IRCWD NEWS

WHO International Reference Centre for Wastes Disposal

Ueberlandstrasse 133, CH-8600 Duebendorf/Switzerland

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The Role of Collaborating Institutions

A meeting of Directors of Institutions collaborating with WHO International Reference Centre for Wastes Disposal took place at the Federal Institute for Water Resources and Water Pollution Control, Duebendorf, the host institute of the IRC, in November 1972.
The following is an excerpt from the draft report of the Secretariat of the Community Water Supply and Sanitation unit of WHO.
It is hoped that the projects assigned priority by the participants of this meeting will procure a closer contact between the IRC and the Collaborating Institutions, using the IRCWD News as the platform for discussing pending problems of common interest. The report of the meeting will be distributed to all Collaborating Institutions as soon as it has been finalized.

Introduction

The development of the ambitious programme of work entrusted to the Centre could not be carried out in isolation. Consequently, and in agreement with the Director of the International Reference Centre, the World Health Organization approached leading institutions and organizations throughout the world to ascertain whether they would be interested in collaborating with the Centre in the development of its programme of work. The response has been most encouraging and at the time of the meeting 44 institutions had been designated as Collaborating Institutions.

The functions and responsibilities of the Collaborating Institutions include the following main activities: to provide the IRC with information on their research programmes and findings, as described, for example, in their annual reports; to collect technical and scientific data on various aspects of the management of liquid and solid wastes; upon request, and subject to their own capabilities, to provide facilities for the training of research and other personnel; to collaborate with the IRC where possible on special surveys, and to conduct developmental investigations with respect to new methods or procedures evolved for the collection and disposal of liquid and solid wastes.

It is assumed that Collaborating Institutions are able to contribute these services to the international programme from their normal resources. WHO has no financial resources for the support of such activities, but may be able to make funds available for certain specific undertakings under contractual technical services agreements. In such cases a WHO contribution towards the additional expenses incurred may be made. Upon request of the government concerned, WHO may also be in a position to provide specialized consultants to a Collaborating Institution to advise on specific problems.

Collaborating Institutions can expect to receive from the IRC annual reports and information bulletins on current results of its programme of work, special surveys, and investigations. This information is transmitted in turn by the World Health Organization through its Regional Offices to Member countries in order to assist them in the planning and development of effective wastes management and control programmes.

The Regional Reference Centres (RRC's)

To further facilitate the work of the IRC and strengthen the network, steps were being completed at the time of the meeting to designate the Central Public Health Engineering Research Institute in Nagpur, India, as a WHO Regional Reference Centre for Wastes Disposal. Budgetary provision has also been made for 1973 for the Designation of another institute in Asia as a second Regional Reference Centre for Wastes Disposal.

The functions and responsibilities of the Regional Reference Centres will be similar to those of the IRC, but their scope restricted to a geographical region. They are intended to stimulate and co-ordinate research, train research workers, convene training courses, seminars and symposia, and disseminate information to Collaborating Institutions. The results of these activities are to be transmitted to the International Reference Centre. The establishment of RRC's will permit decentralization of activities; thus, lines of communication will be established from the IRC to the RRC's and from the RRC's to the Collaborating Institutions, and vice versa. At the same time this need not preclude communication between the IRC and the Collaborating Institutions.

The overall objective

The World Health Organization believes that the International Reference Centre and its network of Collaborating Institutions and Regional Reference Centres to be designated, provide an appropriate infrastructure to make possible the co-ordination of research and development programmes, provide the means for an effective exchange and dissemination of technical and scientific information, and assist in the transfer of existing technology from industrialized countries to developing countries.

In developing countries

There are developing countries which are advancing rapidly and those which are not, but all are faced with limited resources of trained manpower, of industrial production, and fierce competition for financial resources.

The problems are compounded by the dilemma of urban/rural priorities. In most developing countries, by far the great majority of the population lives in rural areas. While on the whole, technical solutions to waste disposal problems in rural areas are either available or can be developed without much difficulty, the problem is one of general lack of development in the rural sector and of priorities. The villager is unlikely to spend effort and money on sanitation unless this is accompanied by some concurrent economic and social development.

In contrast, in the highly congested urban communities of developing countries, sanitary collection and disposal of excreta presents a technological challenge that has yet to be met. Present methods presuppose a properly planned community layout and are by and large beyond communities' capacity to pay. Populations living in fringe areas are a special risk as they combine often the problems of urban and rural areas. Even so, in the urban context, better possibilities exist for the development of institutional and social structures which result in the formulation and execution of national and local plans and the raising of revenues to pay for them.

In the determination of the budgets for urban and rural development, it has to be recognized that support is more readily secured for urban programmes and that the incentives are there to lead to a measure of self-generation and expansion. At the same time any improvement which can be made in the quality of rural life will assist in slowing the drift to urban areas.

In discussing these matters, participants considered that:

- The rate and time for technological developments differ for each country.
- Technology transfer can be harmful if not appropriate and if deliberate steps are not taken to ensure acceptability to the operational agencies and to the population itself.
- Sanitary and environmental engineers in developing countries should have the opportunity to be in touch with modern technology even though they have no immediate opportunity to use it.
- It is important to develop local technology. Officials should be encouraged to accept that there can be simple but effective solutions to waste disposal problems.
- Training is most effective if done in the region. Local conditions give the right orientation.
- The exchange of research workers between Collaborating Institutions is desirable. Regular contact can be assured by the establishment of a "twin" relationship as between a CI in an industrialized country and a CI in a developing country. Initiative from the IRC in exploring such possibilities would be most desirable.
- Those involved in the technical aspects of wastes disposal in developing countries should concern themselves with the development of schemes containing the kind of information which will persuade politicians to vote appropriate financial resources. This information will include details of economic viability and give examples which can show the way. It is believed that the IRC could assist materially in this regard by assembling state-of-the art surveys covering not only technical aspects but also institutional and management ones.

Participants asserted that almost all the roles they have suggested for the IRC and CI's as applied to industrialized countries applied also to developing-country situations except that due account needs to be taken of limitations and constraints already discussed. These indicate a desirable emphasis on:

- training
- development of processes that are simple to build, operate and maintain
- provision of information.

News from WHO

WHO Meeting on Wastes Water Reuse

A WHO meeting on wastes water reuse was held in Geneva late in 1971, with the participation of IRCWD. The report has now been published as No. 517 in the WHO Technical Report Series, with the following title: "Reuse of effluents: Methods of waste water treatment and health safeguards. Report of a WHO meeting of experts." Copies will be sent to all Collaborating Institutions.

Periscope

Paris

An OECD Expert Committee on Science Policy met in Paris on 13th and 14th Oct. 1971. The actual report is available from the OECD Bureau des Publications, 2 rue André-Pascal, F-75 Paris 16e. The following is an excerpt from the most important conclusions and recommendations of this committee.

Two central themes can be discerned in the situation of the OECD countries in the coming decade:

1. Economic growth *per se* is no longer a sufficient overall objective.

2. Further interventions in the operation of the market economy will become necessary.

The uncertainty and rapid change of social goals are causing, and will continue to cause, a difficult and sometimes painful re-adjustment as the scientific establishment strives to respond to new priorities. The levelling off of R & D resource growth is only one consequence of this adjustment. Massive projects in space, defence, and associated activities decline, while goals in social areas have not yet been sufficiently crystallised so that they can be related to coherent and focussed technical programmes.

It is important to recognize that many current problems of society arise from inadequate development of technology in the services sector, in comparison with technology developed for the manufacturing sector. The very slow growth of productivity in government services and in the services sector generally, particularly in education and medical care, has been a major cause of inadequate social performance of the economic system in relation to individual and social welfare.

Further economic growth may be necessary before the advanced countries can remove residual islands of poverty, improve social services such as public health, education, and urban transportation, and increase their aid to less developed countries. However, it is now recognised that growth, as measured by the market alone, does not automatically guarantee the best application of the resources created. Thus, emphasis has shifted from growth in increased personal incomes to growth in generating the means necessary for general social development. The new emphasis entails consideration of the qualitative aspects of economic growth and of social influence upon the direction of investment and innovation.

One of the most difficult and perplexing issues of science policy is the proper balance between centralised policies for science and technology considered as a single aggregate, and sectoral policy related to the particular sectors of social or economic policy served by research and development.

In many countries, science policies have tended to neglect the potential use of science in many sectoral activities. For example, bigger commitments of national R & D capabilities may be required for aid to developing countries, and this may include both efforts within the OECD Member countries on generic problems of underdevelopment and detachment of scientists and engineers to serve overseas.

We wish to stress that simple transfer of existing techniques will seldom meet the needs of the less developed countries. Modern techniques must be adapted to their situation. For example, in agriculture, existing strains of cereals and of plants, as well as breeds of cattle, etc., must be adapted to the various conditions of soil and climate. Often this requires cross-breeding and a network of local research stations.

In all activities, but particularly in industry, public works, and house construction, labour-intensive techniques should be developed because there is abundance of cheap labour but shortage of capital. A dual economy now often develops, composed of a small capital-intensive industrial sector with large production per man, the rest of the economy having very low levels of production with traditional techniques. Modern but labour-intensive techniques hardly exist, and consequently a large-scale rural exodus is involving a growing number of unemployed people who are living in "bidonvilles" under miserable conditions.

Integration of Social, Economic, and Scientific Policies

If, as we believe, growth and technological progress are two aspects of the same phenomenon, we can no longer consider technological progress as an independent variable.

Science and technology are an integral part of social and economic development, and we believe that this implies a much closer relationship between policies for science and technology and all socio-economic concerns and governmental responsibilities than has existed in the past.

International Aspects of Environmental Problems

Many environmental problems are global in nature and require international collaboration, both in assessing the extent of the problems and in taking remedial action. This is particularly true with respect to certain aspects of atmospheric pollution, the pollution of international waterways, and the contamination of the oceans by pesticides, fertilizers, petroleum products, and radioactive wastes. The technical character of these problems is often not fully understood, and monitoring systems are insufficient to determine what is happening.

Science and Underdevelopment

The needs of the developing countries for science and technology are undoubtedly different from those of the developed countries. National science and technology policies within the developed countries should therefore be formulated with attention to the particular situation of those countries. We recommend that problems relating to science, technology, and underdevelopment be considered by Member countries as an integral part of their national science and technology policies.

The Organisation should make an inventory of the activities of its Member countries in science and technology in terms of their relevance to underdevelopment. We furthermore believe that the developed countries ought, as a matter of conscious and explicit policy, to devote a certain fraction of their R & D activities to problems relevant to underdevelopment, and consider that a more rigorous inventory of present science activities should permit a more fruitful discussion than at present with respect to the controversial question of percentages of expenditure. This is a field in which co-operation between Member countries should be extensively developed. The inventory should be seen as a first step towards this. The Organisation should be requested to make any further studies required and formulate recommendations to Member governments in view of such co-operation. Policies should be developed in two directions:

1. Fostering in the less developed countries the development of indigenous capability in science and technology relevant to the socio-economic situation of those countries.

2. Formulating research programmes in favour of the developing countries in the laboratories of the advanced countries, as a part of science policy.

It is of major concern to us that the recommendations made as from 1965 by the United Nations Advisory Committee on the Application of Science and Technology to development problems have had little effect. We suggest that discussions be held in the Organisation between Member countries participating in ECOSOC work to determine what steps should be taken to follow up the ECOSOC recommendations and, more specifically, those contained in the World Plan of Action (1971).

Only by creating institutions in the developing countries themselves does it seem possible, on the one hand, to mitigate the brain drain and, on the other hand, to become sufficiently close to the particular prevailing economic and social environments to respond to their real research and development needs. We recommend a pooling of advanced-country resources with this aim in view, and stress the value of centralising knowledge of these actions to ensure that, so far as possible, they fit in with an overall plan of international action for the installation of a network of centres of research and advanced studies in the developing countries.

The developing countries need to draw as deeply as possible on the "stock" of scientific and technical knowledge existing throughout the world, to avoid duplication and, in some cases, to gain valuable time and to develop their own research activities on the basis of activities already existing or in process elsewhere. Some of the obstacles to transfer are deep-rooted in the economic and social conditions of the countries concerned and can be overcome only in the course of the economic development process itself. There are others, however, of a less fundamental nature, on which direct action is possible in co-operation with the advanced countries. We believe the Organisation should examine the present situation with regard to the following:

- aid in creating in the developing countries technical information-evaluation centres manned and organised by specialists capable of informing themselves of technological development abroad and of advising on the importation of technologies;
- fostering within the developing countries information banks of value for the specific needs of research on the Third World;
- the availability of training assignments and visits by specialists from the Third World to centres of excellence in their own disciplines in the advanced countries, to assure them of frequent consultation, without thereby inducing them to quit their own countries.

We recommend to governments that they organise formal arrangements permitting scientists and engineers from developed countries to spend periods of time in developing countries both to provide technical assistance and education, *in situ,* and to familiarise themselves with problems and conditions. This could be an important transfer mechanism.

Conference

The Canadian Society of Soil Science is organizing an International Conference on Land for Waste Management in Ottawa from 1 to 3 October 1973. Its aim is to collect and disseminate information on waste disposal and waste utilization in soils, to evaluate systems of waste management on land, and to identify the problem areas requiring research and development. Topics on the agenda will include:

a) climate, vegetation and soils as factors in waste disposal, including special problems in the North;

b) soil properties and processes in relation to waste recycling and disposal;

c) hydrogeology and geomorphology as factors in waste management;

d) nature of wastes in relation to disposal on land;

e) socio-economic and land use planning for waste disposal, including health and legal aspects;

f) land waste disposal systems – present and future designs.

Abstracts

The subsequent abstracts have been taken from our documentation on solid wastes which contains at the present moment 2000 publications. Our completed "Solid Wastes Thesaurus" is an important key, providing access to the documentation system. It is composed of 484 scientific and technical terms in the field of solid waste management which serve as a basic reference in information storage and retrieval.

Jenkinson, I.R.: Sludge dumping and benthic communities, 1972, 3, No. 7, 102–105, Marine Pollution Bulletin, Orig. IRC.

In the laboratory, with conditions of gentle mixing in sea water, the fibrous component of the sludge rapidly increased in density and 91% of the total filterable matter ultimately settled out. More vigorous mixing slowed down the rate of density increase and hence resulted in a delay in settlement. Sampling at sea confirmed that some of the sludge had reached a depth of 23 m, 20 min. after dumping had commenced. It may be stated that, despite settling out by the sludge, neither the presence nor the absence of any species could be directly attributed to the dumping of 22,500 tons per year of it at the Needles Spoil Ground, and the evidently precise conditions necessary for the abundant growth of the polyzoan. ***Epistomia,*** nearly a century ago are still fulfilled both on the spoil ground and in the Atherfield region.
The non-homogenous nature of the bottom in the area surveyed and the assemblages of animals sampled suggest that the animals owing their presence first to stones and second to the finer sediment may be best thought of as two more or less interacting communities.
More intensive measurements on the fauna and the sediments of the spoil grounds, including biochemical analyses, are required before it can be stated with certainty whether the current rate of dumping is without deleterious effect.

Rogers, C.J. and others: Production of fungal protein from cellulose and waste cellulosics, 1972, 6, No. 8, 715–718, Environmental Science and Technology, Orig. IRC.

The data reported here indicate that fungi can be used as a biosynthetic agent to produce high-quality protein from cellulose wastes such as kraft paper, agricultural waste, and urban refuse after a process such as hydropulping first separates the cellulosic fibers in the refuse from noncellulosic materials.
Without an effective pretreatment process, recycling cellulose cannot become an economically feasible reality. We hope that this study might promote additional investigations of the pretreatment processes that increase the biodegradation rates of cellulose. In our evaluation of several of these processes, only the photochemical treatment proved to be significant. This process reduced the cellulose fermentation time by one fourth to one half the time required for untreated cellulose. The percent of protein content of the fungi grown from cellulosic wastes ranged from 4.5 to 13.3%. Fungi No. 6, the one with the highest protein content, contained all of the essential amino acids, and in most cases, the amino acid content exceeded FAO requirements.

Anonymous: Hard surfacing prolongs centrifuge life, 1972, 121, Water & Sewage Works.

The Sanitation Districts of Los Angeles County turn their sludge into fertilizer through the use of centrifuges. The centrifuges are protected from corrosion and abrasion by a hard surfacing process.
The Sanitation Districts of Los Angeles County, which serve almost 4 million people, are involved in a maintenance program that other communities might well examine. The digested sludge removed in their water pollution control system is converted into fertilizer. The digested solids pass through Bird solid-bowl continuous centrifuges, which separate the solids from the liquid. The heart of each centrifuge is a large screw conveyor made of mild steel, which moves the corrosive waste through the separator section. Each screw conveyor is 3 feet in diam and 8 feet long.
Both edges and flats of the screw flights are subjected to severe abrasive wear. Also, the feed port, the section of the separator through which the waste solids enter the centrifuge, and the plows, which protect the structure of the bowls from cavitation and the abrasion of

moving, sludge solids, are subject to severe wear. These vital areas are protected and repaired by a hard-surfacing process employing oxyacetylene rods containing a versatile nickel-base alloy which resists both corrosion and abrasion, including metal-to-metal wear. So severe is the wear that without this protection conveyor parts would function efficiently for only one to two weeks, creating an impossible downtime problem. Even with the protection, parts need repair approximately every four months. Since the conveyor screws cost $ 18,000 each, frequent replacement is out of the question, so hard surfacing is really essential to the effective operation of the system.

Basic equipment used in the protection and repair process includes an oxyacetylene torch and a supply of 5/16-in. Colmonoy No. 6 rods. Occasionally, a Colmonoy Fusewelder torch is used for patching or "tinning" bad areas. (The Fusewelder torch is a versatile all-purpose tool that sprays and fuses powdered alloy with accuracy and effectiveness): Before a centrifuge is hard surfaced the entire screw section, the interior diameters of the feed ports and the four sides of the plows are sandblasted. Where there is excessive wear, the flights are repaired with inserts or built up with mild steel electrodes before the protective overlay is put on.

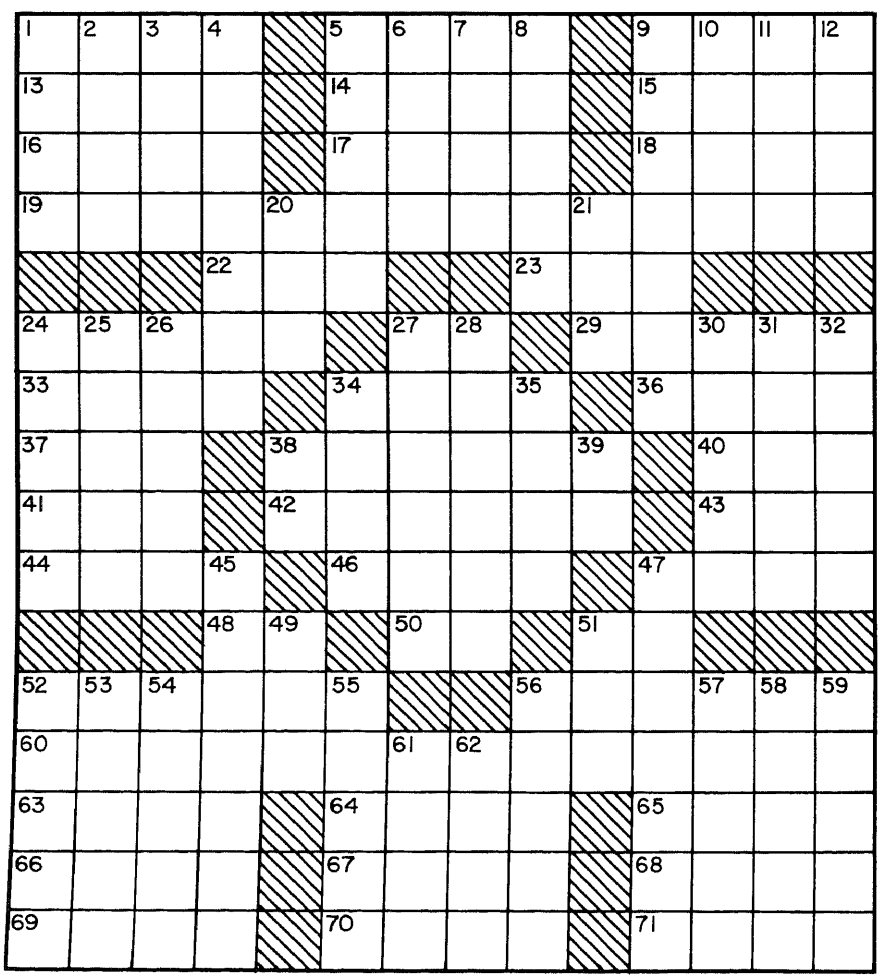
The conveyor screw is hard surfaced on all edges using the oxyacetylene rods, and the leading sides of the flights are also surfaced to about two inches from the edge. In the feed port areas, both sides of the flights are completely surfaced.

The only grinding required is on the edges of the screw flights. There the hard-surface layer must be finished to uniform dimensions to provide clearance for the screw as it turns within the housing.

Glover, W.D., Hankin, L., Zucker, M.: Secondary treatment of liquified garbage, 1972, 44, 1730, J. Water Pollution Control Fed.

The effect of adding a preliquefied garbage in batch procedure, to a model of a secondary wastewater treatment system was studied. The garbage was degraded enzymatically overnight with pectate lyase derived from the culture fluid of *Erwinia carotovora,* a plant pathogen. Levels of liquefied garbage of up to 10 percent, based on total wastewater, did not materially affect the operation of the treatment system. At the 25 percent level, a concentration of material that would not be encountered in a normal operation, the garbage was detrimental to the system. Operation of the system seemed to be enhanced by the lower concentrations of garbage. Neutralization of the garbage would be helpful for improved operation.

Pollution Puzzle



Across:

1. Fuel in combustion
5. Smallest particle of an element
9. Animal skin prepared for tanning
13. Idol
14. Space between the eye and nostril of a snake
15. Two mountain ranges in southern Kirghiz S.S.R.
16. Assistant (abb.)
17. Strip of insulating material (pl.)
18. Past participle of **lie**
19. Physics dealing with the mechanical action or relations of heat
22. External
23. Small town in Karelia, eastern Finland on river Pielinen
24. Opium flower
27. In football, right guard (abb.)
29. The Pope's triple crown
33. Island city in Fukien province, China (n = m)
34. Variety of pigeon
36. Grant of temporary use
37. . . . de Janeiro
38. Pistillate plant
40. Radio and Telephon Gesellschaft (abb.)
41. Ronald (dim.)
42. Part of the environment populated by a characteristic and constant community of plant and animal life
43. Sky and war god in Germanic mythology
44. Stub
46. Advantage (s = ss)
47. Kingdom in the northwestern part of the Indochinese peninsula
48. Erbium (symbol)
50. 3rd pers. sing. pres. tense of verb **ser** (Spanish)
51. Radium (symbol)
52. Small town in Minnesota, U.S.A., on river Rum
56. Putrefied
60. Biologically-formed soil aggregates that have a stabilizing effect
63. Jewish religious literature
64. Net to trap game
65. Object of worship
66. To touch at one end
67. End (German)
68. Concluding musical passage
69. Unit of local government in ancient Attica
70. Grasses with jointed, hollow stems
71. 2nd pers. sing. pres. tense of verb **ser** (Spanish)

Down:

2. Interstitial cell-stimulating hormone (abb.)
3. . . . .fish
4. Theoretical measure of energy in a thermodynamic system
5. Apportion
6. Terrestial, tailless amphibian
7. Wild celebration
8. Intermediate
9. Fat used in making soaps, candles etc.
10. Small town north of Khartoum, Sudan
11. Secular
12. For the preservation of foodstuffs (pl.)
20. Much (Spanish)
21. Insect
24. Young salmon (pl.)
25. Edible bulb
26. City in western India
30. Main artery
31. Proportion
32. County of eastern Scotland
34. Nomadic pastoral people living between the Nile and Red sea (i = j)
35. An unsightly thing
38. In football, fullback (abb.)
39. Epistle (abb.)
45. Reproduce by bud
47. Used as a screen
49. Main vein in a leaf
51. Fabulous bird of prey in Arabian and Persian legend
52. Element with a valence of eight
53. Woman changed into stone by Zeus in Greek mythology (r = i)
54. Gold
55. Star-shaped structure formed in the cytoplasm of a cell during mitosis
56. Governed
57. Formerly ruling family of England
58. Wear away
59. Small town in northern Portugal between river Dão and river Mondego
61. Distinctive style
62. To be in motion

S. Peter, Editor
"IRCWD News"
Swiss Federal Institute for Water Resources and Water
Pollution Control (EAWAG)
Ueberlandstrasse 133, CH-8600 Duebendorf, Switzerland