

Agreement to provide 3G services to remote areas of Balochistan signed

MoITT: Finance Minister Senator Mohammad Ishaq Dar said that government was determined to promote digitalization all across the country for increasing outreach and



Science Communication: enhancing Public Understanding

SIDRA SAIF IBD: A two days' workshop titled "COMSTECH-Technology Times International Workshop on Science Communication: Enhancing Public Understanding" was held here at COMSTECH Headquarters, to train human resources in the field of Science Communication to popularize science in the society. The Chief Guest Fazal Abbas Mekan, Federal Secretary for Ministry of Science and Technology said, "science communication is the key to the real treasure of the scientific knowledge, by virtue of which scientific knowledge and concepts could be carried to the public. Thus, the public is benefited with the new advancements in science and technology and is able to fight against hunger, drought, diseases, several other social and economic problems."

Dr Shaukat Hameed, Coordinator General COMSTECH elaborated at the occasion, "due to lack of interest of scientific knowledge and its slow propagation and penetration amongst larger number of population in OIC member countries especially in Pakistan; people are unable to know the advancements in science and technology. The more alarming fact is that science interest is fizzling out more even in science students. In order to diffuse this situation, immediate measures must be taken".

Sayed Paras Ali, Editor Weekly Technology Times while explaining the objectives of workshop told the participants that Science Communication is proportional to socio-economic development and is an exponential variable to delineate brainteasers of nature. It helps students as well as com-



mon people to understand causes of various tribulations of society pertaining to health, water security, food security etc. and make counter strategy to overcome those problems thus resulting in sustainable socio-economic, cultural, and environmental development of the country.

The Workshop is designed to provide professional development opportunities for people working in environments where science and research outcomes need to be made accessible to the general public and to science policy audiences.

Fabio Turone, Research Fellow, Knight Science Journalism Program, MIT Chief told in his keynote presentation that it is important for scientists to be able to communicate to non-scientists, which is a difficult skill that many practicing scientists lack, likely due to the combination of increased specialization over time and the absence of formal train-

ing in science communication.

This was a two-day workshop comprise of 6 sessions, discussing role of media for science popularization and advocacy.

The session chairs, speakers, and participants concluded that scientists play a critical part in transmitting information to journalists and ultimately the public. But at the same time, it is difficult for scientists to communicate effectively with a diversity of audiences and most scientists do not receive formal training in science communication.

Dr. Pervez Hoodbhoy Distinguished Professor of Mathematics and Physics, Forman Christian College, Lahore briefed that the effects science communication can have on an audience are diverse. Communicators can make people more aware of certain issues for public understandings of science and technology which can make public understand scientific matters; and it is even possible to en-

gage people to the extent that they are willing to take action.

The other speakers of the workshop were: Dr. Ehsan Masood, Editor, Research Fortnight, UK; Ms Knvul Safia Sheikh, Freelance Science Journalist, New York; Dr. Muhammad Ashraf, Chairman, PSF; Dr. Anwar ul Hassan Gillani, Chairman, PCST; Dr. Ghulam Rasul, DG, PMD; Dr. Zabta Khan Shinwari, Professor and Chairperson Biotechnology Department, QAU; Dr. Hamid Saleem, IST; Dr. M. Sabieh Anwar, LUMS; Dr. Imran Hashmi, IESE, NUST; Dr. M. Zafar Iqbal, Chairman Department of Media & Communications Studies, IIU; Dr. Shafqat Kakakhel, SDPI; Zeeshan Ahmad Siddiqui, NCP; Kamran Akhter, Ministry of Foreign Affairs; Aleem Ahmed, Chief Editor, Monthly Global Science; Rina Saeed Khan, Environmental Journalist; Khalid Rehman, Science Journalist; Abdullah Farooqi, BBC World Service; and Saleem Rafik, President OSFP. ♦

Working group of scientists for promotion of S&T to be formed: Ahsan

HEC: Minister for Planning, Development and Reforms Ahsan Iqbal emphasized upon forming of a working group consisting of top scientists to advise government to foster development of science and technology in the country.

The minister expressed these views while addressing Round Table Conference (RTC) on 'Promoting Scientific Education and Research in Pakistan'.

The RTC was also attended by Chairman Higher Education Commission (HEC) Dr Mukhtar Ahmed, scientists, academia and officials.

The conference aims to promote science and technology research



which includes improving education and research system to increase country's competence. Ahsan Iqbal reiterated that knowledge and technology were pivotal to advancement of our human civilization.

The participants of the conference highlighted various options to promote science education and research in the country. ♦

Pak-US S&T cooperation offer researchers funding up to \$500,000

HEC: Pakistan-US Science and Technology Cooperation Program is currently accepting applications for a three year of collaborative research grants. Through this grant, research students can receive funding of up to \$500,000.

The project is managed by the National Academy of Sciences in the U.S. and by the Higher Education Commission of Pakistan. It is designed to increase cooperation between Pakistani scientists and institutions with their counterparts in the United States.

The program originally began in 2003 when the Governments of Pakistan and the United States

signed a comprehensive Science and Technology Cooperation Agreement to established a framework to increase cooperation in science, technology, engineering, and education.

This cooperation would work for the mutual benefit of the science and education communities in both countries.

The program accepts proposals in a wide range of topics. A few topics covered under the program are: Health Security, Education, Nutrition, Water and Sanitation, Agriculture, Environmental changes, Renewable Energy, Social Sciences, and Economic Development. ♦

Pakistani-American win NATO's SA award

MONITORING: Pakistani-American doctor Habib Chotani has won the Scientific Achievement Award (SAA) 2016 from the NATO Science and Technology Organization for his performance in research on medical countermeasures against biological agents.

He is a recognised expert in the identification, surveillance and diagnosis of human and zoonotic infectious diseases. His success in the academic field includes establishing & directing the Global Infectious Disease Surveillance and Alert System (GIDSAS) at John Hopkins University. ♦

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Science and the Sustainable Development Goals

THE CONCEPT of Science Diplomacy is becoming widely used by policy-makers, scientists and scholars of International Relations. Though this is a new concept, it refers to an old practice as scientists always have been at the forefront of international collaboration. Science Diplomacy can be regarded as a tool for states to use science and scientists to pursue their Foreign Policy goals. This can be done to promote the national interests or to solve problems faced by the state. Several states have their own Science Diplomacy programs. Even if no national Science Diplomacy program is available, many states have long deployed scientific attachés in their embassies. The rise of scientific diplomacy in different parts of the world is an interesting trend to watch. It poses the question "for what purposes will states and scientists work together?". The answer might lie in the Global Goals or Sustainable Development Goals (SDGs). Perhaps the most salient development for the future of Science Diplomacy is indeed the growing awareness of global problems that sovereign states are faced with. Not only are they all of a planetary nature; they also are all connected to scientific and technological issues, both for monitoring them and for finding solutions to them. For the SDGs to be reached, different actors (governments, the private sector, civil society as well as the scientific communities) need to do their part. Science Diplomacy might therefore just be the tool we need to realize these goals. One can say that the UN and the S&T community have already embarked upon an increased involvement of S&T in global policy making. But here in Pakistan, the collaboration between scientists and policymakers is a distant dream. Everyone in governance body recognizes the importance of science to achieve SDGs, but how this is best achieved is yet to be answered. It is thus self-evident that effective science advisory mechanisms are much needed at the domestic level for the SDGs to be achievable. A comprehensive SDGs policy-making ecosystem includes both the scientific community and the state. However, in our country this combination is absolutely missing. Bringing S&T to achieve the SDGs is therefore not a simple endeavor and in order to be effective, it needs to be further professionalized and developed as a practice. This can be done through localizing the Science Diplomacy concept, and moving science diplomacy away from the soft power rhetoric and self-interests of scientific organizations towards the national level where it can be used as tool to achieve better national governance. Adopting the triple approach of Science Diplomacy at the national level, one can see three areas: Science in National Diplomacy; Diplomacy for National Science; and National Science for National Diplomacy, where such a National Science Diplomacy effort can be further developed for achieving the SDGs. Together, these areas can be regarded as the building blocks of a National and then Global Science Diplomacy agenda. Further developing such an agenda could be a joint effort of S&T organisation, such as Pakistan Council for Science and Technology (PCST), Higher Education Commission (HEC) and Planning Commission (PC). The stakes are high given that dealing with all SDGs. Obviously, this does not mean that government will (or even should) hand over its sovereign powers to scientists. But the multilateral policy-makers need the S&T input very much to understand the problems and challenges, to draft effective policies, to monitor what is happening and to develop innovative solutions for SDGs. This implies not only that scientists and governing bodies need to step up their interactions, It also means that federal, provincial, NGOs as well as the S&T community all need to take actions to further advance their dialogue and collaboration. Developing a National as well as Global Science Diplomacy agenda should therefore be a priority for all those concerned about the achievement of SDGs.



Humayun Ahmed

Impact of mulching on soil health and plant growth

THE ENGLISH word mulch has been used since the 17th century, is probably derived from the German vernacular "Molsch" meaning soft or beginning to decay....

Impact of mulching on soil health and plant growth

Humayun Ahmed, Nazer Manzoor, M. Maqsood Khan, Tahir Jamil and M. Waseem Abbas

THE ENGLISH word mulch has been used since the 17th century, is probably derived from the German vernacular "Molsch" meaning soft or beginning to decay. Mulch is a material applied to the soil surface to prevent loss of water by evaporation, to suppress weeds, to reduce temperature fluctuations or to promote productivity. It is one of the important agronomic practices for conserving soil moisture and modifying the soil health. Nature produces large quantities of mulch all the time with fallen leaves, pine needles, twigs, or any other organic material. It is a source of highly stable carbon that increases organic matter, microbial activity, water holding capacity, nutrient holding capacity, and total nutrient availability. Mulch decreases compaction, water runoff, soil erosion, weeds and evaporation.

Types of mulches:

Organic mulch is made of natural substances such as bark, wood chips, leaves, pine needles, or grasses. These break down gradually to release nutrients into the soil and help to improve its structure. Inorganic mulches are gravel, pebbles, plastic. Non-biodegradable mulches do not boost the fertility or structure of the soil, but they suppress weeds and conserve soil moisture. Before applying plastic mulch, incorporate all fertilizer. Chemical mulches are sprayed on soil surface such as asphalt, resins, and long chain alcohol (hexa-decanol). Living mulches is growing of spreading type crop between the rows of main crop. eg cereal with clover or grasses.

Selection of proper material:

Grasses, leaves of plants, manures, wood chips, bark, garden waste are usually acceptable materials for mulching while meats, bones, large branches, plastics are not suitable.

Effects of mulches:

It is noted that 4-inch dust mulch can conserve the soil moisture up to 30-40%. The Early Roman gave the idea about the stone mulching; china is vastly

using pebbles in field as mulch for soil conservation. If mulch is not properly maintained, it will not always increase the yield of crop. It is also noted that the effect of mulch in promoting infiltration during the rains is much greater than its effect after the rain. The force delivered to soil by an inch fall of rainfall is equivalent to that of about 10 ordinary farm tractors cultivating the land. Mulch-



mulching should be repeated for several years, 4-5 ton of wheat straw provide significant amount of plant nutrient. Mulch acts like a dug in organic manure. Mulches increases or decreases pH depending upon the pH of mulches.

For agriculture purposes, mulch should have a C:N ratio of 20-30:1. Narrow C:N ratio leads towards fast decomposition of organic matter through mineralization. If there is wider C:N ratio, immobilization leads towards slow decomposition of organic matter.

What do mulches do for the plant growth?

Mulches play role for plant growth by helping to prevent soil erosion. It adds organic matter to the soil. Mulch feeds soil life and improves soil structure by adding

ing causes a great reduction in runoff and erosion. Mulches raise temperature during winter and lower them during summer.

Mulch after decomposition adds more organic matter content than does plowing on the same amount of plant residues. Stimulation of micro-organism by stubble mulching improved aggregate stability and infiltration. Mulching greatly increased earthworms population and consequently aggregate stability in the top eight inches of soil. Mulches increase the infiltration rate and earthworms population in the soil. Mulches Improved plant root system which ultimately Influence the utilization of nutrients. It is noted that if

nutrients to the soil. It also helps in decreasing water loss due to evaporation. A good mulch also works against weeds.

Limitations in mulching:

Some organisms like ants and termites proliferate too much under mulches which may cause a great damage to the crop. When crop residues are used for mulching, in some cases there is a risk of sustaining pest and diseases. When C rich material is used as mulch, there is a risk of nitrogen immobilization. Major constraint for mulching is the availability of mulch material.

The author is scholar at Department of Agronomy, University of Agriculture, Faisalabad, Pakistan.



Mirza Abdul Aleem Baig

GIS for strategic security of CPEC

THE 21ST century has seen the establishment of global and regional strategic milieu around the world. This strategic milieu persuades.....



Faisal Nadeem Ahmed

Safe food production from contaminated soils

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GIS for strategic security of CPEC

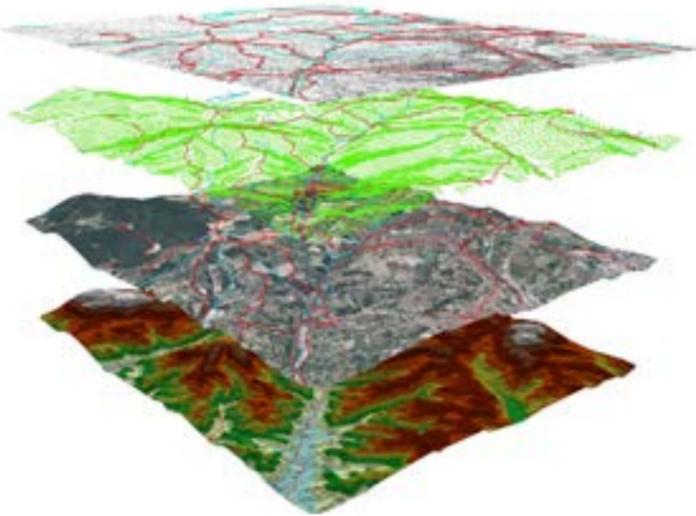
Mirza Abdul Aleem Baig

THE 21ST century has seen the establishment of global and regional strategic milieu around the world. This strategic milieu persuades geo-economic and geo-political tactical partnership among regional countries. Regional connectivity is one of the most significant aspects of Pakistan's foreign policy and Pakistan has been trying to develop good relations with its adjacent countries. Maintaining creditable and healthy relation with China has been an essential part of Pakistan's foreign policy, as China is Pakistan's strategic partner and helps Pakistan in maintaining balance of power in the region.

The history of Pak-China relations can be traced back since 1950 and both countries managed their connection in a very productive and articulated way. With the support of China, Pakistan has gained significant important not only in the region but the entire world. In recent years, both China and Pakistan developed a strong bond of trust and Chinese foreign policy gives a special focus to Pakistan in future endeavors of China. China-Pakistan Economic Corridor (CPEC) is one of the most prominent example of that. The CPEC is a megaproject that will connect Gwadar and Xinjiang via a network of highways, railways, and pipelines to transport goods, oil and gas. This economic corridor will run about 30,000 KM from Gwadar to Kashgar. The

investment package is estimated at over \$ 46 billion, comprising special economic zones, dry ports, energy projects, highways, railways, telecommunications, natural gas and oil pipelines connecting China to the Middle East and improving intelligence sharing

on the course. A strict scrutiny of the performance and quality of work on different projects is need of time. Similarly, safeguards are needed against corruption, pilferage of material and project payouts. Additionally, security concerns have been the most critical



between the two countries.

CPEC is an under-construction megaproject which will not only achieve the political and economic objectives through trade and development but also strengthen the economic and trade cooperation between the two countries. Pakistan's leadership illustrates the CPEC as a game changer for Pakistan and the region. On the contrary, the dividends of this project will wholly turn up gradually over a period of 10 to 15 years thus requires an unremitting determination on the part of China and Pakistan to stay firm

challenge to the CPEC and both Pakistan and China have been trying to meet these. Pakistan faces several challenges in the implementation of the project and these challenges include external and internal. Today's biggest concern is the safety and security of engineers, technicians and labors working on the corridor project. Providing security to Chinese personnel is today's major challenge for Pakistan.

In April 2015, the Pakistan Army announced the establishment of a 'Special Security Division', headed by a Major General,

for providing safety and security to those working on the project. Decision makers should realize that effective action in complex and dynamic areas require both new analytical tools and new approach of collaborating between stakeholders and these tools must be adequately sophisticated to deal with convolution of the policy arena. Geographic Information System (GIS) meet this sophistication and intelligible requirements. The power of a GIS is its capability to graphically organize and display a series of location-based information. GIS enables strategic security and public safety by helping government agencies protect borders and critical infrastructure. GIS provides a common operating picture that is used for routine operations in mitigation, preparedness, response and revitalization from all kind of emergency events. GIS is a core component of situational awareness and can integrate various sensors, field activity, road closures, threats, assets, critical infrastructure, and weather to better inform emergency and security concerns. The under listed are some recommendations which may help in the use of GIS for CPEC strategic security.

- There is an urgent need for massive acquisition and installation of GIS equipments in the country.
- There should be immediate training of security personnel who will handle GIS technology to curb terrorism in the country. Pak-China counter

terrorism mechanism is also required.

- Terrorist hot spots in Pakistan should be map out by the security agencies in collaboration with criminologists and technology experts for the purpose of constant monitoring using the GIS.
- Government should direct its finances to the area of great need such as the GIS. And leaders should exhibit good moral character in their governance and eradicate corruption and nepotism in the society.
- Corruption and nepotism in the public system especially within the security outfits must be drastically tackle. Security agencies must purge themselves of all acts of corruption and nepotism if the GIS must be successful in tackling terrorism and security concern.

The CPEC project will audaciously alter Pakistan's geographic location into an asset. The ongoing construction of the CPEC is undeniably one of the largest endeavors for socio-economic progress in the country and deployment of GIS technology throughout CPEC will not only enable strategic security but also perfection in disaster management, healthcare planning, food security, water resource management, urban development, public safety, education, and the economy for citizens of that Pakistan.

Safe food production from contaminated soils

Faisal Nadeem Ahmed^{1*}, Dr. Muhammad Zia-ur-Rehman¹ and Dr. Zahoor Ahmad²

WHEN WE study other nations, especially about the life spans we come to know that average life of other peoples is far longer than ours. Survey reports that average life span in America is 78.74 while in Pakistan it is about 66.44. Our life expectancy is not good due to actually poor diet, poor access to affordable health care, poor personal health habits and just plain poverty while these factors are mostly absent or minute in other

developed nations. In our country no. of doctors for certain patients are also less comparatively. Even other developed nations have developed proper boards and societies for healthy diets and food safety etc. This makes their even common person much aware of the current health risks there precautions and remediation. We know that health is wealth which is gained by the safe food. Safe foods have following benefits to the humans a. Reduces food borne illnesses b. Protect consumers, your reputation c. Enhance confidence. Safe food not only increases the life span of

the humans but also keep them active. Without health, we cannot easily share in loving relationships with our families and friends, fully



participate in our chosen work, contribute meaningfully to our communities, or effectively compete on the global stage. Comparatively a healthy person is more relax, has more vitality, is in better shape, have better mental health, can manage stress better, have more self-esteem, he can control his weight and even his habits and thinking.

Health is the basic right and fundamental need of humanity with-out it everything feels ruined but in the condition of Pakistan if we visit any hospital it is full of people suffering from different

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M. Yousaf Nadeem

Biopesticides: key component in integrated pest management

AGRICULTURE IS facing destructive activities of pests and weeds resulting in dramatic loss of productivity. Advancement in fertilizer and.....



Biopesticides: key component in integrated pest management

M. Yousaf Nadeem, M. Umer Chattha, Imran Khan, M. Safeer, Wajid Umer

AGRICULTURE IS facing destructive activities of pests and weeds resulting in dramatic loss of productivity. Advancement in fertilizer and pesticides resolved these crises to great extent. But the overuse of these substances sometime leads to serious threats for soil environment and crops and damaging microbial population in soil and also resistance is produced in pests against these pesticides. Moreover the persistent time of residues of these pesticides is very high. The gradual reduction in the use of pesticides in agriculture without effecting the quantity and quality of crops production can only be possible if new technologies are adopted that are economically attractive, easily degradable and environmental friendly pesticides. Sustainable agriculture is the system in which crop yield is obtained with exploiting the natural resources.

Biopesticides are substances of pesticidal activities and considered as low risk compounds obtained from natural resources e.g. animals, plants, bacteria, fungi or mineral source, garlic, mint and canola oil. These biopesticides provides protection against pest and soil borne diseases. The key component in integrated pest management (IPM) is biopesticides. There are four types of biopesticides a) Microbial biopesticides b) Plant

incorporated protectant c) Biochemical pesticides and d) RNAi pesticides. Another classification of these biopesticides, the natural source from which they are obtained, is classified as microbial pesticides, botanical pesticides, zooid pesticides and genetically modified plants. Out of 1 million species of insects, 15,000 are considered as pest and most of them pathogenic microorganism is associative with them and hence controlled naturally. More than 300 species of pest requires some sort of control. The biopesticides obtained from Bactria, viruses, protozoa and nematods are considered as microbial biopesticides. Bacteria are the most potent among bioagents. Due to pathogenicity basis bacteria have four groups but crystalliferous spore forming bacteria is most effective. *B. thuringiensis* is the example of spore forming bacteria with 6000 isolates stored in all over the world. Bt produce alpha and beta exotoxins and delta endotoxins toxins that paralyze the digestive system of pest. Formulation of Bt depends on the properties of pest, soil physical, chemical and biological properties and environmental factors also effect it. The toxic crystal of Bt is commercially affected by eaten by insect gut at specific pH (alkaline pH) at specific temperature. It damages the gut lining and cause paralyzed the insect. It is quite stable and sensitive to heat, so protective measure should be taken during storage.

Viral biopesticides are host specific and efficiency can be seen among 1600 viruses and effective especially caterpillar insects. Most popular viral biopesticide belong to baculoviruses family. Viruses enter in insect's body through gut.

through toxins. Fungus came out of the insect body after producing spores in insect body. These spores spread through wind or water can cause infection in insects.

Many substances are pro-



First virus enters in to tissue and replicate there. It lay eggs there and feeding and by movements viruses disturb the insect physiology. Within 3–8 days the insect died due to viral infection. Genetic modification can be used to increase its killing efficiency.

750 are entomopathogenic fungi but 20 have serious attention as bio-control agents are known, the fungi invade the exoskeleton/ cuticle of the pest by direct penetration. Fungi degrade these cuticles by releasing extracellular as well as intracellular enzymes. Death of host occurs due to tissue damages and

duced by plants genetically that have pesticidal activities. Sometimes foreign material/ particle are introduced in plants and then plants able to produce resistant against the specific organisms. Bt protein is introduced in the genetics of plant material. As a response the plant produces the substance that shows resistance against pests and disease.

Biochemical pesticides are natural substances that are produced by plant itself to control pest. It is the nontoxic mechanisms of pest control. These include substances that interfere with insect mating e.g. Allelochemicals and phytohor-

mones. Hence no change of natural biological and ecological cycle. In this way pest population is controlled because further pest generations are not possible. RNA interference is recent technology and understudy for possible use as spray on pests. Similarly the efficiency bioagents can be improved through recombinant DNA technology. RNA is fragile molecule that degrades within days or week after application. It does not modify the genome of plant.

Biopesticides have many advantages 1) environmental friendly 2) No harmful residues detected 3) Cheaper than chemical pesticides when locally produced. 4) More effective than chemical pesticides in the long-term 5) short biodegradable period. While it has some disadvantages 1) Slow speed of action 2) Inconsistency due to the influences of various biotic and abiotic factors 3) Lack of expertise 4) Lack of good microbes testing laboratories

Conclusion: Pesticides are chemical substances that kill insect by chemical action, shelf life and wide spectrum of activity, fast in killing. Frequently excessive use of these chemical have adverse effect on soil microbial ecology and also for environment. While biopesticides have small shelf life and easily degradable, high target specificity, promote beneficial microbe population. They are environmental friendly and less toxic.

Safe food production from contaminated soils

types of chronic diseases. These diseases are now the part of their genes, are transferring from one generation to another generation. People who are above the age of 45 years are mostly grabbed in diseases because after this age the immunity is reduced or had minimized to such a level that it can't resist disease attack. Many different types of diseases have been spread in the country such as cancer, heart failure, liver disorders mainly hepatitis c virus, hypertension and many more. Survey reports tell that almost every fourth person in Pakistan is infected with HCV. Almost 80,000 people die yearly due to this chronic disease. Cancer is considered the 2nd death-cause in Pakistan still having no proper

preventive measures and cure.

In this scenario Pakistan had invested a lot in importing medicines to cure such diseases. Many antibiotics and vaccines had been imported, many hospitals and research centers have been established in the country but with passage of time situation is getting worst. Doctors suggest many precautions and utilization of natural and organic foods but everything looks like obscured. Root cause of the disease is food because the food which we are consuming now a day is unsafe due to many reasons. Trend of food utilization has changed from fresh food to processed food, people like the food which may be more tasty but not healthy, due to which many kind of pol-

lutants adds in it agriculture food is also adding many kind of pollutants in the foods due to over use of pesticides and other fertilizers which are mostly unsafe for the health. Recently a pesticide named DDT had been used was the main cause of cancer, the International Agency for Research on Cancer classifies it as "probably carcinogenic to humans", it causes hormonal disorders which further steps to cancer. Moreover due to the irrigation of polluted water such as waste water from textile industries and tanneries have many kind of pollutants. This waste water can have bacteria, viruses, road-salt, sea-salt, cyanide, hydrogensulfide, thiocyanates, thiosulfates, heavy metals, pesticides, poisons, herbicides, pharmaceuticals, hormones and other unwanted material which is

soluble in the water and may be up-taken by the plants.

Due to its nutritional value farmers use and please to use the waste water, it improves growth of crops and increases income, increases the value of the land where waste water is available for irrigation. Land value is increase up-to 50 to 100% where waste water applied but its can have certain heavy metals like aluminum phosphide, arsenic, beryllium, cadmium, copper, iron, lead, lithium, manganese, mercury, silver, tin, thallium, and zinc with following disorders in humans like diabetes, hypopigmentation, hyperkeratosis, cancer (lung, bladder, skin), Proteinuria (indication of kidneys damage), osteomalacia (bones problems), goiter (neck enlargement), Wilson disease (hepatic and basal ganglia degeneration), respiratory and

neuropsychiatric (mental disorders) diseases.

To overcome this disorder we must use tolerant crops against heavy metals. First step is the selection of such varieties which do not uptake the heavy metals secondly such amendments can be used that binds heavy metals in the soil and do not let them uptake by the plants. Scientists recommend different amendments to the farmers like all organic amendments binds the heavy metals, biochar, gypsum and other chemicals of calcium sources can be used for heavy metals fixation. Waste water must be treated and heavy metals should be removed before the irrigation.

The authors are from ¹ Institute of Soil and Environmental Sciences, University of Agriculture Faisalabad, and ² Cholistan Institute of Desert Studies, The Islamia University of Bahawalpur.



Bilal Javed

Drone Technology: a climate smart invention in agriculture

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Drone Technology: a climate smart invention in agriculture

Bilal Javed, Dr. Ashfaq Ahmad, H.M Mazhar Abbas, M. Shaukat, and Akhlaq Muddasir

THE CONCEPT of drones is nearly a century old. It is also known as UAVs or unnamed aerial vehicles. The history of drones started as early as World War 1, but they weren't developed in nearest until the 1970s, when western militaries started to look for new ways to keep save their human pilots from harm.

Now the drone technology is transforming to other industries as well. This technology commercially uses since 1980s. However, practical applications of drones are expanding faster than ever in a variety of industries.

Three years ago common

people had no idea about these flying machines. Now, it does have become one of the world's most publicized and fascinating technologies in a wide range of professions. The international drone market has grown considerably in the past few years building on their exhibition and usefulness to agriculturalists. However, agricultural sector will be dominating in drone global market.

Drone Technology and Agriculture

Crop Monitoring

Now-a-days agro-ecosystems are facing serious threats and risks associated with crop production. These risks and uncertainties in crop production will be more in future as global

climate is changing day by day. Climate change will put huge pressure on natural resources and livelihood management. The

productivity of major crop will undergo in shuffling phase due to scarcity of resources and country will face dilemma of food in-

security. So, there is urgent need of use of "4 R" principles of precision farming in order to make our agricultural systems less vulnerable to climate change. The right amount of inputs should be applied at right time in right place with the help of right method. All these scenarios need drones to increase efficacy of resources in agro-ecosystem and sustain higher production of crops.

Soil and Field Analysis

Farmers want to have accurate and up-to-date information on crops health and land fertility status. In this context, drones are very effective tools to get all these information. Moreover, drones can help in generation of accurate 3-D maps for early soil analysis in order to optimize planting patterns, irrigation

Continued on pg: 6



Silicon can increase the crop yield by bounding the cadmium

Khadija Tehseen Arshad

THE BACK bone of the most developing countries is considered as Agriculture. It contributes about 60-80 percent of GDP of a country.

It is the basic source of foreign exchange for a country. Agriculture is not only the source of food for human beings but also a fodder source for animals. Most of the population in the whole world lives on diet based on one or more of the staple foods like, rice, wheat, maize, millet and sorghum etc. Wheat, rice and maize contributes about two-third of population. Therefore, the quality and quantity of these crops is basic concentration point for the farmers, scientists etc to feed the people of their countries.

The wheat is considered as a staple food of Pakistan. In Pakistan, the wheat yield is decreasing since 2002 due to different factors like lack of irrigation water, use of waste water which contain different heavy metals such as cadmium, lead, and mercury etc,

which is toxic to plant growth and development. Cadmium reached in water and soil due to the natural activities like volcanic eruptions, different mining operations, smoking and different type of smelting operations.

Cadmium is a major environmental pollutant and it is considered as poison for plants and it is also harmful for human health when exceed from a certain level. If cadmium exceed from 200mg per kg in human body, then it have negative impact on kidney functioning, it causes the skeletal disorder and it also cause the problem in respiration process. While in plants, it causes the problem of intake nutrients and water through roots. It affects the plant organs and stops the mobilization of nutrients in soil and during grain filling, it causes the hormone imbalance, hence ultimately plant growth stopped and with the passage of time plant died.

Cadmium have inhibitory effects on plant growth like it suppress the germination of seed,

it decrease the leaf area ratio, it causes the respiration problem in plant and specially photosynthesis rate decrease, hence yield also decreased. Hence, cadmium is considered the major problem of yield loss.

Silicon have positive effects towards the growth and development of a crop as it stops the accumulation of toxic substances specially cadmium accumulation is prohibited by silicon and ultimately it promotes hormones during grain filling and yield increases. It also makes plant resistant against diseases which is caused by bacteria, fungi etc. It provides the enzymatic balance which helps in the metabolism processes.

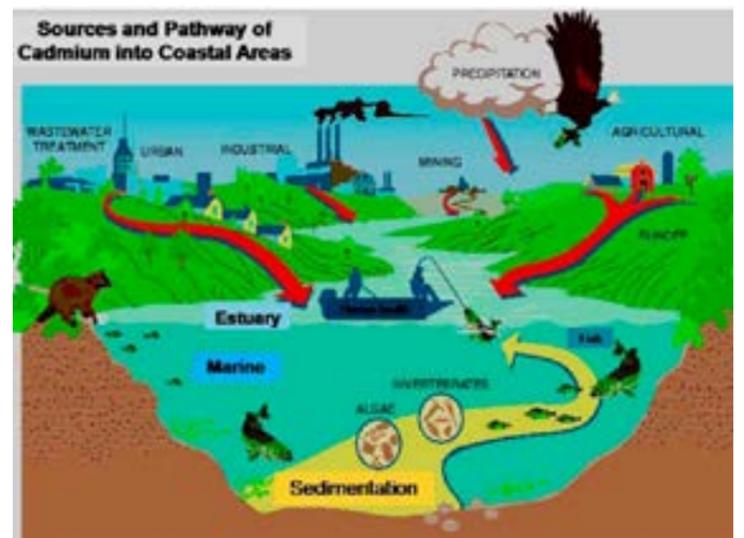
Plants mostly uptake the silicon mostly in the form of mono-silicic solutions. This form is very less mobile in plant and its concentration ranges from 0.1- 0.6mmol per liter in soil solution. Plants continuously uptake the silicon for their optimum growth and development at different growth stages.

Silicon is considered as

the basic element for the plant growth and it can be applied in any form but mostly liquid form is preferred. Silicon can control the cadmium accumulation in crop plants. When it is applied in the soil, it increases the soil pH.

becomes bound and no free for plant uptake. Silicon application also strengthen the roots of plant and roots becomes resistant against the uptake of Cd.

Cadmium is the toxic element which causes the decrease in the



As the pH of soil increased, the number of negative ions also increased in the soil which bound the cadmium. The cadmium

yield of crops especially in wheat plant. By using silicon as a fertilizer helps in the bounding of Cd and helps in the better production of a crop.



Parvez Iftikhar

Role of ICT in achieving SDGs

IN FEBRUARY 2016, Pakistan's parliament did what it had never done before. It became one of the world's first parliaments to formally adopt....



Role of ICT in achieving SDGs

Parvez Iftikhar

IN FEBRUARY 2016, Pakistan's parliament did what it had never done before. It became one of the world's first parliaments to formally adopt United Nation's (UN) Sustainable Development Goals (SDGs) as the nation's development agenda.

Seventeen SDGs had recently been formulated by the UN, to be achieved within one generation (till 2030). Similar goals were agreed to by all the UN member states in 2000 too. They were then called Millennium Development Goals (MDGs). But our performance in achieving MDGs is not anything to write home about.

To facilitate achievement of SDGs the cross-cutting Information Communication Technology (ICT) plays an extremely vital catalytic role.

How ICT helps SDGs

To fight poverty and hunger, ICT helps even the smallest of the farmers, by making it easy to inform the farmers about weather, markets, pests, fertilisers, insecticides in a much more effective manner, because the information can be area-specific, targeted at farmers of a particular area, using the 'location-based service' feature.

Feedback of farmers on various issues can be remotely solicited over mobile devices, with the aim of improving services. ICT also provides mobile banking (like Easy Paisa) and micro-credits to benefit millions who were

previously excluded. Ownership and control over property is made easier and assured through computerised land records.

Performance of over-stretched agricultural extension workers can be vastly improved with digital information services.

To create awareness about such services another ICT service – FM radio – can be employed.

ICT enables health workers to collect information for status snapshots, analysing trends and making projections about disease outbreaks – all within tight time frames to reduce mortality. Some ICT applications are already being used by provincial organisations, like PITB uses smartphones to help in controlling dengue.

ICT connects teachers and students to audio-video learning resources and information relevant to their curriculum.

For higher levels, online courses (like Coursera and MOOCs), from the most renowned universities of the world, are just a few clicks away. This is particularly useful for those women who hesitate to venture out.

ICT reduces gender inequality

by increasing women's access to health, nutrition, education, training, employment and even political participation – particularly for those who face social isolation. In times of crisis ICT also provides access, consolation and help.

There are two ways ICT

that without digital literacy one cannot even find job listings and make applications. At the same time, new job opportunities are coming up in social media management, gaming, mobile apps, offshore services, crowdsourcing and micro work (data entry, cod-

es all over the world. In Pakistan voters already use NADRA SMS services, like checking their serial numbers in voters' lists and locating their polling stations.

It should not stop there. Increasing transparency and empowering citizens through crowdsourcing, record-keeping and tracking government data and local demographics, all are possible today with ICT.

What needs to be done?

It is not being claimed here that ICT could implement SDGs on its own. But it is obvious that ICT's contribution in achieving the SDGs can be colossal. Therefore, considering that our parliament took ownership of these goals, we should start according ICT a much higher level of attention so that all ministries and provinces follow.

To productively use ICT for achievement of SDGs, the barriers to ICT adoption will have to be removed. The enormous amount of required content in several languages cannot be created by IT ministries. Neither would the private sector do it on its own.

The government has to start removing these barriers. In the very short term, let tax-free ICT devices flood our markets and unleash the creative energies of our youth.

The writer is former CEO of the Universal Services Fund and is providing ICT consultancy services in several countries of Africa and Asia



helps green energy (a) by using low-power renewable energy solutions (b) by sustainably managing cities through applications like smart buildings, intelligent transport systems, new efficiencies in energy consumption and waste management, not just for urban inhabitants, but also for the sustainability of the planet. For economic growth and decent work, ICT skills are so important

ing, tagging, etc).

Pakistan is ranked among the top three countries where a large number of online freelancers do this kind of work. The numbers could be made to rise exponentially by removing some ICT related barriers.

ICT is increasingly acting as a powerful aid in electoral process-

Drone Technology: a climate smart invention in agriculture

scheduling and nutrients management.

Crop spraying

Nutrient stress in filed crops is a major yield limiting constraint. Whereas, climate change has pronounced this limiting factor

there is deficiency in some patches. Nonetheless, use of drones for exogenous application of nutrients to specified area is time, cost and nutrient's quantity saving technique. Exogenous application of these nutrients on crops definitely improvestheir efficacy and fulfill



more. However, foliar spray is prompt solution when crop is in severe nutrient stress. But, it is not wise to spray all fields when

crop requirement. Aerial spraying with drones is very effective to control under-ground water pollu-

tion. This is also a very instant approach to compensate deficiency of nutrient due to unavailability of timely sources.

Irrigation

Water is very precious gift of Allah Almighty for all living organism. In agriculture, water is central pillar of crop husbandry. It has prime role in biosynthesis and translocation of starch, and helps in transportation of nutrients from soil to plant body. But availability of water is being limited due to change in climate. Moreover, climate change is likely to; a) Increase water demand b) Shrinking water supplies and c) Damaging water quality. In the face of climate change, drone-shave been equipped with hyperspectral, multispectral, or thermal sensors. These sensors can identify any part of field which are dry or need improvements.

Health Assessment

It's essential to assess crop health and spot bacterial or fungal infections on trees. As soon



as a sickness is discovered, farmers can apply and monitor remedies more efficiently.

Way forward

It is need of time to make this technology accessible for common famers of Pakistan. So following things should be done by Govt. of Pakistan;

- Import this technology from developed countries and subsidies it so farmer can easily purchase them

- Create awareness among masses and explore its potential benefits
- Develop capacity of stakeholders including academia, researchers, extensionists and farmers
- Demonstrate this technology at farmer field
- Give crop insurance to farmers

The author is a scholar at Department of Agronomy, University of Agriculture, Faisalabad.

Making science fun

KARACHI: Unshackled from conventional classroom techniques that have compelled many young, aspiring scientists to desert their passion for science, the social enterprise Science Fuse hosted the event with the aim to “create a generation of scientists, innovators and thinkers in Pakistan.”

oms and molecules. One such example was how she referred to the water molecule as the “Mickey Mouse Molecule” due to the arrangement of the hydrogen and oxygen atoms. With theoretical concepts supplemented and complemented with practical demonstration, soon enough



Dozens of nervous children had earlier trickled in to be welcomed by tables adorned with test tubes and materials right out of a science lab, and many aspiring “Dexters” shared excited glances, in anticipation of what was in store for the science class they had registered for. And to welcome them was founder of Science Fuse, Lalarukh Malik and her team, all geared up to make science fun and exciting for children in Pakistan.

Ms Malik used wit and examples relatable to children to explain various scientific concepts such as describing how matter surrounds us, and how it is made up of at-

the children had rolled up their sleeves and were busy conducting experiments.

Amid excited chatter, and with trepidation, children poked and probed with plastic spoons the slime they had created, and soon enough bravely ventured into using their hands after the Science Fuse team assured them that it was safe to do so.

Nudging children towards self-discovery without belittling them was a clear prerogative of the two-day workshop, and Malik and her team treated the children like adults, holding them account-

able when working in groups, and allowing them a certain level of independence to freely explore within the limits of safety.

Calling herself a science communicator, Ms Malik has studied molecular biology and biotechnology at the University of Oslo, and her venture holds science camps in collaboration with different schools in Karachi and Lahore where the turnout, she explained, has been overwhelming.

Science Fuse also hosts paid programmes where children can register for inquiry-based STEM (science, technology, engineering and mathematics) programmes, and some of the proceeds generated are directed towards pro bono programmes at charity schools.

“There is a need to create informal learning environments after school. Also, schools need to incorporate hands-on, immersive, and interactive science activities into their curriculum as there is a general perception in Pakistan that science is not entertaining,” explained Ms Malik.

The teaching of subjects such as chemistry and physics has seen much change and flexibility in the modern world, with more interactive and practical learning in the laboratory preferred over textbook theoretical teaching. As a result science is progressing by leaps and bounds. This, unfortunately, is clearly lacking in Pakistan, and many argue that the country’s regressive outlook on teaching science needs to be immediately rectified if there is any hope of salvaging it. ♦

11 year old tech prodigy wows professors at ITU

Lahore: Mohammad Raza is not your average 11 year old boy. While his peers go to school, play cricket and scrape the occasional knee, Raza sits in front of a computer and codes.

Raza’s computer.

Then began a process of self learning via YouTube videos. After seeing Raza’s affinity for programming, the same family friend later installed the coding language



He builds software that can help catch most wanted criminals and create language predictors that no one in the market has been able to develop yet.

Yes, he does go to school, but instead of English, Mathematics and Geography, Raza sits in on undergraduate and masters level courses at Lahore’s Information Technology University (ITU) and scores significantly higher than his classmates.

Raza was introduced to programming by a friend of his father’s who downloaded the programming language, GW Basic, onto

C to his computer as well.

He was nine at the time when his parents moved from Karachi to Lahore to set up a printing business which could not do well. Subsequently, financial constraints became a roadblock between Raza and regular school education.

Around the same time, Raza’s father saw a story on the news about a recently concluded robotics exhibition at ITU. Through a common friend, he met with Talha Rehmani, a faculty member at the university, and tried to convince him of his child’s prowess in programming. ♦

HEC shut down 31 PhD and 26 MPhil programmes last year

HEC: The Higher Education Commission reviewed 293 PhD programmes and 57 MPhil programmes of 171 universities last year, of which 31 PhD and 26 MPhil programmes were shut down as they did not fulfil minimum quality standards, HEC officials told The News on Wednesday.

Sharing the performance of the HEC in 2016, the officials said the commission had also received 198 plagiarism complaints since 2006, of which 160 cases were finalised; 90 complaints proved to be false, and 38 faculty members were blacklisted. About 38 cases are under process and six cases are subjudice.

The officials said pursuing the HEC policy of no compromise on quality and governance of higher education institutions, the commission took many new steps last year to strengthen the country’s higher education sector.

They said last year the HEC had launched the first phase of establishing sub-campuses of different universities and degree awarding institutions in 31 districts of Pakistan.

The project aims at opening 16 campuses of public sector universities in those districts which have the potential intake of 1,000 to 1,500 students in addition to setting up campuses of the Virtual University in districts where the population is relatively thin.



The second phase of the project will cover another 35 districts.

Fifteen Virtual University sub-campuses will be set up including two in Gilgit-Baltistan, one in FATA, five in Balochistan, one in KPK, four in Punjab and two in Sindh.

The officials also said last year, the commission had inaugurated the Cloud Data Centre to facilitate universities in becoming part of the world-class research environment. The building of the Centre has been donated by Huawei Technologies. ♦

Agreement to provide 3G services to remote areas of Balochistan signed

MOITT: Finance Minister Senator Mohammad Ishaq Dar said that government was determined to promote digitalization all across the country for increasing outreach and access to financial services to people for sustainable development.

The Finance Minister was speaking at the signing ceremony between Universal Service Fund (USF) and Ministry of Information Technology for laying optic fibre at Awaran and Lasbela the contract of which has been by Universal Service Fund to Pak Telecom Mobile Limited worth Rs 2.3 billion. He said the government was

working for technical and financial inclusion to provide better services to the people all across the country.

This project will provide Mobile Broadband Internet 3G services to the population in the yet unserved areas of Awaran-Lasbela Lot consisting of identified unserved 269 Mauzas in Balochistan with an approximate unserved population of 196, 177 covering an area of 39, 434 Sq.Ft.

Finance Minister said that the national exchequer earned as many as Rs160 billion through six transparent auctions of telecom spectrums adding that the earning



from the spectrum is expected to reach to Rs200 billion.

He said that earlier only Rs50 billion were estimated from the auction of the telecommunication spectrum, however, with diligence and transparency mechanism there has been a multifold increase in the earnings.

Chief Guest of the ceremony Finance Minister Ishaq Dar reiterated government’s resolve to provide the internet and mobile access across the country, adding even the remote areas would also be covered in the network to promote digitalization. ♦

Outdated computer science syllabus being taught

FBISE: Students at schools and colleges affiliated with Federal Board of Intermediate and Secondary Education (FBISE) are being taught an outdated syllabus for computer science.

The classes of 9, 10 and 11 are being taught from books based on the 2002 curriculum.

“Many new developments have

taken place in information technology since then,” said the teacher of a school in Islamabad.

State Minister for Federal Education Balighur Rehman directed the FBISE to change the old curriculum when the matter was brought to his notice.

Following complains about old syllabus, the minister called a meeting

of FBISE officials and directed their chairman, Ikram Ali Malik, to teach students from books based on the 2006 curriculum.

According to the statement, the minister has directed the FBISE chairman to provide new textbooks to students before the start of the new academic session in April 2017.

When asked, the FBISE chairman said the computer science books based on the 2006 curriculum had several mistakes and that the board had no option but to continue conducting exams on the basis of old books. ♦

'Recommendations for Pakistan's National Water Policy Framework': HF

C2 LUMS: The Lahore University of Management Sciences (LUMS) today hosted a panel discussion for the launch of Hisaar Foundation's Report 'Recommendations for Pakistan's National Water Policy Framework' for the consideration of the government.

The event was a culmination of two years of consultations, including discussion sessions with various water stakeholders across the spectrum, as well as two international water conferences that focused on water cooperation and water security. The recommendations are part of the first report of Hisaar Foundation's think tank on Rational Use of Water.

The recommendations focus on five main areas for further action.

These include improving water access for the poor and landless,



financing the urban and rural water value chain, safeguarding the Indus Basin and its infrastructure, improving water institutions and their management and governance, and finally building a base for science, technology,

and social aspects of water.

The goals of the recommendations for Pakistan's national water policy framework call for extending irrigation system to arid districts of Pakistan. It also calls for creating new storages and enhancing existing storages at different levels. The policy framework calls for improvement in water efficiency by 10 percent. It also calls for increasing pro-

ductivity in agriculture.

The policy framework recommends preserving, repairing and maintaining the existing water infrastructure. It also calls for a reversal in abiyana to realise the true value of water. ♦

Pakistan 4th largest country to provide medical practitioners to USA

PMDC: Pakistan is the fourth biggest country to provide doctors to United States and at present 12000 Pakistani physicians and specialist doctors are working in different states.

It is expected that in near future Pakistan will become the third biggest country to provide doctors who fulfill the demand for international doctors in the USA, says a press release.

This was informed during a visit of a delegation led by Dr. Humayun J. Chaudhry President and Chief Executive Officer of Federation of State Medical Boards of United States to offices of Pakistan Medical and Dental Council (PMDC).

A detailed presentation of PMDC functioning was given to him by President PMDC.

PMDC arranged visits for the delegate in public, private and

military medical dental colleges i.e Army Medical College, Rawalpindi Medical College, CMH, Holy Family Hospital etc to brief about the medical and dental educational system of Pakistan.

Meanwhile, Dr. Humayun also attended a seminar regarding Pakistani medical and dental curriculum and licensure in Holy Family hospital jointly organized by PMDC and Rawalpindi Medical College.

The delegate Dr. Humayun Chaudhry appreciated the system of medical and dental education in Pakistan. He said out of 12,000 doctors in USA, 3100 doctors graduated from Dow University of Health Sciences, 1900 from King Edward Medical college and others from Agha Khan university and also Allama Iqbal Medical College Lahore. ♦

Pak students to participate in SpaceX Hyperloop Pod Design Competition 2017

C2 GIKI: A talented and passionate Pakistani team is participating in SpaceX Hyperloop Pod Design competition. This time a joint consortium of Pakistani universities including LUMS, PIEAS, GIKI, NUST to participate in SpaceX Hyperloop Competition.

This year Team Pakistan if qualify, they get to present their idea in front of SpaceX engineers after which Team Pakistan will be able to build its pod and race it at SpaceX headquarters at Hawthorne, Cali-

fornia, USA in the summer 2017.

The initial qualification is a huge thing in its self since this year even more teams have applied and the competition has sky rocketed. Al-



though, Team Pakistan do not have an official status as of yet but they think they are the only team from Pakistan to have made the cut.

Ali Mannan Tirmizi from LUMS (Team member) stated that, "Our team has come up with the design and is currently running simulations and tests, all the while improving its many aspects. We are looking for potential sponsors who can partner with us shape the future of travel, by financially backing the construction of the pod." ♦

NUST awards degrees to 201 undergraduates

C2 SECS: NUST School of Electrical Engineering and Computer Science (SECS)'s 201 students were conferred degrees in the disciplines of Electrical Engineering, Software Engineering, and Computer Science at its 9th undergraduate convocation.

According to a press release issued here said, only a day after its postgraduate convocation, School of Electrical Engineering and Computer Science held a graceful graduation ceremony for the undergraduate batches here at the university's main campus.

Khurram Rahat, Managing Director of Teradata in Pakistan, Afghanistan, Bangladesh and Sri Lanka presided over the convocation proceedings, Prominent among others were people from academia, public and private sector organizations and parent of the graduates.

The chief guest, in his address, complimented NUST on having risen to global prominence by developing its academic and research infrastructure on the most modern lines.

He said that NUST had set precedents based on quality and merit, and that the other national universities needed to follow suit. It was for this reason, he added, that its graduates always remain in demand of the corporate sector.

He lauded the university for aligning its R&D endeavours with the Quadruple Helix Model, which would augur well for the socio-economic uplift of Pakistan.

Congratulating the graduates on their meritorious achievement, he encouraged them to transcend themselves as professionals and, in so doing, inspire the world with their compassion. ♦

Prof Asad A Abidi to hold Abdus Salam Chair

C2 LUMS: Prof. Asad A. Abidi, distinguished Chancellor's Professor of Electrical Engineering at the University of California, Los Angeles (UCLA) will be the inaugural holder of the Abdus Salam Chair at the Syed Babar Ali School of Science and Engineering, at the Lahore University of Management Sciences (LUMS).

An inspiring teacher of the sciences and engineering, Prof. Abidi is renowned the world over for his ground breaking developments in single-chip radios. Electronic devices and circuits attributed to his research form the basis of many of today's mobile devices.

Prof. Abidi is the recipient of the IEEE Donald O. Pederson Award in Solid State Circuits (2008), the highest award in his field. He is an elected Fellow of the US National Academy of Engineering and The World Academy of Sciences (TWAS).

TWAS was founded in 1983 by Professor Abdus Salam. Profes-

sor Abidi has been a Fellow of the IEEE since 1996 and in 2015 The University of California, Berkeley, recognised him as a distinguished alumnus for his contributions to the theory and practice of analog and RF circuits.

The Abdus Salam Chair was endowed to honor Pakistan's only Nobel laureate in Physics, and reflects LUMS's commitment to the uplift of science and mathematics in Pakistan and the region. Salam's mathematical genius combined with his impassioned global activism for the cause of education and science in the developing world gives impetus to LUMS's goal of attaining excellence in education and research in the service of development and economic emancipation.

Professor Abidi's appointment as the inaugural Holder of the Abdus Salam Chair promises new opportunities to enrich the scholarly life at LUMS as well as Pakistani academia at large. ♦

Convocation of PNEC held at Bahria Uni

C2 BU: The 28th Convocation of Pakistan Navy Engineering College (PNEC) was held at Bahria Auditorium. Rana Tanveer Hussain, Minister for Science and Technology was the Chief Guest at the occasion.

361 graduates were awarded degrees at the convocation out of which 80 received Masters Degrees whereas 281 received degrees in the discipline of Bachelors of Engineering and Management Information Systems. To acknowledge the outstanding academic performance of students in their respective disciplines, 39 medals were also awarded to the position holders which included 20 President Gold Medals, 06 Chief of the Naval Staff Gold Medals, 07 Chancellors' Silver Medals and 06 Rector Gold Medals. ♦

Agri innovation expo held at PMAS-AAUR

C2 AARU: Pir Mehr Ali Shah Arid Agriculture University Rawalpindi (PMAS-AAUR) organized Agri. Innovation Expo. & Food Gala 2017, here on Tuesday, with an aim to highlight innovative creative business agriculture products developed by students and to provide them entrepreneurship opportunities in order to cope with the challenge of unemployment.

The Expo will also provide an opportunity to access the potential of Pakistan's agricultural market and to bring together all stakeholders from the public, private,

academia, social sectors on one platform to explore new technologies/innovations in the field of food & agriculture sector.

The event was organized by PMAS-AAUR, University Institute of Management Sciences (UIMS) and Office of Research, Innovation & Commercialization (ORIC). Prof. Dr. Rai Niaz Ahmad, Vice Chancellor PMAS-AAUR, while addressing, said that it is need of the hour to strengthen industry-academia linkage to endorse business activities and PMAS-AAUR is playing its due role in this regard. ♦