Nine Things to *Really* Tell Your Friends About Genetically Modified Crops

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An article in the Botany section of *The Scientific Ravi 2012* entitled *Risk Assessment of Genetically Modified Crops* perpetuates a number of common myths that there are different environmental and health risks associated with genetically modified crops, including dangers of eating foreign DNA. Such viewpoints are promulgated by fringe studies and web sites that are rejected by the overwhelming majority of scientists and scientific bodies worldwide (Chassy& Miller 2012).To inform those who may be alarmed by such claims, we rebut nine common GMO myths below(not all of which were in the Scientific Ravi article) and explain the true state of affairs.

Myth #1. GMOs have never undergone standard testing or regulation for human safety.

The Facts: GMO crops have been subject to more testing worldwide than any other new crops, and have been declared as safe as conventionally bred crops by scientific and food safety authorities worldwide. The American Association for the Advancement of Science (2012) notes, for example, that the European Union has invested more than €300 million in research on the bio-safety of GMOs. A recent EU report concludes that more than 130 EU research projects, covering a period of more than 25 years of research and involving more than 500 independent research groups, show that consuming foods containing ingredients derived from GM crops is no riskier than consuming the same foods containing ingredients from conventional crops (European Commission 2010). Such well-known organizations as the World Health Organization (World Health Organization 2010), the U.S. National Academy of Sciences (National Academy of Sciences 2005), and the European Food Safety Authority (EFSA) have come to the same conclusion (European Commission 2010).To date, not a single case of allergy, illness, cancer, or death has been shown to be associated with foods derived from GMO crops, despite the fact that they have been consumed by Americans for over 16 years.

Myth #2. But we know that GMOs have proven harmful in animal studies.

The Facts: Claims about animal studies should be viewed with great caution (*Academics Review* n.d.). A small number of poorly-done studies purportedly claim such damage, but these have been highly criticized for their veracity (Chassy& Miller 2012) by the overwhelming majority of highly respected scientists and are opposed by many hundreds of studies showing no harmful effects (Campbell 2012). For example, eating too many tomatoes (or many other foods or drugs) *can* kill rats**.** It is very difficult to do animal feeding studies with whole foods correctly. Great care must be taken in the design, execution and analysis of such studies. Investigators must be very careful to reproduce and test their results since false positives are common. To date, not a single rigorous study of GM foods in animals has revealed any adverse effect (Snell et al. 2012).

Myth #3.GMO crops damage the environment

The Facts: GMO crops behave exactly like regular crops with regards to environmental effects. They are no more likely to prove invasive that other crops of the same species (Dale et al., 2002). Not only that, but recently reported studies indicate that insect resistant Bt crops enhance the ecological diversity in the areas surrounding those where Bt crops are grown, as compared to non-Bt crops of the same species (Lu et al., 2012). These studies over a period of 13 years show that the cultivation of BT cotton in China results in an increase in insect diversity and abundance and a decrease in crop damaging insects not only in the BT crop fields but also in surrounding non-Bt fields. Herbicide resistant weeds have arisen, but they are no more invasive that non-herbicide resistant weeds; they are just resistant to one particular herbicide.

Myth #4. And the most widely used GMOs are paired with a herbicide linked to serious reproductive problems and disease.

The Facts: Genetic modification and herbicide use are independent technologies. GM crops can be grown without herbicide use and *vice versa*. Studies showing that GM herbicide resistance, or the herbicides to which resistance was genetically engineered, are harmful used a strain of rats that automatically develop tumors, and were conducted and analyzed very poorly (*Discover Magazine* n.d.). These studies have been rejected by reputable scientists and scientific bodies worldwide, including EFSA (*Science 2.0* 2012; European Food Safety Authority 2012; *Science Media Centre* 2012; Ogorodnev 2012).

Myth #5. The consequences of GMO technology are inherently unpredictable.

The Facts: The techniques of genetic engineering represent the most precise manipulation of genes possible (*AgBiosafety* 2001). By contrast, traditional plant breeding mixes genes in a totally unknown fashion thereby producing less predictable outcomes. Indeed most new crop varieties have been synthesized by atomic bombardment or chemical mutagenesis, and the genetic effect of these processes is totally unknown, and yet they are subjected to zero safety testing.

Myth #6. GMO makers intimidate and silence farmers and scientists.
The Facts: Only farmers profiting from illegally growing crops from patented seed have been prosecuted. Many new GMO crops are being released at cost to farmers in developing countries. The overwhelming number of scientists approves of GM crops and only the false claims of marginal "scientists" are challenged, not only by the commercial GMO makers but by biological scientists worldwide. Moreover, many GMO patents held by private companies and research institutions have expired (or are soon to expire) making the products and processes available for use by anyone (Matthews 2012).

Myth #7. GMO crops are associated with farmer suicides and animal deaths in India.
The Facts: This is just not correct, and is a falsehood promulgated by Indian GMO opponents. Suicides in India are lower in the countryside than in the cities and show no relationship to GMO cultivation (Herring, 2009). Indian farmers have enthusiastically adopted GMO crops with over 90% of Indian cotton being insect-resistant BT cotton. There is no solid evidence of any animal deaths in India being related to BT cotton. BT eggplant (BT Brinjal) is currently prohibited in India for political not for scientific or agronomic reasons.

Myth #8. GMOs undermine our food security.
The Facts: Farmers spend more on improved seeds when their characteristics give them greater benefits in terms of higher profits, lower costs or greater convenience. Many analyses have shown that GMO crops are a valuable tool amongst many to improve food security worldwide, and the higher yields enable more land to be put aside for wildlife (ISAAA 2012; *PG Economics* 2012). Many tropical crops crucial to the livelihoods of the local people, such as cassava, bananas and papaya, are currently being decimated by diseases for which resistance imparted into GMO varieties represents the only protection against devastating crop losses and famine (*GMO Compass* 2006).

Myth #9. GMOs aren't needed in the first place, so why would we take on these risks and harms?
The Facts: GMO crops increase yields and decrease the use of pesticides, and as such, food from these crops has fewer toxic residues (National Academies 2012; *PG Economics* 2012). Some GMO-crop techniques reduce the emission of greenhouse gases from agriculture, thereby combating climate change (*Europabio* n.d.).In many crops diseases are becoming more prevalent and some can only be overcome by GM techniques at present. GMO crops under development also offer improved nutrition; a significant potential benefit to developing countries (The Council for Biotechnology Information 2011).Scientific progress cannot be halted by the false comfort that we currently produce enough calories for everyone. To sustainably feed an ever-growing population, we should take advantage of every technology that safely improves efficiency in food production, processing and distribution.

In conclusion GMO crops have been extensively tested and found to be as safe as conventional crops from food safety, health and environmental points of view (Diehl 2012). They are being adopted worldwide because of their benefits to farmers and society. The public opposition to GMO crops is really a fear of the unknown, with little or no scientific merit. (An excellent new site for accurate information, often cross referencing published scientific documents, is http://www.biofortified.org/).

Medicinal Importance of Maidenhair fern (Adiantum) And Maidenhair tree (Gingko biloba)

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Maidenhair fern (*Adiantum sp.*):
Adiantum, belongs to family Pteridaceae and division Pteridophyta, is a genus of approximately 200 species. The word Adiantum is of Greek origin; It is derived from the word "adiantos" which means "not wetting" due to the frond's ability to shed water without being wet.
Adiantum is referred as Maidenhair having a significant feature that its vernacular name is attributed to a theory known as Doctrine of Signatures (DOC). This principle is based upon the noteworthy work of Paracelsus (1493-1541) who was an iconoclast, Swiss occultist, writer, philosopher, physician, healer, alchemist, astrologist, and considered as the first practitioner of homeopathic medicine in 16th century.
Although Paracelsus led the foundation of this theory but DOC was popularized by Jacob Boehme (1575-1624). According to him, God has provided us mental and visual abilities to identify the beneficial aspects of different living organisms. He wrote a book named as "*Signatura Rerum"* or "The Signatures of All Things" and

published in 17th century. In this book he reported that yellow plants are good to cure spleen diseases, red plants are good to cure heart diseases, green plants are good to cure Liver diseases and Black plants are good to cure Lungs Diseases.

An English herbalist John Gerard (1545-1612) wrote in "The Herbal, General Historie of Plants" that "It consumeth and wasteth away the King's Evil and other hard swellings, and it maketh the haire of the head or beard to grow that is fallen and pulled off" which means that maidenhair fern is named so to have very soft and delicate hair like roots. These roots are used as treatment for baldness.

Nicholas Culpepper (1616-1654) is a famous Physician who wrote in his book "This (Adiantum) and all other Maiden Hairs is a good remedy for coughs, asthmas, pleurisy (inflammation of lungs), etc. and on account of its being a gentle diuretic also in jaundice, and other impurities of the kidneys. All the Maidenhairs should be used as green and in conjunction with other ingredients because their virtues are weak."

Uses:

- Adiantum is used as an alternative for standard allopathic remedies. An Elixir (a sweet liquid used for medicinal purposes) named as Sirop do Capillaire is made in France from its fronds to treat the pulmonary catarrhs. It is also used for treatment of several throat infections. It is flavored with orange flowers and acts as a demulcent (common ingredient in cough syrups) with slightly stimulating effects. (Grieve, M. 1931)
- Dried fronds and rhizomes of maidenhair act as detoxicant (a detoxifying agent) for Alcoholism (uncontrolled consumption of alcoholic beverages). It also acts as a decoction to remove worms from the body.
- An Elixir of Garus (Elixir de Garus) is made in France. It helps in menstrual flow stimulation which is available in market under the name of Polytrichon and Kalliphyllon. (Landerer X., 1883)
- Poultice is made from chewed fronds of Maidenhair fern that is a soft mass used for treatment of any inflammation, aching, and any painful part of body or to stop bleeding from wounds.
- After drying, the stalks of maidenhair fern retain their color and pliability (receptive to change). They are used by Indian tribes including Makah, Quinault, Karok, and Yurok to manufacture baskets and also provide darker color of creation of geometrical patterns.
- John Gerard, in his book "The Herbal, General Historie of Plants" clearly mentioned the treatment of Baldness through hair like roots of Maidenhair fern.
- Maidenhair fern plays a vital role in easing kidney stone, treatment for stone in bladder, shortness of breath, coughs and colds, detoxifying the liver, diuretic (substances that promote production of Urine), pharyngitis (inflammation of throat), bronchitis (inflammation of mucous membranes of bronchi).
- Leaves of maidenhair ferns are crushed and used to make the Brew (herbal tea).
- Adiantum plays a vital role as an Expectorant which signals the brain and body to release an increased amount of secretions, thus reducing the chance of respiratory irritations. As an Emmenagogue it stimulates menstruation and such products are beneficial for women using worldwide.
- In Pakistan, among the lower plants, there are at least 189 pteridophytes (ferns and their allies). Adiantum capillus-veneris is abundantly found near moist and shady places. The local name for this species is Persoshan which is widely used as expectorant and diuretic (Shinwari I., 2010).

Maidenhair Tree (Gingko biloba):

Gingko being the sole survivor of Ginkgoaceae family whose closest tree's lives existed 190 million years ago (older than dinosaurs) is regarded as "Living Fossil". 19 species of Gingko have been found from as far back as the Permian period, over 270 million years ago.

Uses:

- The leaves of Gingko are used in herbal remedies for cognitive complaints, such as dementia (a mental illness), Alzheimer's disease (a form of dementia in aged persons) and vertigo (kind of dizziness in which eye's perception is observed).
- Gingko improves blood flow from body to brain and brain to body circulation.
- Several herbal products are available in market that help the blood vessels to contract and relax more smoothly.
- It is reported that taking ginkgo leaf extract by mouth seems to improve thinking skills in some elderly people with mild to moderate age-related memory loss or thinking problems.
- Leaf extract of Gingko improves some thinking skills in healthy young to middle-aged people. Ginkgo improves memory and speed of mental

processing in people without memory loss. A combination of Panax quinquefolius and ginkgo is effective for improving memory.

- Ginkgo leaf extract is also used to decrease the number of painful people with Raynaud's syndrome (disorder of discolorization of fingers, toes and other body parts).
- Claudication is a disease in which patient feels pain while walking. Some evidence shows that ginkgo improves the poor blood circulation in legs of patients who can easily walk without pain.
- It is said that taking ginkgo leaf extract helps to produce relief in breast tenderness associated with Premenstrual Syndrome.
- Leaf extract of Gingko is used to make medicines EGb 761 and Tanakan, which are medicines to reduce anxiety.
- According to The National Center for Complementary and Alternative Medicine (NCCAM) Gingko has been found to be very efficient in preventing cholesterol from turning into plaque; several flavonoids and tarpenoids are present in its extract that acts as antioxidants and enhances the immune system.

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Medicinal plants and pharmacognosy

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It is the survey of W.H.O. that there are more than 80% people in this world who use natural medicines – generated from plants. This thing shows the relationship between humans and plants as well as with the environment.

The term pharmacognosy comes from two Greek words: "pharmakon" meaning drug or medicine, and "gnosis" meaning knowledge. The ***American Society of Pharmacognosy*** defines pharmacognosy as "**the study of the physical, chemical, biochemical and biological properties of drugs, drug substances or potential drugs or drug substances of natural origin as well as the search for new drugs from natural sources**". This relationship is very old. There are certain chemical compounds present in plants that are involved in the treatment of certain diseases. The use of plants in many areas is gaining much importance. The certain chemical compounds which are of great medicinal importance are alkaloids, flavonoids, tannins as well as the phenolic compounds present in the plants.

Traditionally people are having the opinion that herbal medicine is cheaper and much more effective than the modern medicine. In the developing countries like Pakistan people are not rich and they use medicines from plant source for the treatment of certain diseases. Ethno pharmacology is very effective in finding new ways to discover new chemicals from plants. Medicines taken from the natural resources are studied in pharmacognosy, physical chemical and biological study of natural resources is done in order to find out new medicine from the plant.

Herbal medicine is one which is taken from plants. Certain chemical synthesis occur in plants which perform important biological functions and when these chemicals are used by humans they treat certain diseases .Such chemicals have been found in the plants which are involved in the treatment of certain diseases. Ethno-botany is the relationship between people and plants and researchers are trying hard to discover future medicines from plants. 122 such compounds had been identified till 2001 which are used in medicine taken from plants. It has been estimated that nearly 7,000 medical compounds in pharmacopoeia are derived from natural resources such as plants. Ethno pharmacology is involved in the usage of plants, since it deals with those medicines that are much more important.

- Alfalfa (Medicago sativa) leaves are used to lower cholesterol, as well as for kidney and urinary tract ailments.
- Dandelion (Taraxacum officinale) was most commonly used historically to treat liver diseases, kidney diseases, and spleen problems.
- Garlic (Allium sativum) widely used as an antibiotic and, more recently, for treating cardiovascular disease.
- Horsetail (Equisetum arvense) dates back to ancient Roman and Greek medicine, when it was used to stop bleeding, heal ulcers and wounds, and treat tuberculosis and kidney problems.
- Neem (Azadirachta indica) has been used in India to treat worms, malaria, rheumatism and skin infections among many other things. Its many uses have led to neem being called "the village dispensary" in India.
- Valerian (Valeriana officinalis) has been used since ancient Greece and Rome for sleep disorders and anxiety.

The plant kingdom still holds many species of plants containing substances of medicinal value which have yet to be discovered. Large numbers of plants are continuously being screened for their possible pharmacological value. Pharmacognosy has bright future with the use of these natural resources. Working hypothesis should be able to make the availability of these medicines sustainable.

Hydroponics and Aeroponics – Predicting the Future Farms of Pakistan

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The phenomenon of growing a plant, from one's own backyard to an extensive farm, is quite well-understood by a common man. The traditional methods of growing a plant involve some basic steps i.e. sowing of seeds, provision of suitable conditions followed by harvesting and collection of crops/ plants. The field of science is evolving at a swift pace. Every day, it introduces astounding innovations to the traditional methods that has reformed a layman's living style. Interestingly, a human mind has the ability to think deeply and to carry out groundbreaking studies. In case of growing plants, different techniques have been studied to improve the traditional methods. **Hydroponics** and **Aeroponics** are two such techniques by which plants can be grown without soil.

Hydroponics is a subset of Hydro-culture (i.e. soil-less culture), where plants are grown in the presence of water only. It is a technique by which one has the opportunity to play with the "Mother Nature" by manipulating the pH, electrical conductivity (EC) and temperature etc. This method is all ORGANIC! The plants are made to grow in mineral rich water. *Gericke* defined hydroponics as ***"Plant growth in mineral nutrition solutions."*** It is an established branch of agronomy, usually preferred over conventional agricultural methods. Bubbleponics (a subcategory of Hydroponics) is the art of delivering a highly oxygenated nutrient solution directly to the root-zone of the plant.

The apparatus required for Hydroponics is quite cheap and easy to install. Following apparatus is required for hydroponics:

- A rack with multiple shelves
- Water conducting pipes
- Water reservoirs
- Light availability (photosynthesis)
- Micro-technology (Utilization of technology at micro-level)

Some precautions must be taken to run Hydroponics. Irresponsible human interference may introduce pests to the plants. So, antiseptic techniques must be applied before entering in the sterile environment. It is also important to monitor all the changes regularly.

- Hydroponics has many advantages. Using hydroponics:
- It is easier to establish new plants.
- It is easier to transplant seedlings.
- Controlling the root chemistry is easy.
- The nutrients will not be depleted as these ends up in the soil.
- The plant growth is pest and disease free.
- Weeds almost never grow.
- Gardening practices can be reduced.
- Plants can be grown anywhere, from roof – top to dirt field.
- Ensure higher mineral nutrition.
- There is less water usage and water can be recycled/ reused.

Aerponics, like hydroponics, is a technique for growing plants without the use of soil. In this system, nutrient levels of a plant's water supply are artificially maintained and the water is directly applied to its root system. Plants are cultivated using a nutrient mist-spray. The basic difference between the *Hydroponics* and *Aeroponics* is that, in the former nutrient-added water is used directly, while in the latter, nutrient mist-spray is used.

- The advantages of using Aeroponics over traditional methods are enormous:
- It is an advanced and a great way to grow plants effortlessly.

- The roots are protected from pathogens and debris as air is used as a growing medium.
- Plants grow faster in Aeroponics because there is an ample supply of oxygen for the plants.
- Aeroponics is a user-friendly and safe growing technique to grow healthy and better crops.
- The system utilizes comparatively less quantity of water and energy.
- The spray pulse used is sterilized, so the plants are protected from pests and diseases.

Aeroponics is the future of modern agriculture and can be practiced even in space!

The techniques of Hydroponics and Aeroponics are being practiced in many countries of the world including Pakistan. In Islamabad (Rawat), Hydroponics is being used with the trademark *Bioblitz*. *Bioblitz* is working efficiently on hydroponics and mass-producing fruits and vegetables that are rich in nutrients and wholly organic. An example is that of 'Farmers Market in Pakistan', they are the pioneering hydro-plants grower in Pakistan.

The importance of growing plants in the soil cannot be denied since soil serves as the basic medium for the growth of all kinds of plants. It is important to note, however, that not all the plants can be grown through the techniques of Hydroponics and Aeroponics.

Since these techniques have been successful in Islamabad; the local farmers can learn vital lessons from this experience and adopt these techniques all over the country. In this way, the traditional farming can be replaced by innovative farming practices in the future, when Hydroponics and Aeroponics will be commonly seen all over Pakistan. Let's hope for a green future!

All plants are different with respect to nutritional requirements. Some require diverse growing conditions and some can be grown easily in manmade environments. Tomatoes, cherries, strawberries, some unique ornamental plants like "air grass" can be grown by either of the techniques.

Helper forever

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We often listen in our everyday life about the help of one person for another one. Do people only help each other or something else can also help them? In this article I have discussed about the helper other than a human that we are not considering as much in our life. It's about trees. Various kinds of trees are present around us. Each helps us in various forms, each has its own importance but my article is confined to a tree named as **HEMLOCK TREE.**

General description:

Hemlock tree is a state tree of Pennsylvania. It has various species. It is commonly known as Tsuga. It is slow growing and an evergreen plant and is a member of family Pinaceae. It is a Slow-growing and long-lived, hemlock trees in the wild may reach 80 feet tall or higher, with a spread of 25' to 30.

These fragrant plants are pyramidal or conical in shape, and their small needles give them a fine texture. The needles are dark green on top and light green underneath. The bark of hemlock trees at maturity may be cinnamon-red or reddish brown. Hemlock trees require a soil that is moist but that offers good drainage. Shallow-rooted, they also need protection from the wind. But unlike many large trees, hemlocks will tolerate quite a bit of shade.

Uses:

Generally trees help us in various forms such as in providing shelters, food, wood, timber, fuel and the most essential of all is by providing us with oxygen. Now come towards the uses of the tree under discussion-hemlock tree. This tree is beneficial from top to bottom and the most interesting fact about this tree is that it also helps us after its death.

- As discussed earlier it bears needles, which are used as a source of tea in different areas of world.
- Its wood is used for timber. The bark of this tree has a tannin content of about 10-12 percent and was used to tan sheepskins and heavy leather for shoes in the United States during the late nineteenth and early years of the twentieth century's, according to the U.S. Forestry Dept. publication, Non-Wood Forest Products From Conifers.
- It has hollow pith that provides us with a source of condiment that is most commonly used in India.
- Being a fragrant plant its extract is used as scent in perfumes.
- Its cones are used for ornamental purpose.

The aforementioned advantages tell us how the tree helps us in its lifetime. But after its death it also serves us except by providing wood or fuel.

As being a student of sciences we all know about the food chain and food web. Plants are the producers of these two things. Destruction of plants can affect all other levels in these webs or chains. Now a days due to increase in pollution plants are destroying. The destruction of plants also include deforestation that has a devastating effect on our global environment. Deforestation results in lack of the environment filters (plants). Moreover, various pests are also playing their destructive role in this. These pathogens have also affected tree (hemlock) under discussion.

Some years ago the introduction of exotic pest species in the area of Appalachian island. saw hemlock trees getting weaker day by day and its wood getting black scars on it. It becomes an issue of great debate. So the scientists start to study its cause, after a lot of research they come to

know that pests, named as *saw flies,* are affecting these trees. Moreover this plant is also affected by fungus. On the second year of the damaging affect, the team from U.S. forest service put forth measures to kill this pest. They started to introduce species that would kill these hemlock flies The team visited the place after a time to keep an eye on it.

To overcome the damage to various crops we introduced exotic species in our environment. These species being advantageous on one hand have disadvantages on the other hand. Same has happened in southern Appalachian, but the work of an ecologist **Jennifer Fraterrigo** uncovered surprising benefits of the hard wood trees.

She said

"Ecosystem is changing too. This area before the death of hemlock trees contain more leaching of soil nitrogen but now trees as were no longer taking nitrogen, we found the opposite because much of the nitrogen is now taken up by hardwood trees by compensating their productivity".

Without the mortality of hemlock, the hardwood trees couldn't take up the excess nitrogen in the soil because their growth was limited by lack of phosphorus. The available phosphorus stimulated the growth of existing hardwood trees.

The researchers are working to stop the destruction of hemlock tree**.**

By such means the hemlock is a **helper forever**. That it not only helps plants but also environment and mankind during its life and also after its death.

Another interesting fact about a species Poison-hemlock is, it is acutely toxic to people and animals. In western Washington, it is common on roadsides, in open fields, and in natural areas. Unrelated to the native evergreen hemlock tree, poison-hemlock can be deadly; it has gained notoriety through its use in the state execution of Socrates.

This was the short description about a single tree. But there are various kind of trees present around us that can help us in various forms. As humans, we should make collective efforts to make this world a livelier place. With the growth of trees, we could all take a step forward in protecting our environment.

Ecological Footprint in Pakistan's Perspective

Zafar Khan
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The Ecological Footprint (EF) measures the extent to which humanity is using nature's resources faster than they can regenerate.

In the world of current hour, when man is exceeding all the limited resource limitations of the planet, the ecological assets are becoming critically alarming. Each sate on the globe possesses its own ecological profile. Many countries are running ecological deficit with ecological footprints far greater than their biological capacity. While rest are heavily dependent upon the sources from elsewhere which are counted growing under intense magnitude of increasing pressure.

The consequences of ecological deficit, in various regions of the world, can be catastrophic in nature leading towards the resource loss, ecological collapse, environmental imbalance, poverty, debt, famine and sometimes, even, war.

The awareness of the ecological footprint is getting nourished and developed with every passing hour in developed countries but unfortunately developing countries which are going through the severe state of devastating affairs are still unaware of the terminology. This sorry state of affairs is not less than any alarm of ecological disaster ringing from the horizon of environmental collapse. Countries like Pakistan are at the edge of ecological as well as economical fall down. Economy is shattered because of energy crisis. Intense increase in population is not less than any challenge for an agrarian economy like Pakistan. This phase of condition is true for most corporations and private sector organizations in the country that do not find themselves concerned and is a significant source of ecological stress. Most of the failure owes to their ineptness, lack of competitive edge and knowledge in addressing such core issues.

To lay down grounds for eco-friendly and sustainable trends of source conservation among corporations and private sector organizations, LEAD-Pakistan in collaboration with Asia Pacific for Environment and Development (APFED) took an initiative, titled *Greening Organization for the remarkable reduction of ecological footprint.* The basic and sole purpose of this initiative is to bring awareness about ecological issues among organizations working inside the boundaries of Pakistan. These organizations are engaged in screening and maintaining the professional work platforms. This initiative acquired an evidence based methodologies to alter the attitude of the policy implementing authorities towards eco-friendly scheme of decision formation. This scheme has laid the stone of introducing logical foot printing technologies which are efficient in their behavior along with the training of the masses.

Fortunately, to educate the corporate and private sector about ecological damage caused by their work place, LEAD-Pakistan has brought the ecologically efficient practices on the deck. It has sensitized the masses at root level to play their vital role in practicing eco-friendly technology to enhance the magnitude of ecological stability.

In this connection, LEAD-Pakistan has begun the workshops in three cities of the country. These are being held in Federal capital Islamabad, the mega city Karachi, and Lahore; the industrial and cultural hub of the state.

To conclude:

"We must limit our technological interventions into nature long before we have definitive scientific proof of harm. This is the principle of precautionary action, and if we don't adopt it, nature will get along just fine without us."
(Peter Montague)

Back Scatter

Old Tjikko (World's Oldest Clonal Tree)

Old Tjikko is considered as the **world's oldest known individual vegetatively cloned tree** which is approximately **9550** year old. The age of the tree was determined by **carbon dating** of the root system under the tree. It is located on **Fulufjället Mountain** of Dalarna province in **Sweden**. For thousands of years, the tree appeared in a stunted shrub formation due to the harsh extremes of the environment in which it lives. During the **warming** of the last century, the tree has sprouted into a normal tree formation. **Leif Kullman,** who was Professor of Physical Geography at Umeå University, discovered this tree and attributed this growth spurt to global warming, and given the tree its nickname "Old Tjikko" after his late dog. The tree has survived for so long due to the **cloning process** that many trees are able to take advantage of. The visible tree is relatively young, but it is part of an **older root system** which dates back thousands of years. Nature conservancy authorities are considering putting a fence around the tree to protect it from possible vandals or trophy hunters.

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