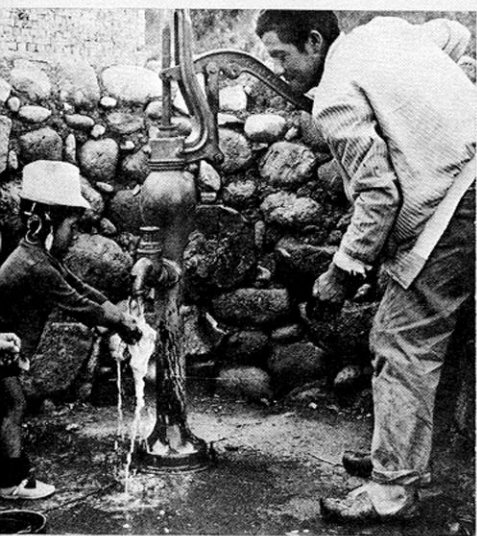


The options are limited

A preliminary report on a review of appropriate waste disposal technologies for developing countries carried out by Witold Rybczynski, head of McGill University's Minimum Cost Housing Group, Chongrak Polprasert, of the Asian Institute of Technology, Bangkok, and Michael McGarry, associate director of the IDRC's Health Sciences Division. The review, now completed, will be published by the IDRC at a later date.



Hand pump: its basic design has remained unchanged for perhaps 100 years.

The situation in which the developing countries find themselves today with respect to sanitation parallels in many ways that of the industrialized countries at the turn of the century. The questions to be asked are: To what extent is the situation similar? To what extent are the options similar? And hence, is the waterborne option adopted by the industrialized countries the optimal choice for the developing countries?

The industrialized countries at the turn of the century found themselves with rapidly growing cities and traditional sanitation systems (cesspools, pit latrines, open ditches) which were inadequate to the new scale of population. The results were high disease rates and poor environmental conditions. So far this parallels closely the situation many developing countries face today, but here the similarity ends.

Most of the cities in the United States, for example, had running water in the houses (and water closets) before they had sewers, and in fact the sudden availability of large quantities of water was part of the reason for the breakdown of the previously adequate cesspools. This is generally not the case in the poor areas of developing country cities, and hence the option of on-site dry systems, not available to the nineteenth-century American cities, is clearly an alternative for the developing world. The second major difference is that nineteenth century America and Europe were in the midst of an economic growth period of unprecedented proportions. It is obvious that this is not the case with most developing countries, and clearly this will limit their options.

The options for the nineteenth century American cities were coloured by the ready availability of large quantities of water. Since this could not be infiltrated on-site, it had to be transported away. The transportation of sewage by truck was seriously considered, and tried, in America. The organizational capability proved to be beyond the ability of the municipal governments of the time. European cities, better organized, did use bucket systems. In some cases (Copenhagen, Stockholm) well into the twentieth century. Present-day literature confirms that in countries with a high degree of social organization (Korea, China, Japan) carting of nightsoil is successfully practiced with little apparent health hazard, and significantly lower costs than sewerage systems.

Septic tank systems (including aquaprivies) were not invented until 1897, and perfected only some 25 years later. Consequently they represent a "new" option. Although often cited as an appropriate solution for developing countries, there is evidence in the literature that high cost and operating problems (due to water availability) have limited the success of this technique. Once again it should be remembered that the septic tank is a solution to

handling rather large quantities of water, and generally presupposes a water closet.

The third option for developing countries is dry on-site treatment. The most simple form of this is the pit privy. It is surprising to find that although this is probably one of the widest used excreta disposal technologies, there is very little technical literature on the subject. There is evidence, however, that the infiltration effects of pit privies are limited to quite a small area, and the application of the pit privy, in some improved version, to urban conditions is by no means out of the question. There is literature that indicates that long-overdue improvements in ventilation and construction can significantly improve hygienic and environmental characteristics.

The main drawback of pit privies is their reliance on particular soil conditions and a low water table for proper operation. One of the options that was discarded in the nineteenth century was the dry earth closet. The literature shows that in the last decade there has been renewed interest in dry long-term decomposition in closed containers as an on-site excreta disposal system. These are sometimes called composting toilets, but more accurately ought to be called "mouldering" toilets. Vietnam is reportedly making a large-scale sanitation effort based on on-site decomposition of nightsoil, and Tanzania has been conducting a research program in this direction, partly assisted by an IDRC research grant.

These dry on-site systems have application only in single family dwellings, and hence are certainly a solution for most slums and marginal settlements. At present, however, there is no evidence of similar systems that could be applied in high-rise or communal housing. For the moment at least, it seems that removal — either by cartage, vacuum truck or sewers — will have to be the solution. However, there is a growing body of literature that indicates that many possibilities exist for re-use of sewage and nightsoil, and that economic implications of such re-use could reduce the cost of sewer infrastructure where the latter is unavoidable. Techniques include composting of nightsoil to produce fertilizers, and the utilization of oxidation pond effluent in aquaculture, algal culture and irrigation. Some of these practices are reported to be taking place on a large scale, others on a more experimental basis. □