GUIDELINES
FOR
ENVIRONMENTAL HEALTH SERVICES
FOR AFGHAN REFUGEES IN PAKISTAN

CHIEF COMMISSIONER FOR
AFGHAN REFUGEES
GOVERNMENT OF PAKISTAN

UNITED NATIONS
HIGH COMMISSIONER FOR
REFUGEES

ISLAMABAD

PAKISTAN
## TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>PREFACE</td>
<td>...</td>
<td>i</td>
</tr>
<tr>
<td>ACKNOWLEDGEMENTS</td>
<td>...</td>
<td>ii</td>
</tr>
<tr>
<td>INTRODUCTION</td>
<td>...</td>
<td>1</td>
</tr>
<tr>
<td>OVERALL OBJECTIVES</td>
<td>...</td>
<td>1</td>
</tr>
<tr>
<td>PART ONE - FECAL MATTER DISPOSAL</td>
<td>...</td>
<td>3</td>
</tr>
<tr>
<td>1.</td>
<td>Basic Considerations</td>
<td>3</td>
</tr>
<tr>
<td>1.1</td>
<td>Cultural Considerations, Values and Attitudes of Target Population</td>
<td>3</td>
</tr>
<tr>
<td>1.2</td>
<td>Refugees Involvement</td>
<td>3</td>
</tr>
<tr>
<td>1.3</td>
<td>Siting of Latrines</td>
<td>4</td>
</tr>
<tr>
<td>1.4</td>
<td>Topography, Soil Structure, High Water Table</td>
<td>4</td>
</tr>
<tr>
<td>2.</td>
<td>Specifications for Ventilated Improved Pit (VIP) Latrine</td>
<td>5</td>
</tr>
<tr>
<td>2.1</td>
<td>The Pit</td>
<td>5</td>
</tr>
<tr>
<td>2.2</td>
<td>The Slab</td>
<td>6</td>
</tr>
<tr>
<td>2.3</td>
<td>The Superstructure</td>
<td>7</td>
</tr>
<tr>
<td>2.4</td>
<td>The Ventilation Pipe</td>
<td>8</td>
</tr>
<tr>
<td>2.5</td>
<td>The Screen</td>
<td>9</td>
</tr>
<tr>
<td>3.</td>
<td>Surface Latrines</td>
<td>10</td>
</tr>
<tr>
<td>3.1</td>
<td>Vault - Specifications</td>
<td>10</td>
</tr>
<tr>
<td>3.2</td>
<td>Vent Pipe</td>
<td>11</td>
</tr>
<tr>
<td>4.</td>
<td>Slab/Vent Pipe Distribution System</td>
<td>11</td>
</tr>
<tr>
<td>4.1</td>
<td>Role of Sanitarians, Outreach Workers and Voluntary Agencies (VOLAGS)</td>
<td>11</td>
</tr>
<tr>
<td>4.2</td>
<td>Slab Manufacture/Procurement</td>
<td>11</td>
</tr>
<tr>
<td>4.3</td>
<td>Slabs/V.P. Storage and Distribution in the Field</td>
<td>11</td>
</tr>
<tr>
<td>5.</td>
<td>Maintenance of Latrines</td>
<td>12</td>
</tr>
<tr>
<td>5.1</td>
<td>Need for Maintenance</td>
<td>12</td>
</tr>
<tr>
<td>5.1.2</td>
<td>Accessibility</td>
<td>12</td>
</tr>
<tr>
<td>5.2</td>
<td>The Role of the Family</td>
<td>12</td>
</tr>
<tr>
<td>5.3</td>
<td>Role of Sanitarians/Outreach Workers/Volags</td>
<td>12</td>
</tr>
<tr>
<td>5.4</td>
<td>Basic Sanitation Tools</td>
<td>13</td>
</tr>
<tr>
<td>6.</td>
<td>Hygiene Education</td>
<td>13</td>
</tr>
<tr>
<td>6.1</td>
<td>Basic Principles</td>
<td>13</td>
</tr>
<tr>
<td>6.2</td>
<td>The Purdah System</td>
<td>14</td>
</tr>
<tr>
<td>7.</td>
<td>Latrines for Basic Health Units and Schools</td>
<td>14</td>
</tr>
<tr>
<td>7.1</td>
<td>Basic Health Units</td>
<td>14</td>
</tr>
<tr>
<td>7.2</td>
<td>Latrine type for BHUs</td>
<td>14</td>
</tr>
<tr>
<td>7.3</td>
<td>Schools</td>
<td>15</td>
</tr>
<tr>
<td>7.4</td>
<td>Coverage in RVs</td>
<td>15</td>
</tr>
<tr>
<td>Section</td>
<td>Title</td>
<td>Page</td>
</tr>
<tr>
<td>---------</td>
<td>----------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>6.8</td>
<td>Monitoring</td>
<td>32</td>
</tr>
<tr>
<td>6.9</td>
<td>Operation, maintenance and repair of piped water supply</td>
<td>33</td>
</tr>
<tr>
<td>6.10</td>
<td>Payment of electric bills/diesel bills</td>
<td>34</td>
</tr>
<tr>
<td>6.11</td>
<td>Role of Water and Power Development Authority (WAPDA)</td>
<td>35</td>
</tr>
<tr>
<td>6.12</td>
<td>Role of UNHCR</td>
<td>35</td>
</tr>
<tr>
<td>6.13</td>
<td>Reporting/Evaluation</td>
<td>35</td>
</tr>
<tr>
<td>6.14</td>
<td>Training</td>
<td>36</td>
</tr>
<tr>
<td>6.15</td>
<td>Coordination</td>
<td>36</td>
</tr>
<tr>
<td>7.</td>
<td>Spring Development</td>
<td>36</td>
</tr>
<tr>
<td>7.1</td>
<td>Basic Considerations</td>
<td>36</td>
</tr>
<tr>
<td>7.2</td>
<td>Steps involved in spring improvement</td>
<td>37</td>
</tr>
<tr>
<td>7.3</td>
<td>Surface tanks vs. standposts</td>
<td>39</td>
</tr>
<tr>
<td>7.4</td>
<td>Potential problems in spring development</td>
<td>39</td>
</tr>
<tr>
<td>7.5</td>
<td>Maintenance of springs</td>
<td>39</td>
</tr>
<tr>
<td>8.</td>
<td>Water tankers</td>
<td>40</td>
</tr>
<tr>
<td>8.1</td>
<td>Implementing Agency</td>
<td>40</td>
</tr>
<tr>
<td>8.2</td>
<td>Monitoring water tankers</td>
<td>40</td>
</tr>
<tr>
<td>8.3</td>
<td>Water Distribution using a water tanker</td>
<td>40</td>
</tr>
<tr>
<td>9.</td>
<td>Water Treatment Techniques</td>
<td>41</td>
</tr>
<tr>
<td>9.1</td>
<td>Overall objectives/Need for treatment</td>
<td>41</td>
</tr>
<tr>
<td>9.2</td>
<td>Chemical disinfection</td>
<td>41</td>
</tr>
<tr>
<td>9.3</td>
<td>Water from improved shallow wells with or without handpumps</td>
<td>41</td>
</tr>
<tr>
<td>9.4</td>
<td>Periodic chlorination</td>
<td>43</td>
</tr>
<tr>
<td>9.5</td>
<td>Consultation with refugees</td>
<td>44</td>
</tr>
<tr>
<td>9.6</td>
<td>Sand filter</td>
<td>44</td>
</tr>
<tr>
<td>9.7</td>
<td>Springs</td>
<td>45</td>
</tr>
<tr>
<td>9.8</td>
<td>Other methods of water purification</td>
<td>45</td>
</tr>
<tr>
<td>9.9</td>
<td>Portable kits for monitoring water quality</td>
<td>46</td>
</tr>
<tr>
<td>9.10</td>
<td>Waste-water drainage</td>
<td>46</td>
</tr>
<tr>
<td></td>
<td><strong>PART THREE - VECTOR CONTROL FOR MALARIA</strong></td>
<td>48</td>
</tr>
<tr>
<td>1.</td>
<td>General Aspects</td>
<td>48</td>
</tr>
<tr>
<td>1.1</td>
<td>Basic Strategy</td>
<td>48</td>
</tr>
<tr>
<td>1.2</td>
<td>Attack on the Adult Mosquito</td>
<td>48</td>
</tr>
<tr>
<td>1.2.1</td>
<td>Principles of Spraying</td>
<td>48</td>
</tr>
<tr>
<td>1.3</td>
<td>Mixing of Powder with Water</td>
<td>48</td>
</tr>
<tr>
<td>1.4</td>
<td>Elimination or Reduction of Mosquito Breeding sites in the Refugee Villages</td>
<td>49</td>
</tr>
<tr>
<td>1.5</td>
<td>Safe handling and Use of Malathion</td>
<td>49</td>
</tr>
<tr>
<td>1.6</td>
<td>Symptoms of Over-exposure</td>
<td>50</td>
</tr>
<tr>
<td>1.7</td>
<td>Treatment of Toxicity</td>
<td>51</td>
</tr>
<tr>
<td>1.8</td>
<td>Conclusion</td>
<td>51</td>
</tr>
<tr>
<td>2.</td>
<td>Operation and Maintenance of the Hudson Sprayer Pumps</td>
<td>51</td>
</tr>
<tr>
<td>2.1</td>
<td>Basic Consideration</td>
<td>51</td>
</tr>
<tr>
<td>2.2</td>
<td>Caution</td>
<td>52</td>
</tr>
<tr>
<td>2.3</td>
<td>How to operate the sprayer</td>
<td>52</td>
</tr>
<tr>
<td>2.4</td>
<td>How to store</td>
<td>53</td>
</tr>
<tr>
<td>2.5</td>
<td>How to service</td>
<td>53</td>
</tr>
</tbody>
</table>
PREFACE

The guidelines are designed for managers and supervisors working for Afghan refugees in the Environmental Health Sector in Pakistan. The primary objective is to present and discuss policies and basic methods that should be applied in the planning and management of activities in this sector. The focus of the guidelines is on appropriate design, construction, operation and maintenance and implementation procedures currently applied by the Government of Pakistan and Voluntary Agencies (NGOs) carrying out Environmental Health projects in the Refugee Villages with due consideration given to the uniqueness of each province where the refugees are settled.

The guiding principles in developing the guidelines have been the need to stress (a) the intersectoral nature of water, sanitation and health education; (b) the application of field-tested strategies and technologies which are both culturally and socially acceptable to the Afghan refugees; (c) standardization and uniformity of approach where feasible; and (d) quality control.

These guidelines do not discuss alternative design parameters and approaches which can be applied in the management of Environmental Health projects as practised in other parts of the world. The alternative approaches can be found in the literature which have been produced in great numbers by other UN agencies, the World Bank and other specialized agencies such as the International Reference Center for Community Water Supply and Sanitation.

Finally, it is hoped that the guidelines will not only serve as a useful field document for existing staff but will also serve as a management tool for those who are new in the programme as well as for those who plan to work inside Afghanistan when the refugees return to their homeland.

PETER OKOYE
SANITATION ADVISOR
UNHCR ISLAMABAD
PAKISTAN
ACKNOWLEDGEMENTS

The development of these guidelines was a collaborative effort of many individuals engaged in the planning, policy formulation, implementation, coordination and evaluation of Environmental Health Services for the Afghan refugees in Pakistan.

The guidelines draw heavily on a wide range of sources: (a) existing literature directed towards meeting the decade goal of clean water and adequate sanitation for all; (b) experience gained from current approaches in use by the Government of Pakistan, Voluntary Agencies (NGOs) and UNHCR in the Refugee Villages; and (c) discussions, arguments, comments and advice from colleagues.

Thanks are due to UNHCR Programme Officers (Water), Programme Officers (Sanitation) and VOLAG managers - Mr. Bruce Pollock, formerly of Austrian Relief Committee, Peshawar; Mr. Abdul Zahir, Mr. Abdul Qadar, Ms. Jean Ryan all from IRC, Peshawar; Col. Amir Nawaz Khan and Mr. Mubashir Ahmad from Pakistan Red Crescent Society, Peshawar; Mr. Poul Christiansen of DACAAR, Peshawar; and many others whose valuable contribution resulted in the development of these guidelines.

Further acknowledgement is due to all the colleagues and experts who critically and admirably reviewed the guidelines – Dr. Andrew Smith, UNHCR Health Coordinator, Peshawar; Dr. Richard Nesbit, Senior Health Coordinator, UNHCR Islamabad; Col. Altaf-ur-Rahman Khan, Director Medical Services, CCAR, Islamabad; Dr. A. Rashid Tareen, Project Director Health (Baluchistan), Quetta; Dr. Zafar Shah Afridi, Project Director Health (NWFP), Peshawar; Dr. Saeed Khan, Deputy Director – Environmental Sanitation, NWFP, Peshawar; Dr. Iftikhar Elahi, Project Director Health (Punjab), Lahore; Mr. S. H. Rizvi, Executive Engineer, Public Health Engineering Department, NWFP, Peshawar; Dr. Peter Wurzel, Chief, Water Supply and Sanitation, UNICEF, Islamabad; Mr. Fernando Mujica, Project Officer, Handpumps, UNICEF, Islamabad. Their inputs are highly appreciated.

A special word of thanks and gratitude go to Mrs. Taskinuddin, Programme Officer (Health), UNHCR, Peshawar – the energy source for these guidelines. Her relentless push contributed immensely in putting together a document that stresses common approaches to similar kinds of problems in the refugee villages. A special word of thanks is also due to Mr. Mohammad Ashraf, Senior Administrative Assistant, UNHCR, Islamabad for the many hours devoted to typing and re-typing the guidelines. The task, though elaborate in nature, was accomplished with devotion, efficiency and cheerfulness.

Sincere thanks and appreciation also go to the Afghan refugees who gave meaning to the phrase – Community Participation.

Comments regarding the guidelines are welcome. Relevant comments will be incorporated whenever the guidelines are revised.
INTRODUCTION

As in many developing countries, majority of the communicable diseases that affect Afghan refugees are related to unsafe water and poor sanitary practices. The reduction of these diseases, particularly, gastrointestinal diseases (diarrhoeas, dysenteries and helminthic infections) among refugee children, can be accomplished through improvements in personal hygiene; provision of safe and adequate water; construction of simple and proper sanitary disposal facilities for human excreta; and by modification of negative factors in the refugee environment which contribute to disease and death.

Environmental Health Services for the Afghan refugees should, therefore, focus on the following areas: Human waste disposal; Water supply/Waste water drainage; Insect-vector control; Solid Waste management; Community health education; and Refugee participation/involvement.

The delivery of the Environmental Health Services for the refugees should be through an integrated Primary Health Care approach with strong emphasis on refugee participation. Successful implementation will, therefore, require effective planning, co-ordination, supervision, continuous dialogue and efficient management by the Government of Pakistan (GOP), voluntary agencies (VOLAGS) and the United Nations High Commissioner for Refugees (UNHCR).

NOTE OF WARNING: These are only guidelines and there is need to state clearly that Environmental health conditions in the field vary greatly from province to province and even within provinces.

OVERALL OBJECTIVES

(1) To establish simple and viable systems which should be used and maintained by the refugees.

(2) To improve public health conditions in the refugee villages as well as the well-being of the refugees keeping in view the World Health Organization's goal of "Health for All" by the Year 2000.

(3) To integrate the activities in this sector into the overall health programme at the Basic Health Unit (BHU) level.

(4) To organize training programmes aimed at improving the theoretical knowledge and technical skills of sanitarians, outreach workers and other health staff involved in the delivery of Environmental Health Services.

(5) To establish strategies which will encourage refugee participation in this sector with subsequent adoption of the same schemes and strategies where applicable when they go back to Afghanistan.
PART ONE – FECAL MATTER DISPOSAL

1. BASIC CONSIDERATIONS

1.1 Cultural Considerations, Values & Attitudes of target population

A low cost dry system for fecal matter disposal has been developed and due to its appropriateness and cultural acceptance, it is the preferred technology for Afghan refugees in Pakistan. The system is the Ventilated Improved Pit (VIP) latrine. The VIP latrine technologically is an advanced model of the traditional Afghan "Khakandaz/Kinarab" shallow pit latrines. The VIP latrine is unique because of the addition of a screened vent pipe which helps to control odour and flies inside the latrine.

The Afghan culture supports single family latrines and totally excludes communal systems. Even within families, a second latrine for the men is usually provided (upon request) since in some areas, men culturally avoid latrines used by females. Additionally, the acute shortage of water in some of the camps and the material used for anal cleansing necessitate the use of a dry sanitation system in the refugee villages.

Keeping in view the latrine behaviour of Afghan refugees, the VIP latrine is appropriate for the refugees in Pakistan because:

- the per capita cost is relatively low
- construction of the latrine is easy and involves the refugees
- construction materials are easily obtainable in Pakistan
- operation and maintenance are simple
- the technology is appropriate for refugees when they go back to Afghanistan even if few modifications may be required to suit prevailing conditions inside Afghanistan.

1.2 Refugee Involvement

The Environmental Sanitation Programme is based on active refugee participation/involvement and full integration within the overall health programme. A distinction needs to be made here. Refugee participation simply means getting the refugees to be part of a specific programme while refugee involvement goes further to get refugees to show full identification and personal commitment to the programme, particularly, in the latrine/shallow well construction. The refugee elders, teachers, mullahs and heads of families are approached by the project staff (GOP/Volags). The project staff motivate and encourage the refugees to dig pits for the latrines according to the standard specifications (see 2.1). The project staff then issue the standard concrete slab and lid as well as ensure proper installation. The refugees then build the superstructure (wall and roof) after which the screened vent pipe is issued and installed. The issuance of screened V.P. differs from province to province and more or less depends on water availability and other materials for constructing the superstructure. In other words, screened vent pipes are issued only after the construction of the superstructure by the refugees. Voluntary agencies only pay for the cost of the slab, vent pipe and the lid. Through contribution of labour by the refugees, the overall cost of constructing one VIP latrine is significantly low.
A team of Lady Health Visitors (LHVs) or Female Health Outreach Workers (FORWs) where available, simultaneously carry out health education sessions within the refugee homes. The LHVs/FORWs teach the families about the health benefits of a latrine, the importance of good personal hygiene in the reduction of diarrhoea, how to make Oral Rehydration Salt (ORS) and proper ways to maintain the latrines. As a matter of policy, all Afghan refugee health staff must be involved in the health education and motivation of refugees to build, use and maintain the latrines in a hygienic manner.

1.3 **Siting of Latrines**

Ideally, the latrine should be located within the compound of the refugees to ensure accessibility to women and children at all times. By emphasizing women and children, it does not imply that men are precluded from using the latrines. The emphasis here is on the most vulnerable group from a standpoint of disease transmission.

The pit latrine should be sited as far away as possible from a well/water source. The minimum recommended distance should be 15-20 meters. The primary consideration in selecting the exact distance and location will depend on the following factors:

- Soil characteristics.
- Slope of ground: Build the latrine on level ground or downhill from a well.
- Depth of ground water table/velocity and direction of flow of ground water.
- The latrine should be built away from the kitchen, the "tandoor" oven and away from all tall structures. (Tall buildings and trees).
- The latrine door should face the direction of the prevailing wind, which in western Pakistan is generally from the north-west, with the vent-pipe on the south side and at least one meter above the roof.
- If it is not possible to build the latrine less than 15-20m from a well or the Sanitarian or ORW/CHS has any doubt about the siting of the latrine, a Volag or GOP sanitation staff must be consulted.

1.4 **Topography, Soil Structure, High Water Table**

In camps with a high water table (1.5 meters or less), raised double-tank composting latrines, commonly known as surface latrines, should be constructed. When one vault is full, it should be sealed and the other used. After a minimum period of 6 months, the sealed vault should be emptied and re-used. The contents can then be used as a safe fertilizer since all viable pathogens and most helminths (ascarids included) would have been destroyed. The surface latrines are recommended only where it is absolutely necessary because of the high cost in comparison to the VIP latrine.

In rocky terrain (bedrock) or where the water table is 2.5 meters, raised VIP latrines should be built. The base of the pit must be at least 1.5 meters above the water table level during the wettest season of the year to avoid its contamination. Large stones which are available in some of the camps or concrete rings can be used.

In unstable soil, the sides of the pit should be lined with concrete ring. (See Part one 2.1).
2. **SPECIFICATIONS FOR VENTILATED IMPROVED PIT (VIP) LATRINE**

2.1 **The Pit**

The pit must be at least 3 meters (9.84 ft) deep, 80 cm (2ft 7ins) long by 70 cm (2ft 4ins) wide, so that a family of 7 can use it for 5 years or more. Usually it is not necessary to line the pit. However, in unstable soil, e.g. sandy soil, concrete rings (1 part cement, to 2 parts sand, to 5 parts gravel) should be used. The cement/sand/gravel ratio applies only to rings to be used in sandy soil or any unstable soil. The rings should have holes interspersed throughout the length in order to allow for easy percolation of the liquid portion of the fecal matter into the soil. Where the soil is stable and there is absence of bedrock, the bottom of the pit should be widened as much as possible so as to increase the life span of a latrine. It requires two people to dig a pit—one person down the pit and one person to receive the excavated earth. Hand-digging a pit deeper than 3.5 meters should be discouraged for safety reasons. During construction, a pit should never be left open or unattended. Children are usually curious to see what is happening and a child falling into an uncovered pit is enough to dampen if not destroy the latrine construction programme in a particular RV. This is a very important concern.

---

**Fig. 1 - THE VIP LATRINE**

ADAPTED FROM MORGAN AND MASA
2.2 The Slab

The pit should be completely covered by a steel-reinforced concrete squatting slab which represents the substructure. Whether the slab is manufactured on-site by a VOLAG or procured from a factory, a ratio of 1 part cement, 2 parts sand and 4 parts gravel should be maintained. The cement/sand/gravel ratio is different from the cement/sand/gravel ratio for concrete rings used in sandy soil (see 2.1 p. 5). In order to prevent the collapse of the substructure or the emergence of flies from the pit, the concrete slab should cover the entire surface of the pit at least 25-30 cm beyond the edges of the pit. A suggested slab design is presented in figure 2 below.

Fig. 2 - SLAB DIMENSIONS FOR A VENTILATED IMPROVED PIT LAVATORY
The size and thickness of the slab can be modified, but the proportions of the keyhole should not be changed, as this size has been found to work well with Afghan refugees. To aid cleaning, the slab should be smooth. While the size and thickness can be modified, the total weight of the slab must be taken into consideration. The heavier a slab is, the more chances of breakage during transportation. It is, therefore, recommended that the total weight of a slab should not be more than 110 kgs for ease of transportation. Ideally, VIP key-holes should not be covered with a lid. However, for cultural reasons, in addition to the slow process involved in the construction of the superstructure, the key-hole in the slab must be covered with a lid. Within the refugee programme, until the superstructure is built, vent-pipes are not issued to the owners which in some areas without water can be as long as one year. The lid, therefore, becomes of extreme importance in many ways:

- reduces smell;
- prevents entry of flies into the pit;
- prevents rain from falling directly into the pit; and
- prevents poultry and other small animals from falling into the pit.

Even after the superstructure/roof are constructed, the refugees still insist on using the lid. Attempts to discourage the use of a lid have failed. The use of ferrocement slab is not recommended since chicken mesh tends to affect compaction of the concrete resulting in poor compression in the weight-bearing portion of the slab.

2.3 The Superstructure

The superstructure should give the user privacy and protection from the weather. It can be constructed of any locally available low cost material. The most common and popular being mud. The roof can be of thatch and the door opening can be covered by a canvas or sack curtain if the owner cannot afford a proper door. Where a proper door is used and this creates more darkness than required, an opening (for light) should be created on one side of the superstructure so that children should not be afraid to go into the latrine. However, the opening in the superstructure should be located only on one side – the wind-ward side and should be screened off to prevent the entry of flies/mosquitoes. There should not be another opening on the opposite side since this would affect the pressure difference which causes the updraft in the vent-pipe. In general, a VIP latrine functions optimally when the superstructure is fairly dark – See figure 3 on page 8.
2.4 **The Ventilation Pipe**

The purpose of the screened vent pipe is to remove foul odours from the latrine through a draft and control flies and mosquitoes. There are many theories as to how the draft is created. Absorption of maximum sunlight results in warming up of the V.P. This subsequently creates a pressure difference that allows cooler air inside the latrine to replace the light air in the V.P. The second theory is simply that wind blowing across the top of the pipe sucks air up it to produce the draft. Foul air is therefore drawn from the pit through the V.P. This is one reason why the V.P. should be well exposed to the sun/air. Vent-pipes can be constructed of Polyvinylchloride (PVC), mud bricks and galvanized tin. Where a PVC vent pipe is used, it should be black in colour to absorb maximum sunlight. Ideally, the ventpipe should be installed outside the superstructure. However, in the Afghan Refugee Programme, the V.P. has to be installed inside the superstructure to protect it from vandalism, especially from refugee children who use the V.P. for target practice. The vent pipe should be directly over the pit and its base flush with the surface of the slab as shown in fig. 4.
The PVC vent pipe diameter must not be less than 75 mm (3 ins). The length of the vent pipe should be 3 meters (9.84 ft). At least, 1 meter (3.28 ft) length of the vent pipe must protrude above the roof of the latrine to ensure that the sun heats the pipe and an updraft is established. If the vent-pipe is functioning properly, the latrine should not have an offensive odour.

The PVC pipe should have a wall thickness of not less than 2 millimeters (1/12th inch). A PVC pipe which has a wall thickness less than 2 mm will become brittle very easily from the sun/gases and other untoward weather conditions. PVC vent pipes should be securely fastened to the superstructure with a string or stabilized using mud around the base.

Tin pipes should be of 27 gauge and of good quality, non-corrodible, and about 15mm to 20mm in diameter. Where mud brick pipes are feasible, they should be encouraged because of cost effectiveness. Mud brick pipes should be built as part of the superstructure with a cross sectional area of not less than 150 mm by 150 mm (6 ins by 6 ins.). The inside should be as smooth as possible and as in the PVC, it must protrude at least one meter (3.28 ft) or more above the roof and facing the sun.

2.5 **The Screen**

The screen on the vent pipe serves to prevent the movement of flies and other insects both in and out of the latrine. There are many kinds of screens - glass fibre screens, metal mesh, stainless steel mesh, plastic mesh and perforated plastic (cup-like) mesh with openings on top and on the sides. Because of cost containment, the screen should be of 1.5mm (1/16th inch) wire, metal or plastic mesh. The screen should not restrict airflow. Plastic materials with few openings tend to restrict air movement and should be discouraged. Stainless steel mesh are exorbitant and field tests have shown that they disintegrate over time under extreme weather conditions.
3. **SURFACE LATRINES**

3.1 **Vault – specifications**

Each individual vault should be approximately 1.5 meters (5.25 ft) long, 0.65 meters (2 ft) wide and 0.9 meters (3 ft) deep thereby giving a volume of 0.9 cubic meters (30 cubic ft). This should be enough to last a family of 7 for over six months. The two tank vaults should be water proof. In order to discourage the breeding of mosquitoes (Culex species), the vault should not be wet. The superstructure should be the same as for the VIP latrines and should be constructed out of mud by refugees. Volags should build the entire structure for schools and BHUs/CHUs/SHUs where needed. The tank vaults should be constructed of concrete blocks or bricks (see fig. 6) The concrete block or brick used may vary depending on the mold used and what is available in the field. Because surface latrines are usually constructed in areas with high water table, compacted earth should be used to surround the base of the vault. A sealable opening should be built for emptying the chambers after the requisite period. See fig. 6. As in the VIP latrine, surface latrines must be constructed a similar distance away from wells or other water sources even if the bottom of the surface latrines are lined or supported with concrete. GOP/VOLAGS/UNHCR are yet to evaluate the surface latrine particularly, with regard to how long it takes for one vault to be filled and the cultural problems associated with the emptying of the vault by the refugees.

---

**Fig. 6 - SURFACE LATRINE -- SPECIFICATIONS**
COURTESY OF ARC/IRC -- PESHAWAR
3.2 **Vent Pipe**

One vent-pipe should be adequate. When one vault is full, the VP. should be transferred to the next vault. The vent-hole in the unused slab should be capped and only opened for vent-pipe installation when one vault is full. The specifications for the vent pipes should be the same as in the VIP latrine.

4. **SLAB/VENT PIPE DISTRIBUTION SYSTEM**

4.1 **Role of Sanitarians, Outreach Workers and Voluntary Agencies (VOLAGS)**

The administrative control of the slabs and vent pipes, their production/procurement and distribution should be the responsibilities of the Volag staff in collaboration with the BHU staff — viz: the Sanitarian/Outreach Workers and the Sanitarian Inspectors. The Sanitarian/ORW should assess the sanitation needs of the refugee village through a survey. The relevant data obtained from the survey should be provided to the Volag operating in the district/agency. The Volag should compile the information and contact PDH/UNHCR to establish priorities.

4.2 **Slab manufacture/procurement**

The slabs should be supplied either through central slab production or produced on-site by a VOLAG. Gravel used by Volags should be put through a 15mm mesh screen or sieve. Curing should last at least for a minimum of seven days. If slabs are supplied through central slab production, the cost of the slab should be uniform for all volags. Transportation to RVs for the slabs should be provided by UNHCR. Unloading of slabs should be arranged between the Volags and the RVAs. Where the slabs are manufactured on-site by a Volag, the total cost of one slab should not exceed the cost of centrally manufactured slabs. In some of the RVs, where the GOP is directly responsible for sanitation projects (Baluchistan), Volags should supply slabs to the BHUs as well as provide technical guidance. Centrally purchased slabs should undergo rigorous testing before an agency undertakes bulk purchases. The testing should determine the ultimate moment capacity as well as ensure that the slabs have satisfactory reinforcing details. Quality control of the slabs should be monitored on an on-going basis by GOP, VOLAGS and UNHCR.

4.3 **Slabs/V.P. storage and distribution in the field**

The slab should be stored in a secure and safe place, preferably, BHUs or schools. Vent pipe materials, particularly PVC pipe is susceptible to sunlight and extreme temperatures and if not adequately stored will become brittle and go to waste. After a pit has been dug according to specifications under the supervision of a Volag/Sanitarian/Outreach Worker, a concrete slab and a lid should be given to the refugee who will transport them to his house for placement over the pit. A receipt or a note book should be used to document the name of the recipient, the name of the RV and district/agency and date slab and lid were issued. The Volag/Sanitarian/Outreach Worker should keep a copy of the receipt and where a note book is used, the Sanitarian/Outreach Worker must ensure that the pages containing the information regarding the slab and lid distribution are not torn. The Field Officer/Sanitarian/Outreach Worker should go around the camp to inspect the latrines under construction and make necessary adjustments where needed. Where it is certified that the pit depth is adequate and the slab is properly placed on the top of the pit, the refugees can then build the walls and the roof. Also, when it is certified that the
superstructure has been properly built, a screened vent pipe with instructions for proper installation, should be given to the refugee. The mesh must be securely tied to the upper end of the pipe to keep out flies and insects before being handed over to the refugee.

5. **MAINTENANCE OF LATRINES**

5.1 **Need for Maintenance**

An unclean latrine which is smelly and full of flies is a health hazard and promotes the fecal-oral transmission cycle. A dirty latrine will discourage refugees from using the latrine. To ensure continuous use of the latrines, the refugees must keep them clean.

5.1.2 **Accessibility**

Refugees must ensure that the latrines are accessible. Vegetation, slopes or rocky ground should be removed so that users, particularly children, can have access to the latrine without difficulty.

5.2 **The Role of the family**

The inside and the surrounding of the latrine should be swept daily. Where children defecate at the edge of the key-hole, water should be used to wash it down the pit to discourage fly breeding. Disinfectants should not be poured into the pit because they affect the bacteria that break down the fecal matter. If children defecate around the latrine, the excreta should be removed and put into the pit. The surface latrine is more complex than the pit latrine and extra education is needed for their use and maintenance. Vegetable leaves which serve as a carbon source should be put into the vault to help the decaying process. The Lady Health Visitors or the Field Officers should stress that the vaults of surface latrines must be used separately and they should be emptied every six months or when the fecal matter has covered 90% of the vault. After each emptying, the cover must be replaced and made air-tight with mud. The broom used for sweeping the substructure should be left in a special corner near the latrine where children should not play with it.

Large objects should not be thrown into the pits/vault. If a VIP latrine or compost latrine gives excessive odour, ash should be thrown down the pit/vault. The Lady Health Visitor/Female Outreach Worker teams should teach as well as demonstrate to the women and children how to keep a latrine clean as well as the hygienic use of the latrine.

5.3 **Role of Sanitarians/Outreach Workers/Volags**

The Sanitarian/Outreach Worker (see attached job description as appendix 1 & 2) should identify maintenance problems in the RV during his field days. The identified problems should be fully documented according to the nature and urgency of the problem in a Bound Register. The register should be presented to both the Sanitarian Inspector and the Medical Officer of the BHU. It is of vital importance that the medical officer incharge of the BHU is fully aware of the existing

**In Baluchistan province, the Sanitarian equivalent in NWFP and Punjab provinces is the Outreach Worker.**
environmental health problems in the RVs. They should, therefore, give necessary support to the sanitarians and the outreach workers particularly, in districts where there is a Health Committee in existence.

The identified problems should also be discussed with a field officer from a Volag operating in the area. The Volag is responsible for the provision of maintenance materials such as vent pipes, screens, and lids. In North West Frontier Province and Punjab, the Sanitarian in collaboration with the Volag Field Officer should supervise the maintenance operation. In Baluchistan, the Outreach Worker should be directly responsible for maintenance activities in the GOP Sanitation Projects. However, Volags should maintain facilities which do not fall within the GOP jurisdiction. Overall, a sanitarian/outreach worker should provide motivation and technical guidance on maintenance of latrines. Latrines should be closely monitored in order to determine when to carry out appropriate maintenance. The key areas to look at in terms of maintenance are: perforated vent pipes, slabs not being cover tight, corroded screens with openings and cobwebs, VP not directly into the pit as a result of weakening of the mud used to fit it in place, lowering of the vent pipe inside the hole causing the latrine to smell, collapsing pits in areas with seasonal high water table. These problems must be recorded in a Bound Register which should be kept at the BHU. The register should also be used to document problems related to: improper well siting, distribution and storage system of piped schemes, wastewater drainage and garbage disposal. The information from the Bound Register should be part of the information submitted by the Medical Officer to the Field Supervising Medical Officer (FSMO).

To enhance the effectiveness of the Sanitarian/Outreach Worker with regard to maintenance, they should be provided with basic sanitation kit. The kit should contain:

a. 1 spade
b. 1 pick
c. 1 bicycle for mobility during field days
d. 1 torch/flash light
e. 1 10 ft. tape measure
f. 2 wrenches 10" and 12"
g. 1 plier.
h. Bag or kit for carrying Health Education materials.
i. 1 steel saw for cutting PVC pipe during maintenance.
j. Wheel barrow (slab transportation and hauling of solid waste)

The tools and bicycle should be kept at the BHU/CHU at the end of each working day. The sanitary inspector or the district health inspector should ensure that the tools are used appropriately. Bicycle maintenance should be part of the FSMO's POL budget.

6. HYGIENE EDUCATION

6.1 Basic principles:

The construction of any type of latrine will have little or no impact if a systematic and a well-organized hygiene education is not introduced simultaneously to promote the health benefits
of using a latrine. The target population for hygiene education should be primarily women and children. The women in particular should be role models for their children and strive to inculcate good hygiene habits in their children. This is based on the premise that when children grow up with specific values, habits or life styles, such behavioral norms are sustained for a long period.

Dissemination of health information may not be an easy task as people have always been made to believe. Health information is useful to the extent that it helps an individual to see the need for change and engage in activities that promote good health practices. (See Guidelines on Health Education and different techniques involved in health education).

6.2 The Purdah System:

Afghan society forbids access of male health workers to Afghan women (Purdah System). This is an age-old cultural norm that must be respected by everyone working for the refugees. It is, therefore, essential for each VOLAG to endeavour to have female health workers on their staff. In some provinces e.g. Baluchistan, female staff are not easily available, older refugee women who are willing and free, could be trained. The female health workers should organize meetings during home visits with the refugee women. The VOLAG female health workers should encourage the BHU female health staff to discuss environmental health problems with the refugees both at the BHUs and inside the RVs. (See section on Community Health Education for details of health messages.)

7. LATRINES FOR BASIC HEALTH UNITS AND SCHOOLS

7.1 Basic Health Units:

For cultural reasons, four latrines should be provided for each BHU where space permits. Two latrines should serve the staff-one for males and one for the females. The other two latrines should be for the out-patients visiting the BHU - one for males and one for the females. The BHU staff should always inform out-patients that there is a latrine available for their use. Availability of a latrine for outpatients gives more meaning to the health education efforts being carried out in the BHU. Since it is the policy of UNHCR to provide a latrine for each BHU, where refugees cannot contribute labour, a Volag should construct the BHU latrine (including superstructure) whether it is a VIP or a surface latrine.

7.2 Latrine type for BHUs:

Prior to the construction of a latrine for a BHU, a survey should be carried out by a VOLAG to determine the most appropriate latrine for a particular BHU. In places where water is supplied through an improved well or an improved spring, it would be more appropriate to construct a VIP privy in the BHU. However, where there is a reliable piped water scheme (tubewell, borehole) or a shallow well with a suction pump to lift water to an overhead storage tank, a pour flush latrine could be constructed as long as hydrogeological conditions can permit the construction of a soakaway pit for sewage disposal. In general, a VIP latrine should be considered first.
7.3 **Schools:**

A latrine should be provided for each school. One latrine should serve at least 60 pupils. In schools with large population, multiple pit latrines should be constructed. For maximum effectiveness, multiple pit latrines should have individual pit for each slab and a vent pipe. This will improve the ventilation system with regard to odour and fly control. A separate latrine should be constructed for teachers. Field observations have shown that pupils are afraid to use the same latrines as their teachers.

7.4 **Coverage in RVs:**

In general, every attempt should be made to provide at least 30% of the refugees with a latrine in each refugee village. Voluntary agencies should pursue this target to the farthest extent possible. However, where the water table is high and where there is lack of cooperation from the refugees, this target may not be realized. Overall, to ensure an even and equitable distribution of latrines in the RVs, VOLAGS should relocate to a new RV after conducting a survey to determine that at least 30% of the refugees in an RV have been provided with latrines. Relocating to a new RV, however, is contingent on formal approval being granted by the Commissioner for Afghan Refugees (CAR). The VOLAG request to relocate to a new RV should be coordinated with the Project Director (Health), the Deputy Project Director (Environmental Sanitation) and UNHCR.

8. **SUPERVISION**

8.1 **Provincial level:**

The Project Director Health (PDH) is responsible for all sanitation activities in the province whether such activities are carried out by Voluntary Agencies (VOLAGS) or by the Government of Pakistan (GOP). The PDH/UNHCR, through a joint effort, would consider the sanitation requirements of districts/agencies/RVs based on the data collected by the PDH/UNHCR Sanitarians/Outreach Workers and Voluntary Agencies. Priority areas and identification of a VOLAG to work in a particular district/agency should also be the responsibility of both PDH/UNHCR.

Coordination of all sanitation activities should be carried out by the Deputy Director-Environmental Sanitation in NWFP and Baluchistan. In Punjab, which has a small refugee population, the FSMO or a designated Medical Officer should be responsible for the coordination of all sanitation activities. Under the overall supervision of the Project Director (Health), the Deputy Director-Environmental Sanitation should be responsible for the day-to-day planning, organization and management of all matters related to the refugee sanitation programme in the provinces and at the district level. Additionally, the DD-Environmental Sanitation should:

(a) Collect and collate related data from the FSMOs for onward transmission to the PDH on a monthly basis using a standardized reporting form.

(b) Liaise with VOLAGS carrying out sanitation activities in order to ensure smooth implementation and strengthen cooperation, understanding and open communication between BHU Sanitarians/Outreach Workers and VOLAG staff.
(c) Assist with the development of a sanitation education component at the BHU level.

(d) Organize and conduct workshops/seminars for sanitarians/outreach workers aimed at upgrading their skills and knowledge.

(e) Organize sanitary surveys aimed at obtaining information to improve the overall environmental sanitation programme as well as ensuring that the activities are fully integrated within the overall health programme carried out at the BHU level.

(f) Organize monthly co-ordination meeting in collaboration with UNHCR aimed at discussing problems/issues in the Sanitation Sector.

8.2 District level

The Field Supervisory Medical Officer (FOMO) should supervise all activities related to sanitation and in particular be fully aware of the roles and responsibilities of the BHU Sanitarian/Outreach Worker. Supervision is made easier when there is a clear idea of the specific roles and responsibilities of the sanitation staff. Reports regarding environmental sanitation should be forwarded to the FOMO by the Medical Officer of the BHU. The FOMO should scrutinize/edit the reports before forwarding them to the Deputy Director (Environmental Sanitation) in an approved reporting form.

In NWFP and Punjab, the medical officers assisted by the sanitary inspectors should supervise the sanitarians both at the BHU and within the RVs. The sanitarians should work part time (morning hours) at the BHU for the collection of malaria/TB slides. The rest of the day should be devoted to working with VOLAGS and refugees inside the RVs to identify environmental health problems. However, where there is an outbreak of epidemics, the sanitarian schedule should be determined by the PDH/DD/FOMO in consultation with UNHCR.

In Baluchistan, the medical officers assisted by the District Public Health Inspectors should supervise the outreach workers both at the BHU and during routine work inside the RVs. The ORWs should work in the BHUs but should be in the field on alternate days and half of the other days.

In general, all information regarding sanitation activities should be forwarded to the medical officers/inspectors for onward transmission to the FOMOs.

8.3 Evaluation:

Fecal matter disposal facilities (latrines) for refugees should be evaluated at least every twelve months. The primary objective of the evaluation should focus on determining the impact of the latrine construction programme on the overall public health conditions in the RVs in addition to establishing new strategies to strengthen the programme. The evaluation exercise should be a collaborative effort between all the VOLAGS carrying out latrine construction (sanitation) and PDH/UNHCR. Two representatives from each VOLAG (Project Manager should be represented), the Deputy Project Director (Sanitation) and a representative from UNHCR should conduct the evaluation. The evaluation should look at the following areas: Organizational structure, field management and policy guidelines, supervision, service delivery, reporting system,
coordination, latrine design and construction, refugee involvement, health education and how delivered, water source-latrine distance from a shallow well, latrine utilization, percentage of refugees with latrines in the RV, maintenance and follow up and other environmental health problems.

A final report emanating from the evaluation should represent the views, observations, conclusions and recommendations of the evaluation team. The report should be forwarded by the Deputy Project Director - Environmental Sanitation to all the VOLAGS carrying out sanitation in the RVs and UNHCR.

The evaluation, apart from determining the qualitative performance of a particular VOLAG, the secondary objective should be aimed at promoting interagency interaction, exchange of ideas, better coordination and adoption of field tested and cost effective implementation strategies.

8.4 Monitoring:

Since the evaluation is carried out periodically, VOLAG staff, Deputy Director (Environmental Sanitation) and UNHCR territorial officers have full responsibilities for routine monitoring of the programmes. VOLAGS should develop techniques which should enhance their monitoring capacity. Such monitoring techniques or approaches could be shared with other VOLAGS during coordination meetings which should be held once a month. The monthly coordination meeting should be used as a forum to highlight and discuss problems and strategies employed by a particular VOLAG as well as discuss policy issues.

8.5 Training/Refresher Course

All sanitation staff should undergo periodic training or refresher course. The training should be organized by the Deputy Director - Environmental Sanitation in collaboration with UNHCR. A competency-based approach should be used for the training. The overall goal should aim at upgrading the technical skills and knowledge of the sanitation staff so that they can effectively perform specific tasks.
PART TWO - WATER SUPPLY
(SHALLOW WELLS, PIPED SCHEMES, SPRINGS AND WATER TANKERS)

1. **OVERALL POLICY:**

Water supply for the Afghan refugees is provided through shallow wells, piped schemes, springs and water tankers. The overall goal is to provide adequate and potable water to meet the needs of the refugees. Ideally, each refugee should have a supply of 25 liters per day. However, because of problems related to non-availability of ground water in some provinces aggravated by dispersed refugee population and the enormous number of refugees in Pakistan, a minimum of 10-15 LCD is provided according to UNHCR policy. In general, all water supply to refugees is carried out on a community basis. In other words, house connections from piped schemes are not given to individual refugees and private shallow wells are not improved nor hand pumps installed in them.

After the emergency phase of the refugee programme, the priority of UNHCR in the water sector changed from piped schemes to shallow well improvement with hand pumps and spring development (where there is available ground water). This priority is not strictly followed in Baluchistan where piped schemes are almost the only alternative in most areas. The emphasis on shallow well and spring improvement is based on the following:

(a) Cost effectiveness in terms of per capita cost in construction and maintenance;
(b) Application of simple but appropriate technology;
(c) Encourages refugee participation and involvement;
(d) Reliability: no need for power to pump water;
(e) Water can be obtained from low yielding aquifers and stored in the well at night;
(f) Ideal for scattered population since Afghan refugees live in dispersed areas inside Pakistan, particularly, in Baluchistan Province;
(g) Since majority of the refugees are from the rural areas, it is a technology which they can apply in Afghanistan keeping in view the World Health Organization's goal of "Health for All" by the year 2000.

Piped water schemes are encouraged where:

- there is a high concentration of refugees and water distribution from the storage tanks or standposts could be accomplished with minimal difficulty and no undue financial burden to UNHCR.

- shallow wells or springs are not feasible e.g. some RVs in Baluchistan/NWFP and all the RVs in Punjab province.

1.1 **Registered and unregistered refugees**

It is the policy of UNHCR to provide water which is regarded as a basic need to every refugee. Unregistered refugees who live inside or within the periphery of the camps are provided with water in the same manner as registered refugees. However, unregistered refugees who have settled some distance away from approved camps are not provided with water schemes funded by UNHCR.
Each BHU, CHU and SHU should be provided with either an improved shallow well (with a handpump) or a standpost where a piped scheme exists.

1.2 Refugees vs local population

In general, the primary mandate of UNHCR is for refugees. However, under special circumstances, for example, where the local population lives in close proximity with the refugees, a joint scheme could be financed provided 80% of the beneficiaries are refugees and 20% are locals. The 80-20 ratio is applied not only on population basis but also regarding financial requirements. Piped schemes benefitting the local population should also be less than 20% of the total cost of the scheme. Problems with land ownership which may disrupt piped scheme installation are handled by the Commissioner for Afghan Refugees in collaboration with UNHCR and the land owners. Compensation to land owners is discouraged. In view of this, majority of the piped schemes are located in government owned lands. However, not all refugees are settled within the periphery of the cities. Some of them are located in tribal areas (see 6.1 p.29).

Construction materials for shallow well improvement are sold at cost price to the local population and to the refugees who own private wells.

2. SITE SELECTION

2.1 Purpose:

The need for site selection is to ensure that refugees are located in areas where (a) there is available ground water (b) land is not in dispute (c) land is easily accessible to refugees and GOP/VOLAG/UNHCR staff, (d) access roads can be easily constructed and (e) the water table and soil conditions are adequate for the construction of simple VIP privies.

2.2 Composition of the site selection committee

A site selection committee should be created to determine an appropriate site before refugees are shifted into a particular place. The site selection committee should be composed of:

(a) Two representatives from the government (one from the legal department and one from the Public Health Engineering Department).

(b) One representative from the voluntary agency which will be directly involved with the construction of the proposed water scheme.

(c) One representative from UNHCR (Programme Officer responsible for water).

(d) One representative from the Water Supply Cell (Baluchistan).
3. **SHALLOW WELLS:**

3.1 **Wells for the refugee community**

Shallow wells (hand dug wells) represent one way of abstracting ground water from low yielding aquifers. Existing shallow wells should be improved for refugee use by voluntary agencies. Where such a well is not available, the refugees should be encouraged to dig a new well. While refugees provide labour, voluntary agencies should provide construction materials and technical guidance. In NWFP, one improved shallow well should serve at least 30 families and in Baluchistan, 10-15 families should benefit from one improved well. The difference between NWFP and Baluchistan regarding the number of beneficiaries for one improved well relates to the fact that refugee families in Baluchistan are widely dispersed. In RVs in Punjab, because of deep aquifers and brackish water, shallow wells are not recommended. No improved shallow well should exceed a maximum depth of 50 meters. At a depth of 50 meters, it is unsafe to hand dig a well because:

- of poor ventilation.
- if a handpump is installed, the wear and tear is faster when the pumping head is very high (Effort and pumping lift).

3.2 **Site location**

- 15-30 meters away from the nearest pit privy.
- Located at a higher level in relation to a latrine.
- Well safe-guarded against flooding especially in low-lying areas.
- Water in sufficient quantity/good quality.
- Accessible to refugees, staff of GOP, VOLAGS and UNHCR.

3.3 **Role of Voluntary Agencies/Refugees**

- Volags in collaboration with refugee leaders and RVAs should determine which wells are to be improved. Such wells should be centrally located and should not be within the compound of any refugee.
- Digging of wells or deepening of an existing well should be carried out by refugees. A significant number of refugees are professional well-diggers.
- Volags are responsible for production of concrete rings, reels or pulleys, well posts, metal covers and purchase or manufacture of hand pumps.
- Concrete rings should be mass-produced in factories at different locations.
- The hand pump should be supplied by a Volag. UNHCR funds DACAAR to produce the Afridev-Indus Pump. However, where the water table is less than 10 meters, a low lift pump could be purchased locally and installed at a reasonable cost (as in D.I. Khan).
- The Volag engineer should determine the number of concrete rings to be used in lining the well. The number of rings should, however, depend on the depth of the well and the soil conditions.

- pH values of the water in the well should be between 7-8 and should be monitored routinely.

4. WELL IMPROVEMENT

4.1 Equipment/Materials

- Spades, pointed pick-axis, heavy hammer, light hammer, chisels, bucket/ropes, bricks, reinforced concrete rings (dia: 102cm, 87cm and 76cm), winch and pulley or reel, basket, a tape measure, handpumps with rising mains made of high quality PVC pipe.

4.2 Determining the depth of a well

- Should depend at what depth enough water is available, however, as stated earlier, it should not exceed 50 meters. Beyond this depth, a borehole with casing and gravel pack is recommended.

- The depth of a well should always be considered a more important factor than the diameter in determining the amount of water that can be drawn when the water level goes down.

- Where feasible, a well should be dug during the dry season. At this time, the water would have dropped to its lowest level.

- In general, the depth of a well should be deemed adequate when the empty hole is recharged to a water depth of about 3 meters measured after one night (static water level = 3 meters).

4.3 Construction

- Two or more men are required to dig one well.

- A minimum diameter of 0.8 meters should be maintained in order to allow a person to go down the hole and dig.

- Digging should go pass through the aquifer down to the next solid layer.

- The water volume should be monitored for four days to ensure that there is enough water before sinking the bottom ring.

- The sides of the well should be lined with concrete rings. Where the soil is stable, the lining should be limited to the first top 3 meters. This will prevent surface seepage and possible contamination. In loose soil, the lining should be from the top to the
bottom. If a well is located on a rocky ground, the bottom need not be lined so that the well can be deepened if it dries up. This is based on experience.

- The sinking of each ring must be done carefully (each ring weighs about 120-150 kg) using a strong rope and a reel. Supervision is, therefore, essential.

- Lining of a well should start from the bottom upward.

- Clean washed gravel (size about 15mm in diam) or small rock pieces should be placed at the bottom of the well at least to cover the bottom to a height of 10cm.

4.4 Effect of drought

Due to lack of rain, the water level usually drops and many hand dug wells dry up. This problem can be solved by deepening the wells since "the greater drawdown will force the water to flow in from the aquifer at a faster rate".

4.5 Well-head (without a hand pump)

- Comprised of the head wall 102cm (top ring) and an apron. Head wall could be prefabricated concrete rings or built with baked bricks and covered with cement mortar of ratio 1:3.

- Head-wall should be at least 46cm from the ground to protect pollutants from entering the well.

- The thickness of the head wall should not be more than 5cm so as to discourage refugees standing on them.

Fig. 7 - WELL HEAD WITHOUT A HAND-PUMP
A hinged metal sheet should be used to cover the well. The cover should be painted with an oil based paint to minimize early corrosion.

Two concrete posts (H:165cm, cross-section 20cm x 15cm) should be used to hold the reel in place. In Baluchistan, a pulley should be used instead of a reel since it has been a standard practice.

4.6 **Well-head with a handpump**

- If a hand pump is readily available, it should be installed. A cover slab with a manhole for inspection and periodic chlorination should be used to cover the well before a hand pump is installed. The hand pump of choice is the AFRIDEV (Indus) Pump. (See 4.7). Ideally, a well with a handpump should not require chlorination. However, because of the tendency of the refugees to go down the wells as well as constant repair of the rising main, periodic chlorination is recommended.

- Cover slab should be cover-tight to prevent foreign materials and spilt water from re-entering the well.

- Apron should have a low mound shape to facilitate drainage of wastewater into a soakage pit or refugee gardens.

- A slope of 1cm per 20cm for a distance of two meters should be adequate.

- The apron which should be solid should be raised at least to a minimum of 0.10M above the ground.

---

Fig. 8 -- WELL-HEAD WITH A HAND PUMP
4.7 **The Afridev Pump (Indus Pump)**

The Afridev pump is a deep-well, sturdy pump which has undergone extensive testing by the World Bank and the Consumer Association Testing and Research Laboratory (CATR), United Kingdom. It is ideal for the refugee programme because it is easy to maintain by the refugees and meets the Village Level Operation and Maintenance Concept (VLOM). An important feature of the pump is that most of the components below ground are made of plastic and only one spanner is required for maintaining the pump head and handle bearings.

It is manufactured for UNHCR by the Danish Committee for Aid to Afghan Refugees (DACAAR) based in Peshawar. The factory is located in Swabi, 30 KM from Mardan. The Afridev-Indus pump and its basic components are presented in fig. 9.
4.8 Technical specification

Pumphead:

- All steel, welded fabrication designed for easy manufacture.
- Hot dipped galvanized (alternative finishes can be used).
- Universal mounting flange with 180 x 140 mm bolt centre provides interchangeability with India Mark II and Maldev.
- All nuts and bolts are M16, and those loosened for maintenance are captive.
- T bar handle for easy 1 or 2 person use, with handle force not exceeding 20 kg-f, with:
  - 3:1 advantage for 10 – 30 m lift.
  - 4:5:1 advantage for 30 – 45 m lift.
- Direct-action pumphead for up to 10 m lift under development.
- Concrete pedestal recommended for low-cost, rigidity and contamination protection (steel pedestal can be used).

Handle Bearings:

- Twin polymer bush assembly specially designed for pumphead hanger and fulcrum bearings.
- Twin bushes using outer polyacetal bush (Derlin 500) running on inner nylon 66 bush (Zytel 101).
- Two parts snap together to give neat, easy-to-replace bearing unit.
- Field and laboratory tests indicate very low wear rates.
- Cheap, mass-produced spare part.

Rising Main:

- 63mm OD, 53mm ID, 15 bar uPVC pipe.
- Suspended from pumphead by compressed rubber cone, giving simple joint that eliminates load concentration.
- Solvent welded uPVC pipe joints (snap together, easy-fit joints are under development).
Rubber centralizers to locate rising main in borehole.

Pump Rods:

- Hooked 10 mm galvanized mild steel rods, with stainless steel option at extra cost for corrosive ground water.
- Joined by special, easy-connect hooks, eliminating threads and tools.
- Hook connection incorporates plastic rod guides.
- Alternative, easy-fit rod connections are under development, to simplify mass-production.

Cylinder:

- 50 mm ID (53mm OD) x 700 mm long stainless steel (304) tube sleeved into 63mm OD, 53mm ID 15 bar uPVC pipe.
- Stainless steel cylinder lining ensures long life and corrosion resistance.
- Incorporates polyacetal (Derlin 500) footvalve receiver.
- Employs 1m long, 75mm OD x 67mm ID suction pipe to give low water velocities thus minimizing sand transport.

Plunger/Footvalve:

- One component used for body of both plunger and foot-valve.
- Valve body comprises two injection moulded parts, permanently spin-welded together.
- Valve body is polyacetal (Derlin 500), an engineering plastic with excellent mechanical properties and low water absorption.
- When used as footvalve, the snap-legs on valve body "plug-in" to receiver at base of cylinder.
- When used as plunger, valve body uses snap-in rubber "U" seal, fitted by hand and removed with a house-hold knife.
- A simple, one-piece, moulded rubber bobbin is used in plunger and footvalve, snapping into valve body by hand through one of the ports.

Tools:

- Only two required.
- Forged socket spanner 24 mm across flats.
- Footvalve "fishing" tool uses simple grappling device on end of rope.

Spares:
- Where possible, spares for routine replacement of parts that wear out easily should be provided.

4.8.1 Quality control:

The primary purpose of quality control is to ensure that the design and specifications as recommended by the World Bank are adhered to. In this regard, UNHCR places strong emphasis on standardization, reliability and simplified maintenance procedures. UNICEF (Pakistan) which is also involved in the Afridev-Indus pump for their Pakistan programme has hired the services of "Crown Agents". The main responsibility of the 'Crown Agents' is to ensure the quality control of the locally produced Afridev pump taking into consideration varying social, economic and environmental conditions existing in the refugee camps and in Pakistan where the refugees live.

Through continuous research, field investigations and refinement, UNICEF is committed to producing a high quality pump that can serve the needs of the refugees and the local population particularly, at a time when many people are interested in meeting the decade goal of clean and adequate water for all by the year 1990.

The Afridev-Indus pump produced in Pakistan is, therefore, closely monitored by both UNHCR and UNICEF in terms of quality control.

4.9 Factors governing handpump installation

When installing handpumps on improved wells, priority should be given to the following factors:

- where there is no piped water/springs;
- where there is no sanitation project in progress;
- where there is a high incidence of diarrhoeal diseases;
- where the water table is very deep. The refugees find it difficult to lift water with a bucket at a depth of 30-45 meters.
- where an average of (30/15)* families benefit directly from the well.

*30 families in NWFP, 15 families in Baluchistan.

These factors should be discussed and agreed to by both UNHCR/VOLAG. Where a VOLAG field officer has questions/doubts, the Programme Officer (Water) for UNHCR should be consulted. The above listed factors should be a guide and flexibility should be exercised where necessary.
4.10 **Role of refugees – re: improved well/handpump**

Prior to handing over an improved well with a handpump to refugees, refugees should make a token contribution (cash) collected from 30/15 families who are the main beneficiaries. The amount should be set aside for maintenance of the pump e.g. replacement of bearings etc. Experience has shown that a token contribution from the refugees gives them a sense of ownership of the pumps which in turn limits the abuse of the pumps and need for constant maintenance.

The refugee leaders should be approached and ample time should be taken to explain and convince them that the money collected would be directed towards maintenance of the handpump. It is strongly recommended that a structured approach to requesting the contribution be used by VOLAGS to remove any suspicions. Where refugees in a particular RV refuse to make the contribution, the pump should not be installed.

In general, where an RV has experienced severe shortage of water as a result of constant breakdown of a piped scheme, there has been full cooperation from the refugees in making the contribution and this has a ‘ripple effect’ on other refugees in other RVs.

4.11 **Pump maintenance**

Improved shallow-wells with or without handpump require maintenance from time to time to ensure optimum functioning. On completion of a well, a caretaker should be appointed by a VOLAG to look after the pump on a voluntary basis. The caretaker should receive basic hygiene education and should be responsible for:

- monitoring the condition of the handpump;
- reporting problems to the VOLAG team/Sanitarians/Outreach Workers;
- ensuring that the pump surrounding is hygienically kept;
- protecting animals from going near the handpump area by fencing off the water point.

DACAAR supervisors and other VOLAGS (International Rescue Committee-IRC, Action Internationale Contre la Faim-AICF, Medecins Sans Frontieres-MSF) should organize periodic health education seminars for the handpump caretakers to reinforce their existing knowledge and further emphasize their basic roles and responsibilities. A job guide or manual describing step by step procedure involved in the operation and maintenance of the pump should be developed and distributed by DACAAR. The manual which should be translated into Pushto/Dari should be used for the training of literate pump caretakers and should also be used for field operations.

4.12 **Key problem areas with the Afridev-Indus handpump to be monitored closely**

- The rising main may not be centralized. It should be held in place by spikes fitted into the soil or into the rings used in lining the well.
- Leakage as a result of poor quality PVC pipes.
- Leakage as a result of poor joining of PVC pipes.
- Corrosion of the pump rods and above ground components if not galvanized.
- Poor quality U-seal and rodcentralizers.
- Silt accumulation – causing obstruction and thereby reducing amount of water delivered and early wear and tear of the pump.

5. MAPPING

5.1 Record of location of improved shallow-wells with or without handpumps

Voluntary agencies involved in shallow-well improvement should have a map of each RV. The location of each improved well should be identified in the map. Where a voluntary agency is also involved in borehole drilling, the location of the boreholes should be identified too. To ensure that an RV with either a piped scheme or improved spring, or both does not have more than the required number of improved wells, existing piped schemes and improved springs should also be identified in the map. The number of refugee beneficiaries as against local beneficiaries should be specified. The mapping exercise should be coordinated with the Public Health Engineering Department (PHED) and the Water Supply Cell (WSC). A copy of the map should be supplied to the sanitarians/outreach workers through the Deputy Director-Environmental Sanitation. The overall objective is to ensure that water is available to as many refugees as possible in addition to keeping accurate record of water sources in an RV.

5.2 General record

In NWFP and Baluchistan, VOLAGS should always have up-to-date information regarding the number of improved wells/handpumps. The information should include the following:

- Name of District/Agency where the well is located.
- Name of the RVA.
- No. of wells improved for each month.
- No. of pumps installed for each month.
- The exact location of the improved well with handpump.
- The name of the pump caretaker.
- The date the pump was installed.
- The names of the VOLAGS implementing sanitation in the particular RV.
- Pump number on plate.

6. PIPED SCHEMES (DEEP WELLS)

6.1 Basic consideration

In general, the design and construction of tubewells and deep boreholes are more complex, capital intensive and involve recurrent expenditure in terms of operation and maintenance than any other underground water source. They involve heavy machinery such as drilling rigs (percussion or rotary), a pump/motor unit, a pump house, a distribution and storage system and electrical machinery. They are, therefore, recommended where it is the only alternative to distribute water to a large refugee community living together. While tubewells and deep boreholes
can be constructed in a relatively short period of time, a major problem faced by UNHCR in the piped scheme implementation has been the long-waiting period to energize the wells by the Water and Power Development Authority (WAPDA). Additionally, it takes WAPDA a very long time to repair or replace damaged transformers. During the summer period, some RVs do not receive water as a result of loadshedding. In the tribal areas and even in some settled areas, water has to be pumped only at night when the voltage is adequate. Perhaps, the most serious and disturbing problem with the piped schemes is tribal disputes resulting from land ownership. Where a long pipeline has to be laid in areas inhabited by two different tribes or locals, there is a tendency to block the flow of water by cutting the pipeline. These problems are not experienced in the shallow well implementation. Decisions regarding the use of tubewells and deep boreholes must, therefore, take the above constraints into consideration.

6.2 **Schemes Approval Committee (SAC)**

The Schemes Approval Committee made up of representatives from CAR, PHED/WSC, a VOLAG involved in the implementation of water schemes (e.g. DACAAR in NWFP) and UNHCR should determine the appropriate piped schemes to be constructed for the refugees (tube well, percolation well, open surface well, borehole). In addition to the criteria for site selection (see part two, 2.1. on page 19), the population (numbers) of the refugees to be served must be a major consideration.

6.3 **Institutional arrangement**

Deep wells for the refugees (which may also benefit locals) should be constructed by the Public Health Engineering Department (PHED), the Water Supply Cell or the Baluchistan Development Authority. (The job is usually carried out by contractors.) The initial design should allow at least a 10-20% extra capacity to accommodate new refugees. UNHCR is responsible for the provision of funds for the drilling and construction of the distribution system, purchase of pump/motor unit and pump house construction. The Programme Officers (Water) in collaboration with the implementing department (Executive Engineer) should plan, cost and review the design for all new schemes. All documents including PC-1 related to a particular project must be approved by the Programme Officer – Water before any construction is initiated. Good organization and effective management should be deemed essential from the onset of any piped scheme construction.

6.4 **Test pumping of a well (well development)**

A 24-72 hour test pumping of a tube well or borehole should be carried out following a well development. The number of hours of test pumping should depend on whether the aquifer is confined (24 hours) or unconfined (72 hours). The test is necessary to determine the potential yield of the well, the quality of the water and that the yield will meet the water demand of the refugee population to be served at the designed pump rate. Additionally, it is helpful in selecting appropriate pump/motor unit for the well.

6.5 **Pump selection**

The pump to be used should be determined by the well capacity, required pumping head, well diameter and depth and duration of pumping cycles and availability of power. Ideally a turbine
pump is recommended when the pumping depth is less than 150 feet (50 meters). Beyond 150 feet (50 meters), a submersible pump is recommended. Where there is a reliable power source, an electric motor driven pump is recommended. Consideration must be given to the RPM whether a turbine or submersible pump is used. However, where power is unreliable (excessive load shedding) or where there is no electricity at all, a diesel powered motor is recommended. In large camps, standby generators are recommended. Decisions regarding the type of pump/motor unit to be used must be agreed upon by the implementing agency and UNHCR and the pump/motor unit should be made in Pakistan. Repair of pumps made in Pakistan is fairly easy because the company that made the pump would be in a position to repair the pump/motor unit. Where feasible, repairs could also be made from the local market as they have been found to be more economical provided that quality is maintained. Such local repairs must be cleared with UNHCR.

A tube well with a discharge capacity of 10,000 gallons per hour should be considered a fairly good tube well. A minimum pumping time of 8 hours a day is recommended where the pump/motor unit is in an efficient condition. The pumping hours should be carried out in two shifts or even three where necessary. However, field conditions must be the final determinant in decisions regarding the operation of a well.

6.6 Well casing, screens and packing

Protection of a well from contamination by surface waters and impure ground water, should be a major consideration. It is important that the wells are lined with a well casing of good quality without involving expatriate technicians. Where the ground water is aggressive or has a high iron content, non-corrodible materials should be used for casing. The well top should be covered with a water-tight cover and the casing should be sealed off with a cement grout and concrete slab. Metal screens with gravel pack should be used to prevent sand and silt ingress. The quality of the metal should be of special importance since poor quality metal would be eaten away due to corrosion caused by corrosive gases dissolved in water resulting in well failure.

6.7 Distribution and storage system/pipe materials

The heart of the system for providing water to the refugees is the distribution and storage system and should be given special attention during the planning/design/construction phase as well as when the entire system is operational. Ideally, a looped system should be used so as to enable maintenance without interrupting water supply to an entire camp and also to allow for extension if more refugees were to be settled in a camp.

A combination of surface tanks and stand posts should be constructed. The number of taps on each surface tank should not exceed four. Experience has shown that the more taps that are made available, the faster the rate of destruction of the taps by the refugees. The resultant effect is that when water is being pumped, the water flows out as soon as it reaches the tanks. Self-closing valves/taps are sturdy but refugees destroy them out of desperation. Where feasible, the maximum walking distance from the farthest point of a camp to a surface tank or standpost should not exceed 800 ft (244 meters). Each surface tank should have a covertight manhole for inspection and cleaning, an over flow pipe and a vent pipe with a screen. The vent is only applicable where the distribution tank is constructed with cement blocks or bricks.
In large camps, large capacity reservoir/s (50,000 gallons or 225,000 liters) should be constructed for emergency use. The number of such reservoirs should depend on the population of the RV. In any case, such reservoirs should be designed for two-days supply and should feed the surface tanks/distribution tanks and standposts by gravity. For example, an RV with a population of 35,000 refugees, two Basic Health Units, a VOLAG running a specialized clinic would require a reservoir with a capacity of:

- Number of refugees = 35,000
- Staff of BHUs = 30
- Staff of voluntary agency = 20
- Liters of water per capita per day = 12
- Requirement for one day
  - 35,000 x 12 = 420,000 liters
  - 30 x 12 = 360 liters
  - 20 x 12 = 240 liters
- Total: = 420,600 liters
- Two days requirement
  - 420,600 x 2 = 841,200 liters

The reservoir/s should, therefore, have a capacity of 841,200 liters.

It should be noted that this is only feasible in refugee villages with an adequate water supply and a well organized institutional arrangement (e.g. Kot Chandna RV, Punjab).

Pipes are made of different kinds of materials. These are galvanized iron, steel, cast iron, polyvinyl chloride (PVC) and asbestos cement. The pipe choice should be governed by (a) nature of soil, (b) topography, (c) strength, (d) cost and (e) availability in Pakistan. The programme Officer (Water) should be involved in the selection of appropriate pipe and size of pipe for a particular scheme. Where topography permits, pipes, especially for the transmission mains, should be buried to a reasonable depth to prevent illegal connection from the mains, vandalism and freezing when the temperature drops very low (Baluchistan). During the initial construction, the executing agency (contractor) should be responsible for the digging of trenches for laying the pipeline. However, if an extension is required at a later stage, the refugees to be served should be responsible for the digging of the trenches. This has never been a problem since water is a basic need and refugees have cooperated without agitation except where a refugee leader refuses that water should be given to new settlers. There is, therefore, need to establish a dialogue with leaders of old settlers so as to ensure that the pipeline laying is not disrupted.

6.8 Monitoring

During the construction phase, PHED should be responsible for monitoring all activities related to the piped water schemes (well drilling, pump house construction etc.). These activities should be carried out by the sub-divisional officers (SDOs) and the sub-engineers under the overall supervision of the executive engineer. Their major role should be to ensure that work is being carried out according to approved estimates and specifications as contained in the PC-I.

UNHCR Programme Officers (Water) where feasible, should visit the scheme under construction. It may not be possible for the Programme Officer (Water) to visit some schemes,
particularly, if many schemes are under construction at the same time. Territorial Officers, therefore, should assist in monitoring the schemes under construction and report back to the Programme Officer-Water.

On completion, all schemes must be inspected before they are commissioned. A "Completion Report" of the schemes as approved by the Schemes Approval Committee (SAC) stating total expenditure incurred, map of the distribution system and other relevant information about the schemes must be prepared by PHED and submitted to UNHCR. If a VOLAG (NWFP) is to be involved in the maintenance of the schemes, the VOLAG must ensure that the scheme was constructed according to original design and specifications before accepting to maintain the scheme. An apron for the distribution tanks/standposts with a gutter for wastewater drainage must be in place. The wastewater could be diverted to refugee gardens or a soakage pit.

Routine monitoring of the schemes after being commissioned should be regarded as an essential component of PHED/WSC responsibilities. The SDOs and the sub engineers should supervise the work of the operators, valvemen, linemen and chowkidars. They should ensure that each operator (at a tube well, percolation well, open surface well) has a hard bound register (log book) to record the following:

| Name of Operator | Time pumping started |
| Location of well (district & RV) | Time pumping stopped |
| Date of pump installation | Date of meter reading (WAPDA) |
| Pump type/make | Daily meter reading |
| Date well was commissioned | Date of pump breakdown |
| Capacity of the well | Date pump was repaired |
| (discharge rate per hour) | Nature of repairs made |
| No. of hours of pumping each day |

Apart from determining the overall efficiency of a scheme, knowledge of the power consumption would assist in determining when the pump/motor unit needs attention as well as ensure that UNHCR is not overbilled by Water and Power Development Authority (WAPDA).

A map of the distribution and storage system of the water supply scheme should be kept in the pump house for inspection by monitoring officers. The SDOs and sub engineers should report their field observations on new and old schemes to the executive engineer. The executive engineer should determine if a particular problem needs the attention of the chief engineer and UNHCR.

6.9 **Operation, maintenance and repair of piped water supply**

The most difficult aspect of a piped water supply scheme which is often overlooked is the operation and maintenance of such schemes after being commissioned. The difficulty lies not in the lack of adequate institutional arrangement or adequate financial resources but simply because of poor supervision of staff and laxity at the management level. To ensure continuous supply of water to the refugees as well as justify the huge financial investment borne by UNHCR, operation and maintenance should be given top priority by the implementing department (PHED/Water Supply Cell).
The PHED/WSC should be directly responsible for the management of all maintenance activities. Apart from providing technical guidance, they should:

- ensure that the pump/motor units are functioning optimally and that adequate water is available in the tanks;
- repair damaged pumps, motors and generators;
- pay the salary of pump operators, valvemen, etc.;
- ensure that drainage troughs are clean and wastewater is disposed of properly;
- disconnect illegal connections in cooperation with the refugee leaders.

These activities should be carried out promptly to ensure that water supply to the refugees is not disrupted. It is unfortunate that ‘preventive maintenance’ is not practised in the refugee piped water schemes. A change is required in this direction.

Sub-divisional engineers (SDOs) should be assigned to look after specific wells in each RV. Their responsibilities and relationship with other staff should be clearly defined by the Executive Engineer. A copy of the organizational chart and job description should be forwarded to UNHCR Sub Offices by the Executive Engineer. Clear delineation of responsibilities enhances supervision.

Where a VOLAG is involved in the maintenance of a piped scheme, the VOLAG, after full consultation and approval from PHED/WSC and UNHCR, should be made responsible for routine civil works such as:

- Repair of leaking pipelines.
- Repair of damaged and leaking surface/distribution tanks.
- Repair of damaged aprons at standposts and distribution tanks.
- Replacement of damaged water taps.
- Disconnection of illegal connections in collaboration with SDOs and Refugee Leaders.
- Clean the distribution tanks and where needed have them chlorinated.

Schemes donated by other donors for the refugees but also serving the local population should be maintained based on the number of refugees benefitting from such schemes. (See UNHCR policy on Part Two, 1.2 page 19).

Based on experience, employing refugees as part of the maintenance team reduces abuse of the distribution/storage system. Where feasible, refugees should be involved in the maintenance of the water schemes. A major advantage of involving the refugees is that since they are part of the refugee community, maintenance problems can be easily identified and rectified.

6.10 **Payment of electric bills/diesel bills**

The PHED/WSC should be responsible for payment of electric/diesel bills related to piped schemes. To ensure that electric bills are accurate, electric meters in each pump house
should be functional and monitored by PHED staff. An individual should be given the responsibility of payment of bills in a particular location and the same person should keep a scheme-wise record for all payments made in a bound register. The register should be examined at least every two months by a qualified staff of UNHCR (Territorial Officers).

6.11 **Role of Water and Power Development Authority (WAPDA)**

WAPDA should be responsible for the installation or replacement of transformers and other electrical requirements for the wells. The Government of Pakistan requires that repairs of items such as the transformer be made through WAPDA. However, where it is possible to arrange local repairs, it should be encouraged since they have been found to be faster and more economical. This is a matter that needs to be discussed at the level of the Chief Engineer (PHED) and Chief Engineer (WAPDA). UNHCR should be informed of any local repairs and the location of the piped scheme before such repairs are initiated.

In the event of a breakdown of the electrical machinery (transformer, low voltage, etc.), the SDO should contact WAPDA immediately. Additionally, the Executive Engineer should be informed. Depending on the nature and degree of the problem, the Executive Engineer should contact UNHCR Sub Office for financial commitment. Repairs which require excessive funds must be cleared with UNHCR before any action is taken.

6.12 **Role of UNHCR**

UNHCR Sectoral Officers should (a) ensure that the well drilling and pumphouse construction work are proceeding as specified in the PC-I; check the record book during field visits and identify problems related to the pump house, distribution and storage system, staff behaviour and report to the sub office. The Sectoral Officer (Programme Officer-Water) should ensure that financial obligations are cleared on time.

The Territorial Officers of UNHCR should report their observations about implementation during field visit as well as their views on location of stand posts and surface tanks, whether they meet the water supply needs of the refugees and the overall condition of the scheme.

6.13 **Reporting/Evaluation**

An evaluation report comprising of description of work carried out during the year, financial expenditures and problems encountered should be submitted to UNHCR sub offices on a quarterly basis and at the end of the year.

For voluntary agencies involved in water schemes, a monthly report detailing progress made should be forwarded at the end of each month to UNHCR sub offices. At the end of the year, the VOLAGs should submit a comprehensive self-evaluation report to UNHCR sub offices. The report should cover:

- Actual achievements matched against original objectives;
- Number of beneficiaries from each water scheme;
- Any increase in the percentage of refugees benefitting from an improved water supply;
- Overall project impact (social, health);
- Lessons learned.

6.14 **Training**

Staff motivation should be encouraged through short-term in-country training/workshops and seminars sponsored by UNHCR. Sub Divisional Officers, Sub-Engineers, Operators, Valvemen and Linemen should participate in these workshops/seminars. Training workshops/seminars for valvemen and linemen should be conducted in a language that is spoken and understood by them. The overall objective is to upgrade existing skills or acquire new practical skills by the workers. Additionally, it should also serve as a forum for discussing problems and issues of common interest. The Executive Engineers should be actively involved in organizing such workshops/seminars in collaboration with UNHCR. The training should apply the competency-based education approach. This approach allows an individual to be trained to a level where he should be able to perform identified tasks, especially, in the field.

6.15 **Coordination**

A coordination meeting of all VOLAGS engaged in water projects should be held with the PHED/WSC on a monthly basis (at provincial level). The Executive Engineer should participate in the meeting together with his SDOs. UNHCR Programme Officers (Water) should also participate in these meetings. A coordination meeting should be a forum for discussing technical and social problems identified in the field and how an agency's successful approach could be replicated by other agencies. Overall, a coordination meeting should be aimed at establishing and enhancing good relationship among GOP, VOLAGS and UNHCR as well as ensuring that funds are used prudently.

7. **SPRING DEVELOPMENT**

7.1 **Basic considerations**

Springs where available and well protected should be improved as a dependable water source. Whether in Pakistan or Afghanistan, springs can be easily located in mountainous or hilly terrain. A major advantage of spring water is that it makes use of gravity flow, does not require energy for pumping water and refugees are directly involved in the construction of the distribution system. Overall, it is very cost-effective in terms of per capita consumption. One disadvantage, however, is that some perennial springs will give a low yield during an extended period of drought. This has been experienced here in Pakistan.
7.2 **Steps involved in spring improvement**

(a) **Source investigation**

Before deciding to improve a spring, it is critically important to first of all locate the source, determine the potential yield of the spring and how well it can be protected from human and animal contact.

To determine the potential yield of a spring as well as increase the yield, it is important to dig into the hill side (source). This will ensure that sufficient depth of the aquifer is being tapped. A pipe should be fitted into the source. The discharge from the pipe should be monitored for a minimum of 30 days. Where feasible, the monitoring should take place during the driest spell of the year i.e. from late December to June. The decision to improve the spring will, therefore, depend on the potential yield, the water quality and the population to be served. If the spring is to be improved, the surrounding areas should be fenced off by digging a ditch around it.

(b) A ditch should be dug from the source. Gravel (5-10 mm diameter) should be placed along the ditch for filtration purposes (see fig. 10). The ditch should then be covered with a concrete slab. The slab should also be covered with a double layer of polyethylene plastic material. Puddled clay and compacted soil should be used to cover the plastic material to ensure that no surface water, underground stream or other forms of pollutants gain access to the spring water flowing through the gravel. A diversion ditch should also be dug around the spring source to ensure that surface water does not contaminate the source.

(c) A PVC pipe should be used to conduct the spring water from the source to a spring box (see diagram). The spring box should be located very close to the source. The spring box has many functions. It serves as a collection point before the water is fed to the distribution/surface tanks. It allows for easy inspection and cleaning of accumulated silt/debris and chlorination also takes place in the spring box. Because of the importance of the spring box, a lock should be put on it to prevent access by the refugees.

The spring box should be constructed with brick or cement block with a solid foundation. The inside should be covered with cement mortar of ratio 1:3 and the outside with a cement mortar of ratio 1:4. A spring box should be as strong as possible so that surface water does not gain entrance into it or be washed away by flood. Only the construction engineer, his team and sanitarians should know the actual location of the spring box. Some refugees who were part of the construction would obviously know but nothing can be done about this except to put a strong lock on the spring box.

(d) The inlet pipe from the spring source should be at a higher elevation than the outlet pipe which should be screened with a mesh. This is very important inorder to ensure that water does not flow out and become contaminated. Both the inlet and outlet pipes could be of a PVC material or galvanized iron.

(e) The distribution main from the spring box to the surface tanks should be either of a PVC material or galvanized iron pipe. Galvanized iron pipe is recommended where there is heavy traffic passing through the mains, where it has to cross a stream and where trench excavation of upto 3.5 ft. is not possible because of rocky and boulder formations.
The pipes, whether PVC or GI, should be buried in a trench dug to a depth of about 2-3 ft (61cm-91cm). The refugees should contribute labour for the trench digging.

Each surface tank should have a capacity of 2500 liters or more and should be evenly distributed in the RV to serve 30 families. This will give about 12 liters per capita per day. This quantity is purely for drinking. Shallow wells should be constructed for other purposes such as bathing, washing of clothes, gardening, etc.

Each surface tank where feasible, should have automatic shut off valves so that water can be automatically extended to other refugees farther away from the spring source. Each surface tank should have two taps, an overflow pipe and a capped outlet for cleaning the inside of the surface tank. A spacious apron and a gutter that leads into a soakage pit to ensure adequate waste water drainage should also be constructed.

Where it is not feasible to install automatic shut off valves, valvemen should be appointed to control the valves so that water can reach other refugees instead of flowing out through the overflow pipe and causing ponding which contributes to mosquito breeding.

Fig. 10 -- SKETCH OF A SPRING
7.3 **Surface tanks vs standposts**

Surface tanks are recommended where there is a large cluster of refugees. An advantage of surface tanks is that water collects at night and where there is a shut-off valve, water is diverted to other surface tanks.

Standposts are recommended in places with high elevation and where water has to be distributed to a few families living together in a cluster.

Experience has shown that surface tanks or standposts located near a school, a mosque or a market are not used by refugee women (the Purdah system). Schools, mosques and markets should therefore be provided with separate surface tanks or standposts.

7.4 **Potential problems in spring development**

- Although an individual may own a piece of land where a spring is located, permission should be sought from the Pakistan Forestry Department before proceeding with spring development. The Forestry Department is always concerned with the ecological impact and in particular with the preservation of the vegetation. It is their belief that spring development could cause damage to the vegetation, particularly, if the distribution line would pass through a large land area. This is based on experience.

- Without proper consultation and education of the refugees, it might be difficult to extend water to an RV farther away. To facilitate the extension of water to other RVs, the Refugee Village Administrator (RVA) and refugee leaders should hold a meeting with the VOLAGS. The refugee leaders should be informed that the water being distributed to other RVs would not affect the quantity of water available to them. The refugee leaders should "participate" in the identification of the site for the location of the surface tanks. Involving the refugees will result in better understanding, recognition of their leadership roles among their people and eventual acceptance of the water extension.

- Vandalism: In some cases, where refugees require water for their cattle or for agriculture, they tend to break the cover slab of the surface tank and remove the floatation valve. This allows water to flow freely leading to ponding and breeding of mosquitoes.

- A spring initial yield may drop significantly during an extended period of drought. This should always by anticipated. Improved shallow wells or other sources are recommended as back ups.

7.5 **Maintenance of springs**

Adequate arrangements should be made for spring maintenance. The emphasis should be on preventive maintenance. The Sanitarian/Outreach Worker (ORW) should carry out both cleaning and periodic chlorination of the spring box and the distribution tanks. Distribution lines should be monitored constantly for leakages. Broken taps should be replaced and worn out apron
should be repaired. The spring source should be monitored closely to ensure that humans and cattle do not visit the area. A contamination of the spring source will possibly lead to waterborne diseases in the RVs.

The Community Health Worker (CHW) should report problems to the Sanitarians/Outreach Workers. Where the Sanitarians/Outreach Workers cannot solve the problem, they should report the problem to their supervisor.

8. **WATER TANKERS**

8.1 **Implementing agency**

The implementing agency for the water tanker operation should be the Commissioner for Afghan Refugees (CAR). Water tankers should be used as a last resort and only in emergency situations because it is the costliest and most time consuming approach to supply water to the refugees. A request for a water tanker should be forwarded by the District Administrator based on perceived need to the Commissionerate Office. It will be decided between the Commissionerate Office and UNHCR if there is need for water to be sent to a particular area using water tankers. For new arrivals (refugees), water tankers should be used until a durable water scheme is constructed.

8.2 **Monitoring water tankers**

The Refugee Village Administrator is responsible for maintaining a trip sheet as well as ensuring that water supplied by the tankers is from a clean source, preferably, from tubewells. If the quality of the water is doubtful, arrangements should be made to chlorinate the water in the tanker prior to delivery to refugees. It is a simple procedure which can be carried out by the drivers. For a 6,500 liter capacity water tanker, 10 gm of bleaching powder should be adequate. This quantity should be put in a jar and thoroughly agitated with water and poured inside the tanker. A minimum of 30 minute contact time is required before the water is distributed to the refugees. The RVA should inform the DA when it is necessary to return the water tanker to the Commissionerate. Where a water tanker is sent for repairs, a spare water tanker should be sent immediately until the repairs are completed. The CAR in collaboration with UNHCR Programme Officers (Water) should determine when a water tanker should be withdrawn from a particular RV. Additionally, the Programme Officers (Water) should be informed of the location of all the water tankers in each province at any given time. For security reasons, the water tankers must be parked in front of the RVs office.

8.3 **Water distribution using a water tanker**

Water tankers are only provided for emergency situations. It is, therefore, essential that water is distributed in an equitable manner so that every refugee gets water. The water distributor should not give special treatment to influential refugees. UNHCR Territorial Officers and Refugee Village Administrator should closely monitor the water distribution from a water tanker. Adequate arrangements should be made for fuel (diesel) for the tankers. Use of (petrol) water tankers should be discouraged for economic reasons. The number of trips to be made by a water tanker should be determined by the population and the number of static tanks in a particular RV.
The formula for calculating the average liters of water to be supplied to refugees per day through water tankers:

\[ \text{Average liters per day} = \frac{\text{Minimum number of trips by water tanker} \times \text{number of water tankers operating in the RV} \times 6500 \text{ liters} \times \text{capacity of one tanker}}{\text{number of refugees to be served by water tanker}}. \]

9. WATER TREATMENT TECHNIQUES

9.1 Overall objectives/Need for treatment

Purification of water ensures that contaminated water responsible for water-borne diseases is not consumed by the refugees. In some areas, improved shallow wells have no covers nor handpumps and the distribution main of tube wells and open surface wells may have leakages or broken joints. When the pumps are not functional, bacteria can easily be sucked into the system through the leaks or broken pipes. To ensure that water consumed by the refugees is not contaminated, it is essential that the water is treated before consumption wherever field conditions permit such an activity.

This section focuses on water treatment practices which are already being carried out by the PHED and voluntary agencies. Where these procedures are not operational, it is strongly recommended that they are incorporated into the overall effort of providing potable water to the refugees.

9.2 Chemical disinfection

Water from tube wells/boreholes

In general, water from tube wells/boreholes is taken from deep aquifers and natural filtration takes place as water passes through layers of sand and gravel. However, during construction, some bacteria may be introduced into the system. It is recommended that the entire system be shock chlorinated by flushing it with a high dose of bleaching powder (100 mg/liter). Where a tube well is serving an RV, and there is a high incidence of diarrhoea or other water borne diseases, a sanitary survey should be carried out to ensure that the well is not being contaminated through poor construction. Appropriate action should be taken in the form of repairs, systematic chlorination and monitoring. Regular chlorination and periodic bacteriological tests are recommended if water from a tube well is to be used to mix Dried Skimmed Milk (DSM) or for supplementary feeding centres.

9.3 Water from improved shallow wells with or without hand pumps

Improved shallow wells with or without handpumps should receive shock chlorination (super chlorination) on completion in order to ensure that the water is free from pathogenic organisms (Coliform group) and other disease organisms that cause diarrhoea and other enteric diseases. Bleaching powder (30-35% active chlorine) should be used. Chlorine is a strong oxidizing agent. It does not only kill pathogenic organisms, but also has an oxidizing effect on iron, manganese and other organic matter in the water. It is relatively cheap but looses its strength over time. For maximum effectiveness, it should be stored in a cool dark place in an air tight container.
to control problems related to heat, moisture and ultra-violet light. Experience in the field has shown that bleaching powder made in India retains its chlorine content for a longer period of time and this is available in Pakistan.

The steps involved in the chlorination process are:

- Determine the amount of bleaching powder needed for proper disinfection.

- The amount of bleaching powder can be determined by first of all determining the volume of water in the well. After construction, a well should be allowed to stand for 72 hours.

- A simple formula for calculating the volume of water should be used:

  \[
  \text{Volume of water in a well in liters} = \frac{\pi D^2 H}{4} \times 1000
  \]

  Where \( \pi = \frac{22}{7} = 3.14 \)

  1 Cubic Meter = 1000 liters

  \( D \) = Well diameter in meters

  \( H \) = Height of water in well in meters.

- The amount of bleaching powder required for each well should be doubled to ensure that all bacteria are killed.

- Ideally, 40 gm of bleaching powder should be used per one cubic meter of water. The water in the well should stand for 24 hours before being completely emptied. After emptying, the water in the well should be ready for drinking purposes.

See example on next page.
EXAMPLE:

Diameter of well = 1.5 meters
Height of water in well = 2.5 meters

Volume of water in a well
= \frac{3.14 \times (1.5)^2 \times 2.5 \times 1000}{4}
= \frac{3.14 \times 2.25 \times 2.5 \times 1000}{4}
= 4415.6 \text{ liters}

Amount of bleaching powder required:

1000 \text{ liter} = 40 \text{ gm}
4415.6 \text{ liters} = ?

\frac{4415.6 \times 40 \text{ gm}}{1000} = 176 \text{ gms}

The amount of bleaching powder is specifically for shock chlorination and, as stated earlier, the well must be completely emptied after standing for 24 hours.

9.4 Periodic chlorination

Improved wells without handpumps/with handpumps: A series of studies have been carried out in the field to determine how much bleaching powder is required to maintain a free residual chlorine of .2 mg/l and for how long the free residual chlorine could protect water in an uncovered improved shallow well. No conclusive result has been achieved yet. However, the pilot studies are still on-going and encouraging. Periodic chlorination should, therefore, be adopted for protecting improved wells without handpumps. This involves putting a mixture of 300 gm of bleaching powder and 500 gm of coarse sand (1-1.5 mm particles) in a dark plastic bag. The plastic bag should have a 2-3 mm diam hole on opposite sides. It should be lowered into the well with a rope. The chlorine seeps into the water in the well through the holes. This should be carried out every six weeks. The amount of bleaching powder and coarse sand should be reduced during the winter period.

For wells with handpumps, the bag should be put after every nine weeks. Each VOLAG should have a Hatch kit for determining the free residual chlorine as well as the pH. In general, free residual chlorine is affected by a variety of factors. These include pH – high pH affects the efficiency of chlorine as a disinfectant, rate of withdrawal of water from the well and temperature. At higher temperatures, the disinfecting power of chlorine is enhanced. The number of weeks stated above are therefore suggested only as a guide. It is easier to determine when to put a new bag of bleaching powder i.e. when the free residual chlorine falls below .2 mg/l.
9.5 **Consultation with refugees**

Bleaching powder (Calcium Hypochlorite) has a pungent odour and refugees will usually complain bitterly of a foreign material in their water source. Prior to putting the chlorine bags into the wells, a VOLAG representative and the Sanitarian/Outreach Worker in a particular RV should fully explain the benefits of having bleaching powder in the water. If this is not done, experience has shown that the refugees will go down the well and remove the bag. It is of considerable importance to monitor the amount of chlorine released into the well. A **major disadvantage** of chlorine is that if the free residual chlorine is more than .2 mg/l, the water is objectionable to the refugees and the refugees would rather choose a contaminated water source than drink the chlorinated water. Chlorine inspectors, therefore, should always discuss chlorine quantity with the refugees to determine how they feel about the palatability of the water.

9.6 **Sand filter**

A sand filter is a low cost water purification method with a very simple design. For the refugee programme, the filter is usually kept inside the refugee houses and water from the sand filter should only be used for drinking. It is a very common technology in Baluchistan and the galvanized tin is locally available. Efforts are being made to introduce the sand filter in NWFP refugee villages.

![Fig. 11 -- A TYPICAL SAND FILTER](image)
Ideally, it consists of a cylindrical galvanized tin of 26 gauge (see fig. 11) with a height of 90cm and a diameter of 57cm. It has a hinged cover designed to ensure that the filter is never left open. A 1.3 cm diam underdrain made with mild steel with perforations is connected to a tap to a level of about 60cm. The bottom of the filter should be filled with washed gravel (4-10mm diam) to a height of about 10cm. Clean washed river sand with an effective size of between 0.2mm and 0.4mm should be placed next to the gravel to a height of 45cm. In order to prevent sand ingress into the gravel layer a filter like material (geotextile material) should be placed between the gravel layer and the sand. This is necessary otherwise the sand could travel all the way down the underdrain.

A column of water 35cm covers the rest of the filter. To prevent the disturbance of the thin biological layer responsible for filtration (Schmutzdecke), a ledge is fitted at about 20cm from the top to break the pressure from the influent water poured through a funnel. Usually, water to be used for sand filter is taken from the shallow wells with the result that the N.T.U. (Nephelometric Turbidity Unit—a unit of measurement for turbidity) is low (usually less than 5 NTU). Roughing filters or presedimentation is, therefore, not needed.

Water coming out of the tap is usually colourless and odourless. However, the effectiveness of the sand filter in removing pathogenic organisms has not yet been fully evaluated by any VOLAG in Baluchistan. A pilot project should, therefore, be carried out to determine the effectiveness of the sand filter in removing bacteria. Documented studies show that Giardia—an organism implicated in many water-borne diseases which is resistant to high levels of chlorination, is easily removed by the sand filter.

For maximum effectiveness, the sand filter should be maintained by scraping off a thin layer of sand periodically. The sand should be replaced with new sand or the old one could be washed and put back into the filter to its original level. Technical guidance is required and the VOALGS should play an important role here.

Where bleaching powder is available, it is recommended that the filtered water be chlorinated too for extra protection. This might be a difficult task since it would require a lot of resources, financial input, logistics problems and manpower to chlorinate all the sand filters in Baluchistan and NWFP. Volags should, therefore, determine what is practical under field conditions.

9.7 Springs

Chemical disinfection of a spring is a simple procedure which involves the addition of bleaching powder (Calcium Hypochlorite 20-35% active chlorine) to the spring box. The spring box should be first cleaned of accumulated silt and sand by the sanitarian/outreach worker. While cleaning the spring box, water from the spring should be diverted to allow for thorough removal of the silt and sand. A 20mg/liter of bleaching powder should be added to the spring box and this should be carried out once every month. The distribution tanks should also be cleaned and shock chlorinated once a month.

9.8 Other methods of water purification

There are other simple methods of protecting water in the home from contamination which cannot be dealt with here. These methods have been discussed in Part Five dealing with
"Community Health Education – Prime Messages". For ease of understanding, these methods include:
(a) storage of water for a long period of time (b) boiling – which is not feasible in Pakistan refugee camps because of lack of fuel for boiling water (c) exposure of water to sunlight for a 24 hour period in a container (d) use of clay pots – there is need to watch for algae growth in the clay pot system. The prime messages regarding water and its proper storage in the house can be seen in the section dealing with Community Health Education (see Part Five, 1.6. p. 62).

9.9 Portable kits for monitoring water quality

The emphasis on adequate water supply that is of satisfactory sanitary quality has focused more or less on the bacteriological and physical quality of the water. In a refugee setting, it would be extremely difficult if not impossible to carry out a chemical analysis of the water from simple systems which are in use in the refugee camps (e.g. improved shallow wells). Water quality monitoring is, therefore, limited but this is not applicable to water supplied from tube wells, boreholes, percolation wells and open surface wells. For these complex water sources, a thorough chemical analysis must be carried out and the results must meet WHO standards before such schemes are approved for construction.

For simple schemes in use in the RV which have been found to be more dependable water sources (improved shallow wells with or without handpumps, springs), VOLAGS should have kits capable of testing the following parameters in the field: (a) pH (b) free residual chlorine (c) fecal and total coliform, and (d) turbidity. A Hatch Kit and a portable incubator are, therefore, basic equipment for VOLAGS involved with provision of potable water to the Afghan refugees.

9.10 Wastewater drainage

Improved shallow wells/springs and piped schemes should be deemed incomplete until adequate facilities for wastewater drainage/disposal are constructed.

Proper wastewater drainage starts with:

- The construction of a solid apron. The importance of the apron has been highlighted in the section dealing with water supply. (See Part Two).

- Apart from keeping the apron clean, the surrounding of the well, distribution/surface tanks should be kept clean and devoid of stagnant pools of water. A washing stand should be constructed a distance away from the apron. This will discourage refugees from washing their materials inside the apron.

- Animals should not be allowed around the water supply points. A special trough should be constructed where animals can drink.

- A gutter from the apron should empty wastewater into a soakage/seepage pit or channelled to refugee gardens. The gutter must be cleaned periodically by refugees and cracks should be repaired by PHED or a designated VOLAG.
The size of the pit should be determined by the size of the water scheme and the number of users.

Ideally, the soakage/seepage pit should measure 1.0 – 3.0 meters deep and 1.0 – 2.0 meters in diameter. The pit should be nearly filled with rocks or broken bricks ranging from 15-25 mm in diameter, gravel, straw or hay. The water percolates into the soil through the sides and bottom of the pit. Straw plays an important role of preventing clogging and the rocks and broken bricks prevent the collapse of the pit walls.

To ensure that vectors (rats, mosquitoes) do not breed there, the pit should be covered with soil at the top and monitored continuously for any signs of failure (bad smell etc.).

Where feasible, a 50-100 mm pipe (PVC or galvanized metal) should extend underground from the end of the apron to the pit. Where a gutter is in place, the gutter with a slope of 1:100 should connect the apron to the pit.

For BHUs and SHUs with small staff and few out-patients (for instance, where there are five liters or less of disposable water per capita), a pit-type Sump or a drum-type Sump could be constructed. A lid is necessary in both the pit-type Sump and drum-type Sump to discourage fly breeding. The drum-type Sump should have holes on both the sides and the bottom.
PART THREE – VECTOR CONTROL FOR MALARIA

1. GENERAL ASPECTS

1.1 Basic Strategy:

The basic strategy required in environmental control for mosquitoes responsible for causing malaria should place emphasis on two key approaches:

(a) Attack on adult mosquito;
(b) Elimination or reduction of mosquito breeding sites in and around the refugee villages.

1.2 Attack on the Adult Mosquito

1.2.1 Principles of Spraying:

This involves the application of a residual insecticide on the interior of walls and ceilings of refugee dwellings, BHUs, CHUs, latrines, verandahs and corridors. The mosquitoes are exposed to the insecticide when they come in contact with the treated surfaces. The mosquitoes absorb sufficient insecticide and subsequently die. The thin film of insecticide on the walls will usually cause death to mosquitoes for a period of about 1-2 months. Malathion, an organophosphorous insecticide is currently in use in the Afghan refugee vector control programme for malaria.

Spraying should be carried out at the onset of the peak transmission period of malaria in Pakistan. This is usually between the months of June and November. However, it is important to note that the peak transmission period differs from province to province depending on climatic conditions.

Although a single spray operation is recommended for each RV, every effort should be made to carry out double spraying in selected RVs. The incidence of malaria in double sprayed RVs should be compared with the incidence in RVs with only one spray. Apart from determining the impact of double spraying, it is useful in the preplanning operation for the following year.

The Hudson X-Pert Sprayer Pump, which is hand operated, is used in the application of the Malathion insecticide. (See Part Three 2.1, p. 51).

1.3 Mixing of Powder with Water

Effective spraying requires that spray powders be mixed carefully with water. The Malathion powder should first be put in a separate container with some water and stirred to make a paste. The paste should be thinned by adding small quantities of water until the desired volume is reached (1 kg in 10 liters of water). The mixture should be poured through a strainer into the sprayer to 3/4 full. The 1/4 space is necessary for air. During application, a pressure range of between 25 and 55 PSI should be maintained and 55-60 strokes will attain this pressure in the 10-liter size sprayers used for the refugee programme. The nozzle distance of the sprayer should be kept at 45 centimeters from the wall surface. The spraying should be carried out from top to bottom, and bottom to top. The recommended dose is 2gm active ingredient per square meter.
1.4 Elimination or Reduction of Mosquito Breeding Sites in the Refugee Villages

Malaria transmission can be reduced by minimizing environmental factors in the refugee camps which enhance mosquito breeding. The Sanitarian/Outreach Workers, sanitary inspectors, public health inspectors, community health supervisors, community health workers and school teachers should organize, direct and encourage the refugees to carry out the following activities aimed at elimination of breeding sites in the RVs:

(a) Drainage of water holes, ditches, puddles and any accumulation of water in or around the RV.

(b) Filling in holes and ditches where refugees excavated earth for katcha house/boundary wall construction.

(c) Construction of soakpits/seepage pits to avoid pools and muddy areas around water supply points.

(d) Collection and disposal of all containers likely to hold water such as empty oil tins, old vessels, old tyres, etc.

(e) Planting of water-avid trees such as eucalyptus in places with a high water table in order to lower the water table.

1.5 Safe handling and use of Malathion

While malathion is an effective insecticide for mosquito control, it can also be (a) toxic to human beings if sufficient malathion gets into the body through eating food contaminated with malathion, inhalation of malathion or direct contact on skin, and (b) hazardous to the environment. This means that insecticides must be handled carefully. Sanitarians/Outreach Workers, Sanitary Inspectors and Public Health Inspectors should endeavour to ensure adequate protection of spraymen and refugees by taking the following precautionary measures:

(a) Malathion should not be stored in rooms in which people live or in which food is kept.

(b) Malathion should not be transported in the same vehicle with food.

(c) Any spillage of insecticide must be cleaned up and disposed of by covering with earth.

(d) Protective clothing (overalls, light fume masks) must be worn before a sprayman is allowed to spray insecticide (ensure that the exposed body parts are covered including mouth and nose). Extra protective clothing and light fume masks should be provided.

(e) Mixers must have all the required equipment and mixing must be done with a rod and hands protected by rubber gloves. Particular attention should be given to
washing gloves, as wearing of contaminated gloves may be more dangerous than not
wearing gloves at all.

(f) Should accidental spillage occur on to the sprayman, it should be washed off the skin
with soap immediately which should be carried to the field. Each sprayman should
have two cakes of soap.

(g) Sprayers should never smoke nor eat while spraying and must clean themselves
before touching any food.

(h) After spraying, sprayers should always wash the spraying equipment, take a bath and
wash the protective clothing with soap.

(i) At the completion of the round of spraying in any particular district, the Hudson
pumps should be dismantled, oiled and stored above ground.

Prior to and during the spraying of the dwellings, sprayers should ensure that refugees are
fully informed as well as ensuring:

(a) That food and cooking utensils are removed or covered.

(b) Any excessive spillage of insecticide should be cleaned up immediately.

(c) Mix insecticide and dispose of contaminated rinse water at least 5 meters away from
a water source.

(d) Used containers should be rinsed 3 or 4 times with water and should not be used for
food or water storage.

1.6 Symptoms of over-exposure

In the event of over-exposure, the early symptoms to recognize are:

<table>
<thead>
<tr>
<th>Early Symptoms:</th>
<th>Moderate to Advanced Symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Headache</td>
<td>1. Twitching and tremor</td>
</tr>
<tr>
<td>2. Weakness</td>
<td>2. Constricted pupil</td>
</tr>
<tr>
<td>3. Excessive sweating</td>
<td>3. Nausea, vomiting</td>
</tr>
</tbody>
</table>

Very Severe Symptoms:

1. Troubled breathing (wheezing)
2. Coma
1.7 **Treatment of Toxicity**

If these symptoms are recognized and over-exposure to malathion is suspected, the following actions should be taken:

1. The victim should be removed from the area of spray, contaminated clothing should be removed and contaminated body parts should be washed with soap.

2. Ensure that the victim is breathing properly. Excessive secretion if present should be removed.

3. Administer atropine sulfate, intramuscular injection of content of one vial (1.0 ml). This should be repeated every 15-30 minutes if required.

4. If the symptoms are severe or if the patient does not improve within half hour, arrangements should be made to transport him to the nearest BHU or health facility where a doctor is present.

5. The patient should be observed at least for 24 hours after treatment to ensure that he has fully recovered.

6. Report the case to the Medical Officer/FSMO responsible for the area/district for further medical action, if necessary.

1.8 **Conclusion**

Environmental control measures of malaria vectors if implemented vigorously, can result in the interruption of malaria transmission. To maximize efficient usage of the insecticide adopted for use by the GOP and UNHCR, it is important to ensure that:

1. Pump users and sanitation staff are familiar with all the parts of the Hudson Sprayer pump, how it functions and how to make minor repairs. Where there are doubts, staff should refer to the section on 'Operation and Maintenance of the Hudson Pump' on Part three (2).

2. All personnel involved in malaria control undergo training prior to spraying. The training should focus on the overall objectives of the malaria control programme, safe use of malathion and proper application procedures.

3. Refugees receive continuous education from sanitation workers on malaria and under what conditions it is transmitted by the mosquito.

2. **OPERATION AND MAINTENANCE OF THE HUDSON SPRAYER PUMPS**

2.1 **Basic Consideration**

The Hudson sprayer works with liquid under pressure. If the precautions/instructions discussed below are not strictly followed regarding the use and maintenance of the pump, the
tank, the hose or other parts may become corroded, weakened; and/or may burst under pressure. This can result in SERIOUS injury to the user if the parts or spray material eject with force.

2.2 **Caution**

(a) The spraymen should ensure that the hose is securely attached to the tank before each use. If the hose is connected too loosely, it could come off when the sprayer is under pressure and cause SERIOUS INJURY.

(b) Inspect the sprayer tank inside and outside, as well as each part of the sprayer thoroughly before each use.

(c) Always empty, clean and drain both tank and hose immediately after each use.

(d) Always release pressure:

1. Before removing the pump.
2. Before removing the extension tube, nozzle cap or other parts.
3. Before trying to unclog the nozzle or discharge line.
4. Before servicing the sprayer in any way.
5. When the sprayer is left in the sun or other warm place.

(e) Follow exactly the instructions for mixing, for safety and for how to apply the insecticide. Be sure to wear protective clothing, goggles and rubber gloves.

(f) Keep sprayer and spray materials out of the reach of children.

2.3 **How to operate the sprayer**

(a) Never pump more than 55-60 full plunger strokes with the tank 3/4 full with Malathion mixed with water.

(b) The sprayer has a pressure gauge and it is necessary to maintain a pressure range of between 25 and 55 PSI. The pressure gauge should, therefore, be clean so that the pressure can be read without difficulty.

(c) The nozzle flow regulator should be fitted into the nozzle assembly.

(d) It is recommended that the pressure regulator should not be changed. If the spray becomes uneven or decreases while the pressure is high, the reason may be that the strainer in the discharge assembly is clogged. The air under pressure from the tank should be released using the relief valve on the cover. Also, the tube-like strainer behind the spray control valve should be checked. The use of pliers on the shell of this strainer is not recommended since it breaks easily. It should be removed by hand and the strainer cleaned thoroughly.
2.4 How to store

Before storing for a period of weeks or months, each sprayer should be completely taken apart and all the parts cleaned and dried. Do not oil any part (except the plunger cup and the threaded fittings).

2.5 How to service

(a) If sprayer does not spray or stops and then starts again, or suddenly lessens while the machine is under pressure, then look at the discharge line for the problem. First, release
the pressure and clean the nozzle cap. Use a broom straw or a sliver of wood to clear the mouth of the discharge line if it is plugged. DO NOT USE WIRE.

(b) If air leaks cannot be easily located, test the fittings by putting a soapy solution on them and watch for air bubbles.

2.6 How to carry

The first important step when transporting a sprayer is to release all pressure. The cover should be kept locked in position or hanging outside of the tank. The cover should never hang inside the tank otherwise, it could strike and possibly damage the pump cylinder. During spraying, the sprayer should be carried on sprayman’s back held in place by a strap over the shoulder.

2.7 Training on the "Operation and Maintenance" of the Hudson Sprayer Pumps

An operation and maintenance manual has been developed and translated into Pushto, Urdu and English. Each Sanitarian/Outreach Worker should have in his possession a copy of the manual during the training preceeding the spraying exercise.

To ensure that each Sanitarian/Outreach Worker, Sanitary Inspector and District Health Inspector receives the appropriate manual with regard to language, the Deputy Director (Malaria) should first of all determine the most functional language of each malaria control staff. Urdu speaking staff should be given Urdu manuals etc.

The training (two-three days) which should be organized by the Deputy Director (Malaria) NWFP and Baluchistan and the FSMO-Punjab in collaboration with UNHCR, should focus on these key areas: Role of insecticide (Malathion) in the Malaria Control Programme; Sprayers – practical demonstration on – how to use them; defects and repairs; assembling, dismantling/spare parts. Malathion consumption and how to record quantity used. Malathion – its application and dosage per square meter; hazards of Malathion to man and the environment, signs and symptoms of poisoning; precautionary measures and treatment of poison cases; Practical demonstration of spraying techniques; How to complete a reporting form after spraying and how to identify a house already sprayed; balance of insecticide after each day’s operation and health education on the elimination and/or reduction of breeding sites. A slide set developed by the World Health Organization should be used as a visual aid in the training.

Experience has shown that Sanitarians/Outreach Workers have a tendency to take the training lightly. They usually argue that they have received the same training for many years. To encourage full participation and also to reinforce the relevant information, the organizers should be innovative as well as practical by involving the trainees in a manner that is stimulating and challenging. Teaching methodologies differ and the organizer/trainer should apply a methodology which encourages full participation. The training should be conducted in each district/agency of all the provinces. Where feasible, Medical Officers should be encouraged to participate.

2.8 Entomological Assessment

Mosquito vectors of malaria can develop resistance to a particular insecticide, particularly when used for an extended period. There is, therefore, need to monitor the effectiveness of
Malathion (the insecticide allowed by the Government of Pakistan) in the control of certain species of mosquitoes in the RVs. Other relevant entomological discussion regarding drug resistance, pre-spray and post-spray survey etc. should be found in the guidelines on malaria.
PART FOUR – SOLID WASTE MANAGEMENT

1. Need for Solid Waste Management

1.1 Definition of solid waste

Solid waste is a term used to collectively describe all rubbish, garbage, solids or semi solids produced by the refugee household, hospitals, feeding centres, BHUs, CHUs and market people in the bazaars. Solid waste is a mixture of both organic and inorganic compounds. The organic components are mostly decomposable and combustible e.g. vegetable matter, left over food, rags and clothes while the inorganic components are non-combustible e.g. metal scraps, cans, injection bottles and nonplastic syringes. There is need to state clearly that fecal matter does not fall under the classification of solid waste.

1.2 Role of solid waste in disease transmission

Absence of an organized solid waste disposal system in a refugee village could contribute to disease transmission in many ways. Flies enjoy breeding in decomposing matter (food remains, excreta etc.). After breeding, some of the decomposing materials are carried on their feet and through mechanical means, food is contaminated. If the decomposing matter happens to be faeces, the fecal-oral transmission is promoted and enteric diseases such as diarrhoea, cholera and typhoid fever can be transmitted in this manner. Rodents (rats etc.) enjoy garbage piles. The rats usually find their way in the refugee houses and contaminate food. In some cases, they consume the food and in the process contaminate the food with disease organisms. Reports from UNHCR field officers have indicated that rats are capable of consuming a large quantity of wheat in storage in a very short period.

Cockroaches also find decaying refuse a nice breeding and feeding place. The cockroaches find their way in the house, particularly in the kitchen and contaminate either cooked or raw food.

Solid wastes such as empty cans, vessels and useless tyres allow water accumulation. The accumulated water encourages mosquito breeding. Poor solid waste management in a refugee village could, therefore, contribute to disease transmission leading to sickness and disease among refugees.

Overall, refuse and garbage are smelly, unsightly and contribute to an unaesthetic environment.

2. Management of solid waste

2.1 Establishing the System

Management of solid waste in the camps should be carefully planned and implemented after the refugees are settled in an RV. The planning should be a collaborative effort of the FSMO, a Volag working in the district/agency, the District Administrator, the Refugee Village Administrator and the refugees themselves. The success of a solid waste management programme will depend largely on the enthusiasm/interest of the FSMO/DA/RVA and the level of cordial relationship that exists between the FSMO/DA/RVA and the refugee leaders. Distribution of half
barrels to refugees for depositing refuse within the RVs should be discouraged because it has been tried in Pakistan Refugee Villages without success.

2.2 **Collection and Disposal methods**

**Basic Health Units:** Each BHU should have an incinerator constructed out of cement blocks, baked bricks or mud bricks. Where feasible, a minimum distance of 12 meters should be maintained between the BHU and the incinerator. The planning and construction of the facilities should be carried out by a Volag in collaboration with the FSMO and his Sanitarian/Outreach Workers, and the Refugee Village Administrator.

Bins should be located at strategic points in the BHU/CHU. At the end of each working day, staff responsible for removing the refuse should empty these bins into the incinerator. Disposable syringes, laboratory materials, dressing materials (hazardous materials) used by dispensers and vaccinators should be kept in a strong polythene bag. These materials should be taken straight to the incinerator without mixing them with other refuse. In the absence of an incinerator, two pits (2m diam, 2m depth) should be constructed some distance away from the BHU/CHU. One pit should be used for burnable refuse. The second pit should be used for burying hazardous materials from the Basic Health Units, Central Health Units and Sub Health Units. Adequate soil should be used to cover the refuse. When the pit is 80-90% full, a new pit should be dug. The use of a dug pit for refuse disposal should be regarded as a temporary measure. In some RVs, the water table may be too high resulting in the pit being filled with water and sometimes cave-ins occur. An incinerator should, therefore, be constructed as soon as it is possible to do so.

2.3 **Precautionary Measures**

In large BHUs, a sizeable amount of refuse is generated. To ensure that the incinerator is functioning properly, it should be cleaned from time to time by the BHU Chowkidar (labourer) under the supervision of the Sanitarian/Outreach Worker. The cleaning would ensure adequate draft for complete combustion. Occasionally, it might be necessary to add a little kerosine or petrol before lighting to ensure quick and complete combustion.

2.4 **Accident Prevention**

Where dug pits are used for solid waste disposal, the area should be fenced off to prevent children from going near the pit. Field observations have shown that children are attracted to the pit and take special delight in playing with unburnt refuse, such as syringes, injection bottles, empty drug bottles made of glass, etc. Apart from fencing off the pit, it is of paramount importance that the refuse is deposited inside the pit instead of at the edge of the pit.

2.5 **Refuse Generated by Refugees within their Compounds**

In general, the Afghan refugee compounds are kept clean except in a few cases where too many families share one compound and at the same time possess many livestock such as cattle and poultry. Animal dung are usually poorly disposed off resulting in dirty and smelly compound. Occasionally, children are seen playing near the animal pens and disease transmission is promoted through this avenue.
The Sanitarians/Outreach Workers should motivate the refugees to dig pits for the disposal of all solid waste generated by the refugees including those generated by their livestock. Additionally, the compound should be swept daily. Emphasis should be placed on the relationship between an unclean compound and disease transmission. To encourage the refugees to dig the pits, sanitation workers should loan tools to the refugees. Over the years, it has been clearly shown that instructing refugees to carry out a particular environmental activity is successful only when the sanitation workers demonstrate how such an activity could be carried out practically.

2.6 **Solid Waste in Bazaars**

The largest volume of refuse is generated in the bazaars by sellers and buyers of food items. Since the bazaar is an open place owned by no particular individual, the bazaars constitute a major problem in terms of organized refuse disposal. Additionally, the bazaar acts as a single most important source of the house fly which likes to breed in decaying organic matter found everywhere in the bazaars.

Refuse disposal in bazaars should be both an individual activity and a community affair. The Sanitarians/Outreach Workers should ensure that each individual with a stall in the bazaar removes refuse/garbage around his stall to discourage larval breeding habitats. The refuse should be hauled a distance away into a large pit constructed by the refugees. Entrails from slaughtered animals for sale in the bazaars must be buried to a depth where dogs do not dig them out for consumption. (There are many stray dogs in the RVs and bazaars.)

Slaughter house construction should be discouraged in the bazaars. Experience has shown that adequate water is usually not available for thorough cleaning of the slaughter houses. Additionally, they are poorly managed, supervised and maintained, and have therefore turned out to be greater health hazards than slaughtering animals in the open.

Voluntary agencies, supported by the District Administrator, the RVA and the FSMO should organize weekly camp-wide cleaning campaigns. This means that a special day should be set aside with the sole purpose of cleaning the entire RV with special attention being given to the bazaar. No one should be allowed to sell anything until the cleaning campaign is over. For maximum effectiveness, Sanitarians, Outreach Workers, Volag field officers under the supervision of the FSMO/DA/RVA should plan, direct and execute the cleaning campaign. Refuse generated from the cleaning campaign should either be burned or buried in a large pit. Since cleaning campaigns require direct involvement of the refugees, health education should be incorporated into the overall exercise.

3. **THE HOUSEFLY**

3.1 **Control Measures**

Although the role of the housefly as a vector in the transmission of communicable diseases and as a nuisance has been touched upon earlier, there is need to emphasize that large numbers of houseflies could result in a problem in a refugee village. While the World Health Organization has recommended specific insecticides for the control of the housefly in fly-infested areas, use of a particular insecticide or insecticides is recommended only where it is absolutely necessary. In the first place, given the number of Refugee Villages in Pakistan (342), the use of insecticide for fly
control does not constitute a cost-effective approach. Secondly, the recommended insecticides may not be available in Pakistan or approved by the government of Pakistan. And even if the insecticide were available and approved by the GOP, it would be extremely difficult to control such a large operation. Thirdly, the housefly has the ability to quickly develop resistance to insecticides. To prevent insecticide resistance, three insecticides should be used simultaneously. The application of the selected insecticides initially should be at full strength, followed by one and a half the recommended dose and finally at twice the recommended dose. The huge cost and logistics problems involved in the application of three insecticides simultaneously should, therefore, be a matter of concern.

In view of the above constraints, the principal and most cost-effective approach for fly control should, therefore, rely on proper environmental control focusing on the activities discussed on pages 57 to 58.

Screening of stalls where meat is displayed for sale protects meat from direct contact with flies. Efforts at getting the refugees to screen the place where meat is displayed were successful in some RVs. However, the refugees prefer to display the meat outside the screen because they claim that the screen prevents buyers from seeing what they are buying. Screening of the stalls is, therefore, not recommended even where a systematic health education is in place. Neighbouring local butchers have no screened stalls and refugees find it difficult to understand why only meat sold by refugees should be protected from flies. Sustained Health Education has not been useful in this regard.
PART FIVE – COMMUNITY HEALTH EDUCATION

1. COMPLEMENTARITY OF WATER/SANITATION AND HEALTH EDUCATION

1.1 Objectives

(1) To inform the Afghan refugee community of the relationship between poor sanitary environment and disease.

(2) To assist ARs acquire necessary knowledge and skills to reduce the incidence of diseases transmitted through the faecal-oral route.

(3) To motivate refugees to participate in the construction, operation and maintenance of schemes (latrines, shallow wells, springs and water supply points) in each Refugee Village.

1.2 Basic Principles/Approach

Environmental health problems cannot be solved just by the construction of facilities. Experience has shown that Health Education which should aim at modifying the behavior of the users of the facilities is an essential component of the Environmental Health Services. Sanitation, Hygiene and Health education should be for every refugee. However, the primary target population should be women and children, who are the most vulnerable groups. They should be educated on basic hygiene principles through a process of planned change and focusing on the values, attitudes, behavioral habits and problems that affect the refugees. The emphasis should be on changing ingrained habits of the refugees which contribute to poor health. Since the women are illiterate, the Lady Health Visitors or Female Outreach Workers where available should hold health education meetings, visit homes and teach refugees through practical demonstrations, role plays and group discussions. Relevant audio-visual teaching aids should be used where available.

The male field officers should communicate health messages to the Afghan refugee community leaders in order to earn their goodwill, obtain their approval, support and involvement in the construction of latrines, wells and other needed facilities. Overall, Health Education should guide and motivate refugees to become health oriented through helping them understand the links between water/sanitation and disease.

Experience has shown that where an organized health education programme (which is aimed at preventive measures) is incorporated into the services of the BHUs, CHUs and SHUs, the number of visits to these health centres tend to decline significantly. The decline in the caseload can be linked to the effectiveness of the health education programme.

1.3 Who should deliver health education/language

All the Afghan refugee BHU health staff in addition to the Volags should deliver the Environmental health related health messages to the refugee community. The BHU Sanitarian/Outreach Worker has a primary responsibility for the delivery of health education. The Community Health Worker network where available, should receive additional environmental health training and should assist in the delivery of health messages to every household. Where refugees are part of the staff of a BHU or a VOLAG, their involvement in the delivery of Health Education should be encouraged since the refugees not only identify with them but also perceive
them as being more understanding. Health education should be delivered in the same language spoken by the refugees. It should be as simple as possible and should rely more on demonstrations and role plays rather than on 'lectures'. (See guidelines on Health Education.)

Health education lessons should be given by all categories of health staff, including the Sanitarians/Outreach Workers. The male staff should approach the following: Refugee leaders, Maliks, Mullahs, school teachers, individual family heads at public meeting places e.g. mosques, schools. Female staff should visit refugee homes to address groups of women. The Volag field staff should organize and conduct health and hygiene training of school teachers in schools who should in turn teach hygiene lessons in their schools using a structured curriculum. (See guidelines on Health Education/techniques.)

1.4 Focus of health message in relation to Environmental Sanitation**

The Community Health Workers, Sanitarians, Outreach Workers, BHU staff and TBAs should emphasize the following topics to every refugee family and community:

- Personal hygiene
- Food hygiene
- Community hygiene, garbage disposal
- Storage of water - protection of water sources,
- Care and upkeep of latrines
- Care and upkeep of wells/distribution tanks/storage tanks
- Fly control/Mosquito Control
- Drainage and disposal of wastewater
- Diarrhoeal disease control and use of ORS

1.5 Note to communicators

More than half of all illness and death among young Afghan children are caused by germs which get into the child’s mouth via food and water. The faecal-oral route of transmission of germs should be of special importance and should therefore be stressed. The eight prime health messages presented below can help refugee families and communities prevent the spread of germs and so reduce illness and death.

It is important to stress that these messages, to be fully effective, must be acted upon by every refugee family.

Within the refugee community, no matter the effort directed at improving environmental health conditions, it is still very difficult for families to prevent the spread of germs. It is, therefore, vital for the GOP/VOLAGS/UNHCR to support the refugees by providing – the necessary materials and technical guidance needed to construct latrines, improve drinking water supplies with the overall goal of improved public health conditions in the camps.

To obtain such service, refugee communities need to know the facts about how disease is spread.
The Health Messages are adapted from UNICEF/WHO "Facts for Life" with a few modifications to suit existing situations in the Afghan refugee programme and Afghan refugee villages.

1.6 The Prime Messages

1) Faeces contain microbes which cause diseases (e.g. diarrhoea, worms).

2) Refugees can swallow these microbes if the microbes get into water, onto food and onto hands.

3) Diseases can be prevented by washing hands with water and soap after defecation and before touching food.

4) Diseases can be prevented by using safe, clean latrine.

5) Diseases can be prevented by using safe, clean water for drinking.

6) Diseases can be prevented by regular washing of the body and clothes.

7) Diseases can be prevented by keeping food clean.

8) Diseases can be prevented by burning or burying household refuse.

Supporting Information

Diseases can be prevented by using safe clean latrines

The single most important action which families can take to prevent the spread of germs is to dispose of faeces safely. Many diseases, especially diarrhoea and worms, come from the germs found in human and animal faeces. People can swallow these germs if the germs get into water, onto food, onto the hands, or onto utensils and surfaces used for preparing food.

To prevent this from happening:--

- Latrines should be constructed and used.

- If it is not possible to use a latrine, adults and children should defecate a distance away from houses, paths, water supplies, and anywhere that children play. After defecating, the faeces should be buried. Contrary to common belief, the faeces of babies and young children are even more dangerous than those of adults. So even small children should be taken to use the latrine. If children defecate without using a latrine, then their faeces should be cleared up immediately and either put into the latrine or buried.

- Latrines should be cleaned every day. An unclean latrine is worse than no latrine.
Diseases can be prevented by washing hands with soap and water after defecation and before handling food

* Washing hands with soap and water removes germs from the hands. Where soap is not available, ash can be used. This helps to stop germs from getting onto food or into the mouth. Soap and water should be available for all members of the family to wash their hands. The LHV or FORW should stress this to each refugee family.

* It is especially important to wash hands after defecating, before handling food, and after cleaning the bottom of a baby or child who has just defecated.

* Children often put their hands into their mouths. So it is important to wash a child's hands often, especially before giving food.

* A child's face should be washed at least once every day. This helps to keep flies away from the face and prevent eye infections. Soap is helpful but not absolutely essential.

Diseases can be prevented by using clean water

* Dirty water, or lack of water can cause disease.

* Families who have a plentiful supply of safe, clean water, and know how to use it, have fewer illnesses.

* Families can reduce illnesses if they protect their water supply from germs by:
  - Keeping wells covered
  - Constructing aprons and drainage ditches to channel wastewater onto refugee gardens or soakpits
  - Preventing children from drinking directly from the taps (mouth contact).
  - Keeping the apron clean by ensuring non-accumulation of dirt, debris and ponding.
  - Keeping faeces, garbage and wastewater (especially from latrines) away from any water used for cooking, drinking, bathing or washing.
  - Keeping buckets, ropes and jars used to collect and store water as clean as possible (for example by hanging up buckets rather than putting them on the ground and by covering storage containers).
  - Keeping animals away from the wells and around the distribution points.
  - Constructing special troughs where animals can drink.

* Families can keep water clean in the home by:
- Storing drinking water in a clean, covered container
- Storing drinking water in a container with a small neck.
- Taking water out of the container by pouring, if not, at least with a clean ladle or cup.
- Not allowing anyone to put their hands into the container or to drink directly from it.
- Cleaning the storage container from time to time.

* Even if water is clear, it may not be free from germs. These germs cannot be seen by the naked eye. The safest drinking water is from protected spring, protected well or piped water from a tube well/borehole. Water from other sources particularly surface waters such as rivers and streams, is likely to contain germs that cause disease.

* Boiling water kills germs. So, if possible, water drawn from improper sources should be boiled for 20 minutes and cooled before drinking. It is especially important to boil and cool the water which is given to babies and young children, because they have less resistance to germs than adults. Since Afghans drink a lot of tea, a small amount of boiled water for making tea should be reserved for use by children.

* Boiling is often not possible because of the lack of fuel/wood. There are three things that could be done: 1) to allow dirt to settle and germs to die. Pour off the clean water at the top for drinking and throw away the sediment. 2) alternatively, store water in a clean plastic or glass container and leave it standing for 2 days before using. Sunlight also helps to kill germs. 3) Use filters – a clean white cloth will prevent passage of many organisms e.g. guinea worm ova.

Diseases can be prevented by keeping food clean

* Germs on food can enter the body and cause illness. But food can be kept safe by:-
- Keeping the kitchen and its surrounding clean.
- Making sure that food is thoroughly cooked, especially meat and poultry.
- Raw vegetables and fruits should be washed thoroughly with clean water.
- Eating food soon after it has been cooked so that it does not have time to go bad.
- If food has to be kept from one meal to another, it should be covered and kept in a cool place and it should be thoroughly re-heated before being used again.
- Raw meat, especially poultry, usually contains germs. Therefore, it should not be allowed to come into contact with cooked meat. Chopping blocks or food-preparing surfaces and hands should be washed clean after preparing raw meats or any other type of food.
Cooking pots, dishes and other utensils should be washed with soap/ash after use.

Keeping food clean and covered and away from flies, cockroaches rats, mice and other animals.

Diseases can be prevented by burning or burying household refuse

* Germs can be spread by flies and rats which like to breed in refuse such as food scraps and peelings from fruit and vegetables.

Every family should have a special pit where household refuse is burned or buried every day.

All the refuse or waste from the BHUs/SHUs should either be buried or burned every day in a pit or in an incinerator.

Empty cans/tins should also be buried to avoid accumulation of water in the cans and subsequent breeding of mosquitoes in these vessels.

Diseases can be prevented by regular washing of the body and clothes

* Taking a bath should be performed at least twice weekly. If there is adequate water, this should be a daily activity.

* Clothes should be washed whenever adequate amount of water is available.

* Bed spreads such as blankets and quilts should be put out in the sun at least once a week.
PART SIX – REFUGEE PARTICIPATION/INVOLVEMENT

1. IMPORTANCE OF REFUGEE PARTICIPATION

1.1 Existing Situation

Refugee participation/involvement should be deemed an essential element in the proper delivery of Environmental Health Services to the refugees. As pointed out earlier (see Part One, 1:2 page 3), within the entire Afghan refugee programme, refugee participation/involvement is most visible in the Environmental Health Sector which is delivered through an integrated Primary health Care approach.

Refugees contribute labour towards the construction of basic facilities (latrines, shallow wells and springs) as well as ensure that the facilities are appropriately used and maintained.

The voluntary agencies (VOLAGS) deserve tremendous credit for the present situation. Through involvement of refugees, a foundation for self-reliance was established. However, self-reliance has its limitations where refugee involvement is not sustained. The long-term objective is aimed at ensuring that the refugee involvement is sustained until they go back to Afghanistan.

1.2 Starting point for Refugee Participation/Involvement

At the field level, the refugee leaders should be identified through the assistance of the Refugee Village Administrators, Medical Officers, Sanitarians and Outreach Workers. The refugee leaders usually constitute elders, mullahs, maliks, school teachers and other influential people who are sometimes invisible. These people are highly involved in decisions regarding the day to day existence of the refugees. They should be seen as active agents for change as well as beneficiaries.

1.3 Communication with Refugee Leaders

Since the refugee leaders have enormous powers in terms of decisions regarding the refugee community, field workers should approach them to discuss the objectives of their mission. Such objectives should revolve around identifying existing common environmental health problems in the refugee camps and how solutions to the problems could improve their health and social status. Although refugee leaders should be given the opportunity to identify their area of greatest need, the discussion should focus on the following areas:

(a) Water availability - quality and quantity.
(b) Excreta disposal - its role in disease transmission.
(c) Wastewater drainage - mosquito breeding and high incidence of malaria.
(d) Garbage disposal - fly infestation and food contamination.
(e) Relationship between contaminated water/poor sanitation and Health.

Attempting to identify existing problems with the leaders could be a very delicate and tedious task since what the field workers perceive as major problems might be of least importance to the refugee leaders. It, therefore, requires continuous dialogue and patience on the part of the field workers. It should be pointed out that discussing the above problems would only make sense
in a camp where the refugees have settled down through construction of houses and have been provided with basic needs such as food, etc.

1.4 Implementation of Environmental Health Projects with Refugees

Where refugee leaders are convinced of a particular need, it is easy for the leaders to convince the refugee community. Through the assistance of the field workers, the refugee leaders should discuss the nature of the project to be implemented with the refugees and the specific roles they should play in the implementation. For instance, in the water sector, the refugees should contribute labour in the digging of trenches for the laying of pipelines, transportation of building materials and assisting the field workers in ensuring that the operation and maintenance of completed schemes are effectively carried out.

2. FACTORS AFFECTING REFUGEE PARTICIPATION/INVOLVEMENT

2.1 Constraints within the Afghan Refugee Community

The Afghan refugee community is unique and their behavioral patterns are strictly governed by a series of customs and laws which invariably exclude women from participation in many of the projects designed to improve their well being (the Purdah System).

Apart from the exclusion of women, there are other constraints which have tended to affect project implementation. They are, viz:

- Little concept of community development.
- Lack of social responsibility, rather, a strong sense of responsibility to extended family.
- Refugee leaders may place their personal interest before those of the refugees.
- Lack of interest resulting from overdependency (i.e. having been used to receiving free items).
- Uncertainty about the future – the refugees perceive their stay in Pakistan as short-term.

In view of the constraints listed above, the field staff (VOLAGS, GOP) have an increased responsibility in assisting the refugees to perceive the need for their continued full involvement in this sector. To minimize problems posed by the Purdah system, implementing agencies should endeavour to include females in their staff to reach women and children who are the most vulnerable groups.

2.2 Conclusion

Even with the above constraints, laudable achievements have been made with regard to involving refugees in this sector. Initially, it was a formidable task. However, through the dedication of all and sundry, the refugees have come to recognize the important contribution they
could make towards improving their health and social conditions. Looking into the future, the Government of Pakistan, the voluntary Agencies and United Nations High Commissioner for Refugees hope that the gains in this sector could be preserved through continued use and maintenance of existing facilities by the refugees until they go back to their homeland.
JOB DESCRIPTION FOR SANITARIANS
(NWFP AND PUNJAB)

The Sanitarian under the overall supervision of the Field Supervisory Medical Officer and the technical direction of the Medical Officer and Sanitarian Inspector will be attached to the BHU and act as a link between the BHU and the refugee community.

Language skills: Pushto, Urdu, English.

Duties and responsibilities:

1. The Sanitarian is responsible for imparting health education to the refugee community regarding the prevailing health problems, their prevention and control measures.

2. Take blood slides (for malaria) and sputum slides (for T.B.) from referred cases; administer both presumptive and radical treatment and conduct follow up of Falciparum cases in collaboration with the Community Health Worker (CHW).

3. Carry out (conduct) spray activities for malaria control in refugee dwellings and surroundings.

4. Assist the refugees in the draining of water holes, ditches, puddles and any accumulation of water in and around the RV; fill in holes, ditches, ponds, swamps to eliminate the breeding sites of mosquitoes.

5. Assist the refugees in the construction of soak pits around water supply points to avoid pools of water and muddy areas.

6. Assist in the training of spraymen on how to use the Hudson X-Pert sprayers, the safe handling of insecticides and proper operation and maintenance of the pumps.

7. Conduct intensified surveillance for malaria when needed, and in particular, during epidemics in collaboration with the CHWs.

8. Inspect and evaluate sources of drinking water supply and drainage systems for BHUs, RVs and refugee schools e.g. shallow wells, springs, storage tanks, to ensure proper operation and maintenance. Report any cases of illegal connection to the Medical Officer or the Sanitarian Inspector.

9. Identify refugee families without latrines and collaborate with Volags to supply slabs and vent pipes.

10. Perform routine inspection of BHUs and school latrines and determine if facilities are properly used and maintained.
11. Advise on proper ways to dispose of garbage in the BHU and schools by organizing the construction of two pits for both burnable and non-burnable garbage where no incinerator is available.

12. Collect and record information on environmental sanitation and transmit such information to the Medical Officer/Sanitarian Inspector.

13. Hold meetings with refugee leaders to discuss environmental sanitation problems and organize camp cleaning on a monthly or bimonthly basis.

14. The Sanitarian should spend half of his working time in the field on sanitation activities under normal conditions but the field work should be extended when there is an outbreak of epidemics.

15. A bound register must be kept at the BHU and problems related to improper well siting, distribution system, waste-water drainage, garbage disposal and latrines must be documented and presented to the medical officer on weekly basis.
JOB DESCRIPTION OF OUTREACH WORKER

POSITION TITLE:- OUT REACH WORKER (ORW)

RESPONSIBLE TO:-
1. MEDICAL OFFICER IN THE BHU
2. DISTRICT PUBLIC HEALTH INSPECTOR

POST OF ASSIGNMENT:- BHUs/SHUs

QUALIFICATIONS:- LITERATE AND WELL MOTIVATED.
FLUENT IN LANGUAGE USED BY ARs IN THE RV.
PREFERABLY AFGHAN REFUGEE.

LANGUAGE SKILLS:- PUSHTO, URDU, ENGLISH AND FARSI WOULD BE AN ASSET

DUTIES AND RESPONSIBILITIES

1. The Out Reach Worker will be attached to the (BHU) and will act as a link between the BHU and the community. He should always be in constant liaison with the M.O., group leaders in the community and health committee (where it exists).

2. The ORW is responsible to teach his knowledge to the refugee community and CHWs (where there is a CHW programme) regarding the prevailing health problems, their prevention and control measures. He will assist in the training and supervision of CHWs if a CHW programme is running.

3. The ORW will work during the hours that the BHU is open. He will be in the field on alternate days and half of the other days. But if required, in case of outbreaks or emergencies, will also help the community after the BHU hours.

4. The ORW will collect the sputum or blood slides from suspected T.B. or malaria patients during his field visits. He will also take T.B. medicines to those patients who may not be able to visit BHUs on the MO's instructions.

5. The ORW will be responsible for environmental sanitation in the RVs including supervision and maintenance of VIP latrines, compost latrines, improved wells and distribution systems for piped water schemes. He will be responsible for checking the breeding places of mosquitoes and flies and taking necessary action to improve the environmental health conditions in the RVs and BHUs.

6. The ORW will supervise and keep the record of anti malarial insecticide spray in the camp and take blood slides from fever cases during the spray. He will also be responsible to keep the spray pumps in working condition.
7. The ORW will be responsible for tracing the T.B. defaulters, for follow up of falciparum malaria patients and children for vaccination who are due for subsequent doses.

8. The ORW is responsible for the recording of TB and Malaria slides. He should also keep a daily record of his activities and report monthly the number of slabs and pipes distributed, latrines completed, health education talks given, and patients followed up for EPI, TB and Malaria. A register of latrines must be kept at the BHU and filled in at least weekly by the ORW. The register should have columns for name, group leader, and dates of receipt of slab, pipe and completion. Problems with wells, distribution systems for piped schemes, garbage disposal and wastewater drainage should be fully documented in the register.
BIBLIOGRAPHY


ABBREVIATIONS USED IN THE GUIDELINES

BHU = Basic Health Unit
CAR = Commissioner for Afghan Refugees
CHS = Community Health Supervisor
CHU = Central Health Unit
CHW = Community Health Worker
DA = District Administrator
DACAAR = Danish Committee for Aid to Afghan Refugees
FORW = Female Outreach Worker
FSMO = Field Supervisory Medical Officer
GOP = Government of Pakistan
LHV = Lady Health Visitor
NWFP = North West Frontier Province
ORW = Outreach Worker
PDH = Project Director of Health for Afghan Refugees
PHED = Public Health Engineering Department
RV = Refugee Village
RVA = Refugee Village Administrator
SHU = Sub Health Unit
UNHCR = United Nations High Commissioner for Refugees
UNICEF = United Nations Children's Emergency Fund
VIPL = Ventilated Improved Pit Latrine
VOLAG = Voluntary Agency or Non-Governmental Agency
WAPDA = Water and Power Development Authority
WSC = Water Supply Cell