Title	Implications of population growth for education and health in an urban Singapore
Author(s)	Ruth Wong
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Implications of Population Growth for Education and Health in an Urban Singapore

The Nature of the Population Problem

It is sometimes known as the Population Bomb which when it explodes will cause incalculable damage. [See Ehrlich's graphic description attached as Appendix A]

It is a problem which afflicts directly two-thirds of the countries of the world – all of them under-developing.

Singapore may consider herself to have population growth well-under control. Her birth rate has been reduced by half since the immediate post World War II years, because of an effective family planning campaign. She has also attained the level of a developed country. But the population problem is still very real in her case because:

a) she is still overpopulated by the simple criterion that she is not a food-providing country;

b) she may have money, but there must be food purchasable from others; if consumers in the food-producing countries are multiplying faster than the supplies can be mustered, there will not be enough food to spare for Singapore;

c) she is an urban state with extremely high population density of 9,000 persons per square mile and even higher concentrations in the high-rise housing estates;

d) she has a youthful population under 25 years of age. This comprises almost 40 per cent of the total population. As this mass of young people moves into its reproductive years during the next decade or so, the revival of Singapore's baby boom is likely, unless the problem is well appreciated by young people in schools right now.

Implications of the Problem for Health

When there are too many people they create:

a) Space deployment problems

i) space for living tends to be overcrowded; this in turn is likely to produce ill-health physically and mentally; diseases spread more easily – so do evil practices and habits with consequent rise in crime and delinquency rates and their related problems; constant interpersonal friction can occur, bringing with it alienation and frustration; problems of adjustment become more difficult; within an urban setting, the paradox occurs of social relationships becoming more impersonal despite the crowds; meaningful friendships are more difficult to maintain;

ii) space for certain specific activities of man (his work and commuting activities) tend to demand more and more space. Witness, for example, the increasing number of factories and car-parks, the burgeoning highways, the crowded skies, provision of these against living room and more healthful recreational space (required in the form of open parks, swimming pools, etc.) cause health hazards.

b) Effluent disposed problems

More people produce more waste. In Singapore nearly 400 truckloads of refuse weighing some 1,400 tons have to be disposed each day. Each person is calculated to produce about 1.5 lbs of refuse per day and by 1980, according to the Permanent Secretary to the Ministry of the Environment, the total refuse load is expected to increase to 2,100 tons per day. The per capita refuse production would have increased to 1.8 lbs per person. Decaying refuse is a threat to health. Hence its disposal becomes more and more of a problem in a crowded city with limited space and a growing population.

More factories and more cars also generate harmful effluents. Air pollution is a problem which has become very real.

The problem of sewage disposal, if improperly attended to, brings attendant problems of water pollution and waterborne diseases.

c) Problems associated with change in forms of recreational activities

Open air sports and athletics require large land areas. These are at a premium. The more common recreational activities tend to be sedentary – T.V. viewing at home, film-viewing in cinema halls, gambling at home and in dens, drug-taking at sarabat stalls or in designated places (by young people who look for peer company). These activities take more people in less space. They appeal, because in an increasingly impersonal society they permit some form of group participation and community of feeling. They do not, however, provide for the full exercises of the person, whether physically, mentally or socially. Some, like gambling and drug-taking, make for moral decadence and have direct and harmful effects on mind and body.

Implications for Education

a) The school curriculum should be re-examined for its relevance to social needs. It is not just the adding of new topics and new content that is needed. The schools are the nurseries for the nurture of future citizens. What they provide in terms of values is particularly important. Too often we forget the attitudinal and affective aspect of education. We stress the physical and the cognitive. But it is not possible to consider all these aspects as mutual exclusives. The whole person is made up of mind, body, soul and spirit. This has to be remembered.

Hence it is important to consider the specific objectives which the curriculum serves before considering what should be taught.

b) Education as a system tends to be viewed in unrelated parts, viz., pre-school education and adult education are truncated sections isolated from the main system. At the pre-school level, the child learns certain social skills. It is at this stage that seeds

of acceptable behaviour should be sown then the more formal primary/secondary system should continue to nurture the growth that should follow by providing opportunities and situations for the understanding and acceptance of certain norms of behaviour. Into the full system, Adult Education fits as an essential part.

One particular aspect of adult education is seldom mentioned, that is, parent education. If the schools take the responsibility of promoting certain norms of behaviour, their efforts should be understood and supported by parents in the home. Otherwise, children will become confused by multiple sets of criteria and standards of behaviour.

More specifically, then, education for the appreciation of population and health problems must be given at every stage of the child's life and must be supported by every segment of society. The latter condition implies that both formal and informal systems must fully share the responsibility of education and persuasion.

c) Because it is not simply knowledge of the population problem that will ensure the solution of the problem, much more should be done to support precept by example. Coercive measures such as legislation have only occasional effect. Teachers, principals, administrators, parents – all adults should be so convinced themselves of the need to ensure health in a healthy environment that their very responsibility "rubs off" on those who learn. Word-level resolve must be translated into action-level behaviour. Without this, a pure organisation of curriculum, of system and of administration can have but little impact.

d) There is too much rote-learning in the classroom, too little involvement of the pupil. Perhaps educational programmes should incorporate more individual and group project work which will increase the interest of pupils and arrest their attention with respect to contemporary issues such as those under discussion. This will fortify their knowledge and give them some responsibility in the working out of solutions.

Too Many People
by
Paul R. Ehrlich

… The doubling rate at present seems to be about 37 years.[1] Quite a reduction in doubling times: 1,000,000 years, 1,000 years, 200 years, 80 years, 37 years. Perhaps the meaning of a doubling time of around 37 years is best brought home by a theoretical exercise. Let's examine what might happen on the absurd assumption that the population continued to double every 37 years into the indefinite future.

If growth continued at that rate for about 900 years, there would be some 60,000,000,000,000,000 people on the face of the earth. Sixty million billion people. This is about 100 persons for each square yard of the Earth's surface, land and sea. A British physicist, J.H. Fremlin,[2] guessed that such a multitude might be housed in a continuous 2,000-story building covering our entire planet. The upper 1,000 stories would contain only the apparatus for running this gigantic warren. Ducts, pipes, wires, elevator shafts, etc., would occupy about half of the space in the bottom 1,000 stories. This would leave three or four yards of floor space for each person. I will leave to your imagination the physical details of existence in this ant heap, except to point out that all would not be black. Probably each person would be limited in his travel. Perhaps he could take elevators through all 1,000 residential stories but could travel only within a circle of a few hundred yards' radius on any floor. This would pemit, however, each person to choose his friends from among some ten million people! And, as Fremlin points out, entertainment on the worldwide TV should be excellent, for at any time one could expect some ten million Shakespeares and rather more Beatles to be alive.

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1 Since this was written, 1968 figures have appeared, showing that the doubling time is now 35 years.

2 J.E. Fremlin, "How Many People Can the World Support?" *New Scientist*, October 29, 1964.

Could growth of the human population of the Earth continue beyond that point? Not according to Fremlin. We would have reached a “heat limit”. People themselves, as well as their activities, convert other forms of energy into heat which must be dissipated. In order to permit this excess heat to radiate directly from the top of the “world building” , directly into space, the atmosphere would have been pumped into flasks under the sea well before the limiting population size was reached. The practise limit would depend on the technology of the day. At a population size of one billion billion people, the temperature of the “world roof” would be kept around the melting point of iron to radiate away the human heat generated.

But, you say, surely Science (with a capital “S”) will find a way for us to occupy the other planets of our solar system and eventually of other stars before we get all that crowded. Skip for a moment the virtual certainty that those planets are uninhabitable. Forget also the insurmountable logistics problems of moving billion of people off the Earth. Fremlin has made some interesting calculations on how much time we could buy by occupying the planets of the solar system. For instance, at any given time it would take only about 50 years to populate Venus, Mercury, Mars, the moon, and the moons of Jupiter and Saturn to the same population density as Earth.[3]

What if the fantastic problems of reaching and colonizing the other planets of the solar system, such as Jupiter and Uranus, can be solved? It would take only about 200 years to fill them “Earth-full.” So we could perhaps gain 250 years of time for population growth in the solar system after we had reached an absolute limit on Earth. What then? We can’t ship our surplus to the stars. Professor Garnett Hardin[4] of the University of California at Santa Barbara has dealt effectively with this fantasy. Using extremely optimistic assumptions, he has calculated that Americans, by cutting their standard of living down to 18% of its present level, could in one year set aside enough capital to finance the exportation to the stars of one day’s increase in the population of the world.

Interstellar transport for surplus people presents an amusing prospect. Since the ships would take generations to reach most stars, the only

people who could be transported would be those willing to exercise strict birth control. Population explosions on space ships would be disastrous. Thus we would have to export our responsible people, leaving the irresponsible at home on Earth to breed.

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3 To understand this, simply consider what would happen if we held the population constant at three billion people by exporting all the surplus people. If this were done for 37 years (the time it not takes for one doubling) we would have exported three billion people – enough to populate a twin planet of the Earth to the same density. In two doubling times (74 years) we would reach a total human population for the solar system of 12 billion people, enough to populate the Earth and three similar planets to the density found on Earth today. Since the areas of the planets and moons mentioned above are not three times that of the Earth, they can be populated to equal density in much less than two doubling times.

4 "Interstellar Migration and the Population Problem" *Heredity*, 50, 68-70, 1959.

Appendix B

The Tragedy of the Commons
by
Garrett Hardin

TRAGEDY OF FREEDOM IN A COMMONS

The rebuttal to the invisible hand in population control is to be found in a scenario first sketched in a little-known pamphlet[1] in 1833 by a mathematical amateur named William Forster Lloyd (1794-1852). We may well call it “the tragedy of the commons,” using the word “tragedy” as the philosopher Whitehead used it[2]: ‘The essence of dramatic tragedy is not unhappiness. It resides in the solemnity of the remorseless working of things.” He then goes on to say, ‘This inevitableness of destiny can only be illustrated in terms of human life by incidents which in fact involve unhappiness. For it is only by then that the futility of escape can be made evident in the drama.”

The tragedy of the commons develops in this way. Picture a pasture open to all. It is to be expected that each herdsmen will try to keep as many cattle as possible on the commons. Such an arrangement may work reasonably satisfactorily for centuries because tribal wars, poaching, and disease keep the numbers of both men and beast well below the carrying capacity of the land. Finally, however, comes the day of reckoning, that is, the day when the long-desired goal of social stability becomes a reality. At this point, the inherent logic of the commons remorselessly generates tragedy.

As a rational being, each herdsmen seeks to maximise his gain. Explicitly or implicitly, more or less consciously, he asks, “What is the utility to me of adding one more animal to my herd?” This utility has one negative and one positive component.

1. The positive component is a function of the increment of one animal. Since the herdsmen receives all the proceeds from the sale of the additional animal, the positive utility is nearly + 1.
2. The negative component is a function of the additional over-grazing created by one more animal. Since, however, the effects of overgrazing are shared by all the herdsmen,

the negative utility for any particular decision-making herdsmen is only a fraction of – 1.

Adding together the component partial utilities, the rational herdsman concludes that the only sensible course for his to pursue is to add another animal to his herd. And another; and another …. But this is the conclusion reached by each and every rational herdsman sharing a commons. Therein is the tragedy. Each man is locked into a system that compels him to increase his herd without limit – in a world that is hidden. Ruin is the destination toward which all men rush, each pursuing his own best interest in a society that believes in the freedom of the commons. Freedom in a commons brings ruin to all.

Some would say that this is a platitude. Would that it were! In a sense, it was learned thousands of years ago, but natural selection favors the forces of psychological denial.[3] The individual benefits as an individual from his ability to deny the truth even though society as a whole, of which he is a part, suffers. Education can countered the natural tendency to do the wrong thing, but the inexorable succession of generations requires that the basis for this knowledge be constantly refreshed.

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1. W.F. Lloyd. Two Lectures on the Checks to Population (Oxford Univ. Press, Oxford, England, 1833), reprinted (in part) in Population, Evolution, and Birth Control, G. Hardin, ed. (Freeman, San Francisco, 1964), p. 37.
2. A.I. Whitehead, Science and the Modern World (Mentor, New York, 1948), p. 17.
3. G. Hardin, Ed. Population, Evolution, and Birth Control (Freeman, San Francisco, 1964), p. 56