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environmental planning in relation to health infrastructure in the developing world

. . . the proclamation of the State and Society for the protection of health of the population, to be based on putting into effect a complex of economic and social measures which directly or indirectly promote the attainment of the highest level of health, through the establishment of a nation-wide system of health services based on a general national plan and local planning, and through the rational and efficient utilisation, for the needs of the health services, of all forces and resources which society at the given stage of its development is able to allocate for the purposes.

World Health Assembly, Resolution WHA 23.61 - part.

INTRODUCTION

Some definitions

Environmental planning is concerned with the organization and spatial distribution of essential human activities in order to achieve agreed ends. In other words its chief concern is the co-ordination of policies in order to attain the physical component 'the better world'. Since the perception of 'the good life' is not static, and both the means and the will to achieve it are also in a state of flux then the act of planning itself is under constant review. Therefore we are here dealing with a process of directed change, not a single act which leads to some once and for all end state situation. In addition environmental planning is primarily concerned with physical change and such change is only one part of a whole series of interconnected processes not easily isolated. This paper aims to explore some of the connections between the environmental planning process and health infrastructure in the Developing World.

The term Developing World includes many countries with varied environmental conditions and many peoples with wide cultural differences. It would,

therefore, be no surprise to find differences in existing health infrastructure, disease patterns, planning mechanisms, and perhaps more importantly in deeply held attitudes about the nature and purpose of health planning. While recognising the crucial importance of these differences, nevertheless, this paper can only explore some of those similarities that distinguish environmental planning and health infrastructure in the Developing World as opposed to the Developed World.

A major concern of planning in this country and in many others has been a desire to improve health standards amongst the population(1). For example, Howard, with his concept of the Garden City, aimed "to raise the standard of health and comfort of all true workers of whatever grade - the means by which these objects are to be achieved being a healthy, national and economic combination of town and country life, and this on land owned by the municipality."(2) Raising health standards can therefore be said to be a goal, though often unstated, of many past plans. Its achievement together with other social objectives has often been seen in terms of the provision of facilities or through the imposition of physical prescriptions(3). Recently amongst planners there has been a growing awareness of the inadequacy of this partial view of a complex problem. For instance Dykeman describes the issue as follows:

"It would be clear ... that urban community is an extremely complex system, open to change in many directions. In practice it may be difficult to determine the number of significant variables which constitute the environment of this system. Only by developing techniques competent to deal 'organised complexity' ... can planning hope to deal with a changing city as a manageable artefact."(4)

This theme of systemic planning discussed in the United States of America by Dykeman and others was taken up by planners such as McLoughlin and Chadwick in this country(5). Certainly, the building of health facilities in the right location and the improvement of housing conditions are still as important in the effort to improve health standards. But, since we are dealing with a quality of the social fabric of a population, health planning must be viewed within the total social context where possibly administrative procedures or other elements of a social policy may have a greater effect on the end result.

Health administrators, too, are beginning to widen their horizons and acknowledge that health planning is multifaceted. Some are suggesting that a systemic view of the problem may assist in understanding the subject and also in suggesting solutions to the problems:

"At present in many countries the health services are fully recognised as a system comprising several integral parts, and in this respect a systems approach seems to be the most appropriate way of improving the existing practices within health administration. The ability of decision-makers to understand and apply the systems approach of health care should be seen as an important factor in the field of health administration."(6)

The evidence of parallel thinking in both the planning profession and amongst health administrators heralds the possibility of the development of a new approach to policy formation for improving health care in the developed and developing worlds. The emphasis in such an integrated policy shifts from the provision of health infrastructure to choosing the most appropriate course of action for the allocation of scarce resources in order to solve specific problems considered in order of priority. As President Nyerere at the 1969 Tanu Biennial Conference said "To plan is to choose". The successful implementation of such an integrated plan then becomes a question of co-ordination of actions in several sectors.

HEALTH INFRASTRUCTURE IN THE DEVELOPING WORLD

The discussion of health infrastructure in the developing world eventually turns to the individual developing country at which point the full impact of the political euphemism 'developing' is realised. 'Developing Country' obscures more than it reveals and in order for this discussion to proceed to the core of the problem the niceties of the term must be challenged(7). Countries are in various stages of development and are developing at different rates. (See Tables 1 and 2).

Table 1: The gross national product as an indicator of development for some countries (1965)

	U.S. \$ per capita
Malawi	40
Tanzania	70
Nigeria	80
Kenya	85
Ghana	230
U.K.	1550
U.S.	3240

Table 2: Indicators of national development for some countries

	Composite index	Rank order
Malawi	1.2	73
Tanzania	2.2	69
Nigeria	5.0	63
Kenya	4.7	64
Ghana	23.2	46
U.K.	121.6	6
U.S.	261.6	1

Most of these countries located in the continents of Asia, Africa and South America by comparison with European and North American countries are low in rank order in terms both of stage of development and rate of development. Therefore in terms of Europe and North America the countries of the third world are underdeveloped and they need to develop if the health and welfare of their people is to improve. Some countries do plan to develop, and indeed are developing. However, the critical factors firstly the rate of development which we have seen is low, and secondly, the possibilities for future development. Most forecasts of rates of development in the third world are gloomy and predict a situation of an ever widening gap between the so called developed and developing world(8). For example by the year 2000 the per capita world product will have increased from \$631 to \$1696. During the same period the per capita third world product will increase from \$135 to \$325 and the developed world from \$1675 to \$5775. That is, the difference in wealth of these

two sections of the world population was twelve-fold in 1965 and will be eighteen-fold in year 2000 which seems to indicate that the harsh poverty of 70% of the world's population will continue for many generations.

It could be argued that on past experience predictions about the nature of the future are more likely to be incorrect than correct, but looking at the evidence of past achievement the picture presented is no brighter. In developing countries the rate of economic growth fell from 4.8% in the first half of the 1950's to 4.5% in the first half of the 1960's while during the same time the population increased from a rate of 2.1% per annum to 2.5% per annum which meant that the rate of economic growth on a per capita basis fell from 2.7% to 2.0%.⁽⁹⁾ Therefore, considering the likely range of possibilities, it is unrealistic to expect great increases in public spending on health care or public health in the developing world over the next years; the most that can be expected are modest increases. While it is true that the developing world has been increasing expenditure on health in recent years, in many cases the increases have been offset by the decline in the real value of the local currency and by the increasing population. In real terms in past years it has been a case of small amounts spent on health increasing by small rates, for example in 35 years the growth of Indonesia's expenditure on health is from 20 to 25 cents and during the same time Nigeria's is from 50 to 75 cents per capita per annum.

Table 3: Health expenditure in 1962 for some countries

Country	Proportion of GDP/GNP spent on health	Per capita expenditure on health
Malawi	-	£ 1.03
Tanzania	1.4 (GDP)	0.77
N. Nigeria	-	0.50
Kenya	2.1 (GDP)	1.54
Ghana	1.16 (GDP)	4.00
U.K.	3.85 (GNP)	56.00
U.S.A.	5.7 (GNP)	162.00

In addition to the hard realities of strictly limited economic resources, developing countries share other common factors such as poor educational services, small numbers of trained personnel, excessive fertility levels, malnutrition, a common disease pattern, an entrenched conservative peasant agricultural society and a rapid rate of urbanisation which outstrips industrialisation. Of these additional common factors linking the developing countries excessive fertility levels have perhaps the most significant effect on the ability to plan for adequate health care. Population control programmes are common in developing countries and are aimed at achieving a more equable balance between population growth rates and economic growth rates in order to achieve desired standards of living more rapidly. In developed countries the urban poor have large families but they form only a minority of the total population, whereas in the developing world it is the rural poor who form the majority of the population and it is they who have the large families and who have the greatest impact upon population growth.

Statistics and forecasts of world population have been quoted elsewhere on numerous occasions. The significant aspects of these figures are that if the world continues to grow at the present rate, population will double in 35 years reaching a total of seven billion. The net gain in

population is fifty five millions and by the year 2000 it will be two hundred millions. The developing world contributes 71% (2.5 billion) to the present world total and by the year 2000 it will constitute approximately 85% since the rate of growth for these areas is 2.6% per annum compared with 1.1% for developed areas.

In terms of density these figures mean that the population in the year 2000 will be living at an average density of 142 persons per square mile compared with 63 now. In Europe densities will rise from 233 to 301, in Asia from 177 to 423, in Latin America from 31 to 96 and in Africa from 27 to 75. Europe because of its industrialisation can support the extra population densities, but developing countries where their culture is linked with subsistence farming cannot. For instance in Africa 47% of the land area and 45% of the population are already experiencing pressures. Population pressures of this order express themselves in cases of chronic malnutrition in both calories and protein food affecting the young child, and these exist in large numbers in every economically underdeveloped country. Protein-calorie deficiency is known as kwashiorkor and results in underweight: oedema, dermatitis, hair changes, apathy, misery; in some cases to irreversible pathological damage and ultimately to death. To these actual food deficiencies are added causative factors such as prolonged weaning, maternal deprivation, diarrhoea and infections(11). To emphasise the magnitude of the problem the FAO (Food Agriculture Organisation) World Survey of 1963 suggested that world food supplies would need to be increased by 35% before 1975 to maintain the present unsatisfactory levels, and by 50% to achieve adequate nutrition. By the turn of the century they would have to be augmented threefold. A joint FAO/WHO Expert Committee on Nutrition which met in 1966 noted that per capita food production was not keeping pace with population growth(12).

Developing countries in addition to the problems facing rural areas is undergoing a rapid process of urbanisation. Urban areas are increasing at approximately twice or three times the national population growth rates. World urban population will probably increase by seven times by the end of the century and it is in the developing world where the major urban growth will occur. Compared with the United Kingdom with 80% of its population in centres of 20 000 or more and the United States with 65%, Asia and Africa have 20% and 15% of their populations in such centres. These rapidly developing urban areas are dependant upon a money economy which places an added call upon limited national budgets and a strain upon already overloaded urban services. The cities of the developing world are known for their peri-urban areas of 'septic fringe' and as Fendall notes "Urbanisation is probably the most visible phenomenon of human want and distress."(13)

The existing infrastructure available for combating and alleviating this want and distress in the developing world is stretched to impossible limits. Whereas in Europe and North America there is one physician to 850 and 780 persons respectively, in Africa and Asia the figures are 8000 and 5900. In addition threequarters of the world's nurses are in North America, Europe and the USSR while the remaining quarter are located in Asia, Africa and Latin America. To add to this critical situation the gap between need for qualified personnel and the existing establishment is growing. For example, the supply of physicians in the developing world is increasing at 2.1% while the population is increasing at 2.6%. The problem of the inadequacy in terms of quantity, in the present infrastructure is compounded by its maldistribution. Tables 4, 5 and 6 illustrate aspects of the maldistribution of both personnel and facilities and shows the serious shortfall of infrastructure outside capital cities and particularly in the rural areas where most of the population is to be found. As Bryant points out:

"The areas of greatest need are distant and rural, the most difficult to reach with supplies, transport and particularly personnel - but the pressures favour the cities. There is

Table 4: Maldistribution tables 1964.
Table of distribution of physicians by proportions

Country	Capital		Rest of country	
	MD %	Pop. %	MD %	Pop. %
Jamaica	70	26	30	74
Guatemala	82	15	18	85
Senegal	63	15	37	85
Thailand	60	8	40	92
Kenya	54	5	46	95

Table 5: Table of distribution of personnel: Thailand: 1964

	BANGKOK	REST OF COUNTRY
	(Pop. 2.3M - 8% total)	(Pop. 26M - 92% total)
	%	%
Physicians	60	40
Dentists	79	21
Pharmacists	77	23
Nurses	67	33
Midwives	57	43
Lab. Technologists	90	10
Dental Hygienists	86	10

Table 6: Hospital and bed distribution: C 1965

Country	National			Capital City			Rest of Country		
	Total hospitals	Total beds	Ratio per 1000	Hospitals	Beds	Ratio per 1000	Hospitals	Beds	Ratio per 1000
Jamaica	33	7401 ¹	4.1	12	2065	5.4	21	2409	1.7
Guatemala	44	10250	2.5	18	5018	8.0	26	5232	1.3
Senegal	42	4492	1.4	7	1565	3.8	74	2927	1.08
Thailand	95*	21962	0.7	16**	6294	2.7	79	15668	0.5
Kenya	164	11521	1.3	23	2988	9.7	141	8533	1.0

Jamaica: The total includes nearly 3000 mental beds in Kingston.
Thus the ratio of general beds is 2:3 per 1000 persons.

Senegal: Additional 39 maternity units.

Kenya: Government 7000; Mission 2904; other 1617.

*Plus 51 private and 25 municipal.

**Plus 24 private hospitals and 48 maternity units.

always a pressing demand to meet the high cost of maintaining and improving central facilities, especially hospitals, and these demands often have political and professional strength behind them: the rural people have been without much care throughout history; today is only another day added to yesterday; better care will come in time."(14)

A study carried out in Uganda showed that the number of outpatient attendances per person halves for every two miles people live from a hospital, and for every $1\frac{1}{2}$ miles from a dispensary and for every mile from an aid post.(15) The maldistribution of facilities and personnel together with the low quality of the service and the wide distances between facilities in rural areas of developing countries account, in some measure, for the higher mortality rates to be found there. For example in Accra and Kumasi the infant mortality rate is 37.6 per 1000 live births while in other urban areas in the country it is 123/1000 and in rural areas 167/1000.(16)

In the developing world there is a common pattern of disease which results from ignorance, poverty, facundity and prejudice - the sort of diseases which were prevalent in the West in the past. In Africa, for example, the major diseases are regarded as malaria, tuberculosis, leprosy, helminthic diseases, diarrhoea and dysenteries, onchocerciasis, trypanosomiasis, bilharzia, smallpox, venereal disease, trachoma, otitis media, and protein-calorie deficiency.(17) It is becoming obvious to many working in the field of health care that existing infrastructure and the western ideology on which it is based is not adequate for solving the developing world's vast problems which amount to crisis proportions. Bryant describes the problems very clearly:

"One can almost sense that the health professions, with all their weapons of modern biomedical technology, are being mocked. We must ask if we are seeing the right issues. Is it possible, even likely, that the medical tools we are using are not the right ones... the great weapons of modern medicine are aimed at the pathophysiology of disease and its susceptibility to pharmaceutical, immunological, or surgical attack. Health services are designed to deliver these weapons through the hands of doctors. The dismal fact is that these great killers of children - diarrhoea, pneumonia, malnutrition - are beyond the reach of these weapons."(18)

Part of the problem stems from the very nature of a major part of the population of the developing world which has not yet perceived the nature of disease in terms of germ theory, nor are they aware of the benefits of modern medicine: they have their own way of looking at health matters and until those attitudes change little improvement in conditions can be expected. The third world comprises many groups with varied cultures which by and large are wedded to land and to traditional beliefs. Even the melting pot of urbanisation has yet to become effective, assimilation into towns being mainly through ethnic groups where tribal traditions tend to persist. Food production could probably be increased by new and more effective farming methods, and in theory, too, population increases could be reduced by effective family planning programmes. But these and other necessary innovations are dependent upon deep and far reaching changes in long established behavioural patterns. In discussing health planning in the developing world, therefore, we are really proposing a planned cultural revolution.

HEALTH PLANNING

Some case studies

The neo-classical approach to economics relates investment in physical capital to economic development. Attitudes however are beginning to change and greater emphasis is being placed on the investment in human

resources where development is measured in the quality of the population.(19) As Myrdal explains by taking this attitude it changes the emphasis of the problem and broadens the perspective so that solutions are no longer crippled by inadequate resources: "If we do add investment in health to investment in education and define human resources in terms of the two dimensions of population quality - as occasional references invite - we must include all costs involved in improving conditions of health, not just expenditures on health facilities."(20) For example, a study in Sierra Leone revealed that increases in the budget of the Ministry of Health were required to pay for statutory salary increments leaving little room for programme expansion.(21) In such sombre situations where solutions bind a new approach is necessary.

The need is for a wider attack on problems of health care at which point the problem can be seen to fall within or to be closely associated with environmental planning. A Scientific Group of the World Health Organisation in 1972 defined environmental health as being concerned with: "the control of all physical, chemical, and biological processes, influences and factors that exercise or may exercise, by direct or indirect means, a significant effect on the physical and mental health and social well being of man and his society."(22) The report of this group then discussed the environmental criteria appropriate to each aspect of urban planning under the headings

- 1) Land use zoning
- 2) Residential areas
- 3) Industrial sites
- 4) Transportation and communications
- 5) Utilities and services and
- 6) Miscellaneous

This broader approach to health planning was developed in the Central University of Venezuela, Caracas and is known as the Paho-Cendes method (or Santiago method).(23) The method as developed is a thorough application of systems analysis to health planning and is a substantial step forward in the conceptualisation of the problems associated with health planning. The method is based on economic theory where the criterion to be satisfied is efficiency and where a resource is efficiently used if the benefits obtained from its use are greater than those which would have been obtained if the same resource had been used for something else. The method applies to health planning those thought processes that we have come to use in problem solving and plan formulation as environmental planners, so that it begins with a systematic determination of what the problems are likely to be at some future date, the resources available for dealing with them and the type of organisation needed to carry out the programme. Priorities are established through goal formulation where the problem of the allocation of limited resources to competing needs is made explicit, that is, how much of the resource base should be devoted to preventive services as opposed to remedial care, or which sections of the population should receive which services. While the method employs the techniques of analysis and evaluation in those areas of the design process where one would expect to find them it begs many of the larger questions such as "is one person's life of more value to the community than another's or are all lives of equal value?" Nevertheless the rigorous approach to problem definition makes explicit these hard questions of choice, illuminates the alternative courses of action and explains the connections between the various elements of policy.

Paralleling the systems approach to planning has been another movement which emphasises the need to involve people in the processes of decision making. In the United States, Davidoff developed the concept of planning as a method of plan making in a plural society.(24) While in Britain after the Skeffington Report and the incorporation of public participation into the framework of planning legislation in 1968 public participation is becoming a feature of all planning exercises.(25) In other aspects of public life people are seeking to express their views and influence decision making, and health care is no exception. The World

Health Assembly Resolution WHA 23.61 quoted at the opening of this paper went on to state that one of the effective principles for the establishment of a national health system is: "the health education of the public and participation of wide sections of the population in the carrying out of all public health programmes, as an expression of the personal and collective responsibility of all members of society for promoting human health."(26) A recent publication of the World Health Organisation edited by Newell discusses case studies throughout the world where the public have been actively involved in community health programmes which perhaps marks a dramatic change in attitudes to health planning.(27)

The main message of this volume edited by Newell is that great achievements are possible with few resources once the public have understood the problem and have been mobilised to action. For example, in Cuba since the revolution in 1959 and with it the loss of most of its physicians the following improvements in health standards have been achieved:- in ten years infant mortality has been reduced from 12 to 5.5 per 10 000 deliveries, the gastroenteritis mortality rate has dropped from 58.1/10 000 in 1962 to 9.7 in 1973, the tuberculosis mortality rate has dropped during the same years from 19.6/10 000 to 4.1, and malaria was eradicated by 1967.(28)

For large scale public participation in health care one must turn to the experience of China. In the 1930's and 40's the death rate in China was amongst the world's highest with infant mortality running at a rate of 200/1000 live births and a disease pattern associated with an under-developed nation. In 1949 there was one doctor for every 25 000 people and one hospital bed to every 5000 people. 80% of the population lived in rural areas and were without medical care with the exception of traditional medical practitioners.(29)

The health care service which was finally adopted at the close of the revolutionary war was based on the concept developed by Mao Tse-Tung and his peoples army in Kiangsi province in the 1930's which involved mobilising the people to educate themselves and encouraging them individually and collectively to provide their own health and medical care services. The four main tenets of the National Health Policy of 1949 were:

- 1) That medicine should serve the needs of the workers, peasants, and soldiers, that is, the mass of the people
- 2) That preventive medicine should take precedence over curative medicine
- 3) That Chinese traditional medicine should be integrated with Western scientific medicine, and
- 4) That health work should be conducted with mass participation.

The basic idea behind this last tenet of the policy is said to be: "the recognition of a problem important to large numbers of people, the analysis of the problem and recommendation of solutions by technical and political leaders and then - most important - the thorough discussion of the analysis and recommended solutions with the people so that they can fully accept them as their own."(30)

Another important landmark in the development of health policy was a directive from Mao on June 26th 1965 which criticised the Ministry of Health and concluded "In medical and health work, put the stress on the rural areas." This directive and the cultural revolution which followed put a different stress on medical education. Less time was given to it and it became more practical and concentrated more on the common illnesses. Out of this change in direction came the mobile health teams - the "barefoot doctors" in rural areas and the "worker doctors" in the factories. These latter were simply farmers and factory workers with limited medical training who served the basic health care needs of their local communities.

Amongst the many interesting features of China's health care planning are the various campaigns which are organised such as the one to eliminate the four pests, flies, mosquitos, rats and bed-bugs, or the campaigns against specific diseases. In this latter category falls the campaign against schistosomiasis caused by snails, which was based on the conviction that "ordinary people possess great strength and wisdom and that when their initiative is given full play they can accomplish miracles." During this campaign the breeding grounds of the offending snail were systematically drained and filled until the disease was brought under control.

While statistics are not yet available on current health in China, according to Huang Kun-Yen diseases such as smallpox, cholera, typhoid fever and plague are completely eliminated. Venereal disease is practically eliminated and diseases such as malaria are being rapidly brought under control. Tuberculosis, trachoma and schistosomiasis, while not under full control are not as prevalent as they were.(31)

In Shanghai where there are a few statistics available the campaign to reduce the birth-rate appears to be successful. The crude birth-rate is 7/1000 with a death rate of 6/1000 which gives a growth rate of 1/1000 or 0.1%. This compares favourably with other cities where the birth-rate is 10-20/1000 and with the 1956 birth-rate of 40/1000. Life expectancy in the city is now 70 and the main causes of death are cancer, stroke and heart disease, or those of the developed world.

CONCLUSIONS

In the planning of health care the most fundamental requirement is political leadership, which is both fully conscious of the problems, and is infused with a philosophy which can form the basis of a plan of action. Without such leadership health planners will continue "to tinker with the machine" or at best treat only the symptoms: the hard core of the problem will remain untouched and services decline as population rises.

In developing countries, and in fact in developed ones too, the only way forward in health care is on a 'do it yourself' basis. The great accomplishments of community action schemes in many parts of the world indicates that another basic requirement of health planning is the conscious support of the population which means that they must be involved in all aspects of health planning from the outset. The third fundamental requirement of health planning is the setting of accepted priorities. The priorities may vary from place to place and from time to time but such a list could read as follows:

- 1) Emphasis on prevention rather than cure
- 2) Concentration of efforts on the young
- 3) Concentration on the prevention of diseases requiring a low cost input
- 4) Concentration on giving simple medical care to a majority of the population.

The rest of the health planning process follows from these basic tenets and would, of course, involve an all round view of the factors affecting health in which case systems analysis and its associated techniques would be useful in describing and defining problems more clearly and in pinpointing alternative strategies for solving the problems. It would appear from most case studies that health care should be organised in a hierarchical series of territorial units. Health care then would be related to the size of the group so that an auxiliary and a dispensary would serve a few families, several auxiliaries including nurses and midwives in a small health centre may serve several thousands of people and at the top of the hierarchy would be the large metropolitan teaching hospital serving a region or the nation.

And finally in the words of Bryant:

"A special burden rests on the universities, for there resides the potential for defining the necessary directions of change and for educating the leadership that can bring those changes to reality. The changes that are needed call for new phases of technological development, new forms of professional capability, new relationships among health personnel, new approaches to educational problems, and new attitudes of professional and academic people. The most fundamental purposes of universities are involved, and it must be asked how these purposes can be changed."(32)

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