dry season and a good way to recycle glassware and plastic bottles. Short sections of rubber hose may also be inserted near the trunk tree, and the surrounding area mulched with stones.

Animal waste: Animal waste is very useful in gardens. Instead of burning, it can be used to feed plants.

3.4 Cooking Food and Heating Water

Open fires are wasteful of energy. Fuelwood may take a long time to collect, the bundles are heavy to carry, and their use causes degradation or destruction of woodland and forest areas. Paraffin has not been a very suitable replacement for firewood due to inadequate technology (i.e. poor quality stoves), refugees' lack of experience, high costs and its high exchange value. Many designs for energy-efficient wood-burning stoves are available, some of which incorporate household trash.

However, in permaculture, all organic materials are best returned to the system, and solar cookers are preferred. The simplest type is a glass-fronted, insulated box lined with reflective aluminium foil. This needs to be moved by hand to track the sun.

An insulated hot box (also known as a 'fireless cooker') may be used for items which need long, slow cooking such as beans (which is a staple food in many refugees camps). Once the pot has boiled on a fire or other intensive heat

source, it is immediately transferred to an insulated box where it continues to cook at a slow rate. The box may be insulated with cushions filled with polystyrene balls (or foam, or cotton waste) or may simply be filled with hay, foam, sawdust, cotton waste, or solid polystyrene into which have been cut the shape of the pot. An insulated lid or polystyrene (foam) cushion closes the box.

Water may be heated using a solar collector on the roof of the home or the communal cubicle shower area. A simple way to provide warmed water for bathing is to attach a tube of thick black plastic of 10-15cm in diameter to one end of the gutter and to collect the water warmed by the sun into a large bucket or tank. Only a few local Zimbabwean farmers have so tried to use solar energy for cooking and heating.

3.5 Lighting

Solar lighting: Where refugees are connected to the electricity grid, electricity will be available, at least for lighting purposes. However, in most of the rural areas of Zimbabwe, this is not available or breaks down frequently. At this stage, solar photovoltaic cells are still very expensive but would be preferable since energy is produced in a sustainable manner.

Plant oils: *Jatropha curcas* is a plant with many uses. It can be grown as live fencing for kitchen gardens and for fences and hedges around the homestead. Oil from the seeds can be used for soap-making, as lighting fuel, in candle manufacturing and for medical purposes. In Zimbabwe refugees and local farmers are using Jatropha oil for lighting, as a hedge and in soap making. Likewise, oil from *Moringa oleifera* seeds can be used for soap and candles. It is also a high quality edible oil.

3.6 Storing Food

An airy, screened cupboard with a number of suspended shelves can be used to store fruits, vegetables, eggs, dried foods and other items that do not need cold refrigeration. Screens can be made from wire mesh, nylon mesh or mosquito nets. For drying fruits and vegetables, communal solar food driers would be suitable.

3.7 Controlling Flies

Fly traps can easily be made from a plastic container or bottle. The top edge or spout is cut off and inverted. A bait made of old food , mixed with a little water, is put at the base. The trap is suspended outside the kitchen door from a branch or hung from the roof with wire or string. As flies enter to eat the bait, they cannot fly out. The decomposing flies create a smell which attracts more flies. Soon the kitchen area becomes free of flies.

3.8 Home Garden Design – Permaculture Zones I And II

This area is closest to the house, starting just outside the kitchen door, and contains the kitchen garden, small, important perennial fruit trees, seedlings and nursery beds, and small, quiet animals such as rabbits, pigeons and bantam chickens. It is visited on a daily basis and it intensively planted and controlled. Home garden designs have been a key priority for refugee permaculture project participants.

In refugee set-ups, due to the lack of space and other amenities, the area and functions of zones I and II are combined. All the elements should be considered in relation to each other, so that the products of one element provide for the needs of another.

The size and shape of the combined zones I and II depend mainly on site, acreage, access, schedules and time available. The structures associated with zones I and II are the composting area, the shower, the clothes washing area, clothes lines, trellises, the water tank and may include a pigeon loft as well as small pens for chickens, rabbits and guinea pigs.

When planning for this area, we need to look at:

- Climate and aspect: From which direction does the wind blow? Which are the sunny spots and shaded areas?
- Structures/elements: Can they be placed so that they fulfil two or three functions? Can they be simultaneously used as water collectors, trellis supports, windbreaks and food production areas?
- Slope: Gentle slopes are ideals for planting because they have a range of drainage conditions (dry at the top of the slope and increasingly moist towards the bottom), soil types and micro climates.
- Access: How should access paths and entries to mulch heaps, vegetable beds and chicken areas be arranged? Can several activities be completed in one walk?
- Water resources: What are the water resources for the garden (gutters, tanks, hoses, grey water from the house), and how is water to be distributed? Where should the water harvesting systems be placed?
- Animals: What small, useful animals (bantam chickens, rabbits, guinea pigs, doves) should be in this area, and what support systems (food, shelter, water) need to be provided for them?
- Plants: How can plants (e.g. layers of groundcover, shrubs, creepers, trees) be stacked to make optimal use of the resources – light, space and nutrients? Which plants should be intercropped to achieve a multi-functional system (e.g. nitrogen fixation, pest and disease control and companion plants which stimulate each other's growth)?

3.8.1 Kitchen Garden Layout

The most important activity is to fill up the area with plants and to totally cover the area with mulch. Kitchen gardening

has been a lovejoy for refugees and local farmers. They have always chosen plants which are particularly nutritious and which can be picked at least twice a week. More than 80 per cent of the permaculture project participants in Zimbabwe have established a kitchen garden with different designs to cater for soil and water conservation.

The other important thing is that the soil should be fully mulched, aerated and rich in humus. It is important to lay out the garden based on the frequency of visits and the size of crop, and to allow for a range of plants to control insects. Paths should be sinuous and garden beds might be mounds, keyholes, raised, spirals, pit beds, double dug or trench beds. Start with an area of about four square metres and branch out as resources permit. The first attempt should be very close to the house, preferably starting from an area next to a path which is weed-free.

In the first year, fairly frequent watering is necessary as the mulch needs to decompose and the newly planted seedlings need water. In permaculture, there is no need to rotate plants or to rest the soil. For example, potatoes are simply placed on top of the old mulch and re-mulched with comfrey leaves. As there is no need to leave room to hoe or dig, plants may be stacked much more closely and preferably in mixed beds rather than in rows. By frequent and random replanting, the garden will start to assume the healthy appearance of natural mixed vegetation. The diversity of plants acts as host for a range of predator insects, frogs and birds and is a major factor in successful pest control. The important thing to remember is that the smaller the available space, the greater the care that must be taken to minimise wastage of space and to intensify food production by using spiral, keyhole, trellis and pit beds and stacked or clumped plantings.

3.8.1.1 Tropical Polyculture

Complex polycultures with a diversity of garden species work best on a small scale and with close attention from people. When planting fruit and shade trees in the garden, it is important to know their characteristics such as the height of mature trees, fruiting habits (plant a tree that fruits on the outside branch next to one that fruits on the inside to minimise competition for light) drought-resistance and shape. Generally, small trees with open foliage are more suitable for planting near the vegetable garden.

Tropical and sub-tropical gardens need a variety of perennials, annuals, vine crops, barrier hedges, fruit trees (like paw-paw) and nitrogen-fixing thin foliaged trees which provide a canopy above the garden to give shade from the sun. Tropical soil are thin and leached due to heavy rain so it is essential to interplant leguminous green crops within the garden as a cut and mulch system. Mulch can be cut all year from a variety of non-legume hedge, understorey and groundcovers. Important species are tobacco, wild ginger, lemongrass, bamboo (leaves), indigenous legumes (*Vigna* spp), vetiver grass, and crop waste from maize. Sesbania and soft-surfaced legumes and comfrey provide constant mulch. All garden waste should be returned to the beds, and beds are replanted as they are harvested. A top mulch of paper, waste materials, straw, bark, dry manure or woodchips should be added annually. Garden beds should be mounded to shed water, particularly in the wet season when they may become waterlogged causing plants to rot.

Because of the prolific growth in the tropics, weeds are often a problem. A band of barrier plants that prevent weed re-invasion can be grown around the mulched gardens. A combination of the following usually works:

- a deep-rooted broadleaf (comfrey);
- a dense perennial clump grass (lemongrass, vetiver grass);
- a carpeting plant (sweet potato); and
- a bulb (*Canna edulis* or onions).

Bordering a garden, woody legumes such as Moringa (horseradish or drumstick tree), *Sesbania, Leucaena, Calliandra* and sunhemp provide mulch for the garden needs and fodder for domestic livestock. Behind that, a taller border of cassava, banana, pawpaw, pigeon pea, and leucaena forms a hedge of windbreak. To discourage animals and bandits, thorny or inedible hedges such as that from *Jatropha* can be planted around the garden. Plants that make good live fences are: cassava cactus, hibiscus, bamboo and a double row of spiny pineapples.

3.8.1.2 Types of Kitchen Garden Beds Suitable for Refugee Settings In Tropical Areas

(i) Spiral beds: These give variable aspect drainage with sunny, dry sites for oil-rich herbs such as thyme, sage and rosemary, and moist or shaded sites for green foliage herbs such as mint, parsley, chives and coriander.

(ii) Keyhole beds: Keyhole beds are so called due to their resemblance in shape to a keyhole. A short central path gives access to the little garden around the end point, which may consist of a compost pit with heavy feeders such as pumpkins, squashes or watermelons growing in it. Different vegetables and herbs are intercropped with the taller species on the south side so as not to shade out the shorter vegetables. Tomato plants need a narrow bed so that they are reached and picked easily when the tomatoes ripen. As they need to be protected from wind, they can be planted in a keyhole bed.

(iii) Barrier hedges: Hedge crops can be planted and grown around the garden to break it up into manageable sections. Hedge plant are often used as wind, weed and animal barriers, and if care is used in selecting species they can also be used as mulch sources, animal forages, nitrogen fixers and edible crops. In refugee settings, hedges are very important to give a sense of privacy and protection from animals and bandits.

(iv) Vine and trellis crops: Using a trellis to support both annual and perennial plants is the single most important space-saving, multiple use device for zone I. A trellis is placed against walls of the house, shower or toilet, or can be built as a free-standing structure. There are many edible perennial vine plants which are

useful scramblers (flowers, fruit and leafy vegetation) providing shade and mulch materials; for example passion fruits, which can be grown on the trellis. Annual vines include cucumber, melon, and the squash family, as well as the climbing legumes (beans, peas). Tomatoes (especially the cherry types) need to be treated as a vine, and can be staked or twined around mesh and string.

(v) Seedlings beds and nurseries: The nursery should be placed where it will get plenty of water and attention with easy access paths. Seedlings can also be raised in pots or in protected areas in the keyhole bed. Earth from the seedling beds is always taken away when the seedlings are planted out and should be replaced from time to time. Worm-farms may be created in old oil drum halves with a mixture of manure, waste materials and soil. After a few weeks, fine dark compost full of earthworms develops, which is ideal for seedlings.

(vi) Container gardens to make use of small space: Container gardens can be constructed in difficult climates (particularly arid regions) and in places where the ground is unsuitable for growing (e.g. rubble, hardpan, sand and clay) as they grow entirely in soil that has been collected from the area and are composted on-site.

Containers (with holes poked in them) to grow vegetables and seedlings can be made of almost anything - plastic bags, wastepaper bin, old baskets or half-filled sacks. Deeper containers are needed for root vegetables such as potatoes. They can be grown in a small area using half an oil drum or old tyres stacked on top of each other. On hard ground or rubble, tyre beds, earth and compost boxes or half oil drums can be used. The main advantages of these beds are:

- water savings: containers can be watered more efficiently than a long row of vegetables; and
- nutrients concentrations: Containers can be a dumping ground for all kitchen scraps, vegetable trimmings, manure and other added organics, forming a rich area of compost and humus.

Recently a slatted box garden (agricubes or maxicubes) has been designed where units can be stacked on top of each other. Vegetables, fruit and herbs can be grown on the sides as well as on the top in moist, compost-rich soil.

(vii) Ridges: Ridges of 5.5x1m increase yields in cassava, sweet potato and yam crops. Mulch and green manure (especially leucaena) can be grown in between the ridges. Pineapple and ginger also prefer ridges in wet areas. Ridges permit deep mulching for low crops such as pineapples with mulch being applied between the ridges.

(viii) Basins: Even shallow basins aid dryland cassava and bananas. Basins allow the soil to be more easily saturated, and deep mulch keeps it from drying out.

(ix) Banana/paw paw circle: A wet mulched circle surrounded by bananas, pawpaw and sweet potato is a useful area to compost scraps, to accommodate excess runoff, or to contain an outdoor shower.

(x) An example of the steps in developing a tropical kitchen garden is given below. It is important in refugee settings to offer a design that can initially provide simple and rapid results, so that the implementers will be encouraged in their efforts:

- Kitchen door bed: A citrus tree such as lime or lemon is grown by the kitchen door. It can be underplanted with small herbs such as chives and parsley. Choose a citrus variety that will crop two or three times per year.

- Herbs and medical herb spiral: Culinary herbs which can be used regularly for health or cooking can be planted in a spiral just to the side of the kitchen door. The spiral has many aspects and niches ranging from very hot on the western side, to dry at the top. The spiral also allows plants to be stacked vertically. Herbs which can be grown in a kitchen herb spiral include all the cultivars of marjoram, oregano, rosemary, sage, basil, savory, thyme and tarragon.

- Depending on the space available, a number of keyhole beds can be outside the kitchen area. A small area can be set aside for the nursery which can be sheltered as well.

- Herbs and plants whose leaves are regularly clipped can be placed on the outside edge of the keyhole bed, while plants that are tall can be grown on the inside edge.

- A number of narrow beds or ridged beds can be placed beyond the keyhole beds to grow crops like cassava, sweet potato and potatoes, intercropped with leucaena and sunhemp. These beds can also have leafy vegetables such as cabbage, spinach, lettuce and onions.

- An area for grains and legumes can be planted in broad beds on the outer edge of the narrow ridges and the whole area can be protected by leguminous trees and trellised vines on the outside edges.

- Where space is very limited, the above can be condensed into a simple kitchen garden, based on a keyhole shape.

3.8.1.4 Common Problems in Tropical Gardens

(i) Wind/shade/sun protection: During the dry seasons, the vegetable garden is likely to suffer from light saturation and excess evaporation. This has been a problem in Zimbabwe. The former reduces photosynthesis hence leaf bulk, and the latter causes

wilt and slowed growth. To protect the vegetables, a special environment around the garden needs to be created. The fine branches of *Faidherbia albida* cast light shade over crops in hot desert-like areas. A trellis system, integral to the house, can support a vine crop to cast shaded light on the vegetables growing below it. Gardens must be carefully sited out of direct windblast. Wooden fences or tyres stacked three to six high, thick-vined trellis structures and hedges all serve to deflect dry winds. Leguminous trees such as *Acacia* spp, mesquite and *Albisia* can be grown on the southern edge of the garden as a windbreak.

(ii) Water: Water is the most serious limiting factor in dryland gardens, but with careful design enough can be made available. Conservation and re-use of water and grey water is essential for garden crops, with washing water directed straight into the garden. Watering in the evenings, overnight or at dawn is preferable to watering by day, due to sun evaporation.

(iii) Soil Protection: Mulch is the key strategy for moisture retention and humus build-up. Possible mulching materials are cardboard, newspapers, leaves, well rotted manure, old cotton or wool clothes, sheets of plastic, woodchips and old carpets or felting. Mulch sources in arid lands may seem few at times, but in fact there is a great deal of material which can either be grown in the garden (comfrey, legumes), collected after harvest or gathered from the wild. Many indigenous trees yield abundant leaf material. Near gullies, deep deposits of leaves and twigs are left by floods. Leaf litter can be gathered after rains from the water flow areas, especially if stones and rocks are set in erosion gullies to trap debris. Stones are often found in drylands and act as a useful mulch, especially around trees.

(iv) Natural pest and disease control for zones I and II: Pest problems are numerous in tropical gardens, especially insect and rodent pests. In Tongogara refugee settlement in Zimbabwe, cotton pests were a major headache for refugees in the previous agriculture season.

However in gardens, some project participants (especially in Nyanga) planted a mixed, multi-storey system, to minimise pest control problems: frogs, spiders, small insectivorous birds, geckoes and bats help to control pests, as do ducks and bantams which eat waste or fallen fruits.

All project participants now use repellent plants to repel pests:

- herbs and weeds with aromatic oils, e.g. rosemary and lavender to either repel or trap insects;
- trap crops to trap pests e.g. milkweed attracts aphids;
- predator attractors e.g. elder flower, fennel (the small white/yellow flowers attract predatory wasps); and
- sprays made from pesticidal plants.

If eel-worms (nematodes) are a problem, then plant sunhemp and marigolds throughout the garden beds, one or two every few metres. Sunhemp root exudates trap nematodes, while marigold root exudates suppress weeds and soil fungi, nematodes and grasses. In guild gardens, a number of mutually useful plants are intercropped to prevent pest build-up.

Permaculture designs may include several heights of vegetation from trees to shrubs to creepers to small plants, arranged so that each creates the environment required by the others. Plants which require or tolerate shade, like sweet potatoes or dusky berries, are grown under the trees and shrubs, while those that need sunlight occupy the open spaces. Care should be taken not to have many similar plants growing next to each other and to ensure sufficient numbers of multi-purpose plants for soil improvement and protection against insects. Strong-smelling plants such as tomato, onion, garlic, marigold and so on are planted among or around other plants such as cabbage, rape and lettuce to protect them from insect attack. Other plants attractive to pests are deliberately grown to trap the pests. The correct approach is to create conditions conducive to increasing existing predator numbers to levels which mean they can carry out their task of keeping crop-eating insects in check. The basis of plant protection is to take care of the soil. A healthy soil is less likely to harbour pests and diseases at harmful levels and produces healthier crops better able to resist attack.

Aphids can be controlled successfully by increasing plant diversity on the land. Garlic, chives, marigold, nasturtiums, parsley, onions and many herbs grown as companion plants are said to repel certain species of aphids, particularly greenfly. Nasturtiums grown as companion plants are recommended for repelling woolly aphids or used as a spray to kill them. Pigeon pea is said to repel green and grey aphids. Milkweed, sow thistle and black nightshade are good trap or decoy plants to attract pests away from the main crop. Neem and various indigenous vines protect vegetables. The key to controlling aphids is to get rid of the ants that carry them to the plants. The presence of large numbers of aphids on a plant is an indication that the plant is not healthy. Check the soil for phosphorous deficiency.

The following are additional pest control measures for use in individual gardens (zones I and II) by both local farmers and refugees in Zimbabwe:

- movable chicken cage in the kitchen garden so that bantams can eat pests;
- black plastics bags around vegetable garden (0.5m high): keep the garden warm and keep snails out;
- scale insect: spray shiny, leathery leaves with oil;
- cutworm: place a collar cut from a tin with a smear of grease on the top edge around the seedlings. Cutworms and snails will not able to get in;
- leaf-eating beetles: place lime or crushed ash around the base of the plant;
- crush leaves of *Tephrosia vogelia* in water for 24 hours. Sprayed on leaves it will kill aphids and leaf beetles;

poured around the base of the plant it will kill termites in the soil;
- a paraffin light close to a bowl of water will attract rose beetles which drown in the water;
- leaf caterpillars die when sprayed with agricultural lime;
- an emulsion of ailing caterpillars can be sprayed on leaves. The viral disease will spread and control other caterpillars (especially good for army worm attacks);
- in zones III and IV, mix fruit trees with wild bush so that birds do not concentrate so much on the fruit trees (allow for bush corridors);
- indigenous *Vigna* spp: use the root for insect control (pound root and leave for 24 hours);
- maize: to kill off stalk borer, pour a handful of soil into the maize funnel every week or pour *Tephrosia* extract down the funnel of a maize plant;
- black jack: *Bidens pilosa* is an effective protection against termites, especially use the water that seed has been soaked in;
- khaki weed: *Tagetes minuta* repels small black ants; and
- protect seeds using agricultural lime.

3.9 Water Polyculture

A simple design to create a pond is based on tyres (preferable larger ones) and is useful because the pond can be sited where water is being harvested from swales on sloping land or it can be placed near the home for more aesthetic reasons. Tyre ponds will change the humidity and the light around the immediate area; they will help moderate temperatures and will attract beneficial insect predators. A small array of water-loving plants will grow well around them.

Dig a hole in the ground about 1m deep (the hole should be narrower than the tyre) and remove all sharp surface stones. Line the area with thick black plastic sheeting which is large enough to reach the top edge of the hole. Clamp the plastic sheet down with large stones. Place a tyre, of which the top edge has been cut off, around the edge to hold the plastic in place. At the base of the pond, place some sand and compost and plant water plants. Other water-loving plants can be planted in old tins or clay pots.

A number of herbs may be planted along the outside edge. The edge of the pond does not have to be limited to the edge of the tyre - a variable edge can be created if the tyre is planted a little deeper or if the edge of the pond is extended away from the tyres. An undulating edge, compared to a completely circular one, creates more micro-climates for various plants and animals.

A demonstration on water polyculture was started in the camp in 2001. One refugee from Rwanda successfully established a tyre pond as a demonstration in the refugee settlement. Others followed later on. However, children have been a hindrance in the success of this initiative as they also want to play with tyres. In the other project area in Nyanga district, Mrs Sedze has been instrumental in promoting tyre ponds and garden in homes and schools.

3.10 Animals in the Permaculture System at Household Level

In considering permaculture as a complete ecosystem, animals are essential to control vegetation and pests and to complete the basic nutrient cycle of a farm. Despite their inefficiency in protein conversion, their diverse products and multiple functions make them invaluable. In permaculture systems, a range of animal feeds (fruits, foliage, pods, nuts, seeds and tubers) are planted so that animals can self-forage, taking most of what they need from the vegetation, and at the same time manuring and controlling the vegetation and pests, and converting plants to protein.

Rabbits, pigeons, chickens and quail are generally closed in (zones I or II), while goats and other birds can range from zones II to IV.

3.10.1 Rabbits

Four refugees and two local farmers who are participating in the project keep rabbits. Rabbits supply both manure for the garden and meat for the table. Leather can be of importance if cheap ways of treating it are available. They are grazers and browsers and will eat grass, soft vegetation, twigs and selected households scraps. They burrow into the ground and will cause damage to soil and vegetation if not properly enclosed. They yield fur (angora rabbits produce a valuable hair which is combed out periodically for sale or home use), meat and manure. Rabbits can be penned above worm boxes so that their droppings are turned into rich compost. Rabbit pens can lead to runs planted with forage crops such as lucerne (alfalfa), tagasate and clover. Rabbits can also be placed in the garden to eat grass in a moveable cage between rows or they can be housed in a simple structure above chickens.

3.10.2 Pigeons and Doves

Some local farmers keep pigeons and doves. They are valued for their phosphate-rich manure which is useful in kitchen gardens. They can be caged above ground and their manure swept out from underneath, or dovecotes can be built from bricks, sticks, maize cobs and clay and the manure can be periodically collected. Pigeons eat seeds and grains which can be grown and harvested from the garden (corn, sorghum, millet, sunflower seeds, peas, wheat). They also provide eggs and meat.

3.10.3 Quail

They provide eggs and meat and need little attention. As they are insect-eaters, they do not harm vegetables and may be placed in movable cages to great advantage.

3.10.4 Chickens

Almost 60 per cent of the refugees in Tongogara have at least one traditional chicken. Besides supplying their direct products of eggs, meat, feathers and manure, chickens also

eat insects, greens and fallen fruit. They scratch an area clean if confined in a small space, and can be used to patrol a fenced boundary area (e.g. between garden and orchard) to keep weed species from invading the garden. Although poultry do not need care and maintenance, the permaculture system is designed so that chickens can move around to feed and take care of themselves. Chickens ranging in the garden under controlled conditions can tractor an area and leave it completely manured. Portable cages enclosed by chicken wire, can be designed to fit garden beds or garden areas with chickens allowed in after a harvest and before re-planting. Bantam chickens are small and eat mainly insects, cutworms and slugs, leaving grown vegetation alone.

The following foods are best suited for chickens:

- seed food: *Tagasate*, sunflower, *Amaranthus*, *Acacia* spp., black locust and honey locust, pea tree and salt bushes;
- greens: chickens will eat any young greens, including garden greens, comfrey, lucerne, buckwheat , clover, pea shrub, young grass, parsley and other herbs.
- minerals: grit, ground eggshells, bone meal, garlic, wormwood, chopped nettles. In addition, chickens need protein in the form of insect foods.
- others: households scraps (except citrus peels, coffee and tea grounds and onion skins).

3.10.5 Goats

Besides their value in milk and meat production, goats are useful for clearing new country. If milking goats are used, concentrated feed is also necessary for good milk production. For a small number of goats a pen can be developed with mesh fence of 2 x 2m surrounded by trees and shrubs. To increase the surface area for browsing, enclose two rows of tagasate into the pen itself. Goats are very destructive to cultivated plants. Apart from browsing, they debark trees. Tethering and the use of an orchard halter will allow goats into the more delicate parts of the systems for short periods, but goat husbandry in large numbers is incompatible with permaculture. Other trees that can withstand limited grazing by goats are weeping willows, mulberries, tree medic, *Acacia* spp., Leucaena and elderberry. Goats enjoy corns and pods, honey locust, pea tree and *Prosopis* spp. Local farmers in Nyanga have had a goat-keeping project since 1999. Eight goats were initially purchased by the project. The progeny were then further allocated to other individual farmers. Only two families have goats in the refugee settlement in Chipinge district.

3.10.6 Bees

These are very useful in the garden and orchard as pollinators. They produce honey, pollen and beeswax and their needs are water and a constant source of nectar (flowers), which can be available from the surrounding woodland and bush. However, flowering and yields of nectar varies greatly from year to year, depending upon weather conditions, so at times bees are fed sugar water or the hives are moved some miles away to another nectar source. In the close living conditions of refugees, bees may not be suitable for zones I and II and are kept as a communal project in zone IV. In Tongogara refugee settlement, 10 families engage in bee keeping. Theft has, however, been a major problem.

Planned with full participation of all project beneficiaries, permaculture has proved to be key for both food security and environmental management in refugee settlements.

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The UNCHS (Habitat) Experience in Rebuilding a Sound Living Environment for Returnees and Internally Displaced Populations

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Executive Summary

UNCHS (Habitat) is the UN agency mandated to co-ordinate activities in the field of human settlements. While UNHCR has clear responsibility for refugee welfare, it is less clear who should cater for the shelter (and other) needs of internally displaced persons (IDPs) and refugees returning to their home countries. The paper provides a summary of IDP and returnee movements, and examples are given from Afghanistan, Rwanda and Kosovo of UNCHS's experience in working in rehabilitation, reconstruction and property rights programmes.

Kew Words:

✓ *UNCHS (Habitat)*
✓ *Returnees*
✓ *IDPs*
✓ *Reconstruction*

1. About UNCHS

1.1 Mission Statement

The mission of UNCHS (Habitat) is to promote socially and environmentally sustainable human settlements, development and the achievement of adequate shelter for all.

UNCHS was established in October 1978 as the lead agency within the United Nations system for co-ordinating activities in the field of human settlements. It is the focal point for the implementation of the Habitat Agenda – the global plan of action adopted by the international community at the Habitat II Conference in Istanbul, Turkey, in June 1996. Its activities contribute to the overall objective of the United Nations system to reduce poverty and promote sustainable development within the context and the challenges of a rapidly urbanising world.

1.2 Statistics

- Approximately 39 million people worldwide have been uprooted from their homes by war.
- Seven million people were displaced in 1999 alone. Of the displaced, 14 million are refugees – people who have fled across national borders seeking safety.
- 25 million are internally displaced persons – people who have fled fighting within their own countries. The United Nations High Commissioner for Refugees (UNHCR) is mandated to take responsibility for refugees. There is no specific agency charged with the welfare of IDPs.
- Nearly every country in the world hosts refugees, including many of the poorest nations. The growth in the internally displaced population reflects not only the number of civil wars raging around the world, but also the increasing unwillingness of countries to accept refugees.

Table 1. Major Voluntary Repatriation Movements in 2000 (by destination, 10 largest movements)

To *(country / territory)*	From *(main countries of asylum)*	Total
Afghanistan	Iran / Pakistan	292,500
Yugoslavia	Switzerland / FYR Macedonia / Bosnia-Herzegovina	124,700
Eritrea	Sudan	68,000
East Timor	Indonesia	48,500
Somalia	Ethiopia	45,900
Liberia	Côte d'Ivoire / Guinea	42,400
Sierra Leone	Guinea / Liberia	40,900
Rwanda	D.R. Congo	26,300
Croatia	Yugoslavia / Bosnia-Herzegovina	20,700
Bosnia-Herzegovina	Yugoslavia / Croatia	18,700

1.3 Sustainable Urban Development

UNCHS's approaches to Infrastructure for poverty reduction are to:

- build local capacities for effective and efficient provision, management and maintenance of urban infrastructure; and
- improve access to basic urban infrastructure (roads, drainage systems, street lighting etc.) for overall poverty reduction and socio-economic growth.

UNCHS's approaches to environmental planning and management are to:

- promote better environmental information;
- support better environmental decision-making;
- contribute to better implementation strategies;

- enhance managerial capacities; and
- advocate more effective use of resources.

UNCHS's approaches to urban governance and institution-building are to:

- improve local policy / decision-making through broad-based participatory processes;
- promote effective and efficient urban management in both large and small agglomerations;
- build local urban institutional capacity to improve settlements management; and
- establish transparent and accountable processes in local urban institutions.

UNCHS's approaches to disaster management are to:

- re-instate governance in post-disaster areas of recovery;
- promote peace through reconstruction and rehabilitation process; and
- improve urban management.

2. Lessons Learned in Afghanistan

UNCHS, in collaboration with UNDP, has been involved in rehabilitation and reconstruction programmes in Afghanistan since 1986. In 1995, the UN organisations reviewed their activities in the country and agreed that there were a number of shortcomings in their approach. The process of learning from these shortcomings led to the development of an alternative strategy which focused on community-based approaches and hands-on-experience.

Following is a summary of the main lessons learned:

- internally displaced people are worse off than refugees;
- many returnees have no home to go to;
- those who have stuck it out bear the brunt of war;
- returnees often weigh risks and opportunities;
- refugees often resettle in cities;
- aid agencies are not always welcome;
- housing projects are not the solution;
- "communities" are not homogenous.

3. Rwanda

3.1 Urgent Rehabilitation and Reconstruction of Kigali and Other Urban Centres (Umbrella Project)

At the end of hostilities in Rwanda, UNCHS and UNEP undertook a joint programme identification mission to Rwanda in September 1994. That mission prepared the present umbrella project.

- In addition, other proposals for improvement of public buildings resulted in the following sub-projects executed under the umbrella project emergency rehabilitation of public buildings in Kigali and other urban centres;
- urgent urban resettlement programme;
- rehabilitation of Amahoro Stadium, Kigali;
- rehabilitation and equipping of communal buildings.

3.2 Inter-Regional Consultation on Women's Land/Property Rights Under Situations of Conflict and Reconstruction

The inter-regional consultation was held in Kigali from 16-19 February 1998. It was jointly organised by the United Nations Development Fund for Women (UNIFEM), the UNCHS, UNHCR and the United Nations Development Programme (UNDP).

The main points of debate were:access to land; security of tenure; and property rights for women under situations of conflict and reconstruction.

4. Kosovo

4.1 The Housing and Property Directorate and Claims Commission

Given the political sensitivities surrounding housing and property rights, and the current barriers inhibiting the courts from dealing efficiently and fairly with such disputes, the Housing and Property Directorate and Claims Commission, staffed and managed by UNCHS, were established as an interim measure to restore property rights.
Both institutions have broadly defined functions in the following three areas:

- temporary allocation of abandoned properties;
- policy and legal advice; and
- resolving property disputes.

4.2 The Kosovo Cadastre Support Programme

The objectives of this programme were to:

- re-establishing efficient mechanisms of governance by re-introducing a land and property management system;
- develop a well-functioning land and property market which will contribute to economic growth, and democratic and sustainable development; and
- rendering proper land and property services to the beneficiaries.

4

Domestic Energy and Household Practices

Fuel-efficient Stoves, Firewood from a Sustainable Source, Tree Planting and Raised Environmental Awareness – Sound Environmental Practice? The Example of Laffa Refugee Camp, Kassala State, Eastern Sudan

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Executive Summary

When large numbers of people move, often as a result of conflict or natural disaster, either within their country's borders as displaced people or across borders as refugees into an area such as Eastern Sudan, an additional burden is placed on the surrounding environment in terms of availability of firewood to meet their daily cooking needs.

In addressing the impact of newly-arrived Eritrean refugees in May 2000 on their immediate environment, a programme of construction of 120 fuel-efficient communal (multi-family) cooking stoves in Laffa camp was carried out. This focused on training for stove builders, trainers and women's groups. The women's training was based on women-to-women transfer of technology, cooking techniques and environmental awareness through women group leaders within the refugee population.

The use of the communal stoves led to a 40-50 per cent reduction in fuel consumption and reduction in cooking time. Each stove is used by at least 10 households, cooking in sequence throughout the morning for which wood was provided from a sustainable source. Thus over 1,200 families benefit in all. The stoves were constructed throughout the camp and housed in separate shelters to ensure their continued use during the rainy season.

The refugees built each shelter from locally-available materials, while the stoves were constructed with a mixture of labour from the refugees and builders from Kassala town. The shelters were sited and constructed with the full co-operation and support of the Commission for Refugees (COR). Some 1,200 mud stoves for gurassa (soup/sauce) were constructed by refugee women and 1,200 *Azza* stoves (tea/coffee preparation) distributed. All women in the 120 groups received continuous training in their use, in the use of firewood generally, and on the broader principles of environmental conservation.

All wood used in the project had been sourced from local traders who carry licences from the Forestry National Corporation (FNC), which includes a fee for management and replanting of a tree, or from mesquite trees growing on agricultural land, at the invitation of the landowners and with the approval of the Forestry National Corporation. A project woodlot of 10 feddans of land was allocated by the Ministry of Agriculture as a plot for tree planting. Each woman planted three trees and 3,000 were planted in total in co-operation with the FNC and water pipelines were extended to secure a constant water flow to the planted area.

Kew Words:

✓ *Communal stoves*
✓ *Shared cooking*
✓ *Mud-stoves*
✓ *Sudan*

1. Background

Kassala state in Eastern Sudan borders Eritrea and has acted as a haven for refugees for over 30 years. Further conflict in May 2000 saw additional influx to the established refugee camps of Laffa, Gulsa and Shagarab.

Kassala state, like much of the Sahelian zone, has experienced extensive loss of trees and woodlands over the past 30 years. The presence of large numbers of refugees due to conflict in the area, all of which rely on locally sourced firewood and charcoal for cooking, created an additional burden on the surrounding environment with the bulk of fuel needs within the camps being met by foraging for firewood on the surrounding land and denuding the land further.

2. Problem Analysis/Identification

Most households light three separate fires daily – almost all of which are traditional three stone arrangements – to meet their cooking needs. In the conditions that prevail in Laffa camp, with little shelter from winds, these fires represented

an inefficient use of the energy content of the firewood. Making *Kisra* (local bread) normally continues for a period of 20 minutes per family, but fires to make soup and tea are allowed to burn significantly longer. Any intervention aiming to make a more significant inroad into the rate of consumption of firewood in the camp had to address the use of these three fires, as well as training women in more efficient ways of cooking.

3. Addressing the Issues/Problem

The rate of consumption of firewood in the camp was addressed by introducing and promoting energy-efficient stoves and that of the destruction of the trees/shrubs was addressed by sourcing of fuel from a sustainable or unwanted source and by planting tree saplings.

The project activities involved local authorities at all stages in the form of co-operation, co-ordination and training, called upon local residents' expertise in the use of town builders for the communal stoves, involved the community through the popular committees and in particular the women in mobilising themselves into groups for training, included the women in training of trainers to enable transfer of the technology, principles of environmental conservation and awareness and improved cooking practices to the refugee community at large.

In summary, after approval from COR and the FNC, women's groups were identified through the camp manager and popular committees of the eight zones of the camp. 100 women's groups were formed within 80 blocks - each group consisted of 10-15 women, representing 1,200 families. These groups identified 100 suitable locations to build the *Kisra* stove and the shelters built to ensure women's privacy and protection against the rain using local materials (bamboo and grass mats over a metal structure).

Initial training was provided by the stove expert of the project to 10 local builders followed by mobilisation of 10-15 women into 100 groups each with a leader. Four women acted as local extension workers, being active, confident and able to speak both Arabic and Tigris. The plantation training of trainers –100 group leaders and four extension workers – was conducted by a trainer from the FNC and focused on the following topics – deforestation and forest degradation, how to substitute the trees and save the environment, the importance of trees, how to plant a tree, explaining the project's work plan of planting trees, the group's leader role in mobilising the group members in tree planting.

This was followed by the project's stove consultant providing training of trainers in mud stove construction using a practical demonstrative method and briefing the women on energy-saving methods, environmental conservation issues and practical demonstrations on the difference between improved and traditional stoves.

These leaders mobilised their groups by training them on the wider benefits of energy-saving techniques, tree planting and mud stove construction. Firewood was sourced from wood merchants with licenses of wood from a renewable/sustainable source. In addition, the Ministry of Agriculture provided land upon which 3,000 trees were planted – three by each woman. This was achieved through co-operation and co-ordination of the FNC trainer, four extension workers, group leaders and project co-ordinator. After each woman had completed the construction of the mud stove and planted the three trees they were given an Azza stove.

4. Observations and Lessons Learned

On completion of the project the stoves consultant carried out an evaluation using both quantitative and qualitative methodologies. A survey was conducted using a sample of – 8 per cent mud-stove users, 6 per cent *Azza* stove users, 25 per cent of the constructed communal stoves (*Injera*) and 2.4 per cent of the communal stove users. (See Annex for a description of each type of stove). Three questionnaires were used to assess the three types of stoves. semi-structured interviews were conducted using participatory rural appraisal techniques combined with direct observation and questions to the group leaders.

Results showed the three types of stoves proved to save an average of 60 per cent energy in comparison with the traditional Eritrean stoves. The women commented on the reduction in firewood consumption, the saved time, the absence of heat (as it is conserved inside the mud and communal stove), lack of smoke (removed by the chimney), ease of lighting the stoves and reduction in cooking time, furthermore the communal stove produces charcoal which can be used in the *Azza* tea/coffee stove or irons. The *Azza* stove was liked as it is mobile, durable and cooking is quick. 95 per cent of the women were using their stoves properly.

Constraints on implementation of the project were delay in obtaining approval from the relevant authorities to commence the project, insecurity in the region halting the running of activities. However the project's timeframe was extended to address both these constraints.

Such a set of activities/project requires follow-up in particular in monitoring the progress and maintenance of the tree saplings/woodlots – thus working in co-operation with the FNC from the outset is essential for sustainability of this activity. In addition monitoring that wood from FNC-licensed woodsellers continues to be used by the community should also fall upon the women leaders and popular committees. Refresher and follow-up training on environmental awareness is needed to maintain actions and attitudes after the project's completion and could be co-ordinated with the FNC trainer through the women leaders, popular committees and camp manager.

Annex: Information on Improved Stoves

(A) Kisra (bread) Communal Stove:

This is a wood-burning stove built from bricks and mortar, 0.45m tall. The chimney produces a draught for combustion and removes the smoke from the kitchen assisted by a baffle for blocking the flue gas and adjusting the draught. There are two inlets, the upper one through which the fuel is fed and the bottom one to draw the pre-heated air into the chamber.

The fuel inlet has a door to block the cool air intake. A circular grate is used to improve the efficiency of the stove as it allows for the conservation of energy contained in both the flame and the glowing embers. The stove is long-lasting and easy to maintain, because it is constructed from bricks. This stove is a communal one used by 10-15 women on a daily basis.

The construction process consists of the following steps:

- accurate measurement of the stove's layout on the floor;
- construction of the skeleton structure for the primary air inlet; the outer wall of the stove and the chimney foundation – all made of bricks;
- construction of the primary air room using bricks and mortar followed by installation of the grate;
- construction of the fire chamber and placement of an iron band to prevent thermal distortion of the top brick layer;
- construction of the chimney, and then the baffle is installed in its proper place;
- lighting of the stove to test the distribution of temperature and to ensure that the chimney removes the smoke effectively; and
- preparation of the fire resistant body using wood-ash, clay and salt. The fire chamber is then plastered to ensure heat retention.

(B) Mud Ceramic Stove:

This is a simple pottery cylinder, which is built with a mixture of mud and animal manure.

The construction process consists of the following steps:

- the soil and the gravel is mixed with water and the liner soaked in water for five minutes;
- placement of the metal shaping box in the identified location; the mixture is then poured onto the empty metal box and compacted with a big flat stone;
- the liner is placed on the foundation , ensuring the liner inlet faces an air circulation path;
- the mixture is pored around the liner; the stove is smoothed and shaped; and
- the stove is left for seven days to dry, then smeared with clay and animal manure mixture.

(C) AZZA Stove:

This is made of ceramic (a fired clay liner) based on a Thai-bucket made of metal casing, which is known as a simple bucket stove. This stove is a mobile one, which is easy to use and durable.

Energy Conservation through Shared Cooking: A 'Best Practice' Worth Promoting?

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Executive Summary

In refugee situations it is not uncommon for energy conservation to be promoted as a way of reducing environmental impacts. This generally includes the promotion of improved stoves and energy-saving cooking practices. However one strategy with significant potential that is often overlooked is the pooling of cooking between households. The economies of scale that can be achieved through this simple measure are considerable, and it may be an option that requires minimal promotional effort in situations where refugees have close ethnic or family ties. The process may be encouraged through clustering of refugee houses, or the distribution of larger cooking pots.

Kew Words:

✓ *Shared cooking*
✓ *Communal cooking*
✓ *Institutional cooking*

1. Introduction

Interventions to reduce energy consumption by refugees typically focus on the promotion of improved cooking stoves. These have the potential to be 20-30 per cent more efficient than open fires, if properly used.

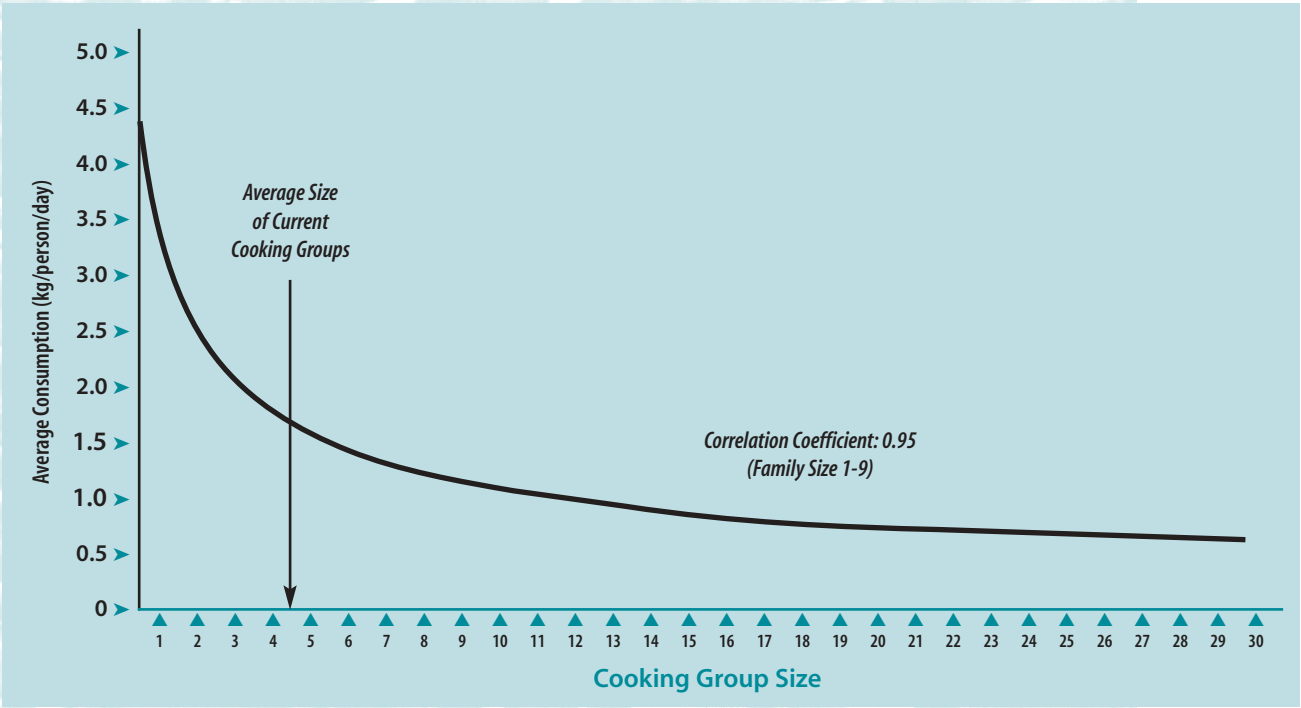
It is also known that certain cooking practices, such as the use of lids on pots or the pre-soaking of hard foods, offer low-cost and no-cost ways in which to further reduce energy consumption. Depending on the perceived need to conserve at a given location, refugees may employ any number of these measures to cut down their use of wood energy.

Changes in diet can also influence the amount of energy required for cooking. Hence the promotion of fresh food in the diet as a well-known energy-saving intervention.

There is another energy-saving measure that is often overlooked. This is the sharing of cooking between families. This paper highlights the potential impact of pooling resources for cooking and suggests ways in which this practice may be promoted more widely in refugee situations.

2. The Potential of Shared Cooking

There are significant economies of scale to be achieved in the sharing of cooking, particular for slow-cooking foods such as beans. Research carried out in the five refugee camps of Ngara District in western Tanzania in 1996 under the auspices of CARE International suggested that there was a 45 per cent reduction in per capita energy consumption between a cooking group size of two persons and a group size of four. When data for all five camps was collated across the range of family sizes, the following trend in firewood consumption emerged:



Source: Author's research published in "Energy Consumption in Refugee-Hosting Areas of Kagera Region, Tanzania" (UNHCR, 1996).

It is apparent that cooking group sizes of one, two and three persons are incredibly inefficient in comparison with sizes of six, seven and above. Six persons cooking together in the Tanzanian example were using 1.5kg of wood per person per day compared with 4kg for one person cooking alone. This represents an energy saving of over 60 per cent - an impact three times greater than that of an improved stove.

It is also apparent from the graph that the cumulative efficiency improvements tail off progressively with larger family sizes, implying that there is little to be gained in energy conservation terms from moving from medium-sized to large cooking groups in comparison with the benefits that can realised from the elimination of very small cooking groups. This is an important point. The data show that a move to over-sized cooking groups would not be especially desirable from an energy-saving point of view. The promotion of such large cooking groups, which in practical terms implies a form of institutionalised cooking, is also likely to be inappropriate from a social and developmental point of view. The notion of mass catering at centralised kitchens is not something that should be encouraged outside emergency situations or in centres such as schools and hospitals.

The main goal should therefore be to eliminate cooking by individuals, pairs and groups of three, wherever practically and socially acceptable.

3. Ways to Promote Shared Cooking

Shared cooking will not necessarily take place automatically simply because an energy shortage is being experienced. Cooking pots may be too small for the preparation of food in bulk; or distances between family dwellings may be too great. There are certain interventions that can facilitate shared cooking, and this paper suggest that they are introduced in refugee situations:

(a) Clustered Housing

If refugee dwellings are located close to each other than it becomes feasible to share the cooking of certain dishes. Yet guidelines on camp planning state that large plot sizes of at least 200m^2. should be maintained wherever possible, which would seem to contradict the idea of closely-arranged dwellings. The solution may be to arrange refugee houses in clusters with adjoining plots of land radiating outwards from the cluster. In this way it should be possible to have 8, 10 or 12 refugee dwellings in close proximity. The doors may face inwards towards each other or they may face outwards away from the central space, which effectively becomes a 'backyard'. This will depend on cultural preferences.

In camps in Burundi in 1993-1994, a cooking shelter was being constructed at the centre of each housing cluster. These served as communal areas for socialising and, importantly, for shared cooking. Adjacent households were pooling the preparation of beans in large clay pots on mud-stoves they had built themselves. This was a combination of three energy-saving measures – the shared cooking, the improved stove and the use of a heat-retaining cooking vessel.

(b) Large Pots

Clearly it will not be feasible to share cooking if the pots that are distributed to refugees are very small. Pots sizes of below about five litres are unsuitable for sharing. It is suggested that pot sizes should be at least eight litres to give refugee households the opportunity to pool certain cooking tasks if they see fit.

4. Conclusion

Shared cooking is an effective means by which to reduce energy consumption and hence protect the environment. The elimination of very small groups of people cooking together is especially effective, targeting individuals, pairs and groups of three. This may be encouraged by planning refugee camps in clustered arrangements that bring cooks into closer proximity and by the distribution of larger cooking pots that are suited to the preparation of food in bulk.

5

Forestry and Natural Resource Management

Towards Sustainable Forest Development in Ethiopia

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Executive Summary

An escalating demand for fuelwood and land for cropping and grazing in Ethiopia is causing rapid deforestation accompanied by a variety of other environmental problems. This exploitation of the country's natural resources is faster than natural replacement rates. The depletion and degradation of forests has implications for whole ecosystems and play a fundamental role in the declining standard of living faced by many households.

Sustainable resource management is the only way to conserve the remaining patches of natural forest. But sustainability is not achieved without a well-formulated environmental policy. This paper looks at the major causes of the rapid loss of forest resources in Ethiopia and outlines strategies and action programmes to combat this loss. The paper is based mainly on the studies that formed part of the Ethiopian Forestry Action Program (EFAP).

Kew Words:

✓ *Forestry*
✓ *Deforestation*
✓ *Forest management*
✓ *Sustainable development*

1. Introduction

Ethiopia is a country of sharp environmental contrasts. Its outstanding natural endowments are its rich soils, extensive water resources, genetic pool of wild plants and animals, and rich human as well as livestock populations.

Substantial efforts have been made to conserve, develop, manage and rationally utilise these resources over the past two to three decades. The efforts made have, however, contributed at best very little to bringing about positive changes towards meeting the overall objective of sustainable resource utilisation.

What continues to be highly visible and of increasing concern is the ever-accelerating rate of renewable natural resource degradation. Notable is the threatening state of land degradation (lower water infiltration and storage levels, soil erosion and soil fertility losses, emanating from over-cultivation and over-grazing), water resource degradation (by way of sedimentation and siltation, flooding, pollution), loss of biodiversity, deforestation and a rapidly expanding process of desertification.

Much of the lack of positive impact of past efforts towards sustainable resources utilisation can be explained, amongst other things, by the lack of clarity in policies, deficiencies in institutional arrangements and proper co-ordination, and the lack of appropriate technology and its dissemination.

An attempt is made, in this paper, to outline some of these constraints and issues. Possible solutions are proposed, objectives formulated, strategies designed and action programmes developed that relate to the development of Ethiopia's forest resources. The ideas expressed are largely based on, though not limited to, the EFAP findings. Any errors in presentation or misconception are, however, the sole responsibility of the author. The paper is meant to stimulate discussion and to help enrich and refine our thinking.

2. Historical Developments and Efforts Towards Forest Development

Historically, concern for Ethiopia's forest resources can be traced back to the days of King Dawit I (1382-1411) who was probably the first Ethiopian King to have assigned guards to protect the nation's forest and wildlife resources. Later, in the 15th century, Emperor Zera Yacob is known to have ordered the preservation of the forests of Wofwasha, Wochecha/Menagesha, Yerer and Jibat. He is reported as being one "who recognised the beneficial effects of forests and named some of the known forests of today such as Wochecha/Menagesha as Crown forest".

More recently, King Tewodros and King Yohanes IV in the 18th century, are known not only to have attempted to sensitise people about the value of forest and wildlife resources, but also to have given guidelines (especially King Yohanes IV) on their use and management. Likewise, Emperor Menelik II (1890-1914) is famed as having recognised the key role which forestry can play in the national economy. He accordingly made contributions towards the introduction and employment of foreign forestry experts, drew up the first independent forest policy, declared all forests as state forest reserves, and organised scientific reforestation.

His work was reinforced through the establishment of boundary description, demarcation and reservation of the crown forestlands, together with the introduction of management through selective cutting and natural regeneration for industrial use. To enhance the reforestation programme, fast-growing species such as *Eucalyptus*, *Acacia* and pine were imported. Indeed, given the versatile, adaptive nature of *Eucalyptus* and its outstanding contribution to meeting the forest products needs of a significant proportion of Ethiopian households today, the introduction of these three tree types by Emperor Menelik will remain one of the landmarks in the history of Ethiopian forestry and forest development.

According to a 1980 National Academy of Sciences publication, the expansion of *Eucalyptus* in the Addis Ababa area between 1910 and 1920 was so great, it was suggested that Addis Ababa's name be changed to "Eucalyptopolis". *Eucalyptus* remains one of the key, although controversial, species in the development of Ethiopian forestry.

After Menelik's death, the introduction of sustainable forest management was, for various reasons, delayed for many decades, in spite of various efforts. These efforts included conservation-oriented articles in the Ethiopian constitution (1943 and its revision in 1953), the creation and reorganisation of a government unit responsible for forestry and game management, as well as the publication of various proclamations, orders, decrees and regulations; the allocations of substantial forestry budgets in the three five-year plans, and the deployment of a number of distinguished foreign forestry specialists. Much of the present day knowledge of the forest resources of the nation can be attributed to the works of foreign forestry experts including von Breitenbach (regarded by many as the "Father of Modern Ethiopian Forestry"), Pichi-Sermolli, Mooney, Logan, Vernede, Huffnagel, Westphal and Chaffey, as well as their Ethiopian counterparts, particularly Wolde Michael Kelecha.

The problem of natural resource degradation, particularly of forests, in present-day Ethiopia attracted both national and intentional concern following the catastrophic drought and famine of 1973-1974. The concern led subsequently to the first legal – and still operational – policy document for the forestry sub-sector, namely the Forests and Wildlife Conservation and Development Proclamation (No. 192 of 1980). It was actually preceded by two earlier proclamations in the 1960s which dealt with the gazetting of two national parks, Awash and Semien Mountains. Other related legislation included the establishment of the Wildlife Conservation and Development Organisation and the Natural Gum Production and Marketing Enterprize.

Forest conservation and development efforts were carried out in a rather un-co-ordinated manner, a situation which continued until 1984, when some genuine initiatives were taken to formulate clear development goals and map out directions for the sub-sector. The Ten-Year Perspective plan for 1984-1985 to 1993-1994 was formulated, and the Ethiopian Highlands Reclamation Study (EHRS) commissioned, simultaneously with the development of the National Programme for the Conservation and Development of the Nation's Forest, Wildlife, Soil and Water Resources. However, most of these efforts remained on paper and did little to bring about the anticipated changes in the conservation, development, management and sustainable utilisation of the country's ever-dwindling forest resources.

Prior to the 1974 revolution, a large portion of Ethiopia's natural forests was owned by the private sector. During this period, private individuals also played a key role in exercising and maintaining the planting of *Eucalyptus* on their farm lands, homesteads and along the roads, under a system where commercial use was given priority over other management objectives. However, management of both government and private forests was not based on inventory information and management plans.

The first reconnaissance forest inventory of the Ethiopian natural forests was made during 1975-1979. The inventory covered areas within a 400km radius of Addis Ababa, and provided substantial information about the country's natural high forests, and resulted in a 1:250,000 map of these forest areas. The inventory was followed by a three-pronged development approach, by way of reforestation being adopted:

- a regular programme, financed by the government which was implemented throughout the country;
- priority project areas development, financed by SIDA, which was implemented in a few selected natural forests; and
- planting degraded highland areas, under the World Food Programme.

The generation of further information from remote sensing data, both by the Assistance to Land-Use Planning Project of the Ministry of Agriculture and the Food and Agriculture Organisation (FAO) in 1984, and the detailed findings of the Ministry of Mines and Energy through the CESEN study in 1986, enabled a desk study to be carried out by experts of the Natural Resources Conservation and Development Main Department of the Ministry of Agriculture in 1990. This study resulted in the identification of the ongoing 57 National Forest Priority Areas (NFPAs) as a management framework.

The main aim of organising the nation's remaining natural forests into NFPAs was to identify and locate all the existing natural forest areas, prioritise them and concentrate

available resources on those areas with the highest potential. It was also to further identify and assess in detail the existing forest resources within the respective NFPAs and introduce an integrated management approach to their development and conservation. The NFPA approach includes the protection, development, utilisation and marketing of forest resources, with the ultimate goal of establishing a self-financing and sustainable enterprize.

Forest management concepts and thoughts in Ethiopia are currently restricted to development and implementation within the 57 identified NFPAs, comprising approximately 2.8 million hectares. Recently a woody biomass inventory and strategic planning project has been initiated under a World Bank loan to provide a basis for inventory, management plan development and sound utilisation of Ethiopia's woody biomass.

3. Major Constraints and Issues in Sustainable Forest Resources Development

Analysis of past efforts towards the conservation and development of renewable natural resources in Ethiopia reveals the existence of many constraints and issues that need to be reckoned with. Of these, fundamental issues are deforestation, land degradation (involving soil erosion and loss of soil fertility) over-use and deterioration of grazing areas, water resources degradation and biodiversity loss. Each of these problems has its own proximate cause. Deforestation, for example, results from the destruction of forest areas for cropping as well as grazing and the need of people to meet their requirements for forest products, especially timber and fuelwood. Land and water degradation and biodiversity losses are in turn induced by deforestation and poor agricultural practices and are largely a function of mismanagement of the forest/land resource base. The fundamental causes for Ethiopia's resource conservation and development problems are, however, widespread rural poverty, poor agricultural development and the unchecked population growth of both humans and livestock.

The existence of an energy sector which is almost totally wood-biomass dependent is another constraint. Others include inadequate rural infrastructure, a low level of technology and its dissemination, low level of environmental awareness and the issues of "public good". On the other hand, inappropriate land use practices and poor silvicultural technology (including poor seed collection and nursery practices, weeding and thinning and inadequate use of fertilizers), characterise a low level of technology development.

An aggregation of the constraints/issues experienced to date, indicate that many are linked to policy and institutional problems. Included in the policy-related issues are:

- lack of and/or inadequate sectoral policies, objectives and strategies, and appropriate legislation. The need for policy and strategy initiatives in the areas of land use, water use/irrigation, forests and wildlife, soil conservation, biodiversity, environment/conservation, education and research is imperative;
- lack of renewable natural resources users' incentives and lack of security of land/tree tenure, seriously inhibits soil and water conservation as well as forestry and wildlife development and conservation efforts;
- lack of price and market liberalisation; and
- inadequate supply of inputs and access to development funds.

The absence of effective institutional and sectoral linkages, inadequate databases, poor planning, monitoring and evaluation capability, and the absence of a farmer-demand-driven, integrated and motivated extension system are some of the major institutionally-induced constraints. The low level of participation, especially by farmers and pastoralists in resource conservation and development, is also central and hence the need for its aggressive rectification, including involvement of the private sector.

In summary, the outstanding constraints and issues which need to be addressed fully to redress natural resource degradation and promote forestry development in the country include the need to:

- alleviate poverty;
- enhance the social and cultural benefits of forest resources, particularly of increasing food, fodder, fuel, medicine household supplies and employment opportunities;
- increase agricultural productivity;
- limit population growth;
- improve the existing low level of technology development and transfer, especially improved forest management to enhance the value of forest products through marketing and pricing;
- improve the policy environment, especially in the areas of incentives in renewable natural resources conservation, development and utilisation and legalised "user rights" to land and assets created on it;
- promote grass-roots peoples participation (which is bottom-up and participatory) in resource conservation and development through a mechanism of "negotiated approach" involving benefit sharing; and
- improve institutional arrangements for effective resource conservation, development and management.

4. The Strategic Implication for Sustainable Forest Development

The above analysis calls for the development of a comprehensive strategy which, based on the principles of sustainability and efficiency, incorporates not only an integrative and participatory approach but also one which emphasizes private sector development, particularly by the farming community, and promotes the use of incentives. Key elements are outlined below.

4.1 Reforming Policies and Institutions

While encouraging progress has been made at the macro and some sectoral levels over the past year or so, there is a strong need for policy and institutional reform initiatives for

renewable natural resources conservation and development. To date, while on-going initiatives are fully acknowledged, many natural resource-related policies are either absent and/or require clarification and appropriate legislation and regulations. The need for well thought-out, integrated and effective institutional arrangements for programme implementation are also, in many cases, outstanding. Major areas of concern for policy and/or institutional reform include land-use/tenure, forest/wildlife, environment, water/irrigation, soil conservation, livestock, and forest product pricing and marketing. The need to create/revitalise government units with concerned manpower development, research and extension, planning, monitoring and evaluation are some of the key institutional reforms that need to be addressed.

4.2 Enhancing the Involvement of Local Communities and the Private Sector in Development Efforts

Experience from Ethiopia and elsewhere suggest that failures in many development efforts are largely a function of poor collaboration between development initiators and the respective local communities. Very often, local communities are neither consulted when the development interventions are envisaged nor when implemented. Little regard has been paid to "benefit sharing" from the development interventions, shared management responsibilities, or defined property rights. It is, therefore, of paramount importance that future development efforts are carried out with the active and full participation of local communities, including clear mechanisms for benefit-sharing. In the interest of maximising efficiency and increasing productivity from forest resources, it is also important that involvement of the private sector is heightened in as many areas as possible, especially in areas where government performance is notably poor. Non-governmental organisations could also play a key role in forest development, provided their interventions address the priority development needs of rural communities which are recognised by the government and at the same time are aligned with government policies.

4.3 Improving Technology Development and Dissemination

Technology development and its dissemination in the area of forest development – and for that matter renewable natural resources conservation and development – needs to be rapidly developed in Ethiopia. There is a need for demand-driven, area specific applied research, building upon promising/proven indigenous knowledge. The institutionalisation of an extension network which is integrative, well-motivated, research-linked, equipped with relevant technology packages is long overdue. Indeed, changing social, economic and environmental realities necessitate a shift from traditional forest management and free-standing forestry development projects to integrated multiple-use forest management and development. Forestry interventions, somehow, need to be linked with agriculture (farm forestry), livestock and other related sectors.

5. Development Objectives

The government's overall strategic framework of an Agricultural Development-Led Industrialisation policy for improved and sustainable resources use, now and in the future, is a general objective for Ethiopia's natural resource conservation and development. Related to this, the above analysis suggests the following objectives for sustainable forest resources development:

- to increase and ensure a sustainable flow of forest products and services including fuelwood, construction material, fodder and outputs from forest-based industries through sustainable use and protection of existing natural forests/woodlands and expanding forest areas achieved by afforestation, re-forestation/rehabilitation and regeneration;
- to help enhance sustainable agricultural production and productivity through integrated and improved land husbandry practices (including reclamation and soil conservation, introducing agroforestry technologies and other improved agricultural practices), to enrich and maintain soil fertility, promoting irrigation and water harvesting;
- to promote and ensure sustained use of both flora and fauna gene pools through biodiversity protection (including medicinal plants); to increase revenue/employment (through development of ecotourism), and enhance research and training opportunities through the protection of unique and/or representative ecosystems and protected area systems;
- to elevate environmental awareness among the public at large and increase the involvement of local people and communities in forest development; and
- to improve the welfare of rural communities, especially women and children, through improved access to forest products, particularly fuelwood, clean water, air and, overall, to contribute to poverty alleviation.

6. Development Strategies

The strategies outlined below are derived from analysis of past and present constraints and the future requirements for forest resources development. They show a need to:

- create an appropriate policy and institutional environment to encourage private sector (particularly by the farming community) investments in forestry development. To encourage sustainable forest development, and sound renewable natural resources management practices, the following will need to be in place:
  - appropriate policies and incentive mechanisms;
  - improved institutional arrangements, especially secure land and tree tenure;
  - liberalised pricing and marketing;
  - targeted input subsidies; and
  - improved research and integrated extension services.
- encourage rural communities to fully and actively participate in forest development efforts. There is a strong need to re-orient, revitalise and, more important, heighten the visibility of farmer/pastoralist organisations

for the purposes of promoting farmers/pastoralists, especially women, active and full participation towards sustainable use and development of forests/woodlands. Grassroots participation of local people/communities in any forest/woodlands development efforts will need to be heightened throughout the development process, including the institutionalisation of benefit sharing mechanisms for their involvement; and
- take measures to enhance the innovation, testing, dissemination and application of appropriate technologies in forest development such that the respective forestry research and extension efforts carried out are, to the extent possible location-specific, demand-driven, integrative and gender-sensitive.

7. EFAP's Development Programmes

EFAP has developed eight development programmes: four primary and four supportive. The primary development programmes involve frontline activities which directly impact forestry development objectives and include the:
- Tree and Forest Production Programme;
- Forest Resources and Ecosystems Management Programme;
- Forest Industries Development Programme; and
- Woodfuel Energy Development Programme.

The supportive development programmes are meant to back the primary programmes and ultimately help sustain the activities of private and public and forest resource managers and include the:
- Technology Development and Dissemination Programme;
- Sectoral Integration Programme;
- Planning, Monitoring and Evaluation Programme; and
- Human Resources Development Programme.

Detailed objectives, strategies, actions and key project profiles have been developed for each of these primary and supportive development programmes. A brief outline of the Forest Resources and Ecosystem Management Programme (FREMP), which has immediate relevance to UNHCR's work on natural resources management is outlined below.

The main objectives of the FREMP are to:
- protect and develop the remaining high forests of Ethiopia;
- prevent the woodlands from further degradation and maintain their ecological balance; and
- conserve Ethiopia's biodiversity and minimise future environmental damage.

Strategy elements for the FREMP are to:
- protect and develop the existing NFPAs to obtain optimum environmental, social and economic benefits based on a sustainable management system;
- increase peoples' participation in forest resource management through a "negotiative approach" to benefit sharing;
- survey, demarcate and gazette the NFPAs, produce management plans and create suitable land use tenure arrangements;
- establish incentive mechanisms for local farmers, pastoralists and land users;
- consolidate the protected area network by establishing high-profile conservation institutions and use *ex-situ* techniques where *in-situ* techniques are inadequate to ensure the conservation of key species;
- undertake applied research; and
- promote conservation education.

Key actions proposed include:
- strengthening natural forest and conservation area management planning;
- undertaking natural forest and woodlands management practices;
- undertaking plan implementation activities;
- ensuring local community participation by involving farmers in the management plan preparation and implementation stages, as well as through a well-designed benefit-sharing mechanism; and
- promoting forest genetic resource conservation activities through a more strengthened organisational set-up.

Key policy and institutionally-induced reform issues include:
- lack of active involvement of local communities towards sustainable forest management, including the absence of legally-binding mechanisms for benefit sharing;
- absence of NFPA gazetting;
- lack of access to revenues collected from NFPAs;
- regional v central management of protected areas;
- lack of policy for prioritising research needs of NFPAs, plantation, woodlands and conservation areas;
- lack of co-ordinated effort among genetic resources conservation-oriented institutions; and
- a suggested ecosystems conservation agency.

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La Gestion des Ressources Naturelles dans les Zones D'accueil des Réfugiés: Cas de la Guinée Conakry

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1. Problématique de l'environnement en Guinée

A partir des années 1990, une importante population de réfugiés commençait à affluer en Guinée en provenance du Liberia et de la Sierra léone suite aux guerres civiles qui sévissaient dans ces pays limitrophes. L'afflux des réfugiés en Guinée forestière s'est effectué avec des effectifs très variés selon les préfectures et les années. C'est ainsi que dans certaines localités, la densité de la population qui était déjà notable a été multipliée par 6 voire par 10 telle que Kolomba à Guékecdou.

L'ampleur et la spontanéité des afflux des réfugiés qui sont essentiellement des ruraux dans ces localités, ont transformé la relative abondance des ressources naturelles en une pénurie aiguë. Les activités menées par les réfugiés qui ont les mêmes pratiques culturales que les populations autochtones ont eu de sérieux impacts sur les écosystèmes locaux.

Après une décennie de présence des réfugiés, les impacts environnementaux se sont accumulés et intensifiés.

Ces impacts des réfugiés ont porté essentiellement sur:
- les terres agricoles;
- les ressources forestières; et
- les ressources hydriques.

Les conséquences de ces impacts des réfugiés sur l'environnement sont entre autres:
- la déforestation dans les camps et les alentours immédiats;
- la pénurie du bois de chauffe et de service;
- la pollution des eaux de surface et la perturbation du réseau hydrographique;
- la perte de la biodiversité;
- la tension entre la population locale et les réfugiés; et
- la dégradation des sols cultivables.

2. Rappel des interventions du HCR

Conscient de ces différents impacts des réfugiés sur les ressources forestières, le HCR a financé un certain nombre de projets forestiers et agricoles pour prévenir, limiter la dégradation de l'environnement et réhabiliter les zones affectées. Il s'agit de:

2.1 Le volet de reforestation du PROGERFOR (1992-1996)

Dans le cadre du Projet de Gestion des Ressources Naturelles(PROGERFOR) sur financement Banque Mondiale et KFW, le HCR a financé un volet de reforestation qui couvre les 7 préfectures de la Guinée forestière.

L'objectif principal de ce volet est de compenser les superficies forestières déboisées suite à l'afflux massif des réfugiés par:
- des actions ponctuelles de reboisement ;
- des actions de protection des forêts classées ;
- un appui à la création par les collectivités rurales d'un domaine boisé permanent ; et
- un appui technique et institutionnel des Sections forestières.

C'est ainsi que dans le cadre de la protection et la réhabilitation de l'environnement, plus de 900ha toutes plantations confondues ont été réalisées (zones Est et Ouest).

2.2 Le Projet de réhabilitation HCR/DNEF (1997-2000)

Le Projet de Réhabilitation qui est mis en œuvre par la Direction Nationale des Eaux et Forêts, est une suite logique de PROGERFOR par non seulement la consolidation des acquis mais surtout par la diversification des activités.

L'objectif global de ce projet vise à mettre en œuvre des actions de réhabilitation des zones affectées par les réfugiés grâce à une approche participative et dans un souci de durabilité.

Cet objectif est atteint à partir des composantes :
- identification plus précise des zones les plus affectées par les réfugiés à partir de la cartographie ;
- renforcement des capacités techniques et institutionnelles des Sections Forestières ;
- contribution à la reconstitution des forêts classées par des reboisements ;
- réalisation des actions agro-forestières et de conservation des sols dans le domaine des communautés rurales décentralisées ; et
- mise en œuvre du volet "économie des combustibles" par la fabrication et la diffusion des foyers améliorés.

Les résultats obtenus sont entre autres :
- plus de 800ha de plantations forestières et agro-forestières ont été réalisées en Zones Est et Ouest ;
- 2000 foyers améliorés métalliques ont été fabriqués et diffusés au niveau de 700 familles réfugiés vulnérables ; et
- des artisans forgerons ont été formés et équipés pour la fabrication des foyers améliorés et 8 unités de production sont fonctionnelles.

2.3 La Stratégie environnementale pour les zones d'accueil des réfugiés en Guinée

En juin 1999, une Stratégie environnementale a été élaborée conformément à la politique du HCR en la matière. L'objectif essentiel de cette stratégie vise à intégrer les principes et les préoccupations environnementales dans toutes les opérations d'assistance du HCR afin non seulement de limiter ou de prévenir les impacts mais aussi de réhabiliter les zones dégradées.

La Stratégie constitue non seulement un outil de planification et de mise en œuvre des activités environnementales mais surtout un cadre idéal pour mieux harmoniser les approches et les interventions des différents partenaires.

2.4 Projet HCR/CIRAD Procédures de diagnostic environnemental dans les régions d'accueil des populations refugiees.

Le projet vise essentiel à :

- minimiser globalement les impacts négatifs des réfugiés sur l'environnement en proposant des méthodes de diagnostic et de suivi de ces impacts ; et
- mettre en place "un système" d'aide à la décision à l'attention du HCR et de ses partenaires.

Le projet est réalisé en partenariat avec le HCR, le Centre de Coopération Internationale en Recherche Agronomique pour le Développement (CIRAD) et l'Institut de Recherche pour le Développement (IRD). Il est soutenu par le Fonds Français pour l'Environnement Mondial (FFEM). Il a démarré en septembre 2000 et durera 3 ans.

3. Le Programme de relocalisation des réfugiés

3.1 Contexte de la relocalisation

Suite aux attaques répétées des rebelles le long de la frontière guinéenne avec le Libéria et la Sierra Léone, entraînant le déplacement massif des réfugiés et sur la demande des autorités, le HCR a entrepris un programme de transfert.

Ce programme de relocalisation porte sur un transfert d'environs 70.000 réfugiés libériens et léonais vivant dans les régions maritimes et forestières et notamment dans les camps se trouvant dans les préfectures de Forécariah, de Macenta, de Guékecdou (60.000) et de Yomou (10.000). C'est ainsi que tous les réfugiés résidant dans ces camps identifiés comme étant des endroits à haut risque doivent être progressivement transférés vers des zones plus sécurisantes à l'intérieur du pays.

3.2 Méthodologie utilisée

Dans le cadre d'une approche participative et compte tenu de la délicatesse du problème de relocalisation des réfugiés que les populations locales assimilent à des rebelles ; les travaux d'identification et de choix des sites ont été menés en étroite collaboration avec les autorités politiques et administratives de chaque localité.

La méthodologie utilisée comprend trois phases :

- Une phase de bureau au cours de laquelle le HCR rencontre les autorités préfectorales pour leur expliquer les objectifs et la portée des activités afin d'obtenir leur accord préalable. Ayant l'aval des autorités politiques, le HCR démarre les travaux proprement dits avec la DPDRE (Direction Préfectorale du Développement Rural et de l'Environnement) à travers ses différents chefs de Section. Le HCR procède à des séances de formations au cours desquelles le maximum d'informations est donné aux agents des Services techniques pour mener à bien la mission d'identification des sites. Ces informations portent sur l'utilisation du GPS, l'estimation des superficies en fonction du nombre de réfugiés, les critères de sélection des sites et la mise à profit des documents cartographiques.
- Une phase de terrain durant laquelle le HCR et les agents techniques de la Préfecture procèdent à plusieurs missions exploratoires pour identifier les sites et analyser leurs points forts et leurs inconvénients en fonction des critères biens définis.
- A la troisième phase, le HCR en plus des services techniques de l'Etat, associe tous ses partenaires opérationnels à des missions conjointes pluridisciplinaires au cours desquelles les gens se déterminent en fonction des leurs expertises et de leurs préoccupations afin de choisir d'une manière consensuelle les choix définitifs des sites.

3.3 Critères de sélection des sites

Les critères les plus importants utilisés pour les choix des sites sont pour prévenir ou limiter la dégradation de l'environnement sont :

- la disponibilité du potentiel hydrique c'est à dire l'existence des eaux de surfaces en quantité et en qualité suffisantes;
- la superficie du site : une superficie minimale de 45m^2 par personne soit 90ha pour 20.000 réfugiés;
- une distance raisonnable par rapport aux frontières internationales et des zones sensibles telles que les cibles militaires (minimum 50km);
- des conditions de sols, de topographie et de drainage favorables;
- une distance raisonnable vis à vis des écosystèmes sensibles (forêts classées, zones protégées etc...);
- présence des zones suffisamment boisées pour faire face aux besoins des réfugiés en bois de chauffe et de service; et
- existence d'un potentiel des zones agricoles.

3.4 Résultats obtenus

Il est bon de signaler que le souci du HCR de répondre à l'ensemble de ces critères afin de mieux protéger l'environnement n'a pas rendu les travaux d'identification et de choix des sites faciles.

C'est ainsi qu'à l'issue de plusieurs missions conjointes, Gouvernement, HCR et partenaires opérationnels impliqués dans l'installation des camps des réfugiés, il a été retenu 6 sites définitifs dont 3 à Albadariah dans la préfecture de Kissidougou, 1 à Dabola et 1 à Nzérékoré.

Pour ce qui est de Nzérérékoré, les processus d'identification des sites continuent.

De nos jours, le plan de relocalisation a permis de transférer 63 800 réfugiés dans les nouveaux sites et repartis comme suit :

Kountaya:	**26 741**
Boreah:	**13 662**
Télikoro:	**11 752**
Sembakounya:	**7 645**
Kola:	**4 000**

4. Programme de gestion des ressources naturelles dans les zones d'accueil des réfugiés

4.1 Objectif du programme

Dans le cadre de la relocalisation, le HCR conscient des impacts des réfugiés, a mis en œuvre un programme de gestion des ressources naturelles pour non seulement limiter ou prévenir la dégradation de l'environnement dans les nouveaux sites mais aussi réhabiliter les zones affectées par la présence des réfugiés.

L'essentiel de ce programme s'articule autour des activités suivantes:

- le marquage des arbres dans les camps et les alentours immédiats ;
- la production des plants en pépinière et la reforestation ;
- la production et la diffusion des foyers améliorés ;
- l'éducation environnementale et sensibilisation ; et
- la régénération naturelle

4.2 Approche ou stratégie de mise en œuvre

La stratégie de mise en œuvre des activités environnementales est bâtie autour d'un certain nombre de principes à savoir :

1. Le HCR en tant qu'organisation humanitaire spécifiquement chargée de l'assistance et de la protection des réfugiés, n'entend pas se substituer aux organismes spécialisés en environnement ou développement durable.

2. Compte tenu du caractère "temporaire" des réfugiés et donc des opérations d'assistance, le HCR joue le rôle de facilitateur ou catalyseur et non d'exécutant.

3. Les tentatives de remise/reprize des infrastructures et des réalisations du HCR aux autorités à Nzérékoré en octobre 1999 ont permis de constater le manque d'implication des services techniques de l'Etat et les populations locales dans la mise en œuvre des activités. Pour corriger de telles insuffisances, les services techniques doivent être impliqués dans la conception, la planification et l'exécution des activités afin de mieux gérer les acquis après le retrait du HCR et ses partenaires opérationnels.

4. Dans le cadre d'une approche participative, les structures représentatives des réfugiés et de la population d'accueil doivent être responsabilisées en amont et en aval dans la mise en œuvre des activités environnementales pour la gestion durable des acquis.

Conformément à ces principes ci-dessus énumérés, le HCR a signé des sous-accords avec certains partenaires opérationnels pour la mise en œuvre des activités. Ces partenaires à leur tour ont sous-traité avec les ONG locales.

A **Dabola** les activités environnementales sont réalisées par :

- CECI (Centre d'Etudes Canadien pour la Coopération Internationale) qui a signé une convention de sous-traitance avec une ONG locale dénommée IBGRN(Initiative de Base pour la Gestion des Ressources Naturelles) pour le marquage des arbres, le reboisement et la sensibilisation.

- Concern Universal qui sous-traite avec RRR (Rapid Rural Relief) qui effectue les travaux de reboisement, de production et de diffusion des foyers améliorés.

A **Kissidougou**, nous avons :

- CECI qui collabore avec les ONG locales telles que GUIPE (Guinée Protection de l'Environnement), UGVRNA (Union pour la Gestion et la Valorisation des Ressources Naturelles), APARF (Association pour la Protection, l'Amélioration des ressources Naturelles et leur Enrichissement).
- BMZ (Ministère du Développement Allemand) qui exécute les travaux de marquage des arbres et de reboisements grâce aux contrats de sous-traitance qu'il a signé avec UGVRNA, APARFE, GUIPE et AVDR (Association des Volontaires pour le Développement Rural)
- ACF (Action Contre la Faim) pour le reboisement.

A **Nzérékoré**, les activités environnementales sont mises en œuvre par ACT (Action by Church Together) qui a signé un contrat d'exécution avec la DNEF (Direction Nationale Eaux et Forêts).

4.3 Les activités réalisées: Acquis, leçons à tirer et perspectives

4.3.1 Le marquage des arbres

Conformément à un des principes directeurs du HCR en matière d'environnement à savoir "Prévenir plutôt que guérir", de vastes opérations de marquage des arbres ont été entreprizes dans les camps et leurs alentours immédiats.

L'objectif essentiel de ces marquages vise à sauver certains arbres à intérêts économiques, écologiques et culturels de la coupe anarchique consécutive à l'afflux massif des réfugiés en quête de bois de chauffe et de service.

Les activités de marquage d'arbres ont consisté essentiellement à :

- l'évaluation et l'identification des zones et des espèces d'arbres à marquer à la peinture dans les camps et les environs immédiats ;
- la définition des critères du choix des espèces à marquer et le diamètre minimal de marquage en fonction des zones agro-écologiques ;
- l'élaboration des fiches de marquage pour inventorier les espèces ; et
- la formation des groupes de marquage constitués essentiellement des villageois, des réfugiés, des agents des services techniques et les représentants des ONG chargés de l'exécution des travaux.

Les résultats obtenus dans les régions et en fonction des camps sont entre autres :

Préfecture Nom du camp Quantité ou Partenaire Superficie

Dabola Sembakounya	100 ha	CECI
Kissidougou Boréah	100 ha	CECI
Kountaya	200 ha	CECI
Télikoro	300 ha	Corps Suisse
Nzérékoré Kola	90 ha	IRC et DNEF
Total	790 ha	

Contraintes, leçons et perspectives

Ces résultats montrent à suffisance que des efforts importants ont été déployés au niveau des zones d'accueil des réfugiés pour limiter la coupe abusive des arbres et protéger l'environnement.

Malgré l'importance des résultats physiques obtenus, certaines insuffisances ou contraintes liées à l'approche ou la méthodologie utilisée pour la mise en œuvre des activités méritent d'être signalées. Il s'agit entre autres de :

- la prolifération dans les camps et aux alentours immédiats des fours traditionnels de carbonisation alimentés par la coupe des arbres déjà marqués ; et
- le manque d'implication formelle ou de responsabilisation des Comités des réfugiés pour lesquels le marquage des arbres est simplement une opération technique et exogène.

Leçons et perspectives

Pour mener à bien les opérations de marquage et obtenir des résultats durables, il est souhaitable :

- d'améliorer qualitativement la composition et la structuration de l'équipe de marquage en responsabilisant davantage les réfugiés ou leurs structures représentatives en l'occurrence les Comités. En effet, le marquage des arbres ne doit pas être perçu seulement un comme un problème technique mais une approche permettant d'induire un changement de comportement au niveau de la population cible afin de protéger l'environnement ; et
- de sensibiliser davantage les réfugiés sur la nécessité de conserver les arbres et leur devoir moral de protéger les ressources naturelles pour lesquelles leur vie et celle de la population d'accueil sont tributaires.

4.3.2 Le reboisement

La reforestation des zones d'accueil des réfugiés vise essentiellement à :

- prévenir ou limiter la dégradation des sols et de la végétation (reboisement des écosystèmes sensibles) ;
- renforcer le potentiel ligneux en améliorant la capacité de charge de la zone dans le cadre de l'approvisionnement en bois de chauffe et de service ; et
- faciliter les efforts de réhabilitation des zones affectées après le rapatriement des réfugiés.

Les activités menées dans le cadre de ces reboisements sont :

- choix et aménagement des pépinières ;
- production des plants forestiers et fruitiers ;
- identification et préparation des zones à reboiser ; et
- mise en place des plants et travaux d'entretien

Les résultats obtenus dans le cadre de la reforestation des zones d'accueil des réfugiés sont explicités dans le tableau ci-dessus :

Préfectures Camps ou Superficies Partenaires

villages	*réalisées*	
Dabola Sembakounya	9ha	CECI 18ha C.U.
Kissidougou Boréah	11ha	CECI
Télikoro	12ha	CECI
Kountaya	6ha	ACT
Télikoro	4,5ha	ACF
Massakoundou	5,5ha	ACF
Nzérékoré Kouankan	5,4ha	ACT
Kola	5,5ha	ACT
Total	76,9ha	

Leçons et perspectives

De 1992 à nos jours, la mise en œuvre des différents projets de reforestation financés par le HCR, nous a permis de déceler certaines faiblesses d'approche méthodologique à savoir :

- la non-responsabilisation de la population cible ; et
- la non-implication des Services techniques de l'Etat qui ont un rôle d'appui/conseil et de supervision.

Pour consolider les acquis en matière de reforestation dans les camps et les villages adjacents et corriger ces insuffisances, la population cible doit être impliquée dans la conception, la planification et l'exécution des activités non seulement pour une meilleure appropriation des réalisations mais surtout leur gestion durable après le retrait du HCR et ses partenaires.

Quant aux structures pérennes de l'Etat en l'occurrence les Services techniques, ils doivent aussi être associés à toutes les activités de reforestation et leurs capacités techniques, logistiques et institutionnelles doivent être renforcées afin de pouvoir mieux faire face à leur mission de supervision.

4.3.3 Les foyers améliorés

Dans le cadre du programme environnemental, un volet "économie des combustibles" a été exécuté par certains partenaires afin de diminuer la demande en bois-énergie au niveau des zones d'accueil des réfugiés. Il s'agit de CECI et Concern Universal à Dabola, et BMZ et CECI à Kissidougou.

Les activités de ce volet s'articulent autour des axes suivants :

- formation des réfugiés et de la population d'accueil sur les techniques de fabrication et d'utilisation des foyers ;
- fabrication et diffusion des foyers par les animatrices et les représentants des ménages ; et
- suivi et évaluation des foyers distribués.

Résultats

A **Dabola**, du début de la saison des pluies à nos jours, 2693 foyers améliorés en argile ont été fabriqués et diffusés par Concern Universal dans le camp de Sembakounya et dans les villages. 87 représentants de ménage ont été formés à la fabrication et à l'utilisation des foyers améliorés.

Le CECI vient de démarrer la construction de 2 ateliers-forgerons et de produire 16 foyers améliorés métalliques à caractère expérimental sur 990 prévus.

A **Kissidougou**, BMZ a fait faire aux réfugiés 3900 foyers améliorés en argile dans le camp de Kountaya dont 2400 dans les cuisines communautaires pendant la phase d'urgence et 1500 au niveau des abris définitifs.

Leçons et perspectives

Au niveau du camp de Sembakounya à Dabola, une harmonisation des approches et des méthodes d'intervention des partenaires auprès de la population cible est indispensable pour plus d'efficacité et d'efficience dans la mise en œuvre du volet "foyers améliorés".

Concernant le type du foyer à promouvoir dans le camp et les villages environnants, les foyers améliorés en argile sont mieux adaptés au contexte socioculturel des réfugiés libériens et léonais en Guinée.

La recommandation de l'alternative des foyers améliorés en argile au détriment des foyers métalliques s'explique par les raisons suivantes :

- une disponibilité de la matière première à très faible coût (argile, paille, bouse de vache etc.) ;
- une simplicité dans la conception et l'exécution par un transfert de technologie rapide grâce à des formations en cascade ;
- leur accessibilité au plus grand nombre c'est à dire compatible avec des revenus faibles voire dérisoires tels que les réfugiés ; et
- un impact plus rapide et plus net dans un délai raisonnable avec peu de ressources financières.

4.3.4 La régénération naturelle

Contexte et objectif de la régénération

Dans une zone tropicale comme la Guinée, un certain nombre de facteurs militent en faveur de la régénération naturelle. Il s'agit entre autres de :

- la forte capacité des espèces ligneuses à rejeter des souches immédiatement après la coupe ou l'exploitation ;
- la résilience des écosystèmes c'est à dire leur capacité à résister aux actions anthropiques défavorables ;
- les conditions pluviométriques très favorables (2000 à 2500mm) ; et
- le rapport coût/efficacité est meilleur que la réhabilitation.

L'objectif essentiel de cette approche vise à mieux protéger ou régénérer la végétation dans les camps et les zones boisées adjacentes par un système de mise en défens.

C'est ainsi que dans certains camps tels que Kaloko, des bandes vertes ou zones tampons de protection de 30 mètres ont été épargnées.

A Dabola, à quelques kilomètres du camp de Sembakounya, CECI l'agence de co-ordination des activités environnementales du HCR a planifié la mise en défens d'une zone boisée de 100ha en étroite collaboration avec IBGRN.

Leçons et perspectives

La régénération naturelle à partir de la mise en défens constitue dans certains cas la forme de réhabilitation présentant le meilleur rapport coût/efficacité.

Pour obtenir des résultats durables dans ce domaine, il est indispensable que:

- la nécessité de protéger la zone soit comprize par la population cible comme étant un besoin réel ; et
- la réglementation de la mise en défens soit élaborée et mise en œuvre par la population cible en étroite collaboration avec les services techniques.

5. Conclusion et suggestions

La consolidation des acquis dans le cadre de la protection et la réhabilitation de l'environnement et leur durabilité dans les zones d'accueil des réfugiés passent nécessairement par deux conditions :

- la mise en œuvre des activités environnementales dans le cadre d'une approche participative tout en responsabilisant la population cible et les services techniques de l'Etat ; et

- l'élaboration et la mise en œuvre des plans d'action environnementaux dans les zones d'accueil des réfugiés.

Les objectifs de ces plans visent entre autres à :

- prévenir et limiter la dégradation de l'environnement ;
- réhabiliter les zones d'accueil des réfugiés ;
- définir d'une manière concertée (HCR, partenaires opérationnels, ONG locales et services techniques)les activités environnementales les plus pertinentes pour inverser le processus de dégradation des ressources naturelles ; et
- mettre en place des mécanismes de collaboration entre tous les acteurs afin d'harmoniser les approches et les interventions pour plus d'efficacité et d'efficience.

Participatory Systems for Mitigating Environmental Degradation in Refugee Hosting Areas: The National Committee on Environmental Impact of Refugee Settlement In Kenya

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Executive Summary

Environmental management and rehabilitation, as pursued by the UNHCR Kenya programme, has been in line with the principles articulated in UNHCR's Environment Policy (1996). The Policy recognises the need for an integrated approach, prevention before cure, cost-effectiveness as well as local participation.

The successful application of the above principles has, however, been fraught with challenges and constraints. This has been especially in reference to the desire to ensure comprehensive participation of the main stakeholders in the identification, planning, implementation, monitoring and evaluation of the wide range of environmental management activities that have been initiated. In this context, participation is taken as the system of collaborative partnerships designed to accommodate the interests of the various stakeholders.

To further this approach, inclusive project design workshops were convened prior to the launching of the main environmental management initiatives such as the firewood distribution, environmental education and 'RESCUE' (Rational Energy Supply Conservation Utilisation and Education) projects. Later, in the implementation phase, Environmental Working Groups (EWGs) were set up in Kakuma and Dadaab refugee camps. Despite the existence of such measures, a gap between practitioners at the ground level and the policy setting at national level was recently acknowledged as a major issue. The newly constituted National Committee on Environmental Impacts of Refugee Settlement in Kenya is expected to bridge this gap.

Kew Words:

✓ *Participatory systems*
✓ *Collaborative partnerships*
✓ *Firewood distribution*
✓ *Environmental working groups*
✓ *Kakuma*
✓ *Dadaab*

1. Background

Kenya is currently host to about 210,000 refugees in two camps, Dadaab (130,000) and Kakuma (80,000). The camps are sited in the ecologically fragile arid lands of North-Eastern and Rift Valley provinces respectively. The areas are characterised by low, unreliable rainfall (300-400mm per annum), low biomass productivity and no surface water. The local host communities are nomadic pastoralists who have through experience developed mechanisms to cope with the hostile climatic conditions that prevail.

The sedentary lifestyle as practised by the refugees is a direct contrast to the nomadic pastoralism practised by the local communities. Pressure on the environment has been a direct result of this sedentarisation. The need therefore for establishing a system of environmental management and rehabilitation was noted and action taken accordingly. Several initiatives to address environmental issues have been in place since the inception of the camps. The main ones are the RESCUE project; the Dadaab Firewood Distribution Project and an Environmental Education Project.

The above projects were conceptualised and launched in a participatory manner. Project design workshops which had the participation of the main stakeholders were organised. Stakeholder involvement thereafter in implementation and monitoring of the initiatives, however, has been less impressive.

To further improve on the participation of the main stakeholders, the EWG approach was launched in 1995 and 2000 in Dadaab and Kakuma Camps respectively.

2. Audience

Participatory environmental management essentially calls for concerted efforts by all parties with an interest in the ecological impacts of the camps. In the Kenyan context, the selected approach has been a deliberate attempt to incorporate the various stakeholders in environmental management and rehabilitation interventions.

In line with the above policy, the EWG idea was constituted to provide a forum for the expression of concerns about environmental matters. It was also charged with monitoring the use and abuse of natural resources in and around the camps. The EWG also provides guidance in techniques of environmental protection while at the same time creating awareness of the importance of such protection.

The EWG membership in Kakuma camp currently stands at 32 comprising:

- local leaders (9);
- community-based organisations (2);
- refugees (11);
- Government of Kenya ministries (5);
- local authorities (1); and
- refugee agencies (4).

In Dadaab Camp, where the EWG approach was piloted, the four nuclei of the EWG include the main EWG and satellite EWGs based in Dagahaley, Ifo and Hagadera camps and Dadaab town.

3. Problem Analysis

The EWG approach has, over the years, provided a useful forum for an inclusive, participatory natural resource management in and around the refugee camps in Kenya. It has been useful in addressing natural resource use conflicts, facilitation of resource use monitoring and encouraging environmental awareness among both the refugees and host community. However, its effectiveness has been constrained by, among other things:

- lack of motivation among the EWG members;
- lack of clarity in the system of enforcing regulations and resolutions;
- ineffective mechanism of popularising the EWG;
- poor documentation of resolutions and regulations in a form for easy dissemination;
- ineffective transmission of the achievements of the EWG to the District Development Committee; and
- problems in regard to streamlining EWG systems with government structures.

Towards a more effective EWG, the following suggestions merit attention:

- there should be effective linkage of the District Environment Committees with the EWG for future sustainability and adoption of resolutions; and
- links with other environmental management bodies/agencies like UNEP and UNDP should be encouraged to provide technical and/or financial support for rehabilitation activities.

4. Addressing the Issues

In appreciation of the need for a co-ordinated and sustainable approach in management of the environment in the refugee-hosting areas of Kenya, the government (through its Ministry of Environment and Natural Resources) recently constituted the National Committee on Environmental Impact of Refugee Settlement. The Committee, with the mandate to co-opt technical departments when need arises, comprizes the following institutions:

- Office of the President;
- Ministry of Environment and Natural Resources;
- Ministry of Home Affairs;
- Ministry of Lands and Settlement;
- Ministry of Health;
- Ministry of Local Government;
- UNHCR;
- UNEP;
- GTZ; and
- National Environmental Management Authority.

The Committee is chaired by the Permanent Secretary, Ministry of Environment and Natural Resources. The Kenya Branch Office of UNHCR provides the Secretariat. It derives its authority from the existing environmental management legislation and best practices.

Its Terms of Reference are to:

1. Provide guidance and advice in setting of appropriate policies that will foster concerted efforts in management and conservation of the environment in the refugee-hosting areas.

2. Co-ordinate activities of the various stakeholders by encouraging complementarity and reinforcement of linkages among the various institutions involved.

3. Liaise with Local and Regional Government Departments, Environmental Working Groups and other institutions as well as relevant United Nations and Non-Governmental Organisations.

4. Receive and review, on a regular basis, information from the refugee-hosting areas on on-going and planned activities and recommend specific measures to be undertaken.

5. Advise on the development and implementation of Environmental Education and Awareness-Raising Programmes.

6. Articulate environmental management and conservation priorities for the refugee-hosting areas in line with existing legislation and best practices.

7. Provide support to environmental management and conservation activities that are going on in the refugee-hosting areas through among others, mobilisation of resources and resolution of resource use conflicts.

8. Consider and provide recommendations related to issues that could promote durable solutions to the refugee problem e.g. integration, resettlement or repatriation.

5. Key Lessons Learned

- For effective management of the environment in refugee-hosting areas, there should be a clearly-elaborated linkage between practitioners on the ground and those at policy level.

- Regular information exchange and dissemination among the various stakeholders will enhance the above linkage.

- To further enhance the linkage, networking and collaborative partnerships should be actively pursued.

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The Management of Kakuma Refugee Camp in Kenya: Survival as an Environmental Challenge

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Executive Summary

Kakuma refugee camp is located in a semi-arid area of north-western Kenya, near the Ugandan, Sudanese and Ethiopian borders. The management and operation of such a camp, with over 80,000 refugees, is an ongoing struggle because of:

- **government policy which mandates that refugees should be settled in confined camps;**
- **the limited resources available locally in terms of water, fuel and shelter materials;**
- **the hostile nature of the environment, which supports only nomadic or semi-nomadic populations; and**
- **the attitude of the local population, who have never accepted the refugees and view them as a drain on their resources.**

The management of Kakuma camp is an environmental challenge that attempts to maintain a balance between the needs of a refugee population wholly dependent on external assistance, and a hostile local environment and population not able (or willing) to support the refugees on a long-term basis.

Kew Words:

✓ *Local conflict*
✓ *Environmental problems and solutions*
✓ *Kenya*

1. Background

Kakuma refugee camp is located in an arid region of Kenya where the traditional way of life is nomadic, in relative balance with the meagre resources available.

Several waves of refugee influxes forced UNHCR, in line with government policy, to create a camp in an environment which was not appropriate. Though established with a temporary perspective, the camp came to be considered as a permanent solution and has expanded continuously.

Solutions had to be found in order to accommodate the refugee population and meet the required standards for the provision of the following services:

- sufficient drinking water;
- domestic fuel, to be supplied in an organised and structured manner for the refugee population, in order not to degrade scarce resources in an environment where there is competition from local people and their livestock;
- adequate shelter material;
- sanitation (waste disposal, vector control and communicable disease control) in a place hostile to sedentary settlement;
- erosion control, in a place where extreme climatic conditions prevail.

2. Audience

2.1 The Refugee Population

Kakuma is a patchwork of ethnicities, nationalities and living traditions. The main nationalities are:

- Sudanese – of nilotic (Dinkas, Nuers, Didinkas and Topozas) and bantu origin (Kuku Kakua, Azande);
- Somalis – mainly from the south, predominantly pastoralists and nomads;
- Ethiopians – a mixture of nomadic tradition and of semi-urban origin;
- Rwandans, Congolese, Burundians and Ugandans – with agricultural backgrounds; and
- Eritreans – mainly semi-urban or urban background.

2.2 The Local Population

The Turkana people of north-western Kenya follow a pastoralist tradition and their mode of living is based on nomadism. The rationale for movement is based on the seasonal search for livestock grazing.

2.3 The Local Authorities

The government is mandated to assist in both refugee support and in the provision of services to local people.

2.4 International Agencies

UNHCR's implementing partners share responsibility for running the assistance programme that ensures the well-being of the refugee community and include:

- LWF – procurement and distribution of food and non-food items;
- GTZ – environment, reforestation, greenbelts;
- World Vision – shelter;
- UNICEF/LWF – water; and
- IRC – health and sanitation.

2.5 International Community

The global community supports the refugees and the environmental activities in Kakuma through donations to the care and maintenance programme.

3. Problem Analysis

3.1 Water

- In the Turkana region, access to sufficient water is a limiting factor to population growth and a reason for engaging in nomadic practices;
- The local population became more sedentary as grazing has become degraded; this has concentrated water demands at population centres;
- In order to sustain water availability, deep boreholes have been required; recharging depends on rainfall far away, mainly in eastern Uganda;
- Surface water is only available during rare flash flood events that take place once or twice a year.

3.2 Domestic Fuel

- There is competition and conflict between refugees and local people for scarce firewood resources;
- The Turkana people oppose all harvesting of wood by refugees.

3.3 Shelter Material

- There is a shortage of materials locally with which to build and maintain refugee housing;
- Local materials are also of poor quality and do not last long in the dry, sunny, windy environment;
- There is insufficient water to introduce large-scale mud brick production.

3.4 Sanitation

- Maintaining a permanent settlement of transplanted people in a hostile environment is bound to present sanitation challenges;
- Sanitation work must include vector control and communicable disease control using appropriate environment-friendly pesticide;
- Waste disposal should be organised carefully and in a dispersed manner.

3.5 Erosion

- Two river beds occur in and around Kakuma camp, but these are dry most of the time;
- During occasional flash floods, the river banks are prone to collapse and adjacent structures are often destroyed and washed away.

4. Addressing the Problems

4.1 Water

- Drilling sufficient productive boreholes;
- According to their location, some boreholes yield more water than others; the availability of water therefore varies between the different zones of the camp;
- An interconnected water distribution system is required in order to guarantee equal availability of water in all parts of the camp, and allow boreholes to recharge by using them in rotation.

4.2 Domestic Fuel

- Refugees should be limited in their access to the camp surroundings, with demarcation of harvesting limits to allow regeneration and grazing areas for local cattle;
- Dead firewood should be collected in an organised basis away from the camp through local associations and communities, and distributed to refugees through NGOs;
- Energy-saving cooking devices should be promoted, and refugees trained in their use;
- Domestic fuel sources should be diversified (e.g. charcoal, briquettes, solar energy).

4.3 Shelter Material

Shelter policy and design should be based on available resources, local policy constraints and budget restrictions, but might include:

- mud bricks;
- poles for roofing; and/or
- iron sheets.

4.4 Sanitation

Appropriate vector control includes:

- pesticide spraying;
- "Dudu-stop";
- Environment friendly pesticides; and
- ash/fresh lime

4.5 Erosion

The destruction of infrastructure due to river erosion should be foreseen. Appropriate planning and contingency solutions are required.

5. Key Lessons learned

5.1 Water

Within the geographical limitations imposed by the government of Kenya:

- appropriate geophysical studies are required; this needs partnerships with knowledgeable water experts;
- a good understanding of the water distribution problem is needed in order to set up boosters, elevated tanks and an efficient piping system; and
- sufficient numbers of boreholes are needed to compensate for boreholes that are being recharged, and to anticipate washing-away of boreholes by flash floods.

5.2 Domestic Fuel

A good analysis of the availability of firewood from the surrounding environment is needed. This should include an impartial understanding of local demand.

A strategy is required for dead wood collection through the local population, who can benefit from this economic activity.

A policy for diversifying domestic fuel sources should be developed. A proactive strategy is also needed for developing energy-saving measures (e.g. communal kitchens).

An active reforestation programme is needed, including the development of green belts based on natural regeneration.

5.2 Shelter Material

A shelter strategy is required for designing a living module that responds to the needs and requirements of the different refugee groups. This strategy should aim to satisfy the local population by avoiding the use of local materials. The structures should be tested for durability. Refugees and local people should actively participate in this work.

5.3 Sanitation

Site planning needs to respect, from the very beginning, the needs and requirements of a sanitation programme in terms of disposal of both human waste (latrines) and other wastes.

Latrine digging should take into account the nature of the soil. There should also be a programme of solid waste disposal, collection and treatment. Appropriate pesticides/larvacides should be selected that respect the environment.

The most expensive sanitation solutions are not necessarily the best: low-cost lime was, for example, introduced in the camps to keep latrines hygienic, with good success.

5.4 Erosion

A good assessment is required of the potential risks linked with the meteorological and geographical realities of the environment. This should consider wind erosion (affecting refugee shelters) and water erosion (affecting river banks, boreholes and other infrastructure).

Environmental Management in and Around Bhutanese Refugee Camps in Nepal

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Executive Summary

Nepal hosts around 97,000 refugees from Bhutan in seven camps in its south-eastern districts. A shortage of suitable land meant that most of these camps had to be located inside forest reserves or along river banks. The result has been depletion of tree and bamboo resources, leading to conflict with local people and the host government, as well as risk to the refugees and camp structures from monsoon-related flash flooding.

This paper describes some of the mitigation measures that have been introduced to ensure sustainable forest use, and to protect the camps and refugees from water-induced hazards.

Kew Words:

- ✓ *Water hazards*
- ✓ *Flood control*
- ✓ *Erosion control*
- ✓ *Reafforestation*
- ✓ *Nepal*

1. Introduction

Nepal is a landlocked Himalayan kingdom bordering India to the east, south and west. Bhutan is also a small mountainous kingdom surrounded by India on three sides with China in the north. Nepal and Bhutan are separated by Indian territory.

There are two dominant ethnic groups in Bhutan: people of Tibetan origin called *Dukpa* living in the north and forming part of the ruling elite, and people of Nepali origin who, for the most part, inhabit the south-west. Oppressed by the ruling *Dukpa*, Bhutanese of Nepali origin fled the country and began arriving in Nepal through its eastern border from 1990. The influx peaked during the first half of 1992 when up to 1,000 persons per day were crossing.

The emergency period came to an end in 1992 and the programme is currently in a protracted care and maintenance phase. As of December 2000, a total of 98,897 refugees were hosted in seven camps in Jhapa and Morang districts. It is estimated that a further 8,000 to 10,000 refugees have settled elsewhere in Nepal with the assistance of relatives and have become Nepali citizens. On a per capita basis, Nepal hosts more asylum-seekers/refugees than any other country in the South and East Asia regions.

The presence of large numbers of refugees in two of the most densely-populated districts of Nepal has had a significant impact upon the economic and physical environment. The effects upon forest reserves, village pastures and local job markets are generally viewed negatively.

The objective of this paper is to share experiences regarding environmental management in and around the Bhutanese refugees camps in Nepal, and to identify the main lessons learned.

2. Temporary Settlement of Bhutanese Refugees

The Bhutanese refugees have been temporarily settled in seven camps. Table 1 summarises the basic camp details as at 31 June 2001.

Table1. Population and Distribution of Bhutanese Refugee Camps

Camp	*District*	*Settlement Area (ha)*	*No. of Persons*	*No. of Persons*	*Persons/ hectare*
Beldangi-I	Jhapa	50	2,524	17,108	342
Beldangi-II	Jhapa	42	3,358	21,333	508
Beldangi-II extension	Jhapa	34	1,672	10,853	319
Sanischare	Morang	40	2,790	19,529	488
Goldhap	Jhapa	20	1,346	8,889	445
Timai	Jhapa	22	1,377	9,484	445
Khudunabari	Jhapa	60	1,963	12,544	209
Total		268	150.3	99,740	372

Note: UNCHR guidelines specify 300-500 persons per hectare.

As the available land is limited, it has been necessary for the refugee camps to be very compact. Huts and communal facilities such as schools and health annexes are normally constructed over a raised earthen plinth with a bamboo skeleton covered with lattice walls made of twigs or bamboo. Roofing is made from thatch or a sandwich panel – plastic sheeting between bamboo mats.

3. Geophysical Setting of the Camps

Jhapa and Morang are densely populated districts with 370 and 364 persons/km^2 respectively. They also have a high percentage of land under cultivation (72 per cent). Locating

sites for a large refugee population was therefore not an easy task. Eventually, camps were developed either in marginal forest lands or along river banks. Except for Goldhap and Sanischare, these camps are located along the base of the Siwalik range at an altitude of around 400m. The land is generally flat or gently sloping with minor relief caused by gullies, streams and ditches dug by villagers to carry water for paddy cultivation. The surface is characterised by a thin soil layer or no soil at all, above unconsolidated layers of sandy gravel and boulders. These areas are susceptible to severe surface erosion.

Beldangi-I and Timai camps are located on the banks of the Ratuwa and Timai rivers, respectively. Both rivers originate from the Siwalik Hills. These rivers are quite steep up to the point where they reach the camp areas and then become flat and unstable, covering wide floodplains. Being in their transitional phase, aggregation, degradation and bank erosion are typical phenomena. It is extremely difficult to predict the extent and location of such processes. These rivers often shift their courses quite dramatically.

Monsoon rainfall is the only source of water for these rivers. Mean annual rainfall ranges from 2,500-3,000mm. Within a period of about four months, normally June to September, the monsoon brings about 80 per cent of the year's rainfall. Extreme rainfall events, often exceeding 350mm in 24 hours, are common in the areas where the camps are located. The adjacent rivers, otherwise dry, rapidly become large torrents during the rainy season. This poses a high degree of risk to the camps.

Being located either on flood plains or along river banks, Timai and Beldangi refugee camps have been the focus of various efforts to contain water-related hazards. Such hazards include the following:

- overland flow and gully/stream erosion;
- breaching of canals;
- bank erosion/undercutting and overspill;
- lateral shifting of river courses;
- inundation of low-lying areas;
- uprooting of trees as a consequence of erosion process; and
- waterlogging due to high groundwater table.

Table 2. Basic Geophysical Characteristics of the Camp Areas

Camp	Land Form/Unit	Altitude	Drainage	Surface Deposit	River System
• Beldangi-I • Beldangi -II • Beldangi-II extension	Alluvial fan apron complex/ gentle slopes	200m	Moderate	0.5-2m silty clay; gravel & boulder beneath	Ratuwa and Mawa rivers
• Sanischare	Recent alluvial plain/ undulating	170m	Moderate	Upto 3m silty clay, sand & gravel beneath	Dans khola
• Goldhap	Recent alluvial plain/ undulating	120m	Moderate	2-3.5m silty clay, sand and gravel beneath	Dewaniya
• Timai	Alluvial area apron complex/ gentle slopes	280m	Rapid	Coarse sand with gravel and boulders	Timai
• Khudunabari	Alluvial fan apron complex/ gentle slopes	200m	Good	0.5 to 2m loamy clay; gravel beneath	Sukhani & Tangting

Table 3. Events that Occur During Rainy Seasons

Events	Refugee Camp
Overland flow	All except Timai
Stream/gully erosion*	Khudunabari, Goldhap, Sanischare, Beldangi-ext. and Timai (serious problem in Khudunabari with 36 families evacuated in 1996)
Bank erosion/undercutting*	Timai, Beldangi-I, and Goldhap (Timai camp seriously affected each year)
Over-spilling of banks	Beldangi-I Sector E and F
Disruption of access roads*	Khudunabari, Goldhap and Timai (every year along access road to Khudunabari)
Inundation of low-lying areas*	Goldhap, Sanischare, and Beldangi (24 huts evacuated in Sanischare in 1996)
Uprooting of trees	Sanischare, Beldangi, Khudunabari, and Goldhap (rainfall events often accompanied by windstorms)
High ground water table	Goldhap and Beldangi -I (caused collapse or sinking of latrine pits)

** Events that have caused emergencies in the past that have necessitated immediate protection works and relief assistance.*

Several of the refugee camps have experienced these processes, causing destruction of huts, damage to infrastructure and breakdown of communication systems and access roads, resulting in disruption of services. The events have led to emergencies in some cases and injured many persons. The most noteworthy problems are outlined in Table 3.

4. Mitigating Measures

As mentioned, due to population pressure and scarcity of public land in south-eastern Nepal, there was little choice in the selection of the sites for establishing refugee camps. The camps were also developed within a short period and little attention could be paid at the time of their establishment to assessing likely water-induced hazards.

With limited funds, efforts have since been made to minimise the potential damage to life and property through both structural and non-structural measures. However, due to the dynamic nature of the water processes, further efforts and investment will be required in the future.

The following sections describe the mitigation measures implemented by UNHCR and its implementing partners, mainly the Lutheran World Service (LWS) Refugee Co-ordination Unit (RCH) and the Nepal Red Cross Society (NRCS).

4.1 Structural Measures

Timai Camp:

- Improvement and maintenance of 1km access road with pipe drainage and by raising road level (1995/1998/2000);
- 150m flood protection work (embankment with gabion structure); partially swept away while under construction and completed later through mobilisation of entire camp (1995);
- Earthen embankment with gabion revetment and apron, short and low cheek dams, and spurs at different locations, both river banks, 900m in total (1996);
- Canal improvement in the extension area (1996);
- Emergency river bank protection work using short gabion spurs near kerosene distribution centre and 700m upstream from pump house (1996);
- Construction of 25m sloping spur 700m upstream from pump house to prevent lateral shifting of river course (1996).

Khudunabari Camp

- Improvement of access roads by raising road level and constructing stream and canal crossing structure (1994-1995);
- 400m concrete causeway cross Tangting river (1994);
- Control of gully erosion with masonry canal check dams, drop structures and dry boulder pitching on the bed and sides of streams and gullies at different locations (1994-1996);
- Construction of drainage crossing using hume-pipes (1995);
- Construction of 16m Aduwa khola RCC bridge (1995);
- Construction of 300m concrete causeway across Biring river (1995-1996);
- Construction of 8.5m RCC bridge across Baradasi khola (1995-1996);
- Construction of head works and improvement of main canal - Paglan khola irrigation project (1998);
- Upgrading 5km of road with double bituminous surface dressing (1997-1998; 2000);
- Construction of lab culvert between Biring and Tangting causeways (1999);
- Plantation of vegetation (Sarua/Besare type) in area affected by gully/stream erosion (1996 post-monsoon).

Beldangi - I, II & Extension

- Improvement of access road and internal roads with hume-pipe crossings, minor causeways, and road elevation (1993-1996);
- Channel modification and bank protection of canals & streams using bamboo fence (1993-1996);
- 35m earthen embankment with gabion revetment and apron on right bank of Ratuwa river near Sector-B Beldangi-I (1995);
- Emergency river bank protection work using short gabion spurs near sector C, Beldangi-I (1996);
- Bio-engineering methods for river bank protection (700m) along left bank of Ratuwa river, south-east of Beldangi-I (1999);
- Bio-engineering methods for river bank protection (200m) along Mawa river (1999).

Sanischare

- Channel modification, bank protection of canals, and installation of hume pipe for drainage crossing (1993-1996);
- Control of gully erosion by constructing gabions, check dams and bank protection (1994-1996);
- Construction of 30m structure and improvement of 83m super passage.

Goldhap

- Improvement of access road and internal roads by constructing hume pipe crossings, minor causeways and raising road level (1993);
- Construction of masonry drains and channel improvement at different locations inside camp (1994-1995);
- Bank protection along Dewaniya river (sector A and B) with gabion walls (1995-1996);
- Strengthening of abatement walls of Dewaniya wooden bridge with stone masonry work (1995-1996);
- Replacement of wooden bridges across Hareha II & Rekha I streams with RCC slab culvert and hume pipe culvert and protection of banks with gabion revetment (1995-1996);

- Channel modification and by-pass floodway at eastern side of school (1996).

4.2 Non-structural Measures

Sophisticated systems for non-structural protection measures – such as land-use and watershed management, flood forecasting and warning systems – are not feasible in the Nepal refugee programme.

Flood fighting during the occurrence of such events and evacuation from areas at risk have been implemented in the past and found to be effective to a certain extent. The representatives of refugee communities have also been given general training to generate awareness on flood prevention and related issues.

Water-induced hazards have also been reduced to a great extent through the development and management of forests. Since August 1993, UNHCR, through its care and maintenance work and a BMZ-supported Refugee Areas Rehabilitation Project (RARP), has invested extensively in forestry activities in the form of fencing of forest areas in the vicinity of refugee camps, producing seedlings, establishing plantations, managing forests, and providing institutional support to the District Forest Offices in Jhapa and Morang.

In September 1999, in addition to the ongoing programme of workshops and training in forest management and protection, a workshop on soil conservation and bio-engineering sensitisation was run by NRCS for community leaders, community forest user groups, district soil conservation officers and the media. The sensitisation workshop had wide reaching impacts on the local community.

Specific forestry interventions carried out under RARP are outlined in Table 4.

Table 4. Plantation Works in Jhapa and Morang Supported under RARP

Activity	Jhapa	Morang	Nepal Red Red Cross Society	Total
Seedling production	1,045,000	320,000	525,260	1,890,260
Plantation established	385ha	205ha	159	749ha
Natural regeneration management	100ha	50ha		150ha
Bio-engineering work			577km^2 of Ratuwa river	577 km^2

Tree species used for plantations were 80 per cent Sissau (*Dalbergia sissoo*), 10 per cent *Eucalyptus*, 5 per cent teak and 5 per cent others such as Kapok, bamboo, Kadam and vetiver grass. Survival rates have been approximately 60 per cent.

The net achievement has been the reafforestation of over 590ha of government forest land, compared with 268ha of forest land actually settled by the refugees. Thus there has been a net balance in favour of forest cover increase.

Training/workshops in forest development, protection and management have been conducted for community forestry user groups in nine packages. Workshops on soil conservation and bio-engineering were conducted for local leaders and community forest user groups in two packages.

Several studies were carried out. For example: by NRCS to establish the survival rate of plantations. A bamboo cultivation and promotion programme was carried out in Jhapa and Morang districts. River training works were implemented using bio-engineering concepts along the Ratuwa and Mawa rivers.

As recommended by an environmental review mission from UNHCR headquarters (1997), local forest user groups have been reinforced in sustainable development, protection and management of community forests. One example of a success story has been the Humse Dumse community forest user groups (near Beldangi camps). The user groups aim to fund some of the long-term development activities in their villages from the income generated through forests they have developed. They have already offered firewood required by refugees for crematory purposes.

The overall achievement has been the generation of awareness among local communities towards the environment and better co-operation between the refugees and local communities.

4.3 Mitigating Measure Planned

Major structural measures such as river bank protection with gabion structures, combined with bio-engineering (covering of river banks with soil conserving vegetation), is currently underway to prevent flooding of Beldangi-I by the Ratuwa river. A similar activity is being implemented on the right bank of Mawa river (near Beldangi-extension camp) under the same programme.

Training and awareness-generation programmes will also continue. Depending on the nature of the hazard and the associated risks, emergency prevention and relief activities will be launched as and when required. Contingency plans are worked out every year and necessary materials for emergency protective works are kept in stock.

5. Shelter Activities

One of the most direct effects on the forest reserves in which the camps are located has been the depletion of bamboo for refugee construction needs. It has been estimated that a total of 1,059,000 *mal* bamboos and 3,508,400 *philing* bamboos are required annually for the repair and maintenance of shelters under the care and maintenance programme. The continuous utilisation of bamboo for various purposes

during the last decade has damaged the resource base and affected its potential for regeneration. This has hampered the sustainable supply. At present the bulk of the bamboo is supplied from Morang, Ilam and as far away as Assam in India.

6. Lessons Learned

Agency mandates and skills vary considerably in refugee situations: The achievements in terms of plantation, protection and afforestaton by the District Forest Offices in the first phase were not encouraging. Later investments in institutional strengthening through logistical support and employment of additional staff supplemented their operational capacity. But the implementation of forestry programmes through community user groups and NGOs were still much more successful in general. The capacity of different implementing partners must be fully appreciated.

Multi-species plantations to ensure biological diversity should be emphasized: Plantation of single species stands (e.g. *Dalbergia sissoo*) in the first phase of the RARP project proved to be an error due to massive spread of a species-specific epidemic. This destroyed millions of Sissau trees throughout the target districts. Species diversity is essential.

Natural regeneration of plants and trees should be encouraged to the extent possible: Initiating a regeneration programme for Sal (*Shorea robusta*) through the two District Forest Offices in the second phase of the RARP project proved more successful than planting new forests.

Training/workshops and involvement of Forest User Groups in public awareness activities can be an effective forest management tool: The training/workshops facilitated jointly by the Eastern Regional Forestry Training Centre, District Forest Office Jhapa and NRCS in forest protection, management and bio-engineering methods of soil conservation had unexpectedly positive impacts on the local communities and their approach to forest development activities in refugee-affected areas.

Demonstration Project in Eastern Sudan: Integrated Environmental Management through Community Participation

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Executive Summary

Since 1997, UNHCR has been supporting an environmental management project in refugee camps and surrounding communities in eastern Sudan. The components of the project are described, and lessons that have been learned are presented and discussed.

Following positive evaluations in 1999 and 2001, the project is being expanded to several other refugee sites in Sudan, targeting both the refugees and hosting communities.

Kew Words:

✓ *Community-based environmental management*
✓ *Sudan*

1. Introduction

A pilot project to demonstrate environmental management approaches through community participation was initiated in Sudan in 1997 by UNHCR's Environment Unit (now the Engineering and Environmental Services Section, EESS). After much consultation and consideration, this project was designed around Hawata refugee camp and adjoining Khalifa village, Gedaref State.

The project goal was to improve the living conditions and welfare of refugees and local people in areas where refugees have been settled for many years, through improved management of the local environment. This is being achieved through reinforcing the capacity of the implementing agency (the Forest National Corporation) and by demonstrating through small-scale projects a range of approaches to address priority, recognised environmental problems in refugee-hosting areas in eastern Sudan, in accordance with the principles set out in UNHCR's *Environmental Guidelines* (1996).

The project consists of four main components: community participation; public awareness-raising; energy-saving; and forestry-related activities (participatory community management of plantations and forests, promotion of natural regeneration; planting of shade and fruit trees within compounds and other strategic locations).

The project objectives are achieved by: involving refugees and villagers in decisions related to the management and use of natural resources, particularly wood-based resources; increasing the level of environmental awareness among local people, as well as concerned authorities and decision-makers; demonstrating practical, relevant, skills to refugees and villagers; and by supporting each group through regular support and monitoring the progress.

All these interventions can be applied to any range of situations. Thus environmental awareness-raising, for example, will benefit refugee communities equally in their present state as well as once they have been successfully repatriated. Also because of the participation of the local community, the benefits of the project to the hosting area are expected to continue following repatriation of the refugees.

2. Progress to Date

A broad range of activities and approaches are undertaken within the demonstration project. In addition to a range of clearly visible benefits (compound trees, well-protected tree seedlings, home vegetable gardens, household nurseries, women- and children-organised woodlots, handicrafts, etc.) the supportive reaction from beneficiaries (refugees and Sudanese villagers alike) is a clear demonstration that this project is having increasingly positive impacts.

3. Lessons Learned

Evaluations of the demonstration project in 1999 and 2001 brought to light many important lessons which, in addition to contributing to future implementation in Sudan, may find relevance elsewhere:

- **Delayed implementation can undermine the impact of a time-bound project**

Delays with project start-up or an interrupted cycle of implementation can cause serious disruption and delays to activities such as tree planting, which are closely linked to seasonal weather conditions.

- **The purpose and intended management framework of the project must be clearly explained**

Intended participants and beneficiaries, as well as staff from UNHCR, implementing agencies, and the government, must be informed about the project from the outset. A response mechanism should be set up that permits input and feedback from refugees and local people to the project team, and vice versa.

- **Project implementation should not be rushed**

As some of the techniques and practices being introduced might be new, a period of confidence-building is essential between the project team and target audiences. Project team members should be familiar with the techniques being promoted. Such techniques should be thoroughly tested in each situation before being introduced to refugee or village groups.

- **For lasting benefits, the mode of project implementation is possibly more important than the level of funds or time invested**

The implementing agency must be competent in all of the activities being suggested and must be well positioned to promote and replicate these activities. In circumstances where the selection of implementing agencies is limited, it is best not to attempt to introduce new ideas or techniques.

- **Simple management techniques should not be overlooked**

Where solutions or improvements to projects are sought, there is a tendency to overlook the obvious. Simple refinement can often be made to project activities in a cost-effective manner. Extension officers should pay attention to small details, such as loosening the soil around tree catchments and ensuring that roots are not exposed; better use of water and avoiding waste; and monitor modifications to stoves that would help to retain heat.

- **Environmental support should include the broadest possible cross-section of people**

Environmental initiatives should preferably be targeted at multi-focus groups. Men and women, young and old, should be considered, with specific areas of intervention identified according to their needs/interests. In addition, attention should, whenever possible, focus on both refugees and local communities.

- **Environmental support should cater to different needs**

People have different needs. Women for example, are the primary users of fuelwood and are also often responsible for planting and caring for trees. On the other hand, refugees may not be willing to participate in environmental activities outside the camps, but are willing to plant and maintain trees within the camps, often at a great personal cost. Extension programmes should take these differences into account.

- **A reporting and monitoring format should be elaborated between partner organisations and the beneficiaries at the outset of the project**

A suitable reporting and monitoring procedure must be agreed between all parties from the beginning of the project.

- **More attention should be given to training suitable trainers and to follow-up and supervise these trainers**

Training of trainers should be encouraged and facilitated. This is not only a cost-effective means of reaching a large proportion of the population, but is also an appropriate form of technical support for those interested in becoming more actively involved with the project. UNHCR and the implementing agency should occasionally identify interested candidates for training.

- **Look for unexpected spin-offs**

The enthusiasm for shade trees, live fences and fruit trees, as well as the construction of fuel-efficient stoves by refugees and rural Sudanese exceeded all expectations with the three project areas, particularly Hawata. There has been a significant change in the attitudes of the implementing agency and state authorities concerning extension, energy-saving and community participation. As institutions or individuals, they are now highly supportive of the activities they once opposed.

- **A favourable outcome**

Evaluation missions in 1999 and 2000 recommended the continuation of the project and extension to three additional sites and adjacent villages in Eastern Sudan – Mafaza, Shagarab and Kilo 26.

Attention is now being given to strengthening the working capacity of the project team, reinforcing the messages and techniques being presented to the beneficiaries, and ensuring that equal and adequate support is given to refugees and villagers. These steps are viewed as essential if the project's messages are to be firmly transmitted and people enabled to practice the various methods and techniques for themselves.

4. Conclusions

Experience since the environmental pilot project was launched in Hawata has demonstrated the benefit of integrating multiple components and applying them as a single package, rather than trying to implement activities on an individual basis. In that way, themes such as community participation, awareness-raising and environmental education are dealt with as specific issues through enhanced training and outreach, but also underpin the other project components. By raising awareness at all levels of society – with particular emphasis on energy-saving techniques and technologies and natural regeneration – visible changes are demonstrated in the short term. This serves to highlight the appropriate nature of small-scale, cost-effective projects in addressing environmental concerns in refugee operations, and constitutes a first step towards replicating results in other refugee-affected situations in Sudan.

Environmental Interventions in Eastern Sudan: Some Successful Practices

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Executive Summary

This paper deals with the environmental effects of refugees in eastern Sudan and the efforts made to find solutions. It focuses on some examples from the ongoing collaboration between the Forestry National Corporation (FNC), Commissioner for Refugees (Sudan) and UNHCR. One example is based on experiences with schoolchildren in tree planting; another is derived from women and energy-saving using different types of stoves.

Kew Words:

- ✓ *Sudan*
- ✓ *Natural resources*
- ✓ *Awareness-raising*
- ✓ *Women*
- ✓ *School children*
- ✓ *Stoves*

1. Background

1.1 Sudan

Sudan is the largest country in Africa, covering an area of approximately 2.4 million km^2. It is almost flat except for a few mountains including Jebel Marra, Imatong, and the Red Sea Hills, altogether constituting about 3 per cent of the country's area.

The population of Sudan is estimated at 30 million (1998) with a growth rate of 2.7 per cent per annum. The majority of the population lives in rural areas (70 per cent), deriving their livelihood from agriculture, livestock and forestry. Sudan enjoys a diversity of plant species that are grown for food and cash generation. Agriculture is the most important sector in the Sudanese economy.

Sudan lies in a dry region with almost 50 per cent of its area classified as desert and semi-desert (30 per cent and 20 per cent respectively), extending north of latitude 16°N. The savannah region comprizes about 38 per cent of the country stretching between latitudes 10°-16°N and contains the major agricultural, range and forest lands.

Sudan is distinguished by the Nile Valley that traverses the country from south to north. It is composed of the Blue and White Niles (and their tributaries) that join at Khartoum and proceed to the Mediterranean Sea. The Nile Valley is one of the major contributors to the livelihood of Sudan. Agriculture, forestry, fishery and range resources provide food, home and energy and income sources for a substantial portion of the population living in the area extending along the Nile valley.

1.2 Natural Resources

One of the greatest challenges facing Sudan is the degradation of natural resources, together with its many consequences. This problem can be largely attributed to lack of proper management of natural resources. Forestry resources are one of the main components of the natural resource base, playing an important role in satisfying the basic needs of both the Sudanese community and refugees from Eritrea and Ethiopia over the last 30 years. The refugee population reached 1.5 million at its peak. Considerable damage has been caused to the forest resources in the north-eastern regions that host refugees (Babiker, 2001).

1.3 The Effect of Refugees on Natural Resources

The poor state of natural resources in Sudan has been aggravated by refugees and their animals. They depend on forest products to meet their needs for energy and shelter. The number of animals in some camps is equal to the number of people. Most of these refugees are nomads or semi-nomads. Their knowledge about resource management is considered poor.

The area damaged by refugees is estimated to be 16,000 feddan annually. The removal of natural vegetation has encouraged the spread of weeds such as *Prosopis chilensis* (mesquite). The volume of destruction of natural resources due to the presence of refugees is large and calls for efforts at all levels.

The FNC and UNHCR started joint efforts for the improvement of the situation of the natural resources in Eastern Sudan. These efforts have been based on the involvement of the refugees and local communities in the rehabilitation of tree cover. Activities carried out have included awareness-raising, tree-planting and energy conservation.

As a result of these activities some experience has been gained and some good examples have been created.

2. Environmental Education and Awareness-Raising

2.1 Schoolchildren and Tree-Planting

Two schools in Kassala Town (a refugee-affected area) succeeded in giving good examples of how awareness, training and provision of some support with co-operation of all partners can produce good results for the future.

The activity started with the organisation of training courses for teachers, simple training for pupils, selection of an active group in each school, and appropriate (non-financial) incentives.

About 200 pupil/student participated in this activity. They succeeded in making their schools green. They planted trees for shade or as a woodlot, established a nursery and provided seedlings for greening the areas around their schools. One of these woodlots is due for felling and will hence provide income to the school. The output of tree-planting in houses and streets was not satisfactory to the extension section in Kassala. The poor performance was due to the limited support from the families to maintain and protect the trees. It would have been better if awareness-raising was intensified in the whole area to fill the information gap between the children and their families. This was taken into account for the other school.

Among the lessons learned is that:

- teachers and pupils/students are potentially useful resources for environmental management – they are active and helpful if motivated;
- simple, gradual and practical training for children can keep their interest for a long time and attract others;
- provision of incentives strengthens the relation between the pupils/students and the activity. These incentives include competitions and prizes within schools and between schools; and
- this is a good example of collaboration between the FNC, Ministry of Education and local communities.

2.2 Energy Saving

Women are traditionally responsible for food preparation. The collection of firewood takes considerable time and energy from the women, and sometimes children. The deterioration of forestry resources has brought problems for firewood collectors as the distance to fuel sources is increasing every day.

The Refugee Environment Project included a component of improved stoves to save energy and, hence, protect forests. Different types of stoves are promoted: a mud stove for firewood, the Azza stove for charcoal and Kisra or Anjra stoves, also for firewood. The project convinced women to shift from the traditional type of stoves to improved forms. The improvements were based on controlling the air flow, minimising waste energy by changing the shape of the stoves to round types instead of square types, and using clay liners.

Table 1. Number of Women Trained in Energy Conservation

Site	1998	1999	Number of 2000	Training Courses
Hawata	600	510	580	10
Mafaza	-	600	800	8
Shagarab II	-	3,135	847	13
Total	600	4,245	2,227	31

Table 2. Number of Mud-stoves Built

Site	1998	1999	2000	People Reached
Hawata	1,000	1,200	800	1,200
Mafaza	-	670	1,300	800
Shagarab II	-	3,135	847	4,032
Total	1,000	4,901	2,947	6,032

Recently a group of women were helped to acquire gas stoves for cooking. They purchased them in instalments from the FNC.

Lessons Learned

- Simple technologies can help in forest protection. The presence of good local leaders or officials is an opportunity to create demonstrations that can diffuse to other areas.
- The reduction in fuel consumption among households will eventually be reflected in the surrounding forests and the environment.
- The knowledge acquired will contribute to the development of better relations between people and the environment.

3. Conclusions and Recommendations

The effect of the UNHCR projects in Eastern Sudan is appreciated by the FNC, but still the problem cannot be fully addressed without continued efforts and long-term activities. Forestry is a long-term investment and time is needed for its rehabilitation. Special programmes should be organised to replicate these examples every where.

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Environmental Challenges in Camp Establishment and Management

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Executive Summary

In establishing a refugee camp, UNHCR and other humanitarian agencies, in collaboration with the host government, immediately take action to assist the refugees in settling down in their new environment. Physical planning, water supply, food, health, sanitation and education tend to be the main sectors given initial attention. Environmental protection is often given low priority or forgotten altogether until problems arise. The UNHCR guiding environmental principle of prevention before cure is not applied in most cases.

This paper gives examples from western Tanzania of how environmental considerations can be incorporated into the siting and establishment of refugee camps, and the kinds of repercussions that arise if these considerations are overlooked.

Kew Words:

✓ *Camp establishment*
✓ *Camp siting*
✓ *Environmental integration*
✓ *Tanzania*

1. Background

Tanzania hosts thousands of refugees from neighbouring countries affected by civil wars. Several refugee camps have been established in the western part of the country since 1994. There are currently 13 camps with a population of 387,855 in Kigoma Region and a further 152,388 in Kagera Region (UNHCR, 2001).

To avoid deterioration of living conditions in and around the camps, priority is increasingly being given to improving and managing the environment. The environmental problems differ from one context to another, mainly due to the variation in carrying capacity of each designated area. Each location therefore requires specific solutions. However across all locations, environmental problems commonly observed include deforestation (for fuel, construction and cultivation), soil erosion, water depletion and water contamination.

2. Camp Establishment

2.1 Land Policy and Protected Areas

Land in Tanzania is state-owned and developers are supposed to seek government permission for any proposed use. Like other users, UNHCR requests the government to allocate an area for refugees when the need arises. Above all else, UNHCR prioritises the refugees' physical security in the site selection process.

In western Tanzania, some of the areas selected for camps are close to protected areas (such as game reserves and forest reserves) in which harvesting of poles and firewood takes place. Encroachment in these areas by refugees is not easy to control, especially as there are no visible boundaries around the camps. Some refugees have been taken to court for trespassing.

One solution has been to demarcate clear boundaries around all protected areas. The introduction of signboards along the boundaries is also recommended.

In establishing new camps, environmental experts need to advise on the recommended proximity to such areas, as per UNHCR's environmental guidelines.

2.2 Accessibility

For an area to be appropriate for establishment as a camp, it must have accessibility throughout the year. Poor accessibility is a significant constraint in western Tanzania, where physical infrastructure is underdeveloped.

The Ilagala site in Kigoma Rural District, for example, appeared suitable from most points of view, but could not be developed due to the high cost of constructing an access bridge across the Malagarasi River. Only with significant donor support could such areas be opened up, for the ultimate benefit of the local population as well as the refugees.

2.3 Terrain

Any proposed camp site needs to be surveyed for physical suitability. Areas with rugged hills and steep slopes will promote soil erosion. Flat areas may be prone to flooding.

Lugufu camp in Kigoma Rural District, for example, is located in relatively flat area and flooding has been a major problem during heavy rains. Latrines regular spill over. With the introduction of a major camp drainage system the problem has been alleviated, but such areas should really never be developed.

2.4 Vegetation

A selected site should preferably have good vegetation cover in the form of trees, shrubs and grass as they help protect the soil from the elements. However, several of the camps in western Tanzania are situated close to local populations and

the areas now occupied by refugees were formerly used by these people for agriculture. They were thus already semi-open at the time of refugee settlement. With the increase in population (both refugees and locals) the effect of human activities is now more pronounced. Shared resources are strained and the remnants of already-affected ecosystems are further damaged.

Environmental agencies have established control mechanisms on the use of forest products, especially poles and firewood. Refugee communities are educated and guided on the areas from which to harvest. Special efforts are made to include women in the planning of programmes to conserve domestic energy.

Nevertheless, refugees engage in agricultural activities through informal arrangements with local communities, making control very difficult. This has often promoted the illegal destruction of forests and water sources.

Locals open up big farms close to the refugee camps to take advantage of the cheap labour now available. In doing so they clear large areas of land through burning (e.g. at the entrance to Nduta camp). Refugees shoulder most of the blame for such activities, even though they are actually hired by locals.

Sometimes refugees cultivate right within protected areas, creating problems with the local authorities (e.g. at Kanembwa camp, Kibondo District). Prevention measures must then be taken, and close monitoring and enforcement becomes an ongoing requirement.

Awareness-raising among both locals and refugees on the protection of the environment is highly recommended. The government's Natural Resources Office is expected to take the lead in protecting the environment (especially outside refugee camps) in collaboration with other environment agencies. Assistance from international organisations is also sought.

2.5 Soils

A thorough survey on the types of soil in a site to be established as a camp should be carried out at the initial stage of settlement. This will determine its suitability for construction and for sanitation purposes (e.g. digging of pit latrines).

Vegetation gives protection to the soil. Removal of vegetation exposes the soil to sun, wind and water run-off and it becomes susceptible to erosion. Environmental protection programmes need to cover this important area.

2.6 Water Sources

Provision of sufficient and safe water is obviously vital for refugees.

Assessment of water availability in a proposed refugee area needs to be carried out by experts in collaboration with local people before the establishment of a camp. Groundwater from springs and wells is generally of better quality than surface water such as rivers, lakes and dams. A combination of both surface water and groundwater are currently used in the camps of western Tanzania.

An example of poor planning is provided by Lugufu camp. Immediately after laying an extensive pipe system to draw water for the camp from the Lugufu River, the river dried up. This suggested that a thorough survey of flow volumes was not conducted beforehand.

Surface water availability has a tendency to fluctuate significantly with the seasons. For this reason, the water supplied to the refugees in some of the Tanzanian camps is sometimes reduced from 15 litres per person per day to as little as 10 litres. Breakdown of borehole pumps is another factor that leads to a reduction in the water that is distributed.

Treatment of surface water before distribution is necessary to avoid water-borne diseases. This may be through settling, sand filtration, flocculation and/or disinfection (chlorination).

Protection of water sources is essential. At springs this can be achieved through the provision of spring boxes. Protecting open water can be much harder. It may become polluted by refugees and local people downstream will be affected.

Cutting of trees and cultivation along river courses is a common phenomenon. In collaboration with the government, UNHCR and related implementing partners, meetings must be held and visits arranged to affected areas to raise awareness on the importance of protecting such water sources. The method has been successful in some camps (e.g. Nduta), but in others (e.g. Mtendeli) streams remain polluted and may even dry up due to refugee over-consumption.

Locals and refugees are encouraged to protect water sources and plant appropriate trees which provide shade and erosion control. Close follow-up by environment and water agencies is of utmost importance.

Fencing of the water source is another option. The costs involved are high for surface water but favourable for springs (e.g. at Mkugwa camp this has been implemented).

Rainwater harvesting is not widely practised within the refugee context, but the possibilities are numerous using the roofs of school buildings, hospital buildings or other structures with metal roofing sheets. Although this is not a permanent water supply solution, it can complement the water supplied from other sources.

To try and ease tension between locals and refugees in regards to water use, some provisions could be made to supply locals with water as well as refugees as part of refugee-affected areas programmes. Tanganyika Christian Refugee

Services and Tanzania Water and Environmental Sanitation, both UNHCR Implementing Partners, are working on such projects in some villages in Kibondo District. The Danish Embassy has also assisted the local government in Kibondo to implement borehole projects in some villages.

2.7 Camp Layout

2.7.1 Topography

The layout and organisation of refugee camps and associated facilities are key factors in designing camps that afford proper protection.

Planning of a camp should from the initial stage consider all elements such as refugee plots, community facilities, open spaces, buffer zones, access roads, water points, etc. All are inter-dependent and complement each other.

Planning starts after a thorough physical survey of the area and procurement of a topographical map. The configuration of slopes acts as a basis for plot assignment and alignment of access roads. Overlooking this factor leads to erosion-related environmental problems.

Soil erosion in Mtendeli camp, for example, can be attributed to poor planning with respect to slopes. Roads were laid out down hillsides and the volume and speed of water run-off during rains led to high levels of soil erosion.

All the camps in western Tanzania were established before the arrival of the refugees. Thus they had no involvement in camp planning. Efforts should in future be made to ensure refugee participation, especially for those facilities planned in their presence. This is the only way they will become truly responsible for the care and safety of the facilities that are provided. Special efforts need to be made to include women's participation.

2.7.2 Plot Sizes

The size of refugee plots is in most cases determined by the anticipated caseload versus the area of habitable land, as well as the availability of other resources. In some of the Tanzanian camps bigger plots were later re-demarcated to allow for an increase in population. Mtabila camp, for example, initially had plots of 30x60m and 40x50m which were later subdivided to plots as small as 7.5x15m

Small plot sizes (below 150m^2) allow for the accommodation of a bigger population but have the disadvantage of congestion and associated problems such as risk of spread of disease and fire, proliferation of latrines, more rapid destruction of natural resources and restriction of home gardening.

Medium and large plots (200-2,000m^2) mean that the camp may be larger and have higher establishment costs, but they give refugees the opportunity for home gardening to improve their quality of food, provide better protection against spread of fire and communicable diseases, and promote a sense of privacy and individuality.

The layout of plots relative to each other should where possible, take into account traditions and family ties. Efforts need to be made to restore traditional communities during the process of allocating plots. Efforts must be made to locate vulnerable women and minors in the safest areas of the camp.

Construction of individual houses (blendes) is normally done by refugees themselves. The community has shown initiative in assisting vulnerable groups in this work.

The dominant construction materials are wooden poles, withies and plastic sheeting. Use of mud bricks is growing and significantly reduces the number of wooden poles that are required, which has environmental benefits (see Table 1).

Table 1. Average Wood Requirement Per Structure for Kibondo Camps

	Poles/Withies/Mud		Poles/Withies/Mud-brick	
Structure	Poles	Withies	Poles	Withies
Blende (house)	88	169	35	87
Kitchen	41	70	14	19
Pit latrine	29	47	12	16
Bathroom	10	10	0	0
Total:	168	296	61	122

Source: Survey conducted by REDESO, Kibondo, July 2001

Mud brick making does, however, result in large holes in the ground. If these are not filled in they present an erosion risk. If they fill up with water they can also be a health risk (mosquito breeding) and a danger to young children.

2.7.3 Community Services

Equitable distribution of community services facilities is required to avoid some sections of the refugee population having to walk significantly longer distances than others to reach them. This may present a safety risk (especially for women) and may inhibit access to the services being provided. Sometimes refugees relocate from their allocated plots and move to areas with better services, leading to congestion. A good example is in Nyarugusu camp, where most services (food distribution centre, hospital, agency offices) are situated along the main road through the camp. The population density has become very high in this area, with several families occupying some plots. Duplication or dispersal of some services (e.g. health posts or markets) is advised.

Construction of community services facilities, especially schools, is done through agencies with the participation of the refugee community. The structures are generally constructed using poles, withies, mud and plastic sheeting. Under the guidance of environmental agencies, refugees are directed to specific areas for pole harvesting to ensure that the demand is controlled and the supply is managed.

Use of mud bricks is now being more actively promoted in the camps to reduce the demand for wooden poles.

2.7.4 Access Roads

All areas within a camp must be planned with accessibility, while taking into account the topography of the site.

Provision of drainage system along roads should take into account the topography to avoid chances of soil erosion. Again, the problem of soil erosion at Mtendeli camp is an example of poor road-planning. Excavation of trenches and lateral drains to facilitate water run-off from roads is normal practice, but needs technically sound planning and implementation. At Mtendeli, poor advice led to acceleration of soil erosion and siltation of the Nyabioka river, which is a source of water for the camp. This caused environmental, social and political problems. The local population complains about contamination and reduction in flow. Roads and refugees have had to relocate due to silt-related flooding.

Environmental agencies were not consulted or involved until after the problems had arisen. On the programming side, it took a long time for a decision to be made on remedial actions and for funding to be made available. Such measures are now being implemented in the form of reclamation of degraded areas, construction of soil erosion control structures and planting of vegetative materials in contour strips and within the gullies.

2.7.5 Buffer Zones

In the course of planning, some areas are deliberately set aside to protect vegetation within the camps between settlement blocks. These buffer zones differ in size from one camp to another, varying from 20-50m in width. No activity is expected to take place in these areas. However some structures do come up over time, especially for activities not planned at the outset such as churches and small shops. Sometimes the buffer zones may also be deliberately reduced when more living plots are unexpectedly required. In Nduta camp, for example, the buffer zones were reduced from 50m to 25m when more refugee families arrived.

Protection of buffer zones is primarily the responsibility of those agencies dealing with camp management and the environment. Any proposal to use buffer zones needs to be co-ordinated with all concerned parties to avoid problems which may arise in the future.

2.7.6 Open Spaces

In many cases camp layouts do not include provision for open spaces for recreation. Or when such spaces are allocated their use becomes easily changed. Yet these places act as safe havens for children to play and as resting places for the whole population.

The importance of accommodating open spaces in camp plans should be emphasized from the outset. To preserve such spaces, refugees should be mobilised to participate in their management.

2.7.7 Environmental Sanitation

Communal latrines are usually constructed at the outset when refugees are still settling in their allocated plots. Construction of family latrines is encouraged immediately thereafter. The agency dealing with sanitation in each camp provides a concrete slab for each family latrine and the household provides labour for constructing the toilet structure. The latrines are located within the living plot and are therefore safely accessible to all family members. Emphasis should be placed on the maintenance and cleanliness of the latrine.

Communal latrines are constructed and maintained in public places such as market areas.

The control and management of waste water from communal laundry points and tap-stands is accomplished through agency and community participation.

Agencies mobilise refugee families in the spraying of camps for vector control, the use of ashes around latrines, removal of mosquito breeding sites, and the installation and maintenance of tsetse fly traps in public places. The insecticides used for camp spraying must be environment-friendly.

3. Camp Management

The management of each camp is ultimately a government responsibility under the Ministry of Home Affairs, in collaboration with humanitarian agencies, UNHCR and refugee leaders. Due to the socio-cultural background of refugees, women are often marginalised and tend to shy away from leadership roles. Even when women show an interest, the community will often not accept them in senior positions. Sensitising the refugee community (and women themselves) to aspire for high posts in camp leadership is nevertheless showing positive results. Some have been elected as Assistant Camp Leaders and Assistant Block Leaders.

The active participation of refugees in running the camps is important. Particular efforts must be made to encourage women's participation at all levels of management.

Participation of refugees will ensure smoother running of activities, provision of appropriate assistance and safety of facilities. For example, camp food committees now include refugee men and women as well as staff from agencies, meaning that problems arising are noted and solved more easily.

Co-ordination of all those agencies working in a camp facilitates smooth operation of their different activities. This is normally achieved through regular co-ordination meetings at camp level.

4. Conclusions and Recommendations

A thorough physical survey of an area proposed as a refugee camp should be conducted by a multi-sectoral team of experts from the host government, UNHCR and other humanitarian agencies. The team should include physical planners, water and road engineers, environmentalists, land use planners, wildlife experts and foresters, to mention a few. Opinion from each expert must be discussed thoroughly and a consensus achieved at the initial stage.

Co-ordination of all activities in the course of implementing camp establishment and management plans is vital to avoid problems associated with neglecting some units. A team spirit among all agencies/experts should be encouraged.

Agricultural activities should be supported where conditions are conducive, meaning that land should be available, the government should support the idea, and proper strategies for implementation should be laid down. The socio-economic conditions of the refugee community will be improved by agriculture. Where there are no agricultural possibilities, other measures to improve the living conditions of refugees should be explored. Self-reliance projects should be promoted through needs assessment and participation of all segments of the target group.

Integrating the resources and needs of refugees in all aspects of programme planning and implementation is a policy of UNHCR. Particular attention must be drawn to refugee women's participation.

Projects should ideally be developed for local communities (under refugee-affected areas programmes) to contribute to their development. To sustain such projects, the participation of the local community should be given priority from inception. Examples in western Tanzania include the construction and rehabilitation of schools, dispensaries in Ngara and Biharamulo Districts, and the rehabilitation of roads and water systems within Kasulu and Kibondo Districts. Politically such projects will ease the tension between refugees and the local community, and the economic and social status of locals will be improved.

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Environmental Management in Refugee Camps: Lessons from Kigoma Region, Western Tanzania

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Executive Summary

Since February 1997, the Kigoma Environmental Management Project has been striving to meet refugees' natural resource needs in western Tanzania, while maintaining the ecological integrity of the *miombo* woodland surrounding their camps. Project activities include selective harvesting of building poles, environmental awareness-raising, household tree raising and planting, rehabilitation of eroded areas and managing natural village forests.

Among the major challenges faced has been the proximity of camps to protected areas, reluctance of refugees to get involved in natural resource management, land conflict between refugees and local communities, deforestation due to expanding agriculture and incompatibility of relief funding with the needs of environmental conservation programming.

It has been learned that controlled agricultural activity within the camps on relatively large household plots could significantly reduce refugee dependency upon donor-funded food rations. It has also been realised that empowering local communities to manage their natural resource and allowing refugees to access these resources in co-ordinated and managed ways can minimise conflicts.

Kew Words:

✓ *Refugee-affected areas* ✓ *Local communities*
✓ *Controlled resource access* ✓ *Tanzania*

1. Background

Kigoma Region of Western Tanzania has provided asylum to hundreds of thousands of refugees from Burundi and the Democratic Republic of Congo since 1993. Based on CARE's experiences and successes in implementing environmental management and rehabilitation activities in Kagera Region, CARE was invited by UNHCR to develop an environmental management programme in and around the camps of Kigoma region. In February 1997, the Kigoma Environmental Management Project (KEMP) was initiated to address a wide range of environmental problems:

- over-harvesting of local forest resources;
- decimation of riverine forest;
- poaching of wildlife;
- encroachment on protected areas; and
- refugee-Tanzanian conflicts over natural resources and agricultural lands.

In addressing these problems the project goal has been to meet the natural resource needs of about 250,000 refugees in six camps without diminishing the natural resource access of local Tanzanians or compromising the security of women and children (traditional firewood gatherers). All this at the same time as maintaining the ecological integrity of the surrounding woodlands.

Refugees depend on the natural environment for construction poles and ropes, withies, thatching grass, fuelwood, medicinal plants and various wild and cultivated foodstuffs. Experience has shown that unless refugees are assisted in managing natural resources, camps and their surrounding areas can quickly become degraded. In Kigoma the proximity of the refugee camps to forest and game reserves, and the high ratio of refugees to local people (96,000:25,000 in Moyovosi and Mtabila camps) make sound environmental management critical.

This paper presents a summary of the implementation approaches adopted by KEMP in collaboration with the District Natural Resource Departments, and shares some lessons of experience.

2. Natural Resource Management in Kigoma Refugee Camps and Affected Areas

Currently there are about 360,000 refugees in nine camps in Kigoma Region. KEMP strives to meet refugees' natural resource needs while maintaining the ecological integrity of surrounding woodland, through the following major activities:

- Guided selective harvesting: Guided to allocated harvesting sites, refugees are shown which trees not to cut, how to cut trees and what percentage of trees to remove for pole harvesting to encourage natural regeneration of the *miombo* woodlands. As a part of this programme, all harvesting areas are surveyed for wood resource availability and sustainable yield. In addition, selective harvesting of big trees helps address a shortage of dead wood needed for fuel and also encourages more natural distribution of age and size. Mature, defective stems are harvested for fuelwood while others are retained for specific purpose (reserved trees, timber logs, fruits, medicines, bee-keeping, etc.).

- Environmental awareness-raising: Awareness-raising of refugees takes place through a variety of extension methods including home visits, zone leaders' meetings, church and school presentations, posters and sign boards and megaphone campaigns. The messages cover, for example, regeneration of cut trees, cutting trees only in authorised areas, collection for cooking purposes of dead wood only, adherence to environmental guidelines and

Tanzanian environmental laws, avoiding cultivation in erosion-prone areas and protecting water sources from pollution. In addition, the project spends time and effort in raising awareness about environmental issues and guidelines among other agencies working in the camps, e.g. those non-governmental organisations (NGOs) responsible for water, sanitation and health.

- Environmental Guides scouting teams: Teams of 30-35 people in each camp (made up of refugees and local people, both men and women) circulate through the camp and monitor activities, restraining refugees from illegal or harmful activities such as cutting trees, polluting rivers, cultivating on river banks, debarking trees, making charcoal, etc.

- Promotion of energy-saving practices: The project promotes energy conservation through practices (soaking beans, chopping food small, simmering, 'double cooking', etc.) and technologies (*Cananke* mud stoves, haybaskets). This is done both with refugees and other implementing NGO staff. Promotion includes training, follow-up technical assistance and distribution of posters, leaflets, etc. to refugees and NGOs.

- Facilitating household tree nurseries: The project facilitates the establishment and management of tree planting with agricultural crops (agroforestry) in two camps and Tanzanian villages.

- Natural resource use planning: Resource planning in and around camps, and promoting village-based forest management in local host communities are strategies used to manage resources for the long term.

- Rehabilitation: In and around the camps the project facilitates rehabilitation of eroded areas and prevention of further soil erosion.

- Facilitation and participation in conflict resolution meetings: The project seeks to resolve conflicts between refugees and local communities on an as-need basis and to participate in environmental task forces at camp and district levels to facilitate better co-operation for conservation.

- Research and monitoring: Research and monitoring activities include refugee cultivation surveys, camp wood intake surveys, and environmental status monitoring. The results of these surveys inform all project activities. The project's research and monitoring unit provides data useful for determining refugee resource use and the effectiveness of CARE's interventions, as well as for analysing dynamics between refugees, Tanzanians and the environment.

3. Results

CARE's programme in the refugee camps of Kigoma has been very successful in that most camps still have extensive tree cover and refugees' needs for fuelwood and construction poles are being met without undue hardship.

- From 1998-2001 refugees have been guided to harvest a total of 1.2 million construction poles, while maintaining the average number of stems per hectare between 500 and 800 (CARE, 2000). In *miombo* woodland the natural number of stems per hectare ranges from 400 to1,600;

- The proportion of mud brick houses (to reduce demand for wood poles) averages 25 per cent in all camps (as high as 60 per cent in Lugufu camp);

- Although cultivation in the camps has increased by 40 per cent, regeneration (vegetation cover) also has increased by 30 per cent (CARE, 2000);

- Four of the eight villages near to the refugee camps have demarcated and begun managing 32,000 hectares of natural woodland.

Some of the key strategies that CARE has found particularly successful in its Kigoma programme include:

Clear Environmental Guidelines and Messages: Under CARE's programme there are very specific environmental guidelines relating to fuelwood collection, pole harvesting and the use of other natural resources. The guidelines and messages are disseminated and encouraged through continuous monitoring throughout the camps by teams of Environmental Guides. This combination of strategies has proven effective in raising awareness about, and controlling, environmental degradation.

Village-Based Forest Management: Assisting villages surrounding the refugee camps to manage their natural resources has given communities authority over these resources and has enabled refugees to access these locally-owned resources with minimal conflict. This has been built upon the favourable policy environment which favours decentralisation, enabling villages to make their own forest bylaws (Tanzanian Forest Dept., 1998). CARE has facilitated functional environmental committees in villages surrounding the refugee camps for discussing issues (related to land cultivation, firewood and water etc.) with counterpart committees in the camps. By creating village forest through developed guidelines (Batulaine, 2000), refugees and host communities have decreased abusive use of the former "public woodlands" within the village boundaries.

Selective harvesting of big defective logs for firewood: The project faced a growing problem of firewood shortage as dead wood became more scarce and refugees increasingly began cutting green trees (not permitted under camp environmental guidelines). In order to address this problem, the project began promoting harvesting of mature, defective stems in allocated areas. Other earmarked trees are retained for specific purpose (reserved trees, fruits, medicinal, fertility rituals). Fire management is crucial and prior inventory surveys are needed to assess what to remove (Batulaine, 2001). Surveys also help to predict how long available resources can last.

Facilitating household tree nurseries: Establishment and management of tree planting with agricultural crops (agroforestry) in two camps and Tanzanian villages proved effective when it was promoted at the household level. Because refugees were encouraged to plant trees around their dwellings, the sense of ownership was greater than in group plots in other areas of the camps. During 2000, refugees in Moyovosi and Mtabila camps raised and planted 65,000 tree seedlings (compared to 140,000 in the neighbouring villages). An assessment in 2001 indicated survival rates of 60 per cent.

Conflict Resolution: Through CARE's co-ordination of conflict resolution meetings between refugees and local communities, the government addressed a number of issues. These included compensation for local communities for farms which became part of the camps. Locally arranged "official farming contracts" between refugees and local communities have started to operate in some villages, recognised by 10-cell leaders and village governments. Discussing refugee and local community rights for the use of natural resources jointly at conflict resolution meetings has minimised conflicts. Conflict resolution meetings are respected if follow-up and implementation of resolutions takes place.

Environmental Task Forces: Co-ordination of environmental task forces in a win-win spirit has helped to implement cross-cutting activities such as environmental education and kitchen gardening in the camps. In at least two camps a joint implementation strategy has worked.

4. Programmatic Challenges

4.1 "Integrating" Environment into other Relief Areas is Challenging Without Adequate Enforcement from a Co-ordinating Agency

In Kigoma Region there were at one point seven different agencies promoting environmental activities in the camps, all with varying levels of technical expertise, commitment, capacity and responsibility. While in some camps the integration of environmental issues was successful (into community services programmes, for example), in others, attempts at integration failed. These failures resulted in numerous environmental hazards and destruction (e.g. soil erosion from poorly-planned roads; deforestation around river banks from poorly-promoted agriculture; increased cutting of trees due to small income-generating projects, etc.) Failure to integrate environmental concerns into all aspects of the relief operation were caused by:

- prioritisation of other pressing immediate needs over the environment;
- limited or inadequate enforcement of environmental guidelines by UNHCR due to staff shortages;
- lack of technical expertise among some emergency and relief agencies – who were nevertheless mandated to protect the environment; and
- during times of budget cuts, environmental activities were the first to be cut from integrated programmes.

4.2 Refugees are Initially Reluctant to get Involved in Natural Resource Management

The most significant factor affecting refugee participation in natural resource management in the camps is that refugees have pressing survival needs which outweigh longer-term conservation objectives. Refugees in temporary camps also feel little incentive to conserve natural resources that they perceive as belonging to others. In addition, initially, many refugees who were used to receiving free goods during the emergency phase were reluctant to contribute labour or time for environmental activities during the care and maintenance phase.

4.3 Land Conflicts Between Refugees and Host Communities Undermine Conservation Efforts

Due to camp sites being allocated without consultation with host communities, sometimes local communities cut trees within refugee harvesting sites in protest. Additionally, inadequate camp demarcation and reluctance by the host government to demarcate them (for fear of making the refugee presence permanent) also lead to land and resource conflicts and a general lack of feeling of ownership among refugees over resources, which inhibits sound natural resource management.

4.4 Conflicting Agricultural Policies Lead to Expanding Deforestation

While local government policy forbids refugee agriculture, at the same time the food ration is not adequate and the type of food distributed sometimes not appropriate. Refugees cultivate land to grow fresh food and to supplement distributed rations. In addition, the plot sizes allocated are too small (15x25 m) and often on infertile land, so refugees needing land for cultivation opt to farm in unallocated sites, sometimes within protected areas, in close proximity to water courses, or even within wood harvesting areas.

4.5 Timelines and Scope of Relief Funding are Incompatible with the Needs of Environmental Conservation Programming

While conservation of the environment requires that operations be put in place prior to and during refugee arrival, continuing after refugees leave, funding in the relief sector is provided year-to-year with inadequate scope for long-term planning. Planning and funding also tends to target refugees alone, while environmental degradation and management is affected not only by refugees but also by host communities. In the case of Kigoma, it is invariably the interactions between refugees and host communities (including land conflicts or labour-for-food agreements for clearing new land) which result in environmental degradation. Fortunately there is growing interest in funding refugee-affected hosts. CARE managed to obtain support for working with local communities adjacent to the refugee camps.

5. Lessons Learned

A number of lessons learned in environmental management in the refugee operations have been documented (e.g. UNHCR, 1996, 1997, 1998; CARE, 1998; Marshall, 1996; Le Breton and Owen, 1997). The problems of firewood procurement and refugee cultivation are particular issues that need to be further explored.

In the Kigoma camps, preliminary experience has shown that:

- Despite the host government policy of not allowing refugee cultivation, where refugee camps are located in arable land, carefully controlled, sound agricultural practices could significantly reduce dependency on donors for food rations. For example in Mtabila and Moyovosi camps, despite the government's policy of forbidding refugee cultivation, cultivated land within the camp and in areas surrounding the camp increased by 40 per cent (CARE, 2000) triggered by a 40 per cent cut in the food ration by the World Food Programme. Crops grown were mainly pumpkins, sweet potatoes, beans, maize, cassava and bananas inter-cropped with fast-growing trees for firewood. CARE made a recommendation to the government that it could consider allowing controlled refugee cultivation (in addition to the permitted kitchen gardens). Specific agriculture-related recommendations include:
  - UNHCR should advocate plot sizes of 50x50m in Africa where possible to encourage sustainable home gardening;
  - UNHCR and implementing partners should ensure that food rations are in line with government policy on agriculture, and that fast-cooking foods are distributed;
  - UNHCR and implementing partners need to be involved in advising the government on controlled and sound refugee agriculture.

- Local/host communities which are present before and after a refugee influx should be involved in conservation interventions to mitigate refugee impacts. Local or refugee-hosting communities have an interest in protecting the natural resource base upon which they depend for food, fuel, medicinal plants, construction materials and income-generation;

- UNHCR should consider providing funds for refugee-affected communities for holistic environmental conservation. Alternatively, separate donors (in addition to those providing emergency relief) should be solicited for longer-term conservation interventions in and around camps;

- Agencies addressing environmental degradation in emergency situations should have a specific mandate, technical expertise and commitment to the environment. Co-ordinating bodies such as the UN need to enforce environmental regulations among all implementing agencies;

- The development of environmental guidelines and enforcement of these guidelines must accompany environmental education and awareness programmes;

- With significant awareness-raising, refugees can and will participate in and contribute to natural resource management – even in temporary camps.

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The Use of Fire in Environmental Rehabilitation on the Site of a Former Refugee Camp at Benaco, Tanzania

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Executive Summary

In 1994, about 450,000 Rwandan refugees settled in the Greater Benaco camps in north-western Tanzania. To meet the enormous fuelwood needs, mainly for cooking, of approximately 1,200 tonnes per day, as well as the initial requirements for construction wood for shelter building, wood resources in the surrounding savannah were severely depleted. After repatriation and a stay of about two and a half years the refugees left behind an area of about 500km² affected by intense wood cutting, whereby the core area was completely deforested. The strongly reduced vegetation cover led to the depletion of the water resources and increased the risk of soil erosion. Although the resilience of these savannahs is high, frequent, fierce late dry-season fires endangered the rapid natural regeneration of the woody plants. A fire management plan was set up for the highly-disturbed core area. Since total fire exclusion of the vast area was not feasible, early-burning was prescribed, which is less destructive to woody regeneration than the hotter late-burning and which prevents the more destructive late dry-season fires. The techniques of controlled burning are explained. The paper pleads for the appropriate use of fire for the rehabilitation of heavily cut savannahs, which takes land-use into consideration. However, it is a prerequisite that all stakeholders and actors agree on the programme.

Kew Words:

✓ *Fire management*
✓ *Savannah dynamics*
✓ *Fire ecology*
✓ *Tanzania*

1. Introduction

On 22 April 1994, during the civil war in Rwanda, more than 400,000 Rwandan refugees crossed the Tanzanian border at Rusumo in north-western Tanzania in just two days. A mass exodus on this scale within such a short period of time is probably unique to date. The refugees settled in an area with a low population density (about 50 people per km²) in the vicinity of a dam near the village of Kasulo (2°30'S, 30°51'E), about 20km from Rusumo. The small village of Kasulo, with less than 1,000 inhabitants, became, within a few days, the second largest population concentration in Tanzania, thereby quadrupling the population of Ngara District. The refugee camp was called Benaco after a road construction company formerly based in the area.

Benaco lies in a savannah landscape characterised by its smooth rolling hills between 1,500m and 1,700m above sea level. As in many regions of East Africa near the equator, rainfall is bimodal. The mean annual rainfall is about 900mm with a main dry season from May to August. The mean annual temperature is about 21°C. The climate type in the Köppen system is Aw (Köppen, 1931). Ferralsols occur on the prevailing gentle to moderate slopes, while Vertisols are found in valley bottoms and Leptosols are restricted to the few stony hillsides (FAO-UNESCO, 1988).

Before the arrival of the refugees, relatively densely-wooded savannahs (tree and shrub cover between 20 per cent and 40 per cent) prevailed in the area of Benaco (vegetation types according to the Yangambi classification, see Scientific Council for Africa South of the Sahara, 1956).

The highest growing stock of 40-50m³/ha was found in savannah woodland type with almost pure stands of *Acacia polyacantha* subsp. *campylacantha* (nomenclature: Troupin 1978, 1983, 1985, 1988). However, this savannah type is limited to valley bottoms and gallery forests along temporary watercourses. The average growing stock for all savannah types was estimated to be about 30m³/ha. Broad-leafed trees were more abundant than the fine-leafed Acacias. Table 1 lists the most frequently occurring species.

The number of refugees increased eventually to about 450,000. Although, later on, the number of refugees in the Benaco camp was reduced by opening new camps, about 350,000 refugees remained concentrated in camps of Greater Benaco (only a few kilometres away from each other), a concentration that had a large impact on the environment and the socio-economic situation of the local population (e.g. increased food prices, scarcity of wood, increased criminality). Immediately after their arrival, the refugees cut wood for the construction of shelters and gathered fuelwood in the vicinity of the camps for their energy requirements. As time went by, the need for construction wood decreased but energy demand was permanent (primarily cooking, but also for heating, lighting, brewing). Therefore, the cutting of fuelwood was the main reason for the vast deforestation of the area. The daily fuelwood consumption was initially about 2.7kg per person or about 1,200 tonnes for the whole refugee population (Owen and Ruzicka, 1997; fuelwood figures for Benaco based on barely-dried wood in general), which corresponds to an annual need of about 550,000m³ (1m³≈800kg) or 1.22m³ per person per year. According to De Montalembert and Clement (1983) minimal fuelwood consumption per person per year lies within a range of 1m³ to 1.5m³ in developing countries under normal circumstances.

Table 1. Frequent plant species in the savannah landscape of Benaco

Tree layer Height: 6–8 (12)m	Resp. cap./ Fire resist.	Shrub layer Height: –6m	Resp. cap./ Fire resist.	Grass layer Height: –1.5m
Acacia polyacantha subsp. Campylacantha	cs	*Acacia hockii*	CS/F	*Chloris gayana*
Albisia antunesiana	cs	*Annona senegalensis*	c/F	*Cynodon dactylon*
Combretum molle	cs	*Cassia singueana*	c/F	*Heteropogon contortus*
Dalbergia nitidula	c/F	*Combretum collinum*	Cs	*Hyparrhenia newtonii*
Kigelia Africana	c	*Euclea schimperi*	Cs	*Hyperthelia dissolute*
Lannea schimperi	cs	*Maytenus senegalensis*	Cs/F	*Loudetia simplex*
Pappea capensis	c/F	*Markhamia obtusifolia*	CS/F	*Panicum maximum*
Parinari curatellifolia	cS/F	*Ozoroa reticulata*	CS	*Themeda triandra*
Pericopsis angolensis	c	*Protea madiensis*	C/F	
		Psorospermum febrifugum	CS	
		Rhus natalensis	Cs/F	
		Terminalia mollis	CS/F	

Resprouting capacity: C: High coppicing capacity
S: High capacity of sucker building
c: Low coppicing capacity
s: Low capacity of sucker building

Fire resistance: F: Relatively high even as young sapling

Due to the ever-decreasing wood resources in the vicinity of the camps and the use of energy-saving methods (e.g. improved clay stoves) the daily consumption of fuelwood per person dropped significantly to 1.65kg (about 580 tonnes for the whole population of Greater Benaco). The daily fuelwood consumption in Tanzanian villages in Kagera Region is about 1.9kg per person. This similarity, however, owes more to coincidence than to any similarity in fuel supply and demand. In the Tanzanian context there are other factors influencing the increase (easy access to free wood, inefficient use of energy) and decrease (large families, fresh food, access to different pot types) in fuel consumption as compared to the refugees. Such a tremendous demand of firewood led to severe deforestation of the surrounding savannah formations. Initially, a growing stock of about 50ha was used daily to cover the fuelwood demands of all refugees! At first, dead wood was gathered in the near vicinity of the camps, but in time people would collect and cut wood within a radius of more than 10km. Woodcutting was selective in the early phase, i.e., people would not cut trees of low fuel quality such as *Cussonia arborea, Kigelia africana* and *Lannea schimperi* or trees of cultural significance (*Erythrina abyssinica*) nor trees with large circumferences. However, in the late phase, when fuelwood became scarce, selective cutting was abandoned in the vicinities of the camps. Even stumps were uprooted, thereby exposing the soil to erosion and endangering soil fertility.

The refugees left the camps after two and a half years in December 1996. An area of more than 500km^2 had been affected by extensive woodcutting. The former camp sites and their immediate surroundings were completely deforested and were partly of bare soil (risk of soil erosion). With increasing distance from the camps the degree of cutting decreased. The reduced vegetation cover in the area strongly changed the hydrology: the outflow of water sources has decreased and some open water surfaces have dried up (OXFAM, personal communication). Fortunately, the clearfelled areas outside the campsites kept a continuous grass layer which, together with the remaining rooting system of the cut woody plants, guaranteed a minimal protection of the soil against surface erosion (mainly moderate slopes). However, frequent destructive fires endangered the natural restoration of the vegetation.

Considering these facts it was urgent to rehabilitate the ecosystems by restoring the former tree and shrub cover, which was only feasible if destructive fires were avoided. Therefore, a fire management plan was elaborated for the deforested core area (former campsites and their immediate surroundings) based on a mission carried out in 1997 for CARE International. In the following we outline the approach for establishing a fire management plan.

2. Methods

2.1 Criteria for Establishing a Fire Management Plan

Savannahs are well adapted to recurrent major natural and anthropogenic changes, which explains their generally high resilience (e.g. Walker and Noy-Meir, 1982; Gauslaa, 1989; Bloesch, 1999). However, the resilience of savannahs has its limits and there are many examples – in particular in more arid areas – where these bounds have been exceeded (Walker and Noy-Meir, 1982). The most striking example is the desertification of the Sahel zone in Africa.

The area of Benaco supplies many examples, which demonstrate the high resilience of the mesic Kagera savannahs. The best example is the area of Nyabugombe about 15km south-east of Benaco, now covered with dense savannah woodland of *Acacia polyacantha* subsp. *campylacantha* (regeneration from seed). The same area was cultivated until 1975, before people moved away and settled in an Ujamaa village (common settlement). The existence of the ruderal plants *Tagetes minuta* and *Leonotis nepetaefolia* proves that the area has been under cultivation in the past.

The restoration speed of a clearfelled savannah mainly depends on the rainfall (resilience is much higher in moist savannahs than in arid ones), on the regeneration capacity of the dominating woody species and their fire resistance and also on the specific fire regime. According to Silva (1996) tree seed that do not germinate do not survive and there is no apparent seed bank in the savannah soil. Consequently, seedling recruitment depends on current seed production, which is almost nil in a clearfelled savannah. The regeneration capacity of woody plants in a clearfelled savannah depends, therefore, on their vegetative reproductive strategy by coppice shoots and/or root suckers. The most common woody savannah plants in the area of Benaco have a high resprouting capacity, as shown by the abundance of coppice shoots and suckers of most species despite inappropriate cutting techniques (see Table 1). Therefore there was no need of tree planting in the clearfelled areas outside the camps sites. In any case, large-scale tree planting is very costly and young plantations require extensive tending during the first years.

Fire is a main feature of savannahs and shapes the composition, structure and distribution of plant communities. The impact on vegetation depends mainly on fire frequency, intensity and season. About 80 per cent of the area of Benaco is burnt annually by man-made fires during the main dry season from June to August. Hot, late dry-season fires often burn large areas. Large differences in tolerance to fire exist between woody plants, whereby seedlings and saplings are most affected by fire (see also Table 1). For the neighbouring Akagera National Park in Rwanda, Spinage and Guinness (1972) reported that savannah trees are most sensitive to fire up to the 1.5m stage. Trollope (1983) defined the fire-susceptible height of woody plants in an arid savannah in south-eastern Africa as 2m. Young acacias (fine-leafed) possessing protective coverings of thick corky bark are usually less affected by fire than broad-leafed trees with a sensitive regeneration. Bloesch (1999) outlined the characteristics of early and late dry-season fires and underlined that their impact on the vegetation is generally different. Late-burnings move faster, have a higher flame height and higher temperatures than early-burnings and are, therefore, particularly destructive to woody plants, especially seedlings and saplings. The negative impact of late-burnings is exacerbated by the fact that savannah trees usually sprout well before the beginning of the rains and are most sensitive to fire damage at this time (Innes, 1972). On the other hand, early-burnings usually only slightly scorch woody plants. Sabiiti and Wein (1988) reported for the Queen Elisabeth National Park, Uganda that low-intensity fires (early dry-season fires) stimulate sprouting of *Acacia sieberiana* fourfold (no burning as reference). Cool, early dry-season fires may also activate the building of suckers of some savannah trees, as e.g. *Acacia hockii*. The quantities of unburned grass stubble after an early-burning also ensure minimal soil protection cover against erosion. Furthermore, burning in general may promote the germination of seed of savannah trees and shrubs such as *Acacia* spp. (Bouxin, 1975).

2.2 Fire Management Plan

Any rehabilitation plan of an area has to take the former land-use by the local population and their future needs into account. Before the arrival of the refugees the small population cultivated only a small part of this area. Large parts of the savannah landscape lay fallow and were only little used, e.g. as pastures and for collecting fuelwood or medicinal plants. At the same time, however, the fallow land was an important land reserve for future generations.

Fire management is often a compromise between ecological and economic (land-use) needs and practical feasibility (Rodgers, 1979). The best protection of natural woody regeneration would be to avoid any fire but this is not feasible for such a vast area, even if an immense effort were made to construct firebreaks and organise fire patrols. Following this reasoning the intervention zone was limited to the deforested core area using: a) controlled early-burning where woody regeneration of at least 1m height was abundant and b) fire-breaks for protecting highly fire-sensitive areas. Controlled early-burning only slightly damages natural regeneration of at least 1m height and prevents a more destructive late-burning. Early-burning also facilitates a controlled burning, as the fire front advances only slowly.

In May 1997, before the beginning of the dry season and six months after the departure of the refugees, we elaborated a map for the core area of the deforestation. The following baseline data were recorded:

- degree of deforestation;
- degree of regeneration (number and height of woody plants);
- areas of bare soil (risk of erosion);
- areas of tree planting and direct sowing of seed within the campsites;
- roads (in view of use as natural fire-barriers); and
- main relief.

For the core area of deforestation, a fire management plan was defined (below), which takes two facts into consideration: a) that the operation was new for both the local population and the staff of CARE International, and b) that the proper time for early-burning and the realisation of firebreaks was short:

- As a first priority, firebreaks were established to protect the heavily-disturbed former campsites of mostly bare soil. These zones also include some young tree plantations and areas of direct sowing realised for the rehabilitation of the site which are very vulnerable to any kind of fire. The

lay-out of the firebreaks followed natural fire-barriers as far as possible, e.g. roads, areas of bare soil or permanently wet valley bottoms. Areas of high biomass and steep slopes were avoided (rapid uphill burning increases the risk of fires crossing the firebreak). Following this concept we realised firebreaks about 30m wide by controlled burning. Providing easy access by the fire brigade the width was reduced to a minimum of 10m.

- Areas in the vicinity of the campsites with severe deforestation but abundant woody regeneration of at least 1m height were selected for a controlled early-burning. We assumed that natural regeneration of at least 1m height might essentially resist a cool early-burning.

- Firebreaks alone do not guarantee the protection of fire-sensitive areas. In addition a fire brigade was created from amongst those people who carried out the controlled burning. Patrolling teams permanently surveyed the core area of the deforestation during the dry season when fire hazard was high. In case of an undesired fire the patrolling team would alert the entire fire brigade to extinguish the fire. Since all firemen originated from Kasulo, the local population was closely involved in the operation and this helped to improve their knowledge of controlled burning. The controlled burning of the firebreaks and of the selected areas took place at the very beginning of the dry season, as soon as the weather conditions and moisture content of the vegetation permitted and timed to facilitate a controlled burning and minimise damage to the woody regeneration. About 20 people from Kasulo, trained in the technique of controlled burning, helped to carry out the firing. It is very important that the burning activity is well organised and guided by an expert. The following points have to be considered:

- Everybody has to know their specific task and fulfil it in a disciplined way; only one person per group is allowed to set a fire, the others are equipped with tree branches, ready to extinguish the fire where necessary (NB: branches from *Euclea schimperi* and *Rhus natalensis* are very suitable thanks to their high flame point and robust leaves).

- Rate of spread of the fire front depends mainly on following factors: a) on fuel moisture (note that at the beginning of the dry season dew levels are high early in the morning and late in the afternoon, which slows down the burning progress), b) on wind speed (variation in wind direction and velocity according to the time of day), c) on the relative air humidity, and d) on the topography (see also Trollope, 1983).

- Low wind velocity and scarce vegetation (or moist vegetation) allows burning with the wind (except uphill burning on steep slopes); high wind velocity and dense, dry vegetation require burning against the wind.

- If the burning process is difficult to control a small strip of the vegetation has to be cut beforehand to ensure controlled burning.

- As soon as the fire catches up, it has to be extinguished opposite to the defined burning direction. The direction of the advancing fire front is guided by controlling both sides of the progressing fire front.

The realisation of the firebreaks by controlled burning is more convenient and cheaper than mechanically removing the vegetation. Controlled burning of large areas (as in our case for the protection of the woody regeneration) is easier to handle than the exact burning of the narrow firebreaks, often owing to the existence of natural fire-barriers.

3. Results and Discussion

The fire management plan was applied to an area of about 25km^2. Controlled early-burning for the protection of the natural woody regeneration comprised an area of about 5-10km^2. Furthermore, about 40km of firebreaks were created by controlled burning. No undesired fire occurred in the core area of the deforestation. This positive result could not have been achieved without the support of the well-trained fire brigade and the local community. Additional motivation was given to the fire brigade in the form of a promise of financial reward at the end of the dry season if no undesired fire had occurred.

In May 1998, a rapid survey revealed further evidence of the high resilience of savannah formations and supported our hypothesis that cool burning does not – or only slightly – affect regeneration of woody savannah plants of at least 1m in height. The vigorous resprouting of the cut woody plants led to a clumped distribution of saplings and seedlings with the consequence that, within these regeneration clumps, the grass biomass was reduced and remained greener (shading effect of the woody plants) compared to the surrounding grass matrix. This vegetation mosaic led to the patchwise burning, i.e. the open areas were intensively burnt while areas with abundant woody regeneration were hardly touched by the controlled fire. Also, small regeneration (less than 1m) of *Acacia hockii, Combretum collinum, Cussonia arborea, Markhamia obtusifolia* and *Parinari curatellifolia* showed barely lethal damage. The rapid development of thick corky bark of *Acacia hockii, Cussonia arborea,* and *Parinari curatellifolia* already at a young age may have contributed to their relatively high survival rate. However, when evaluating these positive results it is important to note that during the controlled burning the fire, facilitated by a moderate wind, advanced at a steady pace. A long-lasting smouldering in the same place would have had similar destructive effects as late fires!

Unfortunately, a detailed survey, foreseen for a later date, could not be carried out. The mass migration of people and political unrest in the area of the Great Lakes led to major security problems. The local authorities, afraid of possible criminal gangs hiding in the bushes, burned the entire Benaco area in the late dry season 1998. The fierce fire destroyed most of the emerging regeneration of woody plants as well as the experimental plots installed in 1997 for monitoring the species specific reproductive strategy for

different fire regimes (early-burning, late-burning and no burning). The first and preliminary encouraging data of the fire management plan could not be followed up. We had planned to continue the controlled burning for the core area for at least another two years.

The use of fire is mainly known from rangeland management with only one stakeholder. Our results, however, show that controlled burning may also be successful for the low cost rehabilitation (using natural regeneration) of clearfelled savannahs (with a number of stakeholders). Controlled early-burning may also be appropriate to protect tree plantations from destructive hot fires. In this way the yield of a plantation can be considerably increased (Gauslaa, 1989). Such a strategy, however, would require that the fire resistance to cool burning – including the fire susceptible plant height – is tested beforehand, since tree species for plantations are not usually savannah species. In view of the thousands of hectares of reforested areas seriously damaged every year in Tanzania by uncontrolled destructive fires such an approach is of considerable ecological and economic importance.

If controlled burning is applied in savannah formations we have to consider that fire is an integrated part of land-use and governed by socio-cultural traditions. Controlled burning of public land is a difficult endeavour, with numerous actors and their differing objectives, and can only be sustained if it is based on a defined and binding land-use policy, accepted by all actors. Furthermore, cool burning may also promote bush encroachment by increased resprouting at the expense of perennial grasses (see, e.g. Klötzli 1980; Sabiiti and Wein 1988), a process not suitable for every management goal (e.g. rangeland). Finally, the incident from Benaco confirms that ecological activities, which usually have long-term perspectives, can only be realised successfully if political stability prevails.

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Natural Resource Management in Refugee Situations in Uganda

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Executive Summary

A summary is given of a four-year environmental management programme that was implemented in and around the refugee settlements of north-western Uganda from 1996-1999. The paper presents the main activities, impacts and lessons learned.

Kew Words:

✓ *Environmental management* ✓ *BMZ*
✓ *Uganda*

1. Introduction

Environmental activities in Uganda's refugee settlements started in 1996 when UNHCR's then PTSS (Programme and Technical Support Section) made a survey which recommended activities to be initiated because of the clearly observed environmental deterioration in camps and settlements. A four-year project funded by the German Ministry for Economic Co-operation (BMZ) was then launched, funded to the tune of DM3.25 million.

The project was founded on certain 'basic principles' that enshrined the concepts of local and refugee participation, sustainability, ownership and the developmental nature of all activities. It was also specifically noted in the project description that "implementing partners are there to complement government efforts, rather than the other way around". The project was thus intended to be very much locally designed, owned and managed, with UNHCR and its implementing partners providing mainly guidance, facilitation and fiscal accountability.

The project was implemented through several partner agencies. Initially in Arua District these were InterAid at the Koboko transit centres, Oxfam-UK at Ikafe and Imvepi settlements and DED (German Development Service) at Rhino Camp settlement. In Adjumani and Moyo the selected agency was ACORD (Agency for Co-operation and Research in Development).

Within each implementing agency, the project was first to establish a forestry and energy unit. This was essentially an effort to ensure the presence of sound technical support capacity. Other than this capacity-building element, project activities were not uniform across the target locations as they were designed with the specific local situation in mind. In general terms, the following were addressed:

- Afforestation and reforestation: A number of systems were envisaged for tree planting depending on the location. These included communal woodlots, buffer strips around forest reserves and individual homestead planting. The idea of direct seeding using ox-ploughs was promoted in Koboko. The intention of the forestry work was to generate tree products such as fuelwood, poles, timber and fruit for local communities and refugees. Seedlings were to be raised under various scenarios according to local capacity, including agency-run central nurseries, independent private nurseries and group-operated co-operative nurseries. In the spirit of local ownership, no salaries were envisaged for workers in independent nurseries as it was expected that they would sell seedlings to the project. It was also not envisaged that implementing agencies would in any way 'own' any tree plantations established under the project, and that after three years there would be a process of "handover to local communities/owners". Even at the design stage, however, it was noted that "special lease and land tenure arrangements would have to be prepared" to define woodlot ownership and usufruct rights. It was intended that tree seedlings would be given away free of charge or under 'stove for tree' arrangements whereby a beneficiary would receive an improved cooking device in exchange for tree planting achievements.

- Energy conservation: The project was to promote fuelwood-saving cooking methods to reduce the pressure on local woodland. This was expected to cover both improved mud stoves and a grass-burning stove recently introduced to the area. The latter was believed to have great potential for substituting for wood fires. The project design also stressed the utility of energy-saving cooking practices in addition to stove hardware, including such concepts as proper drying and preparation of firewood, careful fire management and pre-soaking of hard foods such as beans.

- Soil and water conservation: This component of the project was aimed at increasing food production in environmentally sound ways. The refugee self-reliance strategy demands that refugees must increasingly depend on food that they grow themselves, which in the Uganda context is arguably at odds with environmental protection as it requires clearance of natural vegetation over large areas and, in a situation of sedentary agriculture, has the potential to result in over-use of the land. To counter this threat, this part of the project was therefore to have included the promotion of new crop varieties with higher yields, introduction of crop rotation to allow recovery of soil fertility, on-farm production of organic fertilizers, introduction of agroforestry systems and construction of bunds on slopes to retain soil moisture.

- Environmental awareness-raising: The awareness-raising component of the project was expected to complement and

reinforce the other activities. It was to include advocacy, training, competitions and environment-related events. The 1995 project proposal mentioned school-based approaches and the potential for the use of replicable environmental education materials and kits. No distinction was made between formal and non-formal approaches, however. This later became an issue of contention and the original intent of the awareness-raising component had to be clarified by the mid-term review mission.

2. Project Implementation

2.1 Overview

The first year of the project was negatively affected by cross-border insecurity and drought, especially in Arua District. A 'Phase IV' security status was imposed which meant the evacuation of all non-essential staff. Food shortages were widespread and it became difficult to promote activities that did not focus directly on livelihood support.

The project was further affected by an accounting error made by the donor in 1996. This resulted in an unexpected budget cut which necessitated the removal of most of the soil and water conservation components. The error was later rectified, but by then it was too late to re-institute the affected activities. Little could therefore be done in the first two years in terms of promoting improved agricultural practices.

2.2 Koboko

The problems faced by the project were compounded in the Koboko transit centres (Arua) by the unexpected withdrawal of CARA, the agency initially envisaged as the implementing partner, and a late decision on which partner should replace it. A choice was to be made between the Uganda Red Cross Society and InterAid. It was July 1996 by the time InterAid had been selected, a sub-agreement had been signed, and the NGO had established a presence in the field.

As a result of the delay, the dry weather, the insecurity and the budget cuts, activities in Koboko cannot be described as successful in 1996 and 1997. Five self-sustaining 'co-operative nurseries' were envisaged for tree seedling production, but ultimately these were entirely dependent on InterAid support. It was in fact probably unrealistic to have expected that they would have been able to operate otherwise. The nurseries' output was targeted as two million seedlings but production only reached 180,500.

The direct seeding approach to plantation establishment failed due to the dry weather and inappropriate species selection, after four oxen and the ancillary ploughing equipment and personnel had been paid for. Only 55ha of buffer strips were planted around forest reserves against a target of 1,500ha. Only 69,000 seedlings were distributed to private individuals against a target of three million. No seeds were distributed as hoped. Only 10 grass stoves were manufactured and 26 mud-stoves constructed. Trees planted on private and communal land were not monitored sufficiently to make any objective assessment of survival rates. The overall picture was one of widespread shortfall against project targets.

The project's mid-term review prescribed a 'fundamental transformation' in approach at Koboko, particularly as most of the refugees had been re-located that year from the transit centres to semi-permanent settlements. InterAid was to move away from protection and support measures towards rehabilitation of vacated refugee sites. It was to drop all activities other than tree planting and vegetation inventory, and sub-contract most of the work to the Forest Department in an effort to move towards government rather than NGO management.

There were positive aspects to the work thereafter in spite of the various constraints and implementation weaknesses. InterAid worked closely with up to nine community-based organisations, including farmer's trusts that were used for seedling distribution. This built upon pre-existing community structures rather than creating new institutions. InterAid also made productive use of such groups to gain access to their individual members.

Though it overtly promoted group-oriented approaches, InterAid in fact used the groups as an entry point through which to target interested individuals in tree planting exercises, more than it used the group members working together. It was realised that this approach would bring assured tree ownership and hence better survival rates. In a number of cases where woodlots were officially established as 'communal' projects, negotiations were in fact conducted by InterAid beforehand to ensure that individuals within those communities would take proper responsibility for their maintenance. InterAid also made a policy decision to recruit forest guards who lived adjacent to the woodlots to ensure a commitment to their protection, rather than bringing in staff from outside the area. According to InterAid management, such approaches promoting individual responsibility resulted in higher tree survival rates than would have been realised under the group-oriented strategy officially sanctioned for Koboko.

By 1999, the InterAid project description had acknowledged the changes in the situation on the ground and prescribed mainly rehabilitative planting in forest reserves damaged by the (now departed) refugees. Efforts to support co-operative nurseries were dropped and all forestry work was now explicitly salaried. Given the problems experienced at Koboko and the departure of the refugees, the legacy of the BMZ-supported work is a tree nursery at Adranga and some 120ha of plantation around former transit centres which were 'handed over' to the District Forest Office (DFO) in 2000. The DFO continues to receive direct financial support from UNHCR for maintenance and enrichment planting of these plantations.

2.3 Rhino Camp

The DED was the original BMZ implementing partner at Rhino Camp in 1996. In 1997, DED was dropped from the

project as the German government disallowed funds to be channelled from BMZ through UNHCR to another German agency. DED continued its activities with UNHCR funding from other sources and the BMZ funds were re-allocated to the remaining three agencies.

In its one year under the BMZ project, DED came closer to meeting its forestry targets at Rhino Camp than InterAid did at Koboko. 180,000 seedlings were produced from a target of 200,000 and 14.5ha of block planting was accomplished towards a target of 24ha. These forestry successes were achieved mainly through the establishment of a large, agency-run nursery and the use of salaried labour. Refugees were paid for land preparation and the raising, planting and maintenance of seedlings. Six 'community nurseries' supported by the project produced only 20,000 seedlings in total. Seedling survival rates were poor in block planted areas, even with workers being paid for weeding and termite control. Roadside planting resulted in an almost 100 per cent failure rate. There was apparently little sense of ownership or responsibility felt on the part of the refugees or local people towards the woodlots being established under the project, with predictable impacts upon survival rates. School-based planting showed more encouraging results, the land being clearly under the institutions' own management.

2.4 Ikafe and Impvepi

At Ikafe and Imvepi, OXFAM initially achieved greater success in forestry work by focusing more on individuals and privately-owned land in the tree planting programme. One agency nursery and five decentralised nurseries were set up, and seedlings raised were used to support woodlot establishment on private land. 156,000 seedlings were distributed to individuals in 1996, with another 32,500 going to schools. A tree planting approach such as this focused upon land under clearly defined ownership was not only likely to lead to higher survival rates, but also proved to be cheaper because there was no need to pay for land clearance and planting. Nevertheless, OXFAM still planted 48ha using paid labour in Ikafe, Bidibidi and Imvepi in 1997 compared with only 5ha planted voluntarily by community-based organisations.

In 1998 and 1999, the emphasis shifted further towards woodlot planting rather than homestead planting, which in retrospect seems undesirable in light of the known pitfalls of group-oriented planting, especially when salaried, as compared with the individually-oriented planting upon which OXFAM had initially embarked. Furthermore, OXFAM reduced the number of decentralised nurseries from six in 1997 to three in 1998 and two in 1999, eventually raising 96 per cent of all seedlings in its own nurseries (424,000 out of 443,000 in 1998). This seems an undesirable strategy, particularly given the project's original emphasis upon community-managed activities.

It was initially envisaged that OXFAM would only fund 'initial start-up labour' for tree nurseries and that seedlings would be sold for a small fee to cover production costs. By 1997, however, salaries were introduced for nursery watchmen, supervisors and general labourers. By 1999 any reference to voluntary labour in the project description had been removed and OXFAM was given basic numerical targets to raise 400,000 seedlings at its two agency-run nurseries using hired labour. Nevertheless, the continued focus on individuals and institutions in the planting programme (rather than groups and 'communities') had obvious benefits in terms of clarity of ownership and (presumably) seedling survival rates.

A biomass inventory was conducted by OXFAM in 1996 to establish baseline data for subsequent environmental monitoring and to aid the settlement planning process. Tree marking was carried out by refugees and local communities using their own criteria. Firebreaks were established within and around tree plantations.

A baseline energy survey was also carried out and, as a result, the project decided to focus on improving the performance of the traditional three-stone fire rather than promoting any new cooking technologies or pre-fabricated stoves. Sheet metal was procured to produce pot lids for energy conservation and a variety of no-cost energy-saving techniques were promoted. The grass stove was not promoted under OXFAM following the energy survey.

OXFAM worked on environmental awareness-raising activities and was expecting to participate in a school-based formal environmental education programme organised by UNHCR in 1997. Preparation involved teacher training and syllabus development. In the end, however, changes recommended by the project's mid-term review meant that this was not realised.

OXFAM'S work at Ikafe ended in 1997 as the transit centre was closed down and refugees were settled at Imvepi and Rhino Camp. Oxfam then sub-contracted a number of local organisations to conclude rehabilitation work at Ikafe and consolidated its BMZ-funded activities at Imvepi. Continued emphasis was placed on raising seedlings for distribution to individuals, although woodlot planting was also included, as well as replanting and maintenance of areas planted in previous project years.

OXFAM took consideration of sustainability issues in the forestry work and attempted to define land ownership prior to block planting, and in the same spirit made an effort to promote individual planting of trees around homesteads more than it did 'communal' woodlots. There were clear efforts to encourage the raising of seedlings by community members rather than the agency itself, though these efforts seem to have diminished as the project progressed. In the energy sector there was a careful appraisal of what interventions would and would not be appropriate before activities got under way, which resulted in a sensible focus on improvements to the traditional cooking system rather than any new technologies. Environmental awareness-raising was well implemented, though curtailed by UNHCR's changing policy in this sector.

2.5 Adjumani and Moyo

Working in present day Adjumani and Moyo Districts, ACORD came closest to meeting its forestry output targets under the BMZ project. 160ha of woodlot were to have been established in Pakelle and Palorinya (Moyo) in 1996. In fact, 300ha were set up that year with 900,000 seedlings. Some 236ha were established in 1996 using paid labour hired by ACORD.

According to the project description, ACORD was to be responsible for all operations until the plantations "could be handed over to local communities/owners at the end of three years". The mid-term review mission reinforced the need to reorient the tree planting from agency-managed plantations towards community managed and owned plantations. ACORD attempted thereafter to involve local groups such as the Adjumani Women's Association and Adjumani Youth Association in group-managed woodlot programmes, rather than perpetuating what had become known as the 'ACORD woodlots'. Some 64ha of private woodlots were also planted in 1996 by individuals operating 140 independent tree nurseries - for which no payments were made by ACORD beyond the initial supply of seeds, tubes and tools. Unfortunately over 60 per cent of these plantations had failed by the time of the mid-term review one year later due to inadequate protection, and most of the independent nurseries had closed. It appears that they were set up only to supply the BMZ project's demands.

A small (unknown) number remained functional, to meet local demand for teak seedlings, which was perhaps an indicator of the species upon which ACORD could have focused more heavily if it wished to enhance sustainability of operator-run nursery schemes. These independent (operator-run) nurseries were supplemented by three ACORD-operated nurseries at Palorinya, Mongola and Obilikong. The number of seedlings raised at these nurseries was more than double the initial target. They were professionally run and technically well managed.

From 1997 to 1999, ACORD had annual seedling production targets in excess of one million per annum and managed to meet or exceed these targets using a combination of its own nurseries and community-run nurseries. Annual targets for woodlot planting were also met, though by 1999 the focus had shifted to homestead and institutional planting. Survival rates were not recorded, or at least the figures appear unavailable, which is a major shortcoming. For homestead planting a 'stove for tree' system was proposed but not implemented due to a lack of community interest. Survival rates were not properly monitored and it is not possible to say definitively whether or not this activity was a success, though interest seemed high and homestead planting appeared popular, especially with fruit trees.

ACORD also supported buffer zone planting around sensitive areas such as the Era Forest Reserve in Moyo District and Zoka Forest Reserve in Adjumani. While such buffers clearly demarcated the edge of reserved areas, it is not clear whether they actually had any protective value. The same applies to other protective activities such as tree marking along water courses indicating trees that were not be felled, which was said to 'protect the streams against silting', or indeed the marking of trees in general which was believed to reduce the rate of cutting. 220 metres of gully erosion at Ogujabe was said to have been 'halted with check dams'. These activities certainly appear valid and were well implemented from a technical point of view, but it is not clear that they actually had the desired effects because no reports were kept that might may be used to compare the situation beforehand and afterwards, or offer some kind of monitoring of the situation over time.

ACORD's overall Natural Resource Management approach shifted gradually during the project period from an emergency-oriented perspective to one of community participation and sustainability. This is exemplified by the way in which utilisation and management of planted trees was being encouraged by 1999. The neem tree (*Azadirachta indica*) was one species widely planted under the BMZ project which began to yield benefits for a group of 24 women through harvesting of the leaves and oil for making insecticides in exchange for their contribution to plantation management.

ACORD was also involved in rehabilitation of vacated refugee sites such as the transit camps at Ogujabe, Kator and Oliji. There was a subsequent attempt to return part of the land to its original state as the "Ogujabe Global Forest". This necessitated a concerted effort of multiple agencies and groups to implement land use planning, demarcation, tree planting and gully erosion control measures. ACORD took a strong lead in this process and facilitated co-operation between numerous organisations representing the government, local communities and the relief sector.

Overall, ACORD offered the most technically competent and diverse variety of environmental activities under the BMZ project. In part this reflected the relative stability of the refugee situation in Adjumani and Moyo compared with Arua and the longevity of ACORD's presence in the area. ACORD was also the only agency that appeared to give full consideration to the involvement of the local government and host communities in an effort to ensure the future sustainability of environmental interventions, though this was at a late stage in the project and it was not adequately addressed in the first two years. The fact that ACORD worked from the outset in predominantly land-based settlements rather than transit centres seems to have helped develop a longer-term perspective amongst its staff.

ACORD remains active in the project area under UNHCR annual funding, continuing with similar activities to those initiated during the BMZ project.

2.6 Environmental Education

A fifth objective was added to the project in 1997, which was "to offer a programme of formal and non-formal environmental education to selected refugee-affected areas in

anticipation that the programme will eventually expand into other areas". This was to be funded using the money mistakenly cut from the project by the donor in 1996 and later re-instated. However the 1997 mid-term review mission did not find it in line with the original project design to use this money for intensifying and expanding environmental education when it had originally been intended to support agroforestry and soil and water conservation. It recommended its removal and the formal environmental education programme was ended. The funds were re-oriented towards soil and water conservation and the maintenance of tree plantations. This affected all three implementing partners who had by then invested considerable time and manpower in preparing themselves for the school-based environmental education project anticipated to get fully under way in 1997. It was a waste of donor funds and the fact that it could be initiated and operated for the better part of a year reflected poorly on UNHCR's internal systems of co-ordination and communication.

3. Project Assessment

As for its overall impact, the project did not achieve as much as had been hoped in terms of protecting natural ecosystems such as wetlands and forests in the refugee-hosting areas. Planting woodlots does not substitute for natural forest products when these woodlots are not accessible to the community. Education in environmental protection does not save forests in the absence of accompanying enforcement measures. Energy-saving measures will only tackle part of the wood harvesting problem when people are still harvesting wood products commercially to support their livelihoods.

The project paid insufficient attention to fundamental problems of illegal resource exploitation that demanded strong demarcation, control and law enforcement, not only education and an attempt to provide substitutes. While it is not the role of either UNHCR or NGOs to enforce national laws, more could have been done to support government efforts to protect vulnerable resources. Much of the exploitation of forests in the project area is commercial, and the project also lacked sufficient measures to address rampant charcoal burning and the commercialisation of indigenous wood harvesting for brick burning, brewing, fish smoking, urban firewood markets and for institutions. There is a further lesson to be learned about achieving a more effective balance between law enforcement and education, awareness-raising and on-farm substitution.

In some sense the project lost much of the richness that had originally been part of its design. The 'guiding principles' defined in the project proposal were often overlooked and effort was exerted achieving basic numerical targets in trees and stoves work rather than building institutional capacity, empowering communities, looking at the long-term sustainability of investments and working *with* the target populations rather than *for* them. A particularly clear outcome of this number-oriented approach is the lack of clarity over ownership of woodlots, of which over 800ha were planted under the project. There is a related lesson to be learned about taking a long-term perspective to environmental activities, not seeing them as short-term emergency responses.

The project did, however, achieve considerable success in creating goodwill between refugee agencies and the Ugandan government, alleviating potential conflict between refugees and local people over natural resources, generating employment and generally promoting a constructive social atmosphere. These are useful and worthy impacts. The project was well received and considered an example of the international community's positive support to Uganda's own efforts to host refugees in a peaceable and low-impact manner. The President of Uganda himself has on several occasions raised environmental issues in dialogue with UNHCR, and one lesson learned from the project is the clear linkage between investments in environmental programmes and the smooth relations that this can promote with concerned governments and host communities.

4. Lessons Learned

- **Support to environmental programmes is support to refugee protection:** Environmental projects serve a useful and valid role as examples of the international community's commitment to sharing a country's burden in hosting refugees. They make a contribution to responding to criticism targeted at refugees in their exploitation of natural resources and are of value in alleviating potential tensions and minimising conflicts with host communities and government authorities. In addition to any positive physical impacts that may be realised in terms of environmental protection and resource management, they are, in a real sense, activities which contribute to the protection mandate of UNHCR. This has been exemplified in the Uganda programme, where achievements in the environment sector have been a significant and ongoing positive theme in the dialogue between UNHCR and the government.

- **Environmental activities benefit more than most from multi-year funding:** Environmental activities demand a long-term perspective, especially where the establishment and maintenance of trees is concerned. They thus benefit greatly from multi-year funding such as that provided under the BMZ project in Uganda. Such funding permits the development of long-term planning based on a solid foundation of refugee and local community participation. It also allows for the seasonality of environmental work, which is generally scheduled with the seasons rather than UNHCR's 12-month programming cycle.

- **UNHCR country programmes need Environment Co-ordinators to ensure accountability and technically sound project implementation, but these individuals need empowerment and support:** The presence of an Environment Co-ordinator within a UNHCR country programme is vital to ensure proper monitoring, management and implementation of environmental activities. But such individuals require respect, empowerment and support if they are to fulfil their

responsibilities effectively. This means personal mobility, unimpaired freedom of movement across the project area and the authority to modify and re-design activities as required. It is not sufficient to have a technical adviser in place when that person lacks real authority and is viewed within UNHCR as a sector specialist in a temporary consultancy position working primarily with one sub-office.

- **Development agencies generally make better environmental partners than relief agencies:** The selection of development-oriented partners for the implementation of environmental programmes is, in the long run, more likely to yield sustainable results than the involvement of traditionally humanitarian organisations. Development organisations have a stronger concept of participatory approaches and sustainability, which can be sacrificed by relief organisations in the name of short-term visible impacts. While this may not always hold true, the relative success of ACORD in the Ugandan programme and its dynamic adaptation of approaches as the project progressed, showed a certain understanding of the need for sustainability and participation of the target community.

- **Donor reporting deadlines should be respected.** UNHCR needs to adhere to donor-prescribed reporting deadlines. This should go without saying for major financial supporters. But the final report to BMZ was due within six months of the end of the Uganda project and was submitted 18 months thereafter. The 1999 annual report was delivered at the same time. A lesson must clearly be learned on efficiency and timeliness in the preparation, submission and forwarding of such reports. If the Uganda experience is typical, then UNHCR needs to streamline dramatically its systems for getting reports from the field, to the Branch Office and on to Geneva and then the donor.

- **The host government is a core environmental partner, but will invariably require capacity-building support:** While the involvement of government technical departments in environmental activities is clearly desirable from the perspective of sustainability and basic procedural correctness, there is often a serious lack of staff and resources to actually implement and manage environmental activities in the field. In times of personnel cuts there may also be a significant gap in education and competence between administrators at district level and operational staff in the field. Wherever possible, environmental projects should aim to strengthen the working capacity of government technical departments. Such support should minimise material donations of equipment and materials, but rather be directed at training and skills building, establishment of co-ordination systems in which government personnel are equal partners in planning processes, and reinforcement of the government's rightful leading role in policy development concerning resource management.

Environmental and Sustainable Agriculture Training: Practices and Lessons in Meheba Refugee Settlement, Zambia

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Executive Summary

Meheba Refugee Settlement is located in the North-Western Province of Zambia. It is home to over 54,000 refugees mainly from Angola, with significant populations from the Democratic Republic of Congo, Rwanda, Burundi, and a handful from other African countries. The settlement covers an area of 820km² and has considerable natural resources including forests, rivers, *dambos*, swamps and a diverse range of habitats. It is therefore vital that the impact of the refugee settlement is monitored and that pro-active programmes in sustainable forest management, agriculture, livestock and watershed management are initiated.

The Lutheran World Federation (LWF), with Zambia Christian Refugee Service (ZCRS), is the main implementing agency in the settlement and is responsible for implementing Agriculture and Forestry activities, along with other key sectors. The need to protect the environment and natural resources from the impact of refugee settlement has influenced the way LWF/ZCRS designs its field programmes. As a result, LWF has integrated aspects of environmental protection, management and sustainable land use practices in its delivery of services to the refugees.

Kew Words:

✓ *Reforestation*
✓ *Rehabilitation*
✓ *Land degradation*
✓ *Exotic species*
✓ *Indigenous species*
✓ *Agroforestry*
✓ *Reafforestation*
✓ *Watershed area*
✓ *Sustainability*
✓ *Shifting cultivation*

1. Introduction

Meheba refugee settlement is located in Solwezi District in the North Western Province of Zambia.

The refugee population was 54,622 at the end of September 2001. Some 88 per cent of the refugees (48,204) are Angolans. Other nationalities include 3,406 Rwandans, 1,589 Congolese (DRC), 1,326 Burundians and 97 refugees from other countries (Table 1).

Table 1. Refugee Population Statistics for Meheba Refugee Settlement

Country of Origin	*Population*
Angola	48,204
Burundi	1,326
Congo Br.	2
Congo D.R.	1,589
Mozambique	1
Rwanda	3,406
Namibia	7
Uganda	19
Sudan	19
Liberia	7
Sierra Leone	10
Somalia	26
S. Africa	2
Zimbabwe	1
Ethiopia	3
Total	54,622

The Angolans belong to the Mbunda, Chokwe, Luchazi, Lunda and Luvale ethnic groups. The Rwandans and Burundian refugees are mainly of Hutu ethnic extraction. The Congolese refugees are mainly from the Kasai region.

Most of the refugees are from a rural farming background. Their staple food crops are maize and cassava. Shifting agriculture is the traditional way of allowing land to fallow and has therefore been the principal natural resource management mechanism. Other traditional farming practices, which have been utilised in safeguarding soil use, include intercropping and use of legumes for nitrogen replenishment.

2. Natural Resources to be Managed

The following should be noted:

- forests: over 40 per cent of the total area of Meheba is forest land;
- rivers: Meheba is drained by three perennial rivers – the Meheba, Mwafwe and Milunga;
- *dambo*;
- swamps; and
- a range of natural habitats.

3. External Resources Used in Environmental Programmes

- technical personnel, i.e. Forestry Extension Officers, Beekeeping Technician, Fisheries Officer, etc. Government workers also provide technical support;
- activity inputs, e.g. agroforestry trees species, seeds, other planting material, fishing nets, fingerlings, bee hives, apiary equipment, nursery tools, various training materials, posters etc.;

- environment policy in the settlement: – the indiscriminate felling of trees is unauthorised and organic farming is encouraged instead of using chemical fertilizers; and
- government legislation, e.g. Zambian law prevents cultivation and other land uses within 10m of watershed areas and rivers. Government legislation also requires a person who is felling trees to obtain a permit.

4. Stakeholders

4.1 Refugees

The refugees are the principal stakeholders and must be encouraged to initiate and participate in the development of sustainable environmentally friendly land use activities. It is important to note that a large proportion of the current refugee caseload in Zambia may eventually come to remain in the country. The refugee community should therefore have an interest in protecting the natural resources in the settlement.

4.2 Local Population

Local people are stakeholders, in most cases having traditional ownership over the land where refugees are settled. The local population as a group also possess useful experience in the management of the area's natural resources.

4.3 Host Government and Local Authorities

The local authorities have political and administrative interests in ensuring that natural resources made available for refugee assistance operations are protected and the environmental impact of their settlement is not negative. The government should undertake technical evaluation and assessment with donor support if necessary. The government should participate in overall management of refugee affairs and establish a structure for administration that co-ordinates with UNHCR and other implementing agencies. Government technical workers at different levels and purpose established action should be focal points.

Technical and extension services from the government should also provide information in legislation relating to natural resource utilisation and protection.

4.4 UNHCR

UNHCR has an internationally recognised mandate for protection and management in refugee situations. This places UNHCR in a unique position that requires it to work with the government and take the lead during the emergency phases of refugee assistance, to incorporate and integrate environmental considerations. UNHCR should therefore develop policy and practitioner guidelines for natural resources management and environmental protection.

UNHCR should mobilise donors and funding to help initiate environmental programmes in refugee-affected areas.

4.5 Other UN Agencies

Other UN agencies with technical mandates operating in Meheba are FAO and UNICEF, working in collaboration with LWF/ZCRS and the Ministry of Health, respectively.

4.6 International NGOs

International NGOs work alongside UNHCR during all phases of refugee assistance from emergency, through care and maintenance, to durable solutions. International NGOs are in direct contact with refugees and should provide technical expertise as a resource to identify and carry out needs assessments which would lead to project development and design – leading to eventual implementation and management.

NGOs also can take the lead in implementing rehabilitation projects. NGOs, along with UNHCR, can seek funding from their donors to support the environment.

In the case of Meheba, LWF is the international NGO taking the lead.

4.7 Donors

Donors represent governments, foundations, social groups, individuals etc. The refugee problem impacts on the development activities of host countries. LWF environmental and sustainable agriculture training project for Meheba and Mayukwayukwa Refugee Settlements is funded through Austcare (an Australian NGO) by AustAID with Australian government funds.

5. Problem Analysis

Meheba refugee settlement continues to receive on a steady basis, new refugees, mainly from Angola. This continuing influx has led to degradation and deforestation in parts of the settlement. Trees are cut for different purposes including clearing land for farm plots, shelter construction, charcoal burning and production of traditional medicines.

A detailed outline of a needs analysis, project design, objectives and outputs planned and implemented is provided in the case study that follows.

Also indicated in the outline are observations on assessment of the successes and difficulties and lessons learned.

6. Case Study: Environmental and Sustainable Agriculture Training in Meheba

6.1 Problem Identification

With an increasing refugee population at Meheba, a major concern is how to sustain food production through agriculture to meet the needs of the population, whilst protecting natural resources.

In response, the natural resource management strategy has focused on sustainable use of resources, practicing rehabilitation and directing refugees on the benefits of sound environmental management practices and the incorporation of environmental considerations into all aspects of assistance and intervention.

6.2 Project Design

Agencies involved in the Natural Resource management programme in Meheba are LWF/ZCRS, UNHCR and the government of the Republic of Zambia, particularly the Ministry of Environment and Natural Resources and the Ministry of Local Government.

In recognising the fact that Meheba has fertile soils and high potential for farming, the project was designed around the fact that farming will be a key activity in the lives of the refugee families and the main thrust of the project is to promote sustainable farming practices, environmental rehabilitation and creation of awareness.

The key objectives of the project are to:

i. minimise the negative environmental impacts in Meheba and Mayukwayukwa refugee settlements by incorporating environmental considerations in all aspects of assistance and intervention;
ii. rehabilitate degraded land; and
iii. ensure that economic growth for the refugee population is based on sustainable intensification of resource use through education and motivation.

Methods used in project implementation are:

i. extension outreach and field demonstrations;
ii. provision of inputs for various activities;
iii. training;
iv. formation of clubs; and
v. use of environmental messages e.g. posters.

The main activities of the new project are:

i. agroforestry;
ii. soil conservation;
iii. education and awareness through eco-clubs and women groups;
iv. environmental awareness posters;
v. field trips and exchange programmes;
vi. promotion of use of energy-saving stoves (ESS);
vii. promotion of fish farming; and
viii. promotion of bee keeping.

Key project activities are tabulated below.

Project Targets	Performance Indicators	Final Achievement
(a) Forestry and Agroforestry		
1. 100 farmers (60 men and 40 women) to grow nitrogen-fixing crops and multipurpose tree species (70 in Meheba and 30 in Mayukwayukwa).	Number of farmers and crop areas planted/number of trees planted.	200 farmers growing nitrogen-fixing crops and other multipurpose tree species. 35.5ha of soy beans, cow peas, pigeon peas, green gram, sugar beans, velvet beans, and trees such as *Sesbania sesban, Tephrosia vogelii, Leucaena leucocephala* and *Sesbania marcaranth*.
2. 20 farmers to grow Vetiver grass in 7 sites in Meheba.	No. of farmers, no. of sites planted.	Only three farmers (instead of 20) planted vetiver grass, during the 2000/2001 planting season giving a total area of 0.5ha.
3. 120 girl guides to establish two woodlots plots.	No. of guides, no. of plots	120 Girl Guides put up two woodlot plots of *Gmellina arborea* and *Pinus merkusii*.
4. 300 eco-club members in Meheba (150 boys and 150 girls) and 30 (15 boys and 15 girls) in Mayukwayukwa to plant and maintain 4ha of agroforestry and woodlot tree species.	No. of members involved, hectares planted, no. of seedling planted.	353 eco-club members planted 3.5ha of woodlot tree species, such as *Senna Siamea* (900), *Pinus merkusii* (950), and *Gmellina arborea* (890), in a total land area of 5.84ha.
5. 160 members of women's club to participate in agroforestry/re-afforestation activities.	No. of women involved.	From both Mayukwayukwa and Meheba 200 members of four women's clubs participated in agro-forestry/ re-afforestation activities through woodlot planting, agroforestry planting training sessions and field days. One group of 90 planted 1.75ha of *Sesbania sesban* (680 seedlings), another with 10 members planted 0.25ha of *Leucaena leucocephala*, a third of 50 members planted 0.5ha. of *Gmellina arborea* and a fourth of 50 members planted 0.5ha of *Pinus merkusii*.

(b) Awareness-raising/Exchange		
6. 10 workshops (6 Meheba, 4 Mayukwayukwa) to be held on agro-forestry and reafforestation, 4 workshops (2 Meheba, 2 Mayukwayukwa) on soil/water conservation.	No. of workshop, no. who attend, participant evaluation of workshop.	4 workshops (3 Meheba, 1 Maykwayukwa) agroforestry held, 2 workshops (1 Meheba, 1 Mayukwayukwa) on soil/water conservation organised. Total attendance 1,500. Overall evaluation by participants was favourable, including training methodology.
7. 330 eco-club members to have participated in 3 quizzes/competitions on environmental awareness issues.	No. of competitions held, no. of participants.	Of 353 eco club members, 46 participated in the recitation of poems in Mayukwayukwa and 307 in a quiz in Meheba, while two competitions were held during agricultural shows, and 58 undertook an educational field trip to Kitwe's environmental protection forests.
8. 30 Awareness posters to be mounted in strategic locations within both settlements, videos to be shown to eco-clubs, farmers, women's clubs and eco-clubs, farmers, women's clubs and eco-club members to perform drama, songs, etc. for the community on environmental issues.	No. of posters displayed and in what languages, no. of videos shown and who attended, no. of people involved in performances and no. of audience.	30 Awareness posters constructed and displayed at various locations in the settlements in Luvale and Lunda languages. 12 more environmental posters under construction. 46 Eco club members performed songs and poems during the field day attended by 120 farmers. No videos were purchased or shown.
9. Exchange visits to take place between Meheba farmers and Mayukwayukwa farmers and other institutions involved in agroforestry/ re-afforestation and soil/water conservation.	No. of people who go on visits and participant evaluation of usefulness of visit.	No exchange visits have so far been carried out. However, one is planned in October 2001.
10. 4 field trips to agro-forestry institutions involving 25 participants per trip to take place	No. of field trips and no. of participants; participant evaluation.	One educational field trip by the Meheba Eco club, involving 58 pupils was carried out. However trip aimed to take 50+ students due to logistical and time constraints.
(c) Energy Saving Stoves Activities		
11. 1,000 women (750 in Meheba, 250 Mayukwayukwa) to be trained in use of fuel-saving stoves.	No. of women trained	1,450 women trained in various energy-saving stove methodologies within the two settlements, due partly to mobility of stove instructors who were bought bicycles.
12. 900 stoves to be constructed by women and to be in use (630 in Meheba, 270 Mayukwayukwa).	No. of stoves constructed	800 energy-saving stoves constructed in Meheba (600) and Mayukwayukwa(200). More stoves continue to be constructed.
(d) Fish Farming		
13. 120 farmers (100 men, 20 women) (110 Meheba, 10 Mayukwayukwa) to be trained in fish farming and to receive tools on loan.	No. of farmers trained, no. who receive tools.	During the three months period (June-August), 98 fish farmers were trained and given shovels, wheelbarrows and hoes on loan. Training sessions to continue up to the end of the year, by which time the coverage will be much higher.
14. 250 fish farmers in all zones in Meheba to be practicing fish farming.	No. of farmers engaged in fish farming.	230 fish farmers currently practicing fish farming in Meheba and 194 fishponds out of 250 are now operational.
15. 8 nursery ponds (7 Meheba, 1 Mayukwayukwa) to be established for fingerling multiplication and table fish production.	No. of nursery ponds established.	8 nursery fishponds constructed in Meheba and awaiting fingerling stocking.
16. 6 workshops to be held (4 Meheba, 2 Mayukwayukwa) for farmers (100 to have attended each workshop). Also 1 project staff training workshop to be organised.	No. of workshops held and no. of people attending; participant evaluation.	Four fish farmers' workshops conducted (3 in Meheba and 1 in Mayukwayukwa). 70 fish farmers attended; 15 of whom were women. Staff project workshop to be convened in October 2001.

(e) Bee-keeping		
17. 700 farmers (600 Meheba, 100 Mayukwayukwa) (300 women, 40 men) to be trained in modern bee-keeping.	No. of people trained.	300 beekeepers; of which 25 were women trained in modern beekeeping techniques, such as siting of frame hives, predator control, honey harvesting and general hygiene. More training workshops under way. Workshops favourably reviewed by participants, which encouraged even women to come forward to engage in beekeeping.
18. 700 modern frame hives to be built and 700 farmers to receive on loan basis.	No. of hives distributed	125 modern top-bar hives have been constructed, and another 240 are under construction. The target of 700 will mostly likely be achieved by the end of 2001.
19. Establishment of two demonstration apiaries, (1 Meheba, 1 Mayukwayukwa).	No. of apiaries established	From the current hives constructed, three apiaries have been established.
20. 20 Beekeeping clubs to be formed (15 Meheba, 5 Mayukwayukwa), 2 Beekeeping Associations to be formed (1 Meheba, 1 Mayukwayukwa).	No. of clubs and assoc formed, no. of members of each	13 out of 20 beekeeper associations formed, with total membership of 439, of which 165 are women. The figure is bound to increase before the end of the year. The possibility to get easy loans through such groupings is one of the factors facilitating the formation of associations. Such associations have harvested a total of 11,300kg of processed honey with income estimated at K11.3 million.
21. One educational field trip involving 30 farmers, (15 Meheba, 15 Mayukwayukwa) to modern Beekeeping plant in Kabompo and to view an apiary there.	No. and attendance at trips	Educational field trip to Kabompo and workshop were simultaneously carried out, at which a total of 42 beekeepers attended. Meheba was represented by 36 beekeepers, 7 of whom were women, and Mayukwayukwa by 6 all male beekeepers. Workshop was positively evaluated by the participants who asked for another one before the end of the year.
22. 20 workshops to be conducted (12 Meheba and 8 Mayukwayukwa) on modern bee-keeping, to be attended by 100 farmers at each workshop. Also 1 training staff workshop for project staff on beekeeping.	No. of workshops held and no. of people attending; participant evaluation.	13 training workshops in both Meheba and Mayukwayukwa attended by an average of 300 at each session were conducted. Project staff training workshop is scheduled for mid- October 2001. A total of 3,900 bee-keepers have attended workshops within the settlements. The workshops were evaluated positively.

A summary of the key areas on Natural Resource Management is as follows:

- Forestry

  In Meheba, there are 2 institutional nurseries and 7 communal ones which are used to propagate tree species both exotic and indigenous. The main woodlot tree species being:
  - *Gmellina arborea*
  - *Pinus merkussi*
  - *Pinus oorcapa*
  - *Ficus* species (indigenous).

  The purpose of protecting woodlots is to re-afforest the deforested areas. Agroforestry is also promoted by encouraging refugee farmers to plant the following tree species:
  - *Tephrosia vogelli*
  - *Leucaena leucephala*
  - *Sesbania sesban*
  - *Gliricidia sepium.*

  They help restore depleted nitrogen levels in fields which have grown crops such as maize, sweet potatoes and root and tuber crops.

  In the past two years, educational trips were organised for the benefit of refugee farmers and students, to ICRAF (Chipata, Eastern Zambia) and the Chati Forestry Reserve, Copperbelt Zambia.

  Refugees have been trained in sustainable agriculture practices such as conservation farming, contouring, crop rotation and agroforestry. Organic farming is encouraged

as opposed to the use of chemical fertilizers and pesticides. Crop rotation to break pest cycles is emphasised as an effective and environmentally friendly option to chemical control.

Farmers are trained by extension outreach, field demonstrations and in formal workshops. Field trips to various institutions are means of necessary farmer exposure.

Other farming practices encouraged include use of early maturing and high yielding seeds and cultivars in the case of maize and cassava respectively. More than 2,000 farmers were trained in 2001.

- Beekeeping

Beekeeping is also being promoted. Currently 300 beekeepers are using traditional bee hives. The construction of traditional hives encourages wanton destruction of trees, modern beekeeping techniques are being promoted. A total of 125 modern frame hives have been constructed and will be available to the beekeepers on a loan basis. A group 42 beekeepers attended a workshop in Kabompo district in North Western Province.

Meheba hosted the annual District Agriculture and Commercial Show in 1999 and 2000 from the Solwezi district. These shows provide farmers with valuable exposure to sustainable and environmentally, friendly farming practices.

- Watershed Management

Meheba is served by three perennial rivers and several perennial streams originating from these rivers. *Dambos* exist in the low lying areas of the settlement. The main activities that utilise the water catchment areas are fish farming, vegetable and rice production.

In Meheba, currently there are 194 fish ponds which are being managed. The fish farmers benefit from loans and extension services. The fish ponds are fertilized using natural manure from animal droppings i.e. rabbits, poultry and goats to provide the fish with food. The water in the fish ponds is also recycled with streams draining in and out of the ponds. The water is drained monthly.

Vegetables, root tubers and rice are grown in the *Dambos.* A buffer zone of 10m from the river beds and water sources is maintained and this is enforced by Zambian legislation.

- Livestock Management

Refugee families traditionally keep small livestock like goats, pigs and poultry. Extension services focus on disease prevention, animal husbandry, various other aspects of resource management.

7. Lessons Learned

If any environmental project is to be undertaken, a serious campaign has to be mounted because such issues are relatively new to these refugees who come from rural settings where shifting cultivation is the main farming method known to them.

Given that the refugees in Zambia might not be repatriated soon, long-term policies and strategies should be developed and farmers trained in environmentally-friendly agriculture practice and sustainable land use.

Tree cutting and destruction of natural habitats is common in the newly-established zones in comparison to the old settlement where environmental education has been going on for sometime. This could be attributed to the desperate and difficult circumstances in which the refugees find themselves.

There is a need to reinforce co-ordination between the different stakeholders i.e. the refugees, local population, UNHCR, LWF/ZCRS and Government, in addressing environmental protection.

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Participatory Strategies for Natural Resource Management

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Executive Summary

Participatory methodologies have been recommended for development projects since the 1970s, in recognition of the fact that a project's success is often closely linked to the involvement of communities in planning and designing from the outset.

In refugee situations, participatory strategies can and should be applied when designing assistance programmes. Such strategies and tools are appropriate for environmental problem identification, project formulation, implementation, monitoring and evaluation of interventions.

This paper outlines participatory approaches to environmental project planning, with particular emphasis on participatory monitoring and evaluation techniques.

Kew Words:

✓ *Participation*
✓ *PRA*
✓ *Monitoring and Evaluation*

1. Introduction

Participatory Rapid Appraisal (PRA) is perhaps the best known of current participatory methodologies. PRA evolved from Rapid Rural Appraisal (RRA).

PRA was initially developed in the 1970s in response to the weakness of traditional survey and research methods, which were very costly, time-consuming and gave full control of analysis to external researchers rather than the communities with whom they were working.

PRA was attempted for the first time in Kenya in 1986 by the National Environment Secretariat (NES), which experimented with PRA after experiencing frustrations with other approaches during the natural resource management campaigns which peaked in the country during the 1980s. During the initial years of PRA the methodology evolved through a process of trial and error. Many organisations have now adopted this approach.

Environmental campaigns in the past were characterised by top-down approaches to decision-making. Decisions were made by national-level "experts" and "disseminated" to rural people through seminars and quickly organised visits by provincial administrators. Information was often passed on in haste as the officers were in a hurry to make similar calls in other districts. In some meetings and seminars people were informed about the need to protect their environment through tree planting, soil conservation, water protection, improved sanitation and so on.

The activities promoted were based on what the experts felt that rural people needed for development. Hardly any effort was made to ask people what they felt they needed themselves. Over the years, rural communities became conditioned to this situation and began losing confidence in their ability to decide for themselves important matters affecting their livelihood.

Communities respect outsiders, and in many cases take what they are told by outsiders as the "bible-truth". Consequently a dependency syndrome was perpetuated to the extent that communities would hardly ever say no to a suggestion brought to them by an outsider. This was evident in the mushrooming, especially in the early 1980s, of projects which were costly, capital-intensive, technically unsustainable and which often collapsed once donor money ran out and technicians left.

At present, the traditionally benevolent countries and institutions are undergoing a crisis of donor fatigue. They are realising that despite the large amounts they have pumped into developing countries, particularly in Africa, the lives of the majority of people have not improved significantly and are in fact deteriorating. Donors have therefore scaled down their assistance when the need is highest. This means that for Africans and people from other developing regions to survive, solutions to problems of development must be sought from within.

The general belief that monetary aid alone would be able to solve all development problems has been proven wrong by the fact that poverty in Africa today is worse than it was 20 years ago. It is in this context that PRA came at an appropriate time.

2. Benefits of PRA

PRA enables communities to identify and define their own means of achieving sustainable development using a strategy based on real needs that can be met within the capacities and capabilities of their local institutions. In addition to enabling communities to be involved in their own development process, PRA has been a useful tool for identifying community institutions capable of formulating development plans. PRA enables communities to dovetail the roles of external agencies that can be called upon to provide assistance. It places a premium on community articulation and ranking of their development priorities. This is a major departure from traditional methods, which rely on experts to do this. A PRA exercise devises a management plan known as a Community Action Plan (CAP) or Resource Management Plan (RMP), which helps to guide the community as it implements various programmes (Egerton University, 2000).

The PRA approach focuses explicitly on the role of community institutions and practices, in an effort to identify development plans that community organisations can sustain. Contemporary literature on participation, capacity-building and community institutions suggests that sustainable development projects are built upon the priorities and capacities that communities themselves identify (Interaction, 1991; Uphoff and Cohen, 1979).

It is worth noting that PRA does not claim to be a substitute for government or donor funds. It simply attempts to ensure that community development planning is done with the participation of the beneficiaries. This ensures that projects are supported by the people, serve the interests of the majority and are selected on a priority basis. Projects that are established by the beneficiaries are likely to be protected from theft, sabotage and neglect. PRA ensures that funds are used where they are most needed and where they will have the most impact.

PRA is flexible enough to be adapted to any field. It has been applied in natural resource management, agriculture, health and education, to mention a few. PRA capitalises upon rural people's capacity to map, model, quantify, rank, score and analyse their problems. PRA strengthens community decision-making and management potential, and helps village members to develop a sense of confidence.

The term Participatory Rural Appraisal emphasises that the entire process of data collection and analysis is an evolving process of learning for the "outsiders" (which in a refugee situation would be UNHCR and its implementing partners) and for the population receiving assistance. It is a transfer of knowledge where refugees and/or local communities are the 'experts'.

3. PRA Assumptions

PRA is a systematic, semi-structured data-gathering activity carried out by a multi-disciplinary team. It is designed to uncover hitherto unknown facts about a given community. This information forms the basis of planning community development. The process of data gathering is socially acceptable, economically viable, ecologically sound and leads to decisions that focus on sustainable development. In this regard there are several key assumptions which form the pillars of PRA. These are:

3.1 Local leadership

PRA assumes that communities have local leaders and that the communities form the active foundation facing development challenges. PRA assumes that communities have committed local leaders to steer the development ship.

3.2 Local Knowledge

Communities have knowledge and information; it only needs to be organised. Rural resource-users have considerable knowledge about their problems and are familiar with local ways to solve them. PRA assumes that the community may not appreciate the enormous power that this information can yield nor how systematically this information can help rank problems, sensitise community groups to take action, and attract external agents for assistance. It promotes and recognises the value and indigenous traditional knowledge.

3.3 Community Institutions

Communities have resources that need to be mobilised. They can initiate projects, acting primarily on their own resources. PRA helps local institutions and leaders to mobilise themselves for effective actions.

PRA assumes that community institutions are among the most under-utilised resources available for development efforts. Therefore it encourages these institutions to become the prime movers of the development process.

3.4 Attracting Outside Assistance

External assistance is available but needs to be identified and defined in the context of community priorities. While community institutions can take initial steps to solve their own problems, they cannot necessarily do the job alone. External units such as government technical and extension officers, NGOs and international organisations (such as UNHCR) can often provide critical technical, financial or managerial assistance that is unavailable at community level. PRA creates a setting in which community and outside groups can work together with minimal conflict of interest.

4. PRA Elements

4.1 Target Groups

PRA focuses on:

- people and their institutions;
- rural communities, especially those in vulnerable ecosystems;
- integrating relevant sectors in rural development by focusing on natural resources;
- linking technical and socio-economic issues in defining problems and solutions; and
- systematising participation so that donors, governments, NGOs and CBOs can arrest and reverse declining development trends.

PRA helps communities to mobilise their human and natural resources, to define problems, consider previous successes and failures, evaluate local institutional capacities, prioritise opportunities, and prepare a systematic and site-specific plan of action – a CAP. The CAP is the starting point for a community to demonstrate its commitment to adopt and implement actions which address its needs. CAPs are derived and managed by those who most benefit from their implementation. CAPs therefore offer practical means for facilitating community self-help initiatives. A CAP can also be made sector-specific.

PRA enables community members, multidisciplinary teams of specialists and community leaders to work more closely together and understand community problems, needs and opportunities. Using the theme of natural resource management to integrate development sectors, PRA facilitates multi-sectoral (e.g. government extension services, technical professionals) and multi-institutional (government, NGO, CBO and donor) collaboration.

PRA is an excellent tool to bring together development needs defined by community members with the resources and technical skills of government, donor agencies and NGOs. In so doing, it integrates traditional knowledge systems and external technical know-how in the development process.

4.2 Participation

Ideally participation should involve every member of the community, irrespective of age, gender, socio-political status, geographical, educational, religious or other affiliation.

Full participation from community members is most likely to be attained when:

- perceived benefits are clearly understood;
- benefits are achieved relatively quickly; and
- there exists minimal technological complexity.

Participation is more difficult to achieve when:

- the project takes a long time to mature;
- the community is heterogeneous and/or politically unstable; or
- the community does not have a full understanding of the exact nature of the project, perhaps because it has a high degree of technological complexity.

Participation should not only mean involving people in activities but should also be all-inclusive, consultative and encourage information-sharing.

5. Usefulness of PRA

The PRA process is very useful in communities as a planning tool, for community unification, sensitisation and mobilisation towards collective activities. In addition, PRA is an excellent tool in helping communities to identify locally available resources and how best they can be used to implement poverty alleviation initiatives.

PRA has been used for natural resource planning and management, because it offers an opportunity to generate a wealth of social, geographic, economic, political and historical information about the community. It has also been used as a baseline tool for further enquiry and research regarding the community (Muhia, 1999).

6. PRA Methodologies

The PRA process can be divided into the following steps:

I. Site selection

II. Preliminary site visits:
a. Introduction to the community
b. Community review meetings
c. Planning meetings

III. Launching
a. Data gathering
b. Spatial data
c. Temporal or time-related data
d. Technical data

IV. Data synthesis and analysis
a. Identification of problems and their causes
b. Ranking of the problems
c. Identification of opportunities
d. Ranking of the opportunities

V. Preparation of the CAP

VI. Adoption of the CAP and strategies for its implementation

VII. Participatory Monitoring and Evaluation

7. PRA in the Refugee Environment Context

7.1 PRA with Refugees

Assessment and evaluation in refugee communities are often dramatically different from assessment and evaluation in other rural communities. But despite the differences, most of the above methodologies can be adapted to the refugee context.

Obviously refugee populations who have recently arrived will not have sufficient knowledge about their location of asylum to be able to provide detailed local histories and time lines. But it is important to gather the histories of events from their place of exile, as well as the story of their flight.

Many refugees may have moved to similar ecological regions bordering their homeland. In such cases, their interpretation and use of natural resources will also be relevant to the new location.

7.2 PRA and the Environment

PRA has been used extensively in promoting community participation in natural resource management. Thus it is an appropriate technique for assessing environmental concerns, in refugee-affected areas.

The methodological tools described above are particularly effective in assessing agricultural crops, forests, soils and labour. Socio-cultural attitudes towards resources, as well as access, control and usage of such resources, can also be assessed with the community.

8. Participatory Monitoring and Evaluation

8.1 Overview

With time, there has been realisation that monitoring and evaluation are part of a PRA exercise and need to be properly accommodated.

Participatory Monitoring and Evaluation (PM&E) is an interactive process that involves all stakeholders (UNHCR, government counterparts, implementing agencies, refugees and local communities) in determining the direction and outcome of a project. It is an integral part of the project cycle.

It represents a radical departure from traditional monitoring and evaluation approaches where project/programme monitoring and evaluation was left entirely in the hands of the funding agency, which in turn contracted external consultants to carry out evaluations. The result of this was either that the funding agency considered the monitoring and evaluation reports as a mere formality and did not make any adjustments to projects as suggested in evaluation reports, or that it took drastic steps following negative reports and ceased funding or wound-up programmes without regard to the key participants i.e. the communities. The traditional monitoring approach also often left communities unhappy about continued funding of "bad" projects, and failed to determine what communities perceived as "good" or "bad" projects.

By involving communities in the PM&E process, they are kept aware of the status of all their developmental activities and are jointly responsible for revising implementation strategies before it is too late. As a result, community ownership of projects and programmes is enhanced and implementation becomes cost-effective. This is because the action-learning-action process ensures that only the viable and working options receive continuous financial and human capital investment.

8.2 How It's Done

8.2.1 Principles

All projects, programmes and activities initiated following the implementation of the Community Action Plan are continuously monitored and periodically evaluated so as to keep them in line with initial expectations.

The process is carried out by teams. They are comprised of community members in collaboration with the representatives of implementing agents who may be working with the community.

One of the basic tenets of participation is that communities are involved at all stages of the activity, namely identification, implementation and maintenance. The communities are informed about what is going on at each stage in the process, and are central to all activities and planning.

A plan for implementation should thus incorporate a plan for monitoring and evaluation. It should be noted that monitoring is an ongoing activity, while evaluation is a periodic analysis of the progress of the community towards implementation of project objectives.

8.2.2 Participatory Monitoring

A monitoring committee composed of at least four community members (refugees and locals) and a representative of the implementing agency is formed. This committee is responsible for recording useful information to keep track of activities and progress towards attaining stated objectives. It is responsible for giving the community constant feedback on their activities. This team must be separated from the implementing committee, because it would be difficult for the implementing team to monitor itself. In instances where there are no external collaborators, the community can form its own monitoring team.

8.2.3 Participatory Evaluation

The community also forms an evaluation committee. The composition of this committee is similar to that of the monitoring committee, except that the size of the team will depend upon the number of projects being implemented by the community.

The purpose of forming the evaluation committee is to ensure that the projects receive unbiased and non-hurried evaluations. However, the evaluation team should not go above 10 members, for efficiency.

Participatory evaluation is a periodic analysis of the monitored information and as such it is not fully independent of monitoring.

The monitoring and evaluation committees are expected to produce reports, based on the agreed schedule of activities, and keep the community well informed about their findings. Where necessary, approaches and activities are modified and re-integrated to meet the objectives.

Evaluation should always be based on community-agreed indicators. Setting of such indicators is a laborious process. As far as possible it should be closely linked to the development of the community action plan.

8.3 Application

PM&E is linked to all the activities of the community. It provides information to help communities make informed decisions regarding:

- progress towards achieving their goals;
- the best strategies to ensure progress;
- re-evaluation of objectives to ensure they are attainable; and
- development of information regarding new and emerging linkages and opportunities.

8.4 Stakeholders

In order for PM&E to be successful, the community, UNHCR, government and implementing partners should be involved in the drawing up of the implementation plan in which the different phases are agreed upon and plans are made for monitoring and evaluation schedules.

The community needs to identify both a monitoring and evaluation committee to oversee the implementation process. This will also ensure that projects receive unbiased and unhurried evaluation. UNHCR and implementing agencies also need to identify their monitoring and evaluation team on the ground that will link up with the community evaluation teams.

During this venture, the stakeholders need to come together and harmonise the goals of the joint activities. This is when the roles of each stakeholder are discussed and established. In addition, they need to discuss and agree upon their indicators for PM&E.

The monitoring and evaluation committees from all stakeholders need to create a conducive environment that will allow flow of information in either direction.

Regular meetings with representatives from all sides are very important for the success of the partnership. The need for accountability and transparency cannot be overstated. Regular meetings on progress should be held and the contribution of the community considered in decision-making. This encourages the community to take up ownership of the project once UNHCR and implementing agencies have left.

All stakeholders need to recognise each others' strengths and weaknesses.

UNHCR and Implementing agencies may need to assess areas of weaknesses within the community and look into ways of improving them. For example, book-keeping, writing or leadership training, which can be supported at relatively low cost but will bring significant long-term benefits.

Strengths should meanwhile be emphasised and encouraged. It is important for UNHCR to be open about its own organisational limits to avoid undue expectations.

8.5 Directing the PM&E Process

The M&E process needs to maintain direction and focus. This is the only way to tell if the implementation process is actually moving towards meeting project objectives.

During the initial meeting at which stakeholders outline their respective roles, formulation of indicators at community level should be carried out. The selected indicators should be effective (i.e. able to measure what is intended and record changes in a timely manner). The indicators need to be simple and communities should be able to understand how to measure them.

Regular meetings and monitoring should guide decision-making in identifying constraints, what needs to be modified and how – before the project has progressed too far for amendment. Both the Community Action Plan and Implementation Action Plan can be used as reference points to monitor project progress. Any constraints encountered should also be recorded to avoid future mistakes.

8.6 Integrating PM&E in the Project Cycle

For communities to spearhead their own development they need to recognise ownership of the project.

During the development of the Community Action Plan, community members must commit themselves to the development agenda. Establishing committees or using pre-existing institutions to follow the progress of action plan activities is the initial step. This trains communities to plan with monitoring and evaluation systems in place.

It is wrong to assume that a community lacks capacity. A good example is the way in which women's groups run their projects. Usually they elect an education secretary who is able to write minutes of each meeting and a treasurer who can use simple book-keeping to record members' contributions, defaulters and amounts. After every project cycle, they meet to reflect the past and future of the group. In formulation of committees, they need to elect visionary leaders who are ready to serve and not to be served.

8.7 Outcome of PM&E

The outcome of PM&E is the reflection of the achievement of the project objectives. This can be viewed in two ways:

a. **Benefits accrued**
This is usually measured in terms of the community's access to resources or services that were previously inadequate or lacking. It is linked with improvements in their living conditions as well as partnership cohesion.

b. **Documentation of impacts**
Project evaluation reports are important in measuring the degree of achievements based upon project objectives. For the community this is useful information on their efforts, which can be used to solicit further partnership with other agencies. For UNHCR it is a reflection of its input into the community and a record of the outcome. It also justifies the use of funds to its donors.

Formal agreement upon the type of documentation required is important to allow its subsequent use by all stakeholders. UNHCR will often need more information

than a community and will have to upgrade PM&E information using secondary data from institutions within the project area. For example, the community may indicate an improvement in health status, while UNHCR may need to supplement this with quantitative information from health centres on the prevalence of health issues currently as compared to before project implementation. A copy of the report needs to be given to the community for future reference.

8.8 Benefits of PM&E

All stakeholders stand to benefit from the partnership.

Community benefits:

- there is enhanced motivation when there is progress towards project objectives;
- the partnership increases the sense of ownership and therefore sustainable development;
- there is a greater amount of accountability and transparency towards management of resources; and
- capacity-building of various community skills takes place.

Benefits for UNHCR, implementing agencies and technical staff:

- ability to assess project effectiveness for duplication in other areas;
- assistance in planning and management of resources to avoid "dumping of resources";
- ability to seek funding from contributors; and
- assistance in policy formulation and development.

9. Lessons Learned

The use of participatory approaches in environmental project planning in refugee situations has brought out the following lessons:

- Communities sensitised through broad-based PRA are easier to work with than communities where project inception and identification did not involve them.

- Implementing agents have a limited timeframe to realise project impact. The community takes time to harmonise and get ready to start project implementation. Implementing agents who push for results may not reach the intended outcomes. They may need to consider factors that slow community participation. Therefore, change agents may need to be culturally sensitive, carry out gender analysis prior to implementation and be flexible in project timings.

- The community has a wealth of indigenous information, which can be used to enhance success in the project.

- Communities have capacities that can be tapped, but may require additional skills and training to become better performers.

- Proper training in participatory monitoring and evaluation tools, both for the community and implementing agents is vital for its successful implementation.

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Seed Rehabilitation Projects in Returnee and Resettlement Operations

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Executive Summary

When refugees and internally displaced persons come back to their homes or to new permanent locations, they need to rebuild their livelihoods as soon as possible. Relief organisations often play an essential role in supporting this return and resettlement. In developing countries, where people are often heavily dependant upon agricultural activities, the implementation of seed rehabilitation projects may represent a valuable intervention strategy, with the objective of supporting food production and income-generating activities. However, seed relief projects need to be planned with great care. Consideration has to be given to the capacity of the implementing organisations to understand and respond to actual needs, local capacity to cope with the disaster and the long-term impacts of the projects themselves. Improving the effectiveness of seed relief activities requires improved understanding of seed systems and solid networking between international organisations, NGOs, research institutions and governments. Given the time constraint once emergency efforts start, CARE Norge believes that such understanding and networking by the different actors should be an integral part of normal pre-disaster preparedness. As with any relief intervention, an ad hoc approach can be harmful.

Kew Words:

- ✓ *Returnees*
- ✓ *Refugees*
- ✓ *Resettlement*
- ✓ *Emergency*
- ✓ *Natural and complex emergencies*
- ✓ *Seed systems*
- ✓ *Seed rehabilitation projects*
- ✓ *Seed stress*

1. Background

1.1 Context: Return to Community of Origin and Resettlement (Audience = Returnees and Host Communities)

The world refugee population at the beginning of the 21st century has exceeded 21 million, including many refugees who have been living in camps for years because of lack of capacity to return to their homeland (UNHCR). The unresolved question of the "gap problem" between relief and recovery is still driving refugees and communities to despair.

Relief organisations have an important role in creating incentives for people to come back to their villages by increasing food security, rehabilitating local economies, and restructuring social networks that have been undermined by the disaster. It is necessary to create conditions that allow refugees to return home in safety and dignity, when possible, or to facilitate the resettlement of refugees in viable arable land. Seed relief activities can be a valuable element for creating these conditions. CARE Norge is currently working to develop a methodology that aims at improving rehabilitation of seed systems. Some of the preliminary experiences related to returnees and resettlement operations are presented in this paper. Seed relief activities in refugee camps are not considered.

1.2 Sources of Seeds

The informal seed system, formal seed systems and relief/development activities are the farmers' seed source. Informal sources include farmer-saved seed, seed from neighbours and seed from local markets. In exchanges with neighbours, prices are usually on a par with local market prices for consumption, which correspond, most of the time, to an affordable source of seed. Basic grains and tubers in small-scale farming systems are usually produced for three main purposes: production for household consumption, production for the next planting and production for local markets.

Informal seed systems

Most farmers in developing countries depend on local sources for their seed procurement (Cromwell, 1990). In Africa, a study done by Wright et al (1994) shows that no more than 10 per cent of seeds come from formal systems and that seeds saved on-farm constitute 60-70 per cent of all seeds used by small farm households, the remainder being provided through informal procurement, mainly from neighbours and relatives. In Sierra Leone, the formal sector accounted for only 6 per cent of seed acquisitions (Richards and Ruivenkamp, 1997; Longley 1997).

The formal seed system is mostly characterised by its commercial aims. Therefore it exhibits strong linkages between the farm and the market for input, output and labour. Louwaars (1994) defined the system as a *"vertically organised chain of activities leading to the use of certified seed of approved varieties and hybrids"*. This external procurement of seeds can be used at the level of small-scale farms, first *"to cover deficits following harvest failures and second, to introduce new varieties of the crop aiming to provide seeds of better genetic or physiological quality"* (Wiggins and Cromwell, 1995).

NGOs are usually not producers, but rather distributors of seed to farmers in need. They are an important seed source for small farmers, especially in emergencies. In a non-emergency situation, many NGOs try to provide seeds by training farmers in the selection of local seed or by

apprenticeship in new techniques. In many cases, NGOs also focus on the distribution of certified seeds in order to improve the production of basic crops by "upgrading" seeds stocks and to increase the diffusion of improved varieties.

1.3 Seed Systems and Food Security

1.3.1 Seeds as Productive Assets

Seeds are the driving force of both modern and traditional agricultural systems. Seeds are central elements of livelihoods in rural areas since they represent food, productive assets and purchasing power for the majority of the world population.

The value of seeds resides in the fact that they represent both planting material and plant genetic resources. Seeds as planting material refer to the physical quantity and physiological quality (health) of the seeds. Seeds as plant genetic resources refer to the evolutionary processes where varieties have acquired or lost characteristics (resistance to drought, high-level of protein, short growing period, etc). These processes are easily influenced by factors such as farmers' selection or the introduction of new open-pollinated varieties that may interfere with the varieties already in place.

1.3.2 Seed Systems and Seed Security: A Complex System Based on Local Social, Economical and Ecological Conditions

Researchers commonly define 'seed systems' as the source of seeds, the source of information about seeds, and the activities that farmers undertake to secure the access to appropriate seeds (Haugen, 2001). Seed systems reveal their complexity as farmers manage, develop and frequently introduce new genetic resources to serve the long-term well-being of the household. Practices, knowledge and social relations which farmers use to promote the usefulness of plant genetic resources, are thus important part of the seed systems.

Healthy seed systems depend on various factors (Synnevåg and Halassy, 2000):

- availability and access to seeds of a range of varieties well adapted to the environment and farmer's needs;
- local capacity to manage the seeds, meaning the capacity to produce, select, maintain and store;
- institutional and organisational capacity of the community;
- existence of "seed promoters", structured local markets and infrastructure;
- socio-economic and cultural aspects i.e, social status, wealth, gender, age and taboos;
- formal and informal seed supply systems and the integration between them;
- links to governmental and private services, extension, and information; and
- an event altering one of these factors may put seed security in danger.

2. Problem Identification

Seed stress situations, defined by a lack of availability and/or accessibility of quality seeds of farmers' preferred varieties; differ in relation to the type of disaster. Disasters with rapid onset, such as floods, will destroy houses, food assets, harvest, fields, properties (seeds, livestock, tools), irrigation systems and sanitary systems. Disasters with slow onset, such as droughts, can eradicate forests and reduce or destroy harvests and pastures. Consequences of floods and droughts may be that farmers lose seeds, sell property or migrate with livestock. Long-term political conflicts can be defined as a permanent disaster and frequently lead to important and sudden migration of people (Longley, 1997).

Seed security in resettlement and/or returnees operations is highly vulnerable. Returnees will often find it difficult to access arable land due to mines, ecological disasters or occupation by others during the period of their absence. The institutional and organisational capacities of these communities to manage their seeds are often disrupted because of conflicts and fragile social networks. In a resettlement situation, refugees may also face problems in accessing preferred varieties in an ecological environment that may differ from their own social and cultural references. All these characteristics of seed stress in refugee situations aggravate the challenges faced by relief organisations.

3. Addressing the Issues

The comparison of case studies in different parts of the world shows that seed relief activities often have similar characteristics, and are not designed to address the particularities of disasters involving refugees. For example, Hurricane Mitch in Honduras did not create a big problem of refugees – in contrast to the situation created by the wars in Angola and Rwanda. However, very similar seed relief activities were implemented in the three countries.

In Honduras, the general assumption among the relief agencies was that the disaster destroyed all possibilities of farmers living by subsistence agriculture to recover their stocks of seeds before the next sowing season. Based on this assumption, the country saw a spectacular mobilisation of the international community and relief organisations to implement seed relief activities. Seed emergency projects were mostly based on the production and the multiplication of a few improved varieties of beans and maize. The reason given by the seed suppliers was that improved varieties were considered more suitable to improve the local production of the small farmers than the old landraces. However, studies done at the local level showed that the new seeds distributed were not well adapted to high altitude and humid areas. In Angola, Nankan (in FAO, 1998) also acknowledges the difficulties of implementing well-adapted seed relief projects and emphasises the problem of the loss of information related to appropriate cropping systems due to the departure of people.

In all cases, experience has shown that seed relief activities treated simplistically can lead to a *"virtual denial of the existence of local seed supply systems"* (Louwaar, 1994). Distribution of seeds and planting material poorly adapted to local socio-economic and ecological conditions can lead to a bad harvest and loss of Plant Genetic Resources (PGR). The short-term effects include a considerable reduction in local agricultural production. Moreover, since farmers save seeds from previous harvests, the introduction of new varieties not adapted to local conditions has negative impacts in the long run by "polluting" germplasm of the remaining local varieties. Failures caused by seed supply interventions place the food security of the region in danger, and further increase dependency on external aid. Seed distribution can also disturb the local economy by neglecting local producers and undermining the local seed exchange system.

Projects can aggravate conflicts between villagers and returnees or displaced farmers. Redistribution of arable land, bad targeting of the assistance to beneficiaries, and competition for limited natural resources are often important causes of these conflicts.

Independent evaluations refer to a set of limiting factors that reduce the effectiveness of seed relief activities. These include:

- lack of knowledge of the refugees and of their relationship with their community of origin;
- negligence of local coping strategies and lack of knowledge about local seed systems;
- lack of co-ordination, information networking and transparency between formal and informal systems and between relief agencies; and
- limited capacity of the formal seed system to respond to farmers' demand at the right time. Available commercial seeds are often limited to a few major crop species. The varieties are usually bred for commercial farms and are therefore not well adapted to small-scale farming conditions that depend on low inputs.

4. Observation and Key Lessons Learned

Securing food supplies and income generating activities for returnees is crucial for successful reintegration of refugees in communities affected by disasters. Relief organisations may play a decisive role. Healthy seed systems are vital for assuring food security at the local level and seed relief projects can be a vector for strengthening local capacity to secure livelihoods, create new income-generating activities and thereby reduce the dependency of people on external help.

However, seed relief projects are not always the best solution to rehabilitate seed systems. Distribution of seeds may be a risky activity if the implementing organisation does not have the capacity and knowledge to respond to the particular needs of the target community. Relief agencies should adhere to three core goals when implementing a seed rehabilitation project. These are: i) preventing losses of local PGR; ii) supporting/promoting/strengthening of local seed systems; and iii) strengthening farmers' access and information to seeds and planting material from the formal system.

Relief organisations have to go through different processes before being able to choose the most appropriate strategy. This paper presents the following recommendations:

- Relief organisations should ensure an adequate knowledge of seed systems among those personnel involved in their seed relief projects. Seed distribution should be considered on a long-term basis and after a deep evaluation of the need and the accessibility and availability of seeds at the local level. If availability is not the main cause of seed stress, then the relief organisation has to work closely with the returnees and the community of origin to understand what their real priorities are.

- The involvement of local populations and returnees in the approval of all rehabilitation plans is necessary. It can avoid some of the problems resulting from "top-down" project design. People should not be considered as passive recipients of aid, but as the main actors. This "demand-driven" approach also avoids prejudice and competition.

- Education, training and capacity-building should be major goals when implementing agricultural support projects. Local capacities have to be developed and supported to ensure an effective transition in the aftermath of a natural disaster.

- Land access is a major challenge in seed rehabilitation projects. Relief organisations should ensure that land distribution does not cause conflicts in the community or lead to the degradation of natural resources (e.g. creation of new fields in steep hillsides or vulnerable forests). It is important to understand the consequences of a disaster at the local level in order to better *"address the complex social issues, institutional strengthening and political processes involved in gaining access to safer and more productive land"* (Barraclough and Moss, 1999).

- The formal system, including gene banks, plays an essential role in the conservation of plant genetic resources. It should play an active role in emergencies by offering various varieties (other than commercial varieties) and should *"not be viewed as closed repositories"* (FAO, 1996). Richard and Ruivenkamp (1997) and Berg (2000) emphasise the need to develop gene bank facilities through joint planning involving NGO personnel. There is a need to encourage gene banks to be more oriented towards socio-technical concepts by strengthening the links between seed reserves, seed systems, information networks, technical facilities, relief agencies and farmers groups.

- Co-ordination between the different actors involved in an emergency (leaders of communities, local governments, aid organisations, government, private and international organisations) has to be improved and should be initiated before the disaster occurs and before the return of the refugees. To support this, a high level of transparency of

activities is required. An efficient information centre could be assigned the responsibility for disseminating information. This process should not aim to create new structures, but take advantage of the existing institutional framework to address sustainable development.

- Improved control of activities and impacts at the local level will be gained by systematising monitoring and evaluation processes.

- Donor agreement to flexible timeframes may permit better assessment of local conditions and local needs. However, agencies having poor knowledge about the local farming system or a low capacity to meet farmers' demand may better *"provide other forms of aid which are appropriate for farmers and within their capacities"* (Cromwell et al., 1996).

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The Impact of Large-Scale Population Dislocations on Natural Resource Management

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Executive Summary

Three cases of population migrations are compared, with a view to better understanding their impacts upon local resources. It is concluded that the impact on natural resources (e.g., woodlands, grazing areas and water resources) depends upon both the overall demand and the initial site conditions, i.e. on the local availability of resources and on the vulnerability of the ecosystem.

Relief agencies should endeavour to implement strategies that sustain the local environment, including its natural resources, for the welfare of refugees, IDPs and local populations – both now and in the future. Priority should be placed on mitigating the most critical environmental impacts, i.e. those which have a long-term negative impact. The local community and other stakeholders should be involved in any strategy concerning natural resource management.

Kew Words:

✓ *Natural resource management*
✓ *Population dislocation*
✓ *Environmental stress*
✓ *Tanzania*
✓ *Rwanda*
✓ *Ethiopia*

1. Introduction

Rapid population growth during the last decades, especially in the poorest countries of the third world, has dramatically increased the demand for natural resources. In many areas natural resources are overused, and the sound development of future generations is jeopardised (Gasana, 2001). Additionally, large-scale migrations of refugees or internally displaced persons (IDPs) have been increasing and placing further stress on ecosystems (see e.g., Bloesch, 2001b). Where the hosting environment is already under stress, an influx of refugees or IDPs can seriously threaten the integrity of local ecosystems and the economic activities dependent on them (UNHCR 1998b). Degradation of natural resources affects the welfare of refugees/IDPs who depend upon products (e.g., wood, water, crops) derived from the surrounding environment.

This paper compares three cases of population migrations with a view to better understanding their impacts upon local resources:

(a) **Rwandan IDP Camps (1990-1994)**
The advance of the Rwandan Patriotic Front led to a large-scale population migration within Rwanda. In 1993-1994 about one million people from the north of the country became settled in about 40 camps of various sizes in the Prefectures of Byumba, Ruhengeri and Kigali (Dériaz 1994, Gasana 2001).

(b) **Greater Benaco Refugee Camps, Tanzania (1994-1996)**
In 1994, about 450,000 Rwandan refugees, fleeing civil war in their homeland, were settled in the four camps of Greater Benaco in north-western Tanzania (Bloesch, 2001b).

(c) **Adi Keshi IDP Camp, Eritrea (1999-2001)**
In February 1999, about 20,000 IDPs arrived in Adi Keshi due to the second offence of the Ethiopian army. As many as 40,000–50,000 people lived in Adi Keshi at its peak (Bloesch 2001b). About 20,000 IDPs are still there today.

The following questions are asked in order to assess the impact of each influx of refugees/IDPs on the natural resource base, and its possible long-term consequences:

A) What was the state of natural resource management prior to the influx of the refugees/IDPs?
B) What was the main environmental stress related to the refugees/IDPs?
C) What mitigation and rehabilitation measures were undertaken and what was their impact?
D) What was the most critical environmental impact with the longest-lasting consequences?

2. Natural Resource Management Prior to the Population Influx

See Table 1:

*Figures from population census Rwanda 1991, Tanzania 1988; Eritrea figures from Gebremedhin, 1995

As can be seen, the pre-existing conditions at the three sites are quite different in terms of both their original ecosystems and the intensity and type of land-use.

3. Environmental Impact of Refugees IDPs on Natural Resource Management

See Table 2:

Increased demand of wood, water, pasture (in Adi Keshi) and food in recipient areas led to an increased use of natural resources.

See Table 3:

Organised wood supply from areas with abundant wood resources may also be considered as a mitigation measure. It is important to note, however, that the outcome of this exercise in the two cases where it was introduced was quite

Table 1. Baseline Status of Hosting Sites Before Influx of Refugees/IDPs

	Rwanda IDP Camps	Benaco Refugee Camps, Tanzania	Adi Keshi IDP Camp, Eritrea
Climate type (Köppen, 1931)	Aw, wet-and-dry tropics	Aw, wet-and-dry tropics	BSh, semi-arid
Ecosystem	Moist savannah	Mesic savannah	Dry savannah
Ethnic groups	Banyarwanda	Wahangaza, Banyarwanda, Banyambo, Bashubi	Baza, Narras
Population density*	300-600 per km2	20-50 per km^2	10-15 per km^2
Land-use	Subsistence farming with small amounts of livestock; even marginal land on steep slopes under cultivation; fallow period very short or absent (Gasana, 2001);	Subsistence farming; cattle rearing; fallow period long enough to restore soil fertility	Semi-nomadic pastoralism; irrigation farming along the Gash River
Wood resources	Shortage of fuelwood; accelerated deforestation; use of crop residues for fuel	Abundance of wood (fuel and construction) in the vicinity	Wood resources scarce but low demand

Table 2. Refugees and their Needs

	Rwanda IDP Camps	Benaco Refugee Camps, Tanzania	Adi Keshi IDP Camp, Eritrea
Ethnic groups	Banyarwanda	Banyarwanda	8 different groups
Refugee number	Up to 0.5 million (10/91-7/92) up to 1 million (7/92-4/94)	400,000–450,000	20,000–50,000
No. of camps	40	4	1
Duration of camp	Large camps 14 months	42 months	32 months
Cooking energy	1kg wood/person/ day; 50-80 per cent transported from thinned Pinus and Eucalyptus plantations	2.7kg wood/person/day decreasing to 1.65kg (Owen and Ruzicka, 1997); 20 per cent transported from thinned Acacia stands; 80 per cent self-collecting (mainly green wood in later stages)	Fuelwood consumption not known; self-collecting (mainly green wood in later stages); kerosene less than 10 per cent of total consumption
Shelter building	Building material cut on site	Building material cut on site	Building material cut on site; UNHCR tents
Water	From existing sources	Water dam, new boreholes	New boreholes
Pastures	No significant use	No significant use	Pastures in the vicinity of the camping, lopping of fodder trees
Food	Mainly imported; some exchange with local population	Mainly imported; some exchange with local population	Mainly imported; some exchange with local population

Table 3. Mitigation Measures

	Rwanda IDP Camps	Benaco Refugee Camps, Tanzania	Adi Keshi IDP Camp, Eritrea
Improved stoves	used by about 90 per cent	used by about 80 per cent	no
Kerosene stoves	no	no	yes
Awareness raising	(yes)	yes	no
Energy-saving practices	(yes)	yes	no
Environmental management plan	no	yes	no

Table 4. Rehabilitation Measures

	Rwanda IDP Camps	Benaco Refugee Camps, Tanzania	Adi Keshi IDP Camp, Eritrea
Clearing up	no	yes	planned
Tree planting	no	yes	planned
Direct sowing	no	yes	possibly
Natural regeneration	no	(yes)	possibly
Fire management	not necessary	yes	not necessary

Table 5. Impact of Refugees/IDPs on Natural Resources

	IDP Camps	Camps, Tanzania	Eritrea
Wood resources	●●	●●●	●●●
Wildlife	—	●●●	●
Biodiversity	●	●	●●
Pastures	—	Tree/shrub felling increased pastures	●●●
Aquifers, open water sources	●	●●	●●
Air pollution	●	●●●	●
Agriculture	●	positive effect of clearing land	—
Soil erosion	●●	●	●●●

— no effect ●●● little effect ●● medium effect ● large impact

opposite. Although in both cases the distribution was free of charge, the scarcity of wood in Rwanda and the well-organised operation led to its economic utilisation. On the other hand, due to the relative abundance of wood resources in the Benaco, free distribution actually increased refugees' per capita consumption.

4. Lessons Learned

We should avoid making general conclusions; many lessons cannot be applied elsewhere due to a site-specific context or certain institutional, financial or political constraints (see also UNHCR, 1998a). The following lessons may nevertheless be drawn from the three case studies of large-scale refugee/IDP influx:

- Harvesting of firewood is, in most cases, the most environmentally damaging activity associated with a refugee/IDP influx (UNHCR, 1998a). The resulting reduced vegetative cover may lead to soil erosion, especially on slopes. This reduces soil organic matter and nutrients, diminishes water retention capacity, and reduces the soil depth available to root growth. The net result is a marked reduction in soil fertility. Reversing the process is time-consuming and cost-intensive (e.g. input of manure). It is essential to maintain a minimum vegetative cover for protecting the soil and its fertility.

- The impact on natural resources (e.g., wood, pastures, water) depends on the overall demand and the initial site conditions, i.e. on the local availability of the resources (land-use) and on the vulnerability of the ecosystem. The resilience of ecosystems is very variable, e.g. a mesic savannah ecosystem like that of Benaco restores much faster than a semi-arid savannah like that of Adi Keshi (Bloesch, 2001b). Furthermore, the impact depends on the time period, i.e. the length of stay of the refugees/IDPs. The relatively short duration of the IDP camps in Rwanda avoided long-term impacts on local ecosystems.

- Financial constraints may jeopardise the continuation of an environmental protection operation, e.g. the cessation of kerosene supply in Adi Keshi due to budget cuts.

- Well-organised and co-ordinated operations, as well as technical experience and knowledge of the local context, are essential for the success of environmental operations. These principles are an important part of a successful operation like that seen in Rwanda.

- In highly-populated and densely-cultivated areas like Rwanda, pillaging of crops and general insecurity may lead to disruption of agricultural production.

- Mass movements of refugees/IDPs concentrated in particular regions may worsen misery and create social (ethnic) tensions and conflicts (Gasana, 2001).

- Before starting any rehabilitation measures, the local population should define the future land-use of the area affected by the refugees/IDPs. Tree planting is a costly operation (and not always the best method for soil protection) and worthless if its maintenance and protection is not guaranteed. In many areas of the tropics, plantations are threatened by fire (Bloesch 2001b) and browsing animals. Protection of plantations can only be successful if the refugees/IDPs and/or the local population are willing to participate actively. When user rights are not made clear, people generally have little interest in managing natural resources. This implies that prior to any plantation activity the land tenure system and harvesting rights should be clarified: Of the several hundred thousands trees planted in the Benaco area between 1994 and 1996 only a few survived due to regular burning and lack of tending. Outside refugee/IDP settlements and on land not under private ownership, it is often ecologically more appropriate and cost-effective to restore the ecosystem by using the regeneration capacity of the remaining woody plants through (e.g.) seedling recruitment, coppice shoots, root suckers (Bloesch, 2001b).

5. Conclusions

Conserving the environment is essential for long-term poverty reduction and social freedom (Gasana, 2001). Environmental considerations should be addressed at the earliest possible moment since prevention is more cost-effective than cure. Relief agencies should increasingly endeavour to implement strategies that sustain the local environment for the welfare of refugees/IDPs – as well as for current populations and future generations of local people (UNHCR, 1998a). Priority should be placed on mitigating the most critical environmental impacts, i.e. those, which have a long-term negative impact. The local community and any other stakeholders should be involved in any strategy concerning natural resource management. It is pertinent to address the user rights of refugees/IDPs and the local community over an area's natural resources. The host government should carefully evaluate all decisions related to access and usufruct of the refugees and IDPs. Since environmental activities have mainly a long-term impact, refugee/IDP assistance should not be separated from development assistance.

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6

Environmental Education and Awareness Raising

Environmental Education and the Modalities of Deliberations in Ethiopia

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Addis Ababa, Ethiopia

Executive Summary

UNHCR has been supporting environmental education activities in Ethiopia since 1997. These have covered both Sudanese refugees in the west of the country and Somali refugees in the east, with a variety of both formal and non-formal approaches. Partner agencies have included the Centre for Human Environment, the government's Agency for Refugee and Returnee Affairs (ARRA) and the Ministry of Education.

The project's approaches are described and the pros and cons of various strategies are discussed. A set of lessons learned are offered, based on the Ethiopian experience.

Kew Words:

- ✓ *Refugee environmental education*
- ✓ *Formal environmental education*
- ✓ *Non-formal environmental education*
- ✓ *Environmental awareness-raising*
- ✓ *Environmental mainstreaming*
- ✓ *Ethiopia*

1. Introduction

1.1 Why do we Need Environmental Education?

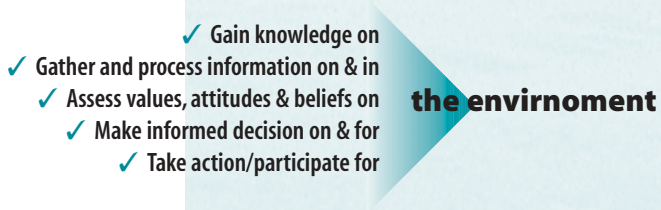
Human development is a complex issue and sustained human development cannot be conceived without sound environmental management. One of the declarations of the Tbilisi Conference of 1980 stated that "Environmental education, properly understood, should constitute a comprehensive lifelong education, one responsive to change in a rapidly changing world. It should prepare the individual for life through an understanding of the major problems of the contemporary world, and the provision of skills and attitudes needed to play a productive role towards improving life and protecting the environment with due regard given to ethical values" (UNESCO, 1980). It has often been stated that "Environmental education is not a subject to learn and teach, it is something you live".

The importance of Environmental Education (EE) as a tool for changing attitudes and behaviour is outlined in UNESCO, 1992. This states that "Education is critical for promoting sustainable development and improving the capacity of the people to address environment and development issues (…). Both formal and non-formal education is indispensable to changing people's attitude so that they have the capacity to assess and address their sustainable development concerns. It is also critical for achieving environmental and ethical awareness, values and attitudes, skills and behaviour consistent with sustainable development and for effective public participation in decision-making".

The World Conservation Union (IUCN) has brought EE closer to life by introducing a concept of "sustainable life" rather than sustainable development. Unlike the concept of sustainable development, which tends to be seen as a matter of concern to governments rather than individuals, "sustainable living" sets the record straight by implying that everyone is able to live in a sustainable way. This is in line with solving the day-to-day problems of individuals as well as the community as a whole.

In the context of refugee situations, EE empowers and equips refugees/returnees to take action to solve environmental problems they face. It is a community-building process which contributes to the rehabilitation and sustainable development of the territory occupied by refugees and therefore serves the long-term interests of the host population. In fact, the beneficiaries of UNHCR's programmes whether they be refugees, internally displaced persons (IDPs) or returnees must never be considered in isolation from the local community. All EE programmes must include the host population as a target.

We teach EE so that the learners may:



1.2 Awareness Creation through Information, Communication and Education

A full-scale dissemination of EE concepts and methods is believed to breed a population fully aware of, and concerned with, the local, national and global environments. An environmental education package must fully grasp the environmental problems of the country, consider worthwhile indigenous knowledge and adhere to EE's guiding principles to warrant its educational relevance and problem-solving capacity. The success of an environmental education programme would depend among other things on the potency of the programme design plus the diversity of the delivery modes employed. It should address all possible target populations using appropriate educational media. The main target populations are the rural, urban, farming and pastoral communities, pupils and teachers, and the youth and women of refugee and host communities.

2. EE Project in Ethiopia

The EE project in Ethiopia was started in 1997. In essence the environmental education programme in Ethiopia has geared all its activities towards sensitisation of school pupils and adults on local and global issues, followed by the integration of those issues into EE carrier subjects in the primary schools of refugees and selected nationals.

2.1 Formal EE

UNHCR, UNESCO-PEER and related Ethiopian implementing partners (Centre for Human Environment, ARRA and the Ministry of Education) have been involved in an EE project for refugee primary schools for over two years. Under the project, 46,000 pupils' booklets and accompanying teachers' guides have been developed and printed in English for primary grades 1-8 for Sudanese refugees and in Somali for grades 1-6. Materials for grades 1-4 have been translated into the Nuer and Anuak languages for wider use by refugees and local people around the western camps. A total of 36,200 pupils' booklets and teachers' guides were also reprinted during 2001 to improve the student book ratio.

Following the printing of the EE materials, three-day training of trainers workshops facilitated by UNHCR Branch Office and UNESCO-PEER together with Ethiopian Implementing partners were held (one in the West and the other in the East) in October 1999. A total of 95 teachers were trained in the use of the materials, and a number of additional teacher trainers have been trained since. They have, in turn, trained 477 refugee teachers who work within the educational system.

During 2001, UNHCR and UNESCO-PEER considered it appropriate to train staff at the teachers' training college in the application of EE, and for EE to be included in their regular in-service teacher training. This approach builds capacity and provides a platform for the sustainable continuation of EE projects in and around the refugee camps. This issue is particularly relevant when teacher wastage, in the form of repatriation and resettlement is considered. Accordingly, in Gambella, 16 teacher training institute lecturers and 5 people from implementing partners were trained. In Jijiga only 16 TTI lecturers were trained in the use of EE materials. Further refresher training workshops were also conducted in Jijiga and Gambella. These lecturers will train refugee teachers at camp level.

2.2 Non-formal EE

A non-formal environmental education project is being implemented in western Ethiopian refugee settlements to halt environmental degradation and help the refugees and local community to live in harmony with the environment.

In the implementation of the environmental project, a set of environmental measures were identified through the active participation of refugees and local communities, which attempted to address environmental problems as well as corresponding social implications. Awareness-raising is one of the main activities and was made practical through various community meetings such as sessions, seminars and workshops where different community members (refugee elders, women, men, youth, and religious leaders) participated. In such endeavours, diversified environmental issues were discussed. Attempts were made to consolidate the theoretical education with practical exercises where different environment-friendly activities were promoted with broad participation of the beneficiaries. Some of the activities included mud block production, compost, tree planting and soil conservation structures.

As a result of the awareness-raising, refugees have shown genuine commitment in environmental protection and development. This was revealed from an increased frequency of camp cleaning, the protection of mother trees by setting rules and regulations and the establishment of environmental committees as well as the sharing of responsibility.

Environmental school clubs were established. School club members were extensively involved in the management of environmental activities, which included rehabilitation of damaged areas through tree planting and conservation structures, sensitising the community through drama and songs, vegetable growing and school compound cleaning.

Demonstration and application of environment-friendly technology has taken place where mud technology was adopted by refugees in constructing their houses. Increased use of fuel-saving stoves and adoption of compost preparation were observed. There was also extensive involvement in tree planting and caring for trees, which has had a significant impact on the local environment.

Environmental resource centres were constructed and equipped with booklets. These will enable the refugees and host population to read about environmental matters and widen their scope. As a result, it has triggered wider interest and dialogues about environmental issues and facilitated community action. The awareness of the refugee community has increased in the protection and rehabilitation of the environment.

3. Modalities of Deliberations

In describing the ideal modalities the top level and the lower level are important. Once the top level organisation is established, the working relations are defined and the necessary resources are allocated, teaching in EE can be channelled using all possible mechanisms of dissemination as sketched below.

In general there are three major components to environmental education: formal, informal and non-formal EE:

- formal EE – activities delivered through the school curricula;
- informal EE – delivered through mass media (radio, newspapers, magazines, TV, films); and
- non-formal – delivered to targeted social groups (community-based).

There is still debate regarding how formal EE should be incorporated in the education system. Some argue for EE as a separate subject (interdisciplinary approach – components are drawn upon to create a distinct course) while others opt for EE to be integrated into various school subjects (multidisciplinary approach – components are tailored to suit carrier subjects). For Ethiopia many people have rationalised that the best approach is the integrated system using mainly carrier subjects such as biology, agriculture, geography, home economics and languages.

Introducing EE as a separate subject has far-reaching implications, which could actually delay the project. The resources required, such as well-trained teachers, equipment and funding are often not available in refugee situations. An extra subject also implies a heavier workload for pupils and teachers. A more pragmatic approach that would be appropriate in the short-term is integration of EE into existing subjects.

3.1 Target Population and Possible Delivery Modes

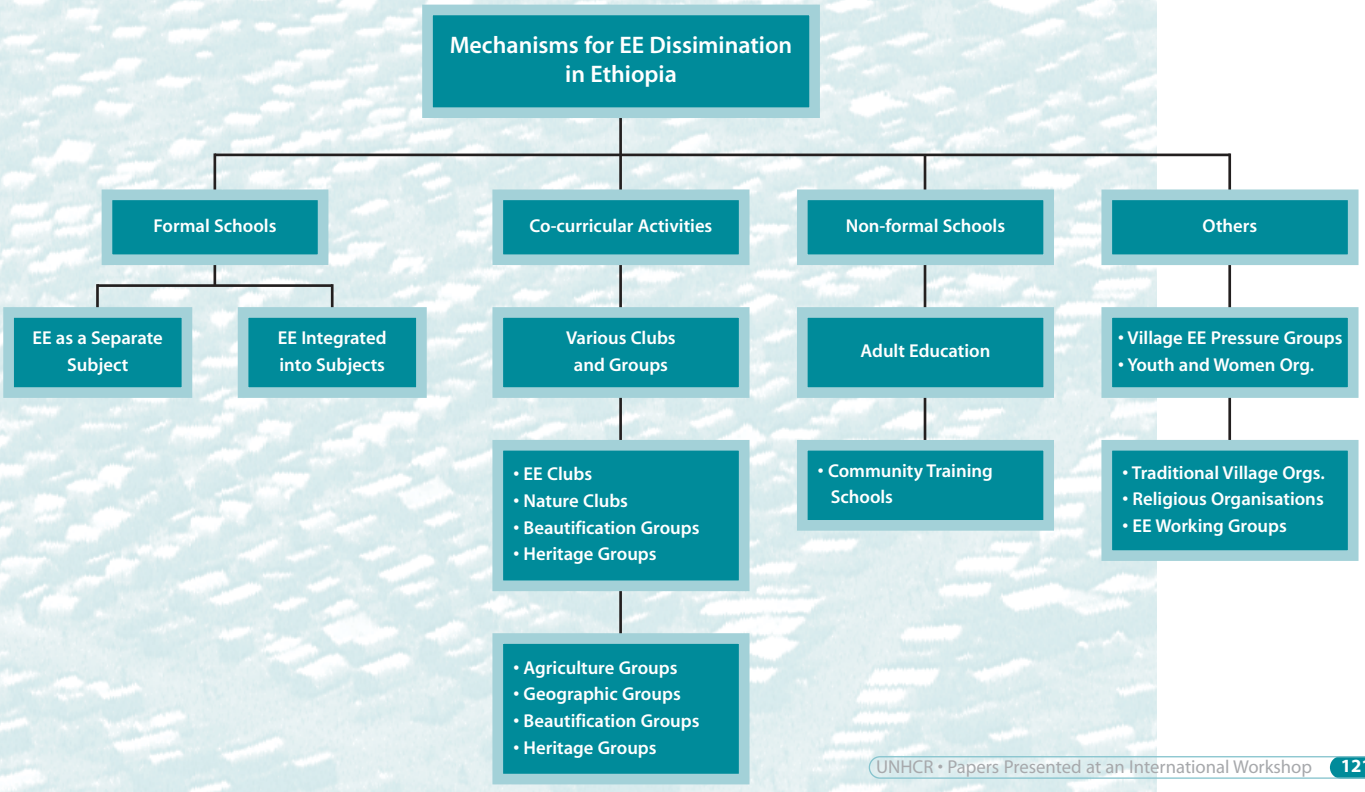
The success of an environmental education programme would depend among other things on the potency of the programme design and the diversity of the delivery modes employed. It should address all possible target populations. The main target populations are refugees and IDPs in a "stable" situation and emergencies, returnees and local host populations, the farming and pastoral community, pupils and teachers at all levels of education and the youth and women.

EE packages can be defined and prioritised through careful planning modes that give best results, with less cost and time.

Environmental education demands full participation and involvement in practical activities. It considers the environment as a teaching ground and most of the acquisition of practical knowledge takes place under field conditions.

These practical activities include:

- compilation of fact sheets on a regular basis, from different publications;
- localised studies such as observing the effects of chemical pollution on vegetable gardens, participation in reforestation activities;
- construction of soil conservation structures out of locally available materials;



Main Target Groups	Possible Modes of Delivery
School children	EE as part of curriculum; EE in co-curricular; EE in mass media
Primary	
Secondary	
Tertiary	
Message multipliers	EE in posters; seminars
Teachers and students	
Village headmen	
Media people	
Adult labourers	EE in posters, seminars, conferences,
Adult men & women	lectures, panel discussions, publications
Village people	
Collectors and traders	
Religious	EE in non-formal-adult, distance, continuing education; EE in mass media, short courses, posters,
Religious leaders	campaigns, talks
Civil servants	Talks at religious gatherings; talks at traditional gatherings, posters, popular talks; discussions at
Development Agents	traditional and religious gatherings
Planners and policy makers	Workshops/seminars; conferences/ panel discussions; in-service courses; mass media; special
Engineers and Professionals	packages, short courses
Teachers	

- environmental health practices such as cleaning school compounds, construction of pit latrines, waste disposal pits, and setting up cans; and
- preparation of seed nurseries, tree planting, gardening, school environment beautification.

These activities focus on offering practical solutions to common and basic environmental problems.

4. Conclusion and Recommendations

- EE is a key factor for proper attitudinal changes and actions.
- Traditional and religious organisations are critical in EE.
- The preferred point of entry to enhance EE is through teacher education. There are many teacher-training institutes in Ethiopia and there is a need to develop strategies for integrating EE into teacher education programmes.
- There is a need for networking in EE. The main objective of such networking should be to promote the flow, exchange and use of relevant EE information and resources so as to be more effective in planning, implementing and evaluating EE programmes.
- The development of regional centres of excellence in EE should be encouraged.
- Capacity building and institutional strengthening is required for formal and non-formal EE.
- Collaboration is needed between the education, agriculture, health, natural resources, environment and development sectors, as well as regional education and other relevant bureaux for EE dissemination.
- The curriculum, co-curricular and popular education materials should include EE.
- Environmental Education can effectively be taught through the content of the various subjects in the existing curriculum. This approach provides the individual with a functional knowledge that would help him/her live sustainably in a healthy environment.
- Schools are influential centres for promoting change in people's behaviour and are therefore a good focal point for EE initiatives. New environmental clubs should be initiated or environmental components included in existing clubs.
- All target groups must be addressed by EE. Awareness raising should be mandatory among the public to generate a culture of environmental consciousness.
- All delivery modes must be used for EE dissemination – including mass media, newspapers, radio and TV in different languages.

- Participation of the refugees and host population in all stages of environmental activity is essential for the success of EE. The formation of environmental working groups leads to an increased sense of responsibility and interest.

- Monitoring and evaluation systems are needed to track progress (or lack of) in EE projects.
- Foster the creation and then support environmental awareness associations to compile environmental information and alert communities to it.

- Formal EE requires more than just booklets for teachers and pupils; these should be supplemented with posters, books, fact sheets, and other materials.

Complementarity should be encouraged between formal and non-formal components of an EE project to reinforce the messages being developed and avoid potential contradictions. Environmental awareness-raising should receive as much attention as formal environmental education. The awareness-raising activities should not be seen as a one-off event, but should be routine and on-going, with training, follow-up and the production and provision of appropriate awareness-raising materials in order to bring the required attitudinal and behavioural changes towards the environment.

Environmental Education and Awareness-Raising During and Post Conflict in Liberia and Sierra Leone

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Executive Summary

During the past decade, the civil conflicts that have raged in West Africa, especially in Liberia and Sierra Leone, have impacted negatively upon the environment and biodiversity, through the forced migration and resettlement of human populations, through the abuse of natural resources as a result of armed conflict, and through the peculiar economies that both funded and fuelled these conflicts.

At the same time, a significant proportion of the donor funding coming to the affected countries has been in the form of humanitarian assistance, targeting refugees, displaced populations and basic community infrastructure. Despite the need for attention to be given to environmental protection, almost all humanitarian interventions have, until recently, been planned with little or no regard for this crucial element and its direct relationship to the long-term welfare of the target beneficiaries.

Meanwhile, an average 75 per cent of the populations in both countries are either illiterate or semi-literate, with little or no awareness about the adverse impacts of their activities on the local environment. At the same time, a conspicuous lack of serious and enforceable government policies on the management of natural resources makes Liberia and Sierra Leone two of the most environmentally exploited countries in the developing world.

It is against this background that in 1998 the Environmental Foundation for Africa (EFA) embarked upon the implementation of a UNHCR-funded Refugee Environmental Awareness Programme (REAP) in Liberia. The main objective was to develop educational and practical schemes for environmental management in six refugee camps. In 2000, a similar programme was launched in Sierra Leone.

This paper highlights a variety of issues related to environmental interventions in conflict situations in Liberia and Sierra Leone. EFA's work is the knowledge base from which most of the experiences have been drawn.

Kew Words:

- ✓ *Environmental awareness-raising*
- ✓ *Community mobilisation*
- ✓ *Returnees*
- ✓ *Sierra Leone*
- ✓ *IDPs*
- ✓ *Liberia*

1. Background

The West African sub-region was originally covered by a continuous belt of dense rainforest – the Upper Guinean Rainforest – which extended from Guinea south through Sierra Leone and Liberia and east into Côte d'Ivoire and Ghana. Today, Liberia has the largest remaining portion of the ecosystem (43 per cent), with 28 per cent in Côte d'Ivoire, 16 per cent in Ghana, 8 per cent in Guinea and 5 per cent in Sierra Leone.

The biodiversity of the region is declining and the dominant forest increasingly fragmented. The whole area is under serious threat of over-exploitation from timber extraction, wildlife hunting, mineral mining, subsistence farming (shifting cultivation) and pressure from an ever-growing population.

1.1 Sierra Leone

Sierra Leone holds the western end of the Upper Guinean Rainforest. Though more than 50 per cent of the country has a suitable climate for rainforest, only 5 per cent is still covered with mature closed high forest (365,000ha out of 7,162,000ha). The Gola Forest in the east (bordering Liberia), contains the last closed canopy rain forest in the lowlands, while moist semi-deciduous forests are found on the Loma Mountains and Tingi Hills in the north-east and montane forest in the Freetown Peninsula Forest Reserve in the west.

The deforestation rate is estimated at 0.6 per cent annually, mostly due to subsistence exploitation (firewood harvesting, charcoal production, shifting cultivation). Diamond mining and timber extraction have also had a major impact on the rate of deforestation, given the attractiveness of the mining and logging industries to armed factions, refugees, returnees and other fortune seekers. In fact, the vast wealth in mineral resources – more specifically diamonds – is often referred to as the "curse" of Sierra Leone. Not only have the forests and lands of the eastern parts of Sierra Leone been devastated in the quest for diamonds, but diamonds have also represented a major interest for the parties in the war. The focus of the war has been as much to have control of the diamond-rich areas as of the capital Freetown and the country itself.

In Sierra Leone the two main vegetation zones (other than the high forest) are coastal mangroves and dry Guinea savannah. The vegetation in all zones has been altered greatly by human impact, and with Sierra Leone now experiencing a mass influx of returnees, the rapidly growing human population is intensifying the pressure on the already fragile situation.

1.2 Liberia

Liberia is the only country in West Africa that lies totally within the Guinean forest belt and was original almost completely covered in tropical moist forest. Today, only 43 per cent remains and is situated in two substantial blocks:

the evergreen forest in the south-east and the moist semi-deciduous forests in Upper Lofa in the north-west. Montane forest is still to be found in the iron-ore exploited Mount Nimba range, but it does not cover a significant area.

The rate of deforestation is estimated at up to 2 per cent annually, due mainly to shifting cultivation and commercial logging. The commercial logging has increased substantially in recent years. Revenue from logging is one of the main sources of income for the government and its leadership.

Liberia is yet to ratify the Convention on Biodiversity, which is a pre-condition for any Global Environment Facility funding to support conservation and other environmental work. Meanwhile, as the holder of the largest remaining block of the Upper Guinean forest ecosystem, it is considered the most crucial area for conservation in West Africa.

2. Status of the Masses in Liberia and Sierra Leone

The socio-economic status of people living in the two countries is basically one of absolute poverty. Characterised by little or no infrastructural development in most of the rural areas, localities lack electricity, potable water supply systems, adequate medical facilities or surfaced roads. Illiteracy stands at over 75 per cent with most schools destroyed or vandalised during the conflicts. The remaining schools are ill-equipped to provide even the most basic education. With no access to free education, many pupils and students fail to complete their schooling. Sierra Leone's declining economy means that over 80 per cent of the population are unable to find gainful and regular employment and there are few alternatives for generating income. This is why the diamond mining industry is so attractive, and even though the devastating effects of mining are already being felt, there is little else to do for the nearly half a million people that depend upon this sector for work.

In Liberia, the UN sanctions imposed upon the government for its support to the RUF rebels in Sierra Leone has led to increased hardship for the entire population.

At the same time there are many individuals, agencies, business enterprises and interest groups that continue to amass immense wealth from Liberia's logging industry.

In her political analysis of the war economy in Liberia, Philippa Atkinson asserts that "the continuation of the war can be attributed to the interaction of a number of internal and external factors". William Reno clarifies this further when he states that "the fueling of the war through the illegal sale of Liberia's natural resources has been ignored at the international level, in spite of early evidence and analysis of its nature and of the involvement of major international players".

3. History of Conflict and Environmental Problems in Liberia and Sierra Leone

After more than a decade of conflict in the two countries, it has emerged without doubt that control of areas rich in natural resources – especially timber, diamonds and gold – has been a chief factor responsible for fuelling conflicts. It is well known that these resources have been traded by rebel forces in exchange for arms. These arms have been used to terrorise local populations and, in so doing, secure total control of the entire country and its natural resources.

It is a sad reality that the mechanisms of the war economy in West Africa, particularly in Liberia and Sierra Leone, have become part of a vicious cycle at both macro- and micro-economic levels. The economic and political incentives for rebels and some government officials to pursue illegal activities far outweigh any incentives to work for peace or democracy. The control by warring factions of natural resources serves to further entrench the processes of exploitation and environmental destruction. Until the rule of law can be re-established, warlords and their expatriate counterparts (businessmen and foreign companies) will continue to exploit the people and resources of these countries with impunity. At the micro-level, the incentives for fighters and civilians involved in the war economy are also quite high. Civilians are often forced (through violence or necessity) into activities that feed the wealth of fighters and rebel leaders, while fighters may perceive participation in a senseless war as the only rational option available.

Efforts to reverse the trend of growing environment abuse are undermined by the absence of defined government policies on the exploitation of natural resources and protection of biodiversity, particularly in times of conflict and negative economic growth. This deficiency has led to a tendency for politicians to relax environmental and social standards governing the exploitation of resources to encourage all sorts of 'investments'.

Another widespread problem for the environment of West Africa resulting from the lack of legislation is illegality of the exploitation of natural resources before, during and after armed conflicts. Governments and warring factions act illegally by, for example, allowing mining or logging in protected areas. Although illegal small-scale mining and logging receives much of the attention, illegal activity by larger operations is also extremely damaging.

An illustrative case is that of businessman Robert Friedland (a.k.a. Toxic Bob). Following involvement in a pollution scandal in Summitville, which cost the US government US$100 million, he ran a Venezuelan gold mining enterprise in protected areas and also broke a UN embargo by drilling in indigenous territories in Burma. In 1998 Friedland was involved in attempts to gain control of rutile and diamond mines in Sierra Leone, through the mercenary group Executive Outcomes.

It must be understood that the wars that are being fought today are a direct result of the decline in old

arrangements inherited from the colonial masters, and the collapse of state authority and capacity.

As has been noted earlier, the economics of Liberia, Sierra Leone – and indeed of many other African countries – have always been heavily reliant on the exploitation of minerals and forest resources to supply the industrialised world, at prices determined by overseas markets.

The political arrangements that existed in the mineral-rich countries of Africa in colonial times were enormously in favour of the colonial masters or colonists and almost always at the expense of the African people and their environment.

For example, when the exploration for diamonds began in Sierra Leone by a UK-based mining company in the early 1930s, the country was under the control of the British Crown. At the time more than three-quarters of Sierra Leone's land area was covered in lush tropical forest. Around the same period, the majority of the country's approximately one million inhabitants, were considered illiterate by modern standards. But they were self-sufficient with food and basic needs, all of which came from the local forests, rivers and the sea. The vast majority of the population lived in the hinterland and practised shifting agriculture, with some artisanal fishing and small-scale hunting for basic animal protein needs.

However, the traditional system of governance which appeared to cater for everyone's need was gradually eroded as more explorers arrived and the forests became opened up. At the time of independence in Sierra Leone in April 1961, there were several UK-based companies exploring for diamonds, gold, iron ore, bauxite and timber, with no responsibility for restoring and rehabilitating the land after extracting the minerals and logs. The fact that most of the population was illiterate and the new breed of African leaders were more interested in power and fame than an environment that could support future generations, meant that foreign companies were not under any pressure to practise environmentally-sound natural resource management.

The situation in Liberia is somewhat similar, despite the fact that the country was never colonised. Political power in Liberia up to 1980 was dominated by Americo-Liberians, the descendants of about 300 families of American blacks who settled in Liberia in the 19th century. Until the coup of April 1980 that brought Samuel K. Doe (a member of the indigenous Krahn tribe) to power, the government apparatus and business establishment was dominated by the Americo-Liberians.

Prior to the era of Tubman (1944-1971) and Tolbert (1971-1980) land ownership in rural Liberia was predominantly communal. However, during the nearly four decades that the two presidents spent in office, they concentrated on converting land tenure from communal to private holdings, boosting agricultural exports and creating new sources of governmental revenue. But this policy disrupted local economies by throwing farmers off their land, undermining the authority of traditional chiefs who adjudicated land tenure issues according to their customs.

At the same time, the reforms created new opportunities for the already powerful elites to extend their economic and political reach over large portions of Liberia. For example, the twenty largest Liberian-owned logging concessions covered about 8,500 square miles or 20 per cent of the surface of Liberia in 1977. This, and the fact that over 80 per cent of the population was illiterate with no possibilities for formal education or medical facilities and living in parts of the country that were (and still are) inaccessible to any form of motorised transportation for much of the year, meant that many indigenous Liberians could be easily recruited to fight against a system that had been exploitative and oppressive for so long.

The above examples of Liberia and Sierra Leone show that the foundations of the conflicts that began at the start of this decade lay in the prevailing political and economic situation in those countries during the previous five decades. It can also be stated that much damage had already been done to biodiversity in these countries and that the wars have only served to intensify the exploitation of natural resources.

4. Changing Land-Use as a Result of War and Consequences for Biodiversity in West Africa – A Case Study

Prior to the onset of war in Sierra Leone and Liberia, an estimated two-thirds of the population in both countries lived in the rural areas and the vast majority depended upon subsistence agriculture and cash crop farming. When the wars started, millions became refugees in neighbouring countries or internally displaced, resulting in significant changes in land use. One such dramatic change was noted in 1994 in Kambia District, northwest Sierra Leone, where the EFA was working with communities to reclaim redundant and mined-out swamps for rice cultivation.

Kambia District is traditionally an area where rice is the main staple and groundnuts are the main cash crop. However, decades of upland farming using the practices of slashing and burning had depleted the soil fertility in many upland farms and rice yields began to dwindle with each planting season. With longer fallow periods required and increasing population densities in the district, many farmers were forced to either abandon upland rice farming in favour of less desirable crops or develop the valley swamps for rice production. Cultivating rice in lowlands requires more labour input but yields are higher and can be sustained year after year. This characteristics of inland valley swamps (IVS) make them a suitable and sustainable alternative to upland farming in many rice-growing countries.

When the RUF rebels first entered Kono District (a predominantly diamond-mining area) in 1992, an estimated 100,000 residents – the majority of whom were miners from different parts of the country – fled to safe areas. Some 2,000-5,000 of these miners made their way to Kambia District, considered a safe area until January 1995. Within

weeks of their arrival, prospecting for gold and diamonds in the nearby swamps began. By October 1994, when an EFA study was conducted, an estimated 5,000 acres of IVS spanning the entire length of Kambia District had been degraded and made unsuitable for any form of agriculture. The 'industrious migrants' attracted a large following of local youth and entrepreneurs, believing that 'one good-sized stone will solve all my problems'. The sad truth is that the swamp did not have the quality and size of gems that abound in Kono, so in most cases mining was fruitless. Meanwhile, only a few of the 150 miners interviewed in different parts of the district, gave any indication that they were aware of the impacts of their activities on the land.

The EFA study showed that mineral wealth can actually depress social conditions in developing countries, particularly in times of conflict when lawlessness prevails. Apart from the detrimental effects of mining on nature and biodiversity, economic growth rates in these countries tend to be slower and in some cases negative. It is also worth noting that West African countries with mineral wealth exhibit lower levels of social welfare and more highly skewed income distributions. In fact, the superior resource base of countries such as Liberia and Sierra Leone has been more of a curse than a blessing.

5. Addressing the Issues

5.1 Overview

A small number of individuals, community groups, national and international agencies are committed to nature conservation and other environmental interventions in Liberia and Sierra Leone. A few of these were active before the onset of the conflicts. Several have emerged during the last few years, a reflection, perhaps, of the growing number of environmental problems that have become more evident.

Several studies commissioned by governmental, UN and international development and relief agencies have underlined the importance of taking definite steps towards reversing the trend of rapid forest destruction and land degradation, particularly if future conflicts are to be avoided. Further studies have shown the direct relationship between the conflicts in West Africa and the inequitable distribution of land and other natural resources among the population.

In light of the growing urgency of the need for sensible natural resource management and environmental repair and protection, seed funds are being provided for relatively small-scale environmental and conservation activities by major conservation agencies, such as the Netherlands Committee of the World Conservation Union, the World Wide Fund For Nature, Conservation International, Flora and Fauna International, UNHCR, the European Commission and a smaller number of international NGOs and embassies. However, compared with emergency relief activities which go on during and post conflicts, conservation activities are erroneously deemed possible only in a situation of peace and stability.

5.2 The 'REAP' Project

EFA, in partnership with UNHCR, has already had extensive programmes (Refugee/Returnee Environmental Action Programme – REAP) based in the returnee areas in Nimba and Bong counties and refugee camps of Cape Mount and Montserrado counties in Liberia (1999-2001). Since July 2000, similar programmes have been extended to internally-displaced and returnee areas in Bo, Kambia, Kenema, Port Loko, Pujehun and Moyamba Districts in Sierra Leone. These programmes have identified several areas of environmental deterioration associated with the establishment of the camps, in particular in relation to:

- **Land:** reduction in soil fertility, increasing erosion of topsoil, reduced agricultural productivity;
- **Forest reserves:** decrease in quantity of wood available for use in construction and cooking, decline in availability of certain tree crops, degradation of forest habitat and subsequent loss of forest products (medicine, utensils, etc.), indiscriminate hunting of wildlife by refugees and returnees; and
- **Water:** altering of natural water systems, water pollution.

The REAP programmes have worked successfully in addressing some of these problems through a strategy of community awareness-raising and participation. There have been three main components of the programmes:

- **Awareness-Raising/Environmental Education:** this has involved a school programme, workshops, open days, public meetings and symposia, focus group discussions in small communities and environmental video showings to a wide range of audiences. The production of picture-based information booklets on nature conservation in Liberia and Sierra Leone and a booklet to aid environmental education in schools in both countries is a key aspect of EFA work in this area.

- **Domestic Energy Conservation Training and Demonstration;** Eco-stoves: fuel-efficient clay stoves are a key strategy in reducing pressure on forest reserves. EFA has conducted extensive promotion of 'eco-stoves' and a training programme including a manual and video documentary on their construction.

- **Tree Nurseries, Tree Planting and Agroforestry:** training and construction of tree nurseries has been followed by the establishment of woodlots and the planting of trees. The tree species have been chosen for their ability to improve the fertility of degraded land. Where feasible, food crops have been interplanted with young trees as a way of ensuring their proper care and maintenance.

All components have operated on the principle of empowering people and communities to take action for themselves to care for their own environment. With the completion of REAP in Liberia in February 2001, there is now a situation where there has been extensive tree-planting throughout the degraded land of the camps and some returnee-affected communities, there is widespread use of

the eco-stove and there is an increase in knowledge of the environment and the environmental issues facing the region.

5.3 Methodology

The methodology of REAP's implementation included a detailed assessment of the camps, host communities and other target areas to identify the main environmental problems affecting the locality. The emphasis has always been on interaction of refugees and host populations. REAP has tried to achieve this through facilitating the establishment of an environmental forum/action group in each camp/community. With the forum established, an intensive environmental awareness-raising exercise followed. This involved a series of workshops and training programmes as well as material support and technical supervision for construction of shelters in each project site for the establishment of tree nurseries and production of eco-stoves.

6. Strengths of REAP

The main strength of the Refugee/Returnee Environmental Action Programme was (and remains) its community-based and participatory approach. The fact that a significant proportion of the implementation time was (and still is) allocated to the training of volunteers and community participants in the various aspects of the project is an indication of the foundation on which all future activities will be based. Before distributing any inputs, a monitoring and evaluation exercise was conducted to establish the level of understanding within communities of environmental issues and problems specific to their locality. The exercise also helped to establish the willingness of the community to participate in the tree nursery and stove production activities, and raise awareness of their roles and responsibilities towards ensuring a successful pilot scheme and continuity after the ending of donor support.

Another strength of the project is its focus on the schools system. Given that the concept of environmental awareness and education is quite new for Liberia and Sierra Leone, particularly in the project communities where the vast majority of inhabitants are illiterate subsistence farmers, the project is seen as a crucial step in preparing future generations to act responsibly towards their environment and be fully aware and knowledgeable about the benefits of proper management of natural resources. The awareness programme also tries to ensure that children are aware that efforts being made today to conserve and protect the environment, particularly forest resources, are intended to ensure a happy future for them. This is a primary motivating factor for children who participate in the various activities.

7. Constraints

- To work in a war-torn country is of course not an easy task. To focus on environmental interventions in a country with a severely degraded environment, an uninterested government and extremely poor people who depend on external assistance for their most basic needs, is even more challenging. As a result, the lack of secure funding to plan for more than 6-12 months at a time makes recruitment and supervision of personnel very difficult.

- In a situation where everyone expects payment for every bit of work done, getting community members to participate actively in the practical aspects of the project is very difficult, especially when the major focus of well-funded agencies is emergency relief assistance. Such agencies work in 3-6 month cycles and are willing to pay for everything in cash because they want quick results. This 'community work for money' syndrome is a major impediment to efforts to mobilise local labour for community-based environmental projects.

- Environmental education is not yet a taught subject in most schools in Liberia and Sierra Leone. In the few schools where environmental science features in the syllabus, the teaching approach is intellectually oriented with little emphasis on guided physical interactions with nature. EFA trains volunteers to visit schools and, where possible, engage the children in looking at their surroundings and taking note of their interactions with nature. This approach works well but requires a generous time allocation by the schools' administration and the pupils themselves for extracurricular activities. However, with school calendars disrupted by political and military insecurity, it has often been difficult to plan school activities. In such instances, the time allowed for awareness-raising by school authorities is rather limited.

- The free distribution by NGOs and UN agencies of food, medicine and other materials to people for their survival, makes the concept of voluntary work for the community very difficult to accept. A common complaint is: 'EFA is not paying us for the work they want us to do'. This misconception is straightened out very often, and most people realise we are talking about voluntary work and most importantly that the benefits are not for EFA but for the community. All community development has to come from within.

8. Observations

- Over the years the numerous environmental awareness-raising workshops undertaken, along with related programmes, have led to a general understanding among many community members, particularly the leadership, that a good environment is a necessity for people's survival in a country where almost everyone depends on forests and other natural resources.

- The irresponsible and uncaring attitude often portrayed is not true for all the communities that EFA has worked with. There are some community groups whose obvious

interest in the project and extraneous efforts to make it work, despite all hardships, is a source of great inspiration for project staff – and for the communities themselves who have become organised to do work that does not promise immediate rewards.

- Environmental projects based in, and led by, communities are key to overcoming the cycle of ignorance about the richness of country's biological diversity and in laying the foundations for sustainable use of land and forest resources. Many people know and appreciate the value and need for environmental protection and conservation and only demand compensation, i) because it is a habit reinforced by many agencies operating in the project areas; and ii) because people are generally very poor in the project areas, and after surviving a war it will take some time for a generous attitude and community spirit to take root.

- The government's ability and willingness to introduce and enforce laws that will help to sustainably manage a country's natural resources represents the second key to effective nature conservation and environmental protection in post-war Liberia and Sierra Leone.

- The international community, particularly governments of industrialised nations, can influence those known enterprises that have played a major role in fuelling the conflicts in Liberia and Sierra Leone. For it has now become a well-known fact that diamonds are largely responsible for the war in Sierra Leone while the Liberian timber industry has been proven as the main conduit for arms supplies to rebel forces in Sierra Leone.

9. EFA's Focus for the Future

EFA has a unique and important role to play particularly in Liberia and Sierra Leone because of its focus on community forestry and fuel conservation as a means to relieve the ever-growing pressure on dwindling rain forests. EFA will therefore endeavour, as a long-term objective, to facilitate the formation of local environmental action groups in every district in each country where it operates. These groups, made up of indigenous people, will spearhead the environmental education, awareness-raising and conservation programmes and other related activities among their respective communities. They will identify local environmental problems and be responsible for planning and managing projects designed to address these problems. They will also be involved in identifying and mobilising local resources for implementing their own initiatives.

For the present, EFA's primary focus is to optimise its strengths and potential for delivery of an urgently needed environmental education and awareness programme, through:

- establishing links with local and international environmental agencies;
- actively seeking volunteers, locally and from overseas, to help increase the quality, scope and effectiveness of its country programmes;
- identifying secure funding sources for implementing the programme activities;
- providing environmental awareness and education programmes for a variety of audiences; these will include local community groups, NGOs, schools (pupils and teachers), commercial enterprises and governmental agencies;
- providing a resource centre of multi-media materials focusing on global environmental issues, with a special emphasis on Sierra Leone, Liberia and other African countries;
- providing a co-ordinating and networking function for diverse groups concerned about environmental degradation in the sub-region;
- researching, compiling and making available geographical, social, economic and technical data and advice on proven practical strategies for environmental repair, from international and local sources;
- advocating for the development of sound government policies for environmental repair and natural resource management, and the allocation by government of the necessary resources to enforce these policies;
- working closely with community-based organisations to develop programmes that highlight the role of each individual in the repair of environmental damage and the sustainable use of the meagre resources remaining; and
- providing opportunities, through volunteer schemes, for overseas nationals to play an active role in the design and implementation of programmes for environmental education, repair and management.

Environment Education with Refugees and Local Communities in Rwanda

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Executive Summary

Reliance on natural resources, not only by refugees but also by local communities, is posing new challenges. It is becoming increasingly clear that the state of the environment and the problems surrounding our natural resources will continue to grow.

The mounting pressure on the natural resource base necessitates more awareness-raising and education among a broader target group and with more intensity than in the past. The development of a society that recognises the importance of the environment and the need to protect it should be a social responsibility of every state. Environmental education through both formal and non-formal channels should be promoted. In the formal sector, environmental issues should be included in the curriculum at primary, secondary and tertiary levels.

The case of Rwanda is discussed, including the particular educational needs of the Congolese refugees as well as those of the local population. As poverty and high population growth are identified as the root causes of environmental degradation in the country, the issue of environmental protection is shown to have broad relevance across many sectors, not only education.

Kew Words:

✓ *Environmental education*
✓ *Rwanda*

1. Background

Rwanda is a landlocked country sharing borders with Uganda, D.R. Congo, Burundi and Tanzania. It has a population of approximately 8.1 million people and a land area of 26,338km^2, giving an average population density of 308 people per km^2.

The climate is tropical, moderated by altitude, especially in the north-west. Annual average temperature is 19^{o}C and average monthly rainfall is 85mm.

Rwanda is hosting over 30,000 refugees, mainly from Congo and Burundi. The government has attempted to provide an enabling environment for protection and assistance to these refugees. Land and other resources have been made available.

The majority of the refugees are housed in two camps in rural Rwanda, with a smaller number located in a third camp and in urban centres. The refugee locations and populations are as follows:

Province	*Camp*	*Main Refugee Origin*	*Population*
Byumba	Gihembe	Congo	16,541
Kibuye	Kisiba	Congo	14,703
Gikongoro	Kigeme	Burundi	504
Kigali		Various	2,126
Total			33,874

2. Rwanda Rural Rehabilitation Initiative

The Rwanda Rural Rehabilitation Initiative (RWARRI) has been an implementing partner of UNHCR since 1998. The partnership has focused mainly on reintegration of Rwandese returnees from neighbouring countries and environmental protection around refugee camps in the country, as well as within settlement villages built with support from UNHCR.

Since 1998, environmental activities undertaken have included:

- natural resource management, with a focus on afforestation, soil and water conservation;
- domestic energy, with a focus on fuel-saving wood stoves; and
- environmental education and awareness-raising in the refugee camps and surrounding areas, mainly involving school children and teachers.

It is the last of these activities which is the principal focus of this paper.

3. Environmental Education

3.1 National Overview

In Rwanda, and indeed in many developing countries, there is a general lack of environmental awareness that cuts across the whole population.

Random interviews carried out by REASON (a local environmental NGO), mainly in schools around Kigali, revealed little knowledge regarding issues of the environment. This, despite the fact that students are often involved informally in activities such as nature observation, soil conservation, tree-planting and making terraces as they assist their parents in their farms.

It was also evident that schools themselves did not undertake environmental projects because they are not emphasised in the national curriculum. These might include tree nurseries, promotion of modern farming practices and information on environmental sanitation, which help in raising levels of environmental awareness.

Among the refugee population, the Congolese in particular come from a region with abundant natural resources where environmental issues have never been of concern. Their immediate neighbourhoods comprise natural forests with wild fruits. Tree-planting has never been necessary for them. The experience in the predominantly Congolese refugee camps of Kisiba and Gihembe point to a general lack of environmental education and conservation awareness among this community.

3.2 The Way Forward

An environmental education strategy should aim at achieving an environmentally knowledgeable and responsible society. Teaching and learning about the environment promotes awareness and can change students' attitude and behaviour towards the environment. Youth in particular should be the primary target in this strategy by making environmental science teaching compulsory in schools and developing a curriculum that better addresses environmental issues. Refugee children should also benefit from these programmes.

While planning environmental projects in schools, refugee camps and local communities, it is necessary for the groups or individuals involved to participate in all levels of project planning and to actively involve them in finding environmental solutions.

As we look at youth as the future generation of administrators, managers, politicians and parents, it is important that attitudes should be changed at an early age.

3.3 Audience

Target beneficiaries of RWARRI's work include refugees (mainly from Congo) and local communities in Byumba and Kibuye Provinces who live close to the refugee camps.

The nationality of RWARRI's beneficiaries is as follows:

Area	No. of Refugees	No. of Local People
Byumba	16,541	42,035
Kibuye	14,703	36,820
Total:	31,244	78,855

There is a disparity in the level of environmental awareness between the refugees and the Rwandese communities.

As already mentioned, refugees from Congo have had little exposure to environmental protection measures compared with their Rwandese counterparts. Congo is endowed with tremendous natural assets and a low population density which has not exerted pressure on these resources. As such, environmental protection has not been a major concern.

On the contrary, Rwanda has scarce natural resources and a high population density which has placed great pressure on land and other resources. As a result it has become imperative for the Rwandese to learn how to protect their environment.

3.4 Project Financing

The financial resources available for environmental education are inadequate in view of the threats facing natural resources. About US$120,000 has been made available so far, in addition to labour inputs which have not been valued. In view of the problems posed by the Congolese and locals in the refugee-hosting areas, over US$300,000 is required each year for the next five years.

3.5 Stakeholders

Environmental education activities involve refugees, local communities, local administration (Secteur, District, Province), UNHCR, donors and implementing partners such as RWARRI, the American Refugee Committee (ARC) and (previously) the Rwanda Development Organisation (RDO) and the International Rescue Committee (IRC).

4. The Broader Environmental Situation in Rwanda

Rwanda is endowed with abundant natural resources. However there has been a progressive increase in environmental degradation in the country, further aggravated by the 1994 war and genocide.

The National Environment Action Plan, which the government has not yet adopted, identifies high population growth (3.2 per cent per annum), poverty and lack of information as the main underlying causes of environment degradation. These have led to a number of concerns, the most critical of which are identified as deforestation, soil erosion, water resource degradation, energy shortage, biodiversity loss, population pressure on the natural resource base, climate change and pollution, environmental ignorance and greed.

To redress the situation, the government is in the process of developing its environmental policy, enacting environmental legislation, developing impact assessment guidelines and introducing an environmental education strategy.

5. Addressing the Issues

5.1 Strategies

The following should be noted:

- the government has to develop its environment policy and enact environmental legislation that will govern and guide all environmental stakeholders in the country;
- environmental science should be introduced in the school curriculum from primary schools up to tertiary institutions;

- the mass media (especially radio) can be used as an effective source of environmental information and dissemination;
- appropriate land-use policies should be designed that will accommodate agriculture, agro-based industries, land consolidation, urban planning, sewage and sanitation planning;
- environmental monitoring systems should be established to control human activities that degrade the environment;
- Rwanda should accede to international conventions on environmental protection;
- the national tree-planting campaign should be reinforced; and
- alternative sources of energy should be introduced.

In the absence of strict environmental laws and regulations, activities that violate the environment will go on undetected and unpunished.

5.2 Weaknesses

A lot of human activities (such as construction on wetland habitats) take place unhindered because of weak laws and a lack of information among law enforcement officers regarding those legal provisions that do exist;

Environmental protection is understood by only a small proportion of the population that in most cases has no influence on matters related to the protection of the environment; as such it is not accorded the importance it deserves;

The ministry charged with the responsibility for environmental protection is understaffed to the extent that it has only recently been able to post one environment officer to each province; these are insufficient to carry out the major tasks of environmental protection;

Civil society involvement in environmental issues is still weak; only a handful of non-governmental organisations are involved but appear to work independently rather than combining forces to form a strong and influential lobby group;

There are inadequate financial resources to support environmental projects.

5.3 Achievements

The following can be cited:

- the government ministry responsible for environmental protection is in the process of finalising the environment policy which will be discussed by all stake holders before it goes to parliament and government for adoption;
- the Ministry of Education Science and Technology is in the process of introducing environmental education in all schools as a way of raising environmental awareness to the children at an early age;
- the government has set up an environment co-ordination unit, which will be responsible for all environmental issues in the country;
- the National Tree Planting Day is an annual event which involves planting of trees in all parts of the country; and
- the national radio station has a weekly programme discussing various environmental issues and over 70 per cent of the population have access to radio.

6. Observations and Key Lessons Learned

Recent developments and changes in the environment have led to a growing awareness within Rwanda of the need to improve the management of natural resources and address other issues of environmental concern.

The main challenge will be to integrate environmental concerns into the development process to avoid creating a conflict between development and environmental protection.

These activities should be supported by all stakeholders, which in the long run should be achieved by integrating environmental education within the formal education system.

In Rwanda, high population growth and poverty have been identified as the underlying causes of environment degradation. The poverty reduction strategy, which is well aware of this linkage, should integrate environmental concerns into all of its development plans.

Donors and implementing agencies involved in environmental protection programmes should place a priority upon environmental education and awareness-raising.

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Environmental Education in Refugee Situations in Uganda

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Executive Summary

Approaches to environmental education in Uganda are outlined, along with the types of constraints currently faced. The paper then outlines the experience of environmental education in refugee settlements in both the north-west and the south-west of the country.

Kew Words:

✓ *Environmental education*
✓ *Uganda*

1. Introduction

Environmental education – compared with other education disciplines – is a relatively new phenomenon in Uganda, not only in refugee settings but in the entire educational system.

An individual is said to have been educated when, after having been exposed to a learning process, an observable behavioural change is realised. This change must be accompanied by the willingness and ability to practice the new behaviour.

Environmental education in Uganda takes the form of:

- formal environmental education; where environmental education messages are incorporated into the national education curriculum across all subjects. Environmental education is not a subject on its own;
- informal environmental education: where Environmental education messages are passed on to organised groups in meetings workshops and seminars; and
- non-formal environmental education: where messages are not directed at any target group but passed on through the print and audio-visual media.

Each of the above forms of environmental education has its own shortcomings. For example, while environmental education messages may be integrated in into all subjects, there are no teachers specifically trained for environmental education. New books are yet to be produced. Some teachers may know their traditional subjects very well, but they are of advanced age and are reluctant to change their subject notes to incorporate environmental material.

In addition:

- since environmental education is not an examinable subject in its right, learners can afford to ignore it and still pass their examinations;
- the time for seminars, meetings and workshops is usually limited with a lot of work to cover. Participants often return with a lot of notes which they never bother to read again;
- audio-visual and print media are targeted at a very small section of the population considering the low literacy level of the nation;
- the audio-visual media are further limited by the numerous (almost 100) dialects that are used over the country; and
- poverty levels make it difficult for a large proportion of the population to have access to radio and television.

2. Environmental Education Initiatives in Refugee Settings in Uganda

In spite of the said shortcomings, the above forms of environmental education have been used in refugee settings in Uganda. A number of activities have been implemented with the aim of promoting sound environmental management.

2.1 Rhino Camp and Imvepi Settlements in Northern Uganda

These camps are host to southern Sudanese refugees since 1994.

2.1.1 School Programmes

- There are 13 primary schools and one secondary school in Rhino Camp and 6 primary schools and one secondary school in Imvepi (refugee populations of ca. 35,000 and 17,000 respectively). The peripheries of Rhino Camp have 5 primary and one secondary school while the vicinity of Imvepi has 6 primary and 2 secondary schools.

- Visits to schools were made by agroforestry extension workers. Because of other activities, however, these were not as regular as necessary.

- School environmental improvement campaigns were launched and conducted at both inter- and intra-school levels. Pupils were given tree seedlings to plant, assigned areas of school compounds and premises to clean and maintain and given themes on which to compose poems, art, music, dance and drama. Judgements were made and various categories of prises awarded to all participants. This may appear non-sustainable since when the prise-awarding agency departs, the activity stops. But the message will have been taken by the audiences.

2.1.2 Non-School Programmes

- Extension workers made programmes to visit and talk to institutions and have meetings with organised groups of youths, women and various religions.

- Workshops for teachers, political, religious and opinion leaders were conducted to equip them with basic environmental education messages that they would be required to include in their addresses at various gatherings.

- A number of posters produced by the National Environment Management Authority and UNHCR were placed in strategic locations for viewing by the public. Unfortunately many of these were removed by unscrupulous people for decorating their rooms and other uses.

- Homestead and environmental cleanliness campaigns were launched and conducted where various categories of prises were awarded to all participants. During this exercise, good personal hygiene, clean households, use of fuel-saving devices, possession and use of proper sanitary provisions, well-planned homesteads, etc were used as yardsticks for awarding prizes.

2.2 Nakivale and Oruchinga Refugee Camps, South-western Uganda

These camps are host to predominantly Rwandese refugees with a few Somalis, Congolese, Ethiopians and Sudanese.

A UNHCR-funded environmental programme is just being established. There was a similar programme which ran for one year and stopped in late 1998.

The current programme includes tree planting, soil conservation and environmental awareness-raising at both community and institutional levels. The response from the community in these two camps can be described as positive for the Rwandese and Congolese but less so for the Somalis, Ethiopians and Sudanese. Interestingly, the response for Sudanese refugees in northern Uganda was quite positive.

Efforts are being made to use the experiences from the north to implement programmes in the south-western refugee settlements.

Community participation in sound environmental management in refugee settings remains complicated due to:
- lack of a feeling of sense of ownership; and
- the differences in social-economic settings in the refugee countries of origin compared to the hosting countries.

Environmental Education in Refugee Schools: Practices and Possibilities

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Executive Summary

This paper reviews a range of ongoing school-based Environmental Education (EE) projects in refugee camps in the Horn and East Africa, drawing experiences from five countries. The focus of the paper is the approaches by which EE has been introduced in these projects, their relative merits and issues that require further consideration. In addition, the paper considers issues relating to institutional relationships, project monitoring and general education issues that effect EE projects in schools.

Alternative approaches to introducing EE projects in schools are considered, and case studies are included, where relevant. In many cases, the adoption of recommendations are in their infancy, and hence conclusions as to their effectiveness have yet to be fully evaluated.

Kew Words:

- ✓ *Environmental education*
- ✓ *Formal environmental education*
- ✓ *Multidisciplinarity*
- ✓ *Interdisciplinarity*
- ✓ *Extra-curricular*
- ✓ *Educational monitoring*
- ✓ *Teacher training*

1. Background

This paper presents an overview of salient issues to be considered when developing Environmental Education (EE) in refugee schools. These issues are based on the experience of the Refugee and Returnee Environmental Education Programme (based in UNESCO), Nairobi.

The Refugee and Returnee Environmental Education Programme (RREEP) of UNESCO was established in 1996. This programme, funded by the EESS of UNHCR, was mandated with developing a pilot EE project in the Kenyan refugee camps of Dadaab and Kakuma. Since that time, the RREEP has contributed to the design and facilitation of EE projects (both formal and non-formal) in countries including; Tanzania, Ethiopia, Djibouti, Sudan and Zambia.

Focusing on formal EE projects (i.e. Kenya, Tanzania, Ethiopia and Djibouti), this paper highlights the experiences of the RREEP in relation to project management and implementation. It reviews what the programme considers to be the most pressing issues facing refugee EE today, and suggests alternatives and solutions. Where possible, all issues are supported by field observations.

2. Approaches to Teaching Environmental Education in Primary Schools

2.1 Multidisciplinary Approach

A multidisciplinary approach to EE is recommended for primary school education. Such an approach was adopted in the pilot EE project in Kenya, and this was also applied to the formal EE project in Ethiopia (and subsequently in Djibouti).

The multidisciplinary approach requires a considerable level of skill and planning on behalf of teachers, as the approach dictates that EE should pervade all subjects taught in the classroom. Such an approach is contrary to traditional teaching, where the syllabus and associated text-books are typically the only teaching resources utilised. Even with extensive teacher-training, it is felt that teachers continue to struggle with teaching EE in this manner. Project monitoring has revealed that whilst EE may be included in work schemes, and even lesson plans, it is rarely used as intended. Where teachers do use the materials, they tend to teach a lesson using the EE materials only, and hence EE is not used to compliment existing subjects.

2.2 Alternative Approaches

It seems that the multidisciplinary approach for teaching EE in refugee situations may not be the most appropriate approach. There are a number of alternatives to the introduction of EE in formal education. The most potentially appropriate are considered below:

- Interdisciplinary approach;
- Modular approach;
- Training of specialised EE refugee teachers;
- Extra-curricular approach.

2.2.1 Interdisciplinary Approach

In situations where students may be taught by a number of teachers (i.e. subject-specific teaching) and for secondary education, the interdisciplinary approach to the introduction of EE is considered to be appropriate. Introduced in this manner, the existing subjects in the curriculum are used to teach specific EE themes. Typically, one may observe geography, history, civics, science and language (known as "carrier subjects") being used to support the teaching of EE.

In reality, experience in Djibouti suggests that this is the manner in which refugee teachers use the EE materials (also highly likely in Ethiopia since they both use the same materials).

The interdisciplinary approach simplifies the teaching of EE, but still requires a considerable level of skill and planning on behalf of all teachers. In addition, where students are being taught by a number of teachers, planning between teachers becomes crucial in order to prevent repetition. A typical example is the teaching of the subject of soil erosion – should this be taught in science lessons or geography lessons? Which teacher should be responsible?

An interdisciplinary approach to teaching EE is being piloted in Ethiopia. Training for this new approach began in May 2001, and it is envisaged that implementation using the interdisciplinary approach will begin in 2002. A limitation to the piloting of the approach lies in the fact that the existing materials (designed for a multidisciplinary approach) are being used, and hence aspects relating to lesson planning do not reflect the new approach.

2.2.2 Modular Approach

An alternative method of introducing EE into formal education is the development of a specific EE module for all grades. Feedback from refugee teachers in Kenya (where EE is taught in a multidisciplinary manner) suggest that this would be favoured by many teachers. The teaching of EE as a module, i.e. an additional subject, obviously places additional pressure on typically overloaded curricula, since time has to be created to teach EE. When this was explained to the teachers in Kenya, they maintained that it would be preferable to them.

The disadvantages of teaching EE as a module are summarised below.

- Creates additional pressure on typically overloaded curricula;
- What happens when double-shift teaching is being used?;
- What are the implications if all thematic education is introduced in this way (e.g. Peace education, AIDS awareness etc);
- It relies on the goodwill and motivation of teachers to teach extra lessons;
- Teachers are under pressure for their students to pass their examinations – what is the likelihood of EE being taught when teachers are likely to be concentrating on forthcoming examinations?

It is evident that the use of an EE module faces a number of barriers to implementation. The major issue seems to be the reliance on the goodwill of teachers. Bearing in mind the pressure placed upon refugee teachers, and the minimal incentives for teachers (a world-wide issue, not confined to refugee teachers), is this approach the most appropriate? How could refugee teachers be motivated to teach EE in this way?

It is pertinent to consider some of the advantages of introducing EE in a modular way:

- Requires a lower level of teacher skill and experience to implement;
- Can ensure that all desired aspects of EE are taught;
- Simplifies monitoring;
- Greater flexibility in terms of content and approach;
- Simplifies teacher-training (can exclude training on integrating EE into existing subjects).

The modular approach may be considered relatively prescriptive in approach, i.e. it dictates to the teachers how to teach each aspect of EE, (what to include, how to teach it etc) but it is important to consider the objective of introducing EE to refugee children. Do we want to introduce EE in a manner that is too complex to result in effective teaching? or would it be preferable to teach EE in a manner that may be considered less desirable, but does ensure that refugee children are involved in activities that will improve their ability to sustainably manage their environment?

In Djibouti, the teaching of EE as a separate lesson (i.e. a module) is currently being trialled. EE is being taught for two periods per week (replacing part of the subject matter of social studies). Unit assessments and examinations will be designed, in order to provide feedback on the progress of the project, and to ensure that EE is regarded as being equally important with the existing subjects by both teacher and students. It is hoped that ensuring that EE has the same status of other subjects will ensure teacher-motivation. Additionally, introduced in this manner, it does not create an extra workload for teachers, since EE replaces existing topics within social studies. This approach seems to have greater prospects of success in Djibouti, since the implementing partner is responsible for the development of the curriculum and can therefore readily incorporate EE into the curriculum.

2.2.3 Training of Specialised EE Teachers

Based on the experience of the formal education component of the Peace education project based in Kenya, the use of teachers specialised in teaching EE is worthy of consideration. Such an approach would involve the training of a limited number of teachers in the teaching of EE who would then undertake to provide teaching (one lesson per week, for example) to all classes.

Introduced in this manner, a number of advantages are identified below:

- Relieves pressure on all teachers to teach an additional lesson per week;
- Teaching is not jeopardised by forthcoming examinations;
- Project monitoring is further simplified;
- Facilitates more in-depth training of the specialised teachers;
- Facilitates greater flexibility / modification of content of EE.

Based on feedback from the education implementing partner in one Kenyan refugee camp, the adoption of such an approach may prove to be an attractive alternative to those discussed above.

The disadvantages of such an approach include:
- The need to provide incentives for specialised teachers;
- The provision of transportation to the schools.

Since both of the above issues involve funding, the importance of considering any education project as an evolving/continuing project, i.e. one that is not self-sustaining, should be one that is considered by all Branch Offices.

2.2.4 EE as an Extra-curricular Activity

An extra-curricular activity refers to an activity that is undertaken outside the regular school time-table, and as such, is typically attended by students on a voluntary basis. Where an EE project is introduced in this manner, a number of benefits may be observed, including the following:
- The framework of the project can be utilised in any country;
- Costs of materials are generally lower than traditional formal EE projects;
- A broader range of activities may be used;
- Learning must be fun for the learner, since their attendance is voluntary.

When introducing an EE project on an extra-curricular basis, consideration must be given to the structure of the project and how it relates to the rest of the school, between schools in a given camp, and the broader refugee community.

In northern Zambia an extra-curricular EE project recently began. By the end of 2001, the first draft of the materials for the project will be reviewed by the project Task Force (teachers from Mwange refugee camp). A similar project has been established in Maheba refugee camp in Zambia.

3. Prospects for Developing Generic EE Projects?

The development of formal EE projects is a lengthy process, typically taking over three years to finalise materials and provide the relevant training. The implications of developing curriculum-specific EE projects become obvious in this context (in terms of time and resources). Bearing this in mind, it is pertinent to consider the possibility of developing generic EE projects.

A generic EE project may not take into account a curriculum of a given country, and attempting to base a package on a number of curricula is virtually impossible. This dictates that a modular approach to introducing EE is necessary. If this approach is considered desirable, then multidisciplinary and interdisciplinary approaches (bearing in mind that they are considered the most appropriate strategies for teaching EE in primary education) must be discounted.

Cultural sensitivity (particularly concerning pictures) is considered essential. Ensuring that text and pictures are culturally sensitive is difficult, since the cultural background of some case-loads in a host country may be diverse (e.g. case-loads in Kenya and Ethiopia). Ensuring environmental relevance is similarly problematic, since, whilst case-loads may share a common culture, they may be hosted in countries with differing environmental features.

3.1 Somali Refugees and the Possibility of Developing a Generic EE Project

In the East African region, Somali case-loads are hosted in Eastern Ethiopia, Kenya and Djibouti. Not only do the case-loads share the same culture, the environments in which they are hosted are also similar (the same applies in Somalia). This provides an ideal opportunity to develop a regionally generic EE project that involves a number of countries working together to create a project that would serve to provide EE to refugees in a number of countries, whilst also providing continuing EE for those returning to Somalia (as is currently the situation, in relation to Somaliland). Benefits of such an approach include:
- improving the security of funding (both within UNHCR and externally);
- increasing the availability of resources; and
- reductions in unit prices of materials.

If it is assumed that all refugees will eventually be repatriated, it would be possible, in this instance, to base the project on the primary curriculum of Somalia (currently being developed by UNICEF and UNESCO, among others). In this context, the materials could be developed with a view to being utilised in a *pseudo*-interdisciplinary manner for returnees. Such a prospect would be more likely to attract external support for EE, and hence not only increase the levels of funding for the project, but also avail a broader range of inter-agency collaboration, and therefore skills and experience. In addition, the development of a regionally generic EE project would reduce funding pressure on individual Branch Offices for the development and sustainability of the project, since it would be shared between a number of country offices.

It is evident that the development of regionally generic EE projects may not necessarily be applicable in all cases, but where opportunities arise, such as the Somali case-load in East Africa, and the Sierra Leonean / Liberian case-loads in Guinea, this approach may prove to be more attractive to donors and UNHCR in terms of rationalising the use of resources.

Where there may be differences in either culture of environments, the adaptation of a generic EE project should offer few problems. It may be possible that the content of such materials would remain the same (i.e. contain the same environmental messages) and only the artwork would need to be changed (as a function of cultural or environmental representations). Modifications of this nature would be relatively simple. Where environmental messages / themes would have to modified, the RREEP would be able to facilitate the modification of the content.

4. Turn-over of Trained Teachers

4.1 The Problem

In any given refugee camp, all teachers may be trained in the teaching of EE. Over a period of time, a significant proportion of those teachers may leave the camp, due to resettlement or repatriation. In Djibouti, seven teachers trained in EE left the camps in 2001 and therefore new teachers have been hired, but they had not received training in EE (until September 2001). In the case of Djibouti, the loss of seven teachers constitutes a loss of 25 per cent of the teaching force in a period of one year. Similar problems are being experienced in Ethiopia, where many refugees are being repatriated. The creation of a mechanism to provide sustainable and systematic training for all refugee teachers in EE is essential in order to provide continuity for any EE project.

4.2 Recommendation

It is rarely possible for the RREEP to train all teachers in EE in any country (Djibouti being the exception, due to the low number of teachers).

In the case of Ethiopia, where it was not possible for the RREEP to train all teachers, a peer training system was adopted. In 1999, the RREEP (in collaboration with a number of agencies in-country) trained a total of 95 teachers. It was then planned that these teachers would train their colleagues in the teaching of EE. Whilst this approach seemed feasible, it became apparent that not all teachers received training in EE. The reasons for the failure of the approach seemed to relate to logistical and financial ones, rather than the concept of the approach itself.

An alternative approach to ensuring continuity in terms of teacher-training is currently being introduced in Ethiopia. The RREEP has trained members of staff in national Teacher-Training Institutes (those providing general teacher-training to refugee teachers) in training teachers in EE. It is envisaged that all new teachers will receive training in EE from the Institute prior to beginning their teaching in the camps. Other teachers will be trained in EE providing that UNHCR is able to financially support this additional training. It is hoped that building capacity in-country will limit the impact of teacher wastage.

The training of staff members in local Teacher-Training Institutes provides an additional benefit in that these staff can also train national teachers (in those schools in the vicinity of refugee-affected areas) in EE. Providing sufficient quantities of EE materials are printed (and the language of instruction remains the same), this serves to provide a significant benefit to local populations.

5. Monitoring EE Projects

5.1 Current Problems

Currently, formal EE is not reflected in examinations. Examination results cannot therefore provide a tool for monitoring the progress of EE projects in schools. Where multidisciplinary and interdisciplinary approaches to EE are being utilised, the most effective manner in which to monitor the application of EE is to observe teachers in the classroom (among others). This requires a considerable level of human resources, usually on behalf of the implementing partners, and this is typically unavailable due to existing workloads. As a result, there appears to be limited documentation relating to the monitoring of EE projects. This causes problems in project reviewing and planning for future funding requirements.

5.2 Recommendations

In order to help implementing partners monitor the progress of formal EE projects, the RREEP is in the process of developing a project-monitoring handbook. At present the draft handbook is exhaustive, considering all aspects of project management and implementation. It is envisaged that the handbook will be considerably simplified in preparation for use by implementing partners. The handbook is accompanied by spreadsheets, thus facilitating data analysis and interpretation. The application of the handbook will be accompanied by training for the implementing partners, in addition to continued support from the RREEP.

It is considered essential that in addition to establishing a systematic approach to project monitoring, the reports generated by its use be shared with all stakeholders in each project, i.e. refugee education committees, UNHCR and the RREEP. This will facilitate project review, action plans, and future financial planning. Equally important, the production and dissemination of project monitoring reports will provide greater accountability to UNHCR and donors alike.

6. Conclusions

To date, the RREEP has focused upon the multidisciplinary approach to introducing EE in refugee schools. The issues presented above suggest that this approach presents a number of challenges to teachers, implementing partners and UNHCR, and that some of these challenges are insurmountable (for the time being, at least).

It is time to consider alternative approaches to introducing EE in refugee schools. The RREEP, in collaboration with UNHCR and implementing partners is currently piloting some of the alternatives presented in this paper. It is envisaged that within the coming two years, project monitoring will allow an objective analysis of which approach (or range of approaches) are most effective, and this can lead the way for all those involved in the development of school-based EE in the future.

Continuing financial support for EE projects is essential. Justifying budgetary allocations would be greatly supported by monitoring reports. Developing a standardised system of project monitoring is an important step towards future project planning.

Non-Formal Environmental Education and Awareness Initiatives and Experiences of UNESCO-PEER

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Executive Summary

The paper defines non-formal education and outlines the benefits of non-formal approaches to environmental education in refugee and returnee settings.

Basic approaches to non-formal environmental education are discussed and two refugee case studies from Sudan and Zambia are presented that feature the experiences of UNESCO-PEER in this field.

Kew Words:

✓ *Environmental education*
✓ *Non-formal education*

1. Introduction

1.2 Definition of Non-Formal Education

Philip Coombs et al. (1973:11) define non-formal education as:

Any organised, systematic educational activity outside the established formal system – whether operating separately or as an important feature of some activity – that is intended to serve identifiable learning clienteles and learning objectives.

The Commonwealth Secretariat (1972:2) defines non-formal education as:

Any organised learning activity outside the structure of the formal system that is consciously aimed at meeting specific learning needs of particular sub-groups in the community – be they children, youth or adults.

For Paulston (1972: ix), non-formal education is the:

Structured, systematic, non-school educational and training activities of relatively short duration in which the sponsoring agencies seek concrete behavioural changes in fairly distinct target populations.

Cole Brembeck (1972:xvi) looks at the scope of non-formal education which:

deals with those learning activities that take place outside the formally organised educational system... to educate towards some specific goals, under the sponsorship of an identifiable person, group or organisation.

According to the US Agency for International Development (AID, 1970:7):

non-formal education is the myriad of means and approaches other than those of formal school structure by which skills and work-related knowledge and attitudes are acquired, updated and adapted.

The term "non-formal education" is also used to denote an *approach* to education rather than a specific educational domain" (CESA, 1999).

1.2 Non-formal Education with Refugees and Returnees

In order to fully achieve Environmental Education (EE) goals and objectives, its structures and processes should not be restricted to formal systems which must abide by specific criteria. Therefore the rationale for non-formal environmental education (NFEE) is to be found in the environment itself, the inadequacy of formal approaches and in the advantages associated with non-formal options for environmental awareness-raising and education. More specifically, the rationale for NFEE is:

- the complexity of environmental issues and problems to be addressed by education and awareness efforts;
- the large numbers of players (populations) contributing to and affected by the issues and problems of the environment; and
- the inadequacy of resources and processes in formal education as a means of informing and stimulating populations to act on environmental issues and problems.

Resource-related inadequacies include:

- untrained curriculum developers, teachers as well as monitoring and evaluation personnel;
- paucity of teaching and learning materials; and
- already crowded timetables.

Process-related inadequacies include:

- contrived curricula (top-down) developed at macro-levels (usually national);
- inappropriate didactic teaching methodology; and
- a stifling orientation to examinations.

Among the advantages associated with NFEE are the following:

- it is usually conducted in the real environmental situations to be addressed and therefore allows the environment to be functionally related to the learning that is taking place;
- its flexibility in infrastructure, timeframe, content and teaching/learning resources; and

- it is usually self-governing, rather than prescribed and pre-ordained, thus lending itself to emphasising local initiatives, self-help and empowerment.

2. Non-Formal Approaches to Refugee and Returnee EE

By approach we refer to organisation and participation, rather than methodology. Therefore we can simplify the otherwise complex possible alternatives into the following three set-ups:

- school-based NFEE;
- refugee/local community-based NFEE; and
- refugee-local community interactive approach.

The complexity of the NFEE processes is diagrammatically represented in Figure 1.

Note:

- Some of the environmental education information shared by schools with camp and host communities may have been acquired through formal education channels;
- In NFEE, learning is a two way process (to and from the facilitators and the learners);
- Learning is a means not an end and it is part of the process illustrated in Figure 2.

3. The Basic NFEE Process

The NFEE process may be implemented in various forms. However, in order for it to be effective in terms of translating into solutions to environmental problems, it ought to accommodate the following milestones shown in Table 1.

4. Case Studies

4.1 Sudan Community Environmental Awareness Programme

Following two needs-assessment missions (in 1998 and 1999) to the eastern refugee camps of Sudan, a project proposal was developed focusing on the provision of environmental awareness-raising through community-based approaches.

The project aimed to achieve the following:

- The establishment of a cross-sectoral task force for the development of awareness-raising materials and additional initiatives;
- The development of a range of community mobilisation materials for use in refugee camps and surrounding communities;
- The training of existing extensions and teachers in environmental awareness-raising techniques, using the materials developed;
- The identification of appropriate community-based organisations and individuals for use as vehicles for the dissemination of environmental messages.

The project was launched in April 2000. A Task Force (comprising government representatives, UNHCR and refugees) was established which served to assist in the development of the materials.

A set of posters was developed that depicted environmental degradation and its social and environmental effects. These were intended to be used by community extension workers and animators to assist refugees and locals living in the vicinity of the refugee camps to identify local environmental problems and to consider alternative mechanisms for amelioration. This was done through story-telling and/or drama with the community animator acting as a facilitator. A manual providing technical environmental information and communication skills was developed to assist non-environmental specialists to use the materials.

A second set of more general awareness-raising posters was produced for display in prominent public places such as clinics and schools.

A trialling induction workshop was conducted followed by the testing of the materials in the community. The trained extension workers and animators conducted 60 group sessions and reached more than 3,000 people (refugee and nationals).

A materials revision workshop was then conducted to revise the materials using feedback collected from the community during the trialling exercise. Twenty posters were produced and an extension/animator's worker guide developed.

The materials are now ready to be disseminated pending training of the extension workers and community animators on the use of the materials and basic community awareness-raising skills.

4.2 Mwange Camp (Zambia) Eco-Clubs Environmental Awareness Pilot Initiative

This school-community communication and education activity jointly undertaken by UNESCO-PEER and CARE International in Zambia (the UNHCR education implementing partner) illustrates how the process described in section 3 (above) is implemented.

4.2.1 Background

By the end of the year 2000 CARE had established eco-clubs in the primary schools of the Mwange refugee camp. So when UNESCO-PEER launched its pilot non-formal environmental education initiative in Zambia, a decision was taken to utilise the eco-club structures to implement it. Using findings of a needs assessment mission conducted early in 2001, it was established that the role of the eco-clubs would be enhanced by making use of both teachers and

Figure 1. The General NFEE Information Education Communication Framework

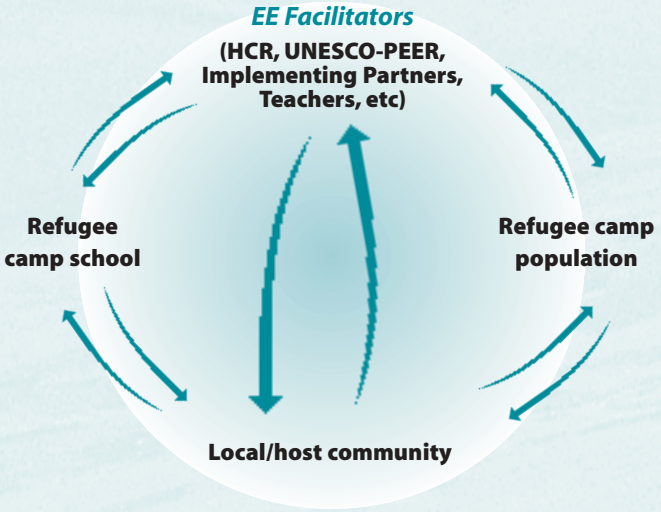

Figure 2. The Process of NFEE Learning for Action

Environmental Education/Awareness-raising as a process is expected to:

EDUCATE *ourselves on environmental issues* → *knowledge skills attitudes*

to improve

AWARENESS *of the environment* → *home school/office community*

which arouses

CONCERN *regarding our environment* → *land air water*

which is translated into

COMMITMENT *to do something for the environment* → *plants clean compound conserve energy*

that demands

ACTION *to act individually and collectively in the* → *town/farm community country*

Table 1.

Step	Details/Procedures
1. Global environmental theme formulation	UNHCR EE Concept Paper
2. Local environmental issues and problem identification	• Local literature review • Group discussions & interviews • Field observations • Interactive workshops
3. Audience identification, analysis and segmentation	Segmentation Criteria • Sex • Age • Education/literacy levels • Social status • Geographical location • Relation to specific problems
4. Message development (including pre-testing)	• Working groups of selected beneficiaries (teachers, community leaders, IP personnel, etc) • Experts (less commendable)
5. Identification of communication channels to carry EE messages	• Interactive workshops • Community research on familiar and effective communication tools • Using past experiences and lessons learned
6. Message dissemination	• Awareness and education materials • Environmental awareness activities
7. Evaluation and review	*Focus on:* • Environmental awareness levels • Environmental behaviour patterns (individual and collective action taken on the problems addressed)
Monitoring	This runs through the entire process

pupils materials to guide their activities. This meant that the main grassroot implementers of the project would be primary school teachers in the camp.

4.2.2 Groundwork

Working with teachers at a 10-day workshop in the Mwange refugee camp, UNESCO-PEER personnel inducted the teachers into the main environmental education learning areas stipulated by the UNHCR Session Paper of 1995. The teachers were then helped to identify and prioritise locally-felt environmental problems. The workshop went on to identify key messages and basic information that would be needed by the pupils, the camp population and the host community to resolve these problems. The focus was on core messages that would be packaged in the materials and other environmental awareness-raising activities that the eco-clubs would utilise to inform and educate specific audiences identified by the workshop.

Using very basic guidelines on sample selection and questions, the teachers went out and pre-tested the core messages. All except two were found to be acceptable to the camp population.

Among the communication channels selected by the teachers to carry the messages were awareness pamphlets, teachers' and pupils' activity books, drama, environmental games and puzzles. The teachers undertook to gather information on local laws and traditions relating to the use of resources in the local environment. This information will be used in the materials and activities that are being developed.

4.2.3 Forthcoming Activities

Forthcoming activities will include:

- pre-testing the draft materials and finalising them;
- inducting the general teacher population in the eco-club approach;
- production and dissemination of the project's materials;
- implantation of the school-community communication activities;
- participatory evaluation of the project.

5. Conclusion

From the brief discussion above it can be asserted that the NFEE option is a practical means of addressing environmental issues and problems. This emanates from its very nature that includes relevance and response to otherwise complex local environmental situations and flexibility in terms of structures, content and methodology – as well as its potential for empowering its audiences to participate in environmental activities. It is a particularly appropriate method for environmental awareness-raising and education in the situation of low literacy that often prevails among refugee and local populations in developing countries.

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Acronyms

CBNRM	Community-based Natural Resource Management
EE	Environmental Education
EES	Engineering and Environmental Services Section
FAO	Food and Agriculture Organisation
FNC	Forest National Corporation (Sudan)
ha	hectare
GIS	Geographical Information System
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit
GPS	Global Positioning System
IDP	Internally Displaced Person
IO	International Organisation
IRC	International Rescue Committee
km	kilometre
m	metre
NEAP	National Environmental Action Plan
NGO	non-governmental organisation
PRA	Participatory Rural Appraisal
RRA	Rapid Rural Appraisal
RREEP	Refugee and Returnee Environmental Education Programme
SAFIRE	Southern Alliance for Indigenous Resources
UNEP	United Nations Environment Programme
UNHCR	United Nations High Commissioner for Refugees
WFP	World Food Programme

UNHCR's environmental activities are designed to prevent, mitigate and, when necessary, rehabilitate the negative effects of refugee settlements on the environment so as to secure the welfare of refugees and local populations, and foster good relations with host governments who provide asylum to refugees.

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