

THE OPTIMUM POPULATION SIZE:

AN ALTERNATIVE APPROACH TO REDUCING POPULATION GROWTH

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Translated by Yonas Admassu

I. Introduction

The aim of my paper is to suggest approaches, different from those we have been using so far, for addressing our social, health and economic problems, since they relate to our efforts to facilitate the speedy development of the people of Ethiopia. We have so far been focusing on reproductive health, especially family planning policies and programs in order to reduce the rate of population increase and alleviate the people's problems. In spite of the fact that we have all attempted to give it our best, we have not been able to achieve satisfactory results.

The population of Ethiopia is currently growing at the rate of 2.8 per cent per annum. The average marriage age of Ethiopian women stands at 16 years. The average number of children a woman delivers is six. And of every 1000 children born alive, 100 die before reaching their first birthday, while 172 die before they attain their fifth birthday. Given the present scenario, the population of Ethiopia will double every 23 years, so that

the current population, which stands at 70 million, could grow up to 140 million 23 years from now, that is by the year 2028 [or 2020 E.C.]

Even with the realization of the magnitude of this problem, the effort to alleviate the country's poverty appears not to have achieved satisfactory results. The country's per capita income still stands at USD 100. Of the school-age children in the country, only 24 per cent go to school. 50 per cent of the children under the age of five years do not have access to nutritionally balanced diet. 90% of the babies born, at any given time, have no access to the services of competent health professionals.

Although I would not be so audacious as to assert that no attempts are being made by the Government or other concerned institutions to alleviate the problems enumerated above, I, nevertheless, do not find myself in a position to offer the opinion that the effort made so far has brought about satisfactory results. Consequently, the core of my message in this paper is as follows: In order to reduce the country's population

growth and, accordingly, enable the people to attain a comfortable level of standard of living, wouldn't it behoove us to change the current orientation of the efforts we have been making so far? In order to help us go about our work with the new approach, I shall focus myself on the issue of what actually constitutes an optimum population size in the context of Ethiopia. More often than not, whenever we find the forum to talk about the growth rate of the population of Ethiopia and the problems it entails, we tend not to take notice of the issue of what constitutes the optimum population size for Ethiopia and how exactly we could attain that level. It is my conviction that it would give us a hint or so to the solutions we need if we could only consider the question to begin with.

Accordingly, in this paper, I shall first tackle the concept or notion of 'the optimum population size' and present the pros and cons of the notion as presented by different parties, also in the process offering my own opinions. I shall then deal with the issue of natural resource utilization that is necessary for

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increasing production as well as consumption, while at the same time trying to give an overview of the Ethiopian situation as compared to those countries with low-, middle-, and high-income levels. Next, I will try to show the relationship between natural resource utilization and standard of living by using certain indicators. Lastly, I shall project my visions of Ethiopia for the year 2020 in terms of how it could properly use the natural resources available to it towards the improvement of the livelihood of its people and manage to curb the growth of its population.

I would like to use this opportunity to thank the Ethiopian Economic Association for providing me with the forum to share my thoughts with others. I would also like to express my gratitude to Miss Meron Bekele and Miss Martha Kebede for their help in computation of the data and for typing the manuscript.

II. The Optimum Population Size

2.1 What does the optimum population size mean?

Although there are some difficulties involved in providing any single definitive meaning to the concept of 'optimum population size', it is nevertheless possible to identify some basic working definitions that can be applied to a number of situations.

- First, what we call optimum population size does not refer to the number of people that can be jammed into the borders of a given country. Rather, the optimum population size of a country is determined by the level

of the natural resources that must be undermined or consumed in order for the people to lead a good, sustainable standard of living.

- Second, for any population size to be considered optimum, it should lie somewhere between the minimum viable number of and the maximum people the country's carrying capacity could permit. But it does not mean that this definition is without problems. For example, what we call the minimum viable number of people could be a matter of social value, so that it could vary from place to place. Since, however, at present population size is skyrocketing virtually everywhere, communities have to arrive at some point of agreement as to what constitutes this minimum viable number of people.
- Third, when we consider the current global situation, resources, whether natural or man-made, cannot be equally distributed among the people of the world, so that the share of resources going to each individual cannot be up to par for all. Although everyone wants to close such gaps, the reality is that any such effort cannot meet with full success. Because of this, what we call the optimum population size should include this reality as part of its definition.

Generally considered, any given country's optimum population size refers to a situation in which the country is able to appropriately use its natural resources such as to ensure a good and sustainable livelihood for its people. If we agree more or less generally on this definition, I shall next deal with the

differences among those parties that are in favor or against the concept of optimum population size.

2.2 Proponents of the concept of optimum population size

"Unless we deliberate on the issue and arrive at a defined figure for what should constitute the optimum population size henceforward, that number shall be determined by circumstances outside of our control. And the number so determined might not prove to be what we desire."¹

This quotation is an expression of the position of those parties that strongly support the idea of determining the optimum level of population size. The following are the arguments they forward in support of their position:

- First, this idea of the optimum population size is not a matter of mere academic pronouncement. It is an issue that points to the future as projected from the perspective of the present and one that requires us to pose some useful questions. For instance, what does our stock of national water, soil, forest, energy resources amount to at present? How many people can each of these resources support in such a way that their exploitation does not exhaust any future inputs available to us? And in what way can these

¹ Wilcox, Boyd, 1996. "Optimum Population and the Search for Sustainability" p. 5, National Optimum Population Commission, Oregon, USA.

resources affect the living conditions of a country? So the issue forces us to ask such questions that might serve as pointers to our direction into the future.

- Second, it forces us to look back and ask ourselves how much of our ecosystem we have polluted, whether knowingly or inadvertently. Which of the environmental resources that we have destroyed can we rehabilitate? And which ones have we lost irretrievably? How can we combat the social and economic crises that have followed in the footsteps of our actions? What are the issues that we should give prior consideration to in order to guarantee our future survival and livelihood? The issue forces on us such questions as well.
- Third, this notion of optimum population size is not limited merely to the number of people alone. It is rather strongly linked to such notions as 'optimum agricultural production', 'optimum water resource utilization', 'optimum industrial production', 'optimum democratization', etc. Generally speaking, the concept of 'optimum population size' is closely linked to the concept of 'sustainable development'. By considering the two in terms of their relationships, we can - in order to realize our capabilities - map out our future orientation.

What, in sum, the proponents of the concept of optimum population size are saying is that, unless we accede to this concept and, accordingly,

adopt some strategy of resource utilization that is acceptable to our countries and set out in that direction, things will fall outside of our control and our very survival will come into question.

2.3 Opponents of the concept of optimal population size

Even given these arguments, there still are parties strongly opposed to this concept. Such parties are predominantly of liberal political orientation and strong advocates of social rights, but particularly of the rights of women. They are strongly opposed to the notion of optimum population size for the reasons stated below. The general drift of their arguments is expressed as follows:

- First, let us look back and consider the genesis of the concept. Reputable economists who lived about the beginning of the century were deliberating and researching on the possibility of controlling the world's population increase in an economically viable way and arriving at the optimum level of population size. Their thought pattern was exactly like that of manufacturing "profitable" commodities in a factory.
- Second, the argument about the issue of population size at first revolved around "numbers." Gradually, however, the argument was extended to assume a qualitative dimension. The pattern of thinking as it evolved then had a racial bent. In the 1920s and 1930s, on the pretext of developing a genetically "perfect" stock of

human beings, research in eugenics² began being conducted in some of the so-called democratic countries. To this end, different kinds of experiment were carried out on some members of the communities (particularly the poor and the physically 'deformed') without their consent. Such studies and experiments were aimed at rendering barren those members of society considered "inessential" [or as constituting an extra "burden" to society].

- Third, the present environmental pollution and degradation is not directly correlated with the increase in population. Because not everyone consumes the same amount of resources, people's contribution to environmental pollution and degradation cannot be the same. To cite but one example, while the industrially advanced countries are home to only $\frac{1}{5}$ (one-fifth) of the world's population, they nevertheless consume $\frac{3}{4}$ (three-fourths) of the world's resources. This means that they contribute to the environmental pollution and degradation more than their share of population size. What this goes to prove is that the problem, rather than being one of population size, is the unequal distribution of wealth among the world's countries. Also because there are huge gaps among the people in the developed countries when it comes to economic status, the level of

² According to *Webster's II New College Dictionary*, 'eugenics' refers to 'the study of hereditary improvement by genetic control' [trans.]

consumption and the contribution to environmental pollution and degradation cannot be the same for all people.

- Fourth, the introduction of this concept of optimum population size has, consequently, made us thwart our attention from those factors responsible for the pollution and degradation of the environment. Our attention, rather than being drawn to this idea of optimum population size, should be focused on bringing an end to the following problems: first, those technologies that cause environmental pollution; second, over-consumption of resources; third, those destructive measures that result in unnecessary destruction of natural resources for short-term benefits, measures that deny the human rights of communities, and those activities undertaken in the name of development but which subject poor farmers to forced migration and exile (e.g. deforestation and mineral extraction). What we should realize is that all these activities have the support and blessing of governments and international financial institutions.
- Fifth, this concept of optimum population size does not point to any definite number for the people or determine their composition. It cannot, therefore, be anything other than the view or position of a government or an external body that seeks to determine the size and type of a country's population on its own. Consequently, then, it cannot escape the conclusion that a

certain sector of a given community is less desirable than another sector. We are well aware of which sectors of communities those demographic policies issued over the years used to consider "inessential." It is usually the poor or the physically 'deformed' or those with undesirable traits that constituted these "inessential" sectors of society. Consequently, this notion of optimum population size does not have as its target those communities with wealth and high resource consumption rate and which, as a result, end up polluting and degrading the environment.

- Sixth, of special concern is the fact that those demographic policies designed by the proponents of the notion of optimum population size have rendered women, in particular, most vulnerable. Most of the dangerous contraceptives (such as Norplant) are tested on women, often without their consent or without being informed of the side effects the drugs might cause. Although it is known that such experiments might result in infertility or other health hazards, no efforts are made to follow up such effects and treat the victims to remedy the situation. In sum, this notion of optimum population size measures up to nothing more than violating the human rights of women and delivering their fates into the hands of policy makers, people who run after short-term profits, and health professionals.
- Finally, these opponents of the notion of optimum population

size cite the following words of a proponent of the concept:

Saving one poor, hungry person is like opening the door for the propagation of many poor, hungry people.

2.4 My own views on the concept of optimum population size

I shall try to present my views by starting with the last point raised by the opponents of the concept and by citing some examples from Ethiopia's current situation for purposes of illustrating my point.

- First, the claim that policies supporting the concept of optimum population size violate women's human rights and render them infertile or barren by making them take birth control drugs, often without their knowledge of the effects of the drugs, may be valid for some countries. This ought to be condemned indeed. I do not think, however, that this argument is valid for the Ethiopian situation. And I have two basic reasons for forwarding this argument:
 - a) While the National Population Policy of Ethiopia, issued in 1993, states, as one of its specific objectives,³ that the percentage of married women using contraceptives should increase from the current 4 per cent to 44 per cent, it has nothing to say as to what type of contraceptive methods they

³ *National Population Policy*, specific objective (b), p. 28 [trans.].

should use. I am, therefore, of the opinion that there has been no effort to deliberately bear upon women to use dangerous contraceptive methods.

- b) Of those very few women who use contraceptives, very many women use the pill (38%) or injection (48%). Those using Norplant, which is considered risky, are very small (5%). Although the hazards of using the pill or the injection method are not clear, I assume that the advantages outweigh their disadvantages.

Consequently, although I am strongly opposed to measures that would result in damages to women, all in the name of attaining the optimum population size, I will nevertheless not categorize those appropriate contraceptive methods that would result in population control and reduction as dangerous.

- Second, I think that the argument that the concept of optimum population size is a conspiracy to rid the world of those considered “inessential,” but particularly the poor and the physically ‘deformed’, has some relative validity. I also believe it should be condemned. When it comes to Ethiopia, however, I do not think there is any evidence as yet of a deliberate and concerted attempt to get rid of the poor and the physically ‘deformed’. On the contrary, the sector of the population that

uses contraceptives, which amounts to 8 per cent, are those who are considered much better off—both in terms of income and education—than those regarded as poor. On the other hand, however, it is undeniable that those who risk damages or death as a result of the low level of contraceptive use in the country are the poor and the helpless. Even then, the causes of their vulnerability, rather than being government policies, are, as Malthus suggests, war and such natural causes as diseases and droughts. If the size of the population, the reduction and control of which has not been properly managed through contraceptive use, grows over and above the country’s capacity to support it, it appears that what Malthus has suggested is going to transpire after all. And Ethiopia seems to have been placed in this category.

- Third, the argument that the consumption level of all countries or all people is not the same and, therefore, the pollution and degradation they cause to the environment is not to the same extent; that the developed countries are consuming more than their share of the natural resources and causing more destruction to the environment; that the actual problem lies in here, not in the claim that the world’s population has increased and, therefore, the solution is not to determine the optimum population size is valid. There are instances in the Ethiopian situation to corroborate this

claim. In terms of economic status, for example, while the share of income of the top 10 per cent of the population is 34 per cent, that of the bottom 10 per cent is a mere 3 per cent. Nevertheless, because it is impossible to bring about total equality among the people as a whole, it is my opinion that the concept of optimum population size would eventually and gradually make relative contribution to the narrowing of the gap between those with different levels of income and resource consumption.

- Fourth, while it is true that it has now been about 70 years since the “numbers” factor in the concept of optimum population size underwent qualitative transformation and the experiments undertaken, due to this qualitative transformation of the concept, to create or develop social groups that are different both in their mental and physical constitution have ceased, it still helps to be on one’s guard with regard to the possible revival of such thinking and experimentation. Although the possibility for such a scenario to emerge in Ethiopia is highly minimal, the possibility, however, of its occurrence in other countries is something to ponder. Whatever the case, the very idea itself is to be strongly opposed.

In my view, therefore, I don’t find the concept of optimum population size that disagreeable. This population size should not represent one specific magic number. Rather, it should be something that would

serve to point to the direction we should follow in the future, based on the advised consideration of the current situation in which we find ourselves. The idea should not focus on just reducing the country's population growth. It must include, as part of its definition and our understanding, a strategy that would enable us to attain a sustainable and "good" livelihood in a manner that would not entail the overuse or abuse of the country's wealth, whether natural or man-made. If we agree on this notion, it is my estimate that the optimum population size I envision for our country will have the following important benefits or advantages:

1. It would help us properly appraise and understand our current predicament and envisage our future direction;
2. It would steer us in the direction of taking stock of the natural resources (water, soil, forest, potential energy, etc.) currently available to us and find out how much of these resources we are utilizing at present;
3. It could provide us with pointers as to how these resources would be of benefit to us in a manner that does not entail the risk of their exhaustion;
4. It would help us realize those resources that we have been squandering and are, therefore, in need of rehabilitation;
5. It would help us know the number and types of

contradictions existing between population size and the stock of natural resources we have;

6. Beyond helping us know about our natural resources, it could give us clues as to the country's democratization process and the creation of a system of good governance.

What I am attempting to show in this paper is how the concept of optimum population size would eventually lead us to the appropriate mode of natural resource utilization. Natural resource utilization would in turn lead us to the identification of living standard indicators or indices. Finally, attitudes about good living standard would point to the direction whereby we could achieve the optimum population size that is acceptable in our context. In order to demonstrate what I am up to, I will use data from the *Living Planet Report* of 2004. Most of the data provided in the *Report* is that for the year 2001.

In the *Report* the countries of the world have been classified under three categories: (1) low-income countries, numbering about 61; (2) middle-income countries, numbering about 93; and (3) high-income countries, numbering about 54. The data for these countries shall be computed in per capita income terms. Moreover, the data has been used such as to show the situation of Ethiopia in comparative analyses.

III. Natural Resource Utilization

As I have pointed out earlier, the optimum population size paradigm helps us take stock of the size of the natural resources in our environment, and how many and how much of each we are currently utilizing. In this paper natural resource utilization is measured on the basis of the amount of land, water and potential energy that a given country's population uses to meet its consumption needs by utilizing the knowledge and technology available to it.

Accordingly, I shall attempt to show in the sections to follow how much of natural resources in Ethiopia we are currently utilizing by comparing our consumption level to that of the low-, middle- and high-income countries.

3.1 Land resource

Figure 1 shows the overall utilization of land resource (i.e. agriculture, grazing, and fishery). While those countries in the low-income bracket utilize 0.8 hectares per capita in order to produce what they need, those in the middle-income bracket utilize 1.9 hectares per capita. The countries in the high-income bracket, on the other hand, utilize 6.4 hectares per capita for the same purpose. By comparison, the per capita land utilization level for Ethiopia is 0.7 hectares.

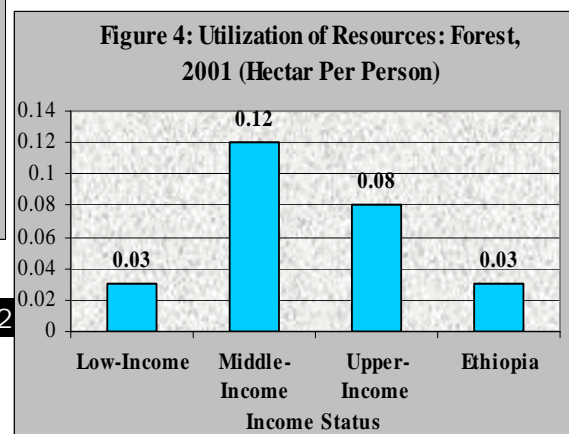
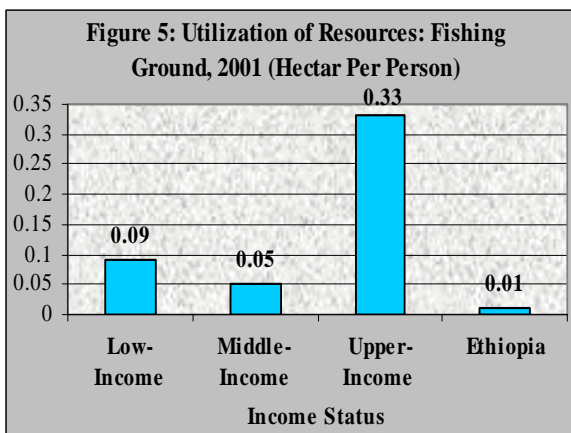
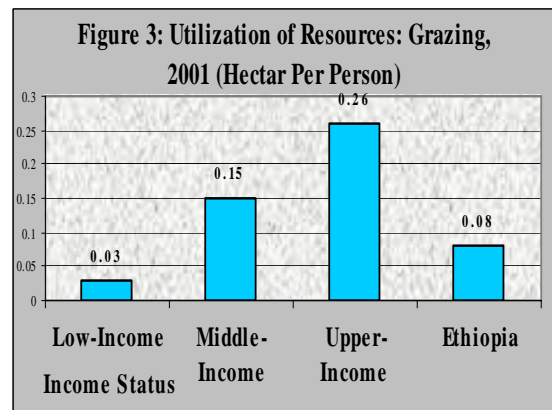
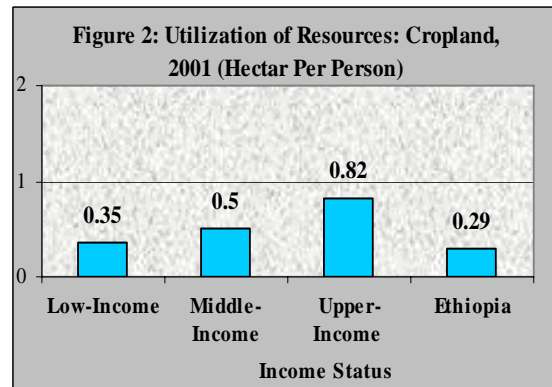
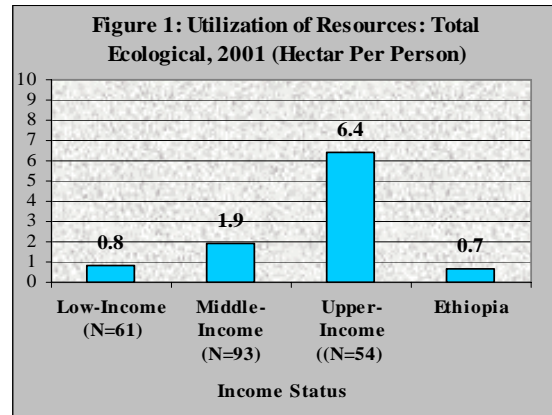
Figure 1 demonstrates that the high-income countries use 9 times as much land per capita to produce for their needs. Even the low-income countries generally utilize about 11% more land per capita than Ethiopia.

Figure 2 shows agricultural land utilization of the countries in the three categories. Accordingly, we see that the high-income countries use about three times as much agricultural land as that of Ethiopia. Even the low-income countries use one quarter more area of agricultural land than Ethiopia.

Figure 3 shows grazing land utilization. We can see from the figure that the per capita land utilization for grazing of the high-income countries is 0.26 hectares. This figure is three times as high as that for Ethiopia, which is 0.08 hectares per capita. Although Ethiopia's land utilization is about half that of the middle-income countries, it is more than two-and-a-half times that of the low-income countries.

Figure 4 shows forestland utilization. In this case the per capita holding of the middle-income countries is the highest compared with those of the other two categories. This figure is four times that of Ethiopia.

Figure 5 shows the size of per capita land holding used for fish farming. The high-income countries have an exceedingly high per capita holding when compared with the countries in the other categories, but more so when compared to that of Ethiopia. It can indeed be said that fish farming has no place in the Ethiopian economy.



3.2 Potential energy

Figure 6 illustrates the overall potential energy (that is carbon dioxide, fuel wood, nuclear energy and hydroelectric power) utilization. In this respect the per capita land utilization of the high-income countries is 4 hectares, while those countries in the poor category, such as Ethiopia, utilize a mere 0.3 hectares. This means that the high-income countries utilize over 13 times those of the poor countries. Even the per capita utilization of land of those countries in the middle-income category is very low compared with that of the high-income countries.

Figure 7 shows the overall emission range of carbon dioxide. Compared to the low income- and middle-income countries, the high-income countries utilize a large area of land. By contrast, the carbon emission range of the poor countries, including Ethiopia, is extremely low.

Figure 8 shows the area of land used to produce fuel wood. In Ethiopia the per capita utilization of land is 0.27 hectare. This amounts to over 10 times that used by the rich countries. This is clearly an indication of the massive destruction of forest.

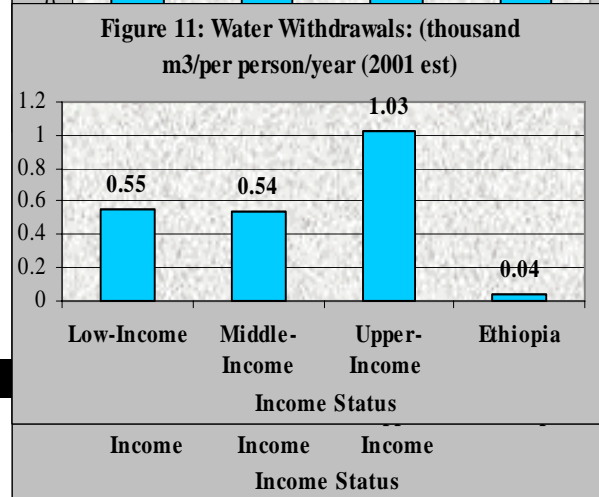
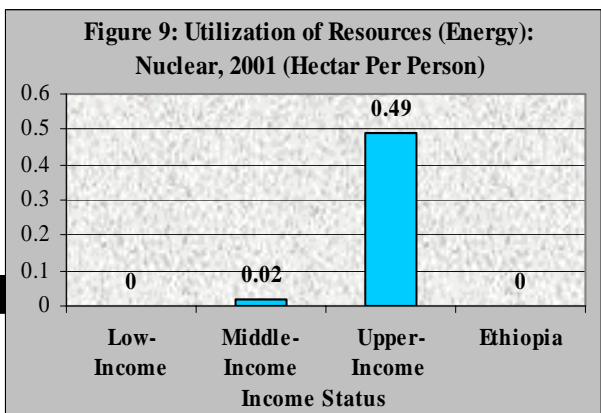
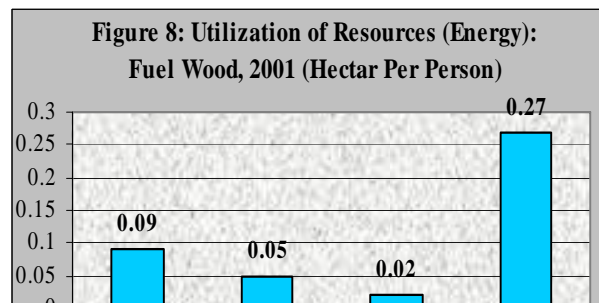
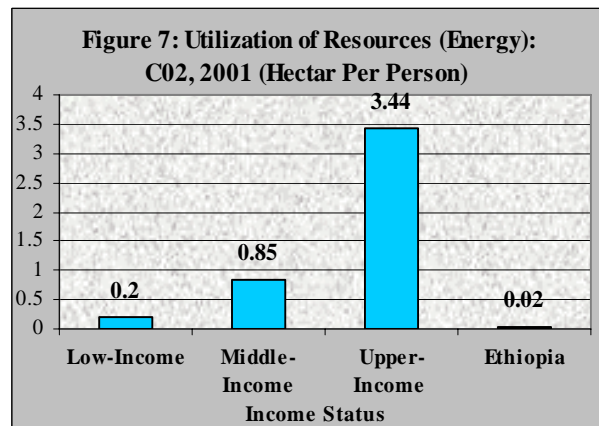
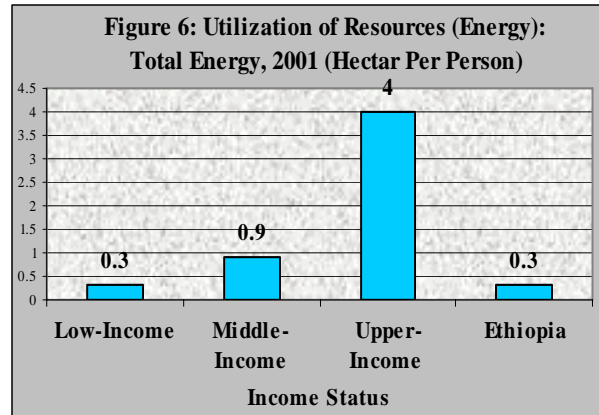
Figure 9 shows the area of space used to tap nuclear energy. While the per capita utilization of land in the rich countries is 0.49 hectare, the land available to the poor countries is nil.

Considered in general, the amount of per capita land used by the developed countries is extremely high compared to that used by the poor countries. We shall see below how this rate of land utilization by the rich countries has led them to the attainment of a better standard of living.

3.3 Water resource

Figure 11 shows the level of water resource consumption. The per capita water resource consumption of the high-income countries is

As Figure 10 indicates, while the per capital land utilization for water resource is 0.01 for the high-income countries, the countries in the other two categories, including Ethiopia, utilize virtually nothing.



1.03 cubic meters per annum. This figure amounts to 25 times that of Ethiopia, which is 0.04 cubic meters. Even the countries with low income consume 13 times that of Ethiopia.

Figure 12 demonstrates the amount of untapped water resource. In Ethiopia the potential per capita water distribution could be as high as 29000 cubic meters. The figure represents 3 times that for high-income countries and 5 times as high as that of low-income countries. While Ethiopia's untapped water resource is extremely high compared to that of the countries in the two other categories, it nevertheless indicates that Ethiopia's capacity to tap and put to use this resource is the lowest by any standard.

Figure 13 shows the area of land utilized for building roads and factories, in short, land used for all construction work, outside that used for agriculture. On the basis of this figure, the area of land utilized for purposes of construction by the developed countries is 0.23 hectares per capita, while Ethiopia's share is a mere 0.04 hectares per capita.

As I have attempted to demonstrate above, the area of land utilized for production in different sectors by the developed countries is extremely high as compared to that exploited by the poor countries. I will, accordingly, show in the following chapter how this difference in the utilization of land and other natural resources results in difference in levels of income.

IV. Living Standard Indicators

As I have pointed out earlier, the gist of my argument is that the appropriate use of natural resources would lead to the attainment of better standards of living, which, in turn, would lead to the attainment of the optimal population size. In the sections to follow, I shall attempt to illustrate the differences in standards of living among the low-, middle- and high-income countries, including Ethiopia, on the basis of the living standard indicators provided in the *Millennium Development Goals*.

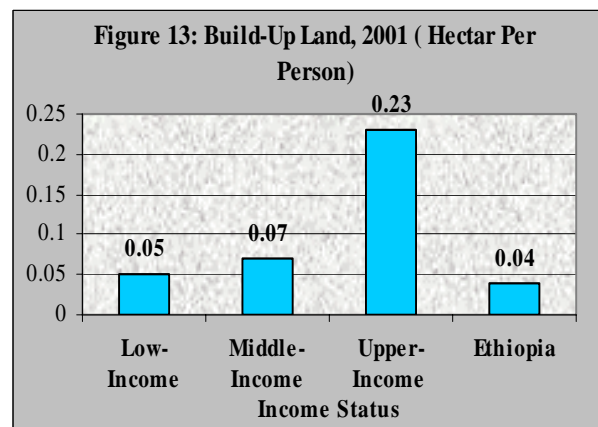
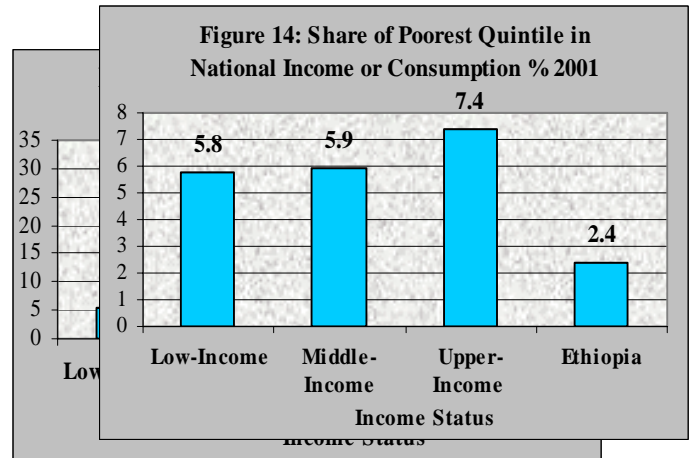
4.1 Income distribution

Figure 14 demonstrates the national income distribution of the countries under the different categories. The figure specifically indicates the income level of the bottom 25 per cent of the population

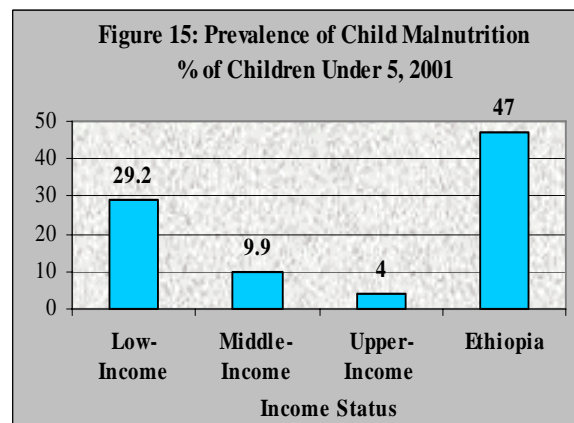
4.2 Inaccessibility of nutritionally balanced diet to children

Figure 15 indicates the number of children below the age of five who have no access to nutritionally balanced diet. Accordingly, while 47 per cent of children below the age of five in Ethiopia have no access to nutritious diet, those in the wealthy countries with no access to nutritious food is on the average 4 per cent. This means that the situation for children in Ethiopia is over 11 times worse than that for those in the wealthy countries. The figure even for those countries considered poor is lower by about half than that for Ethiopia.

for each category. Accordingly, the bottom 25 per cent of the economic strata of the populations of the high-income countries secure on the average 7.4 per cent of the total income of the respective countries. In contrast to this, the same stratum of the population in Ethiopia has a share of a mere 2.4 per cent of the country's total income, while that of the low-income countries around the globe is 5.8 per cent. This goes to prove that, although there certainly are gaps or imbalances in income distribution even in the



wealthy countries, in the case of Ethiopia, the distribution is extremely disproportionate.



4.3 Enrollment in primary education

Figure 16 shows the number of school-age children enrolled in primary education. While the number of the school age children enrolled in primary schools in the middle- and high-income countries is 86 and 84 per cent, respectively, that of Ethiopia is only 24%. In other words, while additional 76 per cent of the children should have been in school, this, however, has not been the case for different reasons. The number of school age children attending school even in the low-income countries is more than double that of Ethiopia.

4.4 The ratio of school-going girls to boys

Figure 17 shows the difference in ratio between girls and boys attending primary and secondary education. In the developed countries, while there are 100 male students for every 102 female students attending school, in Ethiopia, however, for every 88 female students attending school, there are 100 male students. This means that, when it comes to access to primary and secondary education in Ethiopia, the number of females attending school is lower than that for males. However, compared to the other low-income countries, primary and secondary school enrollment for females in Ethiopia is relatively higher.

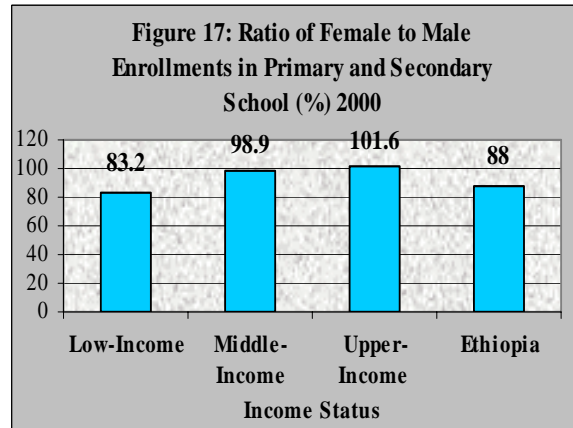
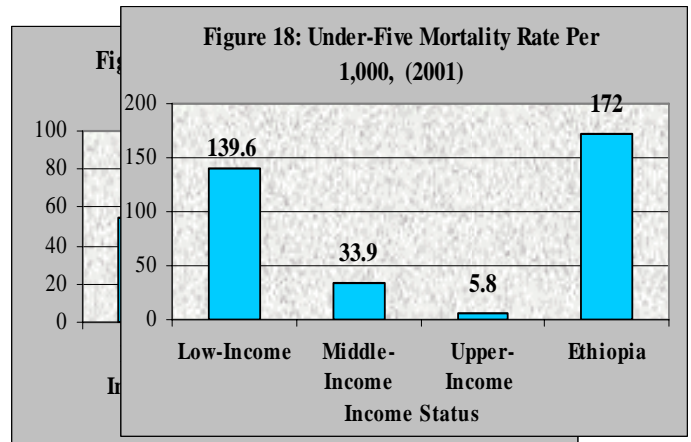
4.5 Infant mortality

Figure 18 shows the number of children that die before they see their fifth birthday. In my opinion this indicator is of particular interest and importance, for it does not only show the status of the health situation of a given country but also points to the level both of the country's economy and knowledge. In Ethiopia, out of every 1000 children born

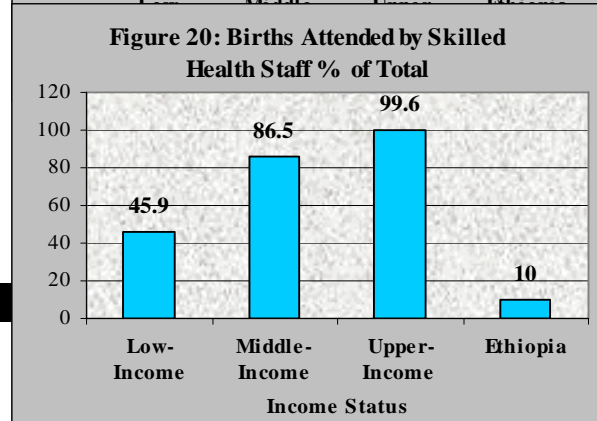
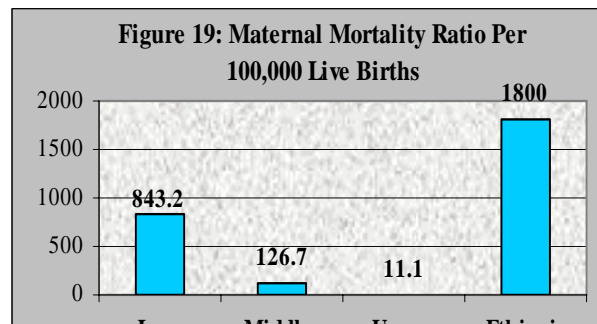
4.6 Maternal mortality during delivery

The number of mothers who die during delivery is a good indicator of a country's standard of living. It appears at present that the high-income countries have reached a level where they have almost solved the problem. The situation in Ethiopia is still grave. As Figure 19 shows, out of every 100,000 pregnant women, 1800 lose their lives in the process of delivery. In other words, out of every 100 women giving birth, two lose their lives in the process. Although one cannot certainly say the problem has been completely solved in the high-income countries, the percentage of maternal mortality is indeed extremely low there.

4.7 Babies delivered with the aid of health professionals



alive, 172 die before they get to the age of five. This number is 6 for the high-income countries and 34 for middle-income countries.



As figure 20 indicates the number of babies delivered by health professionals in Ethiopia is only 10 per cent. That is, the remaining 90 per cent are delivered at home without any help from health professionals. This situation is bound to result in risks for the children both as they grow up and in their future lives. The figure shows that babies delivered in the high-income countries have full access to the aid of health professionals. Even in those other countries in the low-income bracket, the number of babies delivered with the aid of health professionals is more than four times than that of Ethiopia.

4.8 Rate of population growth

Figure 21 shows the rate of annual population growth. Accordingly, one observes that the rate of population growth for Ethiopia is 2.8 per cent per year. In the developed countries, on the other hand, the rate is only 0.6 per cent, which means that, compared with the developed countries Ethiopia's rate of population growth is five times. In other words, this means that, if the low-income countries, including Ethiopia, continue at the same rate of population growth as they have now, it will take them only 20 to 25 years to double their current, respective, populations.

4.9 Contraception use

In this paper, the discussion about contraception use is limited to consideration of the cases only of those women who are married and are using birth control methods. Accordingly, as Figure 22 shows, the average number of women using different methods of contraception is only 8 per cent. Compared to the more than 70 per cent for the developed countries, the figure for Ethiopia is about nine times less. Even in the other low-income countries the number of women using contraceptives is more than three times that of Ethiopia.

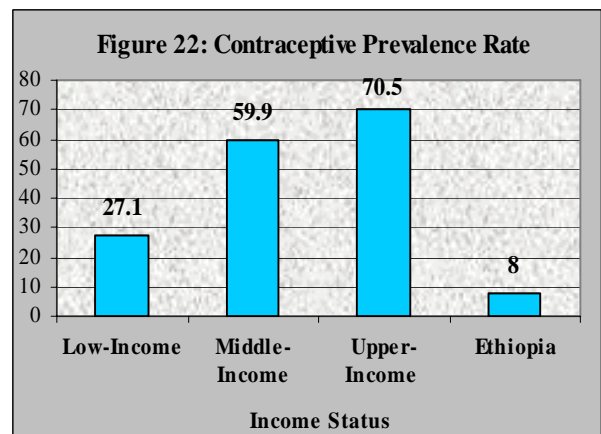
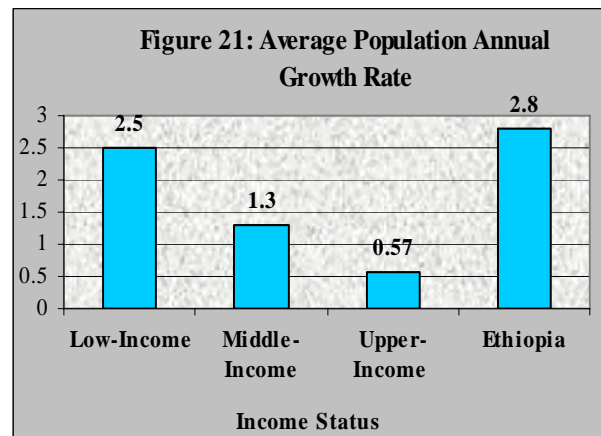
V. The Relationship between Natural Resource Utilization, Living Standard and Population Growth

To reiterate what I have already said earlier, proper natural resource utilization leads to better standards of living, which in turn, could lead to the attainment of the optimum level of population size. What follows below is an attempt to demonstrate the viability of this hypothesis.

5.1 The relationship between natural resource utilization and living standard

In this section I shall demonstrate the link between the overall natural resource utilization and living standard indicators. Accordingly, from Table 1 below, one can observe the following types of relationship between the two issues:

- There is a strong, positive link between the overall utilization of natural resources and income distribution. This means that, to the same proportion that the land utilization of a given country increases so also does the gap in income distribution decrease in the direction of striking a relative balance.
- There also is a similar link between the overall utilization of land and school



enrollment ratio of girls and boys. In other words, to the same extent that the rate of land utilization increases, so also does the opportunity for girls increase to get equal access to education as boys.

- Conversely, there is a strong, positive relationship between natural resource utilization and children's and maternal mortality rate. This means that, the more we use the available natural resources, the more the chances for highly decreasing the death rate among children and mothers in labor. All this goes to show that the appropriate utilization of natural resources will

lead to economic growth as well as health improvement.

5.2 The link between standard of living and population growth

To the extent that the appropriate use of natural resources greatly raises standard of living, so does the rise in standard of living contribute to decrease in population size. Table 2 illustrates the link between standard of living and population growth. The following are some of the observations:

- As the share of income of the bottom 25 per cent of the population in the economic stratum increases, the speed in the rate of population growth decreases.
- Access to nutritious diet for children under five years of age is positively linked to the number of women using contraception. It has been observed, in this connection, that population size also tends to decrease.
- To the same extent that girls and boys get equal access to education, the decrease in the rate of population growth accelerates, which means population size will also decrease.
- As the number of children enrolling in grade one increases, use of contraception will also increase and, in this connection, population size will also tend to decrease.
- It has also been observed that, as the number of babies delivered with the aid of health professionals increases, the rate of population growth tends to show a relative decrease.

As I have attempted to explain above, to the extent that appropriate use of natural resources contributes to the improvement of standards of living, so also does improvement in standards of living contribute toward the curbing of population growth.

VI. Conclusion

The main aim of this paper has been to demonstrate how the concept of optimum population size could be employed as one alternative in the effort to reduce the rapid growth of population. Accordingly, we have seen how the appropriate utilization of natural resources improves standards of living and subsequently leads to decrease in population size.

6.1 Vision 2020

Think Big!

**Start Small!
Act Now!**

The vision I have for Ethiopia in the year 2020 is to see it attain half the level of the standard of living achieved by the developed countries.

Table 3 illustrates what measures Ethiopia should take to meet the targets listed in the report of the Millennium Development Goals, considering half the level of the standard of living reached by the developed countries:

Table 1: Correlation: Utilization of Resources, Quality of Life and Population Growth

Utilization of Resources	Share of income of poorest 25%	Child malnutrition, % children under 5	Ratio, female/male primary/secondary enrollment	Children's mortality rate	Maternal mortality during delivery
Overall ecology	.286**	-.558**	.265**	-.602**	-.532**
Overall energy	.213*	-.517**	.202*	-.557**	-.501**
Carbon dioxide emission	.186*	-.517**	.180*	-.558**	-.516**
Overall water	.273**	-.174*	NS	-.201*	-.377**

** Very significant at .01 level

* Significant at .05level

Table 2: The link between standard of living and population growth

	Population Growth	Contraception Use	Population Size
Economic share	-.445**	.067	.101
Children with no access to nutritious diet	.539**	.635	-.018
Girls/Boys enrolled in primary & secondary education	-.308**	-.008	-.033
Children enrolled in primary education	.008	.211**	-.075
Babies delivered with the aid of health professionals	-.032	.060	.028

** Very significant at .01 level

* Significant at .05level

- The current 2.4% income level of the bottom 25% of the population should increase 1.5-fold to reach the 3.7% level.
- The present 47% level of children with no access to nutritionally balanced diet should decrease 6-fold to reach the 8% level.
- The number of children enrolled in primary education should increase almost two-fold from the current 24% to reach 43%.
- The number of girls enrolled in primary and secondary

education should reach the same level as that for boys.

- The current child mortality rate of 172/1000 should decrease to 86. Similarly, the rate of maternal death during delivery should decrease from the current 1800/100,000 to 900.
- The current 10% level of babies delivered with the help of health professionals should increase to 50%.

If the targets enumerated above are generally met, I believe they will

curb Ethiopia's current rate of population growth considerably. As Table 4 indicates, by the year 2020:

- The number of women using contraception will increase more than four-fold from the current 8% level to about 35%.
- The current 2.8% population growth rate will decrease by 50% annually and will reach the 1.14% level per year.
- The country's population will reach 82 million. Although this figure of 82 million could be

considered the optimum level of population size for the year 2020, it does not, however, mean it remains constant or invariable. All it means is that it could be the ideal population size for the projected year, taking into account the utilization of the then available natural resources and the improvement of standard of living resulting from that utilization.

Table 3: Average Millennium Development Goal Indicators

Millennium Development Goal Indicators	Ethiopia 2001	Multiplying Factor: Targeting 50 % of High Income Countries	Ethiopia 2020
Poorest 25% : % National Income/Consumption	2.4	1.5	3.7
% Malnutrition: % Child < 5	47.0	6.0 (Minus)	8.0
Primary Completion Rate (%)	24	2	43
Ratio F/M School Enrollment	88	-	100
Under % Mortality Rate Per 1000	172	-	86
Maternal Mortality Rate Per 100000	1800	-	900
% Birth Attended by Skilled Health Staff	10	5	50

Table 4: Population Growth and Population Size

The paper has not been designed to include all the above-mentioned factors. Others could present papers on each of them. As I have repeatedly pointed out, the focus of my paper has been the proper utilization of natural resources and how this could lead to attainment of the optimum level of population size. And I hope the paper has achieved this basic aim.

6.2 The issue of attitude/outlook

"Ethiopians are good at breaking bread together, but short on working together."

To attain the level that I indicated above by way of projecting my vision, we need to have the knowledge and capacity to use existing technologies. We also need leaders and leadership capable of providing genuine governance. Most of all, however, we need to change those age-old customs and attitudes that have proved stumbling blocks for years and years to the country's development.

Lastly, I shall conclude my paper by relating two very different experiences of mine.

Population Growth and Size Indicators	Ethiopia 2001	Multiplying Factor: Targeting 50 % of High Income Countries	Ethiopia 2020
Contraceptive Prevalence rate (CPR)	8	4	35
Population Growth Rate	2.8	2 (Minds)	1.14
Population Size, Million	70		82

⁴ Since people are both producers and consumers, the paper did not consider the productive role of the population.

About three months ago, when I was travelling from one country to another for a conference, I had to make transit stop at Los Angeles for some six hours. To avoid the boredom of waiting for that long at the airport terminal, I decided to rent a cab and go sightseeing into town. The white young man who was driving the cab immediately drove me to a wealthy residential quarter known as the city of Beverly Hills. While cruising through the city, the driver was all the while pointing to one building after another and telling me one was the residence of a famous actor, another of a famous basketball player, and yet another the house of a millionaire, himself enthused and excited in the process. Having patiently listened to him at some length, I felt somewhat bored and said to him if he would mind my asking him a question. He smiled to show his willingness. I asked, "Why is it that you Americans worship individuals so much? When you were just telling me about those individuals, it looked to me as if you were revering them as you would an Angel. Where I come from we don't worship singers, sportspersons, or the wealthy, as you do here in America! In fact, we don't even pay them any attention!" Having patiently heard my question, he calmly replied thus: "Look you here now! My attitude or the attitudes of other Americans towards these people is not one of worshipping them. Most of these people started out low and modest and, through their own efforts alone, attained the high level they are at present. So when I was telling you about these people with such enthusiasm, as you had witnessed, I was expressing my admiration of them for the efforts they so successfully made to get where they are now; it is not a matter of worshipping them." I was embarrassed for having asked the question and thanked him for the explanation and shifted our discussion to another topic.

After the cabby took me to the airport and I found myself alone thinking about nothing in particular, something that happened a long time ago surfaced in my mind. About ten years ago, when I was teaching at Addis Abeba University, I had taken my students on a field trip to Debre Sina in Semien Shoa. One morning, before we set out in search of data, I, being a coffee addict, went looking for coffee, only to be told, wherever I went, that what they could serve me was coffee brewed in pots and kept warm in thermos flasks. But as I did not like coffee that is kept long in thermos flasks, I persisted in my search. Finally, I gave up and went to one of the coffee shops and ordered the coffee that I could find, one in thermos flask. While I was drinking my beloved coffee, I asked the waiter standing nearby, with a note of rebuke: "Addis Abeba is not that far away from here. Neither is your town a small one! Why can't you get yourselves a coffee machine?" The waiter tried to calmly explain the situation and said: "Well, *Gashé!*"^{*} Bringing coffee machines to this area has its problems." "Yes, tell me! What is the problem?" I persisted. "Here is the problem. If one of us were to introduce a coffee machine here, the other coffee shop owners would feel beaten and think the person was going ahead of them, and, so, they would, out of sheer envy, poison him to death. So, because no one dares to buy a coffee machine out of such fear for their lives, that is why the town is still without coffee machines." So ended the waiter's story.

In my opinion, one of the main reasons accounting for the huge gap in standards of living between Beverly Hills and Debre Sina is the difference in outlook and attitude between the two communities in question.

References

- ❖ *Living Planet Report, 1999-2004.* WWF International, Switzerland.
- ❖ *World Development Report, 2000-2004.* Oxford, England.
- ❖ *Millennium Development Goals Indicators.*

^{*} A form of respect for elder brothers.