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# Editorial

## The Concept of Sustainable Living

It is generally recognized that sustainable living is intricately linked with what is widely spoken as “Sustainable Development”. But what is connoted by the term Development? It is clear that the term development used in a colloquial context means different situations to different societies, and hence cannot be defined easily. Does it mean the achievement of a higher order of per capita income to satisfy peoples’ egocentricity, where man may be the servile robotic operator of sophisticated high-end techniques and technologies, or does it mean the achievement of an overall element of happiness or pleasure as conceived by the people of the tiny land-locked Kingdom of Bhutan, or does it imply the existence of a role model of a spiritually and non-materialistically advanced contended lifestyle as exemplified and enjoyed by our ancient non-anthropocentric ancestors in pre-colonial Sri Lanka?

Development should necessarily mean the achievement of the peoples’, or that of the community’s aspirations, which consequently means that the term development can have different connotations for different communities. It is in this context that we should appreciate the stance and courage of the Monarch of Bhutan to insist and make the point that what was more important to them (and perhaps for all human beings), was an “Index of Happiness” rather than a “Human Development Index”. Science for a sustainable lifestyle is the main focus of the current number of the Science Magazine Vidurava. This vital subject has been approached from a variety

of angles by the invited authors of articles in this issue. To quote a significant point from one of the articles, it is claimed that a Report compiled by the Stanford Centre on Poverty and Inequality, in 2018, is said to provide adequate evidence to the existence of substantial disparities and societal inequalities within even some of the most advanced countries in the world including the United States of America, thus establishing the fact that economic development as a way out for sustainable development and consequently for sustainable living is an outright fallacy.

Significantly, SDG-12 of the UN Agenda refers to “Responsible Consumption and Production” referring contextually to the fact that countries can manage the sustainable extraction of their natural resources more effectively, and also dispose of toxic waste more efficiently. These are one may say, just empty words with no meaningful and clear directions on how best this process could be scientifically and methodologically achieved, without having to face mishaps of the magnitude of the Meethotamulla holocaust.

In this context where does a small developing country like Sri Lanka stand, caught in a whirlpool of uncertainties in respect of economic progress, socio-political uncertainties, debt servicing and various other debilities and disparities? The question whether science and technology can retrieve and help in causing a U-turn for a better way of life (or lifestyle) for the people of Sri Lanka, currently seems to remain a tall-order.

M. Asoka T. De Silva

## Science for a Sustainable Future

Dr Jayantha Wattavidanage



The fact that throughout the past decade we have been incessantly hearing the words sustainable living, sustainable use, sustainable development shows the extent of their importance. However, we cannot delay anymore to investigate deeply to see whether we are actually leading a sustainable living.

Human beings have been consuming the limited resources on earth since ancient times. Consumption during the past two centuries has been special, because during this period the manner and the rate at which the resources have been used has been unlimited. The opinion of scientists is that along with the scientific and technological development which followed the industrial revolution, there has been socio economic and attitude changes which in turn has brought about the excessive use of resources.

It is frightening even to think that there will be no resources remaining for the people who will

be born tomorrow, at the rate the resources are being used today. If we are to see that some resources, energy and space remain to be used by the future generations, then it becomes necessary for us to lead sustainable living as individuals, societies, nations and finally on a global scale. Everybody has to change the life style.

The main challenges that have been identified globally in this context are:

1. Reduction of fossil fuels
2. The climate change factor resulting from CO<sub>2</sub> release
3. The costs of energy and water which are escalating daily

Hence we will examine to what extent science and technology can be used to overcome the above challenges. Today's main energy sources are the fossil fuels which are burnt to produce the required energy. There are two main problems involved here.

1. The rapid decline globally of the fossil fuels.
2. The sharp climate change brought about by the release of CO<sub>2</sub> into the atmosphere through the burning of fuels

Therefore science has now turned to looking at options to produce 'clean energy'.

Australia has invented the implements (technology) to tap

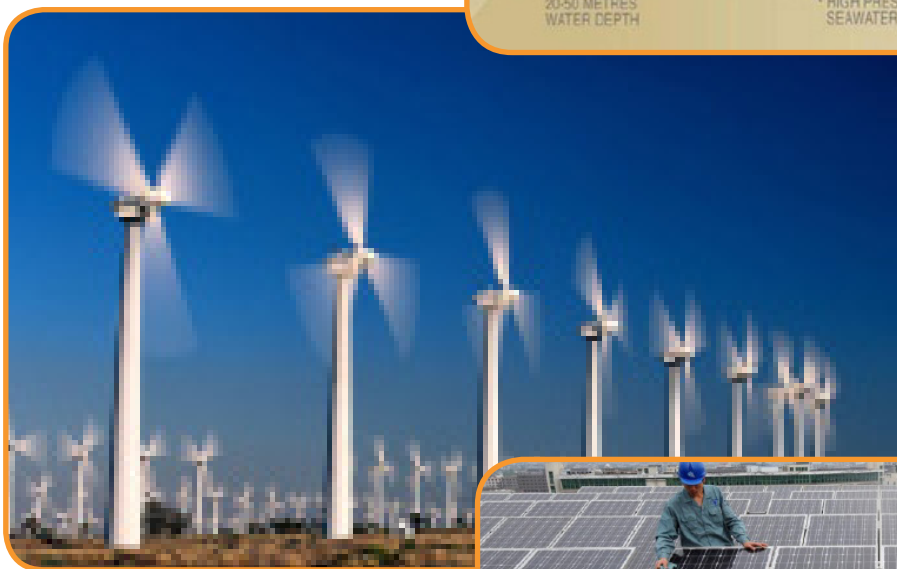
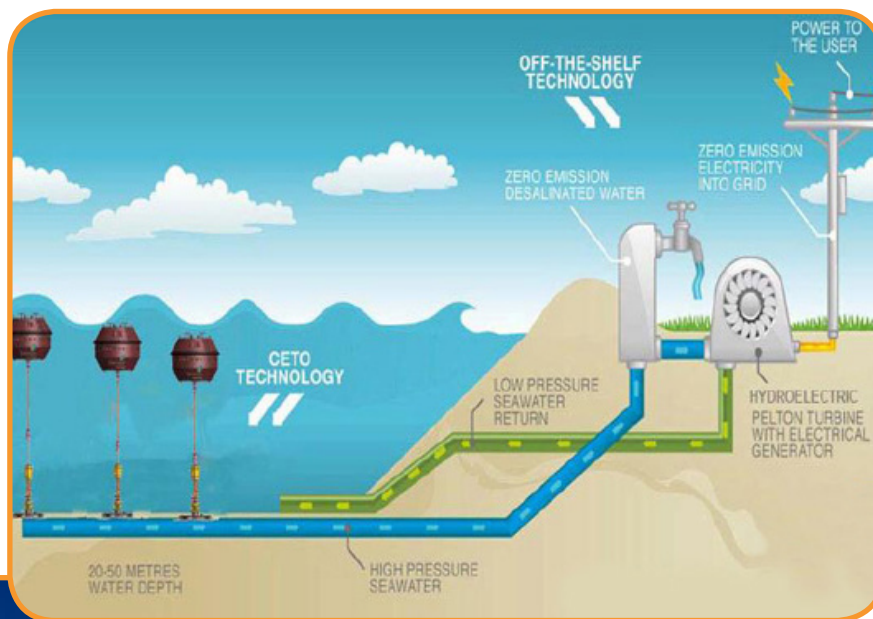


wave energy from waves and tides of the ocean. The production of this 'clean energy' does not involve the release of gases ( $\text{CO}_2$  etc). This technology is used not only to produce energy but also to produce fresh water from sea water by removing the salt in it.

A normal solar panel produces electrical energy when the sun's rays fall on it. Such energy production is less efficient on cloudy and rainy days. However China has recently invented solar panels which have overcome this problem. They have added a net of carbon atoms arranged in the form of a honey comb on the solar panel. The resulting increased charge in the water brought about by increased  $\text{Na}^{++}$ ,  $\text{Ca}^{++}$  and  $\text{NH}_4^{++}$  ions in the water helps to generate electricity. These novel solar panels

use of wind energy from early days. This is evident by the existence of large wind mills specially in some European countries. In Sri Lanka also there is some generation of electricity using wind power. However the electricity generated

from such sources is hardly sufficient to meet the huge demand for electricity. The wind powered electricity generators invented in Japan are very efficient. United States has invented mechanical (artificial) plant 'leaves' which



produce a liquid fuel using sun's energy. These artificial plant 'leaves' carry out a process similar to that of photosynthesis, and break up water into  $\text{H}_2$  and  $\text{O}_2$  using sun's energy. A bacterium that is incorporated into it carries out this process, and at the same time produces a liquid fuel using  $\text{CO}_2$ . The above examples are only a

function efficiently under all climatic conditions and produce clean energy.

Biologists are contributing towards inventing yet another type of solar panel. They have delegated this task to a group of organisms called cyanobacteria.

Human beings have been making





few of the novel inventions for producing clean energy. There is the a great expectation that it would be possible in the near future to produce the required energy for tomorrow through the intervention of science and technology. Another field in which this intervention of science is becoming important is in food security. In this context scientists are in search of plants that are naturally adapted for salinity as well as, resistant to pests and drought. Through such investigations it is possible to control to a certain extent the damage caused to crops by pests, drought and other natural disasters. Another way to save energy is to pay attention when planning and designing buildings. It has been shown that it is possible to reduce the energy demand by about 30% when such buildings are being used. Transport, travel

and lighting are the other energy consuming processes. The new inventions for these processes are unbelievably energy efficient. Consider for instance the developments that have taken place in lighting of houses and offices during the past two decades. The filament bulb, fluorescent tube and the CFL bulb has been replaced by LED technology. We can expect even more efficient lighting techniques in the future. Also the fuel use efficiency of vehicles is increasing in an unbelievable manner. The rate of 'birth' of new inventions in this field can be enhanced by extending

global co operation to research. One can observe the rate of increase of hybrid vehicles on the highways. It is clear that for a sustainable future it is necessary to have a direction not only for science and technology but also for others such as for the environment, social, economic and political activities. Many methods are employed to rectify and orientate the entire compendium of processes. One of these is to change the current trend in consumption, so as to bring about a satisfactory set up for the future by understanding the anticipated use in the future





based on the current consumption pattern. For example estimate for how long the existing quantity of fuel could last at the rate it is being used now, and determining how the consumption should be reduced for sustainable use. Also research should focus on novel methods which will bring about a change in the fuel consumption within a time frame. This is referred to as 'Back casting'.

It is generally accepted that there are a few methods that can be used to re-orient the life style and the economy to adapt to the environment. Novel scientific and technological inventions can contribute immensely towards this end. By the end of the 20th century the industry based economy gradually changed into a knowledge based society. Therefore the knowledge that is increasing daily has to be used in a responsible manner to suit the environment. It is extremely important that environment friendly activities should to be followed especially in

the following areas.

One of the main areas that should receive the attention of scientists is in the use of energy. It is important to develop new methods of energy generation, which will produce less of gases such as CO<sub>2</sub>. In order to maintain twice the level of green house gases that existed before the industrial revolution, it is necessary to reduce the present global release of green house gases by 50%.

It will be possible to reduce the energy used to heat buildings in temperate regions by covering the buildings with insulating materials. Use of wind energy and suns energy are wise options.

Water is essential for agriculture, industries, energy generation and direct human use. When assessing the present day status of water use and predicting the future use it is also necessary to investigate the methods that can be used to "safe guard" water (protect) and to obtain clean water. It is therefore extremely important to develop new technologies and inventions

for the treatment of water, management, recycling and desalination of sea water.

Balanced and nutritious food is a basic human need. When food has to be supplied to an increasing population, and to reduce the level of malnutrition, it is necessary to pay more attention to better ways of land use, and to determine how climate change will impact on agriculture. In

order to produce crops with higher yields and to produce crop varieties which are resistant to drought and pests and which can tolerate very saline soils, biotechnology based studies such as gene technology needs to be used. For these there has to be State intervention.



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## Indigenous Knowledge and Practices for Sustainable Living

Mr M Asoka T. De Silva

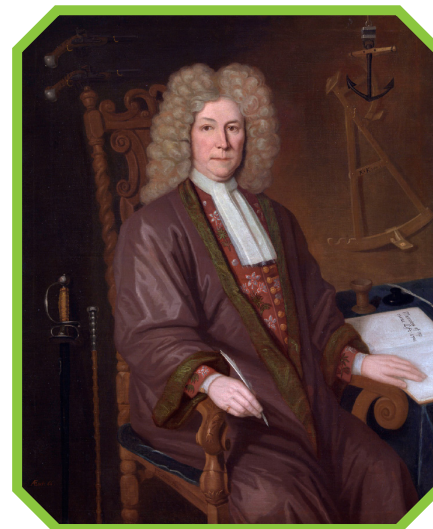
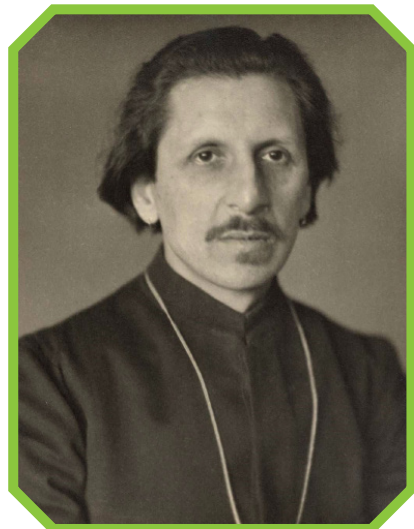
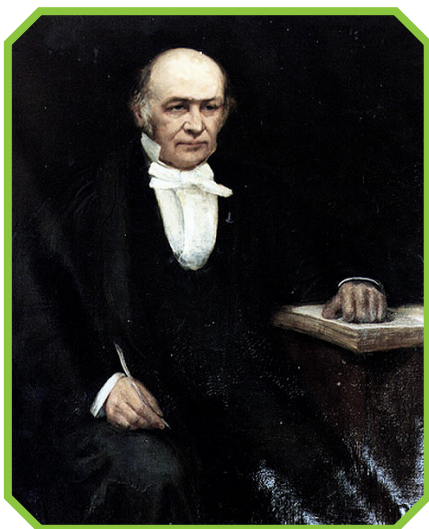


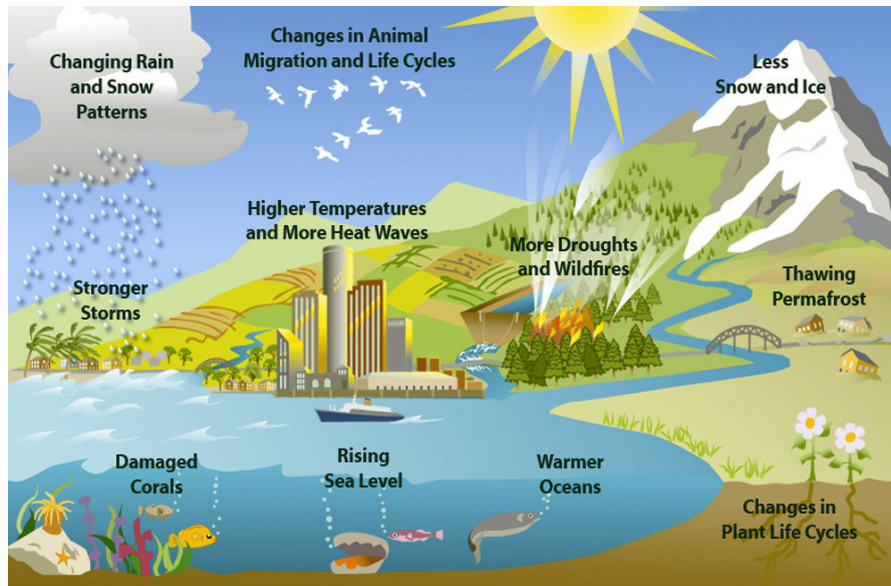
Lifestyle practices of our ancestors in ancient Sri Lanka had received the highest recognition from mediaeval and colonial commentators such as Robert Knox (1681), Ananda Coomaraswamy (1908), Robert Percival (1805), Rev. James Cordiner (1807), and Charles Sirr (1850). A comprehensive review of their observations on the traditional lifestyle of our ancestors, is embodied in a recent publication titled “Glorious Historical Antecedents of a Cultured Civilization: Sri Lanka”, Vijitha Yapa Publications. Robert Percival (1803) referring to the lifestyles of people of Sri

Lanka states that, “both sexes are remarkably clean and neat both in their person and houses. In dressing their victuals, they are scrupulously nice. They are cautious not even to touch the vessels out of which they drink with their lips. Robert Knox (1681) also gives a similar description of how people drank water. He also appears to have been amused and bewildered as to why the inhabitants of this country (Sri Lankans) needed to wash their hands before and after a meal. Ananda Coomaraswamy views with great administration the simple agrarian lifestyle of people when he states that “there is a great charm as one walks along the narrow village

paths, in coming suddenly upon a hillside clearing where 20 to 30 are at work singing in chorus with an old man leading them, or a party of women weeding and singing as they work across a field with stooping backs in the hot sun. They say that singing makes the labour less arduous and irksome, no doubt it does”.

Although emphasis of indigenous knowledge and practices had been heavy on natural resource management, agriculture, climate, water resource management, food security, genetic resources, biodiversity, ecosystems, ethno-botany, ethno-forestry etc, the contribution of this generational knowledge for sustainability of the home economy, domestic





healthcare, nutrition, spiritual manifestation and gender contribution to a holistic lifestyle had not been highlighted.

It is well known that the serenity of the traditional lifestyle manifests initially from the cultural backdrop of the village tank and the temple, which constitute the centerpiece of rural life. These are followed by the lands set apart for swidden cultivation, or the commonly known chena cultivation, the old and new *vel-yāya* (paddy field), and finally the forest fringe. This unique landscape architecture constitutes the basis for recreation, well-being and sustainable food production for the community.

The dwelling places of people were simple, airy, and set in harmony with the natural environment. The means of production and disposal were orderly. Waste production and disposal were in compliance with nature's turn-over cycle, where organic components were recycled by collecting, consolidating, and allowing these to decompose in small heaps in their backyards to generate compost manure, or depending on the composition, the waste was incinerated under anaerobic conditions in shallow pits

to generate ash containing inorganic nutrients such as potassium and metallic micronutrients, which are then applied in the field for crop production operations in an effort to return the lost nutrients, and thereby retain the fertility of the soil.

Traditionally, wealth and material prosperity in ancient Sri Lanka were not measured in terms of rupees and cents, neither was it measured in *Masurang* and *Kahavanu*, nor for that matter even in gold, silver, ivory and gems. Prosperity in pre-modern Sri Lanka was reflected mainly in the achievement of an overall state of happiness,

contentment, spiritual satisfaction and the characteristic holistic lifestyle, literally indicative of what is referred to as "*Saubhaghya*". The term "*Saubhaghya*" signifies a traditional wholesome physical and mental state which encompasses economic prosperity, spiritual advancement, well-being as well as contended living in harmony with the natural environment. There is no English equivalent that genuinely reflects the contextual meaning of this term. Significantly, this term drew considerable interest at the World Bank funded "Workshop on a National Strategy for Incorporation of Traditional Knowledge into Development Practices", held in September 2002, where it was explained and defined to constitute the alliterative doublets (or *Yugala-pāda* in Sinhala), comprising –*Watha-batha*, *Bulatha*, *Kiri-peni*, *Atu-kotu*, *Gaba-kola*, *Haraka-bāna*, *Pin-dhaham*, and *Bana-bhāvanā*. One therefore can observe that their needs for a simple but sustainable living were food security with free availability of rice, and agricultural land for wet and dry cultivation, as well as storage facilities for grains; betel vines and leaves; the free flow of milk and



honey as an expression material prosperity; the natural greenery with its arboreal environment; ownership of livestock in the form of milch cows and grazing grounds; and finally the freedom of worship for spiritual gains.

In the modern day context, this lifestyle would imply the availability to every family in the country, a basket of all essential amenities, resources and utilities, as well as spiritual satisfaction that may amply serve their wants for a happy, contended, wholesome and sustainable livelihood. It is in fact clear that the pre-modern system

of governance ensured equality and prosperity for all citizens in terms of livelihoods by facilitating and ensuring that all service providers to the State were amply and equitably rewarded.

It is well known that Buddhist principles and culture decries any form of discrimination, including ensuring of gender equality. Women had their

own capabilities, and played a significant role not only in bringing up their families but also in contributing towards community welfare. Although this tradition continues to exist, modern lifestyles have unfortunately tended to smother some of the special indigenous capabilities of women. Studies undertaken by Prof. Anoja Wickremasinghe at the University of Peradeniya during 1995-1997 had shown that women in ancient times played a central

role in procuring and producing materials of practical domestic needs for sustenance of family health, nutrition and livelihoods. Their indigenous knowledge related to nutritional food and medicinal plants in regular use, and consequently of ecosystem diversity as well as its utility value for maintaining family health, nutrition and general well-being for a sustainable lifestyle were distinctly prominent.

Unfortunately this cultural advantage had been overrun, and women in modern times are no longer in a position to

nutrition, well-being and happiness in their families, and thereby ensuring a sustainable and enriched lifestyle.

This unfortunate situation is exemplified by the inability of modern day housewives to utilize the generational traditions in the use of simple but highly effective home remedies for common ailments.

Traditionally mothers with their indigenous wisdom could instinctively diagnose simple health problems of children, and treat them with simple home remedies.

Take for example, the use of

the carminative, and anthelmintic decoction prepared with *Embelia ribes* (*Walangasal* in Sinh.) for the treatment of intestinal worms in children. Likewise a decoction made out of *Phyllanthus emblica* (*Nelli* in Sinh.) and *Tinospora cordifolia* (*Rasakinda* in Sinh.), a medication popularly referred to in Sinhala as *Nelli-rasakinda*, was used as a common treatment for



concentrate on family health due to the exigencies of a competitive commercially oriented economic scenario, where they are compelled to supplement family incomes through white collar employment. Here therefore we see somewhat of a negative aspect resulting from gender equality, where women as housewives are no longer capable of utilizing advantageously the wealth of indigenous wisdom on maintenance of good health,

rheumatic pains, urinary disorders and for blood purification. Yet another universally used medicinal preparation for colds, fever, and influenza combining coriander (*Coriandrum sativa*) (*koththamalli* in Sinh.), in combination with the dried rhizome of ginger (*Zingiber officinale*), and the dried slender shoots of *Mollugo cerviana* (*pathpadagam* in Sinh.), to which the inclusion of *Coscinium fenestratum* (*Venivel-geta* in Sinh.), is commonly known to extend and



and understanding of this spiritual dictum in ancient times, was a clear reflection of the non-existence of any barriers to equality and well-being, not only among communities of human beings, but also among all other types of living beings. While decrying egocentricity, selfishness, and greed, this philosophy emphasizes the roles to be played by men and women towards unity and social well-being

enhance its effectiveness to prevent or control tetanus, continues to be in common use even to this day. These traditional home remedies have now been largely replaced with Western pain-killers and antibiotics, which needs no domestic effort for preparation, and are also freely available in pharmacies.

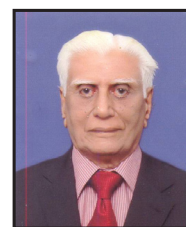
Apart from good health and well-being, responsible production and consumption were hallmarks of traditional lifestyles. Such an organized community based livelihood and an agrarian lifestyle, where the intrinsic value of floral and faunal biodiversity was also recognized, would have been intuitively conditioned by the



of the family unit as well as that of the community at large, which is thus the very foundation for a harmonious, superlative and sustainable living.



Buddhist philosophy of “*Sabbe Saththā Bhavanthu Sukehitathā*”, which literally implies the “Dedication of oneself for the cause of his own well-being and that of all living beings”. The acceptance



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## Science for sustainable living (The present status of science)

Prof. Sarath Wimalabandara Kotagama



Today science has conquered the world. Is this the truth? In February 2018 the 3M association investigated the current status of science in 14 countries, namely the developed countries- Canada, France, Germany, Japan, Singapore, Britain and United States and the developing countries- Brazil, China, Mexico, India, Poland, Saudi Arabia and South Africa. The outcome was that in general most of the developing and developed countries are satisfied with science and are enthusiastic about being

able to learn new things.

However, in addition to this positive attitude there are also the views which cause concern or worry among most adults who feel that science is having more influence on their children than on themselves. Accordingly they pay great effort to provide opportunities to their children to learn science. Given below are some of the views found through this investigation.

- Youth do not exhibit a positive attitude towards science. Also they do not appear to show

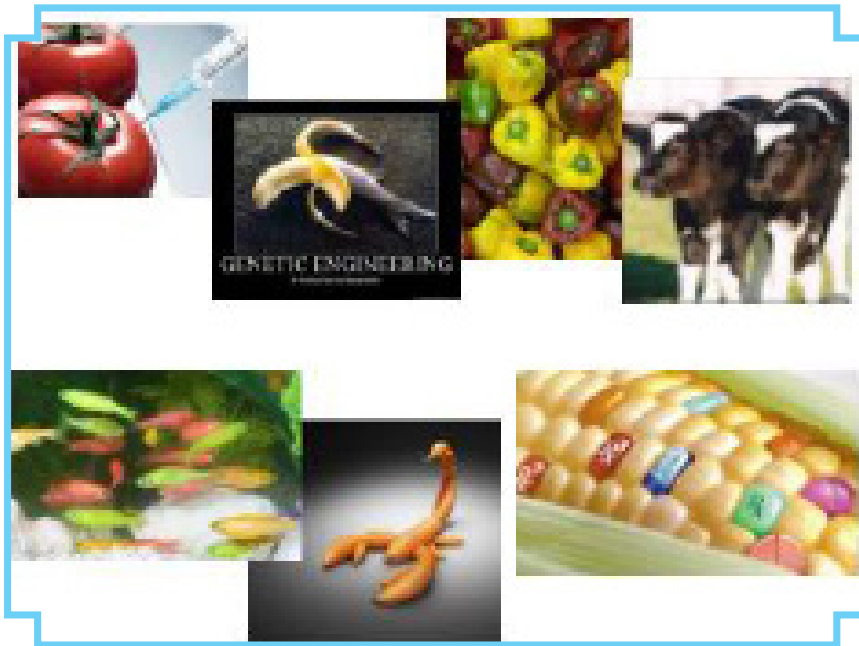
much confidence in what the scientists discover.

- Most view science as something that is invisible and have under estimated it.
- 90% view technology in a positive manner and believe that it is helpful for their living.
- 87% view the consequences of science as amazing.
- 86% know nothing about science.
- 90% view science as a tool for invention.
- 23% think that science and technology are entirely separated from each other.

Even though most considered science to be important they did not consider it to be of much importance to their daily living. The investigation also showed that most did not even think about science. The fact that most people look at science in a skeptical manner can be considered as a major problem. A large proportion of the young people possessing a skeptical view of science is a matter for concern.

With this background it is timely to determine how important science is for sustainable living. What is the attitude in Sri Lanka? The tendency of a decreased number of

|                                                                                  | A - Non skeptical<br>B - Skeptical |     |
|----------------------------------------------------------------------------------|------------------------------------|-----|
|                                                                                  | A                                  | B   |
| Technical development more important than development of science                 | 23%                                | 50% |
| If there was no science my daily life would not have changed much                | 16%                                | 40% |
| If there was no science the society would not have changed much                  | 16%                                | 37% |
| Only those who are intelligent would be able to get jobs related to Science      | 14%                                | 31% |
| Science is not an interesting subject                                            | 12%                                | 41% |
| It is not important for adults/old people to have an understanding about science | 10%                                | 36% |



students wanting to study science in the recent past definitely points to a gloomy future. Scientific thinking is an essential background as a basis for a sustainable living. Therefore the aim should be to popularize science in order to have a sustainable way of living. In order to understand the current basis of sustainable living it is necessary to understand the “environmental problem”. Let us understand how the environmental problem develops from the beginning.

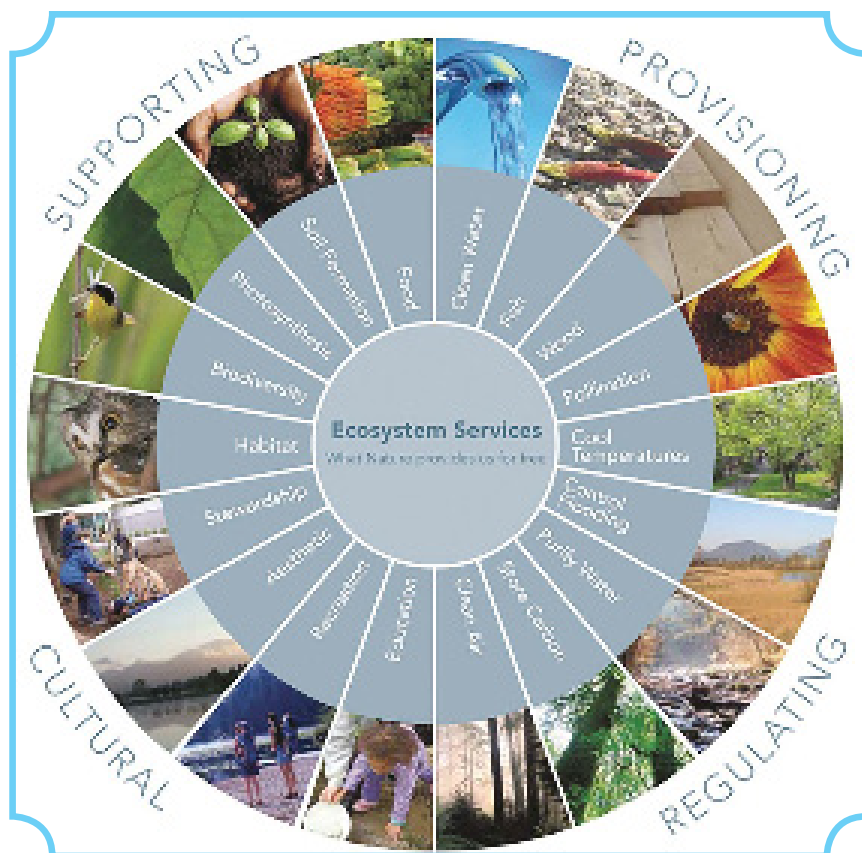
### How did the environmental problem develop?

During the first half of 1960 the entire world faced a food crisis. In

order to come out of this situation food production was increased, through the use of insecticides and chemical fertilizers. Even though the crisis was overcome the “input agriculture” left behind a new method of agriculture. In order to protect the crops from pathogens insecticides were used. While these practices were developed new and more scientific methods were tested in order to further increase the yields. In this regard one of the main inputs was using science. It was proved that it is possible to increase the yield by scientifically getting rid of the competitive and damaging organisms and by providing more nutrients. Very soon as the yield was not still

sufficient to meet the demand of the increasing population other options to increase the yields were begun, such as indentifying the favourable characteristics of crops/animals and developing them further. In order to realize this objective simple hybridization was carried out to obtain living modified organisms (LMOs), and finally genetically modified organisms (GMOs) were produced. In all these the main impetus was provided by science. Even though some people object to the production of LMOs and GMOs these methods have produced crops with increased yield and crops which possess commercially friendly features (advantageous in the market). It may be possible to store them for a longer time (increased shelf life), with better appearance and taste. Of today's main crops about 95% of wheat and soya cultivated are genetically modified. Unfortunately these technologies have been the cause of economic “monopoly” of these crops. So those who possess the technology have secured the production of these crops. Even though it is possible to increase food production by this sort of agriculture a considerable amount of damage has also been caused due to these methods. The ‘poisoning of the globe’ predicted by Rachel Carson has





now become a reality. Agricultural chemicals have paved the way to various non-communicable diseases and also caused environmental damage. Lifestyle of people also has changed simultaneously. It is no secret that the use of technologies have been the cause of these changes. However much it is attempted to show that these changes in the life style of human beings indicate their success, immense environmental problems have been created through these processes. Realizing the present day environmental problems, as a solution ('a sustainable development'), it was proposed in 1992 that a sustainable life style has to be achieved through sustainable development.

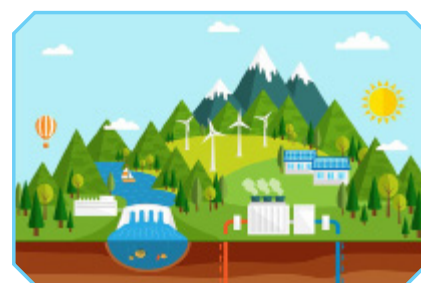
Two factors are involved in creating this background. One is the contribution of science. The second is the environmental

problem created. Some argue that it is science that has created this problem. However science is only ideas and knowledge. Technology is the application of this scientific knowledge. With this argument most people accept that it is not science but technology that has caused the damage to the environment.

Therefore when we attempt to find the causes of the environmental problem we have to arrive at the following conclusions. There are the relatively close and ultimate factors which cause the problem. Accordingly, in respect of the environmental problem, increase in population, technology, advertising methods connected with market economy are identified as the closely connected factors, while "Consumption" which is considered as the ultimate factor, is created by the influence of the

relatively close factors. Marketing techniques and the economy drive us to consumption. Clear changes in life style have been brought about through these. In general, 20% of the world population (living in the developed countries) consume 80% of the resources. Only 20% of the resources remain for the 80% of the world population who live in the developing countries. The desire of the developing country people is to achieve the life style of the developed country people who constitute only 20% of the world population. This cannot happen without destroying the environment. We are already at the 1.5 Index level of the environment foot print Index. This means that the world population is consuming 1.5 of the world's resources. That is 0.5 in excess. If the present trends in life style continues, by the year 2030 this index is estimated to go up to 3.0. It certainly is not an environmental condition that the earth can cope with. So a sustainable life style becomes essential for the survival of the human race. If not we will definitely be marching towards destruction before the earth is destroyed.

With a new understanding of the environmental problem, it was decided in 1992 to take a different path towards development. So far we have not been successful in achieving this. But today it has become a greater necessity



to bring about the change. In 1992, Agenda-21 for sustainable development was ratified in the city of Rio de Janeiro. However, once again in 2012 in Rio de Janeiro itself it was decided to institutionalize the “sustainable development process”. Also the estimate of the earth's Health which was determined by the millennium Ecosystem Assessment in 2003, indicated something extremely frightening and disturbing. Of the 38 indications, not a single was satisfactory. On the basis of this findings even though it was tried till 2015 to achieve the millennium development goals, the attempts have failed when taken as a whole.

In 2015 we began the journey towards the “new sustainable development-17”. The main idea in this was to go forward, all inclusive towards a sustainable life style. If this sustainable life style is to be achieved four sustainable concepts have to take priority consideration. They are:

1. Make room for the aspirations of the future generations, while fulfilling the necessities of the present generation.
2. The natural resources - air, water and soil and the survival of the living organisms should not be destroyed or endangered through sustainable development.
3. When using the natural

resources for sustainable development it should be done in such a way that the ecosystems are not affected adversely.

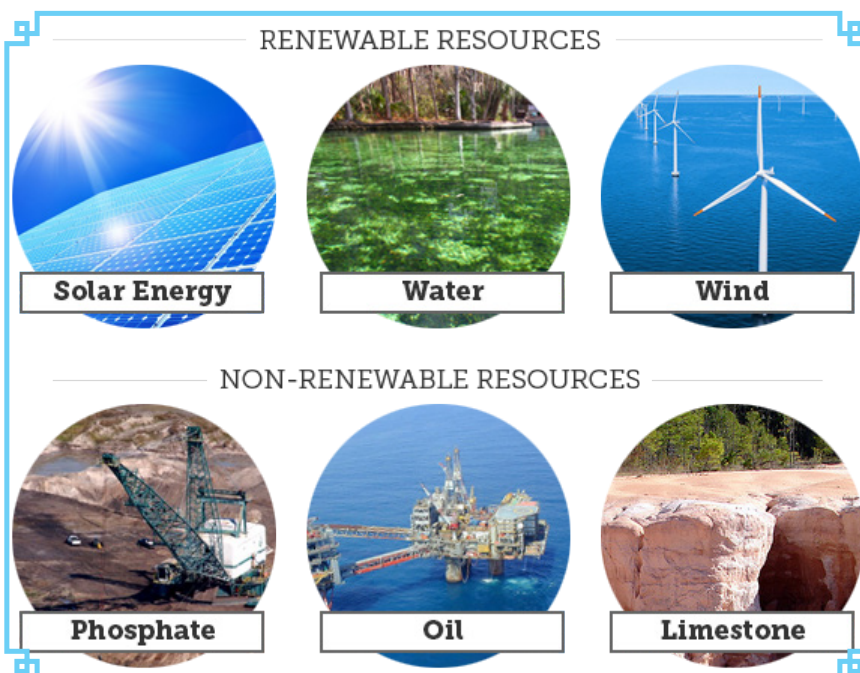
4. Sustainable development should be carried out so that it assists the development of the present generation while protecting the environment.

Herman E Dary have also been taken into consideration.

1. The rate of sustainable use of the renewable resources such as soil, water, forests and fish should not exceed the rate of their natural regeneration.
2. The sustainable use of the non-renewable resources should

not exceed the rate at which the renewable resources are being replaced.

3. The generation of solid waste should never exceed the rate at which it is naturally decomposed (broken down). Even though many such valuable ideas have been put forward as a basis for a sustainable society, whether a sustainable life style has been achieved remains



It is of prime importance to consume the resources while protecting the ecosystems by following these concepts. Karl Herik Robert of Sweden developed the “Four System Code” based on these basic ideas. The codes are:

1. The materials extracted or mined from the earth should not be increased
  2. Human society should not try to achieve satisfaction with artificial materials
  3. Nature should not be destroyed by physical processes
  4. No activity which limits the opportunities to fulfill mans basic needs should be carried out.
- In addition to the above, the three policy proposals of the economist

questionable.

The fact that “economic development” is a fallacy can be understood when we realize the fact that even in the most economically ‘developed’ country, the United States, societal inequalities exist. Some of the details stated in the report of the Stanford Center on Poverly and Inequality (2018) provide evidence for this phenomenon:

1. Inequality of salaries : The inequality of salaries has drifted further apart at a very fast rate during the past 30 yrs.
2. The salaries of heads of Institutions : By 2009 the salaries of Heads of institutions have increased 185 fold when compared

with that of an ordinary worker.

3. Homelessness : About 750,000 citizens remain homeless a day.

4. Occupation : The males are engaged in jobs with higher salaries.

5. Schooling : More of the black people are early fall-outs from schooling. It is even more among the Hispanics. The whites exceed the others when it comes to school admissions.

6. Poverty stricken children : 21% (This is the highest from among the rich countries in the world)

7. Inequality of wealth : The higher class consisting of 10% control 68.2% of the financial resources of the country (1983). (5% of the higher class-59% the lower class of 40% - own 9% of the financial resources) By the year 2007 the wealth of the higher class increased up to 73.1%.

8. Imprisonment : By 2008 about 37% of the Black Americans have been imprisoned.

The statistics of this nature still exhibit this imbalance. Even though there is enough information to rethink of the 'development' that is taking place under the present economic model, we continue to remain blind folded and continue along the same path. The opposing war against this tendency is sustainable development and life style. The main objective of a sustainable life style is to maintain a zero Ecological Foot Print.

This is a big challenge. Because of our upbringing and the main economic model that is driving us, an unlimited development model is the expectation in a limited world. Now economists accept, that this cannot happen. Hence new theories are being sought in the context of what is discussed as the Green economy. No theory would ever



solve the problem without making the life style sustainable. Here science occupies the main position. Knowledge based on accepted arguments will directly influence the sustainable life style, as well as technological applications and economic development.

Most argue to continue along this path staying within this economic model. Ecology has shown that this is an impossibility. The present economic development along with the social inequality bears sufficient evidence for this situation. The statement under the theme "a Time table towards sustainable targets" made in 2017 which encompasses the ideas of the Pope also states the same thing. This statement known as Laudatsisi very clearly states the following:

"However special the SD4 rely on economic growth to end poverty Laudatsisi criticizes the concept of infinite or unlimited growth. It is based on the lie that there is an infinite supply of the earths goods, and this leads to the planet being squeezed dry beyond every limit (LS 106) 'Depending on economic development to alleviate poverty through sustainable development'

has been criticized because it is based on the fallacy that the earth's resources are plentiful. If this journey continues the earth would be squeezed dry.

Under the present circumstances scientific principles are essential for a sustainable life style. Understanding this is a step towards solving the environmental problem. The burning problem is why aren't we getting there?



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## Hunter Gatherers to Agriculture

Dr D.M. Suratissa



Agriculture did not start suddenly. It came to practice after several million years ago through human evolution and transition of culture and technology. The transition to agriculture has always been hard to explain. Why should have people given up an enjoyable lifestyle and a varied diet and adopted lifestyles and diets which were often very tedious and limited? In the words of Mark Nathan Cohen “the adoption of agriculture probably resulted in an increased per-capita work load and a decline in the quality of the diet”.

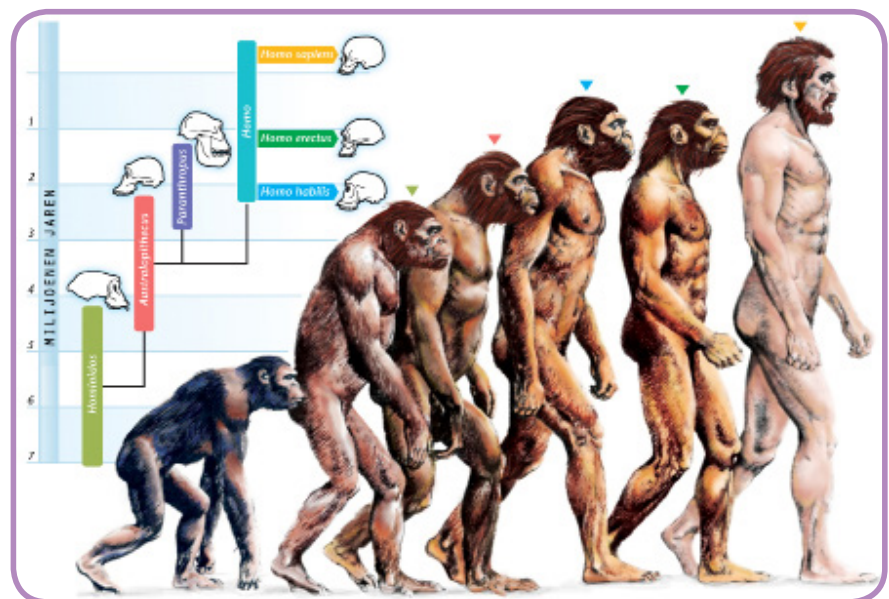
Pre-agricultural peoples had a varied diet and their food-gathering activities must have often been satisfying for their own sake. The “hunter-gatherers” were after all, using their mental and physical resources for the purposes for which they were intended by nature. Their lives were sometimes short, but they were probably happy. By contrast agriculture, particularly before the employment of draft animals, involved a great deal of mechanical back-breaking toil. Food preparation was hard work too, given that cereals had to be ground by hand. And the

final result for most people was a monotonous staple diet and not much else. Why did people adopt agriculture? It was to come from first to last as hunter gatherers, horticulturalists, pastoralists, and to intensive agriculturalists. Before we get into the topic, first of all we should understand briefly about human evolution and special features of their eras.

### History of Evolution of man

Human evolution is part of biological evolution concerning the emergence of humans as a distinct

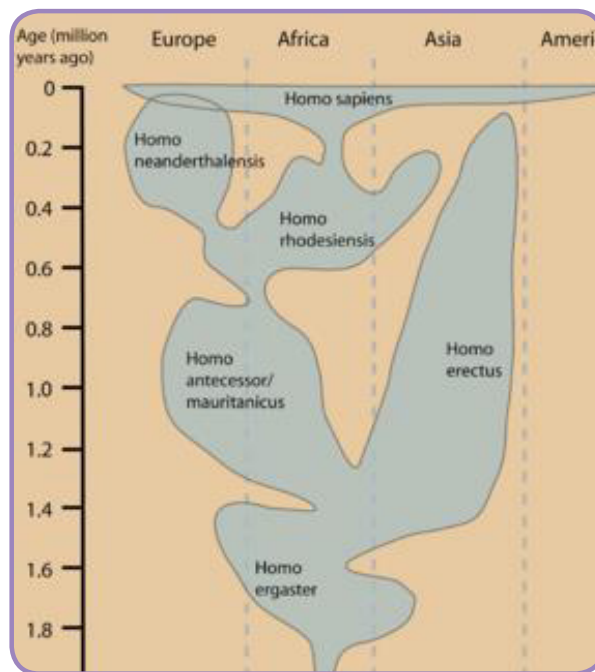
species from other primates. It is the subject of a broad scientific inquiry that seeks to understand and describe how this change occurred. The evolutionary history of the primates can be traced back to some 85 - 65 million years, as one of the oldest of all surviving placental mammal groups. The oldest known primates came from North America, but they were widespread in Eurasia and Africa as well, during the tropical conditions of the Paleocene and Eocene. It is generally agreed that the earliest primate may have emerged by the paleocene, 65 – 55 MYA, and perhaps earlier in the late cretaceous.



## The origin of Culture and emergence of Homo

Making stone tools, is considered one sign of the emergence of a culture. Tool making was associated with expansion of brain, modification of female pelvic to accommodate bigger-brained babies, and reduction in the teeth, face, and jaws. But some sites available with stone tools were dated back Australopithecus period. The australopithecines are now thought to be immediate ancestors of the genus *Homo*, the group to which modern humans belong. Both australopithecines and *Homo sapiens* are part of the tribe *Homini*, but recent data has brought into doubt the position of *A. africanus* as a direct ancestor of modern humans; it may well have been a dead-end cousin. *H. habilis* lived from about 2.4 to 1.4 million years ago (mya). *H. habilis*, the first species of the genus *Homo*, evolved in South and East Africa in the late Pliocene or early Pleistocene, 2.5–2 mya, when it diverged from the Australopithecines. *H. habilis* had smaller molars and larger brains than the Australopithecines, and made tools from stone and perhaps animal bones. One of the first known hominids, was nicknamed 'handy man' by its discoverer, Louis Leakey. *H. erectus* lived from about 1.8 mya to 70,000 years ago. Often the early phase, from 1.8 to 1.25 mya, is considered to be a separate species, *H. ergaster*, or it is seen as a subspecies of *erectus*, *Homo erectus ergaster*.

*H. erectus* was the first human ancestor to walk truly upright. This was made possible by the evolution of locking knees and a different location of the foramen magnum (the hole in the skull where the spine enters). They may have used fire to cook their meat. A famous example of *Homo erectus* is Peking Man; others were found in Asia (notably in Indonesia), Africa, and Europe.



*H. neanderthalensis* lived from about 250,000 to as recent as 30,000 years ago. Also they are proposed as *Homo sapiens neanderthalensis*. *Homo sapiens* have lived from about 250,000 years ago to the present. Between 400,000 years ago and the second interglacial period in the Middle Pleistocene, around 250,000 years ago, the trend in cranial expansion and the elaboration of stone tool technologies developed, providing evidence for a transition from *H. erectus* to *H. sapiens*. Hunters who lived in this period can be named as Paleolithic age.

## What does the Paleolithic Age mean?

The cultural period of the Stone Age that began about 2.5 to 2 million years ago, was marked by the earliest use of tools made of chipped stone. The Paleolithic Period ended at different times in different parts of the world, generally around 10,000 years ago in Europe and the Middle East. Also called Old Stone Age.

## Where was the Paleolithic era?

It extended from the earliest known use of stone tools, probably by *Homo habilis* initially, 2.6 million years ago, to the end of the Pleistocene around 10,000 BP. The Paleolithic era was followed by the Mesolithic.

## Why is the Paleolithic age important?

The Paleolithic Era is significant because people established the process of hunting-gathering, which has supported humans for the majority of their existence on earth. The Paleolithic Era also involved the development of simple tools, including the hand axe, and tool-making industries.

## How did people live in Paleolithic?

They hunted animals, caught fish, ate insects, and gathered nuts, berries, fruits, grains and plants. They were always on the move because they did not have fixed homes.

### Why were the people during the Paleolithic era nomads?

Palaeolithic people lived in temporary shelters like tents or caves because they were nomads. A nomad is a person who does not have a permanent home and moves around a lot. Paleolithic people were nomads because they moved around to follow their food sources.

A hunter-gatherer is a human living in a society in which most or all food was obtained by foraging (collecting wild plants and pursuing wild animals), in contrast to agricultural societies, which relied mainly on domesticated species.

### Palaeolithic and Way of Life of *Homo species*

The economy of a typical Paleolithic society was a hunter-gatherer economy. Paleolithic humans hunted wild animals for meat and gathered food, firewood, and materials for their tools, clothes, or shelters. The human population density in the Paleolithic was very small and numbered around only one person per square mile. At the end of the Paleolithic specifically the Middle and or Upper Paleolithic, humans began

#### **Paleolithic (Stone Age) Lower Paleolithic**

##### **Lower Paleolithic**

*Homo*

Control of fire, Stone tools

##### **Middle Paleolithic**

*Homo neanderthalensis*

*Homo sapiens*

##### **Upper Paleolithic, Late Stone Age**

Behavioral modernity, Started dog Domestication

##### **Mesolithic**

Microliths

Bow

Canoes

##### **Neolithic**

Pre-Pottery Neolithic

Farming

Animal husbandry

Polished Stone tools

Pottery Neolithic

Pottery

to produce works of art such as cave paintings, rock art and jewelry, and began to engage in religious behavior such as burial and ritual activities.

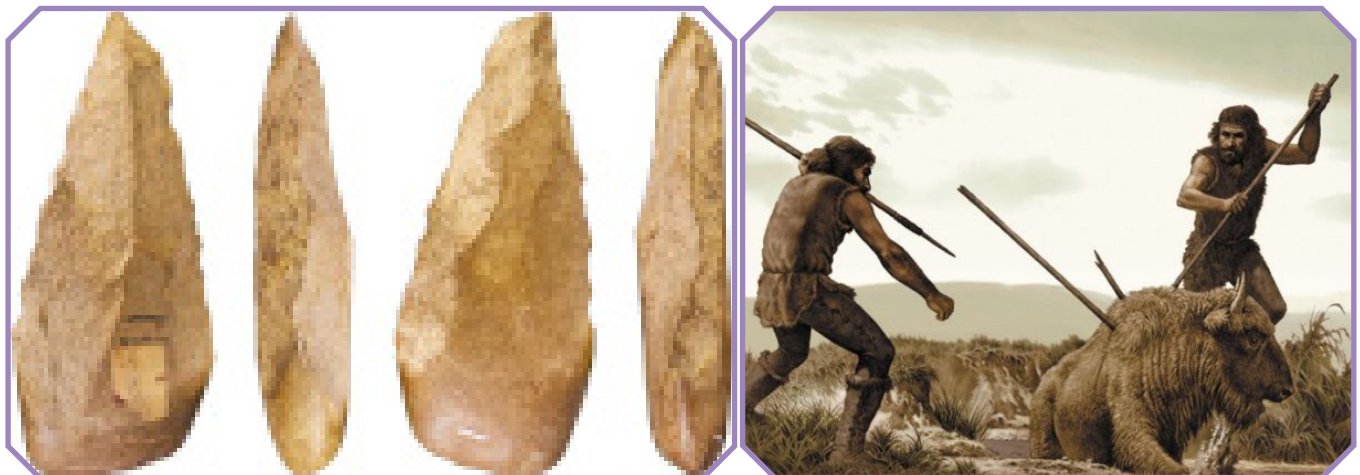
#### **Lower Palaeolithic**

The Lower Paleolithic is the earliest

subdivision of the Paleolithic or Old Stone Age. It spans the time from around 2.5 million years ago when the first evidence of craft and use of stone tools by hominids appears in the current archaeological record. *Homo habilis* remains, such as those from Olduvai Gorge, are much more recognizable as humans. Stone-tool use was developed by these people around 2.5 million years ago before they were replaced by *Homo erectus* about 1.5 million years ago. Members of *Homo habilis* used Oldowan tools and had learned to control fire to support the hunter-gatherer method of subsistence.

#### **Middle Palaeolithic**

The Middle Paleolithic (or Middle Palaeolithic) is the second subdivision of the Paleolithic or Old Stone Age as it is understood in Europe, Africa and Asia. The Middle Paleolithic and the Middle Stone Age broadly spanned from 300,000 to 30,000 years ago. There are considerable dating differences between regions. The Middle Paleolithic/Middle Stone Age was succeeded by the Upper Paleolithic subdivision which first began around 50,000, 45,000 or 40,000 years ago. During this time





period *Homo neanderthalensis* thrived in Europe between 300,000 and 30,000 years ago, and the earliest anatomically modern humans appeared around 195,000 years ago. Paleolithic groups such as the Neanderthals who possessed a Middle Paleolithic level of technology appear to have hunted large game just as well as Upper Paleolithic modern humans and the Neanderthals in particular may have likewise hunted with projectile weapons. Nonetheless Neanderthal usage of projectile weapons in hunting occurred very rarely (or perhaps never) and the

Neanderthals hunted large game animals mostly by ambushing them and attacking them with weapons such as thrusting spears rather than attacking them from a distance with projectile weapons

Also the use of fire became widespread for the first time in human prehistory during the Middle Paleolithic and humans began to cook their food during the early Middle Paleolithic (c.250,000 years ago). Some scientists have hypothesized that Hominids began cooking food to defrost frozen meat which would help ensure

their survival in cold regions. Gathering and hunting comprised most of the food supply during the Middle Paleolithic, and people began to supplement their diet with seafood and began smoking and drying meat to preserve and store it. Cannibalism in the Middle Paleolithic may have occurred because of food shortages. However it is also possible that Middle Paleolithic cannibalism occurred for religious reasons which would coincide with the development of religious practices thought to have occurred during the Upper Paleolithic.



## Upper Palaeolithic

The Upper Paleolithic is the third and last subdivision of the Paleolithic or Old Stone Age as it is understood in Europe, Africa and Asia. Very broadly it dates to between 40,000 and 10,000 years ago, roughly coinciding with the appearance of “high” culture (behavioral modernity) and before the advent of agriculture. Modern humans (i.e. *Homo sapiens sapiens*) are believed to have emerged at least 130,000 years ago in Africa. Though, these humans were modern in anatomy, their lifestyle changed very little from their contemporaries such as *Homo erectus* and the Neanderthals.



After 50,000 years ago, firstly in Africa, it was found that he could easily sort the human artifacts into many different categories, such as projectile points, engraving tools, knife blades, and drilling and piercing tools. These new stone tool types have been described as being distinctly differentiated from each other as if each tool had a specific name. 3000 to 4000 years later this technology spread to Europe resulting in a population explosion of modern humans and also the extinction of the Neanderthals.

The invaders commonly referred to as the Cro-Magnons left many sophisticated stone tools, cave art and Venus figurines. This shift from Middle to Upper Paleolithic is called the

Upper Paleolithic Revolution. The Neanderthals continued to use Mousterian stone tool technology. The earliest remains of organized settlements in the form of

However, there is little direct evidence of the relative proportions of plant and animal foods in the diets of Paleolithic humans.

According to some anthropologists and advocates of the modern Paleolithic diet, Paleolithic hunter-gatherers consumed a significant amount of meat and possibly obtained the majority of their food from hunting. However, the relative proportions of plant and animal foods in the diets of Paleolithic peoples probably varied between regions (for instance Paleolithic hunter gatherers in



tropical regions such as Africa probably consumed a plant based diet while by contrast, Paleolithic populations in colder regions such as Northern Europe most likely obtained the majority of their food from meat). campsites, some with storage pits, are encountered in this period. These were often located in narrow valley bottoms, possibly in order to make hunting passing herds of animals easier. Some sites may have been occupied year round though more generally they seem to have been used seasonally with people moving between them to exploit different food sources at different times of the year. Advanced darts and harpoons also appear in this period, along with the fish hook, the oil lamp, rope, and the eyed needle. Artistic work also blossomed with Venus figurines, cave painting, petroglyphs and exotic raw materials found far from their sources suggest emergent trading links.

### Diet of Palaeolithic People

The diet of the Paleolithic hunting and gathering peoples consisted primarily of meat, fish, shellfish, leafy vegetables, fruit, nuts and insects in varying proportions.

### Mesolithic

The Mesolithic or Middle Stone Age was a period in the development of human technology in between the Paleolithic or Old Stone Age and the Neolithic or New Stone Age. Mesolithic adaptations are cited as of relevance to the question of the transition to agriculture, including sedentism, population size and plant foods.

These people made microlith, which is a small stone tool, typically knapped of flint or chert, usually about three centimetres or less long they are typically one centimetre long and half a centimetre wide when finished. Microliths were produced during the middle stone

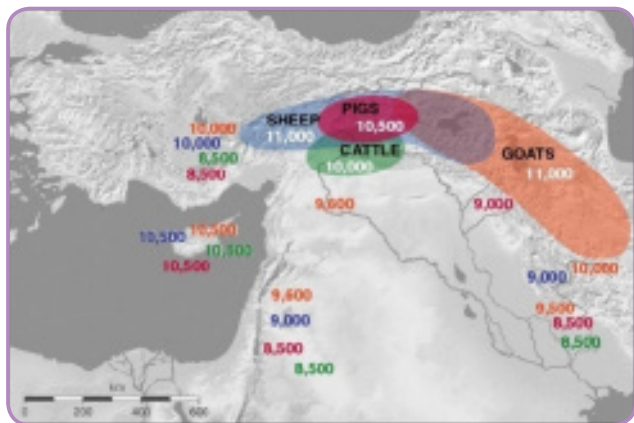
**Neolithic Revolution**  
**The Neolithic Revolution was the first agricultural revolution—the transition from hunting and gathering communities and bands, to agriculture and settlement. Archaeological data indicate that various forms of domestication of plants and animals arose independently in at least 7-8 separate locales worldwide, with the earliest known developments taking place in the Middle East around 10,000 BCE or earlier**



age (Mesolithic) (from the end of the Ice Age (about 9200BC) until the introduction of agriculture (8000BC)). Some types of microliths, such as trapezes, were used in the Neolithic as well. They were probably used as barbs on arrows, spears and other composite tools. Microliths are found throughout Europe and Asia.

### Neolithic Period

The Neolithic or “New” Stone Age, was a period in the development of



human technology beginning about 10,000 B.C. in the Middle East that is traditionally the last part of the Stone Age. The Neolithic era follows the terminal Holocene Epipalaeolithic periods, beginning with the rise of farming, which produced the “Neolithic Revolution” and ending when metal tools became widespread in the Copper Age (chalcolithic) or Bronze Age or developing directly into the Iron Age, depending on geographical region.

Neolithic culture appeared in the Levant (Jericho, modern-day West Bank) about 8500 BC. It developed directly from the Epipaleolithic Natufian culture in the region, whose people pioneered wild cereal use, which then evolved into true farming. The Natufians can thus be called “proto-Neolithic” (11,000–8500 BC). As the Natufians had become dependent on wild cereals in their diet, and a sedentary way of life had begun among them, the climatic changes associated with the Younger Dryas are thought to have forced people to develop farming. By 8500–8000 BC farming communities

arose in the Levant and spread to Asia Minor, North Africa and North Mesopotamia. Early Neolithic farming was limited to a narrow range of crops, both wild and domesticated, which

included einkorn wheat, millet and spelt and the keeping of dogs, sheep and goats. By about 7000 BC it included domesticated cattle and pigs, the establishment of permanently or seasonally



inhabited settlements, and the use of pottery. Not all of these cultural elements characteristic of the Neolithic appeared everywhere in the same order: the earliest farming societies in the Near East did not use pottery, and, in Britain, it remains unclear to what extent plants were domesticated in the earliest Neolithic, or even whether permanently settled communities existed. In other parts of the world, such as Africa, South Asia and Southeast Asia, independent domestication events led to their own regionally-distinctive Neolithic cultures that arose completely independent of those in Europe and Southwest Asia.

### Present Day Hunter Gatherers

Food collection may be generally defined as all forms of subsistence technology in which food-getting





is dependent on naturally occurring resources that is wild plants and animals. A few remaining food collectors in the world today, also referred to as foragers or hunter gatherers, live in what have been called the marginal areas of the earth- deserts, the arctic, and dense tropical forests- habitats that do not allow easy exploitation by modern agricultural technologies. Two groups of present day hunter – gatherers are living in Australia and Aleska, Australian Arboragins – Ngatatjara and Eskimos.

### Domestication/ Food production

This began about 10,000 Years ago with cultivation, and then with domesticated plants and animals. There were three types of food producers; Horticulturalists, Pastoralists, and Intensive Agriculturalists

#### Horticulturalists

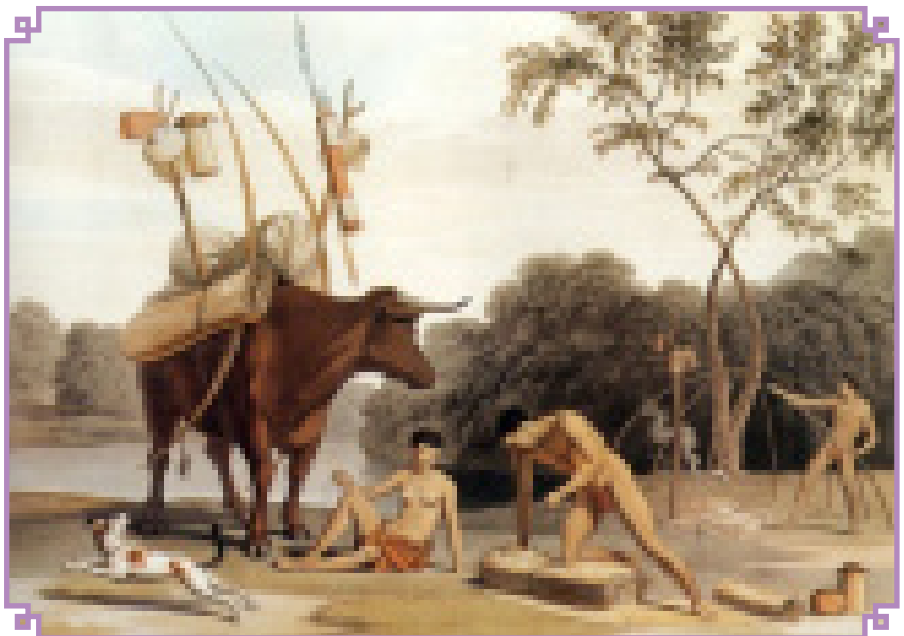
During this period we have archaeological evidences of growing of crops of all kinds with relatively simple tools and methods,

in the absence of permanently cultivated fields. Tools were usually hand tools (Digging Stride or Hoe). No fertilization, irrigation or other was used for restoring soil fertility after the growing season. There were two types: Extensive/ Shifting (Slash and burn technique), and long growing tree crops. They were not depending only on crops, hunting and fishing were also practiced. These people were mostly nomadic. They live in one place for around three months.

i.e. Kayapo- Brazilian Amazon. Some horticulturalists raised small domestic animals. The Yanomamo and Samoans can be considered as the present day Horticulturalists in the world. Yanomamo crops do not provide much protein, so hunting and fishing are important to their diet. Samoans mostly planted three crops for long term food production. i.e. Breadfruit, coconut, banana. Samoans also practiced some shifting cultivation too.

#### Pastoralists

Most agriculturalists raise animals (practice animal husbandry), but a small number of societies depend directly or indirectly on domesticated herds of animals for their living- called pastoralism. We might assume that pastoralists breed animals to eat their meat, but most do not. Pastoralists more often get their animal protein from live animals in the form of milk, and some take as blood (Secondary consumption). Herds also indirectly provide food because they trade



animal products for plant foods and other necessities. The Basseri - Southern Iran and Lapps – Scandinavia can be considered as a present day pastoralists.

### Intensive Agriculturalists

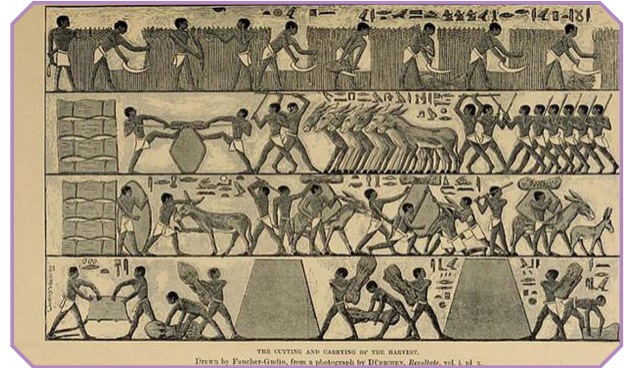
Intensive agriculture was started around 10,000 years before the present day Tribal societies with 100s of people in villages. When this type of agricultural practicing increased, human population also increased larger and larger communities and new social organizations. They did mixed hunting with harvesting of wild wheat and barley. During this

period they had a knowledge of storage, planting, and seed selection, and hunting decreased.

### First Centres of Food Productions

According to archaeological evidence, three independent centres were identified.

1. Domestication of plants and animals began in the Fertile Crescent of South-western Asia (today northern Iraq and parts of Syria, Lebanon, Israel, the West



Bank, Jordan and Turkey) some 10,000 - 11,000 years ago (perhaps 8,500 BCE).

2. Yangtze River Basin
3. Yellow River (Huang He) Basin

### Evidences in Sri Lankan domestication

According to excavations done by Dr.Premathilake at Horton Plain region, incipient domestication in Sri Lanka had been identified during the period 15,000 years ago by the presence of pollen of Barley, Millet and some other cereals used for feeding domestic animals. Therefore, if we can establish this in several places in Sri Lanka, our country can also be considered as one of the independent centres of domestication in the world.



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## Primary Health for sustainable living

Mr Thusitha Malalasekara



The World Health Organization (WHO) in its constitution has very clearly defined the state referred to as 'health' as follows. "Being healthy is not only being free of any disease or disability, but also possessing a good quality physical, mental and social status" WHO. Therefore when describing and explaining the theme of primary health for sustainable living, it is important to discuss how the physical, mental and the social well being of an individual should be promoted. Even though on the face of it physical, mental and social aspects appear to be separate entities, these are entwined with one another not only to enhance a quality life, but also to strengthen each aspect. (Figure 1) A basic feature is that these aspects are not always maintained at a steady level, but frequently oscillate. Let us analyse each of these factors.

### Physical well being

When discussing the physical well being it is necessary to consider it under five categories-being disease free, strong, physically fit, physically

developed and physically active.

### Disease Free

When subjected to a physical disability, or an infection by an external disease causing organism (pathogen), there is a break down of the healthy state. Then we have to revert to the healthy status by getting the necessary treatment. In addition, consuming beneficial food, having the correct habits regarding nutrition, fulfilling the required immunisations, and following hygienic routines (washing hands, brushing teeth, bathing, wearing foot wear and clean clothes) can contribute towards safe guarding good health. Also it is necessary to follow a life style which is conducive to good

health right from childhood. It is absolutely necessary for all of us who aspire to lead a healthy life to adopt a good life style.

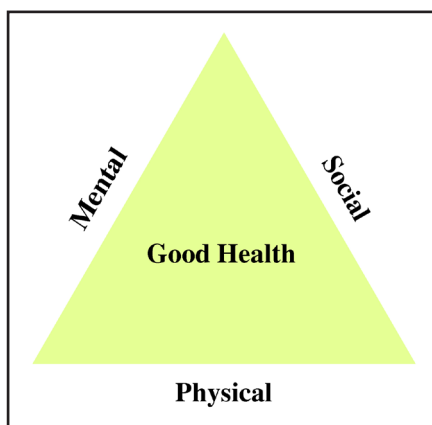
### What is a good life style?

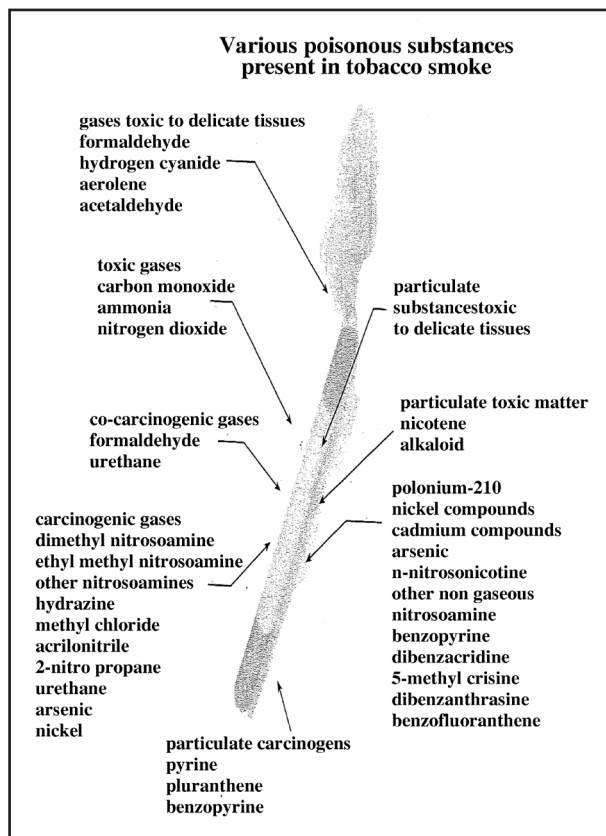
The most important requirement to achieve a high standard of health is to maintain a good life style. For this a few steps have to be followed:

- Consume health friendly food
- Maintain a body weight that is not a threat to health
- Be active
- Avoid smoking and 'drugs' and reduce alcohol consumption to a minimum
- Adopt a stress free life style and be contented with what you have
- Have rest and sleep comfortably

### A health friendly meal

It is necessary to have health friendly food for all three meals of the day. Refrain from skipping a meal in order to reduce the food intake. Also remember that you should not have a large amount of food such that your stomach is





over filled. Unpolished parboiled (*Thambapu*) or raw (*Kekulu*) rice, bread turned out of whole wheat grain flour, dried pulses such as gram, cowpea green gram, ulundu, fish, meat from which the fatty portions have been removed, vegetables and fruits should be included in a health friendly diet. It is best if two or more types of vegetables and fruits are included in the meals of a day. They should not be over washed when cleaning or over boiled because this removes or destroys some of the nutrients. The nutritional value of the meal increases if they contain less of white rice (polished rice), white wheat flour (in which the bran has been removed) sugar, honey, jaggery, oils and fats and salt. Red meat (beef, mutton, lamb) meats containing oils and fat (pork), prawns, crabs, oysters are considered to be of less nutritional value because they increase the

cholesterol and fat content in the body. Sausages with high fat content, meat balls, canned meat and fish and instant (ready made) foods, supply unnecessary oils, fats and salt. Tempered foods, deep fried foods such as cutlets, and 'wade', hoppers and string hoppers of lesser nutritional value, aerated drinks (cool drinks), fruit drinks containing a great deal of sugar bring about many health problems.

### Developing an active life style

The lethargic type of life style that one develops by lounging all day, watching television, reading papers etc. bring ill health close to you. So, carry out some physical exercise for at least 15 minutes a day on at least 4 days of the week. Walking, jogging, running, cycling, swimming and playing a ball game help to maintain you in good health. If you are an athlete or take part in some active games it is necessary to do some physical exercises for a longer time and daily. Get advice from your trainer or a doctor for this purpose.

There is a formula that you can use to determine your pulse rate in order to assess whether you exercise in a fruitful manner.

The formula is:

$$(220 - \text{age}) \times 70 / 100 = \text{Beats per minute}$$

Example : If you are 40 years of age

$$(220 - 40) \times 70 / 100 = 120 \text{ beats per}$$

minute

### The main advantages of carrying out physical exercises

- Strengthening the muscles of the body and heart
- Reduction of the risk of contracting infectious diseases
- Avoiding over weight (obesity) by burning the fat
- Increasing mental health by the reduction of tension or stress

### Maintenance of a proper body weight

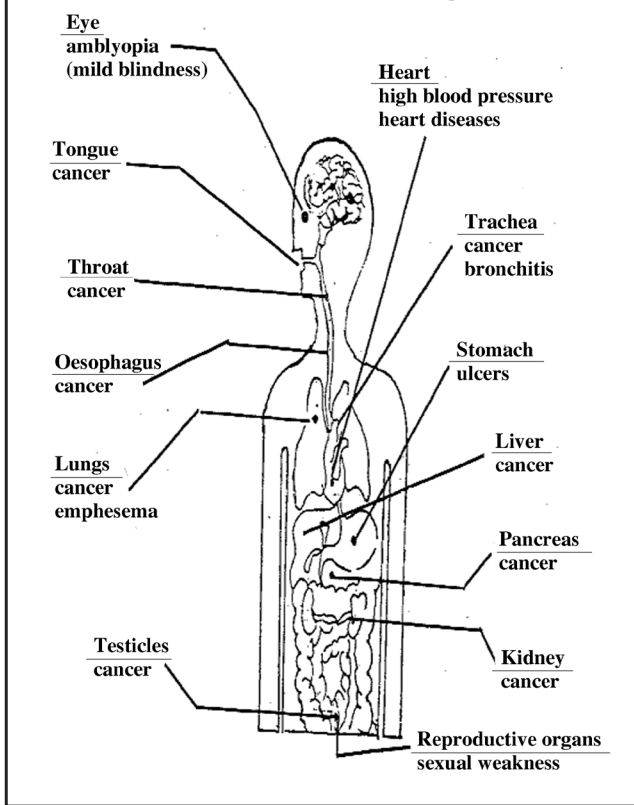
It is absolutely necessary to maintain the proper body weight that suits your age. The best measure that is currently used for this is the Body Mass Index (see the section on body growth) Also, maintain your body shape as that of a "pear" and not of an "apple". A male (man) should try to maintain a waist circumference of 40 inches and a female (women) 35 inches. Developing a large sized abdominal region is the cause of many unhealthy conditions.

### Avoid smoking and "drugs"

Smoking increases the threat of developing cancers in many organs such as the tongue, throat, mouth, lungs, respiratory tubes, stomach, liver, pancreas, testicles and kidneys. It also paves the way for the development of heart diseases, high blood pressure, stroke, stomach ulcers, inflammation of respiratory tubes, emphysema, blindness and impotence.

Alcohol consumption causes many disease conditions including blindness, tremor of hands and legs, cirrhosis of the liver, nerve diseases, burning sensation of the

### Ill effects of Smoking



stomach, damage of brain cells, cancer of many organs such as of the mouth, throat, oesophagus, liver and lungs. So in order to distance yourself from these threats you must try to keep off smoking and consumption of alcohol.

It is also necessary to remember that the betel leaves, areconut, lime, tobacco etc. contained in the betel chew and 'beda' cause cancers specially of the mouth and the oesophagus.

Be contented and happy with what you have in order to reduce tension. A certain degree of tension is necessary to face examinations and to win competitive games. However, if the state of tension persists after the relevant event, then it is a disease state. The excited or the restless condition caused by an event or a situation can be considered as stress or tension.

It is necessary to investigate the reason for this tension and get rid of it. It is also possible to get relief by reading, indulging in pleasurable activity, singing, listening to songs and music, keeping pets, meditation, praying and making offerings to deities etc.

It is great if you realize that you have reached the zenith in your life achievements and be satisfied with that. Being content with what you have got and not try to reach for the skies, helps you to get rid of tension and stress.

### Rest and Sleep

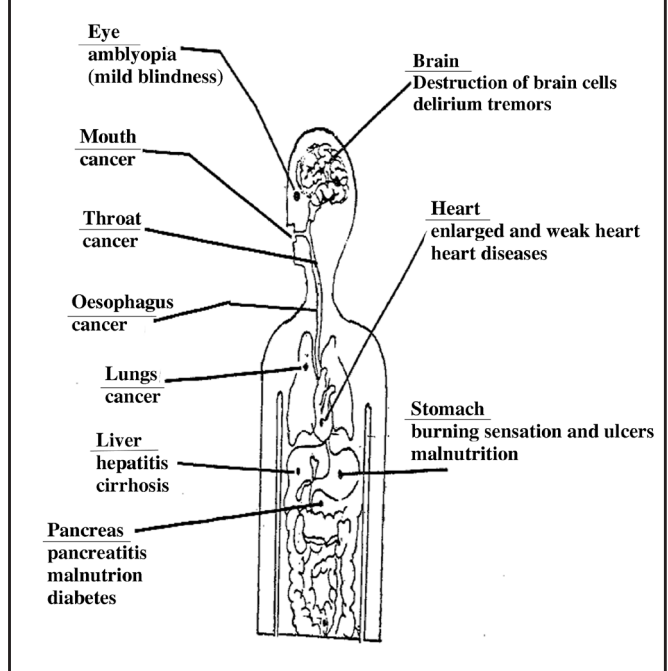
Even though it is beneficial to work hard through the day, in order to reap the real benefits of hard work it is necessary to set aside sometime to rest also. An essential requirement to maintain good health is to ensure at least 6-8 hours of comfortable sleep in the night. If you are in 'sleep debt' to your self by

denying the required sleep, then you pay the interest by way of ill health.

### Physical development

The main evidence which indicates that a new born baby has acquired the required physical development is that its weight is either 2.5kg or more. If we consider the entire life span, the fastest physical development takes place during the first year after birth when the weight increases three fold and the height increases by 50%. Even though the rate of growth is not as fast, during the adolescent years also, the rate of growth is fast. Furthermore, once the full growth potential is reached at a certain age, there is no further growth. This age limit is 19-20 years for males and 12-18 for females. The increase in fatness which takes place is due to fat deposition, which is not considered as healthy growth. So we have to see to it that the children get a nutritionally balanced diet, and that they get opportunities

### Ill effects of alcohol



## Exercise :

## Time required depends on the exertion

| Minimum exertion | Little exertion          | Moderate exertion   | High exertion | Maximum exertion            |
|------------------|--------------------------|---------------------|---------------|-----------------------------|
|                  | 60 mins                  | 30-60 mins          | 20-30 mins    |                             |
| very slow walk   | slow walk                | brisk walking       | aerobic       | sprinting                   |
| dusting          | playing volley ball      | cycling             | slow running  | competitive running (races) |
|                  | minor work in the garden | raking leaves       | hockey        |                             |
|                  | stretching exercises     | sweeping the garden | basket ball   |                             |
|                  |                          | swimming            | fast swimming |                             |
|                  |                          | dancing             | fast dancing  |                             |

## The range that helps to be healthy

- Walk when ever possible
  - walk to the bus halt
  - walk the rest after getting off the bus
  - climb the stairs instead of using the lift
- Minimize the activities which do not provide exercise-example watching television
- Get up from the chair at least once in an hour and stretch yourself
- Play actively with your children
- Initially walk for ten minutes, later increase the duration as well as the speed

for physical exercise so that they achieve the growth targets before they pass the above mentioned ages.

In order to determine whether the growth in adults is satisfactory or not, a formula referred to as the Body Mass Index (BMI) can be used.

Body Mass Index = Weight in Kg/ Height (M) x Height (M)

BMI can be used to assess whether growth is at a healthy level, and also to determine the nutritional

status and the status of health. The following values are general guide-lines

<18 - Malnutrition  
 20-24 - Satisfactory  
 24-30 - Hypernutrition  
 30> - Over Weight (Obese)

So if the value is between 24-30 there is the risk of that person becoming unhealthy and getting ill. If the value is over 30 then it can be considered that such a person is already unhealthy. The commonest

non-communicable diseases of the modern day are diabetes, highblood pressure, heart diseases, stroke, cancer, arthritis and kidney failure.

## Energy

We can say that being energetic is to be able to accomplish the days activities with enthusiasm. This energy required will vary according to the individuals occupation and life style. The energy required by a farmer, labourer or an athlete will be more than that required by a doctor, teacher, clerk or a student. So it is necessary to adjust the energy intake through food to suit ones requirement.

If the energy supplied by the carbohydrates, fats and oils exceeds the energy spent by an individual it will lead to obesity and thereby lead to non-communicable diseases.

## Body Fitness

Even though not much attention is paid to body-fitness in Sri Lanka other countries in the world consider it important and the people indulge in activities such as swimming, gymnastics, daily exercises and cycling. Since of late

$$\text{ශරීර ස්කන්ධ දර්ශකය} - \text{ශ. ස්. ද} = \frac{\text{බර (කි. ග්.)}}{\text{උස (මීටර්)} \times \text{උස (මීටර්)}} = \frac{\text{Weight (Kg)}}{\text{Height (M)} \times \text{Height (M)}}$$

$$\text{Body Mass Index - B. M. I} = \frac{\text{Weight (Kg)}}{\text{Height (M)} \times \text{Height (M)}}$$

Sri Lankans have begun to pay attention to body fitness and it is a health friendly attitude. Body fitness is measured by the amount of “work” that can be carried out during a specific period of time (example: determining the distance run within 5 mins, or by measuring the time taken to complete a specified activity-such as the time taken to run 400 meters) The standards of determining fitness vary with the methods applied. It is possible to raise the level of fitness by engaging in drills, gymnastics, swimming, running, walking, ball games and cycling.

### Physical activities

A healthy life is an active life. It is not healthy to lead a lethargic and a sleepy life. It is necessary to maintain muscles, limbs and all organs in a working or an active state at any age- even at old age-

by carrying out ones own work. It is better for small children and students to engage in some physical activities and games, rather than always being with their books and therefore being physically inactive.

### Mental well being

Mental well being is to maintain the mental health at a high level. It is possible to measure mental well being by assessing the degree of happiness, enthusiasm, independence, maintenance of life, skills, creativity and enjoyment.

### Happiness

It is possible to get an idea of whether a person is happy and healthy or unhappy and declined in health by looking at his face. A smiling face is like a mirror showing good health. Being happy helps to be healthy, to live long and to carry

out work in an efficient manner. It has been found that being happy increases the level of immunity (ability to prevent getting infected) while diminished happiness weakens the extent of immunity.

### Enthusiasm

Enthusiasm is an extension of happiness. Enthusiasm provides the necessary background to carry out the daily activities with maximum zest and interest.

### Independence

When there is no independence or limited independence mental health declines. The young, the adults and old people view rigid laws and regulations and punishments in a discontented manner. We have to accept that every body appreciates the freedom to live independently. For most people it is essential to be able to limit ones privacy to one self.

### Life Skills

It is the life skills that enable us to face the various challenges and problems which arise on a daily basis. These skills are also identified as psycho social skills. Given below are some of the life skills.

### Ability to take decisions

Inability to take the correct decisions when required results in repentance. For example a student has to decide the field of study he hopes to follow in the future. Prior to taking any decisions it is necessary to be informed of all the relevant facts and to be aware of the consequence of the decision. It is also important to consider

**Refer the chart given below to determine whether your weight suits your height**

| Body Weight | lbs   | 90 | 100         | 110 | 120 | 130 | 140 | 150     | 160 | 170 | 180 | 190 | 200        | 210 | 220 | 230 | 240 | 250   | 260 | 270 | 280 | 290 |                 |  |
|-------------|-------|----|-------------|-----|-----|-----|-----|---------|-----|-----|-----|-----|------------|-----|-----|-----|-----|-------|-----|-----|-----|-----|-----------------|--|
|             | kg    | 41 | 45          | 50  | 54  | 59  | 64  | 68      | 73  | 77  | 82  | 86  | 91         | 95  | 100 | 104 | 109 | 113   | 118 | 122 | 127 | 132 |                 |  |
| Height      | ft/in | cm | Underweight |     |     |     |     | Healthy |     |     |     |     | Overweight |     |     |     |     | Obese |     |     |     |     | Extremely Obese |  |
| 4'8"        | 142.2 | 20 | 22          | 25  | 27  | 29  | 31  | 34      | 36  | 38  | 40  | 43  | 45         | 47  | 49  | 52  | 54  | 56    | 58  | 61  | 63  | 65  |                 |  |
| 4'9"        | 144.7 | 19 | 22          | 24  | 26  | 28  | 30  | 32      | 35  | 37  | 39  | 41  | 43         | 45  | 48  | 50  | 52  | 54    | 56  | 58  | 61  | 63  |                 |  |
| 4'10"       | 147.3 | 19 | 21          | 23  | 25  | 27  | 29  | 31      | 33  | 36  | 38  | 40  | 42         | 44  | 46  | 48  | 50  | 52    | 54  | 56  | 58  | 61  |                 |  |
| 4'11"       | 149.8 | 18 | 20          | 22  | 24  | 26  | 28  | 30      | 32  | 34  | 36  | 38  | 40         | 42  | 44  | 46  | 48  | 50    | 52  | 53  | 55  | 57  |                 |  |
| 4'12"       | 152.4 | 18 | 20          | 21  | 23  | 25  | 27  | 29      | 31  | 33  | 35  | 37  | 39         | 41  | 43  | 45  | 47  | 49    | 51  | 53  | 55  | 57  |                 |  |
| 5'1"        | 154.9 | 17 | 19          | 21  | 23  | 25  | 26  | 28      | 30  | 32  | 34  | 36  | 38         | 40  | 42  | 43  | 45  | 47    | 49  | 51  | 53  | 55  |                 |  |
| 5'2"        | 157.4 | 16 | 18          | 20  | 22  | 24  | 26  | 27      | 29  | 31  | 33  | 35  | 37         | 38  | 40  | 42  | 44  | 46    | 48  | 49  | 51  | 53  |                 |  |
| 5'3"        | 160.0 | 16 | 18          | 19  | 21  | 23  | 25  | 27      | 28  | 30  | 32  | 34  | 35         | 37  | 39  | 41  | 43  | 44    | 46  | 48  | 50  | 51  |                 |  |
| 5'4"        | 162.5 | 15 | 17          | 19  | 21  | 22  | 24  | 26      | 27  | 29  | 31  | 33  | 34         | 36  | 38  | 39  | 41  | 43    | 45  | 46  | 48  | 50  |                 |  |
| 5'5"        | 165.1 | 15 | 17          | 18  | 20  | 22  | 23  | 25      | 27  | 28  | 30  | 32  | 33         | 35  | 37  | 38  | 40  | 42    | 43  | 45  | 47  | 48  |                 |  |
| 5'6"        | 167.6 | 15 | 16          | 18  | 19  | 21  | 23  | 24      | 26  | 27  | 29  | 31  | 32         | 34  | 36  | 37  | 39  | 40    | 42  | 44  | 45  | 47  |                 |  |
| 5'7"        | 170.1 | 14 | 16          | 17  | 19  | 20  | 22  | 24      | 25  | 27  | 28  | 30  | 31         | 33  | 34  | 36  | 38  | 39    | 41  | 42  | 44  | 45  |                 |  |
| 5'8"        | 172.7 | 14 | 15          | 17  | 18  | 20  | 21  | 23      | 24  | 26  | 27  | 29  | 30         | 32  | 33  | 35  | 37  | 38    | 40  | 41  | 43  | 44  |                 |  |
| 5'9"        | 175.2 | 13 | 15          | 16  | 18  | 19  | 21  | 22      | 24  | 25  | 27  | 28  | 30         | 31  | 33  | 34  | 35  | 37    | 38  | 40  | 41  | 43  |                 |  |
| 5'10"       | 177.8 | 13 | 14          | 16  | 17  | 19  | 20  | 22      | 23  | 24  | 26  | 27  | 29         | 30  | 32  | 33  | 34  | 36    | 37  | 39  | 40  | 43  |                 |  |
| 5'11"       | 180.3 | 13 | 14          | 15  | 17  | 18  | 20  | 21      | 22  | 24  | 25  | 27  | 28         | 29  | 31  | 32  | 33  | 35    | 36  | 38  | 39  | 43  |                 |  |
| 5'12"       | 182.8 | 12 | 14          | 15  | 16  | 18  | 19  | 20      | 22  | 23  | 24  | 26  | 27         | 28  | 30  | 31  | 33  | 34    | 35  | 37  | 38  | 43  |                 |  |
| 6'1"        | 185.4 | 12 | 13          | 15  | 16  | 17  | 18  | 20      | 21  | 22  | 24  | 25  | 26         | 28  | 29  | 30  | 32  | 33    | 34  | 36  | 37  | 43  |                 |  |
| 6'2"        | 187.9 | 12 | 13          | 14  | 15  | 17  | 18  | 19      | 21  | 22  | 23  | 24  | 26         | 27  | 28  | 30  | 31  | 32    | 33  | 35  | 36  | 43  |                 |  |
| 6'3"        | 190.5 | 11 | 13          | 14  | 15  | 16  | 18  | 19      | 20  | 21  | 23  | 24  | 25         | 26  | 28  | 29  | 30  | 31    | 33  | 34  | 35  | 43  |                 |  |
| 6'4"        | 193.0 | 11 | 12          | 13  | 15  | 16  | 17  | 18      | 19  | 21  | 22  | 23  | 24         | 26  | 27  | 28  | 29  | 30    | 32  | 33  | 34  | 43  |                 |  |
| 6'5"        | 195.5 | 11 | 12          | 13  | 14  | 15  | 17  | 18      | 19  | 20  | 21  | 23  | 24         | 25  | 26  | 27  | 28  | 30    | 31  | 32  | 33  | 44  |                 |  |
| 6'6"        | 198.1 | 10 | 12          | 13  | 14  | 15  | 16  | 17      | 18  | 20  | 21  | 22  | 23         | 24  | 25  | 27  | 28  | 29    | 30  | 31  | 32  | 44  |                 |  |
| 6'7"        | 200.6 | 10 | 11          | 12  | 14  | 15  | 16  | 17      | 18  | 19  | 20  | 21  | 23         | 24  | 25  | 26  | 27  | 28    | 29  | 30  | 32  | 43  |                 |  |
| 6'8"        | 203.2 | 10 | 11          | 12  | 13  | 14  | 15  | 16      | 18  | 19  | 20  | 21  | 22         | 23  | 24  | 25  | 26  | 27    | 28  | 29  | 30  | 43  |                 |  |
| 6'9"        | 205.7 | 10 | 11          | 12  | 13  | 14  | 15  | 16      | 17  | 18  | 19  | 20  | 21         | 23  | 24  | 25  | 26  | 27    | 28  | 29  | 30  | 43  |                 |  |
| 6'10"       | 208.2 | 9  | 10          | 12  | 13  | 14  | 15  | 16      | 17  | 18  | 19  | 20  | 21         | 22  | 23  | 24  | 25  | 26    | 27  | 28  | 29  | 40  |                 |  |
| 6'11"       | 210.8 | 9  | 10          | 11  | 12  | 13  | 14  | 15      | 16  | 17  | 18  | 19  | 20         | 21  | 22  | 23  | 25  | 26    | 27  | 28  | 29  | 40  |                 |  |

whether there are alternative paths of solving the problem, before taking any decision.

It is important to consider whether the decision taken is reasonable. Remember that one has to take the sole responsibility for the decision that one takes. If the decision is taken as a team it is necessary to respect the decision of the team.

### Solving Problems

One must not run away from a problem or blame and place the responsibility on others. Obtain the correct information about the problem and investigate to determine as to how it can be solved. For certain problems there may be more than one solution. It is your responsibility to select the best solution or the set of solutions. If you are unable to solve the problem by yourself do not hesitate to get advice from a suitable knowledgeable person.

### Creative Thinking

Learn to look at things from an unusual or unorthodox angle. Then you will be able to identify the connections between various factors, to act in a manner appropriate to the situation and to face the daily challenges in a novel way.

A great President of the United States of America-John Kennedy said that he needs people who can think in a novel manner. Analytical thinking and thinking deeply about a particular matter, fruitful communication, maintaining interpersonal relationships, understanding one self, empathy, ability to face emotions and mental stress are some of the life skills.

### Enjoyment

This is the capacity to be happy and be content with what one does and sees. Most of us possess the skills of being creative, singing, dancing, playing music, playing games and fashion designing are some creative skills. Also we should be able to enjoy listening to songs and music, watching dancing and dramas. If not we will be considered as people who are subjected to mental stress and of weekend mental health.

### Benevolent thoughts

In a healthy mind good quality thoughts such as kindness, compassion, tolerance will be born. As a result the chemical endoprin that is secreted in the brain will be increased. Endoprin has many desirable effects and also increases the immunity. Concomitant with benevolent thoughts, we are invariably directed towards benevolent activities too. It has been shown that religious activities such as meditation, praying, making offerings to deities also enhance mental health.

### Maintenance of good social relationships

In the present world nobody can live in isolation. It is necessary to

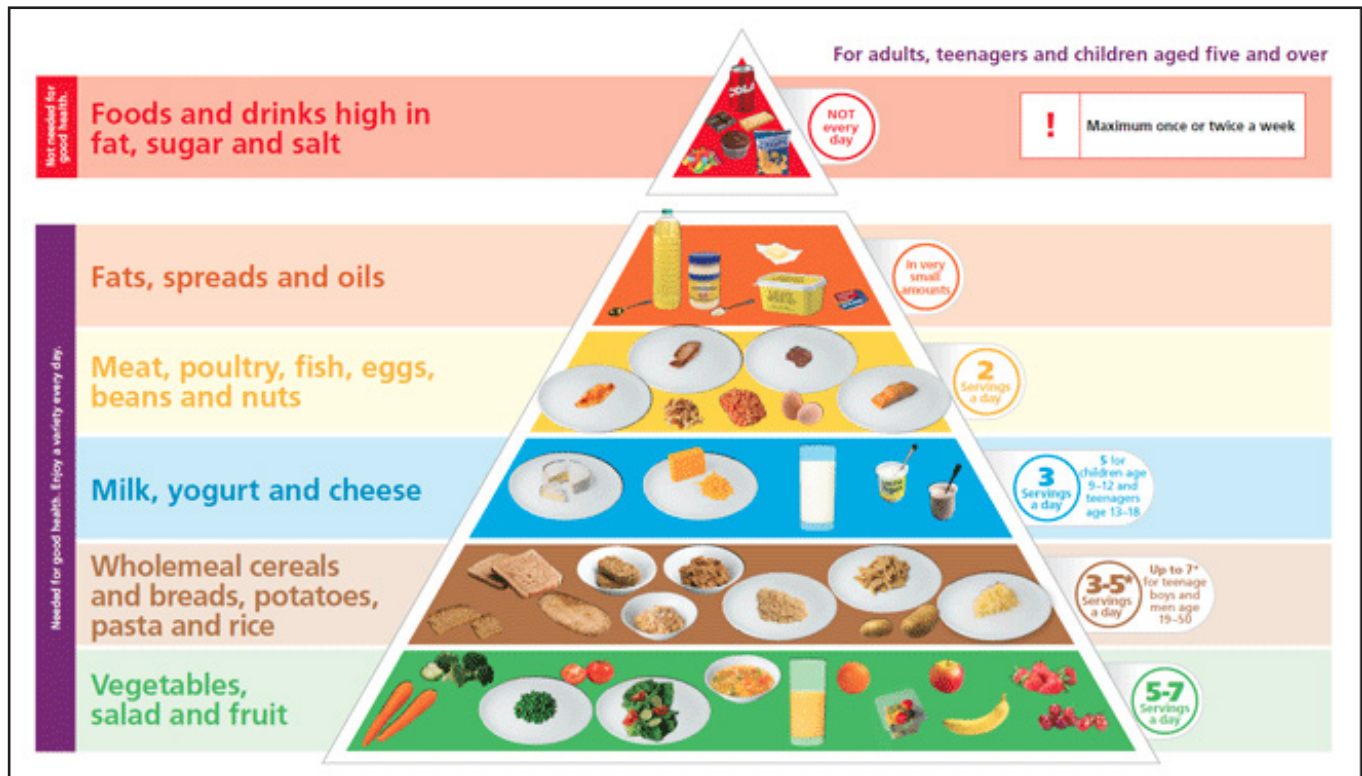
The table indicating the height and weight of a healthy Sri Lankan child according to the age

| Age   | Minimum weight required |        | Minimum height required |        |      |        |
|-------|-------------------------|--------|-------------------------|--------|------|--------|
| Month | Kilograms               | Pounds | Female                  |        | Male |        |
|       |                         |        | cms                     | inches | cms  | inches |
| 03    | 5.89                    | 13.00  |                         |        |      |        |
| 06    | 7.71                    | 17.00  | 65                      | 25.6   | 67   | 26.4   |
| 09    | 8.85                    | 19.50  |                         |        |      |        |
| 12    | 9.75                    | 21.60  | 74                      | 29.1   | 76   | 29.9   |
| 15    | 10.43                   | 23.00  |                         |        |      |        |
| 18    | 11.11                   | 24.50  | 81                      | 31.9   | 82   | 32.3   |
| 21    | 11.67                   | 25.75  |                         |        |      |        |
| 24    | 12.24                   | 27.00  | 87                      | 34.3   | 87   | 34.3   |
| 27    | 12.70                   | 28.00  |                         |        |      |        |
| 30    | 13.14                   | 29.00  | 90                      | 35.4   | 92   | 36.2   |
| 33    | 13.72                   | 30.25  |                         |        |      |        |
| 36    | 14.15                   | 31.25  | 93                      | 36.6   | 95   | 37.4   |
| 39    | 14.74                   | 32.60  |                         |        |      |        |
| 42    | 15.19                   | 33.50  | 97                      | 38.2   | 98   | 38.6   |
| 45    | 15.87                   | 35.00  |                         |        |      |        |
| 48    | 16.32                   | 36.00  | 102                     | 40.2   | 103  | 40.6   |
| 51    | 16.78                   | 37.00  |                         |        |      |        |
| 54    | 17.46                   | 38.60  | 106                     | 41.7   | 107  | 42.1   |
| 57    | 17.69                   | 39.00  |                         |        |      |        |
| 60    | 18.25                   | 40.25  | 109                     | 42.9   | 110  | 43.3   |
| 63    | 18.59                   | 41.00  |                         |        |      |        |
| 66    | 19.68                   | 42.75  | 111                     | 43.7   | 112  | 44.1   |
| 69    | 19.95                   | 44.00  |                         |        |      |        |
| 72    | 20.41                   | 45.00  | 114                     | 44.9   | 116  | 45.7   |

live as a community in the society. There are some aspects connected with the social well being. Love, interaction with the society, role in the society and adapting according to the situation and being peaceful are some such factors.

### Love

In order to live a balanced life it is necessary to receive love as well as to bestow love, from birth until we die. It is this necessity to be loved which makes the children who are deprived of love to wail, makes the men and women who are in their youth cry asking for love, and why the elderly implore saying "Feed me with one or two mouthtuls of rice with your hands etc". When deprived of love some people are driven to indulge in anti social activities and also in self destructive



acts (such as suicide). Love which is not expressed and not felt by the recipient is of no use. Parents specially should love their children so that the children feel that they are being loved. It is a primary necessity for their development.

### Engagement with society

By associating and maintaining relationships with people in a friendly, pleasant and an agreeable manner creates opportunities to lead a life beneficial to oneself and to others. Being helpful to each other and living as a united group in the society is also a health requirement.

### Adapting to the role and requirements of the society

Each of us have a specific role in the society. It is necessary to adapt to suit the different roles as the situation change at times. We have seen the school principal

or a teacher working as a farmer when he goes to the paddy field. It is necessary to adapt to the new role instead of rigidly sticking to the rules and regulations of the original role. For example if we participate in a wedding festival held in a five star hotel we have to use a spoon, fork/knife to eat instead of eating with the fingers, that we have been accustomed to. If there is no experience it would be uncomfortable to use these implements. So it is useful to be informed of how to adapt to the various situations. It is also relevant to be appropriately dressed when going to a temple or a similar place. There we have to be a religious person.

### Peace

It is necessary to maintain peace with foreign nations and also in ones own country, village, community and home. Today it is punishable in law to illtreat and be

cruel to the wife, husband and the children.

Not having a bad temper, getting rid of anger and being patient and tolerant helps to build up a quality family life, maintain good health and also to reduce crimes. If any person safeguards and maintains a balanced and a high level of mental, physical and social well being, then such a person will enjoy a sustainable quality of healthy living.



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