International Journal of Advanced Education and Research
ISSN: 2455-5746, Impact Factor: RJIF 5.34
www.alleducationjournal.com
Volume 2; Issue 3; May 2017; Page No. 236-240

The sunrays: the key factor of life

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Abstract
Sunray is the key factor in photosynthesis, a process vital for many living being on earth. The spectrum of the sun's solar radiation is close to that of the blackbody with temperature of about 5800 k. The Sun emits EM radiation across most of the electromagnetic spectrum. The sun emits X-ray, UV ray, Infrared, visible light and even Radio waves. It in Space at the top of earth's atmosphere at a power of 1366 Watts/m2 each composed of about 50% infrared light, 40% visible light, 10% UV light.
Sunray is the main source of all power in the earth. It has huge power which is utilized various aspects using application of solar technology like architecture, urban planning, agriculture, electricity production. Ultraviolet Ray effect on the earth dangerously at present times increasing Green House Gases caused Ozone Hole. The environment and resource are of most concern with the present society and also for future generation. The resource of the country which are to be utilized adequately. We have to take up serious steps about the effect of Sunrays. Solar Radiation Management (SRM) controls the amount of the Sun's radiation reaching the earth. SRM projects look into ways to increase the atmosphere reflectivity. By increasing the amount of reflectivity in the atmosphere, scientist could reduce the amount of energy that reaches the Earth's surface.
The field and study of Geography is earth and man. Geography is the only discipline that can pursue the study of environment and organism as whole. This paper deals with the different types, activity of the Sunrays and to alert present and future generation from the negative effect of the Sunrays, also Global Warming. By reservation of Sunrays we can protect and develop nature, Society as well as our existence of life circle.

Keywords: sunrays, energy, solar radiation, global warming

1. Introduction
Energy is the main factor of all the activities in the Universe. The thing that is main source of creating solar system is the solar energy. Then, this energy is transferred to animal kingdom through various ways. Life trapping mechanism is occurred first in the plant through the energy of the sun. Then this energy is transferred to animal kingdom through various ways. The sun, our singular source of renewable energy, emits energy as electromagnetic radiation at an extremely large and relatively constant rate, 24 hours per day, 365 days of the year. The rate at which this energy is emitted is equivalent to the energy coming from a furnace at a temperature of about 6,000 K ($10,340^0$ F). If we could harvest the energy coming from just 10 hectares (25 acres) of the surface of the sun, we would have enough to supply the current energy demand of the world.

In recent years, society has become aware and therefore sensitive for the destruction of the natural environment with its unpredictable economic and ecological consequences. For the conservation, goals must be set to reduce the consumption of fossil fuels and to utilize energy more efficiently and cost effectivity. As a result of these goals, specification and requirements for reservation our atmosphere from the hampering effect of the sunrays.

2. Application of Sun's Energy
By the use of solar cell, capturing the sun's energy for light, heat, hot water, and electricity can be a convenient way to save money. Solar cell is a complete photovoltaic (PV) system, has many parts to function properly and safely. All the energy stored in Earth's reserves of coal, oil, and natural gas is equal to the energy in just 20 days of sunshine.

For household uses
Indoor lighting, solar Cooking, Battery Charging, Power Pumps With Solar Energy, Water heater, bath fans, floor fans, and ceiling etc.

For agricultural uses
Solar energy can be used in agriculture in a number of ways, saving money, increasing self-reliance, and reducing pollution.

- Dairy operations can use solar heated water to clean equipment
- Crop and Grain Drying
- Greenhouse Heating: A solar greenhouse uses building materials to collect and store solar energy as heat. Insulation retains the heat for use during the night and on cloudy days.
- Remote Electricity Supply: Photovoltaic (PV) panels are often a cheaper option than new electric lines for providing power to remote locations. And because they require no fuel and have no moving parts, they are more convenient to operate and maintain than diesel or gasoline generators.
- Water pumps. Although current prices for solar panels make them too expensive for most crop irrigation systems, photovoltaic systems are economical for remote livestock water supply, pond aeration, and small irrigation systems.

For architecture and urban planning
The solar technology used in building planning are.

- **Building Integrated Photovoltaic (BIPV):** Its use in the building envelope is very varied and open ways for creative designers. In particular semitransparent photovoltaic glass

modules can be changed into a truly multifunctional building component which in able to serve in addition to an electricity production. There are many to integrate structurally PV into the building fabric,

- **Pitched Roofs:** PV modules are fixed on top of pitched roof such as private home. It is a type of low cost application.
- **Flat roofs:** It has the advantage of good accessibility and ease of installation.
- **Building façade panels:** PV modules can be added on the existing wall. They are just added on to the structure, this being performed by the structure underneath the modules.
- **Skylights**: It can combine the advantage of light diffusion in the building and electricity, providing an open surface for the installation of PV modules.

3. Sun's Radiation and Its Effect on Biosphere

Sunrays: The Sun is the source of all the energy in the earth. The energy of the sun is also called as Electro-Magnetic Energy, which includes visible light, temperature and Radio waves. The energy is divided into two parts first, Electro-Magnetic Radiation (E.M.R) and second, Electro-Magnetic Spectrum (E.M.S). By the effect of earth's Electric field and Magnetic field, light ray is reflected as wave. This reflection of the Sun is called Electro-Magnetic Radiation (E.M.R). In the other side, when the reflected EMR create a field of light spectrum, it is called Electro-Magnetic Spectrum (E.M.S). If reflects different wavelength Electro-Magnetic Ray. Like visible wave, radio wave, Ultra-Violet Ray, X-ray, Gamma Ray etc. The average speed of these ray is $3x10^5$ km/sec. Different parts of Electro-Magnetic Spectrum are shown hereunder:

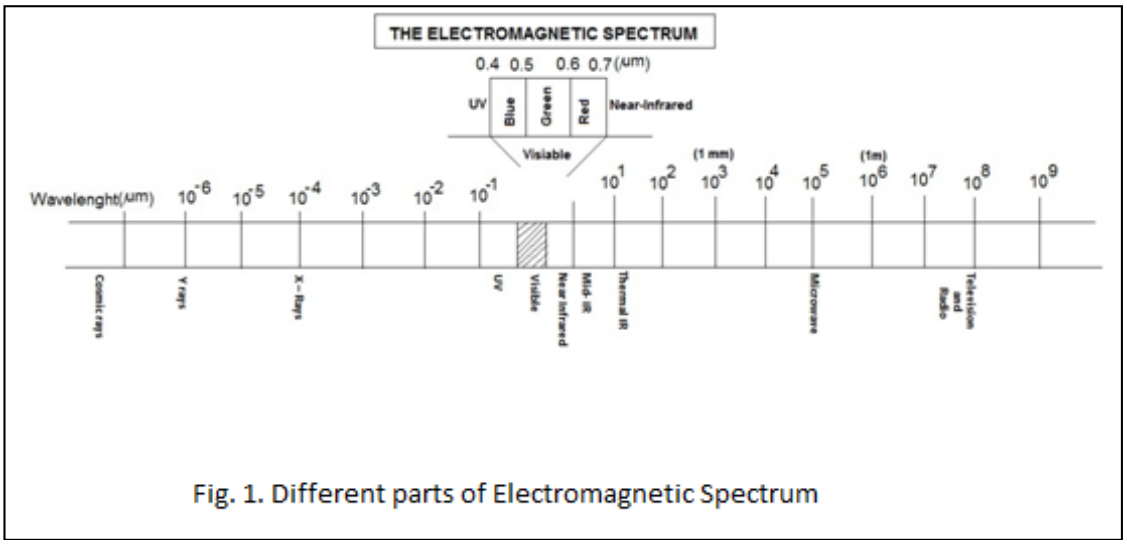

Fig. 1. Different parts of Electromagnetic Spectrum

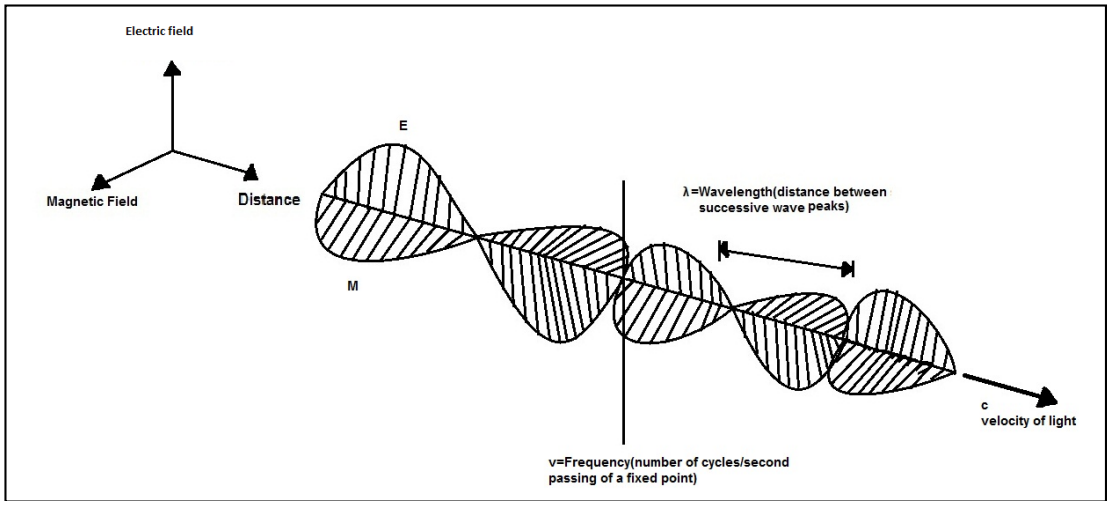

Fig 2: An electromagnetic wave. Components include a sinusoidal electric wave (E) and a Similar magnetic wave (M) at right angles.

Ultraviolet (UV) Radiation

Ultraviolet (UV) radiation is a major risk factor for most skin cancers. Sunlight is the main source of UV rays, which can damage the DNA in skin cells. Ultraviolet radiation has 3 wavelength ranges: 1. UV-A, 2.UV-B and UV-C.

- **Effects of UVA rays:** This rays age cells and can damage cells' DNA. They are linked to long-term skin damage such as wrinkles, but are also responsible in some skin cancers. UVA activates melanin pigment already present in the upper skin cells. It creates a tan that appears quickly but is also lost quickly. Furthermore, UVA penetrates into the deeper skin layers, where connective tissue and blood

vessels are affected. As a result the skin gradually loses its elasticity and starts to wrinkle. Therefore, large doses of UVA cause premature ageing.

- **Effects of UVB rays:** These rays, also called tanning ray, can directly damage DNA and are the main rays that cause sunburns and production of the brown pigment, melanin, by stimulating the melanocyte cell. They are also thought to cause most skin cancers. These rays are partially responsible for causing all three of the main types of skin cancer: Basal cell carcinoma, Squamous cell carcinoma, and Malignant melanoma.
  1. **Basal cell carcinomas** are the most common type of skin cancer. They usually appear as a red lump or scaly area, however, no clear precursors have been identified. They grow slowly, rarely spread to other parts of the body and can be removed surgically.
  2. **Squamous cell carcinomas** are the second most common form of skin cancer. They appear as a thickened red scaly spot at body sites most often exposed to UV radiation. They also tend to be slow growing and can usually be removed surgically before they become a serious risk.

Fig 3: Squamous cell carcinoma

Fig 4: Basal cell carcinoma

Fig 5: Malignant melanoma

  3. **Melanoma skin cancers:** Malignant melanoma is the rarest but most dangerous type of skin cancer. Malignant melanoma may arise as a new mole or as changes in colour, shape, size or sensation of an old spot, freckle or mole. Melanomas tend to have an irregular outline and a patchy colouring. Itching is another common symptom but is also found in normal moles. If recognized and treated early, the chances of survival are good. If untreated, the tumour can develop rapidly, and cancer cells can spread to other parts of the body. Tumour development may be linked to occasional exposure to short periods of intense sunlight, such as at weekends or on holiday. The higher incidence of malignant melanoma in indoor workers compared to outdoor workers supports that notion.
- **Effects of UVC rays:** These rays don't get through our atmosphere and therefore are not in sunlight. They are not normally a cause of skin cancer. Skin cancers are one result of getting too much sun, but there are other effects as well. Sunburn and tanning are the short-term results of too much exposure to UV rays, and are signs of skin damage. Long-term exposure can cause prematurely aged skin, wrinkles, loss of skin elasticity, dark patches and pre-cancerous skin changes.The sun's UV rays also increase a person's risk of cataracts and certain other eye problems and can suppress the skin's immune system. Darker-skinned people are generally less likely to get skin cancer than light-skinned people, but they can still get cataracts and suppression of the skin's immune system.

Ozone Hole

When ultraviolet radiation (UV) strike chlorofluorocarbon (CFC) molecules in the upper atmosphere, a carbon-chlorine bond breaks, producing a chlorine (Cl) atom and UV breaks oxygen molecule into single oxygen atoms. The chlorine atom then reacts with an ozone (O3) molecule breaking it apart and so destroying the ozone. This forms an ordinary oxygen molecule(O2) and a chlorine monoxide (ClO) molecule. Then a free oxygen atom breaks up the chlorine monoxide. The chlorine is free to repeat the process of destroying more ozone molecules. This process destructs Ozone layer and create Ozone hole in the stratosphere. Then, UV radiation, comes directly come to earth, heating temperature of the surface atmosphere, increasing green house gases (our most important greenhouse gases-carbon dioxide, methane, nitrous oxide, and fluorinated gases) and also damaging human skin.

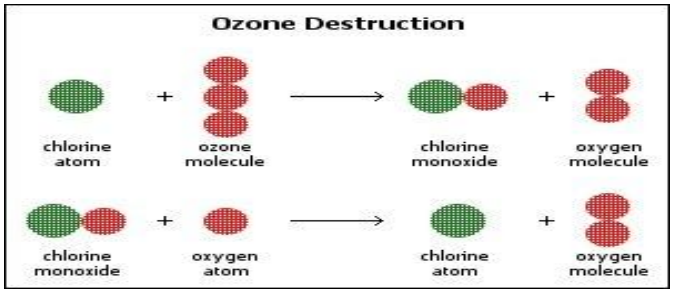

Fig 6

Global warming

Now the most vigorously debated topic is Global warming. Global Warming is the increase of Earth's average surface

temperature due to effect of greenhouse gases. Co2 has exceeded 390parts /min. During the 1990s Carbon emissions grew by less than 1% per year. We are already in risk it is not next year, not next decaded, it's now. Evidence of increasing temperature –Since 1900 northern hemisphere has lost 7% of maximum area covered by seasonally frozen ground. Many types of animals have lost their existence. By continue this processes, it will be in a great dangerous situation.

Global Average Annual Temperature Per Decade.

Table 1: Temperature rising from 1880 to 2014

Decade	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990	2000	2014
Temperature	13.73	13.75	13.74	13.72	13.83	13.96	14.04	13.98	13.99	14.00	14.18	14.31	14.51	14.69

Source: www.currentresults.com, www.livescience.com

4. Protection from Sunrays

- **Solar Radiation Management (SRM):** It means of reducing the amount of radiation reaching the earth from the sun. The proposed and theoretical SRM projects are a type of climate engineering which seeks to reflect sunlight and thus reduce global warming. SRM could be an alternate to address climate change. Various techniques have been suggested for negative forcing:
- **Stratospheric aerosols:** Injecting reflective aerosols into the stratosphere is the proposed solar radiation management method which form sulfate aerosol and cool the planet. It may be risks that include changes in precipitation and, in the case of sulfur, possible ozone depletion.
- **Cloud reflectivity enhancement***:* John Latham and Stephen Salter suggested various cloud reflectivity method which works by spraying seawater in the atmosphere to increase the reflectivity of clouds. The extra condensation nuclei created by the spray will change the size distribution of the drops in existing clouds to make them whiter.
- **Ocean sulfur cycle enhancement:** Increasing the natural marine sulfur cycle by fertilizing a small portion with iron, may also increase the reflection of sunlight. Such techniques also tend to sequester carbon, but the enhancement of cloud albedo appears also to be a likely effect.
- **Cool roof:** Painting roof materials in white or pale colours to reflect solar radiation, known as 'cool roof' technology, is encouraged by legislation in some areas
- **Reflective sheeting**: Adding reflective plastic sheets covering 67,000 square miles (170,000 km^2) of desert every year between 2010 and 2070 to reflect the Sun's energy may be able give globally averaged 1.74 W/m^2 of negative forcing.
- **Forestry:** Reforestation in tropical areas has a cooling effect. Deforestation of high-latitude and high-altitude forests exposes snow and this increases albedo.
- **Space mirrors:** proposed by Roger Angel with the purpose to deflect a percentage of solar sunlight into space, using mirrors orbiting around the Earth.

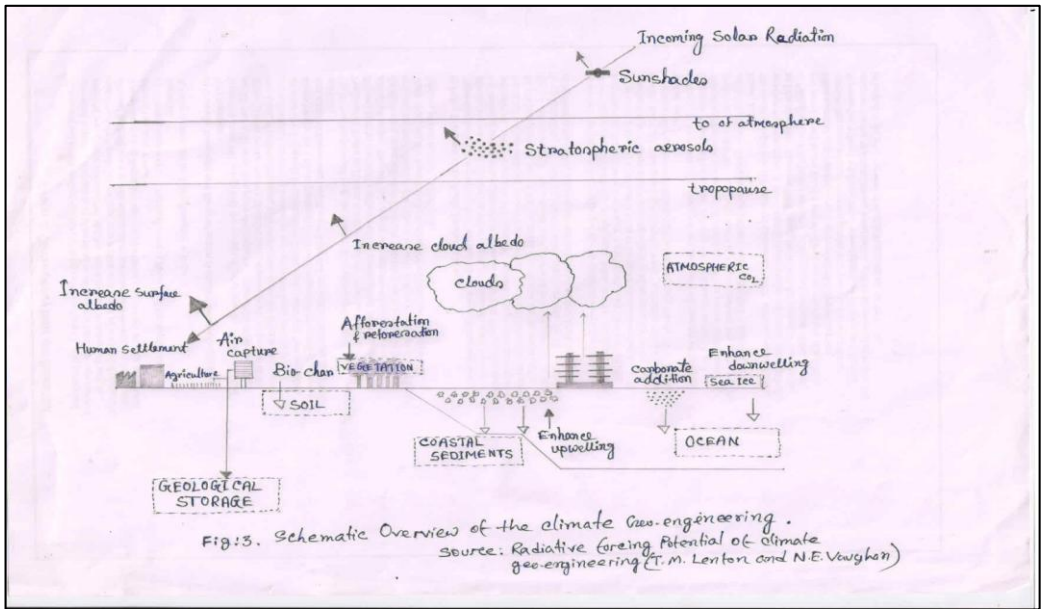

Fig 7

Protection from UV rays: There are some steps can be taken to limit in human body exposure to UV rays:

1. Looking shade: UV rays reach the ground all year, even on hazy days, but the strength of UV rays can be different based on the time of year, elevation, and cloud cover. The UV rays become more intense in the spring (mainly 10 a.m to 4 p.m), even before temperatures get warmer. People in some areas may get sunburned when the weather is still cool because they may not think about protecting themselves if it's not hot out. Be especially careful on the beach or in areas with snow because sand, water, and snow reflect sunlight, increasing the amount of UV radiation you receive. UV rays can also reach

below the water's surface, so human still get a burn even if he is in the water and feeling cool.

Some UV rays can also pass through windows. Typical car, home, and office windows block most of the UVB rays but a smaller portion of UVA rays, so even if you don't feel you're getting burned your skin may still get some damage. Tinted windows help block more UVA rays, but this depends on the type of tinting. UV radiation that comes through windows probably doesn't pose a great risk to most people unless they spend long periods of time close to a window that receives direct sunlight.

The UV Index: To help people better understand the intensity of UV light in their area on a given day, the National Weather Service and the Environmental Protection Agency (EPA) have developed the UV Index. The UV Index number, on a scale from 1 to 11+, is a measure of the strength of the UV rays reaching the ground during an hour around noon. The higher number in UV Index, the greater the exposure to UV rays, indicates the higher the chance of sunburn and skin damage that could ultimately lead to skin cancer. Further information about the UV Index, as well as your local UV Index forecast, is available on the EPA's web site at www.epa.gov/sunwise/uvindex.html.

2. Clothing: Long-sleeved shirts, long pants, or long skirts cover the most skin and are the most protective. Dark colors generally provide more protection than light colors. A tightly woven fabric protects better than loosely woven clothing. Dry fabric is generally more protective than wet fabric. Some companies now make clothing that is lightweight, comfortable, and protects against UV exposure even when wet. It tends to be more tightly woven, and some have special coatings to help absorb UV rays. These sun-protective clothes may have a label listing the UV protection factor (UPF) value – the level of protection the garment provides from the sun's UV rays (on a scale from 15 to 50+). The higher the UPF, the higher the protection from UV rays.

3. Use sunscreen: It is a product that can protect human skin against the Sun's UV rays. Sunscreens are available in many forms – lotions, creams, ointments, gels, sprays, wipes, and lip balms, to name a few. But it must be sure about the quality of product and use as per physician's recommendation.

4. Wear a hat: At least a 2- to 3-inch brim all around Hat is ideal because it protects areas such as the ears, eyes, forehead, nose, and scalp. Straw hats are not as protective as hats made of tightly woven fabric.

5. Wear sunglasses: Research has shown that long hours in the sun without protecting your eyes increase your chances of developing some eye diseases. The UV-blocking ideal sunglasses should block 99% to 100% of UVA and UVB radiation. Labels of the sunglasses that say "UV absorption up to 400 nm" or "Meets ANSI UV Requirements" mean the glasses block at least 99% of UV rays.

6. Avoid tanning: Many people believe the UV rays of tanning beds are harmless. This is not true. Tanning lamps give out UVA and usually UVB rays as well. Both UVA and UVB rays can cause long-term skin damage, and can contribute to skin cancer.

5. Conclusion

In conclusion it should be pointed out that sustainability must be the central goal of sunrays protection. In developed countries, the main sources of increased co2 are combinations of burning fossil fuel (industrial purpose) & burning natural vegetation to clear for construction. CFC gases are increasing by use of more Air condition, refrigerate. In other side developing countries main sources of temperature are CH4, like shifting Agriculture, especially rice growing releases CH4 as do coal mining, oil welling. From 1970, the scientists have been supporting MGW (Management of Global Warming) which were warning of 'coming ice age'. Southern hemisphere is gradually captured by Ozone hole. Due to this reason UV rays strike direct to the human body which is attacked by dangerous disease. In the world immense people is attacked by skin cancers. In these circumstances necessary steps in the right direction has been summed up in the guidelines. So it is our duty to keep safe use and sustainable development in our environment. We need to more conscious for planning the projects, to the ecosystem in the least destructive way. We need more and more research about climate geoengineering, Solar Radiation Management and Other ways to protect sunrays. In the present time the demand of energy gradually growing up but the limited fossil fuels are decreasing reversely. Only the sources of renewable energy can help our human society also biosphere to develop vertically. We know that sun have never ending energy by which we can easily keep pace with the speed of era. Government of India is stressing upon the use and develops of solar energy. Only technology can help absorbed more and more energy to use the sunrays maximum. Although current prices for solar panels make the people too expensive for using their natural life. But the cost of PV is projected to decline significantly over time, which will make more applications cost-effective.

Such a technological value change in energy using and effect of UV rays is not easy to attain. Most likely it will take the time of more than one generation to achieve a major breakthrough as old habits and thought processes need to be suspended and pointed in the right direction.

6. Reference

1. Hagemann I. Solar Design in Architecture and Urban Planning.
2. McGarrity, J.-UVA vs UVB: Types of Sun Rays and Their Effects.
3. Ahmed A. -Modern Practical Geography. Sarathi Book Stall, Kolkata. 2008.
4. Bendt PA. Rabl Effect of Circumsolar Radiation on Performance of Focusing Collectors; "SERI Report TR-34 -093, April. 1980.
5. Fröhlich C, Brusa RW. Solar Radiation and its Variation in Time, Solar Physics, 1981; 74, 209.
6. Iqbal M. An Introduction to Solar Radiation, Academic Press, New York, 1983.
7. http://rredc.nrel.gov/solar -- NREL's solar energy data site
8. www.theozonehole.com
9. https://en.wikipedia.org/wiki/Solar_radiation_management
10. www.google.com
11. http://www.ucsusa.org/.