

Emerging Irrigation Technologies to Fight Drought

Water is a finite but crucial resource, especially in the case of agriculture. Worldwide, agriculture accounts for approximately 66% of water diverted from natural sources for human use and 85% of water consumption. Irrigation has been a tool to address the challenge of massive water consumption in agriculture. Continuous development with emerging technologies is trying to make irrigation more efficient.

For centuries, our farmers relied on flood or furrow irrigation methods. However, new approaches like Micro-Irrigation (also known as drip irrigation) are growing fast in the world. Drip irrigation is used to help irrigate crops in challenging terrain and with limited, expensive water supplies. Drip irrigation consists of a network of plastic pipes and emission devices that delivers water and nutrients directly to the soil and roots at low pressure and flow rates while allowing easy access to the field for cultural operations, sometimes even when irrigating. Considering the potentiality, India formed a task force to trigger the implementation of micro irrigation. Under which Andhra Pradesh Micro Irrigation Project (APMIP) started its journey in 2005 with 8 lakh ha area coverage, 5 lakh ha in Gujrat and with 2 lakh hector land in 2007 at Tamil Nadu and so on. Thus, they saved 59 BCM (Billion Cubic Meter) water valued Rs.45000 crore, energy valued

Rs.38000 crore, fertilizer valued Rs.18000 crore. It was also accounted for additional income of farmers by increased yield valued Rs. 64000 crore.

Subsurface Drip Irrigation (SDI) is a specialized sub-set of drip irrigation where dripline or drip tape “lateral lines” (tubes buried beneath the crop rows) and supply and flushing “submains” (pipes supplying water to the lateral lines) are buried beneath the soil surface for multi-year use. The SDI technique is now being used throughout the world on a wide range of grain forage and fiber crops including alfalfa, corn, cotton, soybeans and sugarcane. In addition to drip tape, thinwall integral driplines are commonly used as well.

Introducing such resource saving technologies for irrigation can help our farmers to survive and thrive during the drought seasons. It will also prevent the overuse of groundwater. However, we need proper localization and adaptation of the technology and tools before field applications. A cost-benefit analysis of the methods and technologies will help our farmers and stakeholders to take informed decisions while adopting these.

Dr. F H Ansarey
Executive Director
ACI Agribusiness



Early stage of cotton on drip irrigation



Maize under drip irrigation

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Requirement for industrial grade potato in Bangladesh

Potato is a staple crop in Bangladesh, where around 8.6 million tons are produced annually. Over 90% of this production is used for table purpose, which is suitable for cooking rather than the processing industry. At the moment production has surpassed demands; in addition with the high cost of cold storage, it has become less profitable for farmers. To increase profitability of farmers and long term growth of the crop, the future lies in breeding also Industrial grade potato.

The Tuber Crops Research Centre (TCRC) at the Bangladesh Agricultural Research Institute (BARI) is the only involved government research centre for potatoes. It has till date developed around 61 varieties, some of which have also gained popularity in the processing centre industries. Private companies have brought international varieties and released them in the local market, out of which Lady Rosetta, Courage, Asterix and Granola are being used in the processing industries to make chips, French fries and flakes; but yet the standard quality required has not been met.

Processors seek industrial varieties of potatoes with higher yields and higher dry matter content. High dry matter content (>20%) is required for efficient processing and better quality of the finished product. Another requirement is of larger tuber (100gm) for making

French fry. It has been estimated that around 5% farmers grow industrial varieties, which is not enough to meet the demands of the processing industry. Hence processors acquire table potatoes, often leading to a 25% loss in production. It has been estimated by surveys conducted by the Agriculture Value Chains program of the USAID that there is a demand of 55,000 MT of industrial grade potato in the country with a rising rate of 10% per year.

The demand generated can be met if both the private and public sectors through Public Private Partnership can form a strategy to expand the industrial grade potato production by developing varieties jointly and then assisting in its adoption at the farmer level. Promising germplasm can be acquired internationally and then acclimatized or bred into the popular varieties of the country. Other molecular breeding techniques such as positive negative selection and TILLING can be utilized to breed a standard variety of industrial grade potato.

The support of Ms Adeeba Raihan and Ms. Momena Khandaker is highly acknowledged.

Prof. Lutfur Rahman

Advisor, ACI Agribusiness & Head of Advanced Seed Research & Biotech Centre



Innovation and New Products

LinPRO-R

LinPRO-R is an effective source of omega-3 for cattle body. It is a unique blend of natural plants to produce an extremely digestible, palatable and nutrient-dense feed product. It has a beneficial impact on animal health, reproduction and growth. When incorporated in livestock diets, omega-3 fatty acids can be transferred into the end product, resulting in a healthier food alternative for consumers. LinPRO-R contains Crude Fat 20%, Crude Protein 20%, Crude Fibre 7%, Vitamins 8, Mineral q.s to 100%. It increases

omega-3s fatty acids into the beef and milk and improves reproduction rate of cattle. LinPRO-R reduces pregnancy losses, increases body growth rate, and improves overall health condition. It also decreases somatic cell count and prevent mastitis while maintaining milk composition and increasing milk production. It is manufactured by Oleet Processing Ltd. (Canada) and launched by ACI Animal health on 6 December 2015. It is available as 1kg sachet.



Plex-5

On 7 December 2015, ACI Animal Health launched Plex-5, which is a super water soluble premix of highly available source of organic bound Zinc, Manganese, Copper, Cobalt, Iron with Glycine which is a kind of Amino Acid. It contains Zinc (Zinc Glycinate 26) 5.15%, Manganese (Manganese Glycinate 22) 2.86 %, Copper (Copper Glycinate 24) 1.86%, Cobalt (Cobalt Sulphate Heptahydrate) 0.18 %, Iron (Ferrous Glycinate 20) 1.00%, Glycine (Amino Acid) & carrier q. s. to 100.00 %.

In case of poultry, Plex-5 ensures better weight gain and improved immunity after vaccination. It also helps to improve laying and hatching rate, to remove loss of appetite and anemia. In case of Cattle, Flex-5 helps to prevent milk spoilage by decreasing somatic cell count, to improve milk production. It also reduces hoof problem of animal and removes anemia. Plex-5 is manufactured by Phytobiotics (Germany). It is available in 100 gm sachet.



Events and Activities

Fertilizer Recommendation made Easy with Soil Testing Kit

On 6 December 2015, scientists of Transchem Agritech, India demonstrated soil testing kit at Soil Science Department of Dhaka University and Sher-E-Bangla Agriculture University. A field demonstration was also held on 7 December 2015 in the farmers' field at Sadar, Netrakona with the presence of Agriculture Officer, Farmers, Traders and ACI Fertilizer Employees including Business Manager, General Manager, Regional Manager, Area Manager and Marketing Officers. These demonstrations took place as ACI Fertilizer has taken an

initiative to develop the soil testing based fertilizer recommendation in the field with the support of Grameen Intel and Transchem Agritech Private Ltd, India. Transchem Agritech, India developed a soil testing kit which is used for testing pH, Organic Carbon and Nutrient status in the soil. The kit is very cost effective and can be easily carried from one place to another. ACI Fertilizer plans to ensure the availability of the soil testing kit and the development of mini lab facilities for valued customers all over the country.



Collective Effort expedites Demand for Organic Fertilizer & Micronutrients

ACI Fertilizer has conducted 200 Retailers Training Program, 3000 Farmers' Training Program, 300 Group Campaigns, 400 Result Demonstrations under the projects in 2015. As a result, the use of commercial Organic Fertilizer and Micro Nutrients is increasing day by day. The aim of these initiatives is to make farmers understand that organic fertilizer and micronutrient bring yield benefit. For this, ACI Fertilizer has partnered with different development agencies and DAE. Currently, the Business is working with SwissContact under M4C

Project; Katalyst & Innovision under Balanced Fertilization Project; Winrock under WEA Project; SFDF and DAE under IAPP Project. Under the partnership programs, ACI Fertilizer is conducting Farmers Training Program, Retailers Training Program, Group Campaign program, Result Demonstration and Field Day to promote balanced nutrition and micronutrient. More than 150 people are working in potential areas in this regard. The business is also growing at a satisfactory level with 30% growth over last year.



Events and Activities

New Year Eve Halkhata of ACI Motors



On the eve of New Year 2016, ACI Motors arranged a number of Halkhata in different areas of the country during the month of December. These events were arranged in Thakurgaon, Dinajpur, and Jessore areas. In Dinajpur area, 3 territories namely Birampur, Dinajpur and Setabganj were covered by Halkhata. Around 700 people attended the programs held during 17-24 December 2015

at those five areas. Halkhata is a centuries-old tradition of opening new financial record books on the first day of the new year (usually the Bangla New Year) with the hope of getting increased economic returns and strengthening business relations with customers. At Halkhata, clients are supposed to clear all old debts. ACI Motors enhanced customer relationship and collected a satisfactory amount of due payments from the customers during the Halkhata.



ACI Power Tiller: Meetings, Gifts and More



ACI Power Tiller Portfolio has done 7 successful mechanics meetings in different parts of Bangladesh in November 2015. More than 450 mechanics from Jamalpur, Rangpur, Bogra, Tangail, and Naogaon were engaged through these meetings. Participants received

different branded promotional items of ACI Motors as gifts. ACI Motors always followed an approach to serve and engage local people in different ways. These engagement programs are part of the approach to reach and serve its end customers with other stakeholders.



Future Agri Entrepreneur Contest 2015



ACI is the largest integrator in agriculture, livestock and fisheries. Also, ACI is the strongest brand in the agriculture sector of the country. Now ACI is trying to find the next agri entrepreneur through the Future Agri Entrepreneur Contest 2015 (FAEC 2015). The main goals of FAEC 2015 are to attract young people, to create opportunity for them, and to create the biggest knowledge

bank of Agriculture. The competition is divided into 4 phases: First Phase - Essay Competition, Second Phase - Sector Analysis, Third Phase - Business Plan, and Fourth Phase -Presentation (The Gala Round). FAEC 2015 is associated By Katalyst, supported By Consiglieri, and open to the students of six agricultural universities of the country. For details log on to: <http://www.universityfaec.com/>



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ENTREPRENEUR CONTEST 2015

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E-mail: universityfaec@gmail.com
#FAEC

First awarded essay submission from each university will get an attractive T-Shirt! (July 1st)

PARTICIPATING UNIVERSITIES

- Sher-e-Bangla Agricultural University
- Bangladesh Agricultural University
- IUT - International University of Business Agriculture and Technology
- Bangladesh Sheikh Mujibur Rahman Agricultural University
- Hapur Mohammad Danish Science & Technology University
- Sylhet Agricultural University

Scientists peg Anthropocene to first farmers

A new analysis of the fossil record shows that a deep pattern in nature remained the same for 300 million years. Then, 6,000 years ago, the pattern was disrupted -- at about the same time that agriculture spread across North America. "When early humans started farming and became dominant in the terrestrial landscape, we see this dramatic restructuring of plant and animal communities," said University of Vermont biologist Nicholas Gotelli, an expert on statistics and the senior author on the new study.

In the hunt for the beginning of the much-debated "Anthropocene" -- a supposed new geologic era defined by human influence of the planet -- the new research suggests a need to look back farther in time than the arrival of human-caused climate change, atomic weapons, urbanization or the industrial revolution. "This tells us that humans have been having a massive effect on the environment for a very long time," said S. Kathleen Lyons, a paleobiologist at the Smithsonian's National Museum of Natural History who led the new research. The study was published on 16 December 2015 in the journal Nature.

(Source: Agriculture and Food News, ScienceDaily. www.sciencedaily.com)



Ox team farming (stock image)

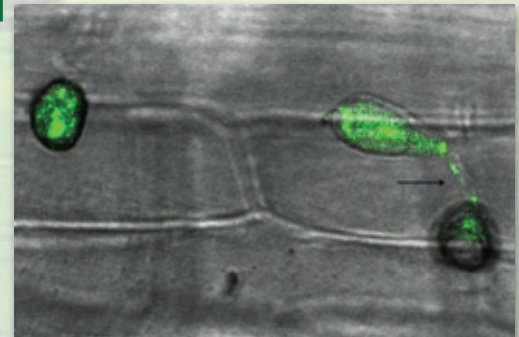
Photo credit: Pworadilok / Fotolia

Fighting rice fungus

In a "clash of the microbes," University of Delaware plant scientists are uncovering more clues critical to disarming a fungus that is the number one killer of rice plants. The findings, published in December in *Frontiers in Plant Science* and in *Current Opinion in Plant Biology*, may lead to a more effective control for *Magnaporthe oryzae*, the fungus that causes rice blast disease. The studies were led by the laboratory of Harsh Bais, associate professor of plant and soil sciences in UD's College of Agriculture and Natural Resources. The first author of both research articles was graduate student Carla Spence. The co-authors included postdoctoral researcher Venkatachalam Laksmanan and Nicole Donofrio, associate professor of plant and soil sciences, in addition to Bais.

"Rice is a food the world relies on -- it accounts for about one-fifth of all the calories humans consume," says Bais. "So it's critical to find ways to reduce the impact of rice blast disease, especially as global population is expected to exceed 9 billion by 2050, and the need for more food increases." Previously, Bais and his research team isolated *Pseudomonas chlororaphis* EA105, a bacterium that lives in the soil around the roots of rice plants and found that this beneficial microbe can trigger a system-wide defense against the rice blast fungus. Now, they have identified a stress hormone that appears to play a crucial role in increasing the virulence of the fungus.

(Source: Agriculture and Food News, ScienceDaily. www.sciencedaily.com)



The rice blast fungus *M. oryzae* infects rice plants through a structure called an appressorium.

Photo credit: UNIVERSITY OF DELAWARE/Bais Laboratory

First map of the wheat epigenome created

Scientists at the University of Liverpool have carried out the first ever genome-wide survey of heritable molecular changes that regulate gene activity in wheat, in what could become a new tool to improve crop breeding technologies. Epigenetic marks are chemical tags which physically attach themselves to DNA, and modify its function without changing the genetic code. DNA methylation is one such mechanism of epigenetic gene expression control that can be passed down to future generations. Now, developing technology has allowed scientists to study DNA methylation across the complex and challenging wheat genome.

Dr Laura Gardiner, from the University's Centre for Genomic Research, said: "Due to the sheer size of the wheat genome, undertaking a survey like this has been technically unworkable until now, but understanding how and when genes are activated is a key part of understanding its complexity. "This work opens up a whole new level of genetic variation which can be exploited by wheat breeders. In the future we see epigenetic marks becoming an important new tool in this area."

(Source: Agriculture and Food News, ScienceDaily. www.sciencedaily.com)



This image shows the wheat fields.

Photo Credit: Professor Anthony Hall

Flushed resource restores ecosystem

Every city has abandoned industrial sites. Encouraging life to return to these barren areas is a challenge. It requires a healthy topsoil for plants and animals to flourish. Cities, with their heavily compacted and often contaminated soils, often struggle to restore blighted spaces. Quality soil is necessary--but not abundant in cities. Enter biosolids. The Lake Calumet Cluster Site (LCCS) was the home of five U.S steel plants on the southeast side of Chicago. Now it's an 87-acre wasteland of glassy slag--a rocky byproduct of steel manufacturing. "It's a mess," says Nick Basta, "Sixty percent of the land is bare rock."

The site used to be a wetland, but years of infill, dumping, and excavation has rendered the area inhospitable to plants and animals. It is on the EPA's national priority list. Over the last few years, the city has tried to restore the area. The hope is that it will become a stop for migratory birds along Lake Michigan's shoreline. Restoration efforts of this scale are difficult. The original plan put forth by the restoration team was a two-inch layer of compost on the site. To Basta, this wasn't the answer. "I love compost, but it's just not good enough," he said. A good soil provides the right combination of depth, nutrients, and texture to support bacteria, fungus, insects, and worms. Compost lacks essential plant nutrients, and is easily dispersed by rain and wind. A soil teeming with microscopic life is ideal for restoring plant and animal communities.

(Source: Agriculture and Food News, ScienceDaily. www.sciencedaily.com)



Photo Credit: Nick Basta

Scientists Sequence Walnut Genome

Scientists at the University of California, Davis have sequenced the genome of a commercial walnut variety, Chandler, the first reference genome sequence for a nut crop. The information will help accelerate the rate of breeding and variety improvement in walnuts and help breeders select for desired traits such as insect and disease resistance, and drought tolerance. California produces 99 percent of U.S. commercial walnuts, which are the state's fourth largest agricultural export. Chandler was used for the sequencing project because it is the leading variety of walnut in California. The walnut genome sequencing information is publicly available at the Walnut Genomics Implementation Group website (link: <http://ucanr.edu/sites/wgig/>)

(Source: Crop Biotech Update, International Service for Acquisition of Agri-Biotech Applications. www.isaaa.org)



Increased CO2 Altered Photosynthesis Over the 20th Century

Researchers at Umeå University and the Swedish University of Agricultural Sciences have discovered that increasing levels of carbon dioxide in the atmosphere have shifted photosynthetic metabolism in plants over the 20th century. The first study worldwide, it deduced biochemical regulation of plant metabolism from historical specimens.

By monitoring plant metabolism retrospectively using historic plant samples, this research group has quantified how much increased atmospheric CO2 levels during the 20th century have contributed to plants' ability to capture the greenhouse gas carbon dioxide. They also observed shifted photosynthetic metabolism in both wild plant species as well as crops. The study analyzed different C3 plants, and calories for human nutrition. In sugar beet samples that grew at different times between 1890 and 2012. The researchers observed a change in metabolic fluxes, which can fully be explained as CO2-driven shift, without a noticeable influence of cultivars, changes in agricultural practices or by plant breeding.

(Source: Crop Biotech Update, International Service for Acquisition of Agri-Biotech Applications. www.isaaa.org)



Food security a fundamental priority at COP21

The Paris Climate Change Agreement, for the first time, has recognised food security as a fundamental priority. FAO director general José Graziano da Silva has welcomed this announcement, which has recognised the fundamental need of safeguarding food security and ending hunger, in addition to highlighting specific vulnerabilities of food production systems to the varied impact of climate change. The historic climate change summit in Paris has widely acknowledged the need to increase adaptability to climate change in ways that would not jeopardise food production. This decision follows FAO's Sustainable Development Agenda and more specifically, the Zero Hunger goal.

"Fighting hunger and climate must go hand-in-hand. FAO is highly encouraged by the fact that agriculture, forestry, fisheries and land use factor prominently in most of the Intended Nationally Determined Contributions (INDCs) – the actions countries intend to take under the new Paris Agreement – and notes that this underscores the need for targeted investment in sustainable agriculture." The parties onboard intend to prepare and maintain the INDCs. Least Developed Countries (LDCs) and Small Island Developing States (SIDS) may prepare and communicate strategies, plans and actions for low greenhouse emissions. A contribution will be made every five years by each party, according to the agreement. According to da Silva, the developments can be considered a game changer for 800mn people suffering from chronic hunger and the 80 per cent of the world's population that thrives on agriculture. These, said da Silva, are the forefront of climate change threats.

(Source: Far Eastern Agriculture, www.fareasternagriculture.com)



Stroking Helps Calves Increases Weight Gain

Gentle interactions improve the relationship between humans and animals. In a recent study published in the journal Applied Animal Behaviour Science, researchers at the Vetmeduni Vienna show that calves that were stroked by people early in their life gained weight more quickly than animals that were not stroked. This can be of commercial value for farmers, as cows produce more milk if they had a higher weight gain as calves. In conventional dairy farming, calves are separated from their mothers on the day of their birth. They are then usually kept in single pens for a period of time before being housed in groups. The animals can only develop a good relationship with humans if their caretakers have regular and gentle interactions with them.

First author Stephanie Lürzel and her colleagues from the Institute of Animal Husbandry and Animal Welfare at the Vetmeduni Vienna studied 104 Holstein calves at a commercial dairy farm in eastern Germany. Around half of the animals were stroked three minutes a day for a period of 14 days after their birth, whereas the other half was not. Lürzel and master's student Charlotte Münsch stroked the calves on the lower part of the neck. "In earlier studies our team found out that cows especially enjoy being stroked at this spot. The animals' heart rates even fall during stroking," says Lürzel.

(Source: Agriculture and Food News, ScienceDaily. www.sciencedaily.com)



Regular stroking improves the human-animal relationship.

Photo credit: Marc Decker



Believe it or not!



It is rare, but not unusual, for a **young hen** to produce an egg with **no yolk** at all!



In one day, a **honey bee** can fly 12 miles



Cows like to sleep close to their families, and sleeping arrangements are determined by individuals' rank in the social hierarchy.



The stalk of **banana tree** is composed of leaf sheaths that overlap each other and grow from an underground stem called a rhizome.

There are no **black roses** in the world! The black roses actually are deep red colored roses which look dark and gloomy.



Calorie Chart

Fresh Fruits		
Food Type	Quantity	Calories (Kcals.)
Potato	100 gm	97
Onion	Half cup (sliced)	23
Peas	Half cup (fresh boiled)	55
Carrot	Half cup/1 fresh	25
Cucumber	6 slices	5

Source: www.nriol.com

Agro Tips

Some symptoms of boron deficiency (in absence or low supply) are: dying growing tips and bushy stunted growth, extreme cases may prevent fruit set. Some crop-specific symptoms include:

- ❖ **Cabbage**- distorted leaves, hollow areas in stems.
- ❖ **Cauliflower**- poor development of curds, and brown patches. Stems, leafstalks and midribs roughened.
- ❖ **Pears**- new shoots die back in spring, fruits develop hard brown flecks in the skin.
- ❖ **Strawberries**- Stunted growth, foliage small, yellow and puckered at tips. Fruits are small and pale.

Boron is an essential micronutrient for plant growth and development, but is required in very small quantities. Although Boron requirements vary among crops, the optimum boron content of the leaves for most crops is 20-100 ppm. Excess boron can result in boron toxicity and the toxicity level varies between plants.

Sharing is caring!

Did you know that plastic water bottles can take between 400 and 1,000 years to decompose? Moreover, only 1 in 5 plastic bottles are recycled. We can hardly imagine the impact of a plastic bottle on our environment when we just randomly throw it away. Plastic bottles can become beautiful, reusable items if we can modify it smartly. Here you can see such an example in the following picture. You will just need a used plastic bottle, a scissor, an electric iron and a caring mind for the nature. You can also add colors to give it a fancy look.



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ACI Agribusinesses

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