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POPULATION AND  
DEVELOPMENT**

(July 28—30, 1971)



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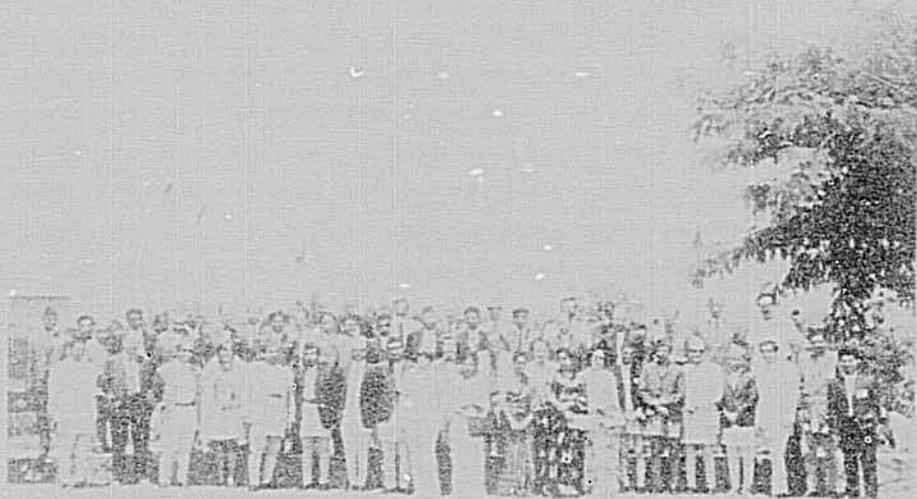
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Participants of the seminar on "Population and Development."

**PART I**

**BACKGROUND OF THE SEMINAR**

**Chapter 1 - Preface**

**The Aims and Objectives of the Seminar,  
by Executive Director Pashupati Shumshere  
J. B. Rana**



## PREFACE

### The Objectives of the Seminar -

(The Welcome Speech to the Seminar)  
by the Executive Director Pashupati Shumshere J. B. Rana

The Malthusian spectre once again haunts the world. This tide of overpopulation seems in special danger of overwhelming the tentative beach-heads of modernisation established at such cost and effort by the underdeveloped world.

This bleak tide has reached even landlocked Nepal. The present population growth rate is two percent. But if fertility remains unchecked, projections show that the population will double by 2000 A.D. The average annual growth rate increased from 1.4 percent in 1961-62 to two percent in the late sixties. On the other hand the dependency ratio has increased from 77 percent in 1952-54 to 81 percent in 1961-62. Clearly population growth is a problem that deserves the attention of major policy makers. Yet it is not for these reasons alone that CEDA was impelled to organize a seminar on "population and development". It was principally for two other reasons that we wished to organize a forum in which distinguished representatives from so many walks of life could exchange opinions and ideas.

First, in this seminar CEDA hopes to see a genuine dialogue begun between the leaders of the various sectors of opinion in Nepal; politicians, businessmen, leading civil servants, intellectuals, technicians and journalists. It is common for each of these groups to meet on their own to discuss specific problems - it is also not uncommon for members of these groups to meet each other. But it is certainly uncommon for these groups to meet in an organized forum to discuss a specific policy issue. It is our belief that the disciplined focussing of brilliant minds from so many different walks of life will provide a rich experience for the participants and productive policy suggestions for the problem in hand.

Secondly, it may be asked why we choose population as the area of focus. This is because the problem of population is the problem of policy planning par excellence. It is becoming increasingly obvious after many years of family planning that the technical and capital investment aspects of the population problem are essentially permissive features. You can work out all the means of making the various contraceptive devices available to villagers, and bring all your propaganda efforts to focus on this area, but this is all a question of leading a horse to water. Whether the horse drinks or not remains a private family decision. And what makes millions of husbands and wives decide in favour of, or against, family planning remains an area of mystery hardly plumbed by research. The factors that influence such decisions may well be much more a correlate of life-expectancy, of property distribution laws, of employment policies in the service sector or of policies in other areas, such as education. For instance the less the parent conceives of the child as an addition to the farm labour force and the more he visualises him as an investment burden to be sustained through the educational period, the greater the likelihood of a family limiting births. This view is not a variable of either the availability of birth control devices or even of propaganda; it results from other broad factors that determine the socio-economic role of a child in a given environment.

It is because we have to conceive of population policy as a sub-system of the total matrix of national policy-making. It is because we have to emphasise as much the policies of various other departments such as education, industry, labour, forestry, and resettlement in thinking of population, that it lends itself naturally to this wide forum of discussion. This seminar is not concerned with the technical aspects of family planning. It is concerned with policy-planning. The importance of this is being increasingly felt in Nepal today. Only the other day Mr. K. B. Malla, the Chief Secretary of Nepal, said to me that had we devoted half as much time in the last decade to the planning of the policy framework as we have to the planning of public investment, our performance and delivery systems would be twice as effective today. And it is because CEDA wholeheartedly agrees with that statement that we chose to look at population, and at population in this particular way.

## PART II

### Chapter II - INTRODUCTORY SESSION

1. Demographic Aspects of Development in Nepal,  
by Dr. Harka B. Gurung.
2. Projected Costs and Benefits of Population  
Control by Dr. Stephen Enke.
3. Floor Discussion.
4. Summary of the Session.

## Demographic Aspects of Development in Nepal

by Dr. Harka B. Gurung

The objective of development planning is to increase the rate of economic growth and social progress by eliminating impediments to this comprehensive goal. Economic growth implies an increase in production per unit of labour and labour efficiency depends on the quality of population. The problem of enskilling the population through education and training becomes harder with an increasing population burdening the available resources. Among the various factors of economic development such as social and political organization, technical innovations and entrepreneurial initiative, terms of trade, export market and foreign assistance, the population size and composition plays an important role. Population growth due to a high birth rate not only reduces savings but also affects the productive labour force. Development is essentially addressed to the benefit of the population and the measure of its success is reflected in the living standard of the people. Insofar as economic growth is negated by population growth, development efforts must encompass demographic dimensions. Development again involves change in terms of alternatives and this in turn requires a study of existing patterns and processes.

With an average density of 173 persons per square mile, Nepal is a fairly densely populated mountain country. The population is unevenly distributed between the Mountains, the Hills, Inner Terai and the Terai. These broad divisions further yield regional differences from the eastern sector to the central sector and western sector, regions roughly corresponding to the drainage basins of the Kosi, Gandaki and Karnali rivers respectively.

The Mountain and Hill regions covering 73 percent of Nepal's total area supports 58 percent of the total population with an average density of 137 persons per square mile. It is necessary however to distinguish two sub-regions within this extensive division; (1) the Bhotia valleys north of the main Himalaya and (2) the Hill (Pahar) complex lying between the high Himal and the Mahabharat Lekh. The Himalayan subdivisions are all about 3,000 metres in altitude and offer wild and forbidding landscape. The high ranges above 3,500 metres are under permanent snow and therefore devoid

of human habitation. The Bhotia valleys with a harsh environment support a sparse population of seasonally migratory groups and the density rarely exceeds 25 per square mile.

The Hill or Pahar region lying between 900 metres and 3,000 metres has been the traditional centre of Nepalese population where hillsides have been sculptured into flights of terraced fields and transhumant flocks of sheep and cattle forage the temperate highlands (Lekh). In the broad Hill region, the population concentration, about 125 persons per square mile, is mainly below 1,500 metres. However, there are local variations ranging from 82 persons per square mile in Baglung to 462 persons per square mile in neighbouring Syangja district. Though lying in the hilly region, Kathmandu Valley supports a dense population owing to its rich soil and metropolitan advantages. Kathmandu Valley covers a mere 0.4 percent of the total area of this region, but claims 4.9 percent of total population. The average density of the Valley region is 2,110 persons per square mile and urban density even exceeds 50,000 persons per square mile. In the Terai region adjacent to the Inner Terai, the average density is 311 persons per square mile, though there are local differences such as 30 persons per square mile in Kanchanpur and 679 persons per square mile in Sirha. The Terai region is a low lying plain below 300 metres in altitude and rich in agricultural, forest and industrial resources. This region therefore, though only 21.1 percent of Nepal's total area, supports 33.0 percent of the total population.

There are equally interesting inter-sectoral differences in population distribution indicating a definite advantage of the wetter (1,778 mm average annual rainfall) Eastern part over the drier (762 mm average) Western part of the country for human occupation. In the Mountains and Hills population density varies from 186 in the eastern sector to 175 persons in the central sector and 90 persons in the western sector. In the Terai also there is a decrease in population density from 432 in the eastern sector to 306 in the central sector, and 95 in the western sector. Only in the limited area of the Inner Terai is the general pattern reversed, with density increasing as you go westward. But here the difference in density between the eastern and western sector is minor compared to the greater distinctions among the eastern and western sector of the Mountains and Hills and Terai regions.

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Table 1  
Population by Geographic Regions

Region	Area sq.mile	% of Total Area	Population 1961	% of Total Population	Density Per sq.mile
1. Western Mountains and Hills	19,616	36.0	17,96,690	19.2	91
2. Central Mountains and Hills	11,144	20.5	19,46,502	20.6	175
3. Eastern Mountains and Hills	11,943	21.9	20,80,388	22.0	174
4. Western Terai	2,843	5.2	2,71,551	2.8	95
5. Central Terai	3,483	6.5	6,44,593	6.7	185
6. Eastern Terai	5,115	9.4	22,13,282	23.5	432
7. Kathmandu Valley	218	0.4	4,59,990	4.9	2,110
Nepal	54,362	100.0	94,12,996	100.0	173
Mountains and Hills	42,703	78.3	58,23,580	61.8	136
Terai	11,081	21.1	31,29,426	33.0	282

Table 2  
Sectors in Comparison

Sector (River Basin)	Area sq. mile	% of Total Area	Population 1961	% of Total Population	Density Per sq. mile
1. Eastern (Kosi)	17,058	31.3	42,93,670	45.3	253.9
2. Central (Gandaki)	14,627	26.9	25,91,095	27.5	177.1
3. Western (Karnali)	22,459	41.9	20,68,241	21.9	92.0
4. Kathmandu Valley	218	0.4	4,59,990	4.9	2,110.0

In cumulative terms, Table 2 clearly shows the heavy concentration of population in the eastern third of the country. The eastern sector (including the eastern Mountains and Hills, the Eastern Inner Terai and Eastern Terai) covers 31 percent of the total area compared to the 41 percent of total area covered by the Western sector. But in terms of population, the Eastern sector has nearly half the total population of the country while the Western sector has only 21 percent of the total population. Both in terms of area and population, the Central sector falls below the Eastern sector but above the Western sector and thus represents a transitional zone. The same pattern is evident in population density; the Eastern sector has twice as high a density (253 persons to a square mile) as that of the Gandaki sector (177) and three times as high as that of the Karnali sector (92).

The total population increased by 73.8 percent between 1911<sup>1/</sup> and 1961 but the progression is extremely irregular (Table 3). The total figure reported in 1911 was not exceeded even in the 1930 census two decades later. In fact, the 1.9 percent population decline during 1911-1930 period was more accentuated than that for the 1911-1920 period. It is hard to attribute this extended population decline merely to Gurkha casualties during the First World War and the influenza epidemic of 1918. The explanation must be sought in either over-enumeration during the base year (1911) and under-enumeration in the subsequent censuses or both. The first increase was seen in the 1941 census: it showed an increase of 11.7 percent over the 1930 census and only 9.5 percent over the 1911 census figure. The subsequent increase of 34.8 percent during post-1941 decade was three times that of the pre-1941 decade. But this

Table 3  
Population Change, 1911 to 1961

Year	Total Population	Absolute Change	Percentile Change
1911	56,38,749	-	-
1920	55,73,788	-64,061	-1.1
1930	55,32,564	-41,224	-0.7
1941	62,83,649	+7,51,085	+11.7
1952/54	84,73,478	+21,89,829	+34.8
1961	97,99,820	+13,26,432	+15.6

<sup>1/</sup>The first recorded census of Nepal was taken in 1911 and continued thereafter at intervals of about ten years.

unusual demographic pattern cannot be supported by the contemporary social and economic situation in the country. The unusual increase during 1941-1952/54<sup>2/</sup> become even more apparent when compared to the more reliable figure for 1952/54-1961 period which shows a percentile increase of 15.6 percent.

We are on surer grounds dealing with the 1952/54 and 1961 censuses in spite of the fact that the former census has been suspected of under-enumeration by at least 10 percent. The two censuses also facilitate comparison on regional as well as census district levels. The absolute and percentile population increase in the ten regions and their respective order is summarized in the following table:

Table 4  
Population Growth by Regions, 1952/54-1961

Region	Absolute Increase	Percentile Increase
1. Eastern Hills	1,77,955	10.0
2. Central Hills	1,92,379	10.9
3. Western Hills	1,81,309	11.2
4. Kathmandu Valley	48,995	11.9
5. Eastern Inner Terai	4,338	2.2
6. Central Inner Terai	46,279	23.2
7. Western Inner Terai	9,292	10.4
8. Eastern Terai	4,07,233	21.4
9. Central Terai	52,178	14.0
10. Western Terai	36,362	15.4
Nepal	11,56,371	15.6

<sup>2/</sup>The country was divided in two divisions for the census. The Eastern half was enumerated in 1952 and the Western half in 1954.

In regional terms, the largest absolute gain has been in the Eastern Terai followed by the Hills, with the Inner Terai regions further down in the order. However percentile increase has been largest in the Central Inner Terai including the Chitwan Valley where a resettlement scheme was started in 1954. Next come the three Terai regions, all of which exceed the national average in percentile growth. Contrary to the 1941-1952/54 pattern, the Hills lag behind in percentile increase. This is the first indication of the increasing importance of the Terai belt for development and settlement.

In terms of census districts, Biratnagar shows the largest absolute gain closely followed by Mahotari and Hanumannagar. With the exception of Tehrathum and Salyan, the Hill districts had a moderate increase in population. The lowest absolute increase was recorded in the four Inner Terai districts and the three Terai districts in the Western sector. The highest percentile increase was recorded in Chitawan district where people from Central Hills have settled in considerable number. Next in order, the Terai districts of Sarlahi, Parsa and Majhkhand also show fairly high relative increase. Most of the Hill districts have a moderate increase. Baitadi has, however, an unusual relative increase of 20.2 percent while on the other hand Lamjung shows low growth. The Eastern Inner Terai districts of Sindhuli and Udayapur both have the lowest relative population increase. In general absolute gains are more apparent in high density districts whereas regions of low density show a higher percentile increase.

Natural increase is highest in the Central Inner Terai and lowest in the Central Terai. In terms of annual rate of increase, however, the Terai regions supersede all the Hill regions including Kathmandu Valley. The population increase in the Terai has been constituted both by settlers from the Hills as well as from India. The three Terai regions have the highest percentage of foreign-born population: Central Terai 19.6 percent, Eastern Terai 9.8 percent and Western Terai 6.3 percent. The Terai region receives immigrants to the order of 6 to 19 percent and largest intake is in the Western Terai.

Population increase during 1952/54-1961 points to the process of descent to the lower elevations. Since the 1952/54 Census, the Nepalese population has increased by 15.6 percent with the broad pattern of relative increase of 11 percent in the Mountains and Hills, 12.8 percent in the Inner Terai and 20.7 percent in Terai (Table 1). The lower humid valleys that were once endemic malaria zones have since been transformed into attractive areas for settlement by modern innovations. In recent times, the extensive forest belt of the Chure Hills and the Terai Plain has been experiencing a heavy encroachment of in-migration. According to one reliable estimate, nearly 60 percent of the total population now lives in areas below 1,200 metres elevation.

The relative population increase in the lower valleys and plains where transportation is easier has also meant an increase in circulation. Increase in circulation has encouraged commerce and industries in the more accessible areas. All these in turn have led to concomitant urbanization and an increase in the number of towns. During the 1952/54 census there were ten towns with a population exceeding 5,000 inhabitants located about half in the Kathmandu Valley and half in the Terai plains. The number of such large settlements increased by 1961 to 16 and taken together they account for 3.6 percent of the total population.<sup>3/</sup>

Half of these large settlements are located in the Terai and of these, one is in the Western Terai and the remaining seven are confined to the Eastern Terai region. Kathmandu Valley has five such settlements and three of these are of large magnitude. The three towns of the Hills region occupy the lower end of the scale in the population size. There has been a shift of population from the traditional centre of the Central Hills region

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- <sup>3/</sup>(1) Kathmandu (1,21,019); (2) Lalitpur (47,713); (3) Biratnagar (35,355); (4) Bhaktapur (33,877); (5) Nepalgunj (15,817); (6) Dharan (13,998); (7) Birgunj (10,769); (8) Thimi (9,719); (9) Banepa (5,688); (10) Janakpur (8,928); (11) Malangwa (6,721); (12) Kirtipur (5,764); (13) Pokhara (5,413); (14) Rajbiraj (5,232); (15) Tansen (5,136); (16) Matihani (5,073).

to the south-eastern part of the country. Kathmandu is still a dominating metropolitan centre but present development trends indicate a high growth potential for the Eastern Terai region.

The Terai continues to be a high population growth area. During the inter-censal period 1961-71, population increase in the Mountain and Hill regions did not exceed 17 percent and the highest growth rate was 1.76. During the same period, the increase in the Central and Eastern Terai was a third of the 1961 base and population doubled in the Western Terai (see Table 4). Let's

Table 5  
Population Growth by Regions, 1961-71

Region	Absolute Increase	Percentile Increase	Growth Rate
1. Western Mountains and Hills	2,12,118	11.8	1.18
2. Central Mountains and Hills	3,86,195	16.6	1.76
3. Eastern Mountains and Hills	1,41,422	6.7	0.68
4. Western Terai	1,42,896	52.6	5.3
5. Central Terai	3,23,198	32.0	3.2
6. Eastern Terai	5,44,980	33.9	3.4
7. Kathmandu Valley	1,26,430	27.2	2.7
Nepal	18,72,243	19.9	2.0

Note: The Western Inner Terai (Surkhat + Dang) are included in Westerns Hills, Central Inner Terai (Chitawan) in Central Terai and Eastern Inner Terai (Sindhuli and Udayapur) in Eastern Hills.

look at sample districts whose census boundaries have remained unchanged since 1952. The population increases in the Terai districts of Banke and Parsa were 47 percent and 78 percent respectively, while in the Hill districts population increased only by 33 percent in Dandeldhura and 20 percent in Ilam during 1952/54-1971. The growth rates in the Terai even exceed those of the urban areas of Kathmandu Valley and this may indicate an increase of urbanization in the Terai region. Urban growth in the three major cities of Kathmandu Valley was on the order of 26.7 percent for Kathmandu, 23.4 percent for Patan and 20 percent for Bhaktapur for the decade 1961-1971. The percentile increase since 1961 was only 12.6 for the Mountains and Hills, while in the Terai it was 32.3 percent.

Nepal has today a total population of 11.2 million. With an average density of 207 persons per square mile, Nepal is one of the most populated mountain countries. Its population is three times that of Afghanistan or Ethiopia and four times that of Bhutan or Ecuador.<sup>4/</sup> If one goes beyond these crude densities, Nepal has indeed very little room to manoeuvre. Of the total land area of the country, 40 percent is unusable being either too high or steep and another 30 percent is under forest

4/

Country	Population in Lakhs (est 1969)	Birth Rate/ 1,000	Death Rate/ 1,000	Growth Rate	Population to double in Years	G.D.P. in \$
Nepal	109	41	21	2.0	35	70
Afghanistan	165	-	-	2.3	31	70
Ethiopia	244	-	-	2.0	35	60
Equador	58	45	11	3.4	21	190
Swiss	62	17.7	9.0	0.9	78	225.0
Austria	74	17.4	13	0.5	140	115.0

cover. The country's low level of living is apparent from the fact that over 90 percent of the population subsists on agriculture where only 13 percent of the total land area is said to be cultivated land. Area under effective agricultural use may be underestimated or the agriculture sector may mask a sizable labour force employed elsewhere, but it cannot be denied that a limited amount of productive land has to support a high population density<sup>5/</sup>. The pressures on land will increase through time as population increases at a higher rate. It has taken 60 years to double the population since 1911, but it will take only half as much time to double it again with the current growth rate.

The high man/land ratio in Nepal is combined with an extensive type of land use. The problem is not only one of more people per unit of agricultural land but output per unit is low. Yet for many years to come, agriculture will remain the main determinant of national levels of income and living. Industrial growth and trade expansion will be less amenable to internal manipulation owing to the land-locked situation of the country and work opportunities in non-agricultural sectors will be limited compared to the population growth.

Agriculture will continue to be a major employment sector for the increasing labour force. Expansion of agricultural land through reclamation and settlement as well as yield augmentation through inputs involves public investment. But the sheer magnitude of people consuming larger welfare outlays for existing and future entry components will tend to limit the rate of savings for productive investment. Even more important than the quantitative aspect seems to be the structure and quality of the people. High fertility will yield a high dependency ratio and a decrease in per capita income. A high dependency ratio will put an increasing burden on the nation's capacity to provide educational facilities on a larger scale as the extent and coverage of education will determine the quality of population that enters the labour force later.

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<sup>5/</sup> Agricultural density in the Hill region is about four times that of the Terai region.

Nepal does have its population problem. The present level of living is sustained to a certain extent by external employment opportunities. Demographic trends in the neighbouring countries indicate that this avenue of employment will decrease in the near future. A country committed to development cannot afford to dole out its meagre resources for the mere survival of the increasing population. Since population is one of the most important variables of economic development, it should be tackled through conscious planning and in time. It has been experienced that a high rate of population growth may not only retard but even negate economic advance. However, with the increasing exposure to other's experiences and assistance, it has been said population growth need no longer be the rock upon which all efforts to plan for economic and social development are wrecked.

Determination of population size and growth in consonance with the country's development aspirations demands a planned effort at all levels. Family planning programs aimed at reducing birth rate can be made effective only by instituting other supporting measures. Statistical compilation of the population census and other surveys need to be analyzed rigorously in order to evaluate demographic patterns and processes. The household and the family have to be studied as economic systems. Birth control notions may fail to influence poor societies where the family acts as a provident fund and schooling may be considered a liability to the opportunity cost of child labour. An effective social security system may offset the subsidization of child rearing that stimulates fertility in some measure. Finally official goals in matters of population growth must be fully clarified. Policy formulations may incorporate such aspects as employment of women, legislation on abortion, anti-natal mortality fiscal measures, immigration control and internal migration but they should be set out clearly both in short and long term perspectives. Finally, official goals in matters of population must be fully clarified and pursued in a comprehensive manner.

Projected Costs and Benefits of Population Control

Summary of Remarks made by Dr. Stephen Enke

Dr. Stephen Enke presented a brief summary of the GE Tempo Model<sup>6/</sup> relating population and development. The model takes data as of 1971 and projects 30 years into the future. Two fertility conditions form the basis of the projections: (1) high or constant fertility with a crude birth rate of approximately 40/1,000 or a gross reproduction rate of 2.5 percent and (2) declining fertility with a gross reproduction rate of 1.25 percent.<sup>7/</sup>

Using these two rates the model provides the following projections for the year 2001: (1) age/sex distribution, (2) demographic consequences of declining fertility in Nepal, (3) economic consequences of declining fertility, and (4) the pay-off of family planning in economic terms.<sup>8/</sup>

With regard to the projected age distribution, the low fertility case results in a less-pyramid shaped population structure, i.e., with a crude birth rate (CBR) of 40, approximately 40 percent of the population will be below 15 years of age; while with a CBR of 20, only approximately 20 percent of the population will be below 15 years of age. This is important since the objective is to reduce the dependent age population/working age population ratio. A large proportion of children increases the dependency burden and reduces the resources available for investment or increased consumption.

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<sup>6/</sup>"GE Tempo Model", California, General Electric's Center for Advanced Studies, U.S.A.

<sup>7/</sup>cf. Appendix 2.2.

<sup>8/</sup>Ibid, Appendix 2.2

The demographic consequences of declining fertility in Nepal are seen in terms of total population, dependent population, and school-age population. With constant fertility, the projected population in 2001 is 22 million; while with declining fertility, the projection is 16.7 million. The difference in dependent population is more noticeable: 9.1 million in 2001 with constant fertility and 5.0 million with declining fertility.<sup>9/</sup> A major policy question emerges out of this information: Will Nepal try to educate everyone or only a select few?

With regard to the economic consequences of declining fertility in Nepal, the model generates values for per capita income, savings, investment, etc. over the 30 year period. As the proportion of children declines, resources are released for consumption by others or for savings and investment. Per capita GDP is Rs.890 in 1971 -- with declining fertility, annual savings and investment increase rapidly and per capita GDP is projected to reach Rs.1,897 in 2001. In contrast, with constant fertility, this value will be only Rs.1,453. Similarly, projections show investment to be Rs.4,332 million with declining fertility and Rs.3,657 million with constant fertility.

The model also relates rates of return on investment in family planning and other fields. It is assumed that it costs Rs.500-600 to prevent a birth. If this same amount were invested in an irrigation or "other" project with a 10 percent return, then the return on family planning investment would be 120 times as great in terms of per capita income (or 75 times as great when "other" investment has return of 15 percent).

The model emphasizes that development is increased per capita income. This can be achieved by increasing the numerator (national income), decreasing the denominator (population) or both; this requires a policy choice to be made. However, the model claims that it is more effective to cause the population to increase more slowly than to cause the national income to increase more quickly.

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<sup>9/</sup>op. cit., Appendix 2.2.

As emphasized by Dr. Enke, the results of declining fertility take a long time to be evidenced; however, policy makers must recognize these long-term benefits. If Nepal is "to make it," it must reduce the fertility rate. If it doesn't, Nepal may be driven to the situation where its chief export is cheap surplus labour.

#### Nutrition

During recent years the food intake per capita has apparently not increased. The short stature of many Nepalese may indicate a protein deficiency that can affect mental as well as physical development. Hopefully Nepalese will be able to consume more protein through meat, poultry, and dairy products, all of which make a heavy indirect use of cereals. If the people of Nepal are to enjoy a 2.0 percent annual improvement in diet, measured in cereal production requirements, the cereal output will have to quadruple by AD 2000 even with a minimum population increase.

#### Education

The prospective increase in school age population makes achievement of 100 percent school enrollment a dream for this century. There are now about 5,00,000 children in school. Universal schooling would mean a sevenfold increase in attending children if fertility were slowly halved and an elevenfold increase if fertility remains unchanged. Given the usual attrition of teachers, the teacher training requirements would be enormous, and probably impossible. Hence hard decisions must be made as to which categories of children should have priority access to education. Should more children be given fewer years of education or fewer children be given more years schooling? To what extent should boys be preferred over girls where teachers and schools are scarce? Moreover, what kind of education is most needed, and should it not include less that is academic and more that is "practical" (including schooling in agricultural practices and family planning).

#### Other Consequences of Population Pressures

Visual evidence of already existing overpopulation includes deforestation, erosion, and silting. Within the last decade, wooded hill-tops have been cut down or severely depleted, terraces have been extended to the tops of hills, and cattle have had to graze further away. In some areas hill-top terraces have leached-out, have been abandoned, and have started to collapse on terraces below. Villagers often have to go much further to cut fodder for animals. The complex interaction of wood for fuel, cattle for manure and draught, and manured terraces for rice, etc. is becoming increasingly vulnerable to overcrowding of the Hill areas. If conditions worsen, areas now cultivated will have to be abandoned. "Fragmentation" of land holdings will increase, a class of landless wage-workers will evolve, and litigation over rights to land use will increase. The traditional Hill culture of Nepal could begin to erode even as the terraces are already eroding.

### Floor Discussion

The ensuing discussion fell into two major categories (1) the GE Tempo Model and its implications for the optimal pattern of investment and (2) the role of family planning and attitudinal factors in reducing fertility.

With regard to the Model and the pattern of investment, the following questions and comments were raised:

- (1) Explaining a request made by K. N. Pyakuryal to clarify the 120 times figure, Dr. Enke pointed out that this had been calculated for thirty years, assuming a rate of return of approximately 10 percent in other investments. The return of 120 times is valid only in the case of 30 years, and this figure significantly declines if we consider a smaller time period. The details will be evident if one studies the Tempo Model.
- (2) Messrs. B. P. Shrestha, G. P. Lohani, B. B. Pradhan, and N. K. Shah all raised questions about the pattern of investment in the model. The model is based on an assumption that changes in the fertility rate and the demographic structure will automatically lead to changes in savings, investment, income, etc. However, results depend upon how the Government reacts to such changes. There is no guarantee that declining fertility will lead to a higher level of economic development without certain decisions by the Government and society. High fertility obviously inhibits development, but it is not necessarily a corollary that declining fertility contributes to development.

While not wanting to deny the returns on investment in family planning, how does one determine the optimum investment between family planning and other development areas? Furthermore, what level of investment can be efficiently utilized in FP?

A further related question raised by Mr. G. P. Lohani concerning the pattern of investment is related to the time span of returns and the possible inflationary tendencies of FP investment. The returns on FP investment are slow in appearing, yet expenditures continue to be made. Since these financial resources are often from foreign aid and exogenous to the domestic economy, the immediate and short-term effect of investment in FP can be inflationary.

Dr. Enke replied to these questions by saying that the model has been used all over the world and that results have always been similar. The model is very insensitive to changes in the functional parameters (e.g., elasticity coefficients in Cobb-Douglas function) -- i.e., the overall results do not change with these changes in variables.

With regard to the optimal pattern of investment, Dr. Enke said that the problem is not a real one since it is not necessary to spend very much on FP. Of every 100 people, 40 are children. Of the remaining 60, only about 20 (10 couples) are of child-bearing age and desirous of controlling fertility. Therefore, the target figure is only 10 out of every 100 persons. He further stated that FP can never be a real competitor to other investment resources, especially since estimates are Rs.500-600 to prevent a birth. Think of the investment needed to provide an income for that person. It is cheaper to prevent the birth of the child than to provide the necessary investment to generate an average per capita income.

With regard to the inflationary aspects of investment in FP, Dr. Enke explained that there are multipliers for both monetary and resource effects. He also stated that since FP investment will not be financed by deficit spending, it will not be inflationary.

Mr. Pashupati Shumshere J. B. Rana tried to emphasize that FP per se is not the only means of preventing birth. The provision of commodities and services is not the only cost. What other things influence the decisions of families about family size? What are the costs of these things? What other investment must accompany investment in FP?

These questions initiated a discussion about family planning and the role of attitudinal factors in lowering the fertility rate. Dr. Cool stated that the conference is concerned with non-contraceptive means of decreasing fertility and influencing people to avoid having more children. The presence or absence of contraceptives is not the major variable in the equation. Rather, there are factors such as the level of female education, the pattern of land inheritance rights, and the levels of monetization and urbanization. Dr. Cool also introduced the idea of the "real costs of children". As Government takes over responsibility for education, housing, health, etc., these costs are taken away from parents. This is to suggest that perhaps the costs of off-spring should be returned to parents and their decisions to have more children would be negatively influenced. Related to this, Dr. Enke asked whether it would help to require people to pay for the educational costs of all children other than one son. Dr. P. Pradhan said this would not make a significant difference; parents would merely not send children to school.

This question of convincing rural people to limit family size was discussed in several aspects:

1. Dr. P. Pradhan mentioned the middle class bias inherent in a desire to limit family size. He also suggested looking at the institutional changes necessary to achieve declining fertility.
2. Dr. Beyer asked the participants to discuss the factors which will effect parents' decisions to have children. Is the benefit of smaller sized families sufficiently large to ask people to pay for health services at full cost? (This is related to Cool's earlier remarks.)
3. Answering Mr. W. C. Ide, Dr. Gurung said that he did not see a strong ethnic influence on family size. He did mention that a smaller number of children seems to be related to nuclear family predominance, while a larger number of children is associated with extended family communities.

As a corollary, nuclear families tend to predominate in the more rural areas of Nepal.

4. The significance of religious influence on attitudes toward family planning was discussed by several persons - Dr. Rita Thapa, B. B. Pradhan, Mr. J. B. Shrestha, Dr. Vaidya, and Mr. Chitra Bahadur K.C. There was no consensus of opinion.
5. The need for legal restrictions on family size and the legalization of abortion were also discussed. Dr. Thapa and Dr. Vaidya both spoke of the presence of illegal abortions in Nepal today and the need to legalize abortions. They said legalizing abortions in hospitals would save the lives of women, as well as contribute to population control. Mrs. Kamal Rana disagreed with the legalization of abortion. She said that there are not enough qualified medical officials at the district level, that Nepal cannot have legalized abortion without enough qualified physicians and midwives to conduct the operations.
6. Related to the arguments for abortion were the arguments of Mr. J. B. Shrestha and Mr. Rawal stating the need for legal restrictions on family size (or sterilization). They felt that with a large illiterate rural population, an imposition from above is the only way to curb population growth.
7. The need for integrated family planning and health services in the rural areas was also discussed by Dr. Jagadish Sharma, Mr. Chitra Bahadur K.C., Dr. B. P. Shrestha, Mr. Upadhyaya, Dr. Kim, Dr. Shah. As pointed out by Dr. B. P. Shrestha and Dr. Rita Thapa, the current high rate of infant mortality necessitates a high birth rate. Since approximately 54 percent of all children under five years of age die, parents must have six to seven children in order to have three grow to adulthood. As stated by Dr. Kim, the survival of children is an important factor in declining fertility rates. In order to guarantee the survival of children, there must be improved health services. Family

planning must be combined with the establishment of comprehensive health services if people are to be motivated to accept FP. As pointed out by Dr. Shrestha, the rural community must be instructed in the importance and significance of a declining infant mortality rate. Also, as pointed out by Dr. Thapa and Dr. Shah, people want only three to four children. But to guarantee this number, they must give birth to eight or nine - therefore, the need for the Maternity and Child Health (MCH) component of FP.

8. This need for surviving children is related to social security. As suggested by Mr. Furst, Dr. Shrestha, and others, the provision of some alternative system of social security should accompany FP efforts.
9. Dr. Kim said that there should not only be a guarantee for the survival of children, but a guarantee for a bright future. This means concurrent development of infrastructure, education, industry, etc. Related to this were Mr. Upadhyaya's remarks concerning the need for both FP and regular infrastructure. He further warned against an overemphasis on urban areas alone. Unless welfare can be improved in rural areas, population growth cannot be reduced.

Dr. Kim also spoke of the need for greater research concerning the motivational factors of family planning. He said this could best be done by local people.

10. The need to go beyond traditional FP techniques was also brought up by Dr. Thapa. She suggested that FP should be the job of other Ministries besides just the Ministry of Health, e.g., agriculture extension workers could and should also spread the word about FP and MCH.
11. Dr. Beyer suggested that the Western notion of individual and family oriented population control might not be valid in Nepal. Perhaps the decision of the individual about family size is related to

the opinions of others in the community. Perhaps FP should be approached on a community, rather than on an individual level. The community might be the core unit in the Hills, while the extended family would be the case unit in Katamandu Valley.

Dr. Dhital briefly brought up an interesting, but unrelated, question, agricultural employment. Looking at the GE Tempo data, there are approximately 5.7 million persons in the agricultural labour force today. With constant fertility, this will increase to approximately 11 million in 2001. Will the agricultural sector be able to absorb this number?



### Summary of the Session

Dr. Harka Gurung summarized the day's session. He emphasized that population is not a health problem, but a national problem. With regard to the SE Tempo model, he pointed out that a model is primarily a methodology which is able to show the magnitude of the problem. Population is growing at an increasing rate. The model was not presented as an alternative to all development planning. There must be investment in other areas. However, we should remember that if we neglect investment in FP, the necessary investment in other areas will increase in later years.

Dr. Gurung also pointed out the regional population movement, especially the growing importance of the Terai. But we must go further. Is the increased population of the Terai due to migration from the Hills, from India, or from natural increase? India currently serves as a safety valve for Nepal's overpopulation, but this is not a real solution to the problem.<sup>10/</sup>

FP services must be matched up with health services. We must guarantee the lives of children already born and accompany this with means to decrease family size.

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<sup>10/</sup> Myron Weiner, "Political Demography of Nepal," cf., p. 98.

### Chapter III - POPULATION GROWTH AND AGRICULTURE

1. Population Growth, Food Needs and Environmental Stress, by Mr. Lester R. Brown.
2. Comments by Dr. B. P. Dhitai.
3. Comments by Mr. G. P. Lohani.
4. Panelist Dr. Ray Fort's remarks.
5. Panelist Dr. Prakash C. Lohani's remarks.
6. Floor Discussion.
7. Summary of the Session by the Chairman Dr. Yadav P. Pant.



Mr. Lester R. Brown presenting his paper.  
(From L. to R.) Dr. Raymond Fort, Mr. Lester R. Brown,  
Dr. Yadav Prasad Pant (Chairman of the Session),  
Dr. Prakash Chandra Lohani.

### Population Growth, Food Needs and Environmental Stress

Human population growth is mainly the result of increases in food production. This relation raises the question: How many people can the biosphere support without impairment of its overall operation?

by Mr. Lester R. Brown

Throughout most of man's existence his numbers have been limited by the supply of food. For the first two million years or so he lived as a predator, a herbivore and a scavenger. Under such circumstances the biosphere could not support a human population of more than 10 million, a population smaller than that of London or Afghanistan today. Then, with his domestication of plants and animals some 10,000 years ago, man began to shape the biosphere to his own ends.

As primitive techniques of crop production and animal husbandry became more efficient the earth's food-producing capacity expanded, permitting increases in man's numbers. Population growth in turn exerted pressure on the food supply compelling man to further alter the biosphere in order to meet his food needs. Population growth and advances in food production have thus tended to be mutually reinforcing.

It took two million years for the human population to reach the one billion mark, but the fourth billion now being added will require only fifteen years: from 1960 to 1975. The enormous increase in the demand for food that is generated by this expansion in man's numbers, together with rising incomes, is beginning to have disturbing consequences. New signs of stress on the biosphere are reported almost daily. The continuing expansion of land under the plow and the evolution of a chemically oriented modern agriculture are producing ominous alterations in the biosphere, not just on a local scale but for the first time in history, on a global scale as well. The natural cycles of energy and the chemical elements are clearly being affected by man's efforts to expand his food supply.

Given the steadily advancing demand for food, further intervention in the biosphere for the expansion of the food supply is inevitable. Such intervention however, can no longer be undertaken by an individual or a nation without consideration of the impact on the biosphere as a whole. The decision by a government to dam a river, by a farmer to use DDT on his crops or by a married couple to have another child, thereby increasing the demand for food, has repercussions for all mankind.

The revolutionary change in man's role from hunter and gatherer to tiller and herdsman took place in circumstances that are not well known, but some of the earliest evidence of agriculture is found in the hills and grassy plains of the Fertile Crescent in western Asia. The cultivation of food plants and the domestication of animals were aided there by the presence of wild wheat, barley, sheep, goats, pigs, cattle and horses. From the beginning of agriculture man naturally favored above all other species those plants and animals that had been most useful to him in the wild. As a result of this favoritism he has altered the composition of the earth's plant and animal populations. Today his crops, replacing the original cover of grass or forest, occupy some three billion acres. This amounts to about 10 percent of the earth's total land surface and a considerably larger fraction of the land capable of supporting vegetation that is the area excluding deserts, polar regions and higher elevations. Two-thirds of the cultivated cropland is planted to cereals. The area planted to wheat alone is 600 million acres-nearly a million square miles or an area equivalent to the U.S. east of the Mississippi. As for the influence of animal husbandry on the earth's animal populations, Hereford and Black Angus cattle roam the Great Plains, once the home of an estimated 30 to 40 million buffalo; in Australia the kangaroo has given way to European cattle; in Asia the domesticated water buffalo has multiplied in the major river valleys.

Clearly the food-producing enterprise has altered not only the relative abundance of plant and animal species but also their global distribution. The linkage of the Old and the New World in the 15th century set in motion an exchange of crops among various parts of the world that continues today. This exchange greatly increased the earth's capacity

to sustain human population, partly because some of the crops transported elsewhere turned out to be better suited there than to their area of origin. Perhaps the classic example is the introduction of the potato from South America into northern Europe, where it greatly augmented the food supply, permitting marked increases in population. This was most clearly apparent in Ireland, where the population increased rapidly for several decades on the strength of the food supply represented by the potato. Only when the potato blight organism (*Phytophthora infestans*) devastated the potato crop was population growth checked in Ireland.

The soybean, now the leading source of vegetable oil and principal farm export of the U.S., was introduced from China several decades ago. Grain sorghum, the second-ranking feed grain in the U.S. (after corn), came from Africa as a food store in the early slave ships. In the U.S.S.R. today the principal source of vegetable oil is the sunflower, a plant that originated on the southern Great Plains of the U.S. Corn, unknown in the Old World before Columbus, is now grown on every continent. On the other hand, North America is indebted to the Old world for all its livestock and poultry species with the exception of the turkey.

To man's accomplishments in exploiting the plants and animals that natural evolution has provided, and in improving them through selective breeding over the millenniums, he has added in this century the creation of remarkably productive new breeds, thanks to the discoveries of genetics. Genetics has made possible the development of cereals and other plant species that are more tolerant to cold, more resistant to drought, less susceptible to disease, more responsive to fertilizer, higher in yield and richer in protein. The story of hybrid corn is only one of many spectacular examples. The breeding of short-season corn varieties has extended the northern limit of this crop some 500 miles.

Plant breeders recently achieved a historic breakthrough in the development of new high-yielding varieties of wheat and rice for tropical and subtropical regions. These wheats and rices, bred by Rockefeller Foundation and Ford Foundation scientists in Mexico and the Philippines, are distinguished by several characteristics. Most important, they are short-statured and stiff-strawed, and are highly responsive to chemical fertilizer. They also mature earlier. The first of the high-yielding rices, IR-8, matures in 120 days as against 150 to 180 days for other varieties.

Another significant advance incorporated into the new strains is the reduced sensitivity of their seed to photoperiod (length of day). This is partly the result of their cosmopolitan ancestry: they were developed from seed collections all over the world. The biological clocks of traditional varieties of cereals were keyed to specific seasonal cycles, and these cereals could be planted only at a certain time of the year, in the case of rice say at the onset of the monsoon season. The new wheats, which are quite flexible in terms of both seasonal and latitudinal variations in length of day, are now being grown in developing countries as far north as Turkey and as far south as Paraguay.

The combination of earlier maturity and reduced sensitivity to day length creates new opportunities for multiple cropping in tropical and subtropical regions where water supplies are adequate, enabling farmers to harvest two, three and occasionally even four crops per year. Workers at the International Rice Research Institute in the Philippines regularly harvest three crops of rice per year. Each acre they plant yields six tons annually, roughly three times the average yield of corn, the highest-yielding cereal in the U.S. Thousands of farmers in northern India are now alternating a crop of early-maturing winter wheat with a summer crop of rice, greatly increasing the productivity of their land. These new opportunities for farming land more intensively lessen the pressure to bring marginal land under cultivation, thus helping to conserve precious topsoil. At the same time they increase the use of agricultural chemicals, creating environmental stresses more akin to those in the advanced countries.

The new dwarf wheats and rices are far more efficient than the traditional varieties in their use of land, water, fertilizer and labor. The new opportunities for multiple cropping permit conversion of far more of the available solar energy into food. The new strains are not the ultimate solution to the food problem, but they are removing the threat of massive famine in the short run. They are buying time for the stabilization of population which is ultimately the only solution to the food crisis. This "green revolution" may affect the well-being of more people in the shorter period of time than any technological advance in history.

The progress of man's expansion of food production is reflected in the way crop yields have traditionally been calculated. Today the output of cereals is expressed in yield per acre, but in early civilizations it was calculated as a ratio of the grain produced to that required for seed. On this basis the current ratio is perhaps highest in the U.S. corn belt, where farmers realize a four-hundred fold return on the hybrid corn seed they plant. The ratio for rice is also quite high, but the ratio for wheat, the third principal cereal, is much lower, possibly 30 to one on a global basis.

The results of man's efforts to increase the productivity of domestic animals are equally impressive. When the ancestors of our present chickens were domesticated, they laid a clutch of about fifteen eggs once a year. Hens in the U.S. today average 220 eggs per year, and the figure is rising steadily as a result of continuing advances in breeding and feeding. When cattle were originally domesticated, they probably did not produce more than 600 pounds of milk per year, barely enough for a calf. (This is roughly the average amount produced by cows in India today). The 13 million dairy cows in the U.S. today average 9,000 pounds of milk yearly, out-producing their ancestors fifteen to one.

Most such advances in the productivity of plant and animal species are recent. Throughout most of history man's efforts to meet his food needs have been directed primarily toward bringing more land under cultivation, spreading agriculture from valley to valley and continent to continent. He has also, however, invented techniques to raise the productivity of land already under cultivation particularly in this century when the decreasing availability of new lands for expansion has compelled him to turn to a more intensive agriculture. These techniques involve altering the biosphere's cycles of energy, water, nitrogen and minerals.

Modern agriculture depends heavily on four technologies: mechanization, irrigation, fertilization and the chemical control of weeds and insects. Each of these technologies has made an important contribution to the earth's increased capacity for sustaining human populations and each has disturbed the cycles of the biosphere.

At least as early as 3000 B.C. the farmers of the Middle East learned to harness draft animals to help them till the soil. Harnessing animals much stronger than himself enabled man to greatly augment his own limited muscle power. It also enabled him to convert roughage (indigestible by humans) into a usable form of energy and thus to free some of his energy for pursuits other than the quest for food. The invention of the internal combustion engine and the tractor 5,000 years later provided a much greater breakthrough. It now became possible to substitute petroleum (the product of the photosynthesis of aeons ago) for oats, corn and hay grown as feed for draft animals. The replacement of horses by the tractor not only provided the farmer with several times as much power but also released 70 million acres in the U.S. that had been devoted to raising feed for horses.

In the highly mechanized agriculture of today the expenditure of fossil fuel energy per acre is often substantially greater than the energy yield embodied in the food produced. This deficit in the output is of no immediate consequence, because the system is drawing on energy in the bank. When fossil fuels become scarcer, man will have to turn to some other source of motive energy for agriculture; perhaps nuclear energy or some means, other than photosynthesis, of harnessing solar energy. For the present and for the purposes of agriculture the energy budget of the biosphere is still favorable. The supply of solar energy - both the energy stored in fossil fuels and that taken up daily and converted into food energy by crops - enables an advanced nation to be fed with only 5 percent of the population directly employed in agriculture.

The combination of draft animals and mechanical power has given man an enormous capacity for altering the earth's surface by bringing additional land under the plow (not all of it suited for cultivation). In addition, in the poorer countries his expanding need for fuel has forced him to cut forests far in excess of their ability to renew themselves. The areas largely stripped of forest include mainland China and the subcontinent of India and Pakistan, where much of the population must now use cow dung for fuel. Although statistics are not available, the proportion of mankind using cow dung as fuel to prepare meals may far exceed the

proportion using natural gas. Livestock populations providing draft power, food and fuel tend to increase along with human populations, and in many poor countries the needs of livestock for forage far exceed its self-renewal, gradually denuding the countryside of grass cover.

As population pressure builds, not only is more land brought under the plow but also the land remaining is less suited to cultivation. Once valleys are filled farmers begin to move up hillsides, creating serious soil-erosion problems. As the natural cover that retards runoff is reduced and soil structure deteriorates, floods and droughts become more severe.

Over most of the earth the thin layer of topsoil producing most of man's food is measured in inches. Denuding the land of its year-round natural cover of grass or forest exposes the thin mantle of life-sustaining soil to rapid erosion by wind and water. Much of the soil ultimately washes into the sea, and some of its lifted into the atmosphere. Man's actions are causing the topsoil to be removed faster than it is formed. This unstable relationship between man and the land from which he derives his subsistence obviously cannot continue indefinitely.

Robert R. Brooks of Williams College, an economist who spent several years in India, gives a wry description of the process occurring in the state of Rajasthan, where tens of thousands of acres of rural land are being abandoned yearly because of the loss of topsoil. He talks about the overgrazing by goats which destroys the desert plants which might otherwise hold the soil in place. Goatherds equipped with sickle attached to 20-foot poles strip the leaves of trees to float downward into the waiting mouths of famished goats and sheep. The trees die and the soil blows almost 200 miles to New Delhi, where it comes to rest in the lungs of its inhabitants and on the shiny cars of foreign diplomats.

Soil erosion not only results in a loss of soil but also impairs irrigation systems. This is illustrated in the Mangla irrigation reservoir, recently built in the foothills of the Himalayas in West Pakistan as part of the Indus River irrigation system. On the basis of feasibility studies indicating that the reservoir could be expected to have a

lifetime of at least 100 years, \$600 million were invested in the construction of the reservoir. Denuding and erosion of the soil in the watershed, however, accompanying a rapid growth of population in the area, has already washed so much soil into the reservoir that it is now expected to be completely filled with silt within 50 years.

A historic example of the effects of man's abuse of the soil is all too plainly visible in North Africa, which once was the fertile granary of the Roman Empire and now is largely a desert or near desert whose people are fed with the aid of food imports from the U.S. In the U.S. itself the "dust bowl" experience of the 1930's remains a vivid lesson on the folly of overplowing. More recently the U.S.S.R. repeated this error, bringing 100 million acres of virgin soil under the plow only to discover that the region's rainfall was too scanty to sustain continuous cultivation. Once moisture reserves in the soil were depleted the soil began to blow.

Soil erosion is one of the most pressing and most difficult problems threatening the future of the biosphere. Each year it is forcing the abandonment of millions of acres of cropland in Asia, the Middle East, North Africa and Central America. Nature's geological cycle continuously produces topsoil, but its pace is far too slow to be useful to man. Someone once defined soil as rock on its way to the sea. Soil is produced by the weathering of rock and the process takes several centuries to form an inch of topsoil. Man is managing to destroy the topsoil in some areas of the world in a fraction of this time. The only possible remedy is to find ways to conserve the topsoil more effectively.

The dust bowl era in the U.S. ended with the widespread adoption of conservation practices by farmers. Twenty million acres were fallowed to accumulate moisture and thousands of miles of windbreaks were planted across the Great Plains. Fallow land was alternated with strips of wheat ("strip-cropping") to reduce the blowing of soil while the land was idle. The densely populated countries of Asia, however, are in no position to adopt such tactics. Their food needs are so pressing that they cannot afford to take large areas out of cultivation; moreover, they do not yet have the financial resources or the technical skills for the immense projects in reforestation, controlled grazing of cattle, terracing, contour farming and systematic management of watersheds that would be required to preserve their soil.

The significance of wind erosion goes far beyond the mere loss of topsoil. As others have observed, a continuing increase in particulate matter in the atmosphere could affect the earth's climate by reducing the amount of incoming solar energy. This particulate matter comes not only from the technological activities of the richer countries but also from wind erosion in the poorer countries. The poorer countries do not have the resources for undertaking the necessary effort to arrest and reverse this trend. Should it be established that an increasing amount of particulate matter in the atmosphere is changing the climate, the richer countries would have still another reason to provide massive capital and technical assistance to the poor countries, joining with them to confront this common threat to mankind.

Irrigation, which agricultural man began to practice at least as early as 6,000 years ago, even earlier than he harnessed animal power, has played its great role in increasing food production by bringing into profitable cultivation vast areas that would otherwise be unusable or only marginally productive. Most of the world's irrigated land is in Asia, where it is devoted primarily to the production of rice. In Africa the Volta River of Ghana and the Nile are dammed for irrigation and power purposes. The Colorado River system of the U.S. is used extensively for irrigation in the Southwest, as are scores of rivers elsewhere. Still to be exploited for irrigation are the Mekong of southeastern Asia and the Amazon.

During the past few years there has been an important new irrigation development in Asia; the widespread installation of small-scale irrigation systems on individual farms. In Pakistan and India, where in many places the water table is close to the surface, hundreds of thousands of tube wells with pumps have been installed in recent years. Interestingly, this development came about partly as an answer to a problem that land has been presented by irrigation itself.

Like many of man's other interventions in the biosphere, his reshaping of the hydrologic cycle has had unwanted side effects. One of them is the raising of the water table by the diversion of river water onto the land. Over a period of time the percolation of irrigation water downward and the accumulation of this water underground may gradually raise the water table until it is within a few feet or even a few inches of the surface. This not only inhibits the growth of plant roots by waterlogging but also results in the surface soil's becoming salty as water evaporates through it, leaving

a concentrated deposit of salts in the upper few inches. Such a situation developed in West Pakistan after its fertile plain had been irrigated with water from the Indus for a century. During a visit by President Ayub to Washington in 1961 he appealed to President Kennedy for help. West Pakistan was losing 60,000 acres of fertile cropland per year because of waterlogging and salinity as its population was expanding 2.5 percent yearly.

This same sequence, the diversion of river water onto land for irrigation, followed eventually by waterlogging and salinity and the abandonment of land, had been repeated many times throughout history. The result was invariably the decline, and sometimes the disappearance, of the civilizations thus intervening in the hydrologic cycle. The remains of civilizations buried in the deserts of the Middle East attest to early experiences similar to those of contemporary Pakistan. These civilizations, however, had no one to turn to for foreign aid. An interdisciplinary U.S. team led by Roger Revelle, then Science Adviser to the Secretary of the Interior, studied the problem and proposed among other things a system of tube wells that would lower the water table by tapping the ground water for intensive irrigation. Discharging this water on the surface, the wells would also wash the soil's salt downward. The stratagem worked, and the salty, waterlogged land of Pakistan is steadily being reclaimed.

Other side effects of river irrigation are not so easily remedied. Such irrigation has brought about a great increase in the incidence of schistosomiasis, a disease that is particularly prevalent in the river valleys of Africa and Asia. The disease is produced by the parasitic larva of a blood fluke, which is harbored by aquatic snails and burrows into the flesh of people standing in water or in water-soaked fields. The Chinese call schistosomiasis "snail fever", it might also be called the poor man's emphysema, because, like emphysema, this extremely debilitating disease is environmentally induced through conditions created by man. The snails and the fluke thrive in perennial irrigation systems, where they are in close proximity to large human populations. The incidence of the disease is rising rapidly as the world's large rivers are harnessed for irrigation,

and to-day schistosomiasis is estimated to afflict 250 million people. It now surpasses malaria, the incidence of which is declining, as the world's most prevalent infectious disease.

As a necessity for food production water is of course becoming an increasingly crucial commodity. The projected increases in population and in food requirements will call for more and more massive and complex interventions in the biosphere. The desalting of seawater for irrigation purposes is only one major departure from traditional practices. Another is a Russian plan to reverse the flow of four rivers currently flowing northward and emptying into the Arctic Ocean. These rivers would be diverted southward into the semiarid lands of southern Russia, greatly enlarging the irrigated area of the U.S.S.R. Some climatologists are concerned, however, that the shutting off of the flow of relatively warm water from these four rivers would have far-reaching implications for not only the climate of the Arctic but also the climatic system of the entire earth.

The growing competition for scarce water supplies among states and among various uses in the western U.S. is also causing consideration of heroic plans. For example, a detailed engineering proposal exists for the diversion of the Yukon River in Alaska southward across Canada into the western U.S. to meet the growing need for water for both agricultural and industrial purposes. The effort would cost an estimated \$100 billion.

Representing an even greater intervention in the biosphere is the prospect that man may one day consciously alter the earth's climatic patterns, shifting some of the rain now falling on the oceans to the land. Among the steps needed for the realization of such a scheme are the construction of a comprehensive model of the earth's climatic system and the development of a computational facility capable of simulating and manipulating the model. The required information includes data on temperatures, humidity, precipitation, the movement of air masses, ocean currents and many other factors that enter into the weather. Earth-orbiting satellites will doubtless be able to collect much of the information, and the present generation of advanced computers appears to be capable of carrying out the necessary experiments on the model. For the implementation of the findings, that is for the useful control of rainfall,

there will of course be a further requirement. The project will have to be managed by a global and supra-national agency if it is not to lead to weather wars among nations working at cross purposes. Some commercial firms are already in the business of rainmaking, and they are operating on an international basis.

The third great technology that man has introduced to increase food production is the use of chemical fertilizers. We owe the foundation for this development to Justus von Liebig of Germany, who early in the 19th century determined the specific requirements of nitrogen, phosphorus, potassium and other nutrients for plant growth. Chemical fertilizers did not come into widespread use, however, until this century, when the pressure of population and the disappearance of new frontiers compelled farmers to substitute fertilizer for the expansion of cropland to meet growing food needs. One of the first countries to intensify its agriculture, largely by the use of fertilizers, was Japan, whose output of food per acre has steadily risen (except for wartime interruptions) since the turn of the century. The output per acre of a few other countries, including the Netherlands, Denmark and Sweden, began to rise at about the same time. The U.S., richly endowed with vast farmlands, did not turn to the heavy use of fertilizer and other intensive measures until about 1940. Since then its yields per acre, assisted by new varieties of grain highly responsive to fertilizer, have also shown remarkable gains. Yields of corn, the production of which exceeds that of all other cereals combined in the U.S. have nearly tripled over the past three decades.

Experience has demonstrated that in areas of high rainfall the application of chemical fertilizers in conjunction with other inputs and practices can double, triple or even quadruple the productivity of intensively farmed soils. Such levels of productivity are achieved in Japan and the Netherlands, where farmers apply up to 300 pounds of plant nutrients per acre per year. The use of chemical fertilizers is estimated to account for at least a fourth of man's total food supply. The world's farmers are currently applying 60 million metric tons of plant nutrients per year, an average of nearly 45 pounds per acre for the three billion acres of cropland. Such application, however, is unevenly distributed.

Some poor countries do not yet benefit from the use of fertilizer in any significant amounts. If global projections of population and income growth materialize, the production of fertilizer over the remaining three decades of this century must almost triple to satisfy food demands.

Can the projected demand for fertilizer be met? The key ingredient is nitrogen, and fortunately man has learned how to speed up the fixation phase of the nitrogen cycle.<sup>11/</sup> In nature the nitrogen of the air is fixed in the soil by certain microorganisms, such as those present in the root nodules of leguminous plants. Chemists have now devised various ways of incorporating nitrogen from the air into inorganic compounds and making it available in the form of nitrogen fertilizers. These chemical processes produce the fertilizer much more rapidly and economically than the growing of leguminous plant sources such as clover, alfalfa or soybeans. More than 25 million tons of nitrogen fertilizer is now being synthesized and added to the earth's soil annually.

The other principal ingredients of chemical fertilizer are the minerals potassium and phosphorus. Unlike nitrogen, these elements are not replenished by comparatively fast natural cycles. Potassium presents no immediate problem; the rich potash fields of Canada alone are estimated to contain enough potassium to supply mankind's needs for centuries to come. The reserves of phosphorus, however, are not nearly so plentiful as those of potassium. Every year 3.5 million tons of phosphorus washes into on the ocean floor. Eventually it will be thrust above the ocean surface again by geologic uplift, but man cannot wait that long. Phosphorus may be one of the first necessities that will prompt man to begin to mine the ocean bed.

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<sup>11/</sup>C.C. Delwiche, "The Nitrogen Cycle", Scientific American, September, 1970.

The great expansion of the use of fertilizers in this century has benefited mankind enormously, but the benefits are not unalloyed. The runoff of chemical fertilizers into rivers, lakes and underground waters creates two important hazards. One is the chemical pollution of drinking water. In certain areas in Illinois and California the nitrate content of well water has risen to a toxic level. Excessive nitrate can cause the physiological disorder methemoglobinemia, which reduces the blood's oxygen-carrying capacity and can be particularly dangerous to children under five. This hazard is of only local dimensions and can be countered by finding alternative sources of drinking water. A much more extensive hazard, profound in its effects on the biosphere, is the now well-known phenomenon called eutrophication.

Inorganic nitrates and phosphates discharged into lakes and other bodies of fresh water provide a rich medium for the growth of algae; the massive growth of the algae in turn depletes the water of oxygen and thus kills off the fish life. In the end the eutrophication, or overfertilization, of the lake slowly brings about its death as a body of fresh water, converting it into a swamp. Lake Erie is a prime example of this process now under way.

How much of the now widespread eutrophication of fresh waters is attributable to agricultural fertilization and how much to other causes remains an open question. Undoubtedly the runoff of nitrates and phosphates from farmlands plays a large part. There are also other important contributors, however, considerable amounts of phosphate, coming mainly from detergents, are discharged into rivers and lakes from sewers carrying municipal and industrial wastes. And there is reason to believe that in some rivers and lakes most of the nitrate may come not from fertilizers but from the internal-combustion engine. It is estimated that in the state of New Jersey, which has heavy automobile traffic, nitrous oxide products of gasoline combustion, picked up and deposited by rainfall, contribute as much as 20 pounds of nitrogen per acre per year to the land. Some of this nitrogen washes into the many rivers and lakes of New Jersey and its adjoining states. A way must be found to deal with the eutrophication problem because even in the short run it can have damaging effects, affecting as it does the supply of potable water, the cycles of aquatic life and consequently man's food supply.

Recent findings have presented us with a related problem in connection with the fourth technology supporting man's present high level of food production: the chemical control of diseases, insects and weeds. It is now clear that the use of DDT and other chlorinated hydrocarbons as pesticides and herbicides is beginning to threaten many species of animal life, possibly including man. DDT today is found in the tissues of animals over a global range of life forms and geography from penguins in Antarctica to children in the villages of Thailand. There is strong evidence that it is actually on the way to extinguishing some animal species, notably predatory birds such as the bald eagle and the peregrine falcon, whose capacity for using calcium is so impaired by DDT that the shells of their eggs are too thin to avoid breakage in the nest before the fledglings hatch. Carnivores are particularly likely to concentrate DDT in their tissues because they feed on herbivores that have already concentrated it from large quantities of vegetation. Concentrations of DDT in mothers' milk in the U.S. now exceed the tolerance level established for foodstuffs by the Food and Drug Administration.

It is ironic that less than a generation after 1948, when Paul Hermann Muller of Switzerland received a Nobel prize for the discovery of DDT, the use of the insecticide is being banned by law in many countries. This illustrates how little man knows about the effects of his intervening in the biosphere. Up to now he has been using the biosphere as a laboratory, sometimes with unhappy results.

Several new approaches to the problem of controlling pests are now being explored. Chemists are searching for pesticides that will be degradable, instead of long-lasting, after being deposited on vegetation or in the soil, and that will be aimed at specific pests rather than acting as broad-spectrum poisons for many forms of life. Much hope is placed in techniques of biological control, such as are exemplified in the mass sterilization (by irradiation) of male screwworm flies, a pest of cattle that used to cost U.S. livestock producers \$100 million per year. The release of 125 million irradiated male screwworm flies weekly in the U.S. and in adjoining areas of Mexico (in a cooperative effort with the Mexican government) is holding the fly

population to a negligible level. Efforts are now under way to get rid of the Mexican fruit fly and the pink cotton bollworm in California by the same method.

Successes are also being achieved in breeding resistance to insect pests in various crops. A strain of wheat has been developed that is resistant to the Hessian fly. Resistance to the corn borer and the corn earworm has been bred into strains of corn, and work is in progress on a strain of alfalfa that resists aphids and leafhoppers. Another promising approach, which already has a considerable history, is the development of insect parasites, ranging from bacteria and viruses to wasps that lay their eggs in other insects. The fact remains, however, that biological control of pests is still in its infancy.

I have here briefly reviewed the major agricultural technologies which have evolved to meet man's increasing food needs, the problems arising from them and some possible solutions. What is the present balance sheet on the satisfaction of human food needs? Although man's food supply has expanded several hundred-fold since the invention of agriculture, two-thirds of mankind is still hungry and malnourished much of the time. On the credit side a third of mankind, living largely in North America, Europe, Australia and Japan, has achieved an adequate food supply, and for the remaining two-thirds the threat of large-scale famine has recently been removed, at least for the immediate future. In spite of rapid population growth in the developing countries since World War II, massive famine has been avoided (except in Biafra in 1969-1970) by huge exports of food from the developed countries. As a result of two consecutive monsoon failures in India, a fifth of the total U.S. wheat crop was shipped to India in both 1966 and 1967, feeding 60 million Indians for two years.

Although the threat of outright famine has been more or less eliminated for the time being, human nutrition on the global scale is still in a sorry state. Malnutrition, particularly protein deficiency, exacts an enormous toll from the physical and mental development of the young in the poorer countries. This was dramatically illustrated when India held tryouts in 1968 to select a team to represent it in the Olympic games that year. Not a single

Indian athlete, male or female, met the minimum standards for qualifying to compete in many of the 36 track and field events in Mexico City. No doubt this was partly due to the lack of support for athletics in India, but poor nutrition was certainly also a large factor. The young people of Japan today are visible examples of what changes can be brought about by improvements in nutrition. Well nourished from infancy, Japanese teen-agers are on the average some two inches taller than their elders.

Protein is as crucial for children's mental development as for their physical development. This was strikingly shown in a recent study extending over several years in Mexico. Children who had been severely undernourished before the age of five were found to average thirteen points lower in I.Q. than those children in a carefully selected control group. Unfortunately no amount of feeding or education in later life can repair the setbacks to development caused by undernourishment in the early years. Protein shortages in the poor countries today are depreciating human resources for at least a generation to come.

Protein constitutes the main key to human health and vigor, and the key to the protein diet at present is held by grain consumed either directly or indirectly (in the form of meat, milk and eggs). Cereals, occupying more than 70 percent of the world's cropland, provide 52 percent of man's direct energy intake. Eleven percent is supplied by livestock products such as meat, milk and eggs, ten percent by potatoes and other tubers, ten percent by fruits and vegetables, nine percent by animal fats and vegetable oils, seven percent by sugar and one percent by fish. As in the case of the total quantity of the individual diet, however, the composition of the diet varies greatly around the world. The difference is most marked in the per capita use of grain consumed directly and indirectly.

The two billion people living in the poor countries consume an average of about 360 pounds of grain per year, or about a pound per day. With only one pound per day, nearly all must be consumed directly to meet minimal energy requirements; little remains for feeding livestock, which may convert only a tenth of their feed intake into meat or other edible human food. The average American,

in contrast, consumes more than 3,600 pounds of grain per year. He eats only about 150 pounds of this directly in the form of bread, breakfast cereal and so on; the rest is consumed indirectly in the form of meat, milk and eggs. In short, he enjoys the luxury of the highly inefficient animal conversion of grain into tastier and somewhat more nutritious proteins.

Thus the average North American currently makes about four times as great a demand on the earth's agricultural ecosystem as someone living in one of the poor countries. As the income levels in these countries rise, so will their demand for a richer diet of animal products. For the increased world population at the end of the century, which is expected to be twice the 3.5 billion of today, the world production of grain would have to be doubled merely to maintain present consumption levels. This increase, combined with the projected improvement in diet associated with gains in income over the next three decades, could nearly triple the demand for grain, requiring that the food supply increase more over the next three decades than it has in the 10,000 years since agriculture began.

There are ways in which this pressure can be eased somewhat. One is the breeding of higher protein content in grains and other crops, making them nutritionally more acceptable as alternatives to livestock products. Another is the development of vegetable substitutes for animal products, such as are already available in the form of oleomargarine, soybean oil, imitation meats and other replacements (about 65 percent of the whipped toppings and 35 percent of the coffee whiteners now sold in U.S. supermarkets are nondairy products). Pressures on the agricultural ecosystem would thus drive high-income man one step down in the food chain to a level of more efficient consumption of what could be produced by agriculture.

What is clearly needed today is a cooperative effort--more specifically, a world environmental agency--to monitor, investigate and regulate man's interventions in the environment, including those made in his quest for more food.

Since many of his efforts to enlarge his food supply have a global impact, they can only be dealt with in the context of a global institution. The health of the biosphere can no longer be separated from our modes of political organization. Whatever measures are taken, there is growing doubt that the agricultural ecosystem will be able to accommodate both the anticipated increase of the human population to seven billion by the end of the century and the universal desire of the world's hungry for a better diet. The central question is no longer, "Can we produce enough food?", but, "What are the environmental consequences of attempting to do so?"

Additional Remarks by Mr. Lester R. Brown

In order to alleviate ecological stress, Mr. Brown suggested two alternatives: (1) to produce per capita consumption in the more affluent portion of the world and (2) to slow down the population growth. He illustrated the consumption problem with his grain requirement ladder:

The average North American requires 2,000 lbs. of grain per year - although only 150 lbs. are direct grain consumption. The bulk is through animal protein. The average person from the developing countries consumes only 400 lbs. Most of this is direct grain consumption with little left for protein consumption.

This stress on food supplies by North Americans can be reduced by increasing consumption of vegetable products - e.g. oleomargarine, instead of butter.

Mr. Brown referred to the population problem as a global one, not merely a national one. He explained that governments around the world are using a wide range of tools: (1) economic incentives such as the Family Festival in Kerala, India at which vasectomies were given to large numbers of men; (2) the provision of free family planning facilities; (3) the legalization of abortion; and (4) the active involvement of ministries other than Health in promoting family planning.

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Comments by Dr. B. P. Dhital

The increase in population, as Mr. Brown points out, if not checked in time, will eventually but inevitably mean that food supplies for all will approach the subsistence level. The Malthusian theory of the relation between population and production implies that disaster will occur if preventive checks on population growth are not adopted on a global scale. The problem of human food production and its effect on environment is no longer a national or regional problem.

The new technology and modern science have no doubt opened new lines of supply. It would be, however, naive to be too optimistic about these gains if we consider the long-term social costs and returns of these gains. The central question, as Mr. Brown puts it, is no longer, "Can we produce enough food?", but, "What are the consequences of attempting to do so?"

Mr. Brown's excellent exposition of the problems of increase in human population shows that there exists a kind of vicious circle inasmuch as population growth exerts pressure on increasing food supply and the increased food supply results in a larger human population. Technological change in agriculture is necessary to increase food supplies. Since technological change in agriculture is a biological activity, it is bound to have a tremendous effect on the biosphere.

Technological change has evolved inputs that are characterized by elasticity of supply. The most important inputs from the point view of the environment are chemical fertilizers, water and pesticides. These inputs along with the new crop varieties and livestock have significantly shifted the production function upward increasing the rate of return to much higher levels. Inputs can be applied in greater quantities at a proportionately smaller increase in price.

A rapid increase in the supply of the basic inputs in a traditional agriculture is practically impossible due to their inelastic supply schedules. Increasing agricultural production without technological change or without adverse effects

on the environment would require large increases in agricultural prices and large net transfers of resources to the agricultural sector. Such transfers would in turn eventually impede economic growth. It appears that there is no choice but to use large quantities of these inputs if there are to be large increases in agricultural production.

The large increases in the use of chemical fertilizers, the exploitation of water resources either through dams and canals or the lifting of ground water would bring about major ecological changes. Apart from these changes the most complicated one arises in the use of pesticides. This is of much greater significance in a country like Nepal where warm temperatures and moist agricultural land are more conducive to the multiplication of pests. This means that if these pests are to be controlled by chemicals, the total chemical application per unit area is likely to be more than elsewhere.

Given that there is no alternative to the technological change needed to increase production in agriculture, there seems to exist a conflict with technological change due to its effect on the environment. Can this conflict be resolved without impairing the present or potential rate of increase in agricultural production?

Coming to the condition in Nepal, we seem to think that we have enough food to feed our present population. The statistics show that if we provide 185 kilograms of cereals per capita per annum, there would be about 5,00,000 metric tons left for other use or export. This itself is very low compared to the USA where per capita consumption would be about 725 kg. If the present rate of population doubles in about 30 years, even to provide a bare subsistence level of 185 kg per head per year, forgetting about "the surplus", agricultural production will have to increase by about 78 percent (present requirement of 185 kg about 1.87 million MT, present production 2.37 million MT). If we consider other needs such as export requirements (20% of total production will have to increase  $2\frac{1}{2}$  times the present level.

The present rate of population growth will bring 9.1 million people as dependents by 2001 and there will be 12.9 million people needing employment. If we assume that there will be a 10 percent shift in occupation, there will be 10.32 million workers left in agriculture -- an increase of nearly 80 percent from the present level of 5.73 million. Can Nepalese agriculture provide employment for this many people? Will the land area available be sufficient to produce food for this many people?

The introduction of new technology in agriculture no doubt will help Nepal increase production. This also will require a considerably larger amounts of labor per unit area of cultivation. Nevertheless, along with the improved efficiency of outputs, the labor requirement for each unit of output is likely to decline. The new variety and the new practices may double the yield, but the labor requirement per unit area will not increase by as large a proportion. At the same time, considering the fact that the cost of production in Nepal is high and the major component in the cost has been labor, the reduction in the cost of production would also mean, among other things, a more efficient use of labor. The search for new technology is moving toward finding means for using lesser numbers of workers even in Asian agriculture. Much higher yields of rice are being obtained in countries like Australia without puddling the soil. They are trying at the International Rice Research Institute to obtain the same yields by direct seeding on unpuddled soil as they would by transplanting on puddled soil.

There is no doubt that in Nepal the agricultural sector will have to provide employment to additional labor for some time to come. But the fact is that there exists a threshold beyond which things cannot go, for one cannot ask a pickaxe to replace a plow because there are more people that need employment.

Comments by Mr. G. P. Lohani

I fully agree with Mr. Brown's contention that the stresses and strains on the environment witnessed in developed countries as a result of man's quest for food will eventually spread to the under-developed countries also and thereby accelerate the process of global bio-environmental disruption. The Green Revolution should not make us complacent towards population control. It will only give us a breathing spell to find and adopt corrective measures to forestall the inevitable crisis. Only conscious intervention in the biosphere can guarantee our survival in the long run. Man must plan his numbers if he wants to plan his environment.

The problems of the world have become indivisible in this respect too and international cooperation in economic development and control of population has become all the more urgent. Population and food are two variables if looked at from the national point of view, however, from the global and long term perspective, there is only one variable -- the population. That technology can go on expanding the frontiers of the world's physical resources without seriously affecting the bio-environmental balance is very much in doubt. The bio-environmental balance cannot be disrupted indefinitely without paying a very high cost -- the survival of man in the long run.

All planning involves certain costs, discipline, organisation and control mechanisms. Poor countries do not possess adequate resources to accelerate the pace of economic development and, at the same time, decelerate the fertility rate of their people. Besides the inadequacy of material resources, there are very many other constraints as well. Where shall the necessary resources come from? Material and technical assistance from the developed countries is one of the sources but with several limitations. Foreign aid can, at best, help a country only as drugs and a good diet can help a sick patient. The efficacy of external aid depends also on the absorbing capacity of the receiving country. Underdeveloped countries like Nepal do not have a broad tax and savings base inasmuch as about half the economic activities are not monetary transactions. The saving capacity is also

very limited. As the bulk of the meagre resources at the country's disposal has to be invested in the development of infrastructure, expansion and diversification of the production base is bound to be slow for several decades. Much also remains to be done to improve institutionalized patterns of ownership of the means of production, social values, political and organisational forms and the administrative framework so that they work concertedly to cope with the Herculean task of achieving socio-economic development at a reasonably fast rate. All these crucial factors will have to be evolved internally as they cannot be imported. In view of the urgency of the problem these prerequisites will have to be developed speedily.

Locked at from a broader perspective, economic development (and also fertility control) is a social movement. A passion for change will have to be aroused in the minds of the people at large. Living and working patterns will have to be altered. The concept of mass indoctrination will also have to be accepted and applied to some extent. Many of the vague, liberal values adopted by the thin crust of the elite section of the population will have to be abandoned or modified. A Promethean attitude towards nature and society helps a great deal in activating the masses. Most of the elite of Nepal are unaware of this socio-psychological phenomenon divorced as they are from the masses, largely illiterate and tradition-bound peasants. Living in an ivory tower and planning a dream world does not solve the real problems of the country. Subjective projections separate one from objective reality. Plans based on deeper analysis, realistic, objective thinking, practical experience, and action-oriented learning and observation are urgently required if the challenges posed by the 20th century are to be met by Nepal successfully. This calls for a new approach in planning and execution.

It is not true that underdeveloped countries do not have resource bases adequate enough for massive investment. In the context of a densely-populated, underdeveloped country the term "resources" will have to be defined properly. Nepal lives simultaneously in several ages. Hence we cannot do everything along modern lines. We do not have enough

modern resources to go around, but we have a vast store of uninvested and under-invested labor power in the villages. Modern techniques were developed basically as labor-saving devices. We do not have labor-constraint as yet. Our main constraint is capital resources. Therefore, we must concentrate whatever capital resources we can muster on those vital projects that call for very high doses of capital. On all other projects - specially those which relate to the development of the vast rural areas - we must utilize locally available labor power and material, and traditional techniques as much as possible. Building roads and bridges, digging irrigation and transportation canals and reservoirs, afforestation, small dams and earth-work, land reclamation and land preparation, village schools, hospitals and other community buildings, housing, storage facilities, village workshops and factory buildings, dikes and walls, levelling and filling works, the manufacture of compost manure, simple tools, boats and carts, building materials, simple labor saving devices (primitive machines) and a host of other very useful investment works can be done without waiting for a substantial influx of modern capital resources. Even if modern resources were available in abundance for the development of the vast rural areas, they call for sophisticated techniques and organisation, necessary skills and a host of other things which are equally in short supply.

It is much easier for people living with a medieval life style to understand and adapt to changes initiated by a labor-intensive, intermediate technology rather than to progress directly to modern methods of development. It is also a basic question of choice between waiting for development to eventually come to the village (remaining stagnant and getting poorer every year in absolute terms and relative to pockets of development and spiralling activities elsewhere) and starting the process of development and change with whatever local resources are available, and thus modernising the development process. If the former strategy (if we might call it so) were adopted, the rural economy in general and surplus rural manpower (or call it population pressure) in particular will largely discharge only the

consumption function; the production function would remain only marginal and act as a drag on development. However, if the latter strategy is adopted and all necessary arrangements are made to activate the rural unemployed and underemployed in local development programs, the overall growth rate of the national economy could be accelerated. This strategy would help in the achievement of a substantially higher rate of capital formation and savings mobilization and the available capital funds could be put to more rational uses. In this way, rural people would gradually come to accept modern ideas and institutions and the widening gulf between rural and urban and between different regions of the country in regard to standards of living, facilities and services, employment and income levels and social values and norms could also be narrowed.

A massive program to influence the human fertility rate could find proper and widespread response only in such an atmosphere. Such an approach to national development, I think, is not only rational but also the only logical course to achieve the country's goals established by His Majesty the King. This is the only way to start a widespread growth process in the country, to plant democracy on a sounder footing, integrate the people living in diverse situations and bring about a sense of participation and social justice in the minds of the people. If this strategy is put into practice, it will eventually lead us in the not very distant future to a stage where most investment will be along modern lines, the population growth rate will reach almost zero and the dignity of man will be upheld by widespread use of machines all over the country.

Many people in our country, specially those who have been to the West (mentally and/or physically) think that the Technotronic Age can be brought about in Nepal in due course, by establishing a few pockets of development. They think only in terms of machines, electronic devices, sophisticated capital goods, higher training and streamlined bureaucratic management and administration etc. When the labor-intensive strategy of growth is suggested, they invariably pose questions about the scarcities of surplus land,

and financial and physical resources to employ the surplus labour, the organisational and managerial constraints, the dearth of skilled manpower and above all the inadequacies of the political and administrative structure. They say it is not possible in a democratic set up.

What is meant here is not the use of more labour-power in farming itself but in subsidiary occupations and non-farm production, preventive and developmental works. Hence, the question of the availability of surplus arable land is only a misunderstanding on their part. There is very little opportunity cost of labour in our countryside (except in suburban and nearby areas). The bulk of labour for community development has to be voluntary and unpaid. The poor people can 'save' and contribute the only thing they have in plenty -- their labour power that remains idle voluntarily or involuntarily. We do not have to spend a substantial amount on wages to utilize such labour power in local development. Hence, such development has very little cost in relation to the quantum of investment and benefit to be achieved.

There is a built-in safeguard against inflation in such a program. Man, unlike machines, continues to consume even when not in productive use. So why not keep him busy with directly or indirectly productive and capital-forming jobs that help him in the short run and benefit him enormously in the long run? From the point of view of social justice, the rural rich will have to be asked to contribute money and/or grain voluntarily for the rural development program. Taxation measures could also be resorted to in selected rural areas. Developed countries could also donate food and various other materials and also provide more liberal technical assistance to countries adopting such a strategy of development.

It would seem that the political structure of the Panchayat System is quite suitable for such a pattern of development. We have established a pyramidal organizational structure. This structure has been successfully used for land reform, the mobilization of savings, some administrative work for H.M.G. and also for some socio-political programs. In many areas, the village and district

panchayats have been given wider powers of taxation, administration and community development. Mobilization of voluntary labour for local development is not a new idea in this country. My suggestion is only to make it a national strategy of growth, an integral part of the National Plan and to provide the minimal necessary administrative, technical and material support to the district and village committees to frame and execute their respective five-year development plans based mainly on labour-intensive projects and local resources.

The most crucial thing in such a model of development is organisation. But it is not an insurmountable problem if there is a national resolve and a real passion in the hearts of the power elite for the development of the country. It is a manageable variable, but I agree, it is quite a task and we should not brush aside the whole strategy by thinking that organisational conditions impose an element of impossibility. We must start the wheel of progress moving in an upward spiral in the country as a whole if we do not want to be left far further behind by the end of this century.

Thus, it is obvious that the problems of balance between population, food and environment of Nepal call for a new dimension in thinking, programming and implementation.

Panelist Dr. Ray Fort's Remarks

- A. Erosion, an example of stress against the environment, is an important destructive element in Nepal's quest for food. But many factors of the ultimate solution to erosion are not in the hands of the agriculturalist. For example, three of the most important elements are:
1. Firewood - People need firewood to cook. In order to stop people from cutting wood, a substitute fuel would have to be found. Kerosene oil comes from India and is not only a problem because of transportation but is a pawn on the political chess board of India/Nepal relations.
  2. Fertilizer - In the Hills, cattle are kept not for power or milk but for their manure which is used to fertilize the fields. Tree leaves and branches are lopped to provide food and the grass is heavily grazed.
  3. Reforestation - This is a complex process, involving tree planting and restricted grazing, which requires a sizeable organizational and administrative effort well beyond the individual farmer or his village.
- B. Another example of environmental stress in Nepal is that many species of wild life are being threatened as the forest cover is destroyed.
- C. The following are comments regarding policy decisions which seem to be important for Nepal.

For a country such as Nepal, Government policies are perhaps the most important single factor in the race between population and agricultural production. Ministries must work together with a common policy. The emphasis on public policies is a common feature in modern development literature, but in Nepal one must really be careful when one talks about public policies. The same policy decision which works in India and Pakistan may not work in Nepal. In agriculture this is because of Nepal's

economic dependence upon its large neighbor, India. For example, in grain price policy, Nepal cannot set a higher price for its agricultural products than India because it must export its product to India. The ultimate price is set in India. The Government of Nepal can do little to manipulate that price. Production costs are high because all modern inputs must be imported. The government's policies are more or less limited to those kinds of activities which can make the acquisition and distribution of input more efficient. Subsidies, particularly, are a dangerous weapon in Nepal's agricultural sector. A very large proportion of Nepal's national production comes from the agricultural sector and it is difficult to imagine how subsidies can be extracted from that same sector. This is not to say that this cannot be done, but it is to say that any subsidy must be of a very short-term nature and must be invested in high return, quick gain agricultural production items.

- D. The lack of trust by the Government of Nepal in private enterprise is limiting agricultural development in Nepal. It is assumed that margins are high and marketing systems are inefficient. This is probably not true. Even Nepal's ancient marketing system may be relatively efficient. In any case, the private sector needs entrepreneurial talent which is scarce and available mostly in the private sector. Government policy in Nepal should concern itself with the following:
1. Removing constraints on the private system and encouraging competition.
  2. Improving transportation, constructing roads and trail networks.
  3. Carry out land reform so that tillers receive the benefit of their toil.
  4. Developing market information systems which accurately reflect price trends particularly those in India. This would necessarily mean a concern with Indian's price policy.

5. Establishing standards, weights, and measures so that Nepalese agricultural products could find acceptance in world markets at something other than the lowest grade.
6. Increasing the availability of credit for private enterprise, particularly retail operations, for agricultural inputs. At present there is plenty of credit in government lending institutions but getting credit is extremely difficult for the average entrepreneur.
7. Increasing the quality of On-Farm Storage for agricultural products to reduce losses in storage and to provide a higher quality food grain to be sold at the seasonal high price later in the market cycle.
8. Coordinating foreign aid. There are currently many donors, each assumes his project is most important, but priorities must be established.

Panelist Dr. Prakash C. Lohani's Remarks

Dr. Prakash C. Lohani spoke of population growth in terms of equilibrium analysis, i.e., as the death rate decreases and the birth rate remains constant, the population equilibrium is upset. After experiencing this load/lag relationship between technology and population, how does Nepal get back to an equilibrium and at what cost? This should be looked at not merely in terms of the cost to reduce fertility, but also in terms of the ecological cost of increasing population.

In order to restore equilibrium, one must look at both the economic and cultural variables. On the economic side, one must look at the net cost of children, i.e., cost of rearing vs productivity. The cost of producing children must be raised. Also, there could be incentives for not having large families, e.g. at the age of 50, anyone with two children or less could get Rs. 10 per month as a social security "bonus".

On the cultural side, Dr. Lohani observed that basic human emotions favour birth over death. We must bring village opinion leaders to the side of population control. In order to do so, family planning facilities must be made available. Also, there is a need to consider the introduction of legalized abortion.

### Floor Discussion

The ensuing conversation focused on four topics: (1) labour force and increased agricultural production, (2) a comprehensive approach to family planning, (3) regional variations of population, and (4) the ecological effects of population growth.

With regard to the first topic, Dr. B. P. Shrestha commented on the slow but steady improvement of technical farm practises in Nepal. He also commented on the agricultural labour force - i.e., the low marginal productivity of labour is due to both quantitative and qualitative inputs. A study of the Pokhara Valley shows a low capital coefficient for labour in agriculture. The agricultural labour force has not decreased. Changes in the structure of the labour force take a long time. It is difficult to shift population from the relatively low productivity primary sector to the more highly productive secondary sector. It is important to remember that development models with an unlimited supply of labour are only applicable when there is an adequate supply of food. According to Dr. Shrestha, there are two fundamental questions: (1) Can Nepalese agriculture provide employment for a growing population? and (2) Will the existing land area be sufficient to provide food for this many people? He fears a negative answer to both questions.

Mr. Fashupati Shumshere J. B. Rana also directed his remarks to the question of Nepal's labour force. He suggested that Nepal needs to return to a more classical theory of economics - i.e., in classical English economics, land was the major constraint, while in post-classical New World economics, labour and capital were the major constraints. Nepal should focus its attentions on increasing productivity per unit of land. Agricultural productivity per unit of land is highest in Kathmandu Valley. The labour-intensive technology of Kathmandu should therefore be transferred to the rest of Nepal, especially the Terai. This would also correspond to Nepal's political and social needs. He further stated that the crucial factor in introducing a labour-intensive technology is organization rather than wages. It must be remembered that agriculture is the major employment opportunity in Nepal (about 90 percent) and that small management units of land are viable in Nepal.

With regard to this question of increasing agricultural production, Dr. Stephen Enke provided some additional data. Even if the Gross Reproduction Rate is zero in 2001, the population will continue to grow for another 50 years (i.e., another 20 to 25 percent increase). Therefore, the population in the year 2025 would be 22/23 million even under the most favourable conditions. Assuming people expect per capita increase in consumption (e.g., one percent per year), the food supply will have to increase four-fold in the next 75 years to meet the demand of the projected 22/23 million people.

There do not appear to be new lands available for production in the hill areas. There might even be a reduction in land available due to deforestation and erosion. The Terai is a temporary safety valve. It will buy 25 to 40 years of reduced pressure. But if these years are not used to solve the population problem, they will have been wasted.

Responding to this, Dr. Donald Rice queried whether Nepal's agricultural production can be increased four-fold within 75 years. Is there a limitation in the water supply to be used for agriculture?

With regard to this question of increasing agricultural production Dr. Harka Gurung recommended that agricultural programs be geared to poor farmers in the Hills, not to self-satisfied farmers in the Terai who feed themselves and export the surplus. Greater horticulture planting should be attempted on the steep terraces of the hill areas. This would help to halt erosion and would also help to counter the problem of price-taking from India. In order to increase production, Nepal also needs to improve its transport and marketing networks.

The second major topic of discussion concerned a comprehensive approach to family planning. Mr. W. C. Ide and Mr. R. C. Malhotra questioned whether other countries have coordinated their family planning programs between several ministries. How can Nepal have a national policy focussed on population and family planning? How do persons concerned with social services, education, etc. contribute to family planning?

Mr. Lester Brown reasserted his belief that agricultural extension workers are at the grass-roots level and usually a good mechanism for increasing the receptivity of people to family planning. Dr. Frances Nitzberg also suggested that agricultural extension workers can perhaps show that the present number of labourers is not needed, i.e., children are not needed for agricultural production.

As pointed out by Mr. Brown, there is a basic need to organize national priorities and to make choices if family planning is to become an integrated national effort and not just part of a health service. He suggested that youth groups can be effective in pointing out the need for population control, i.e., perhaps college and university students in Nepal could be organized in support of family planning. He also pointed out that there are several foreign aid donors now active in the area of population control: Sweden, Japan, Finland, the U.S., and the United Nations.

Dr. Harka Gurung commented on the question of regional disparities in Nepal's population. Population has increased in the Terai, but this has not been accompanied by a decrease in the Hills. The growth rate in the Hills may have decreased, but the absolute number of people has not. We do not solve the Hill problem by shifting people to the Terai because we are only shifting the surplus. As a corollary to this, Dr. Gurung said that we need to reexamine the mythology of food deficit in the Hills. The Hill people are not taking food home, but are rather relocating in areas with food.

The question of regional expenditures in family planning was raised by Dr. John Beyer. He stated that the costs are higher in the hill areas, while the aggregate number of births prevented might be less. This problem of regional disparities is also related to the fourth general topic of conversation, the ecological effects of population growth. Even though population is increasing in the Terai, it is not decreasing in the Hills. Therefore, the ecological dilemma in the Hills is not decreasing.

Dr. Beyer commented more generally on the effects of a large population in Nepal. He mentioned that land may go out of production, never to be brought back. Dr. Nitzberg and Dr. N. K. Shah both emphasized the need for increased work in the field of contraceptive technology. Medical technology must be developed quickly so that environmental degradation can be halted before it is too late.

Summary of the Session by the Chairman Dr. Y. P. Pant

It is a great privilege for me to be present here and preside over one of the sessions of this seminar on "Population and Development" sponsored by CEDA, which seeks to discuss the problem of population growth and agricultural development. In the discussion, particulars based on a paper presented by Mr. Brown, you have focussed attention on a number of problems of population growth in relation to agricultural development on a global scale. I agree with some of the views expressed by various commentators or panel leaders or even distinguished participants from the floor. More particularly human population growth is mainly the result of increased food production and this has been very historically and properly elaborated by Mr. Brown in the paper he presented to the seminar.

I feel that we have arrived at a number of consensus views. In the first instance, the problem can be solved only on a global scale. Secondly, technological improvements have greatly contributed to the upward trend of agricultural production. Some concern was expressed that with the disturbance in the population equilibrium, a new equilibrium will have to be established. One of the issues raised in the discussion also relates to the increasing application of labour-intensive technology to provide employment opportunities for the growing numbers of people. Thus one cannot disagree with some of the basic things which have been discussed in the meeting. Personally I have nothing much to add as far as the technical contribution to the subject is concerned. But as a part of my duty I would like to make certain observations before the meeting is concluded. This will not exactly be a summary but will pick up threads of ideas which many of you have developed during the course of discussion this morning.

In one of his recent addresses, the President of the World Bank, Robert Macnamara, has said, "A problem that already plagues man in the present is the tangled problem of excessive population growth". He further added, "If it is not dealt with reasonably, it will, in fact, explode; explode in suffering, explode in violence, explode in inhumanity." In fact, every one of us agree that control of population is an inseparable part of larger, overall development.

Several distinguished participants have already tried to explain the dimension of the explosion or violence. I have nothing to add further.

However, I might deal with one aspect which many of you have already discussed and which I would like to elaborate slightly further. It is estimated that the average population growth of the world is just over two percent, though today a large number of developing countries are burdened with a rate of about four percent annually. This may seem like a small figure in absolute terms, but at this rate it means the population doubles in about 25 or 30 years. Today, Nepal's rate of growth does not exceed the world average which is estimated to be less than two percent. But still, we are lagging very much behind in agricultural development. Therefore, something should be done. However, as Mr. Brown has suggested, even for the developed countries which have attained a zero rate of population growth or are going to attain it in the near future, problems remain.

Of course, my dear participants, I am not going to suggest specific remedial measures as this is not my duty. Many of you have already done so. Nor would it be justifiable for me as a Chairman of this meeting to make any comment on this problem in the global context which has been so nicely done by Mr. Brown. However, based on my own experiences and from a study of Nepalese conditions, I would like to make some broad remarks. In Nepal, future population policy in relation to development should, in its substance, be oriented towards the problem of mitigating the poverty of the masses. Broadly speaking, an ideal population policy, it seems to me, should be a simultaneous inclusion of three measures: a program for planned agricultural development, a sustained and vigorous family planning scheme, and a program for industrialization with emphasis on consumer goods industries.

I would like to touch upon the first aspect to some extent. In Nepal, the linear growth rate in agricultural output, if you look back over the decade 1961/62 to 1969/70, has been around 2.42 percent per annum. The average annual growth rate of commercial crops over roughly a decade has been faster at 7.46 percent than that of food crops which is estimated to be 2.09 percent. The overall growth rate

during the Second and Third Plan periods has been 2.6 percent for food crops and 7.5 percent for commercial crops. In the Fourth Five Year Plan, the growth rate anticipated for food crops is three percent per annum, whereas for cash crops it is around eight percent per annum.

It is estimated that the growth rate will fall short of the estimated demand in the Fourth Five Year Plan until 1974/75. The most probable demand for food grains has been calculated at 4.5 percent per annum, and for cash crops about 7.59 percent per annum. It seems thus that the growth rate anticipated in the Fourth Plan with respect to food grains will fall short of the anticipated demand by about 1.5 percent per annum. Of course, with regard to cash crops, the anticipated growth rate is almost equivalent to the expected demand. Hence, there is a need to increase the growth rate in food grains to about five percent per annum from the growth rate of three percent anticipated in the current Plan.

At the same time it looks important that necessary steps should also be taken to remedy defects in our process of agricultural planning. I may briefly mention that it seems necessary to shift resources from crops with low money value to crops with high money value and plan to bring farmers to an optimum situation of profit maximization. This would necessitate, as has been discussed quite thoroughly, a wider application of the new high yielding varieties of wheat and rice, in fact, a green revolution.

Secondly, the scheme of family planning, which envisages a national reduction of the birth rate, should receive more extensive government support in developing countries. Family planning measures have, no doubt, been started in Nepal, but there is a greater need for substantial, technical or financial assistance before any significant reduction in birth rates can occur. Also more intensive research is yet to be conducted on a comprehensive basis. Some of the important prerequisites are: adequate information, acceptable techniques and the nation-wide implementation of a family planning programs.

Thirdly, there is a need for greater emphasis on industrialization in a country like Nepal which is at a pre-industrial state. But in the process of development, as you know, agricultural and industrial development are interrelated. Experiences of several developing countries show that agricultural prosperity cannot be built up unless non-agricultural employment and income are making the required changes in agricultural methods possible. All such aspects of economic development are always instrumental in bringing about proper adjustment of future demographic changes in Nepal.

Although, in the global context, we all have a very long way to go in providing the entire population with sound diet, we are also a long way from the mass starvations of the earlier eras of human history. It has been emphasized that modern agriculture depends heavily on four technologies: mechanization, fertilization, irrigation and the chemical control of weeds and insects. Mr. Brown has suggested in his paper that what we clearly need today is a world-wide cooperative effort to investigate and regulate man's intervention in the environment, including that made in his quest for more food. I think that this is the basic approach which each country including Nepal will have to adopt if the problem of population growth is to be solved. Obviously, feeding the expected numbers of human mouths remains a problem, but perhaps not an unsurmountable one provided necessary steps are taken by individual governments simultaneously on a more coordinated and planned basis; e.g., on an interministerial basis. So far, no doubt, we can assess that the world, and particularly the developing countries, are still at the very beginning of what will inevitably be a long-range movement. Much has been accomplished and much more remains to be done.

#### Chapter IV - POPULATION GROWTH AND SOCIAL SERVICES

1. Population Growth and Social Services in Nepal by Dr. F.E. Okada.
2. Comments by Mr. R. C. Malhotra.
3. Comments by Dr. John C. Cool.
4. Panelist Dr. Bharat R. Vaidya's remarks.
5. Panelist Mrs. Kamal Rana's remarks.
6. Panelist Dr. Rita Thapa's remarks.
7. Floor Discussion.
8. Summary of the Session by the Chairman Mr. K. B. Malla.



Dr. Okada presenting his paper with Chief Secretary Krishna Ban Malla as Chairman of the Session. Former Home Minister Mr. S. K. Upadhyaya can be seen on the left of Dr. Okada.

## Population Growth and Social Services in Nepal

by Dr. Ferdinand E. Okada

The social services sector of Nepal is comprised of three major divisions, Panchayat, Education and Health and, in terms of budget allocations, a number of lesser ones such as Housing, Drinking Water, and Information and Broadcasting. This paper is concerned primarily with Education and Health and their relationship to Nepal's population growth.

Since His Majesty's Government of Nepal has a set target date of 1990, twenty years hence, for the provision of free and compulsory education to all its elementary school-age population, the growth of this population is of more than passing concern to all planners of national development. The problem faced in the fulfilment of this particular objective in education services, however, may be eased by the extension of certain kinds of health services.

The national population census of Nepal undertaken this year, 1971, is the seventh in a series which started in 1911 when a total count of 5.6 million was recorded. The validity of the earlier censuses, before the census of 1952-54, is open to question. For instance, Nepal's population growth apparently not only stagnated for almost 20 years but even showed a slight decline to 5.5 million in 1930. It showed an average annual growth rate of 1.2 percent from 1930 to 1941, when the count reached 6.2 million, and an unexpected average growth rate of 2.9 percent per annum between 1941 and the census of 1952-54. This last census showed a total population of 8.4 million.

Though the country was enumerated in two steps, Eastern Nepal in 1952 and Western Nepal in 1954, this census was the first one taken on a scientific and systematic basis with every safeguard to ensure reasonable accuracy. Using it as a base, with a population figure of 9.4 million in the census of 1961, an average annual growth rate of 1.4 percent was calculated. It is postulated that the present

census, 1971 will show a total population of 11.2 million calculated on an average annual growth rate of 1.8 percent for the decade. Further projections, on the basis of an annual growth of 1.95 percent for the first five years and 2.14 percent for the second five years, give a population of 13.8 million ten years hence. And of the 13.8 million, 38.7 percent will be below fifteen years of age. The population which might be termed school-going, that is, between the ages of 5 and 14, will amount to 3.2 million or approximately 24 percent of the total.

These same projections based on an accelerating average annual growth rate, from 1.4 percent in 1961 to 2.14 percent in 1981, also postulate a proportionately decreasing young population. That is, the percentage of those aged under 15 in the total population will decline from 40.3 percent in 1966 to 38.7 percent in 1981. This is generally contrary to what happens in a country where the growth rate is accelerated by a high birth rate rather than by, say, large scale immigration. In fact, to digress a little, Nepal's growth rate may, in fact, be lower than might be indicated by her birth rate because of large scale emigration in past and present years to India and to Bhutan, Sikkim and Burma in the past.

Nepal's birth rate has been estimated as being 45 to 55 per 1,000 a birth rate which is high, and a death rate of about 27 per 1,000. Life expectancy at birth is probably less than 40 years. None of these figures is out of keeping with those from other developing countries or with certain Asian countries. Under these conditions, it is most likely that children will increase in proportion to the total population rather than decrease. In fact, some published estimates give 2.2 million elementary school-age children (ages 6 - 10) by 1974, and 4.4 million (ages 5-11) by 1995. Even a minimum projection by UNESCO assumes that there will be, on the basis of 60 percent enrollment, over 1.1 million children in elementary school by 1980. At present, enrollment, with about 5,00,000 school children, stands at the 35 percent mark. It should be noted that doubling the number of children in school in ten years' time does not double the percentage.

The education budget for the fiscal year 1971-72 is 77 million rupees, not all of it, of course, for elementary education. This is about 6.8 percent of the national budget for education. It would seem that since 1961 the percentage of financial allocations for education in the national budget has decreased but the proportion of children who need to go to elementary school is increasing steadily because of the need to achieve 100 percent enrollment by 1990.

Thus the costs of education must be considered not only in terms of maintaining a particular level of service but also in terms of increasing, both in quantity and quality, the level of service provided. Now teachers must be trained not only as replacements but also as additions to the present cadre, the existing stock of school buildings must not only be maintained but added to. Thus, almost in an endless list, more text books must be provided, more note-books, more school furniture and equipment, and so on, perhaps even down to more chalk. And the provision of material items is probably one of the easier problems to be encountered in creating a viable educational system.

For health service, between 1965 and 1970, 6.9 percent of the national budget was allocated. In the fiscal year 1971-72, the proportion has gone down to less than 5 percent but it is still a goodly sum, over Rs.50 million. In the past five years, however, of the 6.9 percent of the national budget allocated to health - a sum of Rs.120 million in total - but a fraction was spent on family planning. Family planning was given Rs.5 million which amounted to 4.6 percent of the health budget and less than 0.5 percent of the national budget. It is suggested here that the problem faced by education may perhaps be caused by some change in the proportion of allocations within the health budget. Perhaps family planning could be given a much larger percentage rather than the previous 4.6 percent.

It has been calculated by A.S. David that under present conditions with no reduction in fertility, Nepal's population will exceed 22 million by 1995. If fertility were reduced by 25 percent, the population would reach 20 million and,

with a 50 percent reduction in fertility, 18 million. Granted that his premises are arguable - his population growth rate may be too high and he discounts emigration - the fact still remains that a 50 percent reduction in fertility does not mean that the population stops growing. It will still continue to increase, though at a slower rate, and the labour force (ages 15 to 64) will not decline during that period; in fact, the decline will decrease in proportion to the total population of those who are under 15 years of age. David estimates that the school-going population (which he defines as the 5-11 year old group) which he puts at about 18.5 percent of the population in 1970 will rise to almost 20 percent in 1995 if there is no reduction in fertility. It will decline to 16 percent with a 50 percent reduction. In short, with a reduction in fertility, the dependency ratio, the proportion of non-workers supported by the working age population, will drop.

A good health programme reduces mortality. Vaccinations, immunizations, malaria eradication, the improvement of sanitary conditions, the increase in numbers of doctors and trained medical personnel and so on, all serve to reduce mortality and increase the population. A reduction in fertility through family planning must also be part of a program to offset the reduction in mortality. The improved quality of the population in both educational and health terms will then be easier to achieve, and the improved quality of population is one of the main goals of national development.

Concluding his paper, Dr. Okada asserted that the present 4.6 percent of the health budget allocated to family planning is not adequate. A figure as high as 20 percent might be reasonable. If one waits for an atmosphere conducive to family planning, one may have to wait a very long time, i.e., to wait for improved health services may be to wait until it's too late.

With regards to Nepal's Family Planning Project, Dr. Okada made a number of specific comments:

1. Efforts should be made to integrate family planning and health services. At present, there is too much hostility. The incident in Nepalgunj where health clinics would not help vasectomy patients was brought up.
2. The Family Planning Project should stress reaching the village women. Hill people such as the Gurkha soldiers are not ignorant of contraceptive techniques. Also women in the Hills show great interest in family planning. As a reference, Dr. Okada cited women who were willing to pay Rs.100 for one "pill", thinking it would prevent contraception.
3. The elite is not concentrated in Kathmandu. The Family Planning Project should approach the local elite such as ex-servicemen, Thakuries, Brahmin Pundits, Newar shopkeepers, etc. It should be remembered that local civil servants are not necessarily the relevant elite.
4. Efforts should be made to determine the effects of pensions and social security on family size.
5. The effects of land reform on family size should also be studied - e.g., when land cannot be subdivided, family size might decrease. In Japan male infanticide was practiced when plots of land became too small.
6. Research should also be conducted on ethnic influence, on family size and resettlement areas, on the effects of urbanization and on effects of an extended family structure.
7. If one wants immediate results on family size, legalized abortion is a must. In Japan they offer abortions to women in hospitals for \$3.00.

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Comments by Mr. R. C. Malhotra

Instead of looking at it as an isolated or independent phenomenon, population pressure should be viewed from the standpoint of how it affects the goal of achieving a higher standard of living. The problem is that of maintaining a balance between the rapidly increasing pressure of population and the available resources, or in other words, the problem of the population growth rate is relative to that of the growth rate in national development of the G.N.P. In the face of a rapid growth of population, basic facilities like education, health, housing, employment and other amenities have to be provided for more and more numbers even to maintain the existing level. In this situation it would be increasingly difficult to raise the level of these services.

The population of Nepal increased by 68 percent during the period 1911 - 1961 and according to the latest projection there will be 3 million more by 1976. Population projections for Nepal for the period 1961 - 1976 are given below:

Population Projection for Nepal 1961-76

<u>Years</u>	<u>Population projection</u>	<u>Increase in every 5 years</u>
1961	94,12,996	
1966	1,02,76,533	8,63,537
1971	1,12,47,616 <sup>12/</sup>	9,71,083
1976	1,23,92,794	11,45,178

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<sup>12/</sup> 1,12,90,000 according to the preliminary results of the Population Census, 1971.

Accordingly the annual rate (geometric) of population growth for different periods will be as follows:

<u>Period</u>	<u>Annual growth (rate percent)</u>
1961-66	1.78
1966-71	1.81
1971-76	1.95

During the Fourth Plan period, there would be an increment of 6,64,930 population in the 15 - 59 age-group. Out of this the number of potential labourers who would be seeking job opportunities is expected to reach 5,25,000. Though there has not been any survey on unemployment in the country, it can be expected that there already exists a large stock of underemployed and some unemployed persons who have to be taken care of. Therefore, to meet the needs of additional population growth during the Plan period, 5,25,000 additional jobs have to be created.

Education and training increase the quality of population, which is a basic factor necessary for national development. Although there has been a rapid expansion of educational institutions in the past two decades starting from a virtual non-existence of these facilities in 1951, the rate of growth has not been in keeping with the growth in population.

The number of school-going age children (6-8 years, according to the new age classification in the new education plan) in the primary level would go up by 1,04,317, from 8,51,903 in 1971 to 9,56,220 in 1976, which is an increment of children in the secondary and higher education level. All these additional children have to be provided with increasing services both in terms of quality and quantity.

According to the new education plan, 64 percent of primary age children will be provided with primary education facilities by 1976. This is an increment of only 12 percent from the present estimated enrollment of 52 percent. (taking the new primary age group of 6-8 instead of 5-11).

Nepal's literacy rate estimated at around twelve percent, is perhaps the lowest of all Asian countries. The annual rate of growth in literacy has hardly been as much as the growth in population. In this situation more and more facilities have to be provided to attain a given level of literacy. The task of raising the literacy level for the present size of population in Nepal would, therefore, require a tremendous effort.

Though no target date (such as 1990) has been fixed so far, the provision of free and compulsory primary education to all primary school-going age children has been the long-term objective of His Majesty's Government. In addition to its social values, education is being increasingly recognized as a productive investment. Because of financial limitations so far a comparatively small proportion of the total development budget is devoted to education. It does not mean that the importance of education in nation development is minimised, it only indicates the limited budgetary resources for allocation to this sector. With the introduction of the new education plan however, there will be some increase in the allocation for education.

Nepal suffers from poor environmental health conditions and the lack of modern medical facilities throughout the country. With a population of 11.3 million and the existing number of doctors being 300 at present, only one doctor is available for 38,000 people! This ratio is among the lowest recorded for the ECAFE region. As compared to this, the doctor/population ratio in some of the neighbouring countries and other developed countries is as follows:

India	5,000 : 1	UK	930 : 1
Pakistan	8,000 : 1	USA	780 : 1
Ceylon	4,500 : 1	USSR	580 : 1

The problem is also aggravated by the fact that nearly two-thirds of the doctors are centered in Kathmandu. In this case, for the rest of the country one doctor would be available for every 1,13,000 people.

To reach the ratio of one doctor for every 10,000 persons, Nepal would require more than 1,000 doctors (700 in addition to the existing number). At present, around 30 students are being sent abroad for MBBS studies every year. If we continue at this rate it will take us nearly 24 years to reach the above ratio of 10,000:1, provided the population remains stationary, which of course is unlikely. Obviously therefore, with the growth in population continuing as it is at present the magnitude of the task would look almost impossible.

Assuming that around two thirds of the students return after completing their medical studies during the Plan period, 20 doctors per year or 100 doctors over five years would be added to the existing number of 300. Taking into consideration a population increment of 11,45,000 during the same period, the population/doctor ratio by the end of the Fourth Plan would go down to only 31,000:1. This ratio is still very high and clearing up the vast backlog would still be a tremendous task.

The situation with regard to nurses and other para-medical staff poses a similar problem. The total number of nurses including assistant nurse mid-wives in the country at present is 346. Here again in terms of the present population, there is only one nurse available for 32,000 people. The doctor/nurse ratio in Nepal which comes to 1:1.1 is far below the minimum requirement. The picture is not expected to change significantly in the next five years.

Similar pictures can be drawn for the availability of hospital facilities. There is one hospital bed available for nearly 6,000 people. Here again most of these are located in Kathmandu and in a few other urban areas. A large portion of the population still falls victim to various communicable diseases. Preventive health services have so far reached only a small fraction of the total population.

It is to be noted however, that because of limited resources, Nepal is not in a position to provide advanced medical facilities throughout the country for some years to come. In this connection, the steps taken by His Majesty's Government in the provision of basic health services to the entire population deserve special attention. With a view to provide primary medical care including control of communicable diseases, the Fourth Plan aims at establishing 225 additional health posts in addition to the already existing 113. One health post will cover a population of 25,000. The ultimate objective is to develop a network of healthposts to cover the entire population.

Housing and the other environmental conditions of an area greatly affects its productivity. Housing costs are a major item in social overhead expenditures. These costs imply also the dwelling units provision of other utilities and services. The condition of housing in Nepal, in general suffers from qualitative deficiencies in terms of minimum standards and the requirements of the people. To take the special case of the housing situation in Kathmandu, the existing congestion of the city as a result of the growth of its population has led to poor ventilation and overcrowded living quarters. There is a growing inadequacy of public utilities and services, such as lack of sanitary disposal facilities and the availability of adequate amounts of pure drinking water.

According to the Housing Census of 1961 out of 14,402 dwelling units in Kathmandu, only 81 percent of the houses are "Pacca", or adequate. Out of this 53.5 of the dwelling units are being occupied by seven or more persons. According to the same Census, the percentage of houses with private water facilities and modern lavatories is 25.8 and 22.3 percent respectively. Only 50 percent of the houses in Kathmandu have facilities for electricity. Though it is expected that the situation has improved by 1971, housing and other physical facilities do not appear to have increased at a rate equal to the increase in population. The population increase has been housed by overcrowding existing facilities. This has in turn led to a decrease in the quality and overall standards of housing space occupied. Similarly, the provision of needed services and facilities has become increasingly difficult.

The problem of Nepal is not to allocate between social services and physical infrastructure. It must be recognized that there can be no development in Nepal without the necessary physical infrastructure.

It is this infrastructure which even provides the basis for an effective family planning program. With no adequate delivery system, family planning practices can hardly be introduced. The real problem is a shortage of resources. Surplus labour can be used, but it needs to be properly managed. This might in part substitute for a demand for other resources. Economic growth should be receiving the top priority. If the G.N.P. were growing adequately there would probably be no need for family planning. However, net growth (per capita income) has been negligible. This is partially because investment in infrastructure does not have immediate returns.

Comments by Dr. John C. Cool

The paper prepared by Dr. Okada admirably sets the stage for consideration of the alternatives open to Nepal's leaders in planning for social services in the generation ahead. While he may leave room for quibbles concerning specific details, the central burden of his paper is clear. Nepal is likely to find it increasingly difficult to provide even present inadequate levels of health care and education in the years ahead and the difficulties in doing so will be disproportionately compounded if population growth is permitted to continue at its present rate.

Before proceeding I would like to underline the point made yesterday by Prof. B. P. Shrestha, for it is essential that we all be clear that the mere removal of the "negative constraint" of high fertility, imperative though that may be, is in itself not going to increase per capita levels of well-being in Nepal without positive, imaginative and dynamic action by all of you to deploy your limited resources carefully in the generation ahead.

For this reason you will be faced during the remainder of this century with the continuing need to examine critically the assumptions, objectives, strategy and tactics upon which resource allocations -- especially the allocation of that most precious resource, your time and energy -- are based. This dictates a continuing re-examination of goals and a conscious effort to avoid the easy but perilous path of planning the future on the basis of the past by prescribing "more of the same". Our children deserve better for it seems certain that the future need only resemble the past to the degree that we, in this generation, fail to understand and react responsibly to the challenge and opportunity of the present.

Dr. Okada's projections imply an almost exponential growth in financial allocations for health and education over the next two decades merely to extend and maintain services at minimal levels. You are likely, if he is right (and I believe he is conservative in his estimates), to

have to run very hard simply to stay where you are. Rather than commencing with concern about actual and potential sources from which the required resources may be obtained, I suggest we commence with some thoughts about the purposes of social services, with ends rather than with means.

Leaders have the obligation to lead. And to lead they must be concerned with the actual situation; the needs, desires, aspirations and capacities of those they are responsible to. The end of society, of government, of development and of social services must be man himself. The good man living the good life - however that may be culturally defined. Your task in Nepal -- indeed, our task on this earth -- is to work towards a social order in which the individual can enjoy the freedom, the mental and physical well-being, the educational opportunity and the command over resources which will afford him the possibility of fulfilling his potential as a human being, in peace and with respect for his own dignity and that of his fellow man.

At a minimum, such a social order should permit man to maintain the illusion that his life has purpose, direction and meaning; that it counts for something, and that he retains unto himself the capacity, however marginal, to affect his own destiny. It should permit him the respect of his peers and the enhancement of his self-esteem, confident in the knowledge that his community attaches value to him and assigns worth to that which he freely contributes to the commonweal.

That this has been an illusory goal for man and society throughout the past should be obvious. Yet man needs to continually restate his ideals and objectives in human terms in order to evaluate his options. I make no apologies for this diversion for it seems to me that the real tragedy of our times is that we have never, as a human society, been so potentially close to having the capacity to achieve these goals, and never so far from fulfilling that potential. Exponential growth of population constitutes a major barrier to that fulfillment. For as population grows it will become increasingly difficult to achieve even minimum objectives. It may even prove to be impossible, unless man acts now to brake human breeding.

Yet man has it in his power to affect this variable. You have it in your power to examine and evaluate the policies which may alter the rewards and penalties within Nepalese society so as to reward low fertility rather than high fertility. That, indeed, is what I understand this seminar to be about. What then, as a practical matter, can be done? In an effort to provoke discussion let me suggest some possibilities.

First, in the face of resource constraints and as a matter of population policy it may be prudent to think of a more limited role for the national government in the provision of some direct social services. The family and the community have in past provided for the needs of members. These institutions continue to be the shock absorbers of the society, providing social security for the individual. Much that government has done during the past generation has had the effect of eroding the authority of these institutions. Would it not be well to examine ways in which they could be strengthened, supported and utilized? This seems to have been inherent in the early idealism of those working to give a positive role to the panchayats. I continue to hold that this was, and continues to be, essentially right-minded at the local level. That the potential of this form of participatory democracy has not been fulfilled may not mean that civil servants must fill the void. Local participation in local affairs through the institution of the village panchayat may continue to constitute an important means of achieving social equity. Indeed there may be no meaningful alternative. Would it not make sense, given Nepal's circumstances, to once again attempt to devolve meaningful authority and command over resources to elected leaders at the local and district level and, at the same time to develop an educational and health system which maximizes community responsibility? That there would have to be some sacrifice in standards initially may well be true. Yet with the time-bound target of universal free primary education by 1990 there may be no other prospect for success. And locally supported schools enriched by centrally trained teachers, quality textbooks and a graduated examination system could bring greater equality of opportunity earlier than might otherwise be feasible. Direct educational taxation at the local level could also have population policy effects for it would bring back

to the parents with some immediacy the costs of educating their offspring. National government educators might better concentrate upon building a system of excellence for teacher training, for higher secondary scholarship students and for professional education within the universities. Special attention must be given to the problems of population education and of educating women for, as I noted yesterday, there appears to be a high positive correlation between female educational levels and a decline in parity. Alternative roles for women must be established and socially sanctioned if you are to utilize their creative energies in ways other than child-bearing. The solution to this challenge has not yet been found, but it contains within it the seeds of a fundamental restructuring of society.

And I would urge that you consider education as more than an investment in economic development. It should also be seen, I believe, as an end in itself. For through education man transmits the tribal wisdom and affords to each successive generation the means of its own self-realization. Education holds the possibility of liberating the minds of men and this, in itself, may well be a first essential objective for us all.

In health services, is it not possible to focus the limited resources of the national government on preventive and public health measures, including a massive and imaginative campaign to motivate couples towards responsible parenthood and to strengthen the contraceptive delivery system -- leaving the provision of curative services mainly in the hands of private practitioners, both allopathic and ayurvedic? After all, the great majority of the people obtain curative treatment from these sources today. And they pay for them. Would it be better to abandon Western and Indian models and seize the opportunity to be imaginative in critically examining and strengthening the existing "on the ground" system of curative practice currently extant throughout the country? I don't profess to know the answer. But I suspect that enough serious attention has not been focused on the strength and potential of the traditional curative and mental health systems. With limited resources the needs of the people might better be served by regularizing the medical and pharmaceutical supply system, improving the

training of Veds, and by insuring the continuance of conditions in which it is economically rewarding for them (for reasons of private gain) to work and live in remote and isolated areas. This could liberate health authorities from the task of dragooning reluctant medical officers to serve such areas and allow them to concentrate on preventive public health measures. Foremost among these they could improve maternal and child health programmes and family planning services, including, when legalized, the provision of high quality, supervised abortion services.

Social welfare is yet another area where community responsibility may be the best alternative. If you seek to establish the small family norm, what assurance can society give that parents will be provided for, with dignity, in their declining years? Must the state assume this burden? Can it? I doubt it, though we don't really know. Birth bonus schemes, low parity social pensions and other forms of social security based upon the capacities of a central bureaucracy and the confidence of people in government over a thirty year period have not been tried in countries like Nepal. Perhaps you should evolve an appropriate Nepalese social security scheme and put it to the empirical test in a trial area? Yet the lessons of land reform and compulsory savings would seem to indicate that the central government machinery would have difficulty in the implementation of such schemes. Hence you may wish to continue to utilize and to strengthen the traditional community and family institutions.

What about employment -- full, marginal, under-employment or otherwise -- and the dignity of labour? I believe that the affording of productive or service roles to the members of society has an importance which goes well beyond the economic function. Yet it seems unlikely that capital investment in Nepal will keep pace with the demand for new jobs in the generation ahead. What alternative roles can be opened to new entrants into the labour force by realistic policy planning? G. P. Lohani suggested this morning, and I strongly agree with him, that the creative harnessing of underutilised or unutilized manpower represents a great challenge to Nepal's leaders in the years ahead. But not only for economic reasons, for nothing is more calculated

to erode man's self-esteem than to find he is unneeded or his services unwanted. And the societal consequences of this loss of self-esteem on any scale could be destabilizing in the extreme. Dealing with those already born and those yet to be born constitutes an essential element of comprehensive population policy.

Yet the challenge is one which only Nepal's leaders can meet. Life in Nepal has for centuries fulfilled the conditions essential to giving meaning and continuity to human existence. The cycle of planting, cultivating and harvesting; the rituals of births, marriages and deaths, have made life purposeful. Religion, family and community have been the dominant themes. While it is true that the past will be an inadequate guide to the future, I urge that Nepal not lose sight of its roots in planning its future, for those roots are deep and still have great strength.

I humbly commend these problems to your thoughtful attention with a final admonition that we all keep in mind that our central purpose is not to manipulate the statistics or balance revenues against expenditures but rather to improve the condition of life for the people of Nepal.

Panelist Dr. Bharat R. Vaidya's Remarks

Mr. Chairman,

The main problems facing the Health Service can be broadly classified into two groups:

- (a) An inadequate number of doctors, nurses, Paramedical staff, hospital facilities and poor environmental health conditions.
- (b) Control of communicable and infectious diseases such as cholera, smallpox, leprosy, tuberculosis etc.

With a limited budget, both quantitative and qualitative services cannot be achieved but with better planning we can improve the services. The Ministry of Health is aware of the problems facing it. In order to tackle the problems the Department is giving more stress to preventive medicine and the eradication of some common killing diseases. Malaria is now almost eradicated. Smallpox is expected to be eradicated in 1977. B.C.G. inoculations are going on according to schedule. As we cannot produce doctors in our country and we have to depend on training our doctors in other countries, the number of doctors which are trained annually is limited. The training of doctors in foreign countries has also another draw-back; some of them do not return as they are attracted by better facilities and better opportunities elsewhere. So the Ministry of Health in order to give treatment for common diseases to all the population has envisaged in the fourth five year plan to establish 225 health posts. These health posts will be the basic units of an integrated health service; one health post will cover a population of about 25,000. The function of the health posts apart from preventive care and family planning will also treat people with common ailments.

If malaria returns again the effect on the country will be disastrous. The people who have migrated to the Terai cannot go back to the Hills because they have already sold their belongings. So health posts will be established first in the districts which have been marked by malaria eradication. The Government should recognize the benefits gained by such health projects and the Department of Health should receive a budget sufficient to launch other nation-wide health programs.

As far back as 1965, the Government recognized the benefits of a policy of family planning and in 1968 the Family Planning Board was formed. Population control cannot be done by family planning alone however. It should be included in the planning of other departments also, e.g. food and agriculture, land reform, broadcasting and information etc. Social service workers and panchayat people should be made to cooperate in this program.

I agree with the statement made by Dr. Okada about the hostility between the Public Health people and the Family Planning Organization. I am sure in the near future there should not be any more hostility as we are trying to make the Public Health people take a more active part in family planning programs by giving them training and making them responsible for family planning work in their districts. From this year, the Ayurvedic physicians will also be trained to take an active part in family planning programs. The use of military men in health projects mentioned by Dr. Okada is also under consideration by the Government.

Panelist Mrs. Kamal Rana's Remarks

The overcrowded family is the greatest obstacle to social progress. It affects the health and education of the individuals and consequently the production of the country. The unwanted child creates a frustrating and miserable environment and is a threat to human dignity. In this modern age, a child brought into this world must not only be fed, but clothed, housed, medically cared for and must have access to at least minimal educational services. In the absence of these services, human society will be no more than a chicken brooder. To avoid this and consequently to achieve the upliftment of human society we need (a) massive improvement in the educational system, (b) increased job opportunities for women, (c) a lowering of the infant mortality rate. Providing these bare necessities is impossible with the present increase in the rate of population.

At this critical juncture we are bound to solve this population problem. Fortunately, we have been able to check the death rate. In other words the "natural laws" governing death have been drastically amended by man; the "natural laws" of birth have not. This imbalance has created a real threat to present human society. For this reason, we reach the conclusion that population growth must be checked for the betterment and progress of society. The question now arises as to how we should go about this, humanely or in-humanely, rationally or irrationally. We obviously cannot afford to increase the death rate by disease, starvation, war and the like. We must therefore strive to curtail the birth rate medically and by the creation of a suitable environment. The population dilemma cannot be considered as simply an internal health problem; it is a national as well as an international problem. As such, the solution can only be attained if the problem is considered from a much broader perspective.

Health:

Maternity and child health programs must be made available to the remotest parts of the country which usually have a high infant mortality rate and less facilities for maternity care. The family planning program is best received by mothers in their maternity state and therefore this is the best time to enlighten the women on birth control measures. I believe that if the Family Planning Centre could have maternity facilities, their effect would undoubtedly be doubled. This I feel is a dire necessity. Since our slender resources are not enough to fulfill these necessities we need help from generous international agencies in this field.

The family planning program should not be concentrated in the urban areas. Regions of dense population should be chosen (preferably in the Terai belt). Our family planning program still lacks motivation. Motivation, I feel, is a vital part of the program, and this is sorely lacking. Only after interest is aroused in the needy people can medical and surgical devices be brought into use. Of course for the illiterate masses, surgical treatment would be preferable. I cannot however agree to legalising abortion in this country yet. As everyone knows, abortion is much more risky than ordinary delivery. In our country we have a severe lack of medical personnel. Not to mention doctors, we do not even have trained midwives in every district, let alone in every village. How can we give enough care to abortion when young mothers are dying due to lack of ordinary health facilities during maternity. Where such poor health services exist, legalising abortion could be harmful to women. Furthermore we must consider the moral and social aspects of abortion too. It will take time to orient people's thinking in this field. Family planning devices are designed to "prevent" conception, but abortion most people feel is the killing of a human being and therefore a very great sin. Therefore before legalising abortion, we should create a suitable environment in which society will be ready to accept it.



Mrs. Kamal Rana, Chairman of the Women's Organization  
and Rastriya Panchayat Member commenting on Dr. Okada's  
paper.

### Social Welfare:

There are a lot of improvements to be made in existing social laws. Our minimum age for marriage must be raised, polygamy and bigamy must be strictly checked. Child marriage should be considered a state crime. A system of birth and marriage registration must be introduced.

### Agencies:

The Women's Organisation must be made very active in the field of family planning. This organisation can reach the very core of women in society and therefore would be a most effective agency for motivating women. The Family Planning Association and the Women's Organisation should have very close coordination to accentuate the effectiveness of the family planning program. This program, if launched properly, would no doubt help to liberate women from the throes of misery and poverty and make them come out and take jobs. As there are more women than men in our country, according to the latest census, this extra labour force if properly utilised could be very effective for progress.

### Education:

There is much to be done in the field of education. Our studies show that families are bigger in the uneducated group. Education can create a society which is conscious of the benefit and necessity of a small family. As we have about ten percent literate (of which women constitute 1.75 percent) how can we expect the masses to understand the population problem. So, a strong effort to eradicate illiteracy is called for. Our educational services should be vastly increased with special emphasis on female education. The demand of the modern age is for an educationally equipped labour force not the numerical increment of illiterate people.

Panelist Dr. Rita Thapa's Remarks

1. The present population program in Nepal consists solely of the family planning program which is a service-oriented program under the Ministry of Health. An effective population program, specially in Nepal where there is no infrastructure of health services, should not be limited only to the Ministry of Health. The approaches to this population program should go beyond the Ministry of Health approach. We need, for example, a high level population council headed by a senior person where the various concerned ministries like Agriculture, Information and Broadcasting, Health and private organizations like the Family Planning Organization, and the Women's Organization could be held responsible for their concerned assignment and population program. For example, Agricultural Extension workers could very well talk also about contraceptives and immunization services available in the village when they talk to the farmers about improved varieties of seeds. In short, population control efforts should be an integral part of the various concerned ministries.
2. Quality service for today's motivated parents is the fundamental basis of a successful family planning program for tomorrow's parents, the children of today. So for quality service (since no contraceptives today are 100 percent ideal), there should be a much stronger follow-up service for the few couples who have accepted contraceptives through extension workers.
3. There is much necessity for a built-in evaluation for on-going family planning and the maternity and child health program. This could be done in villages choosen on a sampling basis where typical family planning and M.C.H. programs are going on.

At periodic intervals one could assess what is happening to the variables of population like Crude Birth Rate, Death Rate, Infant Mortality Rate, Migration Rate, etc.

4. Inclusion of basic knowledge about maternal and child health, family planning, communicable diseases, and personal hygiene in the High School curriculum as compulsory subjects for all children would greatly increase awareness regarding these topics.
5. As none of today's contraceptive methods are 100 percent effective in preventing pregnancy, well-qualified doctors should have the liberty of preventing birth by abortion in cases of contraceptive failure. The decision for abortion could be handled by a very strict committee comprised of members from various walks of life.

### Floor Discussion

The ensuing discussion concentrated on the cost of family planning and the allocation of funds for it. The cost of family planning in Nepal should include the cost of contraceptives, the administrative costs of health services, the cost of communications, and the cost of incentives such as social security benefits. Dr. Enke's GE Tempo Model assumes a great deal of the necessary communication and medical infrastructure; therefore, the costs tend to be somewhat downward biased.

Dr. B. B. Pradhan felt that the Fourth Plan does not adequately face the problem of population growth. He asserted there is a margin at which it is more profitable to invest in family planning rather than new roads. Mr. Chitra Bahadur K.C. reinforced this by saying that the Ministry of Finance gives first priority to projects with quick returns. At the same time he countered Dr. Okada's remarks about the size of the family planning budget. It has increased from Rs.26,000 in 1965 to Rs.1,00,000 at present.

Mr. Malhotra carried on the theme of the costs of family planning. The 120 figure for benefits provided by the Enke Model is true only for initial cases. Costs increase when trying to go beyond the easy acceptors. He again stated his view that both the numerator and denominator should be considered when viewing per capita income - neither should be emphasized at the expense of the other.

Mr. Shailendra took up the question of research necessary for an effective family planning program: How are resources going to be used? How much research has been done? Is research being done on ethnic groups? Where do we concentrate resources? To these questions, Mr. Shrivastwa from CBS commented that there are no reliable birth and death data.

Mr. Shailendra also questioned the plan to integrate family planning services with basic health services. He said Nepal does not yet have the basic services to accomplish this!

Dr. Cool's suggestion of greater community responsibility was taken up by Dr. N. K. Shah and Mr. Brown. Dr. Shah said that panchayats must be actively involved in family planning - especially in motivation and distribution. Dr. Cool again related information on the FP Festival (Vasectomy camp) in Kerala. It was conducted by the District Collector, not the national FP program.



Summary of the Session by the Chairman Mr. K. B. Malla

In his summary of session, Mr. K. B. Malla made the following observations. The rapid growth of population demands increased expenditures in housing, health, education, panchayat, etc. This demand creates more constraints on the national budget. The food-population problem of the 1960's is becoming the employment problem of the 1970's. In Nepal, population growth is having especially bad consequences on the health of Nepalese. Because of the importance of population control, family planning should be supported by all ministries. A strong public policy is necessary in order to mobilize public support for zero population growth and to create the machinery for implementation of a family planning program.

Chapter V - POPULATION GROWTH AND GOVERNMENT

1. The Political Demography of Nepal  
by Dr. Myron Weiner.
2. Comments by Dr. Jagadish Sharma.
3. Comments by Mr. Pashupati Shumshere J. B. Rana.
4. Floor Discussion.
5. Summary of the Session by the Chairman  
Dr. Tulsi Giri.



Dr. Myron Weiner presenting his paper, Dr. Tulsi Giri  
(Ex-Chairman of the Council of Minister) as Chairman  
of the Session.

## The Political Demography of Nepal

by Dr. Myron Weiner

Political demography is the study of the political effects of changes in the size, rate of growth, distribution and composition of a population. Among the more familiar demographic differences between developed and less developed countries is that the latter have high fertility, mortality and morbidity rates, larger families, a young population and therefore a heavy dependency ratio, and fewer older people. Among the more typical social and political consequences of these differences is that less developed countries are often faced with a restive youth population, annual increments to the labour force which exceed employment opportunities, growing fragmentation of land holdings and increased pressure on the land, rising demands upon government for social services, and increases in per capita incomes well below increases in the gross national product.

The focus of this paper will be on some of the long-term political consequences of rapid population growth in Nepal.

Nepal is a population-exporting nation. Since the middle of the 19th century thousands of young Nepalese have migrated to India to serve in the Gurkha regiments of the British and Indian armies. Still others have migrated to India to work as tea plantation labourers or cultivators in Sikkim, in Darjeeling and Jalpaiguri districts of West Bengal, in Lakhimpur, Darrang and Kamrup districts of Assam, in the border districts of U.P. and Bihar, and as watchman in factories, offices and residences in Calcutta and Bombay. The 1961 census reports that there were nearly a half million Nepali-born migrants in India, and a total of one million who reported Nepali as their mother tongue. And to these migrations one should add a small number of Gurkhas in the British army in Singapore, Hong Kong and Great Britain.

Apart from providing an important economic and political safety valve for the surplus population of the Hill areas of Nepal, the emigration has been a significant source of income for Nepal. The British government alone pays one

million pounds sterling a year in pensions to twenty thousand retired Gurkhas and the Indian government reportedly provides several times that amount to over a hundred thousand retired soldiers. One informed estimate is that there may be as many as one million Nepalis belonging to families with at least one member receiving retirement benefits from the British or Indian governments. How many more Nepalis receive benefits from the half million Nepali migrants to India would be a wild guess, but it could hardly be less than another million.

Where in India do these migrants live? According to the 1961 Indian census there were 4,98,836 persons born in Nepal residing in India, of whom 2,80,009 were males and 2,18,227 were females. They were distributed as follows:

<u>State</u>	<u>Persons</u>	<u>Males</u>	<u>Females</u>
Assam	82,624	53,189	29,435
Bihar	1,08,971	24,925	84,046
Gujerat	3,352	2,629	723
M.P.	7,605	5,971	1,634
Madras	2,645	2,231	414
Maharashtra	13,704	11,812	1,892
Mysore	1,398	1,231	167
Orissa	2,476	1,774	702
Punjab	11,719	9,598	2,121
Rajasthan	2,053	1,509	544
U.P.	1,11,718	63,661	48,057
W. Bengal	1,09,190	68,501	40,689
Delhi	5,892	4,544	1,348
Himachal	9,699	8,845	854
Manipur	3,576	2,146	1,430
NEFA	8,223	7,542	681
Nagaland	4,926	4,155	771
Sikkim	5,352	3,328	2,024

(States and territories containing less than 1,000 Nepali migrants have been excluded from the table).

What is the annual migration of Nepalis into India? The 1961 census reported that 82,000 Nepalis had resided in India for less than one year. Of these 66,000 were males and only 16,000 were females. 1,29,000 Nepalis stayed in India

from one to five years; it would have been two and a half times that number if all the first year migrants had stayed on. Another 76,600 had lived in India from six to ten years, 66,200 from eleven to fifteen years, and 1,32,700 for more than sixteen years. The bulk of the annual migrants thus leave within five years while almost all of those who remain longer than five years are life-time residents. The attrition rate appears to be of the following order of magnitude: 40 percent of the migrants leave after one year, another 30 percent of the remainder leave after the second year, 20 percent after the third year, 10 percent after the fourth year and five percent or less every year thereafter. Most of the attrition after a decade is accounted for by the mortality rate.

Almost all of the male migrants to India join the labour force. Of the 2,80,000 male Nepalis in India, 2,35,000 are workers and only 45,000 are nonworkers - that is retired, ill, unemployed or too young to work. Thus, 83 percent of the males are employed as against 57 percent for the total male population in India.

In contrast, of the 2,18,000 Nepali-born women in India, slightly under 79,000 or 36 percent are employed (as against 26 percent of India's female population), suggesting that a very substantial number are married. One striking feature of the male-female ratio of Nepali migrants to India is that among those who live in India for less than a year, the number of males exceeds females by a ratio of four to one (65,800 males to 15,700 females), but drops to two to one in the group that has lived in India from one to five years; the female proportion then mounts sharply thereafter until there are 83,000 Nepali born women residing in India for more than sixteen years as against only 49,000 men.

I have estimated that of the 15,700 Nepali women who enter India each year, approximately 10,000 stay permanently. Of the 65,800 Nepali males who enter India each year, approximately 10,000 remain permanently. Incidentally, an examination of male and female migration tables by district suggests that these male and female migrants are not married to each other. I would estimate that approximately 3,000 women cross into Bihar each year and that another 1,800 women cross into U.P. to marry Indians. Considering the

similarities in the Bhojpuri, Maithili and Awadhi speaking peoples on the two sides of the borders, the movement of brides across the borders is quite understandable.

To recapitulate, approximately 82,000 Nepalis migrated annually to India as of the 1961 census, and each year approximately 62,000 migrants returned after having lived in India from one to five years. Of the 20,000 who remained, half were males and half were females and at least half of these females came to India to marry Indian citizens.<sup>13/</sup>

Where do these migrants come from? One striking feature of the migrations to India is that the migrants do not come from the densely populated Terai districts bordering India but from the less densely populated Hill districts.

There are two tables in the 1961 Nepali census that provide us with data on migrations to India - a table on sex ratios and another reporting the number of people absent from home and out of the country for six or more months. Fortunately, the two tables are consistent. The Nepali census reported that 3,28,470 Nepalis were out of the country for at least six months and that they came primarily from three regions:

Eastern Hills	80,592
Western Hills	1,50,502
Far Western Hills	74,264
	<u>3,05,358</u>

The sex ratios for these three areas were as follows: Eastern Hills 93.7, Western Hills 91.7, and Far Western Hills 95.6. In other words a larger number of males left these districts than females. In contrast the number of males exceeds the number of females residing in the Eastern,

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<sup>13/</sup> In these calculations I have assumed that nothing abnormal occurred in 1960-61 which would have substantially increased that year's migration from Nepal to India. The number does moreover appear to be consistent with the five year migration figures.

Western and Far Western Terai and in Kathmandu Valley, areas from which there is little emigration.

These figures confirm the impression that it is the Hill areas of Nepal which are feeling the burdens of population pressure. Though these areas are not densely populated per square mile, they are densely populated per unit of arable land - a much more meaningful measure of density in a rural society.

Until we have the final results of the 1971 censuses for India and Nepal we shall not know whether the rate of migration of Nepalis into India has risen or declined and whether the Hill people still predominate among the migrants. There is reason to believe, however, that the number of Gurkhas recruited into the Indian army has not declined during the past decade and even some reason to assume that it may have gone up in view of the Indian army's concern for recruiting men who can function effectively in the Hill areas of northern India. It is highly probable that Indian military recruitment has more than made up for the decline in British army recruitment which is reported down from its annual intake of 1,000 to 500 per year.

For the past few decades India has provided a significant safety valve for Nepal's surplus male population, especially from the over-populated Hill areas. But two features of this emigration warrant our attention. The first is that for most of the emigrants the outlet has been a temporary one, that is for less than five years. As we have seen, only about 10,000 males and 10,000 females migrate permanently to India each year. Secondly, there is no evidence that in the period from 1951 to 1961 the rate of migration to India increased, nor is there any reason to expect that in the future India will be able to provide land or substantial employment opportunities for an increasing number of Nepalis. The outlet to India is thus in no way a solution to Nepal's population growth.

## II

The Terai is now providing an additional outlet for the Hill population which migration to India once exclusively provided. In the past large portions of the malarial Terai

were not particularly hospitable for human habitation, but in recent years a relatively successful malarial control program has opened the Terai to new settlement. Between 1965 and 1969 it is estimated that the amount of land under rice cultivation increased from 11,11,000 hectares to 13,25,000 hectares, a 20 percent increase, and the amount of land under maize and wheat cultivation increased from 568 hectares to 735 hectares, a 30 percent increase. Almost all of this new land is in the Terai. It is interesting to note too that Nepal's increase in rice and maize production during this period is almost entirely a consequence of the increase in arable land. Only the output of wheat has substantially increased in per hectare production.

The magnitude of the migration of Hill peoples into the Terai during the past decade is not known. The government has made some Terai land available to ex-Gurkha soldiers and there are reports that many preवासि, that is migrants who have returned from India, have been settling in the Terai. The Forest Department also reports throughout the Terai many people from the Hills have become squatters, and illegally cut or burn forests.

Until 1961 the Terai was occupied almost exclusively by people of plains origin. About 30 percent of Nepal's population was in the Terai and these included 5,77,000 speakers of Bhojpuri, 11,30,000 speakers of Maithili and 4,47,000 speakers of Awadhi, or about two-thirds of the Terai population. These are all Indian languages spoken in the neighbouring districts of U.P. and Bihar. Another 4,07,000 people are Tharus, a tribe of plains origin. In 1961 little more than 10 percent of the Terai population spoke Hill languages, such as Newari or Nepali, as their mother tongue.<sup>14/</sup>

The Terai, especially the levelled lands in the eastern Terai, has for some time been attracting Indian migrants. In 1961 the Nepal census reported 3,24,659 persons born in India residing in Nepal, of whom 2,13,230 resided in the Eastern Terai, and 78,162 resided in the Western Terai. We must await the forthcoming Nepal census and the results of

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<sup>14/</sup>cf. Dor Bahadur Bista, The People of Nepal, Department of Information, Kathmandu, 1971.

the recent Indian census to find out whether the migrations from Bihar and U.P. into the Terai have increased. A recent survey of 100 villages in the Terai conducted by Professor Fred Gaige of Davidson College reports that there has been a substantial increase in migrations from India, perhaps larger than the migration of hill people into the Terai. Many of the landless labourers in the Terai are from Bihar, and there has been a substantial increase in the number of Marwari shopkeepers and urban dwellers from India into Biratnagar, Birganj and Nepalganj, all rapidly growing Terai towns. Moreover, many of the labourers employed in the construction of the new east-west highway in the Terai have come from India.

Although the opening of the Terai to settlement by people from the densely populated Hills is providing an additional outlet for Nepal's overpopulated regions, it is also creating new problems for the political and economic system.

First, the increasing deforestation of portions of the Terai is reducing the country's timber resources for development and increasing soil erosion and flooding. Much of the damage will be irreversible.

Secondly, the settlement of Hills people in the Terai has increased the possibility of political conflict between them and the plains people, most of whom are of Indian racial and linguistic origin. Elsewhere in the subcontinent the movement of divergent linguistic groups into competitive economic positions has frequently resulted in social and political tensions. In the Terai tensions may arise over divergent views as to who is "local" and, who is an "outsider", for while the plains people are native to the Terai, the Hills people may view themselves as more representative of Nepali culture and nationality. Future political tensions in the Terai must also be seen in the context of the government's political objective of incorporating the Terai politically, culturally and economically into Nepal and to reduce, where possible, the links between the Terai and India. To achieve this objective, Nepali has been introduced as the medium of instruction in all primary schools in the country, including the Bhojpuri, Maithili and Awadhi speaking areas of the Terai. Radio broadcasts are now exclusively

in Nepali and government officers, generally of Hill origin, are instructed to carry on government business in Nepali rather than in the languages of the Terai.

Few of the plains people in the Terai can be found in the power structure of Nepal. Few are recruited into the army or the administration and not many are in the national panchayat or in the cabinet. Nor can grievances be expressed through organized political parties. In contrast, the Hills people who are settled in the Terai are much more integrated into the power structure; a casual survey of cabinet members, political leaders and secretaries of ministries show that many who are permanently settled in the Terai are ethnically of Hill origin.

The continued settlement of Indian-born migrants into the Terai may create still another problem. The Terai is Nepal's economic frontier. With the improvement of transportation and communication and the opening of new lands, it is likely to attract private investment from India and more migrants not only from the hill areas of Nepal but from the neighbouring districts of India. The government of Nepal has taken the position that the continued encroachment of Indian Nationals into Nepal is unacceptable and has therefore prohibited the purchase of land by non-citizens. It is likely that pressure will increase to restrict the employment of non-citizens as well. By the 1980s the Terai could be enmeshed in the citizenship controversies that have marked the politics of Ceylon, Burma and East Africa in recent years. Because of its obvious international repercussions, the citizenship question is particularly explosive.

In the absence of a compulsory birth registration scheme there is now no clear and reliable method for ascertaining who is a citizen and who is not. The establishment of such a compulsory birth registration scheme at this time, before the citizenship issue has become explosive, would be one way of reassuring Nepalis of Indian origin that their children's rights as citizens - to buy land, to vote, to obtain educational benefits and to find employment - would be protected. There is thus a great incentive for the scheme is expanded so as to permit all parents with small children to register their children for birth certificate.

then the citizenship of a substantial part of the population could be clarified within a decade.<sup>15/</sup>

### III

Many Nepalis have expressed their concern that the Hill areas rather than the Terai will become an area of social and political discontent within the next decade. The construction of the east-west highway in the Terai is to be followed by the construction of link roads connecting the Hill areas to the Terai. This will make possible, it is hoped, greater trade between the Terai and the Hills with the Terai selling food grains in return for forest and horticultural products. But whatever the long-term plans, the more immediate prospect is that the economy of the Terai will improve more rapidly than that of the Hills. Most of the agricultural development programs are in the Terai and for some time it is the Terai transportation and communication system that will improve. With a growth in agricultural productivity, the sale of consumer goods will increase and some new industries may be started. Little of this is likely to benefit the more isolated Hill areas.

The Hills represent the cultural heartland of Nepal and its political leaders may protest that their region is being neglected while the Terai, with its large population of plains

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<sup>15/</sup> To be more precise, if all children under the ages of ten are now registered, and all subsequent births are registered during the next ten years, then 50 percent of the population would be registered by 1981. In addition to clarifying citizenship, a birth registration scheme has many other social and legal benefits. It is a necessary condition for the enforcement of compulsory primary education, restrictions on the employment of child labour in factories, regulation of age of marriage and provisions for social security. While none of these measures are on the immediate horizon for Nepal, compulsory birth registration is a necessary first step toward the establishment and enforcement of such programs. Birth registration also provides important data for family planning programs and facilitates vaccination for children and other public health measures.

people, is getting the greater share of the government's resources. But the economic reality is that the plains have greater prospects for more rapid economic growth and the government of Nepal simply does not have the resources to accelerate development in the Hills. The dilemma is a familiar one within developing countries: To pursue a policy of developing first those regions with the greatest economic potentiality is to exacerbate regional disparities and provoke political conflicts. To do otherwise may be to slow the pace of national economic growth.

Some members of the government are fully aware of the political dangers that could arise from a substantially slower rate of economic growth in the Hills, continued population pressures on the land only partially relieved by migration of Hill peoples to the Terai, and of the pressures that might be placed upon the government from the Hills for more development assistance. Some government leaders have advocated turning more powers and resources over to district panchayats by transferring powers now in the hands of the administration, such as the departments of education, agricultural, public works, and health, into the hands of panchayats. The political effect of such a transfer would be to engage the attention of the small landholders and college graduates who dominate the panchayats in local development activities for at least another decade or so. In short, an effort would be made to satisfy the demands for more development by the Hill people, not by a reallocation of national resources from other regions of the country, but by a reallocation of resources from administrative agencies to elected panchayats.

While regional disparities, the relationship between Hills and plains people, and the thorny issue of migration from India may strike outside observers as three of Nepal's major long-term political problems, those who are in the midst of the political scene are more concerned with the immediate consequences of a restive student population. The recent disturbances of Ceylon are seen as a more ominous lesson for Nepal than the disturbances in Pakistan.

Ever since the King abolished parliament and banned political parties, pressure for the restoration of the parliamentary system based on direct elections has come almost

exclusively from the college students and graduates. The number of graduates in Nepal is small - they are estimated to be about 10,000 with more than half residing in Kathmandu Valley. In 1967-68, 11,802 students were enrolled in thirty-six colleges, 1,188 students completed their intermediate exams that year and 490 students passed the BA examinations.

While political parties and political association in Nepal are illegal, students can run their own student unions and are, in effect, permitted to form political associations within the campus to contest student union elections. Thus, one will find on the campus of Tribhuvan University and in colleges throughout the country, political groups which are elsewhere banned. These activities are watched carefully by the government to ensure that they are confined to the campuses and that disruptions are kept to tolerable limits.

Many government officials are less concerned with what students do while they are in college than with what they may do as graduates once they have left college. They believe that students are always bound to be disruptive, that they can do little damage to the country so long as their activities are confined to the campus of the University and are incorporated into the country's economy they will come to accept the political system.

If these assumptions are valid, then there must be some tolerance of student discontent, a willingness by government authorities to provide employment in government even to those students who have been its most radical critics, and adequate opportunities in government or in the private sector to employ the annual crop of graduates.

The problem of balancing the number of graduates with the country's manpower requirements - to redefine the political problem into more neutral terms - was a major issue before the task force on education appointed by the Crown Prince. The task force recommended that the system of open admissions into higher education for all those who passed the School Leaving Certificate examinations should come to an end and that there be independent higher education admission examinations run by the university. The government

could thereby limit the number of students entering the university without restricting the expansion of primary and secondary schools. The present loophole in the proposal, however, is that students who are not admitted into colleges in Nepal or who repeatedly fail examinations can seek admission into Indian universities and upon graduation return to Nepal for government employment. The Nepal government could either establish equivalences for foreign and domestic degrees or instruct the public service commission to no longer rely upon degrees, certificates and diplomas as the exclusive criteria for government employment.<sup>16/</sup>

While calling for a limitation on the expansion of higher education, the task force also pressed for the expansion of primary and secondary school education and for a sizable increase in expenditures on education. At present only 32 percent of the children of primary school age attend schools in Nepal; the drop-out rate in primary school is very high and the proportion of girls in school is very low. Since there is evidence elsewhere in the world that female education is an important factor in receptivity to family planning measures - educated women generally have smaller families than uneducated women - the decision to expand primary education could have long-term implications for the country's population growth if it results in a substantial increase in female school attendance.

But population growth also has an impact on demands for an expansion of the educational system. In Nepal, the demand for education has not reached the level that it has in many other developing societies where governments have been committed to universal primary school education and

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<sup>16/</sup> This latter solution would of course relieve the universities of their present burden of being screening institutions for government employment and force the government to define the skills required and prepare examinations for various type of government jobs. But it seems most unlikely that the Nepal administration would be prepared to assume this responsibility though its advantages both to the university and to the administration would be considerable.

where a large part of the rural population is sufficiently politicized and organized to press government for educational facilities. Paradoxically, as the government of Nepal expands its investment in primary schools, the pressure for their expansion is likely to increase and it is then that the government is likely to feel the pinch of population growth.

In educational expansion the relevant statistic is not a country's population growth rate, but the fertility rate minus the child mortality rate. What is the increase in the proportion of children reaching primary school age each year? A population growth rate of 2.5 percent a year could mean a 3 percent or 3.5 percent increase in the number of primary school children each year depending upon the infant and child mortality rate. According to government estimates 40 percent of the Nepali population is now below the age of 15. If the fertility rate does not sharply decline, the government would have to expand primary school enrollment three to four times during the next twenty years if they are to achieve a target of universal primary school education before the end of the century.

A commitment to make primary education in Nepal universal would thus mean a substantial shift in resources. The more useful primary education can be made (a major objective of the education reforms is to increase the vocational component of education), the greater may be the demand for it; and the more village, and district panchayats are brought into the sphere of primary education, the greater is likely to be the organized pressures for heavier government allocations.

V

Nepal is an economically dependent state. About 60 percent of all of Nepal's development expenditures comes from foreign aid and nine-tenths of her trade is exclusively with India. Her efforts to diversify trade have thus far had little success. And the volume and proportions of foreign aid have been increasing in the last few years. In 1962 external assistance to Nepal totalled \$8.3 million, by 1967 it had nearly doubled to \$15.8 and by 1970 it was

up to \$30 million.<sup>17/</sup> In 1969-70, India provided 52 percent of Nepal's foreign aid, China provided 27 percent, the U.S. 16 percent, the U.K. and the Soviet Union two percent each and one percent came from UN agencies and other countries. The estimates for 1970-71 show increases in the proportion of American and British assistance with proportionate decreases in Soviet and Chinese aid.

Nepal's extreme dependence upon the outside world for development (it ranks among the lowest in the proportion of internal resources used for development) is the result of a number of factors: the extreme poverty of the country, the low level of monetization of the economy, the absence of a taxable industrial sector, the heavy dependence on low-yield agriculture, and the absence of any primary products sought on the world market. It is estimated that the Government's revenue is 4.26 percent of the gross domestic product (estimated to be \$840 million in 1970).

Nepal's high population growth is a contributing factor to this position of dependence. With a population growth rate of well above two percent per year, increases in per capita income are nominal, the rate of savings is low, and the capacity of the government to increase revenue through taxation is likely to remain limited. Given these considerations it is hard to see how Nepal could be much less dependent upon external assistance by the end of the century than she is today.

Some aid-givers have argued that Nepal is now receiving more assistance than the country can gainfully use given the limited number of technically skilled people, the primitive state of transportation and communication, and the government's limited administrative capabilities. But geopolitical considerations rather than Nepal's needs or

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<sup>17/</sup> cf. Pashupati Shumshere J. B. Rana, "India and Nepal: The Political Economy of a relationship", Asian Survey, July, 1971, University of California Press, Berkeley. Nepal's development budget is larger than the governments' regular annual budget. If the two budgets are added together, the total percentage of external support would be nearly 50

absorptive capacity have largely determined the volume and sources of aid. India aims to limit Chinese penetration into Nepal. China wishes to demonstrate that she can maintain friendly relations with a border state. And the United States, Britain and the Soviet Union would like to maintain Nepal as a buffer state separating India and China.

For the government of Nepal, therefore, the problem is one of how to use the generous aid from outside (whatever the motivations of the giver) to hasten the time when Nepal's dependency can be sharply reduced.

## VI

The population of Nepal is currently increasing at a rate at least twice that of most Western countries in the 19th century and in an economy which is far less developed. Population variables are thus bound to loom larger as factors effecting internal migration, educational development, the rate of economic growth and many other social, economic and political changes than is the case for countries which developed earlier.

Precisely because its impact is greater, population issues are receiving greater attention by governments today than was the case in the past. From an initially exclusive concern with family planning programs - clearly a first and essential step toward a population policy - governments have begun to give attention to two more components of a population policy: the social conditions, such as female education, the employment of child labour, infant mortality rates, social insurance for the aged, etc., which are likely to effect decisions made by couples as to the optimum size of their family; and secondly, the social, economic and political consequences of population growth and population movement. A population policy for Nepal should encompass both these sets of issues.

Comments by Dr. Jagadish Sharma

"Political Demography", according to the author, is "the study of the political effects in the size, rate of growth, distribution and composition of a population". As the title of Dr. Weiner's paper itself suggests, the author's intention is to do just this. The paper, however, appears to be merely the first step towards the attainment of that objective.

Regarding the male-female statistical breakdown, indicated on page 4, one wonders how accurate this really is. The present commentator is not all that confident of the figures for females. First, there is a considerable amount of female slave traffic that flows from Nepal to India. Most of these women are reported to be employed in Indian brothels. And it is doubtful if they are included in the Indian census figures. Since most of these women find themselves in the profession not of their own volition, it would be surprising if they were allowed to participate in the census exercises.

The statement that "36 percent (of females) are employed (as against 26 percent of India's female population) suggesting that a very substantial number are married"<sup>18/</sup> is open to question. Also the author's following statement remains to be accounted for because the birth factor is unconvincing.

"One striking feature of the male-female ratio of Nepali migrants to India is that among those who live in India for less than a year, the number of males exceeds females by a ratio of four to one (65,800 males to 15,700 females) but drops to two to one in the group that has lived in India from one to five years; the females proportion mounts sharply thereafter until there are 83,000 Nepali born women residing in India for more than sixteen years as only 49,000 men."<sup>19/</sup>

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<sup>18/</sup> Myron Weiner, "The Political Demography of Nepal", page 100.

<sup>19/</sup> Ibid., p. 100.

In view of the above, Weiner's mention of the "movement of brides across the borders" is not wholly tenable inasmuch as it does not take into account the slave traffic.

The sex ratio the author refers to in the last paragraph of the same page remains to be spelled out. The commentator is, however, in agreement with the author as far as the burdens of population pressure on the Hill areas is concerned. Regarding Gurkha recruitment in the Indian army, it may be noted that they are also recruited into the Assam Rifles and the Jammu and Kashmir militia.

The present commentator is in agreement with the statement that "the outlet to India is thus no way a solution to Nepal's population growth."<sup>20/</sup>

Also, an increasing number of India-born Nepalese (most of them educated) continue to pour into Nepal. Many of them have been able to land much better positions in their native land than they could ever hope to achieve in India.

Regarding the settlement of migrants in the Terai, it may be noted that these comprise not just prevasi migrants from India, as has been mentioned, but include returning expatriates from Burma, as well as from adjoining Sikkim and Bhutan.

With reference to Weiner's statement that "few of the plains people in the Terai can be found in the power structure of Nepal"<sup>21/</sup>, it should be acknowledged that the situation has improved a great deal over the past few years.

The establishment of a compulsory birth registration scheme, as suggested by the author, is most necessary.

In the end, there is no denying the fact that time is running out and we have to do everything possible to stem the tide of population. In the opinion of the present commentator, Weiner's analysis is not as alarmist as it is realistic.

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<sup>20/</sup> Ibid., p. 102.

<sup>21/</sup> Ibid., p. 105.

Comments by Mr. Pashupati Shumshere J.B. Rana

1. The Soft-state Syndrome and Population

In reading Dr. Weiner's excellent paper, I was struck primarily with how the population problem impinges on what might be called the fundamental "soft-state" syndrome. Take the problem of the great move of the population from the Hills to the Terai. It is ironical to note that the natural and historic guardian of the forest wealth of Nepal was malaria. Given the pressure of population in the Hills, had it not been for this ecological inhibition, the machinery of the state could never have stemmed the tide of resettlement. The success of malaria eradication has now unlocked the floodgates to uncontrolled resettlement of the Hill population into the Terai. Given again the weak and corrupt machinery of government so inevitable in a soft-state, is it possible to aim at a large-scale forestry preservation program in the Terai? The cost of a large-scale and effective administrative system for the preservation of forests against this natural and inevitable population movement is likely to be prohibitive in view of the many other calls on the state's resources. The sensible question for a policy-maker would have to be put in terms of a preservation scheme that does not move against this migratory trend of resettlement, but moves with it. It may be that we have to think essentially in terms of afforestation and preservation in the Hills which are being drained of population. Clearly a policy solution when actually worked out will emerge in the form of a compromise. But if this logic of moving with the tide - accepting the inevitable defects of a "soft-state" syndrome - is acknowledged in principle, then the solution would emerge in terms of minimal forest preservation in the Terai. It would mean that only two or three select areas would be preserved in the Terai. In those, forest administration would have to be even more costly and organized than that now imposed in the Chitwan-Narayani area and stricter than even the Gairdi-Graati.\* Apart

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\* This is the name given to the set of forest guards responsible for preventing poaching in the Chitwan-Nawalpur area, where the rhinoceros are. These guards are present in very much larger numbers in proportion to the area than elsewhere in Nepal and are considered "comparatively" efficient in preventing poaching.

from these two or three select Terai areas, the whole emphasis of forestry policy would shift to afforestation and preservation in broad areas of the Hills. This would also mean a division of the Hills into two different types of areas: One for forestry and horticulture, the other for animal husbandry with clear demarcations between the two.

Thus population migration patterns have major consequences for both forest administration policy and regional agricultural policy. Working out policy options which are not directly contradictory to inevitable trends in the economy, but rather capitalize on the inherent forces in the economy is perhaps the only solution that is realistic for "soft-states".

## 2. Necessity for Research

The decisions that determine population growth, migration etc. are essentially the decisions of millions of individual families. By definition, the more backward a state is, the smaller the organized sector and therefore the smaller the sectors amenable to manipulation by direct policy instruments. Consequently in a country as underdeveloped as Nepal, inducing decisions on the part of the populace by direct means is exceedingly difficult. It is essential then to consider what indirect means can be used to release environmental and market forces in the desired direction.

It is a poor comment on the state of the sciences that so little work has been done in this direction. One obvious conclusion from this is the necessity of a research programme to isolate: (a) What are the factors that are critical to the decisions of most husbands and wives to limit families? (b) Of the many different social groups and regions in Nepal, which are the ones most likely to take advantage of birth-control facilities if they are made available?

For instance, Dr. Weiner's paper indicates that there are in several parts of the Hills groups of men who are either (a) seasonally absent or (b) secularly absent. Both these groups are likely to possess two

characteristics: (a) Their mobility should increase their propensity to accept innovations such as birth control. (b) The very fact that they are present with their wives for only brief periods after long intervals means that the cost of using birth-control devices is likely to be very much smaller in their case. Now if birth-control could concentrate on such areas with high migration propensities, benefit per unit of cost is likely to be higher than elsewhere.

It would seem that research in several sample areas could establish other such characteristics which define the propensity to limit family size. Not only would this make it possible to isolate the areas where the pay-off on birth control programmes would be highest, but by contrasting the characteristics of areas where acceptability is high and those of areas where acceptability is low, it may be possible to isolate the critical factors which induce parents to limit the size of their families.

### 3. Non-Representation of Terai Peoples in the Establishment

Dr. Weiner's statement that the Terai is unrepresented in the establishment needs qualification. The elite groups of the Terai, such as the more affluent groups among the Kayasthas, Rajputs or the Marwaris, are well represented in the establishment. Marwaris for instance control a very large percentage of trade and industry. Other Terai groups such as the Tharus, Rajbansis, Danwars, Satars, Bodas, and Dhimal on the other hand are very poorly represented.

Nor is it true that all the Hill people are well-represented in the establishment. Hill communities such as the Tamangs, Rais and Limbus are perhaps as poorly represented in the establishment as say the Tharus and Satars of the Terai.

For instance an ethnic analysis of government positions above the under-secretary level in 1969 showed the following distribution:<sup>22/</sup>

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<sup>22/</sup> Pashupati Shumshere J. B. Rana, "The Fourth Plan: A Critique", Nepal in Perspective, Chapter 1, Appendix IV, Yeti Pocket Books Pvt. Ltd, Kathmandu (Forthcoming).

The three dominant castes (Chhetri, Brahman, Newar)	93%
The other Hill groups	2.5%
The Terai groups	3%

Similarly an ethnic analysis<sup>23/</sup> of the graduates registered in the 1967 elections for the Rastriya Panchayat showed that the Terai people enjoyed better educational opportunities than the non-dominant Hill communities.

The three dominant castes	90%
Kayasthas (Terai)	8%
Other Hill communities	1%

So Dr. Weiner's remark that all Hill people are "much more integrated into the power structure" requires considerable qualification. While his remarks apply a fortiori to the three dominant castes (Newar, Brahman and Chhetri), it is not valid in regard to the non-dominant Hill groups, particularly the Tamangs, Bhotias, Sunwars, and Jirels who may in fact be even more discriminated against than the Terai groups. Thus this sweeping distinction between the Terai and the Hills is not a terribly useful device. It is true that the dominant castes would enjoy tremendous inherent advantages over the Tharus, Satars etc. But the Tamangs or Rais on the other hand are likely to enjoy no such advantage. On the contrary the elite Terai groups are likely to enjoy inherent advantages over them.

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<sup>23/</sup> Ibid., Chapter 1, Appendix V

### Floor Discussion

The discussion which followed was concerned with four major issues: (1) migration, (2) rural vs. urban population and regional disparities, (3) compulsory birth registration and (4) national integration.

Generally, everyone agreed that migration has been away from the over-populated Hill areas. Dr. B. P. Shrestha's work shows that there is no correspondence between per capita arable land and the number of people migrating. He further questioned whether the tendency of people to emigrate from Nepal is due to population pressure or other factors such as ethnic group. Dr. Harka Gurung stated that the population density of the Hills is four times as high as that of the Terai. According to Dr. Gurung, the greatest number of migrants come from areas not given a high priority in Gurkha recruitment. The migration of people from these areas to India confirms that the Hills of Nepal are a depressed area - the people are migrating to supplement their incomes. With regard to this question of numbers migrating to India, Dr. Gurung said that Dr. Weiner's figure of 82,000 is underestimated. The Indian census is taken during June and July, the peak work season in the Hills of Nepal, so fewer Hill people are residing in India at that time. It is not only the development process which causes people to move from north to south. Terai towns have historically been economically important to the wealthy principalities, even in spite of malaria. Also, as pointed out by Dr. Gurung, it is the flow of capital, investment, and technology which is important, not merely the numbers of people. Indian migrants to Nepal provide many development services, as well as provide an inflow of capital, while Nepali migrants to India perform menial duties such as chawkidars.

This point was also brought up by Mr. J. B. Shrestha who commented on the labour situation in Biratnagar. The labour force at the Jute Mill was about 3000 in 1936; the Nepalese component of the labour force was zero. After 35 years, the Nepalese proportion has only increased to 25 percent. The sugarcane could not be completely harvested due to a lack of labour. In the Terai, the Nepali labour force is inadequate; therefore, many specialized jobs are done by Indians.

What can be done about this situation? Mr. Shrestha said that there must be some effort by HMG or management to provide the necessary training. Factories could even contribute to the cost of the training. There might be short-term losses in efficiency, but the training will eventually lead to a more beneficial substitution in the labour force. Also, if Nepalis are trained to fill some of these jobs, the law must be changed so that Indians can be displaced from them.

An additional political problem of migration to the Terai was brought up by Mr. Malhotra -- i.e., the Hill people are grabbing land from the poor Terai people (Tharus). A systematic resettlement scheme must be established. This problem is closely related to the question of regional disparities and urban-rural conflicts. Dr. Harka Gurung first pointed out that it is really inaccurate to refer to only two regions. There are actually three major ones: The mountains, Hills, and the Terai. We are making the greatest demands upon the mountain people for the sake of others. He further commented that the question of developing the Terai first is a serious one. A concentration of investment in this region naturally means that people will flow there. However, there is no guarantee that the gains from this development will be redistributed throughout the country. Policy makers must decide whether there should be a concentration of development projects in the densely populated Hill areas or the more easily developed Terai.

Dr. Weiner seemed to assume that the migration of Hill people to the Terai will lead to political conflicts. However, this view was countered. First, Dr. B. P. Shrestha said that the unifying factors of religion and allegiance to the Crown are stronger than any dividing factors such as language. He expressed the view that there need not be significant differences between the groups. Mr. Pashupati Shumshere J. B. Rana said that this shift of population from the Hills to the Terai should be seen as an opportunity. Such large shifts in population will lead to intermingling and intermarriage between ethnic groups. In the short-run effect because the migrating groups are not elite Hill peoples. That they have not become part of the Terai power structure is understandable -- they were not part of the power structure in the Hills either. As Newars, Chetries,

and Brahmins move to the Terai, the power structure may shift.

Dr. Wainer referred to other effects the redistribution of population would have on the national political structure. The Terai is becoming increasingly urban, and urban areas demand more of the political and economic system. This implies a shift in power to urbanized Nepal. In contrast to this, Mr. G. P. Lohani asserted that since Nepal cannot invest heavily in industry, it will remain primarily rural during the next 50 years. The rural people will become a political force and will challenge the urban areas. The political system currently squeezes the villages to support the cities -- e.g., the land reform movement was imposed upon rural people by urban people. As rural areas become more powerful, they will make greater demands on central resources. Urban people will then be supporting rural ones. Rural people will demand their own land reform program, perhaps achieving the four bighas limit.

As explained by Dr. Mohsin, the new education plan is part of an effort to reduce the disparity in political power between Kathmandu Valley and the rest of Nepal. The plan will broaden educational opportunities and will improve higher education opportunities for non-Kathmandu persons. This problem was also touched upon by Mr. Malhotra. He stated that the requirement of a degree for HMG employment is undemocratic, especially since Nepal cannot guarantee free degree education to all people desirous of government employment.

Dr. Weiner also discussed the distribution of power between adults and children and between sexes. Most modern societies have greater rights for children and women, thereby forcing the education of children and the protection of women through age restrictions and marriage. However, in order to do so accurate birth information or compulsory birth registration is required.

With regard to compulsory birth registration, Dr. Jagadish Sharma was skeptical about the implementation of such a program. There must be incentives for people to register. Perhaps this could be done by providing incentives to astrologers (e.g., Rs. 5 for completing forms). On this

topic Mr. Malhotra said that previous attempts at registration have had administrative and cultural difficulties. The Malaria Eradication Program tried to get data. The panchayats have been even less eager to get the information because of the time constraints under which they operate. There is also a cultural difficulty getting people to talk about death for death registration purposes.

The entire question of national integration was only briefly touched upon. Mr. Pashupati Rana called for a more innovative approach -- an "integrated integration plan". This would include some of his views concerning forest preservation and take into account population movement trends. Mr. J. B. Shrestha also offered a concrete suggestion about a plan to help alleviate regional disparities and thereby to encourage integration -- i.e., banks should provide lower interest rates on loans for investment in the Hill areas. Perhaps this lower rate will meet the transfer costs of those interested in Hill investment.

During the discussion, Dr. B. P. Shrestha also disagreed with some of Dr. Weiner's statistical data: e.g., the volume and proportion of foreign aid and the reason for Nepal's increased agricultural output. This primarily reflects the scarcity of good data in Nepal and as pointed out by Dr. Weiner, the statistical questions raised do not invalidate the conclusions.

Dr. Weiner also tried to explain that the population problem is not merely a long-term one. At what point does a child have an impact on the system? At birth, a child has an impact on the health and food ministries. At six, he adds a demand for educational facilities. At 12-15, he demands employment. In his 20's, the death of a parent will have an impact on land holdings. In each of these areas, there is a government ministry that will be directly affected. There are a large range of policies influencing population. Perhaps Nepal needs a task force to study population: Who is affected? What ministries?

Summary of the Session by the Chairman Dr. Tulsi Giri

In his summary of the session, Dr. Tulsi Giri stated that whatever the reasons for migration, it is a search for survival and bound to involve a struggle with political ramifications. Therefore, the problem will continue for years to come. He strongly supported the suggestion for compulsory birth registration.

Dr. Giri also countered the proposition that there is conflict between the Hill and plains people living in the Terai. He is from the Terai and feels that among the common masses there is not much difference between Hill and Terai people. In the midst of a Gurung-Magar area near his Terai home, a Brahmin candidate won easily over a Gurung-Magar candidate during the last general election. He does not feel migration from the Hills to the Terai will affect political stability.

Chapter VI - POPULATION AND ECONOMIC DEVELOPMENT

1. Population, Development and Social Structures  
by Mr. Mohan M. Sainju.
2. Comments by Dr. Pushkar N. Pant.
3. Comments by Mr. Juddha B. Shrestha.
4. Panelist Dr. B. P. Shrestha's Remarks.
5. Panelist Dr. John Beyer's Remarks.
6. Panelist Dr. Mohsin's Remarks.
7. Floor Discussion.
8. Summary of the Session by the Chairman  
Biswa E. Thapa.

## Population, Development and Social Structures

by Mr. Mohan M. Sainju

### I

Without getting involved in the semantic problem of development and underdevelopment<sup>24/</sup>, one clearly finds development to be a complex process of growth and change. The methods and strategies adopted are so diverse and the overall body of literature so extensive that review is not needed here. Despite this "exhaustive" body of literature, it is still very difficult to advance a single variable that determines economic development.

Quite recently, most countries, developed countries in general and less developed countries in particular, have become conscious of the population problem. The simple fact is that the world population which used to take more than 100 years to double now takes less than 35 years to double. Population projections show that the share of developing countries in the total increase of population is not less than eighty five percent.<sup>25/</sup> This fact alarms the leaders and statesmen of the developing world especially because per capita income and savings are relatively very low and the rate of economic growth still very slow. Because developing countries have more than twice the population of developed countries and a rate of growth of population more than double, the widening gap between developing and developed countries is far from

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<sup>24/</sup>The definition of development is a complex and difficult task which still needs rigorous conceptual investigation. For the purpose of this short paper, the classifications "developed" and "less developed" distinguish the differences in per capita income of the respective countries. See Pearson, L., Partners in Development, Report of the Commission on International Development, New York: Praeger, 1969, pp. IX and 23.

<sup>25/</sup>J. D. Durand, "The Modern Expansion of World Population", Proceedings of the American Philosophical Society, June 3, 1971, pp. 137, 139, 149.

narrowing. It is estimated that in 1967 the Gross National Product (GNP) shared by developed countries was 79 percent with only about 27 percent of the total population whereas the share of the developing countries was 21 and 73 percent respectively.<sup>26/</sup>

The implications of population change and the high rate of population growth is multidimensional. Regarding its economic implications, several studies have been done that relate population in developing countries to economic development.<sup>27/</sup> Although negative effects of population growth are evident in many forms, such as in output per worker, capital per worker and nutritional level per worker<sup>28/</sup>,

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<sup>26/</sup> The Population Explosion, A Present Danger, Booklet.

<sup>27/</sup> Ansley Coale and E. M. Hoover, Population Growth and Economic Development in Low-Income Countries, Princeton: Princeton University Press, 1958.

E.M. Hoover and Mark Pearlman, "Measuring the Effects of Population Control on Economic Development: Pakistan As A Case Study", Pakistan Development Review, II, 1966.

Paul Demeny, "The Investment Allocation and Population Growth", Demography, 2, 203-233, 1968.

Stephen Enke, "The Economic Aspects of Slowing Population Growth", Economic Journal, March 1966.

George Zaidan, "Population Growth and Economic Development", Studies in Family Planning, No. 42, The Population Council, N.Y., May 1969.

Apart from the general studies cited above there are many individual reports and studies conducted by various international agencies such as the Population Council, the US AID Missions abroad and Ford Foundation.

<sup>28/</sup> R. A. Easterlin, "Effects of Population Growth on the Economic Development of Developing Countries", The Annals, 1967.

George Zaidan, op. cit.

thereby forming a negative impact on capital formulation, one still faces the difficulty of connecting it empirically to the changes in GNP per capita. As Kuznets says, "the rate of population growth among the underdeveloped countries has no uniform effect on growth in per capita product".<sup>29/</sup> However, the negative impact of population growth is adequate enough to alarm the developing countries where more than "65 percent of the total investment is needed just to maintain the per capita income at a constant level, whereas the corresponding figure for a sample of developed countries is less than 25 percent".<sup>30/</sup> The obvious alternative for a developing country is either to increase its national income and/or reduce its population.

Hence the question is not whether population has any role in the process of development, but whether it has "first order relationship". This demands rigorous research. Despite the controversy of its "conclusive role" in the process of development, there are studies which conclude that excessive population growth has adverse implications on certain social and economic indicators.<sup>31/</sup>

As development is a complex process of social, economic and political change, the process of development must be conceived in a totality which Myrdal calls an

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<sup>29/</sup> Simon Kuznets, "Population and Economic Growth", Proceedings of the American Philosophical Society, 3, No. 3, 1967.

<sup>30/</sup> George Zaidan, op. cit.

<sup>31/</sup> See, Studies in Family Planning. The Population Council No. 16, 1967.

"institutional approach".<sup>32/</sup> The theories of development which are mostly the outcome of western experiences have turned out to be completely inadequate, if not obsolete, to deal with the problems of development. Myrdal's main thesis, it seems, is a challenge to the existing approach of analyzing the problems and issues of the developing world.<sup>33/</sup> Nevertheless some critics like Kusum Nair find Myrdal trapped in the same dilemma when he tries to suggest some policy recommendations.<sup>34/</sup>

The experiences of the developing countries clearly indicate that the existing economic tools and models have proved totally insufficient to deal with the problems developing countries face. This is evident from the gap that exists between the targets of development plans and the

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<sup>32/</sup> He means that "history and politics, theories and ideologies, economic structures and levels, social stratification, agriculture and industry, population development and health and education and so on must be studied not in isolation but in their mutual relationships". See, Gunnar Myrdal, *Asian Drama*, Vol. 3, p. X.

<sup>33/</sup> He addresses himself to the problems of using Western theories and concepts in studying the developing countries and "aspires to do little more than speed up the reorientation of economic and social research". *Ibid*, p. XIII.

<sup>34/</sup> To take one example Nair finds Myrdal advocating "institutional reorganization" of agriculture as an imperative step for South Asian governments on the one hand (p. 1370) and recommending a country like India to make a deliberate policy choice in favour of capitalistic farming on the other hand (p. 1380). See Kusum Nair, "Asian Drama - A Critique" in Economic Development and Cultural Change, July 1969.

actual achievements.<sup>35/</sup> Hence the economists' tendency to forward non-economic factors like social and political institutions as the main obstacles is understandable.<sup>36/</sup>

### III

In spite of the fact that adequate empirical evidence is still lacking to prove the direct relationship between population growth and per capita product, existing evidence has shown that slowing population growth speeds development because reduced fertility would expectedly result in additional income for development.<sup>37/</sup> Theoretically one can easily see that a reduction in the fertility rate will gradually lower the burden of child dependency, allow better educational facilities, permit better nutrition and health, reduce expenditures for immediate consumption, and thereby release resources for productive investment, increase capital investment per worker and ultimately help increase the total national output.

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<sup>35/</sup>A. S. David, *Towards a Psycho-Economic Explanatory Constant of the Relationships between Population and Economic Development*, Mimeo., Carolina Population Center, Chapel Hill, U.S.A., 1969.

<sup>36/</sup>Paul Baron, "On the Political Economy of Backwardness," *The Manchester School of Economic and Social Studies*, January 20, 1952.

Best F. Hoselitz, "Non-Economic Barriers to Economic Development", *Economic Development and Cultural Change*, 1, 1952-53.

H. W. Singer, "Obstacles to Economic Development", *Social Research*, 20, No. 1, 1953.

Simon Kuznets, *op. cit.*

<sup>37/</sup>J. J. Spengler, "Population and Economic Growth", in *Voice of America Series*, 1967.

Questions immediately come to mind. What are the determinants of fertility? Who decides? And what and where are the decision-making structures? In fact there is no one single answer to these questions. The determinants of fertility vary from social, economic and political to psychological, cultural and biological in nature. There is a logical tendency to believe that the question of population control is purely a private and an individual concern. Bedrooms are considered to be the only legitimate places where these decisions are made. That could be partly true, but as a whole it is misleading. The very fact that a man is a social human being and that individuals and families do not live in isolation, they cannot be separated from the structures and organizations of the society in which they live. Hence the interactions between the individuals and/or families and the institutions of the society become the most important factors which need to be taken into account.

Irrespective of the system or type of government, most of the developing countries are committed to modernizing ideals and the "welfare state" has become the model of development. But merely aspiring to the welfare state does not necessarily eliminate the traditional characteristics of the system. Instead the traditional norms and values clearly undermine the purposes of the welfare state. In such a situation, the existence of a traditional system tends to foster and support, through its norms, values and structures, a high fertility rate in the society. On the other hand, the common measures taken by governments, increased social services like health and medical facilities and the gradual elimination of epidemic diseases, contribute toward reducing the death rates thereby helping the population increase.

#### IV

Although small in size, Nepal is not exempted from the population problem. The estimates clearly indicate that with a two percent annual rate of population growth, Nepal's population will double unless checked before the year

2000.<sup>38/</sup> This average annual growth rate has increased from 1.4 percent in 1961-62 to two percent in the late sixties. On the other hand, the dependency ratio has increased from 77 percent in 1952-54 to 81 percent in 1961-62. There had been no systematic assessment of the total impact of population change on the nation's development.

As in most of the developing countries the rate of population growth in Nepal does not significantly depend on the rate of economic development. Whether there is economic development or not, the population is bound to increase. But it is certainly evident that a slower or reduced fertility rate does, in one form or other, determine the level of living and obviously may influence public expenditures on social services like health and education.<sup>39/</sup> As far as its effect on the size of the labour force is concerned, Nepal's position is not different from other developing countries.<sup>40/</sup> On the other hand a reduced fertility rate would bring down the dependency ratio through changes in the age structure which would enable the resources to be properly and qualitatively allocated.

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<sup>38/</sup> Harsh N. Thakur & Krotki, "Estimates of Population Size and Growth from the 1952-54 and 1961 censuses of the Kingdom of Nepal," paper presented at the Annual Meeting of the Population Association of America, Boston, April 1968; A. S. David, "Nepal: National Development, Population, and Family Planning" in Studies in Family Planning, No. 42, May 1969.

<sup>39/</sup> An interesting analysis of the possible effects of population on per capita GNP, primary school enrollment and per capita food availability in Nepal has been done by A. S. David in his "Nepal: National Development, Population, and Family Planning", in Studies in Family Planning, The Population Council No. 42, May 1969.

<sup>40/</sup> Coale & Hoover studies show that there will be no substantial influence on the size of the labour force in underdeveloped countries for almost a generation despite a decline in the fertility rates. Myrdal says that instead, "its impact on the number of consumers, however, would be immediate. (See Myrdal: 1970, p. 170.)

Once again, the question is not whether population change has implications on social and economic development in Nepal, but what are the determinants of fertility, who decides, and how are the decisions influenced become some challenging questions. Several models relating to the determinants of fertility, ranging from economic, socio-psychological and other models, have definitely helped in better understanding the problem, but these have failed to provide a single reliable theory. More and more the unexplored environmental causes have come up either as obstacles or as a help. The organizational and institutional structures of the society in which individuals and families make their decisions, it seems, must be taken into account.

Under present conditions, the balance of control in the agricultural sector, which includes more than 95 percent of the total population as dependents, is tipped heavily in the direction of the landlord class. Through ownership of land, through performance of credit and marketing functions, through socio-economic dominance within and outside the community and through elections to political offices, from the village to the national level, this degree of control is maintained. This is the class which still legitimizes the norms and values of the society and becomes the source of rewards and punishments. The participation of the common mass is still limited to voting which in itself has not been effective and meaningful due to the existing dominance of the socio-economic power structure of the community. The gap between the ruling elites and the ruled subjects and the worsening socio-economic inequalities in the society make the problem more complex and difficult. The growth of the population, on the other hand, is "worsening the inequalities in the social and economic stratification to make them more rigid".<sup>41/</sup>

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<sup>41/</sup> Gunnar Myrdal, "The Challenge of World Poverty," N.Y., Pantheon, 1970.

Comments by Dr. Pushkar N. Pant

First of all I would like to express my sincere thanks to Centre for Economic Development and Administration for inviting me to participate in the Seminar on "Population and Development".

The paper, "Population, Development and Social Structures" which its author, Mr. Sainju, just now, introduced to the Seminar is an excellent piece of work. This subject is very important for the planners and policy makers. Mr. Sainju, in his brief paper, has made a very good attempt to point out some of the implications of population growth in economic development and social structure. It is recognized that economic development is a complex process involving a number of variables. One cannot, therefore, isolate one particular factor from others responsible for economic growth.

In any economic development program, man is the central figure. When we say economic development, we really mean improvement in the economic well-being of the people. After a country reaches a certain stage of economic development, other non-economic factors may come to play and in developed countries have actually started playing an important role in their development. But in a developing country where the basic economic needs of the people are yet to be fulfilled, economic factors assume an important role. Therefore, the measuring rod of development in developing countries is still the rate of growth in per capita income. As a matter of fact developed and developing countries are classified on the basis of per capita income. The central issue before us is, in the real sense, the effect of population growth on the growth of per capita income.

The rate of growth depends on the rate of investment and marginal capital output ratio. Average marginal capital output ratio depends on the distribution of investment among the various sectors. Planners can alter this ratio by allocating more investment in those sectors where the marginal capital output ratio is low. Very soon they reach a stage when they cannot lower this ratio any more. The capacity to invest also is limited because savings in

developing countries are low. Therefore, we may make all efforts but still the rate of economic growth would be still low. As a matter of fact during the first economic development decade, in spite of great efforts made, both at the national as well as international level, many developing countries could not achieve the objective of the decade, a five percent rate of growth in national income. The rate of increase in per capita income in these countries remained still lower depending on population growth. The increase in per capita income is arrived at by an increase in national income minus an increase in population. Therefore, at a given level of national income a lower rate of population growth would result in a higher rate of per capita income. Therefore, other things remaining the same, the higher the rate of population growth, the lower will be the rate of the economic well-being of the people.

In developing countries, population growth is as high as 3 to 3½ percent. Any rise in national income is offset by the growth of population. Therefore, the developing country should prepare simultaneously with its economic development programs, an effective program for population control. In order to achieve a high rate of economic growth, developing countries should make all efforts to increase the levels of investment and at the same time to reduce the rate of population growth. In this respect, the author of this paper says that the obvious alternative faced by a developing country is either to increase its national income and/or reduce its population. I feel that both have to be done simultaneously. As a matter of fact we should make all attempts to increase national income and reduce the rate of population growth. In this way alone can a very high rate of growth in per capita income be attained.

In Nepal, during the fourth plan period, it is envisaged that the national income will grow at a rate of 4 percent and the population at 1.8 percent. The per capita income is expected to increase at 2.4 percent at constant prices. If somehow the rate of population growth can be reduced, the net per capita income would be further increased. Therefore, the same level of economic activity with a lower rate of population growth can produce a higher level of economic well-being.

We have now dealt only with the quantitative aspect of population growth and the qualitative aspect of population seems to have been ignored. It is not number that matters; actually quality of the people is more important in economic development. In addition, the distribution of the population in different sectors can also have an impact on economic development.

The basis for conclusions which the author has arrived at in the last paragraph of his paper is not known. As a result of political and social development in the country in the last ten years, tenants and owner cultivators are emerging as a new powerful class. The landlords have already started finding their position very shaky. Therefore, I have difficulty in accepting the author's conclusion that the landlords have as dominating role in rural life as before.

Comments by Mr. Juddha B. Shrestha

First of all I would like to thank CEDA for giving me the opportunity and privilege to comment on the paper on "Population, Development and Social Structure" presented by Mr. Mohan Man Sainju.

The question raised by the speaker in his paper is not whether population has any role in the process of development but whether it has a first-order relation. To prove his arguments, he has enumerated some negative effects of population growth and has said that the negative impact is adequate enough to alarm the developing countries. He further says that the existing evidence has shown that slowing population growth will speed development because reduced fertility would expectedly result in additional income for development. At the same time he has admitted that there has been no systematic assessment of the total impact of population change on national development in Nepal and further says that the rate of population growth in Nepal does not significantly depend on the rate of economic development.

I have no basic differences of opinion towards the theoretical aspect of the points raised by the speaker quoting different learned authors, but my approach in projecting the problems and the emphasis is quite different. For a poor country like ours to increase the national income or to reduce the growth of population, both are difficult tasks and we have to select the easier and more profitable one.

While it is true that the population problems of some of the poorer countries are very serious, it is not always true that population growth is the principal reason why their levels of living are not rising. Population growth at the rate likely in the next two or three decades is not an insurmountable obstacle to economic growth. Raising output per head is no doubt more difficult if the population is growing by two percent per annum than if it is growing by one percent per annum, but the principal obstacle to raising output per head in countries like Nepal is not the rate of population growth but the fact that their rates of capital

formation are much too low. If they are able to raise their rate of investment, their output per head would be rising and this itself would bring down the birth rate and reduce the rate of population growth.

I am not convinced that population growth will eventually outrun the development of the world's resources. Those who forecast the exhaustion of the earth's resources, under-rate the ingenuity of man and the potentialities of science. Population and food supply may be running neck and neck but if we learn to use the leaves of plants and not only their fruits, the world's feeding capacity will multiply enormously. Those who forecast that if the population growth continues for some decades with the present speed there will be no place for people on this earth even to stand, do not understand that in spite of the utmost precautions taken by human beings there will be wars, famines, floods, earthquakes, new types of diseases and epidemics and other unforeseen calamities which will check population growth. If these things do not check growth, the ingenuity of man will colonise other planets.

The "fruits of economic development" means a large income to enjoy life specially outside the home, more opportunities for using leisure, greater educational facilities, greater social mobility and a more reasoned approach to life. The increase in the ways of using one's time not only diminishes opportunities for child bearing but also makes child rearing rather more of a burden.

With economic growth there is the desire of the parents to give their children as good an education and start in life as they can afford, so that they can move up the social ladder. This also increases the cost of children and diminishes their number. An improvement in the standard of living is either an essential condition for the limitation of births or at least a very favourable factor. The economic solution, therefore, will facilitate the demographic solution. Hence the right way to control the population is to concentrate on economic growth.

The population which a country can carry without diminishing returns depends upon whether its natural resources fit it to be a manufacturer of metal goods and

heavy chemicals or whether they fit it primarily to engage in agriculture. In the former case, the country may continue to secure increasing returns over a considerable increase in population whereas in the latter case diminishing returns set in much earlier. We have also a paradox that a country may be overpopulated relative to its agricultural resources, but underpopulated relative to its capacities for industrial development. A country is not to be described as overpopulated simply because it has more people than can be fed from its own land. This is determined on the one hand by the standard of feeding and on the other by productivity. A country cannot be overpopulated so long as it can engage its population to show a larger output per head.

What are the determinants of fertility? Who decides and how the decision are made has become, as the speaker says, challenging questions. Although a high birth rate is a national calamity, the individual's reason for having more children is not as despicable or as irrational as might be suggested because in our society we have to crave for a male child. It is essential for salvation which is supposed to be attained after certain death rites are performed by one's son. A son is necessary for the continuity of one's family lineage. There is thus an urge to have at least one son. I know some highly educated people who have continued attempts to have a son even after seven daughters just to fulfil these aspirations. It is very difficult to alter the reproductive pattern of a society like ours merely by persuasion.

Bearing and rearing children are looked as an investment; children offer a measure of security in illness and old age and all too frequently begin to lighten their parent's work while still in childhood. Children are expected to fulfil obligations to parents more than parent's to children. With the relative prevalence of the joint family system in our country, the responsibility of bringing up children and the direct burden of looking after them does not rest exclusively on the individual parents. Other members of the extended family can be relied on to share the burden.

Where, because of poverty, there are no standards to live up to and where education is brief or nil, a child is a very small burden on the family budget. Furthermore, whereas a western child will not become a producer until he is 21, in most parts of Nepal a child becomes a producer at eight or nine particularly where low agricultural productivity requires many hands, even small ones, on the job. And when the western youth does become a producer, his first thought today is to leave his family home, while the Nepalese child remains within the family structure and brings his earnings into the common pool. This is not only true of the rural areas, but also true of the poorer and lower middle class families of the urban areas.

Against these heavy odds, the measures which we are contemplating adopting to check the undesired population growth have been only family planning programs and that also not in the rural areas where it is mostly needed, but in the cities and towns where it has become fashionable to have less children. These fashions seem to be determined mainly by ideas of personal convenience, featuring on the one hand love of children and family life and on the other hand the cost of inconvenience of rearing children.

Programs like family planning are important from the point of view of the health and welfare of individuals but this alone does not control population. It is pretty safe to assume that a fall in the birth rate is due to a change in attitude towards child bearing and not merely to the family planning techniques of birth control. Japan lowered its population growth rate dramatically, not through conventional family planning but by sanctioning abortion as far back in 1948. Abortion is a highly effective weapon in the armoury of population control. The shortage of competent doctors, clinics and hospitals may be a handicap in the beginning but eventually these will catch up with the times. The other complementary solution is sterilization of all males who are fathers of more than three children. The socio-political problem that may be raised by such programs have to be ignored. How can we expect self-control from a poor man when society and the government cannot provide him with the bare necessities of life. The only alternative is to impose regimentation by total mobilization and total discipline on the population. This would be a decisive factor in economic development where population is large and almost everything is scarce.

Therefore, I do not even partly agree when Mr. Sainju says that the question of population control could partly be a private and individual concern and that bedrooms are the only legitimate places where decisions are made.

The current Fourth Plan (1971-75) of Nepal has fixed a target of providing services of family planning to 15 percent of the population in the age group 15 to 45. The budget provided is 4 million US dollars. If the investment return on family planning is as high as 120 times as suggested by one of the learned speakers of the seminar, it is high time for our planners to take this matter seriously and alter the investment pattern of our current five year plan. As raising the standard of living is a necessary condition for bringing the birth rate down, the population problem will be with us for a good long time because the statistics provided by the speaker say that the total world GNP shared by the developed countries is 79 percent with only 27 percent of the total world population, whereas the share of the developing countries is 21 and 73 percent respectively. There is very little sign of the more developed countries recognizing the real magnitude and causes of this problem to the extent of being willing to make adequate contributions towards solving it.

Is it only population which has widened the gap in economic growth between the developed and developing countries? Can the developing countries reach the same level of economic growth if the population of the developing countries is brought down to the level of developed countries? Is it not a fact that most of the developed countries have thrived and are still thriving at the cost of developing countries, mostly by utilizing the very population as a base to sell their products and/or by exploiting the resources of the developing countries? What will happen to the economy of the developed countries if all the developing countries decide to boycott the goods of the developed countries? These are extreme questions no doubt but they might attract the attention of developed countries towards sharing their fruits of economic growth with the developing countries not only by making alarms on population explosion, but by making adequate financial and technical contributions to raise the national income of the developing countries. The developing countries are not so much alarmed by the growth of population as they

are by the apathy and neglect shown by the developed countries who are not contributing even one percent of their GNP even though this has been requested by so august a body as the United Nations.

I totally agree with the speaker when he says that the theories of development which are mostly the outcome of western experiences have turned out to be completely inadequate. I shall even go further and say that these theories are completely obsolete. New theories based on the experiences of our own difficulties and results should be the tools and models for the developing countries.

In all the underdeveloped world aspirations greatly exceed production and the gap is increasing. The result of frustrated aspirations may be more dangerous to existing socio-political patterns than speeding up production would be. But in any case our goal should always be that production grow faster than population, with or without external assistance.

Lastly, I cannot understand why the speaker has a bias against Nepal's so-called landlord class. Has this class not been eliminated by land reform policy? Socio-economic power is not like landed property which can be taken away by one stroke of a pen and be distributed to the landless masses. It is not a pill which the government can ask the mass to swallow in order to gain power. The gap between the so-called ruling elites and ruled masses will remain for a considerably long period till the masses are educated and become conscious of their political strength, duties and obligations.

To me this seminar has provided a forum to express and exchange views on a very important topic. Mutual discussions should enable us to find some consensus from which we can understand the problem from different angles. I am very happy to be able to attend this seminar and I extend cordial greetings to all the speakers and participants who have patiently heard my comments.

Thank you.

Panelist Dr. B. P. Shrestha's Remarks

I don't think I have much to comment on the non-controversial paper so well presented by Mr. Sainju. In the last two days we have talked in several ways to reinforce the central theme of this conference, namely, that a high rate of population growth has an adverse impact on economic development. Along this line we have also focussed our attention on family planning and birth control techniques to bring down the fertility rate.

Mr. Sainju has rightly remarked that "population growth in Nepal does not significantly depend on the rate of economic development. Whether there is economic development or not, the population is bound to increase."

As I said on the opening day session, population is only one of several variables and as such there is no guarantee that a zero rate of population growth can ensure a higher level of development and a better standard of living to the people without, at the same time, a series of consistent measures with regard to other variables. As a matter of fact, the nature and extent of the relationship between the change of population and production is not so simple and straightforward as we often tend to assume. It is all the more difficult, rather I should say, impossible, to single out the effect of any single variable.

Population control is only the means. It is not an end in itself, the end being a better and more satisfying life to the people through economic development. We should, therefore, be concerned as much with the means as with the end.

As a matter of fact, there is, on the whole, a favourable impact of economic development on population growth. As far as my knowledge goes, there is no evidence of the birth rate rising with economic development. On the contrary, the available evidence indicates a declining population with economic development. Even Malthus thought that the capacity to increase food would cause population to rise only to the limits of its capacity.



Dr. John Beyer & Dr. Badri Prasad Shrestha  
commenting on Mr. Mohan Man Sainju's paper.

All I am trying to emphasize is that action is needed on all fronts simultaneously - on the population front as well as on the development front. The records of our performance in the past few years on both these fronts do not warrant any sense of complacency on our part. As you know, the growth of our domestic product is barely keeping pace with our population growth. The Fourth Plan also envisages only a 4 percent average annual growth in the GDP as against a projected population growth of about 2 percent. Our efforts to control population are also inadequate. The available information shows that between 1966-67 and 1970-71, a little over 7,000 females have used loops for the first time and about 24,000 have used pills. This total of 31,000 or a little more represents only 1.4 percent of our female population in the age group 15 to 44. Over the same period, more than 12,000 males have undergone vasectomies and more than 33,000 have used, or are using, condoms. The total of 40,000 or a little more, represents only 2.1 percent of the male population in the age group 15 to 44. The current plan has a target of providing family planning facilities to 15 percent of the married couples between the ages of 15 and 45. The target, though humble, needs tremendous efforts for its achievement in view of the little progress we have made so far.

Panelist Dr. John Beyer's Remarks

Dr. John Beyer limited his remarks to five general areas:

1. A decreasing fertility rate is a necessary, but not sufficient, condition to achieve Nepal's development objectives. In addition to halving the fertility rate, other development tools must be utilized. If Nepal could increase per capita income by approximately 3 to 3½ percent, the level of income would increase to Rs.2,500 to Rs.2,800 by the year 2001. Rural employment is one of the additional questions which needs to be faced - why should the government provide subsidized prices for capital intensive agriculture? The Nepali labour force must be trained so that it can be integrated into the labour force.
2. Planning depends upon a clear understanding of what Nepal's objectives are and the resources necessary to achieve these objectives.
3. It is necessary for HMG to develop a staff capability to study and evaluate the effects of population growth.
4. It is necessary for HMG to develop a staff capability to conduct research and demographic studies concerning population growth.
5. The national data base must be improved, including the generation of national accounts data.

Dr. Beyer also asked two questions of the Nepalese participants: (1) why is the Fourth Plan so silent on population policy? Can the Plan be revised to reflect a cognizance of the need for population control? (2) What are the micro-economics of child-rearing? How do we discover the costs of bringing up children in Nepal?

Panelist Dr. Mohsin's Remarks

In his comments Dr. M. Mohsin questioned how the social structure influences population growth and economic development. What is the role of the state in the development context? - especially since there are large groups of people unable to communicate with one another. To what extent has the family planning program been successful in Nepal? The middle class and elites are receptive, but we must think of ways to mobilize the entire population. Power is still in the hands of the landed class, and thus, the social structure of Nepal affects population growth. This requires a more consolidated approach to development planning rather than a mere reliance on economic growth.

### Floor Discussion

The general discussion focussed on the following topics: (1) The relevance of Western models and estimates of costs of preventing births, (2) the relationship between population growth and the GNP, (3) factors affecting fertility, (4) micro-effects of population growth on families, and (5) methods of family planning and the role of family planning in population control.

Mr. Sainju reinforced his views that it might be futile to try to reconcile Western solutions with the realities of life in Nepal. The cost benefit analysis for child bearing is more concerned with scientific analysis than with the real world. The decisions of families in Nepal are closely related to the social structure. Therefore, we need to do further research on the question of who legitimizes norms and how these affect family size.

Dr. Mehta first raised the question of the statistical relationship between population growth and the GNP (including savings, capital formation, etc.). He asserted that this relationship is indicative rather than definitive. A higher rate of population growth is not necessarily related to low productivity. Is it economic development which influences population growth or the rate of population growth which influences income growth? Dr. Enke answered by stating that there is an almost perfect relationship between population growth and absolute annual increases in GNP per capita. Dr. Rice also remarked that if Nepal wants to keep its per capita GNP increasing at the same rate as population, then the GNP must increase three times as much as population.

Closely related to this is the issue of what factors affect the fertility rate. In his remarks, Dr. Mehta stated that in the developed countries, fertility rates decreased only after economic development reached a certain level - i.e., the most important factors lowering fertility rates are those related to increased income, increased electricity consumption, increased urbanization, and increased industrialization. Dr. Enke replied that

urbanization has no effects on fertility, only in the second generation. He also reemphasized that the purpose of decreasing fertility is to increase capital formation (especially capital per worker). Decreased fertility releases resources from consumption.

In the process of these remarks he also clarified the meaning of several population concepts: (1) a country can have population pressure with no population growth, (2) population growth affects the economy by hampering the accumulation of capital and other factors of production, and (3) the fertility rate is not identical to the population growth rate, i.e., the growth rate can be the same with a high CBR and CDR or a low CBR and low CDR. During these remarks, Dr. Enke also attacked the "empty lands view" that children are not born in these empty regions, but in populated areas, moreover these lands are usually empty for economic reasons.

Also related to this discussion of fertility rates and the growth of GNP were remarks by Mr. Shrivastwa and Mr. B. B. Pradhan. Both commented on the problem of an immobile labour force. Mr. Shrivastwa further remarked that at least 50 percent of Nepal's labour force is imported. If Nepal goes to a stage of declining fertility, there will be an inadequate supply of labour and no economic development will occur.

As a fourth major topic, Dr. Weiner introduced discussion on the micro-effects of population growth on families and children. Exploitation of children is great in a situation of high fertility in developing countries. Bearing and rearing children are looked upon as investment -- i.e., to lighten the parents' burden even while in childhood.

With regard to methods of family planning, Dr. Kim emphasized that family planning does not necessarily decrease population growth. While there is a need to develop additional contraceptive technology, there are sufficient means at present. A number of countries have already succeeded. He cited Korea's "department store" approach as an example. Korea also has had the benefit of a strong national leadership supporting family

planning. He also recommended that some mechanism for popular participation be developed for Nepal. In Korea, the FP association is strong in the villages; the people did not listen to government officials, but to community leaders. Citizen associations were important to the spread of family planning in Korea. Training and supervision, as was necessary with the Malaria Eradication Program, are important for the future development of a family planning project in Nepal. Mr. Pokhrel also advocated the mobilization of voluntary organizations. He also suggested that thought should be given to the balance of family planning; what if only people in the Hills accept family planning?

The question of abortion was also discussed again. Opinions differed with some in favour and some opposed. At one point, the opponents even likened abortion to infanticide. However, the majority of participants seemed to advocate the legalization of abortion, especially when contraception has failed.

Mr. Brown seemed to summarize the question of abortion when he said that the question is not whether we have abortions, but rather under what conditions should abortions be legal? On the average, there are already 1,85,000 maternal deaths per year in India due to abortions. Those who argue that abortions use too much of the physicians time should be reminded of the time an individual needs during his life from all sorts of people.

The entire issue of overpopulation was dramatically stated by Mr. Brown when he stated that the typhoon deaths in East Pakistan were not due to a natural disaster, but to overpopulation. Because of great pressures on the land, people lived in areas barely above sea level and known to be hazardous.

Summary of the Session by the Chairman Mr. Biswa B. Thapa

Mr. Biswa Bandhu Thapa pointed out that the seminar should have been arranged in Pokhara, as originally planned, because this would have aroused some degree of local interest in the problem.

Population increases can be very readily observed even in the villages. Farmers have many children because they need helpers. It is also the prevailing idea in the country that those who have a lot of children are blessed by God, while those without aren't. There are indeed plenty of such superstitions, beliefs and ideas among our people, and it is the unquestioned acceptance of our traditional ways of life which should be changed.

The Chairman made the following recommendations:

1. Family planning measures should make effective use of the village women, since it has been generally observed that they are interested in having fewer children.
2. Although Nepal does lack a good deal of secondary and tertiary sectors for the inter-sectoral transfer of labour from agriculture to others, policy-makers should not forget the importance of this transfer. The change from being a farmer to a labourer does have significant bearing on attitudinal changes in terms of optimum family size.
3. CEDA should organize smaller types of the present seminar program in the districts, where local people could be encouraged to participate.
4. He hoped the conclusions of the seminar would be published.

Concluding, the Chairman noted that in Nepal the social system has been very individual-oriented in the sense that there has really been no one to assume responsibility for the problems of the masses. Mr. Thapa said

the present type of seminar was indeed a break in this old pattern and CEDA is to be congratulated for having organized it. He also hoped that an organization like CEDA would take the responsibility for organizing a proper campaign to successfully implement a family planning program. He was against the creation of a big organization for this purpose.

PART III

Chapter VII - SUMMARY-CUM-FAREWELL SPEECH BY THE  
CHAIRMAN OF CEDA DR. T. N. UPRAITY

## Summary-cum-Farewell Speech by the Chairman of CEDA

Dr. T. N. Upraity

### I. Introduction

I regret my inability to attend these seminar sessions. At the very outset, I would like to express my appreciation to the organizers and participants. I understand the seminar has brought to the fore a wide range of policy issues of importance to national planners. Let me attempt to summarize what I understand to have been the major issues and findings which have emerged. Of course, I recognize that this will be partial -- less than comprehensive and somewhat fragmentary -- because my summary is based upon "secondary sources".

### II. The Evidence of Current Overpopulation

There can be little doubt that even now Nepal is an over-populated nation. Not, perhaps in terms of population per square mile, but rather in terms of available resources, arable land and levels of technological achievement. For, as has been pointed out, optimum population is, in part, a function of man's capacity to control and utilize resources.

While it may be possible for Nepal to produce much more adequate amounts of foodgrain to meet the needs of a greatly increased population in the generation ahead, the cost in terms of the total agricultural and environmental system will be increasingly higher. It is already evident that our forest resources are being squandered, both to clear land for farming and grazing and to provide firewood for household cooking. As this deforestation continues we will have an increasingly serious problem of erosion; rapid run-off of water will result in more flood damage, and siltation rates will become so high as to deny us the

opportunity to exploit the hydro-electric potential of our river systems. This problem is particularly evident in much of the Hill regions where population stress is leading to an irreparable loss of natural resources. And bringing the newly-sprayed, malaria-free areas of the Terai under cultivation can offer us only temporary and short-lived relief. These lands are not unlimited and had, perhaps, best be used to produce exportable crops and forest products in the interest of the national economy.

A whole new policy consideration is now arising with regard to where our forestry program should concentrate. Should we not accept the inevitability of resettlement in most of the Terai due to population pressures from the Hills and concentrate upon creating forest resources in the Hills where the population pressure is diminishing. This type of consideration of other areas, as well as a need to rely on other agencies to help solve problems indeed highlights the essential nature of the population problem. Nor can Nepal continue to rely upon India as a ready recipient of surplus manpower. As India's own population rises towards the one billion mark by the end of this century, the pressures to transfer surplus population may well be in the other direction. The 1971 Indian census indicates that some such movement from the border districts of Bihar into the Terai may already be taking place.

Your examination of the inter-relationships between population growth and social services has demonstrated the need for greater investment in the social services as an integrated program which would include family planning. However, the problem is that we are dealing with scarce resources and competing needs. For this reason you have suggested that alternative strategies -- including those which would transfer a greater share of the responsibility to resources of local and traditional organizational systems -- might properly be examined. In any event, it is absolutely essential that we reduce fertility rates significantly and soon.

### III. Population Policy and Family Planning

Your discussions appear to have led to common agreement that the control of population growth can only result from a national effort which mobilizes the support and energies

of all departments of government and all elements of the society. This can begin by inter-ministerial recognition that the entire cabinet has responsibility for population control and that it is not simply the task of the family planners within the Ministry of Health. Indeed, it has been suggested that the implementation of a national policy designed to slow population growth cannot await the creation of a fully functional national health system. For this reason, some of you have advocated that a wide variety of other means be employed, including agricultural extension personnel, teachers, ex-servicemen, Ayurvedic practitioners and specially trained para-medical personnel to motivate and make available contraceptive means in all areas of the nation. The educational system is an avenue of great potential through curriculum, text books, and teacher training if they are sensitively utilized. Also, a compulsory birth registration scheme may well have to be an essential part of a rational population policy.

Discussions of the economic benefits of slowing population growth seem to have left little doubt that a rupee invested now in preventing an unwanted birth affords a higher rate of return than almost any other development activity. This alone should prompt us to insure that adequate funds continue to be available for an imaginative and expanding program. Yet money alone will not achieve the objective. For your deliberations have made it clear that organization and management, trained and highly motivated personnel, effective logistic support and high mobility are all required to make the program successful.

Yet new approaches are required and you have suggested a multitude -- including economic incentives and penalties, no-birth bonus schemes, low parity pension plans, and the serious consideration of liberalized abortion laws.

#### IV. The Question of a Harmonised Approach to Policy

The one finding that has been of the greatest interest to me is the Janus aspect of population. It cannot be attacked in isolation, it has to be attacked as an integral unit of the total national policy framework. It has become

clear that education policy, especially the education of women, means of social security for old age, the degree of reliance one can place on the survival of children, and above all the role of the child in society, to list only a few factors, are equally as important as the provision of contraceptive devices for inducing decisions to limit family size. Similarly all population developments have enormous implications for forestry, land reform, employment, urbanisation, education, etc.

There is a point that should be made again today regarding the family planning program in Nepal. One of the most important needs is to expand the family planning base into other programs beyond health, i.e. agriculture, panchayat, communication, etc. Perhaps the most vital finding of this seminar will be the need for this integrated approach both in policy formation and in departmental organization.

#### V. Critical Need for Research

This leads to the last major area which you have considered, namely the need to lay the foundation of knowledge, upon which better, more effective program decisions can be based in the future. You have suggested that there is a need to undertake organized social research in three major areas. These are, first, the acquisition and analysis of the data needed to make sound decisions with regard to population policies; second, operational studies to provide needed information on how the current family planning is working, what the actual situation is in demographic and cultural terms and how improvements in planning, organization, administration and overall implementation may be brought about. Lastly, you have suggested that research be undertaken to determine the factors which affect the motivation of individual couples and of groups to accept and effectively utilize family planning services. I regard this as a formidable research task and I share with you the belief that it is of the highest importance that work along these lines should move forward at an early date. To this end I would hope that the University could be an active partner in the process.

## VI. Closing

In closing let me commend you for the high quality of the presentations and the wide-ranging yet relevant discussions which you appear to have had. I feel confident that all who have participated in this Seminar will leave with a more comprehensive grasp of the complex inter-relationships associated with population growth and its limitation. The inter-disciplinary nature of the group and the prestige and brilliance of the participants has exemplified the creativity of such seminars which bring together different sectors in one forum. This Seminar may well mark the beginning of a new phase in Nepal's efforts to reduce the birth rate. But more than that, it will, I hope, mark the beginning of a coordinated population policy for Nepal.

Thank you.

PART IV

Chapter VIII - SUMMARY AND CONCLUSIONS

## Summary and Conclusions

CEDA, as organizer and manager of the Population and Development Seminar, has compiled the following summary and list of conclusions. Although the Seminar did not formally adopt resolutions or recommendations, it is felt that some of the following are worthy of consideration when policy decisions about population and family planning are being reached by HMG.

### A. General

1. High Economic Benefits: In a long-range perspective, there are higher rates of return per rupee invested in population control than in any other field of development activity. The fact that this policy is likely to yield the highest economic benefits means that it needs to be given commensurate priority.
2. A strong public policy is necessary in order to mobilize public support for zero population growth and to create the machinery for implementation of such policy. This type of comprehensive population policy should be evolved to provide for those already born and those yet to be born.
3. There are a large range of policies influencing population. The questions as to what areas are affected and what ministries are concerned demand a systematic study. Hence, it is suggested that an inter-ministerial task force on population be formed to undertake such a study.
4. A national effort which mobilizes the support and energies of all departments of government and leading elements of the society must be geared to control the population growth. This can begin by inter-ministerial recognition that the entire cabinet has responsibility for population control and that it is not simply the task of family planners within the Ministry of Health.

5. As socio-economic and political power is still heavily tipped in favour of the landed class and this is the class which legitimizes the norms and values of the society, the social structure of Nepal significantly affects population growth. This means we need a more consolidated approach to development planning not merely a program to achieve economic growth. For instance, questions such as those of land reform and the size of holdings in resettled areas need to be reviewed in terms of population pressures. The whole system of social mores, as in regard to abortion, needs revision in relation to the impending threat of overpopulation. It is clear that such considerations will require radical social and economic reforms.
6. To understand this problem is to realise that the time for action is now. Just as returns to investment are highest in this field, so will the costs of delay be proportionately high.
7. A decreasing fertility rate is a necessary, but not a sufficient condition for high rates of economic growth. Thus, population policy must not be viewed as a panacea solution to the problems of development. On the contrary, it must be viewed in its proper perspective as a vital member on the team of development efforts whose contributions will be highest when coordinated with the rest of development effort.
8. As with all implementation systems, it will not be enough to allocate more funds; it is also necessary to create an appropriate organization and to appoint able managers, to train and obtain highly motivated personnel and develop effective logistical support. In effect a whole new implementation system suited to this novel and special challenge has to be designed.

## B. In the Field of Agriculture

1. In view of the existing and potential surplus of labor in agriculture, the government should not encourage capital intensive techniques, rather it should aim at increasing the productivity per unit of land by a bigger dose of labor.
2. The maximum utilization of the labor force is not possible given the existing institutional conditions. Particularly in regard to land ownership and the tenure system, a population control policy must be launched along with social and economic reform measures. Otherwise the growth in the labor force contributes to "worsening the inequalities in the social and economic stratification and making them more rigid".
3. To capitalize on, rather than resist, the inevitable migration into the Terai resulting from population pressures in the Hills, it is suggested that His Majesty's Government (HMG) preserve only a very few selected forest reserves in the Terai and carry out a massive campaign of afforestation in the Hills, where "soft wood", which grows quicker and fetches a better price, can be planted. This could also check a good deal of the current erosion in the Hills. The Hill areas should also be introduced to a wide range of horticultural crops.
4. In order to improve the agricultural sector and to increase productivity, the land reform program must be strengthened so that the farmers get the benefits. In particular the logic of overpopulation implies a lowering of land ceilings.
5. Export of Labor: Jobs in India may become a relatively less important "relief" for Nepal's population pressures. During the past decade at least 80,000 Nepalis have migrated to India each year and at least 60,000 have annually returned after from 1 to 5 years absence. Of the 20,000 approximately

remaining - the net annual drain - about half are men and half women. This drain of 20,000 a year must be set against the present annual increase of over 200,000 in Nepal's population. Thus 90 percent of the natural increase is retained within Nepal. As population pressures continue to worsen in India, the job opportunities accorded Nepalese, except perhaps in the Indian army, will probably deteriorate. If fertility rates are not reduced in Nepal, drastically and soon, Nepalese will have to accept ever more inferior jobs of a kind that Indians avoid.

6. As agriculture is the only employment opportunity for the vast majority of the population in Nepal, to achieve intensive utilization of the labor force, small management units of land need to be made viable. The transfer of a highly labor intensive technology to the rest of Nepal (the valley already has it) would be a fruitful means of achieving this. This means the present unit of resettlement needs to be reduced from seven acres approximately to a two or three acre unit that Japanese and Kathmandu agriculture has already shown to be both profitable and highly productive for the average family.
7. The above clearly implies that credit and marketing facilities must be provided to private farmers so that they can take advantage of market prices. Of course, if the landlord-moneylender-millowner complex of exploitation is permitted to continue to screen the farmer from the profits of his toil, no solution is possible.
8. Attention must be given to improve the transport and communication system. Infrastructure is as necessary to population control as it is to other development activity.
9. As agricultural extension workers are at the grass roots level, they can usually become good agents for increasing the receptivity of people to family planning measures.

C. In the Field of Education

The benefits accruing in the long run to the Education Ministry through a decreasing burden for providing schools and teachers, as a result of reductions in fertility rates, are immense. In view of this fact, the following points are recommended.

1. The Government should pay attention to the need for providing education to children regarding population problems because it is the children who will determine whether there will be a population problem in the future.
2. The Education Ministry should try to bring out more textbooks on the population problem, so that they can be read by students as well as non-students.
3. The Government should enhance the program of educating the female population of the country, because a change in their attitudes toward child bearing can go a long way towards helping to solve the population problem. It is generally true that women have a more favourable attitude.
4. The Education Ministry should also help the propaganda campaign for the family planning program through its own extension services.
5. Education should try to close the communication gap between the various groups of people, so that national policies are understood clearly by the people.
6. With the present rate of fertility, the Government's pledge to provide universal free primary school education becomes an important but very expensive prospect. Hence, the fertility rate must be reduced in order to provide the pronounced services.
7. With the increase in the school age population, the education budget is a smaller proportion of the total budget (from 10.6 percent in 1961 to 6.8 percent now). This trend must be changed and the proportion must increase.

In the Field of Family Planning

1. This program should receive the support of national leaders and eventually be taken up as a national policy.
2. The Family Planning Organization by itself is too small an organization to reach all parts of the country and particularly the villages, and it is, therefore, necessary to integrate the services of as many departments, agencies and offices as possible in order to give the program the type of wide coverage it needs. The help of panchayats and other local groups should be keenly sought.
3. Before attempting field activities, it is a prerequisite to have a well organized body with a well planned and coordinated set of tasks.
4. It is not sufficient to depend just on medical personnel and it is, therefore, necessary to develop a whole group of para-medical personnel. The help of ex-servicemen from the British and Indian armies could be utilized.
5. In consideration of the initial difficulties in working in the villages, the work of interesting the village women in family planning should begin through questions about the child. It may even be necessary to carry small things like Sulfa drugs, tincture of iodine or eye ointment in order to take care of the small troubles the child might be having to gain the trust of the parents.
6. Family planning clinics and programs must work closely with the rest of the health services. The other health services can help win acceptance for methods of birth control.
7. The time has come for Government to seriously consider the pros and cons of legalizing abortion in the country. If this is not possible, at least the liberalization of abortion laws to sanction those cases like rape and pregnancy resulting in spite of the use of contraceptives is necessary.

8. Organization of Family Planning Festivals within the country (like the one recently organized in India) would help to encourage people to use and accept contraceptive measures. We must encourage non-family planning people to organize these festivals.
  9. As large-scale national programs always have some operational difficulties, the Government must take the initiative in launching community level work in family planning.
  10. Local Panchayats must be actively involved in family planning especially in motivation and distribution. CDOs must play a significant role in mobilizing local Panchayats and in integrating the program.
  11. The quality of family planning services must be given due emphasis and stress.
  12. The present budget allocation for family planning (which is only 14.35 percent of the Health budget) should be increased so that the services can be expanded and as many villages as possible can be covered under the program.
  13. Some effective mechanism of popular participation must be developed so that the information and services of family planning can reach the common people. For this purpose mobilization of voluntary associations and organizations becomes necessary.
  14. The results of the family planning project have so far been minimal. This project must be made effective through increased services and through an integrated approach on all fronts.
- E. In the Field of Government
1. The increasing pressure of population growth in Nepal is also manifesting itself in terms of a huge movement of people, both within and without the country. This aspect should also receive serious concern from the Government.

2. The possible serious implications of population movement from the Hills to the Terai will be not only economic and social, but also political, as well.
3. The provision of more places in the power structure for the handicapped sections of the population, special scholarships to raise the educational level of discriminated groups, in effect an outward looking and all-embracing policy of national integration, rather than a narrow, exclusive attitude of elitist nationalism is the order of the day.
4. A preservation scheme must be developed which moves with the resettlement trend, not against it. This would mean greater efforts for preservation in the Hill areas (which are losing population) and less in the Terai.
5. The cooperative services, especially the marketing and credit cooperatives, become very important in the new settlement areas.
6. A systematic resettlement scheme must be established so that the problems of the initial stage and the difficulties of adaptation become minimal.
7. There must be efforts by His Majesty's Government and/or other management agencies to provide necessary training facilities to Nepalese labor. (This will enable the replacement of Indian labor by Nepalese in industry).
8. The Government must take steps to obtain accurate birth information through compulsory birth registration. This helps to properly analyze and resolve the problems of distribution between adults and children and between the sexes. In Nepal it will be very useful for identifying citizenship, pension schemes, delaying the marriageable age etc. It also helps the state to intervene in terms of providing social services and legislations for women.

9. The Government should encourage employment of women as this also helps reduce the fertility rate.

F. Field of Research Needs

The need for further research on demographic patterns and conditions in the country should be stressed along the following lines.

1. To improve not only the data base but also the quality and reliability of demographic figures. It is pointed out that family planning has been facing serious difficulties because it lacks reliable data in deciding where and how to work.
2. The need for research into things like the impact of pension and security systems, land reform, resettlement, and urbanization on family sizes and attitudes should be obvious. In other words, research is emphasized for both the macro and micro aspects of the population.
3. To what extent can community and family responsibility be increased in terms of providing education, health services and social security? It was only with increasing governmental responsibility that those once active, traditional community and family institutions have eroded away. Can this be revised so that the state's limited resources can be utilized for more important and general problems?
4. There should be a study regarding the extent to which vegetable products can be substituted for livestock products in our daily intake of food. The extent of malnutrition of different groups should also be studied.
5. There should be a study of the extent of exploitation of children in our society.
6. There should be a study of the extent to which a large scale redistribution of people would have political consequences.

7. There should be a study regarding the motivational factors related to family planning, concerning decisions of families about family size.
8. Research is needed in order to determine which areas of Nepal are most likely to accept family planning.
9. A study is needed regarding the ethnic influences on family size, resettlement areas, on the effects of urbanization, and the effects of an extended family structure.
10. It is high time that a regular sampling and evaluation program regarding family sizes and attitudes be started.

PART V

APPENDIXES

1. Participants' List (with Short Bio-data.
2. Relevant Basic Datas and Charts
  - 2.1. Tables
  - 2.2. Charts
3. Photographs.
4. Acknowledgement.
5. Methods and Procedures Used in Conducting the Seminar.

Participants' List (with Short Bio-data)

1. BEYER, John C.

Born 9th May, 1940, Minnesota, U.S.A.; B.A. Economics and Philosophy 1962, University of Pacific, California; M.A. in International Economics, 1963 and Ph.D. in Development Economics, 1966, Fletcher School of Law and Diplomacy, Tufts University, Massachusetts - Economic Advisor to Government of Sarawak, Malaysia (under the auspices of the Africa-Asia Program, Syracuse University), 1964-65; Consultant, Robert R. Nathan Associates, Inc. Washington D.C., 1966-68; Economic Advisor to Ministry of Finance, Ford Foundation, Nepal, 1968-70; Development Economist with National Planning Commission, Ford Foundation, Government of India, 1970 to present. Writer of the articles on "Trade and Development" in Economic Development and Cultural Change, Yorkshire Bulletin of Economic Research and Development Journal.

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38. SHAH, Bhogya Prasad

Born 23rd August, 1925, Kathmandu, Nepal; B.A.; Working in Broadcasting for last 19 years, Director, Department of Broadcasting, HMG, Nepal at present.

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Born 13th Sept., 1941, Kathmandu, Nepal; Ph.D., 1967; Assistant Professor, Chico State College, California; Senior Research Specialist, University of California, Berkely; Member, Panchayat Darshan Samiti; Joint Secretary, HMG, Nepal at present.

41. SHARMA, Yag Nath

Born 15th August, 1912, Banaras, India; M.B.B.S., Bihar University; M.P.H., John Hopkins University, U.S.A.; Chief, Malaria Eradication in Nepal, 1959-65; WHO Malariologist in Afganistan 1965-70; Senior Medical Officer, Reserve Pool, Department of Health, Nepal at present.

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51. UPADHYAYA, Murali Prasad

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Charts\*

1. Sex and Age Distribution of Population in Nepal.
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3. Economic Consequences of Declining Fertility in Nepal.
4. Implementation of a Declining Fertility in Nepal.

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\*All the Charts given here are presented by  
Dr. Stephen Enke.

Table 1  
Population Projection

<u>Year</u>	<u>Growth Rate</u>	<u>Total Population</u>
1960		94,12,996
1965	1.78%	1,02,76,553
1970	1.81%	1,12,47,616
1975	1.95%	1,23,92,794
1980	2.80%	1,37,77,262

Source: Fourth Five Year Plan, HMG/Nepal.

Table 2  
1971 Census Report

<u>Total Population</u>	<u>Male</u>	<u>Female</u>
1,12,89,968	56,58,323	56,31,645

Source: Central Bureau of Statistics,  
HMG/Nepal.

Table 3  
Age and Sex Distribution of the Population  
1954 and 1961  
(in Thousands)

Age Group	Population 1954			Population 1961		
	Total	Male	Female	Total	Male	Female
0 - 14	33,14	16,89	16,25	37,60	19,16	18,44
15 - 59	47,19	23,02	24,17	51,32	24,88	26,44
60 and above	4,12	1,91	2,21	5,20	2,33	2,87
Total	84,45	41,82	42,63	94,12	46,37	47,75

Source: The Third Plan, HMG/Nepal.

Table 4  
Active Population 1954 and 1961  
(in Percentages)

Status	Population 1954			Population 1961		
	Total	Male	Female	Total	Male	Female
Active	57.0	22.7	29.8	54.5	26.6	28.1
Inactive	43.0	21.2	21.8	45.5	22.6	22.9
Total	100.0	48.4	51.6	100.0	49.0	51.0

Source: The Third Plan, HMG/Nepal.

Table 5  
Density of Population 1960-80  
(in square miles)

Region	1960	1965	1970	1975	1980
<u>Nepal</u>	<u>173.2</u>	<u>189.1</u>	<u>207.0</u>	<u>228.0</u>	<u>253.5</u>
Eastern Hills	186.5	203.2	222.4	245.1	262.4
Eastern Inner Terai	105.9	118.0	129.1	142.3	158.3
Eastern Terai	432.3	472.1	516.8	569.4	622.1
Kathmandu	2,111.0	2,309.9	2,528.1	2,785.5	3,069.7
Western Hills	152.9	166.5	182.9	201.5	224.0
Far Western Hills	99.6	108.5	118.8	131.8	145.4
Central Inner Terai	169.0	184.9	202.4	223.0	247.9
Western Terai	306.3	330.2	361.4	398.2	442.7
Western Inner Terai	138.1	158.3	173.3	191.9	212.3
Far Western Terai	95.5	104.8	114.7	126.4	141.5

Source: The Fourth Plan, HMG/Nepal, p. 31.

Table 6  
Number of Students in Primary Schools

Year	Boys Enrollment	Girls Enrollment	Total	% of Total
1964-65	2,86,640	47,360	-	14
1965-66	3,11,170	54,930	-	14
1966-67	3,38,478	56,222	3,94,698	14

Source: Educational Statistical Report 1966-67,  
Ministry of Education, HMG/Nepal.

Table 7  
Number of Students in the Secondary Schools

Years	Number of Boys	Number of Girls	Total	% of Girls to the Total
1964	43,400	11,400	-	20.3
1965	49,075	8,365	-	14.5
1966	58,470	10,630	69,100	15.4

Source: Educational Statistical Report 1966-67,  
Ministry of Education, HMG/Nepal.

Table 8  
Number of Teachers in Primary Schools

Year	Trained Teachers	Untrained Teachers	Total	% of Total Teachers
1964-65	2,561	9,434	-	21
1965-66	3,360	10,084	-	26
1966-67	3,350	10,610	13,960	24

Source: Educational Statistical Report 1966-67, Ministry of Education, HMG/Nepal.

Table 9  
Number of Teachers in the Secondary Schools

Years	Total Teachers	Trained Teachers	Total	% of Trained Teachers
1964	3,150	1,093	-	34
1965	2,930	777	-	26
1966	3,500	892	4,392	25

Source: Educational Statistical Report 1966-67, Ministry of Education, HMG/Nepal.

Table 10  
Projection: Student Class

Year	Total Population	School Age Number	Number of Primary Education Getting Students	Decrease in the Plan Period	% of Class or Age Teachers
1970	1,10,48,000	14,36,000	5,03,000	-	35 2,000
1975	4,21,56,000	15,80,000	7,11,000	2,08,000	45 2,73,000

Source: The Fourth Plan, HMG/Nepal.

Table 11  
Government Expenditure on Education  
(Rs. in million)

Year	Total Government Budget	Budget of Ministry of Education	% of Total Budget Allocated to Education
1965-66	458.8	36.2	7.8
1966-67	546.2	37.2	6.8
1967-68	667.3	43.5	6.5

Source: Educational Statistical Report, Ministry of Education, HMG/Nepal.

Table 12  
Agricultural Production  
(M. Tons in Thousand)

Year	Third Year Plan Target		Achievement				% Increase	% Target
	64/55	68/69	64/65	65/66	66/67	67/68		
Total Foodgrains	32,70	37,76	33,58	33,38	34,20	35,98	10.30	64.8
Paddy	22,01	23,68	22,07	20,27	22,17	23,22	5.45	72.5
Maize	8,54	9,18	8,56	8,24	8,75	9,00	5.39	71.9
Wheat Barley	1,52	4,25	1,75	1,87	2,16	2,56	68.42	38.0
Millet	63	65	1,20	1,20	1,12	1,20	84.62	-
Cash Crop								
Sugarcane	1,26	2,52	1,92	1,47	1,67	1,88	49.21	49.2
Mustard	51	60	51	56	57	56	11.37	66.6
Tobacco	9	24	8.0	5.2	6.3	6.3	-30.00	-
Jute	38	54	39	38.4	39.4	-	-	-

Source: The Fourth Plan, HMG/Nepal.

Table 13  
Housing Facilities in Kathmandu 1970

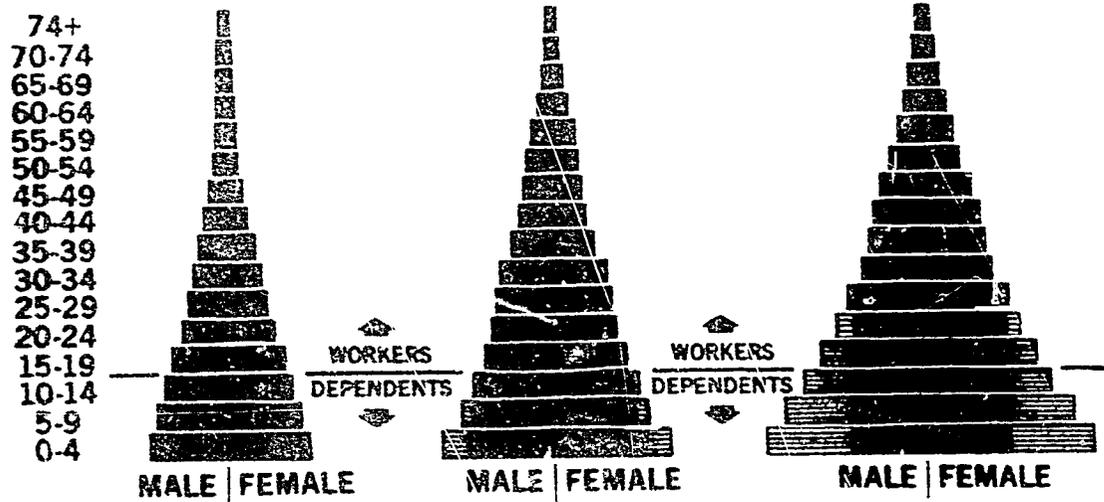
1. Population	1,19,541
2. Number of Houses	17,963
3. Hygeinic Officials	277
4. Total Expenditure of K.N.P.	6,00,000 to 7,00,000 Rupees Per Annum

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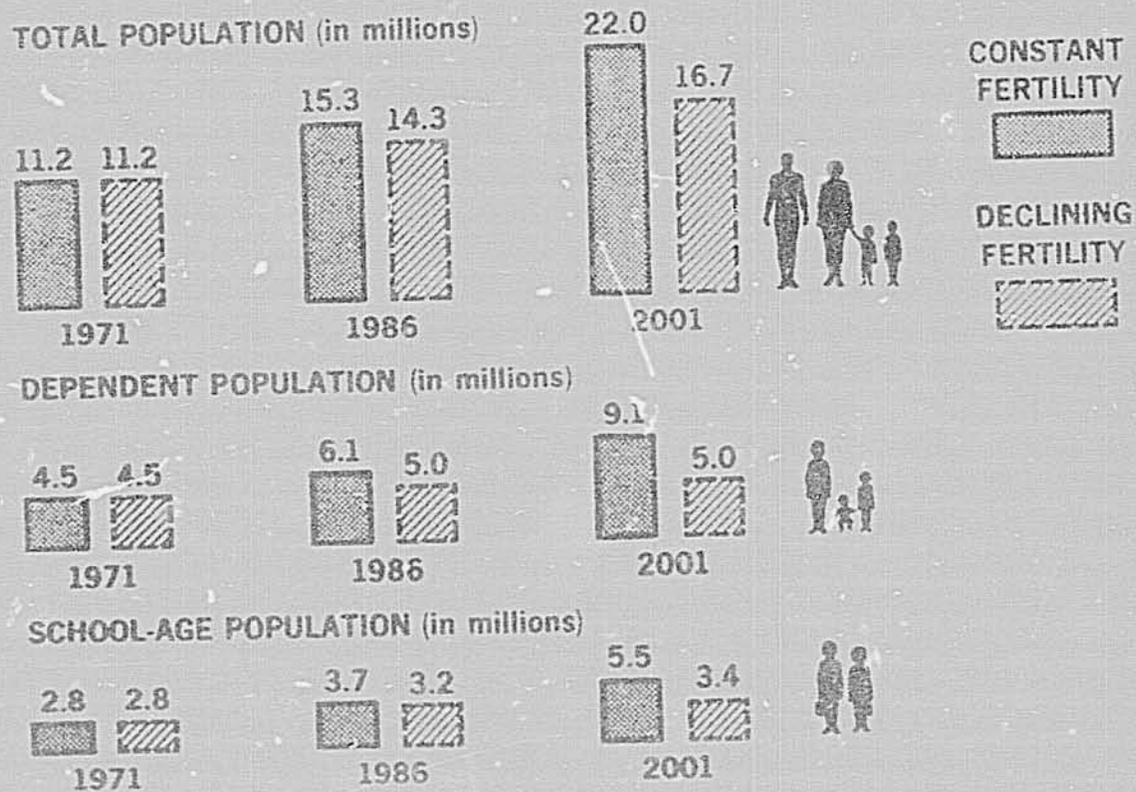
Source: Kathmandu Nagar Panchayat.

## SEX AND AGE DISTRIBUTION OF POPULATION - NEPAL

POPULATION	1971	1986	2001
CURRENT FERTILITY	11,247,000	15,346,000	22,053,000
DECLINING FERTILITY	11,247,000	14,272,000	16,679,000

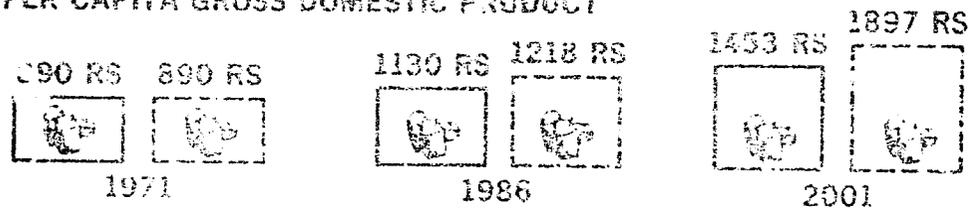


## DEMOGRAPHIC CONSEQUENCES OF DECLINING FERTILITY IN NEPAL

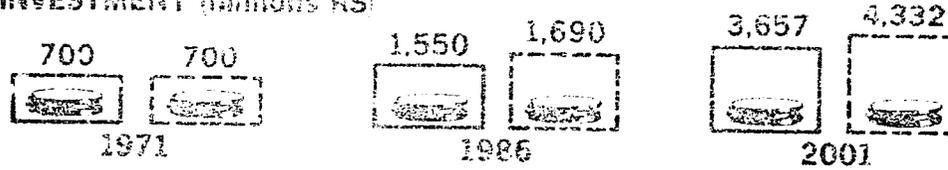


## ECONOMIC CONSEQUENCES OF DECLINING FERTILITY IN NEPAL

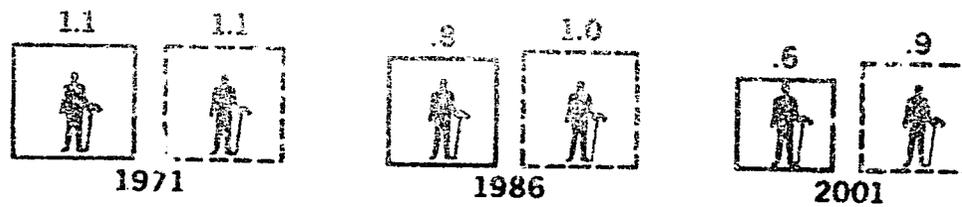
### PER CAPITA GROSS DOMESTIC PRODUCT



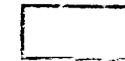
### INVESTMENT (millions RS)



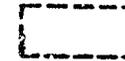
### AGRICULTURE (hectares of land per farmer)



CONSTANT FERTILITY



DECLINING FERTILITY



## IMPLEMENTATION OF A DECLINING FERTILITY IN NEPAL

I TO ENABLE A DECLINE IN FERTILITY OF 50% OVER 40 YEARS IN NEPAL,  
FEMALES IN THE FOLLOWING AGE GROUPS WILL HAVE TO HAVE FAMILY  
SIZES AS FOLLOWS

AGE	FAMILY SIZE	
0-4	2.7	} EDUCATION MOST IMPORTANT
5-9	3.0	
10-14	3.3	
15-19	3.6	} PROPAGANDA-PRACTICE MOST IMPORTANT
20-24	4.3	
25-29	4.5	
30-34	4.8	

II RETURNS TO FAMILY PLANNING ARE VERY HIGH

--- 1 RS INVESTED IN FAMILY PLANNING WILL RETURN



25 RS OR MORE OVER THE NEXT 30 YEARS

Acknowledgements

The Centre for Economic Development and Administration would like to thank the United States Agency for International Development, Nepal for financing the Seminar.

Methods and Procedures Used in Conducting the Seminar

Each session was of three hours duration. The discussion commenced with a presentation by the speaker lasting approximately 30 minutes followed by the commentators who read their comments on the speaker's paper. The written comments were generally short and did not exceed ten minutes. The panel members then made observations and comments.

After a 15 minute recess for tea, the floor was opened for questions and comments by the audience. The session was concluded by the Chairman with a summary presentation and concluding remarks.

Except for the Introductory Session, there were two sessions each during the other two days.