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**EXPERT COMMITTEE ON  
ENVIRONMENTAL SANITATION**

**Third Report**

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WORLD HEALTH ORGANIZATION

PALAIS DES NATIONS

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## EXPERT COMMITTEE ON ENVIRONMENTAL SANITATION

### Third Session

Geneva, 27-31 July 1953

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\* Mr. R. P. Burden and Mr. J. A. Logan, Members of WHO Expert Advisory Panels, attended the session as observers, in accordance with paragraph 4.7 of the Regulations for Expert Advisory Panels and Committees.

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# EXPERT COMMITTEE ON ENVIRONMENTAL SANITATION

## Third Report\*

The third session of the Expert Committee on Environmental Sanitation was held in Geneva from 27 to 31 July 1953.

Dr. M. G. Candau, Director-General of the World Health Organization, welcomed the experts and referred to the increasing recognition that had been given to the value of environmental control by the nations of the world. Regional committees have requested WHO's assistance in developing various programmes of sanitation. The relation of environmental conditions to child health has been recognized by the United Nations Children's Fund.

One salient fact which the Director-General noted was the impossibility of establishing uniform sanitation practices to be followed by all countries, even though there are certain common principles which are universally applicable. In addition, experience points to the inevitable conclusion that a programme of rural sanitation cannot be successful without the active participation of the local community. It is necessary for all health workers at every level to participate in well-designed programmes of health education of the rural population.

Professor G. Macdonald was unanimously elected Chairman, Mr. M. D. Hollis, Vice-Chairman, and Dr. R. M. Morris and Mr. M. Aziz, Rapporteurs, for the session.

### 1. Introduction

#### 1.1 *General*

1.1.1 The committee noted the comments of the Executive Board on the report of the first session of the Expert Committee on Environmental Sanitation: "The Board ... thinks that fuller consideration should have

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\* The Executive Board, at its thirteenth session, adopted the following resolution:  
The Executive Board

1. NOTES the third report of the Expert Committee on Environmental Sanitation;
2. THANKS the members of the committee for their work; and
3. AUTHORIZES publication of the report.

(Resolution EB13.R12, *Off. Rec. Wld Hlth Org.* 52, 5)

been given to the question of rural sanitation, which is frequently a problem of grave importance in underdeveloped areas",<sup>1</sup> and the recommendation made in the *Proposed programme and budget estimates for the financial year 1 January - 31 December 1953* : " It is considered necessary for the Expert Committee on Environmental Sanitation to meet in 1953 in order to study the sanitation problems of small communities in under-developed countries and methods of solving these problems",<sup>2</sup> and also the approval of this recommendation by the Fifth World Health Assembly.<sup>3</sup>

These instructions were interpreted as referring to both aggregated and dispersed communities in underdeveloped countries.

1.1.2 The following definitions were adopted for the purposes of this report :

(a) The term " environmental sanitation " means the control of all those factors in man's physical environment which exercise or may exercise a deleterious effect on his physical, mental, or social well-being.

(b) The term " rural areas and small communities " refers to areas where agriculture is the chief or even the sole industry and where there is a lack of diversity of skill and of organized community services, or to areas where the dwellings are scattered or are in small groups, which dispersion creates difficulty in the provision of organized community services such as water-supply, excreta disposal, control of vectors of disease, and similar services, at a cost suited to the economic level of the persons concerned.

The committee adopted for its own use the nomenclature of sanitary staff utilized in the second report,<sup>4</sup> considering that, though it was not generally adopted, it constituted a convenient standard for internal use.

1.1.3 The committee notes that since sanitation problems differ so widely in different areas there is general belief that no common concepts and understandings are applicable. It feels there is need to promote an understanding of the basic similarity of sanitation needs in all areas and among all peoples. Sanitation is fundamental and basic to individual and community existence. It relates to the essentials of life and health, the environmental significance of air, water, food, and shelter, which last includes clothing, and, in some places, protection against insect vectors of disease. These basic environmental essentials are common to all peoples, and differences between areas are not differences in kind but only in complexity.

Sanitation programmes in their various stages of evolution follow roughly the pattern of the developmental curve. In the more advanced

<sup>1</sup> *Wld Hlth Org. techn. Rep. Ser.* 1950, **10**, 3

<sup>2</sup> *Off. Rec. Wld Hlth Org.* **39**, 142

<sup>3</sup> Resolution WHA5.60, *Off. Rec. Wld Hlth Org.* **42**, 38

<sup>4</sup> *Wld Hlth Org. techn. Rep. Ser.* 1952, **47**, 8, section 2

areas the programmes are on the top slope of the curve. In these areas there must be continuous adjustments and refinements in techniques as well as in emphasis to meet inevitable changes. If sufficiently sensitive and alert these programmes are kept constantly in phase with the needs of the times.

At the other extreme, in the less advanced areas sanitation programmes are either non-existent or have made little measurable progress. These areas are in the lag stage on the bottom slope of the curve. Sanitation programmes in the intermediate areas are at various stages on the sharp incline of the curve. It is significant that generally there is rapid and sustained progress of sanitation programmes once they are well established, fully understood, and their value clearly demonstrated.

For the less advanced areas the prime need is for some organized movement to stimulate initial action in the field of sanitation.

## *1.2 Relation of sanitation to general community development*

1.2.1 The committee recognizes the low economic status of underdeveloped areas and the resultant fact that attempts by small communities in such areas to improve their status, i.e., their per capita income, must be limited largely to the contribution of their own labour and the utilization of local materials and resources until capital can be created through taxation or personal savings. One of the most promising means, as evidenced by its increasing adoption, is general community development through self-help. The committee calls attention to the value of such programmes, and stresses their fundamental importance in the development of communities, particularly small ones in underdeveloped areas. While these programmes are equally important for developed areas, there are distinct differences which require special consideration. In such areas sanitation practices evolved indigenously as a part of general progress, making rapid strides during the 19th century, often under the stimulus of epidemics. Values, needs, the recognition of the methods, and the methods themselves were established through social, economic, and technical development as a natural part of the social structure. In underdeveloped areas, there is increasing pressure for the introduction of practices that are not indigenous and that are often not associated with other efforts to increase resources. There is a real danger that such uncoordinated programmes of environmental sanitation may increase the demand on their often already overstrained economies. It should be considered axiomatic that environmental sanitation programmes in underdeveloped areas should be integrated with general community development, and particularly with agricultural progress.

The committee wishes to emphasize that its view on the need for integration in no way alters its conviction that the creation of a sanitary environment is essential to human dignity. It is, however, concerned with the fact that health programmes can be injured by insisting on a status that cannot be supported.

In many underdeveloped areas where leaders may wish to introduce environmental sanitation programmes, the local sense of values may not include the need for such services. In these instances, the careful adaptation of practice to make the people aware of technical knowledge and its power to improve their lot may arouse felt needs and expressed wants sufficiently to stimulate a self-help movement. The positive step of participating in the creation of a sanitary environment itself produces a change in the sense of values, which is necessary if a programme is to receive continued support.

1.2.2 Gains in health may result indirectly from other community programmes. The introduction of some form of power can materially ease the provision of water for both personal and agricultural use. Improvement in communications strengthens the economic productivity and may permit of a more rapid improvement in the state of the environment. Simple water conservation or development programmes may extend the agricultural growing period and offer a simple way of increasing food supplies, and may, at the same time, stimulate cottage and small industries. Changes in land management may offer an opportunity to establish a sanitary environment in previously stagnant communities. While these examples could be expanded, they are adequate to show the interrelationship between different community developmental activities.

While stressing the interdependence of developmental programmes, the committee wishes to caution against perfectionism. Complicated arrangements, and costly machinery, supplies, and practices are not essentials in encouraging and integrating activities in underdeveloped areas. Realistic acceptance of the fact that these areas stand at the crossroads of stagnation or at the beginning of progress calls for the adoption of simple measures.

## **2. Sanitation in Rural Areas and Small Communities**

### *2.1 Relationship of sanitation to health*

2.1.1 It is well established that there is a relationship between the provision of adequate environmental sanitation and the state of health of the population. It is shown by the example of the reduced incidence of those diseases which are commonly acquired or transmitted from excreta, or conveyed to

man by contaminated water-supplies, or transmitted by living vectors of disease.

Further evidence of this direct relationship may be seen in the death-rates—particularly those of children—published in the United Nations *Demographic yearbook*. Examination of the 1952 edition<sup>5</sup> shows that the death-rate of the age-group 1-4 years in inadequately sanitated countries may be from 30 to 40 times as high as that in well-sanitated countries.

2.1.2 There are other important relationships, albeit of a more indirect character, which the committee feels merit consideration :

(a) The general improvement of hygienic conditions promotes a state of well-being in the population which is conducive to its social development.

(b) The resulting improvement in health and the consequent rise in living conditions influences for good the attitude of the people towards other improvements in their pattern of life.

(c) The provision of organized sanitary facilities, such as a water-supply, leads to a considerable saving of time and labour, which should become available for productive work in the rural economy.

(d) There is considerable evidence that the diminished incidence of excremental and water-borne diseases which results from improvements in environmental sanitation is accompanied by a marked decrease in morbidity from other diseases the etiology of which is not directly related to either excreta or contaminated water-supplies.

2.1.3 Various economic considerations arise in connexion with the implementation of sanitation programmes which must be taken into consideration.

The committee particularly stresses the facts and figures which are presented in regard to intestinal and vector-borne diseases in Winslow's monograph *The cost of sickness and the price of health*.<sup>6</sup>

Other economic considerations are :

(a) The normal expectation of life has progressively increased with improvements in environmental sanitation, which has in turn resulted in an increase in the proportion of population in the productive age-groups.

(b) The allocation of funds available in national health budgets may well be influenced by the considered statement of the President of the Fourth World Health Assembly to the effect that the implementation of

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<sup>5</sup> United Nations, Department of Economic Affairs (1952) *Demographic yearbook 1952*, New York

<sup>6</sup> Winslow, C.-E. A. (1951) *The cost of sickness and the price of health*, Geneva (World Health Organization : Monograph Series, No. 7)

environmental sanitation programmes would "save ten or twenty lives for the one that some programmes, at equal or greater cost, will save".<sup>7</sup>

(c) It follows from the above that appreciable savings may be expected in the cost of clinical facilities for the treatment of disease as well as in the overall cost of the man-days lost by sickness and enforced absenteeism from work.

(d) Food shortages in underdeveloped countries are in many instances aggravated by the coincidence of peak morbidity from preventable diseases, such as malaria, with the harvesting season. The economic implications of crop losses are obvious.

(e) Morbidity resulting from lack of even the simplest sanitation facilities adversely affects deployment of labour. When healthy, unemployed persons who are unable to find work in one place may readily emigrate to another where work is available. The sick man cannot do so.

## 2.2 *Present sanitary conditions in underdeveloped countries*

From the information available, the committee reached the following conclusions :

2.2.1 In many of these countries, more than 80% of the people live in rural areas and small communities, where they are mainly engaged in some form of food production or work in domestic industries, and as a general rule have low incomes.

2.2.2 A diversity of factors including political, racial, and religious differences within the population is not infrequently a serious obstacle to any form of organization of community health services.

2.2.3 At present, most of these people lack soil sanitation, have inadequate and contaminated water-supplies, and practice indiscriminate fouling of the surroundings with human excrement.

2.2.4 Lack of adequate methods for disposal of garbage, manure, and other refuse leads to unlimited opportunities for fly-breeding and rodent infestation. Under these circumstances, domestic animals often feed on and spread human excreta, thus causing health hazards and economic loss.

2.2.5 Such conditions often exist in rural areas near towns where they not only constitute a danger to the rural people but also aggravate the urban problem. In these circumstances, there is constant high mortality and morbidity as well as an ever-present danger of serious epidemics which may threaten the health of other communities remote from the focal points.

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<sup>7</sup> *Off. Rec. Wld Hlth Org.* 35, 151

2.2.6 Furthermore, the difficulties of carrying out a programme of environmental sanitation are often accentuated by the condition that neither individuals nor communities own, or can afford to purchase, sufficient land to provide for safe water-supplies and sanitary excreta disposal.

### 3. Needs and Objectives

#### 3.1 *Basic sanitation needs for protection and improvement of health*

3.1.1 The first step in any environmental programme should be the elimination of those factors which are the most important agents in the transmission of disease. Unless these basic steps are taken communities will continue to bear an appalling burden of suffering and misery. Throughout a major part of the world which includes most of the under-developed countries, the environmental conditions are such that a normal pattern of life involves much chronic illness, a low expectation of life, and tragically high mortality among infants and children. The outstanding causes for this are :

- (a) contaminated water-supplies ;
- (b) infections acquired by direct or indirect contact with human faeces ;
- (c) infections transmitted through the agency of arthropods, rodents, molluscs, or other vectors ;
- (d) contamination of milk and other food supplies ;
- (e) inadequate housing and overcrowding ;
- (f) diseases of animals communicable to man.

3.1.2 The committee strongly recommends that the first basic steps towards the provision of a safe environment in rural areas and small communities should be by action to :

- (a) provide adequate supplies of safe drinking-water ;
- (b) provide for the safe disposal of human excreta ; and
- (c) control the insect and animal vectors of disease, in areas where they are of significant importance.

Wherever possible, action should also be directed against the other causes of disease listed above, but where it is necessary to allocate priorities in health programmes the threefold attack recommended above should be pressed with all the vigour and resources available.

#### 3.2 *General objectives*

While the general objective of environmental sanitation as a fundamental function of the health department is to work towards a state of positive community health and well-being, specific objectives will vary with the

state of development of the community. In the early stages, the basic needs of environmental sanitation must be provided, but as the community develops there should be a progressive expansion of sanitary services to provide better standards of health and improved conditions of living.

3.2.1 The basic sanitary need of a community is the elimination of the gross causes of communicable disease, which are usually an insanitary water-supply, contamination from human excreta, and insect vectors of disease. The provision of facilities to take care of these basic needs does not however offer a complete answer to the problem. There must, in addition, be a concomitant understanding of the importance of health and an effort to practise its elementary rules. In some areas, conditions such as gross overcrowding prevent improvement in health standards, and in others inadequate levels of nutrition do so. To serve this ultimate purpose sanitation must be part (albeit one of the essential parts) of a general plan of community improvement which has, as its objective, the provision of an improved standard of well-being and living conditions.

3.2.2 As health standards are raised, the comfort, attention to convenience, and efficiency of the population become increasingly important, and will require further improvements in water-supply, more-effective excreta disposal, and a consideration of such factors as refuse disposal, housing, and food and milk control.

As has previously been mentioned (section 1.2.2, page 6), the provision of roads and communications, education, agricultural improvements, and social amenities should be integrated into the health programme, their priority in the general plan depending on the local situation.

#### **4. Technical and Administrative Aspects of Improvement**

##### *4.1 Health education of the public*

4.1.1 Health education, adjusted to local conditions, is of the utmost importance in improving the health practices of a people, and the application of its techniques is especially important in the less developed areas of the world. It should be one of the earliest approaches, and should be closely integrated with action programmes which will provide visual demonstration for health education and which will in turn be stimulated by it.

4.1.2 The committee emphasizes the value of teaching through demonstration and actual participation, since people learn more rapidly by doing than by listening to theoretical instruction. Wherever possible, use should therefore be made of local resources, the mobilization of which should be one of the main objectives of a health education programme, involving

the local population to the greatest possible extent in the sanitation programme.

Customs, habits, religion, and sociological factors have a marked influence and must therefore all be carefully weighed both in the programme of health education and in the development of the sanitation programme itself. For these reasons, educational work should be done by persons who are thoroughly familiar with the sociology, habits, and customs of the people.

4.1.3 Wherever practicable and within the recommendations in this report, the wishes of a local community as to the priorities in an action programme should be respected, subject to a reasonable allocation of available finance.

To assist the community to reach a sound decision in choosing the priority, it should be a main task in the health education programme to create in the minds of the people an awareness of their health problems, and confidence that they can do something useful about them. The deliberate creation of a wholesome dissatisfaction with the status quo may sometimes be desirable.

General health education in this field should be carried out as a part of the daily activities of sanitary officials who have had special training in adult-education methods. For this reason, health education should be an integral part of the training of all sanitation personnel. This work is likely to be most effective if carried out with the guidance of a professional health educator.

4.1.4 To be effective a health education programme must reach all segments of the population from the highest to the lowest in the land. In particular, it is essential that leaders of the people, including teachers, veterinarians, agriculturists, religious leaders, and members of voluntary organizations, should both be given the fullest information and be fully utilized for its further dissemination.

It is also important that every effort should be made so that children during their school life should have inculcated into them the proper appreciation of sanitary standards both by teaching in the classrooms and by the day-to-day familiarity with good sanitary practice and habits through the provision of the best possible installations for their use.

#### 4.2 *Enlistment of local participation*

The committee's discussions repeatedly brought out the importance of enlisting local participation in sanitation programmes, and the need for officials at all levels to keep this in mind when developing such programmes. In the final analysis a satisfactory environment for the peoples in under-

developed rural areas will, to a large extent, depend upon the understanding, attitude, and action of the people themselves. This is especially true with regard to water-supplies and excreta disposal. In reality, it is unlikely in most of these areas that outside assistance can provide more than guidance, technical aid, and perhaps arrangements for some material resources. A general understanding on the part of the people of the relation of water-supply and excreta disposal to sickness is important and necessary to promote proper use and care of these facilities. As a means of stimulating local participation, full use should be made of influential local groups and individuals. The responsibility for promoting local participation rests largely with the health staff. Many examples were before the committee where organized community effort had produced striking results in improving rural sanitation.

#### 4.3 *Administrative organization of rural sanitation programmes*

The pattern of organization of health services in different countries varies over a wide range and is much affected by the degree of centralization or decentralization of work. Accordingly, there is no uniformity as to where and how the health engineer and other sanitation specialists fit into the environmental structure at the various administrative levels.

The committee does not wish to comment on the relative merits of the details of several systems of administration, but does feel the following points to be relevant :

(a) Responsibility for environmental sanitation programmes should be borne by the head of an organization who is advised by, and has at his disposal the services of, suitably qualified medical and engineering staff. The committee therefore strongly recommends the inclusion of sanitary engineers at a proper level in the national health structure to fulfil this function.

(b) Officials responsible for rural health services should be physically located as close to the people as is consistent with the national policy of administration. The object is to ensure that the people understand the nature of the health organization, the health value of sanitary facilities, and the simple problems of maintenance and operation. In rural areas this is even more important than in urban surroundings, since water-supplies and excreta disposal for rural homes are closely associated with family life and, in fact, may be considered extensions of the family roof.

(c) It is generally true that rural people are more reserved and less susceptible to the influence of outsiders than is normally the case in urban life. As a consequence, a health worker residing in the local area is likely to be much more influential than one resident at a distance or paying only

occasional visits. Such a local person would normally be non-technical at the health-aid or village-worker level.

(d) The administrative structure should provide the simplest possible mechanism for the local health worker to obtain technical guidance from and consultation with staff at the next higher administrative level of government. Other technical services, such as laboratories, health education, and investigations, should be correlated with the needs of the rural sanitation programme.

#### 4.4 *Fields of activity*

No single set of criteria could logically be adopted as standards applicable in all the widely differing stages of technical development throughout the world. Local conditions will decide what solution is most applicable to a given situation. Nevertheless, it is recognized that, in all cases, some active steps towards improvement can be taken although it may be possible to take only the most elementary action in the areas at the lower levels of development.

However, it should always be the aim to base all technical considerations on sound sanitary practice, and sanitary installations, however simple, should embody the best possible approach to complete health protection.

The committee wishes to emphasize that the best design or the best methods are often those which are the simplest. It notes with concern the fact that elaboration and complication are often confused with technical excellence, whereas in small communities in underdeveloped countries simplicity of design and ease of maintenance are very desirable features.

This report cannot attempt to establish design criteria for the various fields of sanitary activity. The committee recommends that these technical details should be made available in the form of manuals for sanitary practice which should be prepared and published by WHO. These manuals should also cover the whole range of instructions for the continuous maintenance of the equipment and installations which they describe.

However, it is believed that good design should follow certain basic principles, which are outlined below.

4.4.1 *Water-supply systems.* The basic purpose of a water-supply system should be to provide adequate quantities of safe water for human use for drinking and culinary purposes. For health, comfort, and convenience, additional quantities for bathing, washing, and public cleansing are necessary. The ultimate objectives, however, should be the provision of adequate supplies of safe water for all the needs of the community, including domestic, public, industrial, agricultural, and recreational purposes.

4.4.2 *Excreta disposal.* Excreta disposal should be carried out so as to reduce to a minimum (a) the danger of direct contact with man ; (b) the contamination of soil or of ground or surface water ; (c) the possibility of transference to man through the agency of insects or animals ; and (d) the possibility of creating a public or private nuisance.

The committee recognizes the widespread use, in many parts of the world, of human excreta as a fertilizer as well as the utilization of animal manure as a fuel. With the growing world population and the limited extent of world resources, all efforts to utilize sanitary by-products and return them to the soil should be encouraged. The necessity of controlling these activities in such ways as to reduce to an absolute minimum their inherent public-health hazards cannot be too strongly emphasized.

4.4.3 *Refuse disposal.* Community refuse, excluding excreta, may be disposed of in such a way as to conserve its value as a fuel or as a fertilizer, or it can be destroyed as quickly, completely, and innocuously as possible. In either case the process must be done in such a way as to prevent public nuisance, to avoid the breeding of flies and other insects, to discourage rodents, and to prevent the contamination of water, milk, and other food.

4.4.4 *Vector control.* In every area in which vector control is a primary need, suitable measures should be taken, but as an integral part of the general programme of environmental sanitation. It is emphasized that this activity should not take such precedence in the programme as to exclude action in the safe disposal of excreta and in the provision of safe water-supplies. Vector-control programmes should be based on a sound knowledge of the ecology of the vector under attack. The costs of such programmes must be carefully evaluated in terms of the overall health budget and their importance from the standpoint of health and well-being.

4.4.5 *Composting.* The process of composting, properly done, is applicable to several types of organic wastes. It may not only provide a relatively safe, cheap, and non-offensive method of waste disposal, but may also yield end-products of considerable economic value to the soil. It is being used in many places for the stabilization of garbage, barnyard wastes, and similar refuse. In areas where human excreta is applied to the soil, apart from the risks of handling, composting with other organic materials may, under careful management, provide significant sanitary safeguards. The time element involved, together with the heat generated, may reduce materially pathogenic and parasitic organisms. Fly-breeding may be controlled by the temperature generated by well-operated composting methods. The desirability of study of technique and its improvement is referred to elsewhere (section 4.13.2, page 22).

4.4.6 *Rural housing.* Housing should meet the requirements of the climatic conditions of the area ; it should be of ample capacity and so constructed as to promote family well-being and comfort. Efficient space-utilization, storage, and home-safety features should be incorporated in design. Lighting and ventilation are important. Quiet and privacy should also be considered. Ready accessibility to sanitary facilities is of extreme importance. Within practical limits, housing should also afford protection against animals and insects.

4.4.7 *Milk and other food sanitation.* The criteria for food sanitation should cover the whole process of milk and other food production, storage, and usage.

It is emphasized that, in this report, allusion is made to the sanitation aspects of the problem. It is essential that, at each stage, control should be exercised to prevent contamination or addition of harmful chemicals ; to prevent infestation of food by animal parasites liable to cause disease in man ; and to ensure the safety of milk supplies.

#### 4.5 *Integration of environmental sanitation with other health activities*

Integration with other medical activities must necessarily be subject to local conditions, and the degree of co-ordination between preventive and curative work will vary accordingly. It is nevertheless very important that a reasonable balance should be maintained in meeting the claims on national budgets of these two sides of health work.

An important aim should be to foster in the mind of the public the idea of the principle of the indivisibility of curative and preventive work as an essential in the maintenance of good health in the community. This can be achieved if there is good liaison between the existing branches of health services. The question is already receiving close attention in many countries, in some of which the process of integration is gaining momentum and has already reached a satisfactory stage. In other areas, however, further efforts should be made in this direction. Assistance in this may be obtained by linking the centre from which local environmental sanitation activities are carried out with some other centre of health work which has already gained credit with the public.

In some areas there are groups of full-time health personnel who deal only with certain seasonal epidemics. With suitable additional training many of them could be integrated into the general sanitation services and thus have a greatly enhanced usefulness to the communities they serve.

#### 4.6 *Personnel requirements, qualifications, and utilization*

4.6.1 The committee stresses once again the principle enunciated at the second session that there is a real necessity for the services of well-trained

specialists in environmental sanitation in the formulation and development of programmes, even though in many underdeveloped countries it may not be possible to have more than one or two such officers. Owing to the great diversity of circumstances in these countries, it is not possible to state personnel requirements categorically, but it is obviously very desirable that governments, with the professional advice of the specialist officers, should make a close study of their environmental sanitation position and the staff required for its improvement, particularly in rural areas. Such a study should give the facts on which a programme, however simple, can be based, and lead to decisions as to the means whereby it can be implemented.

4.6.2 The committee here wishes to emphasize the essential value of sanitation personnel who can enter into people's homes. Health aids particularly should be able to do so. In many areas, it may be of considerable value to employ women at this level, since they are accorded a more ready access than men to the homes of the people. The committee was impressed by the success which had already been achieved in many countries by the use of trained women in both domestic and community sanitation programmes.

4.6.3 In most countries it is possible to organize workers at the village level on a voluntary basis as a part of a self-help programme, although in some areas a small subsidy or salary may be essential. To meet local needs, such workers require a certain minimum training. It must also depend on local circumstances whether such village workers deal entirely with environmental sanitation or whether they are multi-purpose, and include sanitation merely as a part of their general duties.

#### 4.7 *Resources for providing sanitary facilities*

4.7.1 In relatively highly developed areas there generally exist highly organized governmental agencies charged specifically with the responsibility of providing leadership and technical guidance and often direct aid in initiating and promoting sanitary practices in keeping with the needs of the people. These areas usually have some degree of public awareness of sanitary values together with economic resources. Reliable statistics are available, and hence effort can be focused in line with need, and sanitary services for small communities and isolated dwellings kept reasonably in phase with the trends of the times.

At the other extreme in less advanced areas the resources available for sanitation may be largely limited to manpower and local materials. Since a large proportion of the world's population resides in such areas, there is a great need to emphasize that much can be accomplished by a proper utilization of even those meagre means.

4.7.2 It is accepted as axiomatic in the field of environmental sanitation that it is governments which should take the initiative both to stimulate action and to provide essential technical guidance.

For national programmes the primary responsibility and authority for planning, organizing, and implementing wide-scale rural sanitation obviously rests with each country and its political subdivisions.

For more-local programmes and, more particularly, for maintenance of amenities in these basic fields of environmental sanitation, the responsibility may most appropriately lie with a local body or organization as being in the closest touch with both the people and the problems.

For such local programmes, the committee strongly endorses the principle of self-help, encouraged, guided, and aided by governments. The psychological advantages stimulated by the self-help concept is extremely important, even if the extent of the self-help is limited to the provision of manpower and locally available material. If nothing more, the people, with the proper guidance, can be taught elementary methods of providing safer water and safer methods of human excreta disposal.

#### 4.8 *Appraisal of a rural sanitation programme*

The assessment of community health is a fundamentally desirable activity. It is valuable in the appraisal of rural sanitation programmes, either alone or combined with general development work. Measurement of the result may be by either direct or indirect means. The direct means are always preferable although some resort must be made to indirect measures. Whichever type of measure is used, the aim should be to ensure that the methods are objective and not subject to the opinion or discrimination of the observer, that standards of comparison between controlled and uncontrolled conditions are maintained, and that in their assessment full allowance is made for the variation which might have occurred had the specific measures not been taken.

In appraising a programme designed to meet the minimum sanitation needs of small communities as outlined in section 3.1.2 (see page 9), there should be no diversion of resources for the collection of data that would detract from the effort to create a sanitary environment. In these cases a simple recording of births and deaths together with an accomplishment record might well comprise the elements. The addition of simple indirect means such as records of school attendance or lost working-days might be considered where applicable.

Such a basis would need elaboration as the community progressed, or if work were started in one already partially advanced. The most important elaboration includes routine surveys of diseases which can be objectively

measured, a census and age estimation of the population, and registration of births and of deaths together with age at death. Analysis of the data thus provided can be of material help in deciding on the most economic and effective lines of development for a health programme.

The committee points out the dearth of sound appraisals of rural health experiments, in particular, the lack of those based on direct measurements, and that, with the integration of environmental sanitation in general community development, even more variables have been introduced about which our knowledge is meagre. The committee notes that WHO is taking an increasing interest in the appraisal of health programmes, draws attention to its proposal for such an appraisal in section 4.13.2 (d) (see page 22), and recommends that particular attention should be given by WHO to the support and encouragement of appraisals of health programmes. It suggests that consideration should be given to the support of one or more comprehensive experiments in which appraisal would be based on a very broad baseline including such factors as social, cultural, economic, and agricultural progress as well as on health conditions.

#### 4.9 *Sanitary inspection and maintenance of sanitary installations*

4.9.1 The committee lays particular emphasis on the need for the inspection and maintenance of sanitary installations since it feels that, when badly maintained, they may lose much of their value and may, in extreme circumstances, even become a danger to the community they are intended to serve. Though self-help is important, it should be supported by periodical visits by sanitation personnel of a local sanitation agency. Inspection should be oriented away from the concept of enforcement by sanctions towards methods of persuasion by health education to secure willing co-operation.

It is, however, recognized that the value of such inspections may be much diminished by the existence of obstacles to a right of entry to premises, private as well as communal. Very careful consideration should be given to the most appropriate method of overcoming these obstacles wherever they occur.

4.9.2 The maintenance of private installations for excreta disposal should be the responsibility of the householder, but it may be desirable that the local authority should maintain private water-supplies if the owners are willing to permit their use by the public.

The responsibility for the maintenance of collective water-supply systems and of community installations for excreta disposal is an appropriate function of a local authority.

4.9.3 To facilitate maintenance, care should be taken in the selection of sanitary installations for a rural community so that their management is within the skill of the people who have to maintain them.

#### 4.10 *Training facilities*

4.10.1 In considering training facilities, the committee noted the comments made at the second session<sup>8</sup> and considered those aspects needing special emphasis for the support of work in rural areas and small communities in underdeveloped countries.

4.10.2 The committee emphasizes the necessity for education and training of public-health engineers, of medical officers of health, and of supporting professional staff. This education and training necessitates prolonged study in academic institutions, which are often available only in foreign countries, and post-graduate visits to progressive schemes which are also often in distant lands. It is desirable that such study should be encouraged, and the committee therefore recommends that WHO should continue to support it through its fellowship programme. It also recommends that WHO should encourage and stimulate the establishment and development as soon as possible of specialized education and training for professional staff within their own countries.

4.10.3 Technical staff at the non-professional level should be trained within the country concerned, or in a neighbouring one, under arrangements specially designed in relation to rural hygiene schemes.

The training centres should be in rural areas that are, as far as possible, typical of the general countryside, social conditions, and hygienic standards of the area in which the pupils will work. It is essential that they should be in specific health areas in which environmental hygiene is practised, and that they should be managed by professional staff whose primary function is training and teaching, although staff may be provided with some executive work in the health area in order to give material and facilities for practical teaching.

4.10.4 Primary emphasis should be placed on the training of health aids and health assistants as defined in the second report.<sup>9</sup> As the sharp distinction of these two grades without material prospect of promotion from the junior to the senior often promotes dissatisfaction and consequent bad work, the course of instruction should be so designed that entrants who prove themselves suitable may, after qualifying as health aids and working in that capacity, return for later courses as a preliminary to

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<sup>8</sup> *Wld Hlth Org. techn. Rep. Ser.* 1952, 47, 13

<sup>9</sup> *Wld Hlth Org. techn. Rep. Ser.* 1952, 47, 16, 17

advancement. In the initial stages of a campaign, the emphasis on training health inspectors may be secondary, but the scheme should preferably be designed to permit of their training both by selection from among health assistants and by direct entry of carefully selected persons of good education and character.

4.10.5 The committee strongly recommends that the training of all grades should, as far as possible, be operational in character, that continuous institutional work should be reduced to a minimum, and that appropriate manual techniques should be taught and their practice encouraged. It considers that abilities of observation, criticism, and constructive remedy can and should be rapidly developed by specific techniques, such as the use of rating cards, successful examples of which have been reported. It recommends that WHO should make a study of such techniques and, where appropriate, publish examples of them.

4.10.6 The committee deprecates the preparation of standard detailed curricula intended to be more or less universally applicable. It considers that each training scheme should be founded on a careful analysis of the functions of the people to be trained. Although some simple instruction in physiology, bacteriology, parasitology, and such subjects is necessary to convince pupils of the microbial origin of disease and of the means of its transmission, it should not be elaborated beyond this point without special reasons related to the ultimate function of the pupil. In the training of junior grades, emphasis should be placed on the use of standardized techniques, routinely applicable to many situations within a country, thereby reducing the element of choice by the worker as much as is possible.

4.10.7 Training schemes for village workers whose functions cover other matters besides hygiene should be specially arranged, and should be separate from those for specific health staff, although some facilities could be common to both. As far as possible, such workers should be taught sanitation by personal practice in construction and should also be taught to use carefully standardized techniques.

#### 4.11 *Equipment, supplies, and transportation*

4.11.1 The committee notes that there is a great variation in the types of equipment in use (e.g., water pumps), that this introduces difficulty in designing and working schemes, and that there appears to have been inadequate study of specifications of equipment most suitable for use. It recommends that WHO should undertake a study with the object of producing standard specifications setting forth the principles of satisfactory equipment and materials in common use, and that it should publish such specifications in appropriate manuals.

4.11.2 The committee recognizes the advantages in many circumstances of the use of standard designs for sanitary installations such as wells, latrines, and the like, and in some cases of the production of standardized parts to facilitate construction by partially skilled labourers. It advocates the extension of these principles, and recommends that methods thought suitable for wide applicability should be published in appropriate manuals.

4.11.3 The need for transport for sanitation workers is recognized. No generally applicable method of its fulfilment can be advocated, but provision should be made to correspond with local circumstances.

#### 4.12 *Laboratory facilities*

Environmental sanitation programmes ultimately rest on analysis of the environment and the diseases prevalent in it. Simple schemes can and should be instituted despite the absence of laboratory facilities, but such a lack should be made good as soon as possible even though the circumstances of most underdeveloped countries will often restrict laboratory provision to a single base area. Such laboratories should be primarily maintained for public-health services, care being taken to prevent clinical pathological examinations, or other matters irrelevant to the immediate purpose, assuming any major importance in them. The functions of the laboratory include chemical and bacteriological analyses of water and food, which can be of much value in training schemes for senior sanitary students. They should also include epidemiological studies of prevalent disease, and the control of materials and methods used by the sanitation staff, as, for example, in insect-control schemes. As extension of full laboratory services to the field is not immediately possible in most of the areas now considered, the development of simple qualitative tests for use by field workers, and instruction in collecting, packing, and despatch of material should be an important responsibility of the central laboratory. It is recommended that approved qualitative techniques suitable for use under the conditions now envisaged should be published.

#### 4.13 *Research, investigation, and technical development*

4.13.1 It was pointed out in the second report that the highest expert services were needed in the countries of least resources, as their problems were the most pressing. Such services are needed not only in consultative and executive branches, but also in the field of research, investigation, and technological development. Experience shows that all are necessary, that the aspects requiring study in underdeveloped countries are different from those in lands with better resources, and that all hold the prospect of material progress. The committee stresses the fact that it is this field

which offers the greatest opportunity for technical assistance projects, that no other area of activity provides the possibility of such large returns in terms of the investment required, and that, in the early stages of their development, underdeveloped areas do not have the highly trained staff needed to cope with the research type of problem. In the field of technology, it is important not to copy slavishly existing practice, but to investigate the possibility of new techniques suited to the local circumstances; this requires imagination, an appreciation of the problems, and a concentration of effort. Whereas much work must be done where the problem exists, basic research may be best carried out elsewhere.

4.13.2 The committee recognizes that the advancement of health demands continued studies covering a wide field including nutrition, agriculture, animal husbandry, economics, and sociology, all of which require integration, but strictly within its own field, it draws attention to the need for studies of the following types.

(a) Basic research in the development of new methods of excreta disposal and of composting by non-traditional means; in the biology and physiology of insects with a view to the more rational development and use of insecticides; in food preservation and storage; in non-traditional methods for the disinfection of water; on the influence of housing and industry on human physiology; and in the development of new methods of obtaining water, such as cloud-seeding, the electrodialysis of brackish water, and the distillation of saline water through the use of solar energy or of conventional power sources.

(b) Investigation into the availability and distribution of material resources; the appraisal of local sanitation problems in an attempt to find logical and economical solutions, utilizing, as far as possible, local resources; investigation of non-traditional building materials.

(c) The development of new uses for sanitary wastes, particularly in the fields of agriculture and fisheries; the development of field tests for the control of field operations; the adaptation of techniques, apparatus, and equipment to suit local conditions.

(d) An accurate method of appraisal of the social, economic, and physical effects of environmental sanitation in a controlled area. Although the beneficial effects of environmental sanitation are usually obvious, a quantitative measure of these effects would be valuable. To replace efforts to measure these effects from data which are seldom accurate and which usually depend on mixed causation, the committee considers that a special study should be made of the problem under scientifically controlled conditions. This would involve the establishment of norms of physical, social, and mental well-being to serve as a baseline for measurement, and the

measurement of changes in them in conjunction with improvement in environmental conditions.

4.13.3 It is important that there should be a direct link between research, technical development, and field measurement of the results of their application. Their close association can materially speed the general application of new development.

The committee recommends that WHO promote and encourage projects of the type described, both by stressing their importance and by the provision of technical guidance and advanced training.

## 5. The Role of WHO

### 5.1 *Development and demonstration teams*

The committee recommends that WHO should take all steps possible within its Constitution and resources to stimulate an awareness of the need for immediate action in the field of environmental sanitation. Such action could well include extension of the existing plans for development and demonstration teams. The committee also stresses the importance of demonstration areas, not only as a means of arousing public awareness as to the value of sanitation and of stimulating progressive improvement in environmental conditions in the country as a whole, but also as training areas for local staff.

While it is the committee's opinion that a scientific appraisal of the value of environmental sanitation should be considered as a special research project, it is understood that appraisal should be inherent in any demonstration project, and that facilities should be provided for this purpose.

For the initiation of a demonstration area in a country previously without one, and which requires an initial analysis of needs and the development of techniques, a specialist staff would be necessary. This team, which would be responsible for training, technological development, and demonstration, would be of a pioneer nature and it is not envisaged that a similar professional group would be necessary in local projects.

The committee recommends, therefore, that, to carry out this pioneer work, teams consisting of a sanitary engineer, an epidemiologist, a sanitarian, and a public-health nurse should be organized and made available to governments. The part-time services of a statistician, a public-health educator, and a public-health laboratory should also be available. The equipment and transport required would depend on local conditions.

### 5.2 *Research projects*

The committee considers that WHO could promote the practice of environmental sanitation in many underdeveloped areas by encouraging, and, if need be, by supporting, with staff and other forms of aid, a research project, in association with an operative programme, intended to make objective measurements of the effect of environmental sanitation on the physical, social, and economic well-being of the population.

### 5.3 *Manuals of rural sanitation*

The production of a manual or manuals of design, operation, and maintenance of sanitary installations, of specifications for equipment and material suitable for use in sanitation projects, and of methods and techniques used in them, would be of great value to those operating such projects. The committee recommends that WHO should undertake studies of these subjects and publish a manual or manuals of specifications and techniques found suitable.

### 5.4 *Other programmes*

The other fields in which WHO can be of material assistance to sanitation projects are education and training ; assistance to governments in creating public-health organizations ; the provision of sanitation staff to work with governments or teams engaged in insect control, child welfare, and other demonstrations ; aid in the establishment of teaching facilities in universities and of training schemes ; and assistance by all means within its power of research projects such as those listed in section 4.13.2 (see page 22). WHO already undertakes much work in these fields and the continuation and extension of those aspects related to work in rural areas and small communities is strongly recommended.

## 6. **Recapitulation of Main Recommendations**

The committee believes that it should be considered axiomatic to integrate environmental sanitation programmes in underdeveloped areas with general community development, with particular reference to agriculture (section 1.2.1). The committee recognizes that the first step in any environmental sanitation programme should be the elimination of those factors which are the most important agents in the transmission of diseases. It strongly recommends that the first basic steps towards the provision of a safe environment in rural areas and small communities should be by action to :

- (a) provide adequate supplies of safe drinking-water ;
- (b) provide for the safe disposal of human excreta ; and
- (c) control the insect and animal vectors of disease where they are of significant importance (section 3.1.2). This activity should not take such precedence in programmes as to exclude action in the safe disposal of excreta and in the provision of safe water-supplies (section 4.4.4).

The committee stresses the importance of health education of the public and the necessity of training all sanitation personnel in health education (section 4.1.3).

For local programmes of sanitation, the committee strongly endorses the principle of self-help, encouraged and aided by governments (section 4.7).

The committee recommends that WHO should encourage and stimulate the establishment and development of specialized education and training for professional staff, on country or regional bases, within their own countries as soon as possible (section 4.10.2). The committee considers that technical staff at the non-professional level should be trained within the country concerned, or in a neighbouring one, under arrangements specially designed in relation to rural hygiene schemes (section 4.10.3). Emphasis should be placed on the training of health aids and health assistants (section 4.10.4).

The committee recommends that WHO should take all steps possible within its Constitution and resources to stimulate an awareness of the need for immediate action in the field of environmental sanitation. Action could well include extension of existing plans for development and demonstration teams (section 5.1). It also points to the need for one or more comprehensive experiments for the scientific appraisal of the value of environmental sanitation on the physical, social, and economic well-being of the population (section 5.2).

The committee recommends that WHO should undertake the preparation of manuals of rural sanitation and of specifications for equipment and materials suitable for use in sanitation projects (section 5.3).

## 7. Acknowledgements

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