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NESA

NATIONAL ENVIRONMENTAL SCIENCE ACADEMY

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NESA Award 2018 Notification No. 1

APPLICATIONS ARE INVITED

FOR THE NESA AWARDS 2018

LAST DATE 30th SEPTEMBER 2018

(1) NESA FELLOWSHIP AWARD

ESSENTIAL

Professors/Scientist F and above

1. Research/Teaching experience of 15 Years or more.
2. Accomplished Research Work
3. Research publications in Journals with good impact factor.

DESIRABLE

1. At least 10 publications in journals with impact factor 3 or more.
2. Patents granted/Technology developed
3. Any award / recognition at National level.

AGE

45 and above.

The recipients shall get Citation, Certificate, Memento and a Gold plated medal, and can suffix F.N.E.S.A. after their names.

(2) NESA EMINENT SCIENTIST AWARD

ESSENTIAL

Professors/Scientist F and above or equivalent

1. Research/Teaching experience of 12 Years or more.
2. Accomplished Research Work
3. Research publications in Journals with good impact factor.

DESIRABLE

1. Atleast 10 publications in journals with impact factor 2 or more.
2. Patents granted/Technology developed
3. Any award / recognition at National level.

AGE

40 and above.

The recipient shall get Citation, Certificate, Memento and a Gold plated medal.

(3) NESA SCIENTIST OF THE YEAR AWARD

ESSENTIAL

Associate Professors/Dy. Director or equivalent

1. Research/Teaching experience of 10 Years or more.
2. Accomplished Research Work
3. Research publications in Journals with good impact factor.

DESIRABLE

1. At least 10 publications in journals with impact factor 1 or more with proven record of achievement in that year.
2. Any award / recognition at National level.

AGE

35 and above.

The recipient shall get Citation, Certificate, Memento and a Gold plated medal.

(4) NESA ENVIRONMENTALIST AWARD

ESSENTIAL

1. Associate Professors/Scientists/Professionals with significant contribution in the field of environment.

DESIRABLE

1. Any award / recognition in the area of environment at national level.

AGE

Up to 35 and above

The recipients shall get Citation, Certificate, Memento and a Gold plated medal.

(5) NESA GREEN TECHNOLOGY INNOVATIVE AWARD

ESSENTIAL

1. Scientists/Academicians/Social workers
2. Accomplished Research Work

DESIRABLE

1. Innovation in the area of green technology.

AGE

1. 35 and above
1. The recipients shall get Citation, Certificate, Memento and a Gold plated medal.

(6) NESA YOUNG SCIENTIST AWARD

ESSENTIAL

Assistant Professor/Research Associate/Research Fellows/any other PDF.

DESIRABLE

Active involvement in research with proven track record.

AGE : Up to 35.

The recipients shall get Citation, Certificate, Memento and a Gold plated medal.

PRESCRIBED APPLICATION FORMS

The application forms could be downloaded from www.nesa-india.org

Separate application form should be submitted for separate awards.

The application forms are non-transferable and it can also be obtained by sending sending a bank draft of Rs. 1000-00 / $40 only (per form). Drawn in favour of NATIONAL ENVIRONMENTAL SCIENCE ACADEMY payable at NEW DELHI.

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BREAKTHROUGH TECHNOLOGY DEVELOPED BY NESA SCIENTIST AT UNIVERSITY OF OXFORD

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Breakthrough technology has been developed by NESA member Dr. Amjad M. Husaini at University of Oxford, UK. Dr Amjad is in-charge of Genome Engineering Lab, Division of Plant Biotechnology, SKUAST-K Shalimar and focusses on Societal Biotechnology. Dr. Husaini was on a DBT-CREST Fellowship to the University of Oxford for a period of one year. His work has recently been published in "Breakthrough Technology" section of one of the most reputed Plant Science journal 'Plant Physiology' published by The American Society of Plant Biologists. The title of the paper is "Multiplex fluorescent activity-based protein profiling identifies active α-glycosidases and other hydrolases in plants". He has reported novel alpha-glycosidases that are differentially active during saffron-stigma development, and has developed a technique for Multiplexing of fluorescent probes in Activity Based Protein Profiling (ABPP). Plant Chemetics Lab led by Prof. RenierA L. Van der Hoorn at University of Oxford is the onlypioneer laboratory at global level that uses ABPP in plant studies. Dr. Husaini has uncovered massive changes in hydrolase activities in corms upon infection with Fusariumoxysporum. Fusariumoxysporum is a major fungal pathogen that causes saffron corm rot, a disease of immense challenge for Kashmir saffron industry.

Recently Dr. Amjad has been successful in fetching a grant of aroundRs. 97.5 lakh under National Mission on Himalayan Studies, Ministry of Environment, Forest and Climate Change, Government of India. The project "A Value Chain of Saffron in New Areas of NW Himalayas by Engaging Youth and Women for Strengthening a Bio-Based Green Economy" aims at SKILL DEVELOPMENT OF YOUTH through conduct of training programs on 1) In vitro cormlet production, multiplication as well as hardening procedures; 2) Extraction methods for manufacturing organic dyes from saffron bio-wastes; 3) Quality control check of saffron; 4) and also on saffron diversification in new areas of J&K to provide alternate source of income to the dry land poorest of the poor farmers with direct involvement of women. Dr. Amjad is a working-group member of YPARD India (Young Professionals for Agricultural Development),an organization spearheading youth involvement in agriculture. YPARD is hosted at GFAR Secretariat, FOA, Italy. DBT in collaboration with Prakash lab, Stanford University, USA has granted another project to Dr. Amjad for "Identification of pure saffron using Foldscope based visual markers to avoid fraud and cheating, and to create a poster of these markers for customers/ vendors", which has been is a major concern for saffron traders of J&K.

Dr. Husaini was recently awarded by the Academy as' Scientist of the Year-2017', while earlier he has received Junior Scientist of the Year Award-2007 too from NESA. He is recipient of International Training Award-2013 (NAIP-ICAR), Summer Research Fellowship Award-2013 (IASc-INSA-NASI), Young Scientist Award-2009 in Agriculture (J&K Council for S&T), JawaharLal Nehru Award for Outstanding Agricultural Research-2008 (ICAR), to name a few.

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WOMEN: THE KEY OF NATURE'S SUSTAINABILITY

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Wangari Maathai

Wangari Maathai (1 April 1940 – 25 September 2011) was a leader in ecofeminist movement in Nairobi, Kenya. She was the founder of the Green Belt Movement organization in 1977. Green Belt Movementhave a holistic approach of development with prime focus on conservation of environment, community development and capacity building of women. She gave the concept of '4R' for waste management that is Reduce, Reuse, Recycle and Repair. She published a book 'The Green Belt Movement'. She received the Nobel Peace Prize in 2004 for radical action against systems to eradicate rural poverty.

Vicki Susan Buck

Vicki Susan Buck is an active and vigorous environmental leader in Christchurch (New Zealand). She works on reversing the effects of climate change such as use of biodiesel which is a sustainable, low cost, cleaner fuel alternative. She has been director and co-founder of Aquaflow Bionomic Corporation which was formed in 2005 (Bloomberg, 2017). It is a bio-fuel company using wild algaein biodiesel manufacturing technology and cleaning dirty and contaminated water too by bioremediation technology. Biodiesel blended with conventional mineral diesel could run vehicles without any vehicle modifications.Aquaflow could reproduce the biodiesel process in many other areas of New Zealand and overseas countries (Climatebabes, 2006).

She has been director and co-founder of Carbonscape, aimed at sequestering carbon from waste biomass through microwave technology. This technology is an environmentally friendly technology which produces a range of high value carbon products that are renewable alternatives to fossil derivatives e.g. graphite, activated carbon, biochar and green coke. The microwave hydrothermal biomass pre-treatment reaction accepts feedstock high in moisture content without the need for pre-drying, thus saves energy and time (Carbonescape, 2017). She has been on the New Zealand advisory board of Craigmore Sustainables, involved in carbon forestry (Wikivisually, 2017).

Rebecca Hosking

Rebecca Hosking was born in Modbury, south Devon, in 1974. Earlier, she was a BBC wildlife film producer. She made a film on

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AGRICULTURE: NON-POINT SOURCE OF WATER POLLUTION

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Agriculture is the largest user of freshwater resources. In recent times intensive agricultural practices are leading to degradation of surface and groundwater resources through erosion and chemical runoff. Agricultural activities are considered as a non-point sourceof pollution since they are diffuse sources. Although pollutants originate from point source but long transport of those pollutants to water bodies and multiple sources make them nonpoint source. Different agricultural practices like tillage, land preparation, irrigation, application of fertilizers, pesticides and manures are done to optimize the production. Agricultureis both cause and victim of water pollution. It causes pollution and sedimentation of surface and groundwater, through net loss of surfacesoil by poor agricultural practices; salinization and waterlogging of irrigated field. It is a victim because use of untreatedwastewater and polluted surface and groundwater contaminate crops and vegetables, subsequently transmit disease to end users and farm workers.

Agricultural sources of water pollution are:

(1) Sediments: Erosion of cultivated soil can lead to deposition of sediments in water bodies. Sediments can enter fresh water bodies through wind and water erosion from cultivated land. The dissolved contaminants finally find their way into ponds, lakes, rivers and oceans.Water quality gets affected due to the presence of suspended solids which cause turbidity in water.

(2) Chemical fertilizers rich in nitrogen and phosphorus: Plant nutrients are added to soil through chemical fertilizers to support plant growth. Runoff loss of these chemicals and infiltration of these chemicals from fields into ground water bodies constitute the nonpoint source of water pollution. Excessive application of fertilizer can lead to leaching of nitrate (NO3-N) to groundwater having serious impact on human health. Nitrate N concentrations above 10 ppm in drinking water causes health threat.

(3) Pesticides and herbicides: Pesticides are chemicals which include insecticides, fungicides, herbicides, nematicides, rodenticide and plant growth regulators. Pesticides are used to control pests, diseases and weed infestation in crops. Pesticides can enter water through surface runoff and leaching. In India, rivers are one of the important sources of water supply. Most of the agricultural fields are situated on the bank of rivers, and are exposed to pollution by pesticides. Groundwater is vulnerable to contamination from fertilizers and pesticides application since residues remain in the soil after plant uptake and may leach into subsurface waters.

(4) Animal waste: Washoff from cattle sheds and also from manure applied crop fields or seepage into underground water reservoirs can pollute water. Although livestock slurries and manures are valuable sources of nutrients for plants. But excessive use of livestock waste is a potential threat to surface and groundwater. Currently the main agricultural and non-agricultural organic wastes applied to crop land include sewage sludge, paper, dairy,

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MANAGEMENT OF PEST/DISEASES THOUGH IPM STRATEGY

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Integrated pest management (IPM) is a common sense approach to control the pest. IPM practices the use of pesticides on a limited basis in situations where other environmentally friendly methods are not appropriate and aims to suppress the pest populations below the economic injury level (EIL). Recognizing the environmental hazards of pesticide use, many home gardeners integrated various strategies to keep pest populations at tolerable levels preserving the environment from the hazardous effects.

IPM emphasizes the growth of a healthy crop with the least possible disruption to agro-ecosystems and encourages natural pest control mechanisms. The successful use of IPM requires the knowledge of plants and plant pests, keeping a watchful eye for changes in plant health and production. A number of safe, environmentally friendly pest control options should be considered prior to using an insecticide.

- Cultural control method includes crop rotation, tilling, pruning, thinning and good sanitation.

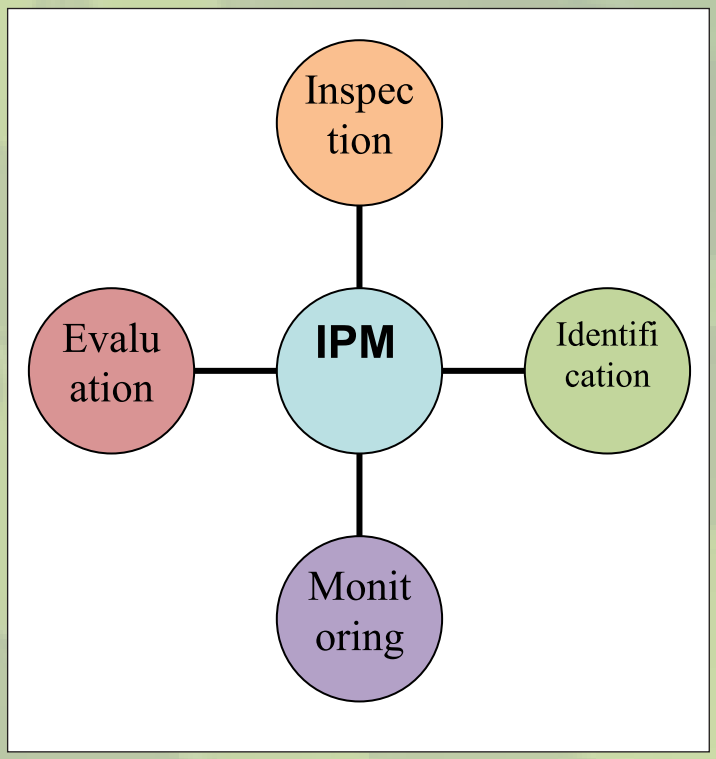

Fig.1: Integrated Pest Management

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distillery and food processing wastes, composts and blood and gut. Although they have fertilizing and soil conditioning properties, but their improper application under unfavourable conditions causes soil and water pollution. Improper management of livestock manure may also affect water quality through excessive phosphorus inputs. Phosphorus content in high amount causes algal growth in surface water.

Effects of water pollution

1) Human health: High concentrations of nitrate in drinking water, causes methemoglobinemia or blue baby syndrome, a fataldisease in infants. Pesticides can cause health hazards in human beings ranging from headaches, fatigue and nausea to chronic impacts like cancer, tumors, reproductive failure, suppression of immune system and endocrine disruption. Although sometimes the pesticide residues are present in small amounts in the environment the concentration increases as it moves up in the food chain which is known as biomagnification.

2) Fisheries and aquatic biodiversity: Polluted water adversely affects fish and aquatic animals. Excess nutrients, particularly nitrogen and phosphorus can cause eutrophication of water bodies. It leads to increased growth of undesirable aquatic plants and algae and an increased demand for dissolved oxygen. Depletion in dissolved oxygen can kill fishes and cause loss of other aquatic animal life. Huge amount of nitrogen and phosphorus enter into the water bodies every year. These excess nitrogen and phosphorus cause toxic algal blooms and make water bodies hypoxic which can in turn cause huge economic losses across many sectors. Suspended sediments in water affects aquatic life by reducing incoming sunlight, damaging spawning grounds and also being toxic to aquatic organisms.

3) Tourism industry: Polluted water especially in coastal areas discourage the tourists. The algal growth in water bodies also causes foul smell near beaches making them unsuitable for recreation purpose.

4) Agricultural use: Water pollution leads to use of contaminated irrigation water in agriculture. High concentration of salt and heavy metals in irrigation water has harmful effects on crops.

World famous highly eutrophicated lake Udaisagar of Rajasthan is a disposal site for domestic and industrial effluents and agricultural runoff water. They have reported that high concentration of nutrients, total dissolved solids and high water temperature led to the flowering of water, fish mortality, foul odour, blue –green colouration of water body and overall decrease in recreational value of the lake.

Interaction between agricultural activities and water quality is complex. Appropriate steps must be taken to ensure that agricultural activities do not adversely affect water quality. Balanced application of organic and inorganic fertilizer is required to reduce contamination of water along with maintaining sustainable agricultural productivity. Low cost- water quality monitoring system can be implemented in agriculture sector. Optimum use of agri-inputs like proper dose, timing and application method of fertilizers will help in reducing losses and subsequently it will decrease pollutant load in surface and ground water. Minimum use of agro-chemicals through adoption of integrated pest management practices (IPM)will be beneficial. Prevention of agricultural runoff and sedimentation and proper disposal of domestic sewage and manure is required. Preparation of criteria guidelines regarding physical, chemical and biological water quality for agricultural users and awareness creation about water pollution among farming communities can help in preventing water pollution to great extent.

ASIATIC ELEPHANTS IN GRAVE DANGER OF EXTINCTION DUE TO A NEW THREAT

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Saved from the grips of the merciless ivory trade, Asiatic elephants across South East Asia are once again facing a serious threat of endangering their wild populations beyond recovery. This new threat is so widespread, devastating and deadly that experts are already showing serious concern regarding the bleak future that threatens Asiatic elephants over the next two decades. The ban of ivory trade has opened an alternate market of elephant body parts in mainland China that is seriously endangering the future of this majestic land mammal. The skin of Asiatic elephants is being harvested after their indiscriminate poaching for the alarming rise in demands for natural jewellery manufactured from such elephant skin. The helpless animals are poached first by highly organized poaching units with sophisticated firearms, latest GPS tracking and high powered communication system like satellite phones and other advanced tracking and./or communication devices. Following that the skin of the animals are removed with precision and exported to China via illegal trade routes for manufacturing special elephant skin beads that are dyed with specific coloring agents and then made into specialty jewellery items like beaded necklace and bracelets and other expensive fancy items. Such fashionable jewellery items are fetching high economic returns from their customers in the illegal wildlife black markets operating in China and in some pockets of South East Asia.

This new trends has caught wind too fast and has been impacting wild Asiatic elephant populations and subpopulations across South East Asia. Previously, only selected males with large tusks were targeted by poachers for the ivory trade. Female Asiatic elephants do not produce tusks unlike their African cousins. Decades of poaching generated hunting pressure so drastic on populations of wild elephants that bull elephants with large dusks are not so common in their wild Asiatic herd populations any more. But the skin trade is gender neutral; and hence male, female juvenile, sub adult, baby as well as old and sick elephants are all being targeted by the poachers in their relentless hunt for elephant skin for the novelty jewellery industrial markets in China. As a consequence a very serious, detrimental and irreversible hunting pressure is being exerted across wild Asiatic elephant populations in South East Asia exerting irreparable damage to the sustenance of many herds and pushing them towards extinction; if this is going to continue unrestricted. Removing young calves and breeding females from the wild herd populations is going to exert serious pupation pressure on these herds with bleak future awaiting them in the future; as there will be less chances of individuals removed being replaced by new and vigorous stock for the future.

Elephant carcasses with clinically removed skin are showing up even in the very remote parts of South East Asia indicating that the problem is deep rooted and is slowly getting out of control. The poor management of forests and poor conditions of the forest and wildlife security across the region is further deteriorating the process at an unprecedented and alarming rate. The situation has been worrying most elephant conservation agencies around the globe. Some reports are suggesting that the poaching of wild Asiatic elephant herds have surpassed that of the African elephant herds over the past few years in an exponential manner within a very short period of time. All the elephant inhabiting nations across South East Asia are facing the heat. But the situation is worst in Myanmar due to its close proximity to international border with China; and the poaching pressure on wild herds of Asiatic elephants across Myanmar even in remote and inaccessible elephant habitats are raising by leaps and bounds annually. Unless something serious is attempted in Myanmar and that too very soon; the wild herds may bid adieu forever from the region.

The situation is alarming for neighboring South Asia particularly for countries such as Nepal, Bhutan, India and Bangladesh close to China. Once the poaching gangs start operating at an industrial scale in South Asian countries; the toll will be several folds on wild herds of Asiatic elephants in South Asia. All these countries need to act now before the problem hit their shore by working together as a joint force in dealing with such monumental challenges through mechanisms like Joint Conservation Initiative (JCI). The governments across South Asia with significant wildlife population and rich biodiversity must act now before the poaching plague hit their shores. However, this is not just the case of Asiatic elephants alone. The monumental negative impacts on different species of wildlife populations as well as major and minor forest resources around the globe through intra and intercontinental poaching and illegal trafficking of forest

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- Mechanical controls Method includes removing of pests by hand or the use of traps, nets or other barriers.
- Bio-rational controls consist of living organisms that kill plant pests. There are also naturally occurring bio-chemicals that are harmful to the pest yet harmless to other creatures.
- Genetic controls involve plants that are bred to be disease-resistant.
- Chemical controls involve the use of naturally derived or synthesized chemicals called pesticides.

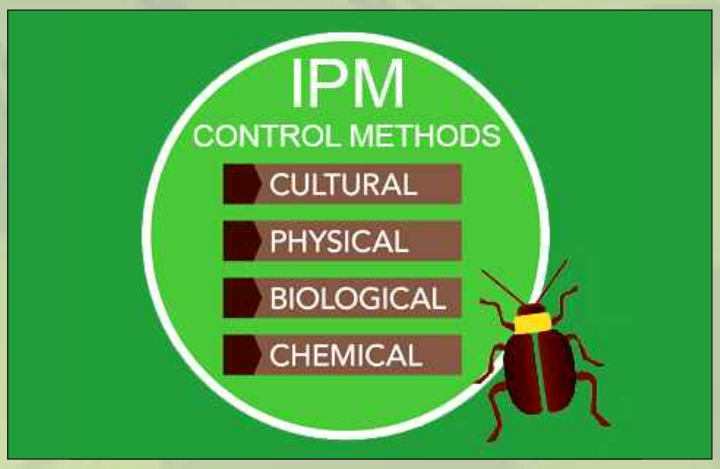

Fig. 2: Integrated Pest Management Control Methods

If these pest control options are either unavailable or impractical, then selection of least toxic and most specific pesticide available should carefully selected for the use. The pesticide that will do the job with the least impact on the environment should be selected. The active ingredient should always be identified and the label should be carefully read to make sure that it will control the pest. The safety precautions should be used while using the pesticides such as label reading on the pesticide container, using of specialized equipment suggested and wearing of protective clothing and considering the restrictions on use as well as environmental precautions listed on the label. Remember that it is illegal to use any combination of unregistered chemicals or household products for pesticide purposes. Such use may be dangerous to plants, human-being, animals and the environment. For years it was believed that the natural filtering of water during its slow movement through soil, sand, gravel and rock formations was adequate to cleanse it of contaminants before it reached groundwater. Today many chemicals can be detected in groundwater. Maintenance of livestock facilities, storage of chemicals and fuels, disposal of wastes, and the land application of manures, fertilizers and pesticides are all potential contributors to groundwater contamination. It is very difficult to purify or clean groundwater that has become contaminated. Treatment is complicated, time-consuming, expensive and often not feasible.

Horticultural oils and insecticidal soap are two synthesized pesticides that are least disruptive to the beneficial insect populations. Because most pesticides are toxic and many animals rely on insects in their diet, pesticides can alter the natural balance in your yard and adversely affect wildlife. The demand for an environment that is clean and safe continues to grow. Pesticide use, an activity that has been taken for granted, is now being carefully examined for potential damage to the environment. All pesticides can cause environmental damage, but if handled properly they can control pests with minimal environmental impact. Groundwater is a crucial natural resource. One third of the people in Pennsylvani- up to 95% of those in some rural areas, must rely on it as a source of drinking water. Groundwater is also essential to industry and agriculture. Groundwater is the water that lies below the soil surface and fills the pore spaces in and around rock, sand, gravel and other materials. Pesticides become problem when they move off target. This may mean drifting in the

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products, live wildlife and various wildlife body parts into China is getting worse by the day.

The situation is so worrisome that several countries impacted by wildlife poaching due to the powerful and politically influential illegal wildlife markets operating in China have been compelled to approach Beijing to take suitable steps to curb this massive billion dollars plus illegal industry operating openly in the country. Although the Chinese government has promised to take serious action, the reality is that nothing truly is visible on the grounds. The economic and political power helping such illegal wildlife markets to operate in China fuelled by the frenzy for bush meat, wildlife trophies and wildlife body parts for use in traditional Chinese medicinal practices among the local customers is playing havoc across the globe with respect to biodiversity conservation. Three continents rich in biodiversity, namely Asia, Africa and Latin America as well as economically under developed Eastern Europe have been worst impacted by this illegal wildlife trade and trafficking.

Several species of endangered aquatic (both marine and fresh water) and terrestrial invertebrates; as well as amphibians, reptiles, fishes, birds and mammals have been drastically impacted to the point of no return around the globe due to this factor. The worst impacted being mostly the economically backward; but biodiversity rich developing and under developed nations in both hemispheres. Without covert political support such illegal wildlife trade and trafficking markets could neither operate nor survive in China. The Chinese government must act strongly, without delay on these illegal wildlife markets and eradicate them completely. Unless China takes responsibility and act diligently to cut down wildlife trade and trafficking operating within her borders; or is pushed and/or forced by the international as well as regional community and conservation agencies; the global future for several wildlife species (like Asiatic and African elephants, rhinoceros, leopards, snow leopards, clouded leopards, endangered pangolin, primates, bears, bats, deer, antelopes, rodents, wild sheep and goats are all at stake to name only a handful) is in complete jeopardy in the not so distant future.

Acknowledgement: **Sikkim Express**

SCOPE AND NEED OF AGRICULTURE STATISTICS IN INDIAN AGRICULTURE

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Agriculture and allied activities contributed nearly 50 percent to India's national income and around 72 percent of total working population was engaged in agriculture even growth of other sectors and overall economy depends on the performance of agriculture to a considerable extent.

The crop sector, which forms largest segment of agriculture, showed poorest growth during post-WTO period in comparison to all other periods. Further, within crop sector, all crops except sugar showed declining trend between initial years of reforms and post-WTO period. This deceleration was very high in Cereals, Corse Cereals, Pulses, Oilseeds and Drugs & Narcotics. Both dominant nature of agriculture and reduced growth trend in agriculture attracted the attention of policymakers, researchers and economists. The main cause of failure of all development policy for agriculture is that there is no availability of any separate development strategy for Indian agriculture. This is due to the fact that, required data is not available to study the characteristics of Indian agriculture. Data and numerical information have played a very vital role in the growth and development of agriculture, especially in the developed countries, like India having about 70.5 million operation holdings over an aggregate of 162 million hectares, the utility of agricultural statistics is even more important, though it has not been utilized adequately so far. The quantitative agricultural researches, in fact, are largely based on statistical data. The advent of modern data processing equipment's has enabled the agricultural land use planners to utilize new techniques and methodologies and the demands for still more data. Agricultural statistics has a very wide coverage and its scope is very widening. The detailed agricultural statistics is required at the national to the village and farm levels for agricultural policy decision, placing agricultural development and estimates of the agricultural and national income. The statisticians have been one of the first few users of computers. In fact, the first commercial computer was used for the tabulation of the US Census data as the time lag between the conduct of census inquiry and the availability of the final results was considerably large. As the computers have advanced over time, these are increasingly being used for the compilation and tabulation of not only the Census data but also of the large scale sample surveys data. The data entry, storage, retrieval in the desired format, making cross classified tables and applying statistical functions and procedures has become all too easy with the availability of powerful computers. In order to understand the nature of agricultural statistics can be grouped into the following categories:

(i) Land utilization and irrigated area in different season crops along with forest crops.

(ii) Agricultural production-arable, plantations, livestock and fisheries.

(iii) Agricultural prices and wages; organization and farming structure etc.

(iv) Production and marketing.

(v) General statistics, literacy among those employed in agriculture, health, sanitation.

(vi) Weather and climate data

STATISTICS AND THE NATURE OF DATA

The famous statistician, Sir R.A. Fisher and his colleagues at Rothamsted Experiment Station in United Kingdom and elsewhere, while attempting statistical solutions to agricultural problems, led to the development of design of experiments and analysis of variance techniques which are fundamental to the subject of statistics. Modern agricultural production is characterized by some particularities and many different activities. So, different problems arise when there is different nature of agricultural material data which require different approach to the use of statistical methods. Statistics is a discipline which mainly deals with data quantifications. Even in the case of non-numerical data, statistical methods use transformations to change non-numerical data to numerical data, with the aim of achieving some level of quantification to make conclusions about the matter of interest. Many data in agriculture are of numerical character which is accompanied with the existence of the variability of data. Variability is a characteristic of biological and agricultural data. Statistics can be used as a tool for research, spreading in many fields of research. For these reasons statistics can, however help the research worker to design their experiments and to evaluate objectively the resulting numerical data. Scientists use statistics as a tool, which, when correctly applied, is of enormous assistance in the study of the laws of science. It is important to emphasize that there are no statistical procedures which are applicable only to specific fields of study. There are general statistical procedures which are applicable to any branch of knowledge in which observations are made. There are many problems which are faced in the Agricultural data as use of statistics is related to: crop farming (wheat, maize, sugar beet, sunflower, fodder crops, other industrial crops etc), vegetable crops (potatoes, tomatoes, beans, peas, onions, peppers etc), fruit growing (apples, pears, plums, cherries, sour cherries, apricots, peaches, walnuts etc), viticulture (grapes), horticulture plants, perennials, livestock breeding (cattle breeding, pig breeding, sheep breeding, poultry breeding), exploitation of agricultural machines and transport means, utilization and protection of water, consumption of mineral fertilizers, consumption of plant protection preparations etc. There is rarely any field, which is untouched by the statistical application. Problems are also faced in agricultural economics as: agricultural population, cultivable area, agricultural enterprises and cooperatives, individual (private) holdings, workers in agricultural enterprises and cooperatives, costs, sources of income etc. Some examples of the application of statistical methods in problems through research processes are: genetics and plant breeding, crop production concerning different conditions of agro techniques and plant protection, type of soils, localities, varieties, sorts, hybrids, conditions of irrigation, use of herbicides, plant physiology, plant biochemistry, genetics and livestock breeding, animal physiology, livestock production concerning different races, different conditions of animal nutrition, protection etc. Some other

examples of the use of statistics are related to: the method of production functions in wheat, maize and sugar beet production etc the influence of particular factors on agricultural production, measuring of contribution of production factors and technical progress to the growth of national product, tendencies of production lines in agriculture etc. Statistical software are the specialized computer programs which helps to collect, organize, analyze, interpret and statistically design data. Few popular software's are listed in Table 1.

Table 1: Various Statistical Software's and Utility

Software	Description	Website
SAS	Used for analysis of variance and linear regression and meets both specialized and enterprise-wide statistical needs.	http://www.sas.com/en_in/software/analytics/stat.html
MINITAB	Minitab to create and analyze data. More than 90% of fortune companies and around 4000 colleges and universities around the world use Minitab.	http://www.minitab.com/
MaxStat	It provides the step by step analysis it very handy for students and young scholars and very easy and affordable statistical software available online. Three easy steps are required to finish the statistical analysis within a single dialog box.	http://www.maxstat.de/
AcaStat	AcaStat does the statistical analysis rapidly and makes it simple and is one of the best statistical analysis tool available online.	http://www.acastat.com/
WizardMac	In wizardmac no typing or programming is required for data analysis. Any professional can start their survey with the help of WizardMac. The predictive models help to make the choice very easy.	http://www.wizardmac.com/
IBM SPSS	IBM SPSS is analytical software developed by IBM. It provides numerous statistical analytics such as text and entity analysis automated modelling and decision management and development.	http://www.ibm.com/analytics/us/en/technology/spss/
NCSS	It provides the facilities like organized documentation, free training videos and 24*7 email support team.	https://www.ncss.com/software/ncss/
Statwing	Users can perform tasks 5 times faster in Statwing than they would in MS Excel or other statistical tools available in market such as R or SPSS.	https://www.statwing.com/
XL Stat	These can easily alliance with Microsoft excel software and the solution is workable on PC and Mac.	https://www.xlstat.com/en/
Stata	Stata is unified software which provides a complete package required for data analysis.	http://www.stata.com/statamp/

IMPORTANCE OF STATISTICAL EDUCATION

Statistics, in fact, provides scientific tools for representative data collection, appropriate analysis and summarization of data and inferential procedures for drawing conclusions in the face of uncertainty. It is indeed true that statistical tools have wide applicability to almost any branch of science dealing with the study of uncertain phenomena involving aggregates. It has also been established that many apparently deterministic processes, on closer scrutiny, turn out to be inherently stochastic in nature. However, in agricultural research, statistics finds some of the very interesting applications which often led to the development of newer statistical techniques or at least a refinement of existing ones. Consequently, the branch of statistics dealing with agricultural research has been recognized as a separate entity in itself, as agricultural statistics, in view of the growth of the subject particular to this area. "Every practical statistical analysis is directed toward establishing a probability model of an appropriate level of complexity, which can then be used to make "predictions" in some sense, on the basis of which decisions can be made". The statistical education for agriculture is very important for many reasons:

- The study of statistics is helpful in experimental work both for the analysis of the data and for the design of the experiment in such a way that valid and efficient results are produced.
- Statistical methods used in agricultural science are useful also for better understanding and explanation of causal relations between existing phenomena.
- Is oriented to obtain an understanding of statistical concepts and principles and to make efficient applications of statistical techniques to various data in agriculture.

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form of dust or mist, moving with soil particles by erosion, being carried out as residues on crops or livestock or evaporating and moving with air currents. Pesticides may also move from the target area by leaching through the soil with rain or irrigation water. An understanding of the groundwater resources and their protection can help one to become a better gardener and land manager. It is very difficult to purify the ground water that has already become contaminated. Treatment is complicated, time-consuming, expensive and often not feasible. The best solution to groundwater contamination is to prevent the problem in the first place. The following pesticide-handling practices can be used to reduce the potential for ground and surface water contamination:

- When mixing, applying or disposing of pesticides, consider the location of groundwater-sensitive areas.
- Transport pesticides safely.
- Store pesticides properly. Buy only what is needed for a season or a specific spray job.
- Mix carefully- The mixing process is possibly the most critical step in avoiding pesticide contamination.
- If after careful consideration a chemical treatment is decided, it is important to follow some important guidelines to protect wildlife. Make sure the pesticide is labeled to control the problem pest. Choose the least toxic pesticide available. Avoid spraying any area where animals are nesting. Read the entire label before using the product. Mix according to directions. Spray only the parts of the plants affected by the pest. Dispose of pesticides properly-never pour them onto the ground.

The use of pesticides has not been the same across the world due to the cost of the chemicals (most of them patented), but also due to the cost of man power and the specific pests of each climatic/geographic region. Many cases of intoxication of farmers, rural workers and their families did occur during pesticide applications and were documented in reports on poisoning and effects of synthetic chemicals on human health. So, much emphasis is given on using the pesticides. The focus is on keeping the environmental quality safe. In particular, developing non-pesticidal alternatives and more environmentally benign pesticides will no doubt continue to be emphasized. Nevertheless, a broader need for mechanisms within pest management to address issues of environmental safety is observed. In particular, looking at aspects of pest management and identifying ways we might change practices to improve environmental safety, as well as developing new tools such as pesticide selection criteria and environmental EILs are among the most immediate approaches that can be used in this enterprise. Though there are many barriers and many difficulties in implementing the IPM programs but nevertheless, because our pest management programs must be because our pest management programs must be responsive to the needs of the individual growers and general public as well, developing methods to improve environmental safety in pest management will remain a preference for the foreseeable future.

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The emphasis of statistical data in agriculture is on regression and correlation analysis and sample survey. Concerning the improvement of understanding of statistical concepts, it is concluded that computers have proved useful in facilitating any form of statistical analysis, but the easy access to computational facilities could lead to inappropriate analysis. As statistics belongs to methodological disciplines, agriculture uses it in such a way that is enough to help in solving the problems and to improve their explanations.

Conclusion

Statistical software packages have changed the scenario and now agricultural research worker is willing to use any advanced statistical technique for which the package provides for the analysis. Crop and land use statistics form the backbone of the Agricultural Statistics System. Reliable and timely information on crop area, crop production and land use is of great importance to planners and policy makers for efficient agricultural development and for taking decisions on procurement, storage, public distribution, export, import and many other related issues. With an increasingly evident trend of decentralized planning and administration, these statistics are needed with as much disaggregation as possible down to the level of village panchayats. With most parts of the country having detailed cadastral survey maps, frequently updated land records and the institution of a permanent village reporting agency, the country has all the necessary means to produce reliable and timely statistics.

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ocean pollution and demonstrated deaths of thousands of albatrosses in the beach on Midway. In 2007, she launched the campaign 'ban plastic bags' in Modbury after seeing the devastation plastic had caused in the Pacific (Vidal, 2007). Rebecca returned to the family farm in 2008 with a vision to become more 'climate aware' (Midgley, 2016). She started her own sheep flock on a holistic plan grazing system, breeding animals which fit the landscape (Goldapple, 2015). In 2014, Rebecca and her business partner Tim Green (her former boss from the BBC) took over the tenancy of Village Farm, a 70 hectare unit in the small coastal village of East Portlemouth. Village Farm teamed up with the Woodland Trust to plant 10,000 trees such as coppice, hazel, alder and other species (Midgley, 2016).

Masoumeh Ebtekar

Masoumeh Ebtekar is born in 1960. She has served as faculty member of Tarbiat Modares University (Iran) since 1996. She has been active in environmental and women's issues. She served as Iran's first female Vice President and Head of the Department of Environment from 1997 to 2005. During her tenure environmental awareness and practice improved significantly and Iran played an influential role in international environmental decisions (Wikipedia.org). During her tenure, the economic and industrial sectors in Iran improved environmental compliance; natural protected areas grew from 4.5% to 7.5% of the country's area; and environmental Non-Government Organisations grew from 20 to more than 650. Internationally, she attended and provided stewardship in the Kyoto negotiations, The Tehran Convention for the Caspian Sea Environment, the International Conference on Environment, and the Peace and Dialogue among Civilizations.

In 2004, she founded the Centre for Peace and Environment 2005 for promotion of sustainable peace and the protection of the environment. Ebtekar was named one of the seven '2006 Champions of the Earth' by the United Nations Environment Program as a prominent and "inspirational" environmental leader who has made an impact at policy level in a region of the world. From 2007 to 2013 she served as an elected member of the Tehran City Council where she established the Environment Committee. Dr Ebtekar was again appointed as Vice President and Head of the Department of Environment in 2013. She believes that peace and sustainability depend on the spiritual and the feminine. She provides her views on the interrelated nature of peace and sustainable development (Sustainability.thomasreuters.com).

Marina Silva

Marina Silva is an environmentalist and politician from Brazil. She was born in 1958 in the province of Acre in Western Brazil. She was inspired by the ideas of the environmental activist Chico Mendes. She became politically active, and an ardent proponent of negotiation, non-violence, and innovative solutions. She has been a member of Brazil's National Assembly since 1994.As a native Amazonian and a Senator, she built support for environmental protection of the reserves as well as for social justice and sustainable development in the Amazon region. She was environmental minister in 2003.She worked for protection of amazon forest ecosystem by clamping down on illegal activity and managed to reduce deforestation by almost 60 per cent from 2004 to 2007.Another result of Silva's work is the Amazon Fund, established to prevent greenhouse gas emissions through rainforest conservation which is financed by national and international contributions. In 1996, Silva won the Goldman Environmental Prize for South and Central America. In 2007, the United Nations Environment Program named her one of the Champions of the Earth. Silva resigned as Minister of the Environment in 2008. However, she has great influence on environmental policy in Brazil (www.un.org).

Maria V. Cherkasova

Maria V. Cherkasova is a well-known ecologist and journalist from Russia. She was born in 1938. She graduated in biology from Moscow State University and became a faculty of biology in the same University. She was active in the environmental protection movement in the early 1960s. Post 1960, she started working on Red Data Book of the Russian Federation (Shailesh, 2012). She researched and preserved rare species and became the editor of Red Data Book of the Russian Federation.

She is recognized for successful coordination of a 4 year campaign to halt the construction of the hydro-electric dam which was planned by Ministry of Energy, Russia on the Katun River in the Altar Mountains in 1986. She stopped the construction of the hydro-electric dam due to its negative environmental impacts such as flooding, land erosion, water pollution and destruction of wildlife (www.unesco.org). She became the director of Centre for Independent Ecological Programmes (CIEP) in 1991. CIEP organizes and drives activities in a wide range of ecologically related areas and is involved in environmental issues and ecological restoration activities. In recent years, she has turned her attention to protecting children's rights to living in healthy and valuable environments. She has also co-founded the Socio-Ecological Union, which has become the largest ecological NGO in the former Soviet Union (Rees, 1992).

Indira Gandhi

Indira Gandhi (1917-1984) was the first woman prime minister of India. She was a naturalist and was worried about the environmental consequences of urbanization and industrialization. She worked as prime minister from 1966 to 1977 and from 1980 until her death in 1984. She participated in the historic U.N. Conference on Human Environment at Stockholm in 1972. Indira Gandhi spoke about the future of planet Earth and environmental security. The conference made it apparent to all attendees that each nation require to implement legislation addressing health and safety issues for human and natural resources. Stockholm served as the genesis for the series of environmental measures India passed in the years to come. Water (Prevention and Control of Pollution) Act passed during her tenure in 1974. The Water Act also established the Pollution Control Boards at central government and state government levels (Rangarajan, 2006). Indira Gandhi created the Department of Environment in 1980. In 1981, the Air (Prevention and Control of Pollution) Act was passed. She declared a complete ban on commercial green tree felling in the Himalayas in the state of Uttar Pradesh in 1980. For her contribution towards Environment after her death two important Awards are constituted in her name: The Indira Priyadarshini Vrikshamitra Award in the field of afforestation and wastelands development and The Indira Gandhi Paryavaran Puraskar in the field of environment.

Medha Patkar

Medha Patkar initiated Save Narmada movement in 1985. Medha Patkar founded the National Alliance of People's Movements (NAPM) with the stated aim of working on a range of issues related to socio-economic justice, political justice and equity. NAPM filed a number of public interest litigations including those against Adarsh society, Lavasa Megacity, Hiranandani and as well as other builders. Narmada Bachao Andolan and Ghar Bachao Ghar Banao Andolan, founded by Medha Patkar with others are allies of NAPM. She received Goldman Environment Award in 1992 (Wikipedia.org).

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Vandana Shiva

Vandana Shiva is an environmental activist. She founded the Research Foundation for Science, Technology and Ecology (RFSTER) in 1982. This led to the creation of Navdanya in 1991 that is a national movement to protect the diversity and integrity of living resources, especially native seed, the promotion of organic farming and fair trade. In the area of intellectual property rights and biodiversity, Shiva and her team at the RFSTER challenged the biopiracy of Neem, Basmati and Wheat. She has served on expert groups of government on Biodiversity and IPR legislation. She wrote books such as Staying Alive, Ecofeminism, Biopiracy: the plunder of nature and knowledge etc.

Bija Devi

Bija Devi protects seeds. Her mission is to protect nature and people's rights to knowledge of biodiversity, water and food. She was farmer before joining Navdanya seed farm. She trained 5 lakh farmers in seed sovereignty, food sovereignty and sustainability. Being a seed expert, she have 550 varieties of rice seeds and 800 varieties of plant seeds. Seeds of salt-tolerant rice have helped farmers recover after the 1998 Orissa Super Cyclone, the 2004 Tsunami, and the 2008 floods in Bengal.

Sugatha Kumari

Sugatha Kumari was born on 3 January, 1934 in Kerala. She is best known as an environmental conservationist as well as environmental poetess. She served as the secretary of the Society for Conservation of Nature, Thiruvananthapuram. In the late seventies she led a successful nationwide movement, known as Save Silent Valley, to save some of the oldest natural forests in the country, the Silent Valley in Kerala, from submersion as a result of a planned hydroelectric project. She worked actively for nature and women issues. She received the first Indira Priyadarshini Vriksha Mitra Award from the Government of India for her efforts in environmental conservation and afforestation in 1986 and received Padma Shri award in 2006 (www.wikipedia.org).

Mayilamma

Mayilamma was a known face for water preservation in Kerala's Palakkad district. She was the founder of the Coca-Cola Virudha Samara Samiti (Anti Coca-Cola Struggle Committee) in the small village of Plachimada in Kerala's Palakkad district. She had been at the forefront of the people's agitation against the multinational Coca-Cola Company. Due to Coca-Cola's operations, the well-water had been highly polluted and deemed unfit for human consumption. She played a key role to shut down the Coca-Cola bottling plant in March 2004.She died on 6 January, 2007 (www.wikipedia.org).

Sunita Narain

Sunita Narain is an environmentalist and advocates environmental sustainability in India. Presently, she is the director of Centre for Science and Environment (CSE, New Delhi). Her research areas are natural resource management, water related problems, climate change, sustainable development and environmental awareness etc. She receivedPadma Shri and Stockholm Water Prize awards (www.wikipedia.org).

Maneka Gandhi

Maneka Gandhi is well-known leader for animal rights in India. Her organisation 'People for Animals' works on animal welfare which was started in 1992. She sponsors international animal rescue too (www.wikipedia.org).

Contribution of common women

Common women's contribution in environmental sustainability are fuelwood collection, water collection and storage, formation of biofertilizer and biopesticide, sustainable farming practices and rural crafts etc. Women nurture the nature for life support systems such as food, water, fuel, fodder and habitat.

Women have always been the principal conservers of environment as they are considered the primary users of natural resources. Women play role in seed selection, production and conservation of biodiversity. Food security can be achieved by implanting various varieties of food crops to increase the food production. Women can work hard to accomplish food security. Since women's perspectives and values for environment are somewhat different from men and they devote more in environmental sustainability. Women are known as good managers. This inherent capability of women need to be fully developed to attain sustainability on the earth.

Women being first mentor of children can inculcate environmental values in children. Transmission of environmental values in next generation would be possibleespecially by educating and introducing these values in girls.

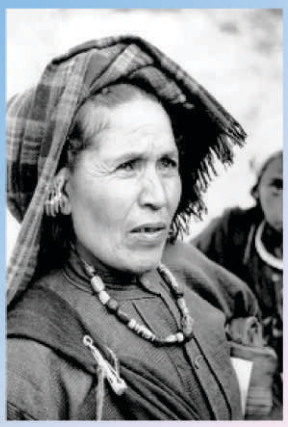
Suggestions: It is the need of the hour to learn from these woman exemplars. Women can inculcate a sense of responsibility in their children to preserve natural resources. We can adopt few sustainable practices in our day to day life such as use of dustbin for waste collection, segregation of wastes, use of renewable sources of energy, concept of small family, save water and save energy at house level and rural women can use sustainable farming practices.

Conclusion

The growth of technology and the processes of commercialization, industrialization and globalization affect men and women differently. In general, women are much conscious for environment as women have inherent capabilities in the management of nature. Henceforth, we need to strengthen women's education, creativity, innovation, inventory and production management. Without women real development cannot take roots. Hence, they should be allowed to actively participate in environmental issues and environmental decision-making at the local, regional, national and international levels for environmental sustainability.

We need to change our attitude towards nature. We have to understand difference between need and greed. Nature has enough to fulfil our need but not our greed. After the industrial and technological interventions, we think that we are the most powerful creature on earth and we have the power to alter and destroy nature. But ultimately, overexploitation of nature would result in destruction of mankind. Now is the time to challenge ourselves to achieve environmental sustainability and subsequently human sustainability.

Amrita Devi and Gaura Devi: Tree huggers



EVENT / CONFERENCES

Following are the details of some important conferences:

1. The ASAR-International Conference on Renewable Energy, Green technology & Environmental Science (ICREGTES), New Delhi, India on 1st July, 2018 http://www.asar.org.in/Conference2018/7/NewDelhi/ICREGTES/
2. 2018 INTERNATIONAL CONFERENCE ON PHARMACEUTICAL, MEDICAL & ENVIRONMENTAL HEALTH SCIENCES (ICPhar ME-2018) organized by Institute for Global Research Forum (IGRForum). The conference will be held in Bangalore, India on 1st July, 2018.http://irfconference.org/Conference2018/7/Bangalore/ICPharME/
3. ISER-399th International Conference on Chemical and Environmental Science (ICCES), New Delhi, India on 15th - 16th July, 2018. http://iser.co/ Conference2018/India/1/ICCES/
4. ISERD – 414th International Conference on Environment and Natural Science (ICENS) on 16th - 17th July, 2018 in Boston, USA http://iserd.co/Conference2018/USA/13/ICENS/
5. IASTEM- 440th International Conference on Environment and Natural Science (ICENS) on 15th - 16th August, 2018 at New Delhi, India http://iastem.org/Conference2018/India/3/ICENS/
6. International Conference on Advances in Agricultural, Biological and Applied Sciences for Sustainable Future on 20th - 22nd October, 2018 at Moot Court Conference Hall, Swami Vivekanand Subharti University, Meerut, Uttar Pradesh, India www.agriinventionjournal.com
7. National Conference on Chemistry for Human Health and Environment (CHHE) on 15th - 16th December, 2018 at Conference Center University of Delhi, Delhi 110007 www.nesa-india.org

APPEAL TO LIFE MEMBERS

NESA Life Members are requested to submit short articles for the NESA e-Newsletter that are consistent with NESA's objectives to improve environment. The articles should focus on topics related to environment and facilitate communication and discussion among researchers, academicians and students. The articles for August edition can be submitted to **nesapublications@gmail.com** before **25th July, 2018**.

Dr. Shefali Gola
Editor, NESA E-newsletter

To,

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