Developing a Sanitary Survey Form for Evaluating Refugee Camp Locations

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Abstract

A sanitary survey form was devised based solely on the camp siting criteria as found in the World Health Organization's "Guidelines for Sanitation in Natural Disasters." Three trial forms were used in a pilot study conducted in an Indochinese refugee camp in Thailand. A final form was then prepared, based primarily on the preferences of sanitarians who used the pilot study forms. That final form was successfully used in a thesis research project which compared refugee campsite locations with rates of environmentally-incurred disease. The form can be used in selecting the optimum camp location from among several choices within a given geographical area.

Disasters, both natural and man-made, are significant moderators of man's health and well-being. Morbidity and mortality during such disasters may be great and the disease and resultant death occurring through the aftermath period may be significant as well(5).

The exodus of hundreds of thousands of Indochinese from their home countries of Cambodia, Laos and Vietnam exemplifies the aftermath of a man-made disaster. Additionally, refugees leaving Cambodia were affected by malnutrition and starvation resulting from severe rice crop shortages in the previous four years. For the most part, these people were isolated in refugee camps in Thailand, Malaysia and Indonesia.

Shortly after the establishment of the refugee camps in Thailand, voluntary agencies (VOLAGs) began to provide direct medical, public health and nutritional support. Sanitation was generally provided by VOLAGs who contracted with the United Nations High Commission for Refugees (UNHCR) for sanitation services, such as the provision for safe drinking water, refuse disposal and vector control. The contracts also included for maintenance of those services and consultation on basic sanitation and sanitation education. These services were generally guided by volunteer sanitarians from the United States, Canada and Thailand.

Arriving sanitarians continually remarked about the difficulty in providing sanitation services due to the poor location of the camps. Although general criteria for locating temporary disaster relief camps are found in the World Health Organization (WHO) "Guidelines to Sanitation in Natural Disasters"(1), those or other siting criteria were apparently not used in locating refugee camps in Thailand. Medical and public health professionals believed that the problems of sanitation, water supply and drainage in the camps were due to the wrong selection of camp sites.

Despite the initial, and often continuing, environmental handicaps, the sanitation levels within the camps improved remarkably. Using funds as generally allocated by the UNHCR, VOLAGs vigorously provided sanitation services. Drainage was obtained or, where it was not, people were relocated to other areas within the camp. Mosquitos and flies were controlled, sewage systems installed, and safe drinking water provided.

The health of the refugees also improved, as substantiated by the morbidity and mortality data(3). With rest, nutritious food and improved environmental living conditions, the health status of the Indochinese refugees was also markedly improved and was a frequent topic of conversation among the staff of the camps.

In 1981, a study was begun to assess the effect of locations of the refugee camps on certain morbidity rates in selected Indochinese refugee camps in Thailand. It compared selected morbidities with environmental factors that may have been the cause. For example, the rate of turberculosis was to be compared with the levels of crowding, and malaria was to be compared with the presence of the vector and drainage potential.

To make an environmental assessment of the camps, it was necessary to develop and use a sanitary survey form, a common device for such evaluations(2, 4). The form used has to provide the capability of assigning a numerical value to each of the various environmental factors, such as water supply quantity or drainage capability.

Methodology

Pilot Study: A pilot study was carried out from June until September 1981 in which three styles of forms were tested. These forms were based solely on the criteria found in the WHO Guidelines. The criteria are not

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style which offered an expanded coding scale were both included in the final form (Figure 2).

Sanitary surveys using the form were carried out in seven Indochinese refugee camps in Thailand between November 1981 and March 1982. When each camp was visited, the UNHCR field officer was contacted, as well as the lead VOLAG responsible for sanitation. A map of the vicinity and/or camp was obtained, if available. Each survey included surveillance of the vicinity, usually up to 5 kilometers. The camp site was evaluated and the sanitary survey form completed.

Evaluation and Conclusion

The sanitary survey form was developed based entirely around the WHO disaster camp siting criteria. Those guidelines in themselves may have been deficient as they did not include assessment of a site for refuse disposal, accessibility by road, rail or air, or initial real estate or local resident relocation costs.

No attempt was made to check the accuracy and precision of the sanitary survey form by multiple observations at several sites and by multiple observers at a single site.

In the thesis research for which it was intended, the sanitary survey form served its purpose. That is, it allowed for the quantification or coding of environmental site conditions in the refugee camps. Although somewhat deficient in coverage, it proved to be a remarkable and useful tool in assessing the camp site locations.

Within a given geographical area, use of the form to compare several sites may be valuable in selecting a site for refugees which offers maximum protection of environmental and human health at a minimum of expense.

References

1. Assar, M. (1971) *Guidelines to Sanitation in Natural Disasters*, Geneva: World Health Organization, p. 135.
2. Chen, Lincoln C. (1973) *Disaster in Bangladesh*, New York: Oxford Press, p. 285.
3. Gregg, M., Ed. (May 1980) "Follow-up on the Health Status of Kampuchean Refugees—Thailand, November 1979-December 1979," *Morbidity and Mortality Weekly Report*, 29(19):218-220.

Figure 2
Final Sanitary Survey Form

Sanitary Survey Form for Disaster or Refugee Camp Site Evaluation

Date of Survey _____ Camp Name _____

Location _____

Name of Investigator _____

Each of the major siting criteria items consists of a short answer section and a weighted compliance scale. If answers are unknown, please so indicate. Please provide a response between 0 and 100 on the compliance scale which reflects the site's most probable compliance to the recommended criteria, with 0 being the least acceptable and 100 as the most favorable.

CROWDING — Item

Population (anticipated number of occupants) _____
Area available (hectares in horizontal measurement) _____
Population density, persons per hectare _____

Criteria:	0 50 100	Item
1000 persons per 3-4 hectares; 30-40 m² per person	☐☐☐☐☐☐☐☐☐☐	1

Comments: _____

WATER SUPPLY

Describe the **source** of and **distance** to the anticipated water supply _____

Quantity available per day, m³ _____

Criteria:	0 50 100	Item
Total dissolved solids: 1500 mg/l max.	☐☐☐☐☐☐☐☐☐☐	2
Chloride: 600 mg/l max.	☐☐☐☐☐☐☐☐☐☐	3
Coliform: 1 to 10/100 mg/l max.	☐☐☐☐☐☐☐☐☐☐	4
6 Liters per person, culinary use, day	☐☐☐☐☐☐☐☐☐☐	5
15-20 Liters per person per day total	☐☐☐☐☐☐☐☐☐☐	6

Comments: _____

DRAINAGE:

Describe the slope of the land and general terrain characteristics _____

Describe the nature of the soil (permeability, grain size and distribution plasticity) _____

Criteria:	0 50 100	Item
Slope of land favoring easy drainage	☐☐☐☐☐☐☐☐☐☐	7
Soil favoring easy drainage	☐☐☐☐☐☐☐☐☐☐	8

Comments: _____

SEWAGE DISPOSAL

Describe sewage disposal sites location relative to flooding _____

Describe soil permeability and potential for subsurface disposal _____

Depth of soil _____ Depth to groundwater _____
Depth to impervious layer _____

Criteria:	0 50 100	Item
Site free from flooding	☐☐☐☐☐☐☐☐☐☐	9
Site well-drained	☐☐☐☐☐☐☐☐☐☐	10
3 meters of soil	☐☐☐☐☐☐☐☐☐☐	11
Subsurface disposal for hospital and feeding centers	☐☐☐☐☐☐☐☐☐☐	12

Comments: _____


VECTORS

Describe the site relative to endemic vectors _____

Criteria:	0	50	100	
Site away from mosquito breeding areas				13
Site away from refuse dumps				14

WEATHER PROTECTION

Annual rainfall _____ Mean temperature, °C _____ Min/Max ____ ____

Criteria:	0	50	100	
Protected from adverse weather conditions				15

AIR AND NOISE POLLUTANTS

Describe location relative to air pollution, including natural pollution, such as dust storms _____

Describe location relative to noise pollution _____

Criteria:	0	50	100	
Site away from industrial zones				16
Site away from commercial zones				17

4. Hopkins, E.S. and Schulze, W.H. (1958) *The Practice of Sanitation*, Baltimore: Williams and Wilkins, p. 486.
5. Kroeger, E.K. (1976) "Disaster Management in Tropical Countries," Tropical Doctor, 6(4)'147-152.

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Epsilon Nu Eta News—Alpha Chapter

Epsilon Nu Eta, National Environmental Health Honor Society presented a career suminar March 15 at Ferris State College. 'Careers for Your Future" featured four speakers from professional backgrounds related to the field of Environmental Health. The purpose of the annual seminar is to expose students to careers available to them upon graduation. Speakers included: Michael Schmidt, Amway Corporation; Guy Estep, Meijers Corporation; Lawrence Halfen, Environmental Consulting Service; and Charles Taylor, Kellogg Company. Robert Large from the Ferris State College Placement Service addressed the students on the procedure for registering at the FSC placement office for interviews.

Epsilon Nu Eta has eleven active members this year, and three faculty members. Membership is open to junior and senior level environmental health students with a 3.0 (out of possible 4.0) grade average, and at least 15 hours completed in Environmental Health core classes. The purpose of Epsilon Nu Eta is to recognize students that have attained a high standard of leadership and scholarship and to inspire others to promote Environmental Health.

Ferris State College

The Ferris Environmental Health Association (FEHA), was very active in projects and activities during the school year (1982-83).

In October, FEHA students attended a groundwater seminar at Grand Valley State College. Two FEHA members attended a presentation on Resource Recovery from Municipal Solid Waste sponsored by the Kent/Ottawa Resource Recovery Project. FEHA was also involved in the annual alumni telethon for Ferris State College.

Our annual Fall Potluck featured retired Environmental Health Department Head, Mr. John Fleming, who gave a slide presentation on his trip to Alaska. FEHA President, Michelle Parker and Advisor, Mr. Michael Ells appeared on Northern Michigan Morning, a local television program, to discuss the Environmental Health Association at Ferris. They discussed FEHA's Outstanding Student Affiliate Award and Travel Award that was received at the NEHA Annual Educational Conference in 1982.

FEHA members participated in a trash clean-up at the Manistee National Forest and received a thank-you letter from the USDA, Forest Service Division for our efforts. A film entitled, "Mad River: Hard Times in Humbolt County" was shown at two FEHA meetings. The film depicted the confrontation between the loggers and environmentalists in the Redwood National Forest area. FEHA members set up laboratory displays in Environmental Health classrooms for Parent's Day.

FEHA students weatherized three underpriviledged elderly families' houses in Mecosta County. FEHA students and Environmental Health faculty and staff donated gifts of food and clothing for a needy family in the community to make their Christmas a happy one.

A ventilation seminar at Ferris was attended by environmental health and occupational safety and health students. Several students toured the Midland Nuclear Power Plant in Midland, Michigan.

FEHA members in a seminar class developed a brochure to recruit high school and transfer students into the curriculum. A fluoride clinic was sponsored by FEHA to test local residents drinking water for fluoride levels.

A FEHA Winter Potluck February 9, featured Advisor Mr. Michael Ells with a slide presentation on Hawaii, where he did his graduate work. Several FEHA members went on a downhill ski trip to Caberfae Ski Resort later in the month.

On March 24, several FEHA members attended the Michigan Environmental Health Association Annual Conference which was held in Traverse City, Michigan this year.

A Spring Picnic was held to celebrate with graduating seniors and renew old acquaintances with alumni.

Preparations are also underway for the Annual Educational Conference in Norfolk, Virginia, which FEHA hopes to actively participate in.