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SAARC AGRINEWS

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Promotion of Agricultural Research and Development in SAARC Member Countries

A Quarterly Newsletter of SAARC Agriculture Centre (SAC)

Editorial

Growing of vegetables in peri-urban areas is a common practice in many South Asian countries. Such crops are invariably irrigated with untreated municipal/industrial wastewater because of its availability, low cost, high concentration of organic components and some nutrient value. However, its excessive and long-term application to arable land can adversely affect soil health, fresh water resources and groundwater quality since it contains considerable amount of metals such as cadmium (Cd), chromium (Cr), lead (Pb), nickel (Ni), and copper (Cu) which are serious source of health hazards. The municipal/industrial effluent contains considerable amount of metals contributes to the heavy metal content of soils. The heavy metals content of crops being irrigated with municipal/industrial effluent and shallow groundwater are high enough to cause clinical problems both to animals and human health. Prolonged exposure to excessive metal concentration could pose a significant threat of carcinogenesis, neuralgia, encephalopathy, respiratory cancer, mutagenesis, and cardiovascular and gastrointestinal diseases. Further, surface soil is a rich habitat of all major groups of microorganisms, i.e., bacteria, actinomycetes, fungi, and algae and are natural recyclers. These microorganisms convert toxic organic and inorganic compounds to harmless products, often carbon dioxide and water. Several chemical, biological and physical techniques are used for remediation of polluted soil and water. Conventionally, chemical and physical techniques are applied to remove heavy metals from wastewater and contaminated soils. Currently, scientists are exploring the remediation potential of biological materials such as microbial and associated biota within the ecosystem and the technique is known as bioremediation, i.e. degradation, accumulation and/or removal of pollutants. Bioremediation is an integrated management of a polluted ecosystem where different organisms are employed to catalyze the natural processes that decontaminate the environment. Bioremediation is defined as "the utilization of microorganisms to reduce or eliminate environmental hazards by mediating desired chemical reactions or physical processes". Soil is a rich habitat of all major groups of microorganisms and continuous application of untreated wastewater to the agricultural soil elevates the metal concentrations in surface soil which are toxic to bacteria and fungi. However, a long term exposure of microorganism to high metal concentration develops immunity in them. The metal tolerance of microorganisms in different areas not only for removing metals from polluted soils, but also to provide a tool for bioremediation of polluted wastewater by using these metal tolerant species. Microorganism are of primary importance in bioremediation of contaminated soils and wastewater, essentially because of their ability to alter the chemical status of the metal ions and in turn metal ions mobility through processes such as reduction, bioaccumulation, mobilization and immobilization. Among the microorganisms, fungi are very important for bioremediation due to their mycelial nature and well documented ability to accumulate metals of all kinds. Fungal resistance to heavy metals results from various mechanisms, i.e., active transport of metal ions outside the cell, masking metals by chelating, enzymatic transformation of metal ions, creating vacuoles in which metal ions are gathered and immobilization in the form of polyphosphates, increased production of melanin and other pigments, and production of specific metal binding compounds inside the cell. The removal of metals from soil and water bodies by fungi also have industrial relevance as this process not only cleans the environment and protects its biodiversity, but it also allows the recovery of the metals and their subsequent reuse.

Issue Highlights

Recent Publications of SAC

2013 Publications

SAC Monograph

The SAARC-Australia Project
Developing Capacity in Cropping Systems Modelling for South Asia

SAARC Agriculture Centre initiated an Australian- funded project on " Developing capacity in cropping systems modeling to promote food security and the sustainable use of water resources in South Asia. The immense output of the project has led to the publication, containing articles written by the trainee scientists of the project from their research carried out during the project period. The Monograph also contains some useful articles by the project team. It will be the tremendous resource and reference for the modelers and modeling activities in agricultural development in the region.

Coastal and Marine Fisheries Management in SAARC Countries

The compilation of country status papers prepared by experts of five SAARC countries with regard to coastal and marine fisheries management in the coastline of Bay of Bengal, Arabian Sea and part of Indian Ocean. Here, the authors share their experiences, knowledge and proficiency. Most of the pertinent and relevant chapters related to this book include marine environment, resources, livelihood, policy and research issues.

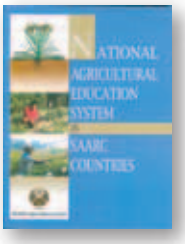
Extent and Potential Use of Bio-pesticides for Crop Protection in SAARC Countries

The book highlights the enormous wealth of botanicals with pesticidal properties in the SAARC region and the century old traditions of aromatic and medicinal plants as medicines and insect repellents we have plethora of knowledge and resources to learn and adapt. The advances made in bio-pesticide research, provides a regional perspective on the use and extent of bio-pesticide and suggests way forward to share best practices among the SAARC member countries to enhance agricultural production and food security is discussed in the publication.

Best Practices and Procedures of Saline Soil Reclamation Systems in SAARC Countries

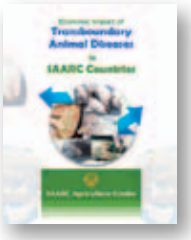
In this compilation emanating from expert inputs for the national scientists , who has worked on soil salinity and consultative process, provides a regional perspective on the salinity problem and suggests way forward to share best practices among the SAARC member countries are available here.

National Agricultural Education System in SAARC Countries



Six countries (Bangladesh, Bhutan, India Nepal, Pakistan and Sri Lanka participated in a consultation meeting organized by SAARC Agriculture Centre for reviewing the past developments of agricultural education system and examine the current status and future prospects of agricultural education in SAARC region. The compilation is holding a good number of comprehensive country reports.

Economic Impact of Transboundary Animal Diiseases in SAARC Countries



This book containing papers on the existing scenarios of prevalence, surveillance, impact and preventive measures of animal diseases for the benefits of the stakeholders of SAARC Member countries; highlights possible economic impact of diseases and compiles available information and predictions and advocates possible policy intervention for prevention and control of diseases.

Diversity of Veterinary Services in SAARC Countries

This book emphasis the existing national veterinary systems and practices, the veterinary research education extension and farmers linkage, assess the essential components of rational delivery mechanism, services of the different category of community livestock service providers and their effectiveness at the community level, the role of public and private sector, constraints and opportunities for expansion of such services in the region.

Popularizing Multiple Cropping Innovation as a means to Raise Crop Produtivity and Farm Income

It is a comprehensive study of multiple cropping innovations in the region and promotes exchange of scientific information and knowledge to adapt multiple cropping innovations in order to enhance crop productivity and farm income.

Quality Seed in SAARC Countries, Production, Processing, Legal and quality Control and Marketing System

This is a compendium of the country papers of six member countries namely Bangladesh, Bhutan, India, Nepal, Pakistan and Sri Lanka. The country papers were presented in the regional workshop on 'Quality Seed in SAARC Countries, Production, Processing, Legal and quality Control and Marketing System" held in New Delhi during 16-18 December 2009. The concept note delineated the areas to be incorporated. The book first published in 2011 and reprinted in 2013.

SAARC AgriNews

Vol. 6, issue No. 4 and Vol. 7, issue no. 1, 2 & 3

SAARC Agrinews is a regular publication of the Centre. It is a widely circulated quarterly Newsletter, devoted for disseminating agricultural research and development finding as well as information on applied technology for scientists, technologists, extension service providers, policy makers, students and farmers in South Asia. In 2013, four issues of the Newsletter have been published.

SAARC Journal of Agriculture (SJA)

Vol. 11, Issue 1 & 2, 2013

It is regular publication of SAC contains scientific papers of original research and review articles in the field of agriculture, fisheries, livestock, and allied fields from the SAARC member countries. In Vol.11 issue 1of SJA contains 13 and Vol.11, issue no. 2 contains 16 research articles.

SAC Annual Report-2012

The Centre is publishing Annual Report every year. The report represents information about SAARC Agriculture Centre's objectives, major functions and completed activities and programmes. The Annual Report is published in June 2013

Foodgrain Situation in SAARC Member Countries

Bulletin No. 16, Crop Year 2011-2012

The bulletin "Foodgrain situation in SAARC countries" provides information on major food grains in the SAARC member countries, including production, anticipated demand, likely shortfalls, surplus etc. The information will be useful for planning strategies for achieving food security nationally and regionally.

Direct seeding of Rice - A resource conservation technology for sustainable Rice production

Conservation Technology

Direct seeding of Rice - A resource conservation technology for sustainable Rice production

Declining water resources, high labour costs and drudgery in traditional transplanting have compelled the researchers to develop and optimize resource conservation technologies (RCT) so that rice tract may shift from flooded transplanting to direct rice seeding (DSR). Nearly thirty percent of total water requirement of rice is consumed in puddling and transplanting operations, besides additional water is required for raising rice seedlings in nurseries. Continued puddling over the decades has led to deterioration in physical properties of soil through structural break down of soil aggregates and capillary pores as well as clay dispersion. Puddling forms a compacted layer (plough plate) that restricts percolation of water causing temporary water-logging which confines root penetration and growth of succeeding wheat crop after rice. Direct seeding of rice (DSR) sidesteps puddling and does not need continued submergence thus reduces overall water requirement for rice cultivation (15-20% saving). Besides being more water efficient, DSR is less labour intensive and is farmer friendly and time saving. It is the best alternative option for rice growers against conventional transplanting. The yield increase in DSR is 15-22% over conventional transplanting. But application of traditional cultural methods by the farmers in DSR cultivation may give rise to few problems such as poor germination, high seedling mortality during heavy rainfall, need for gap filling in uneven fields and higher weed infestation. However, as a result of continuous research work at Rice Research Institute, Kala Shah Kaku, Pakistan improved agronomic practices to effectively address these issues have been devised during the recent years. The salient features of this DSR technology are described as under;

Land preparation

Land preparation for DSR is similar to that of wheat crop but precision land leveling is very important for proper seed germination and efficient water utilization. Use of laser land leveler will not only minimize cost of land preparation but also save irrigation water, facilitate uniform germination, increase fertilizer use efficiency and finally the crop yield.

Thus for seed bed preparation apply two dry ploughings followed by planking in the 3rd week of May and irrigate (rauni) the field. Later on when field is at "wattar" condition, two ploughings along with plankings should be done.

Suitable varieties:

Fine grain varieties; Basmati 515, Super Basmati, Shaheen Basmati, Basmati 2000, PS2, coarse grain varieties; KSK434, KSK133, KS282, IR6, NIAB-IR9 and PK386 as well as hybrid varieties are suitable for DSR cultivation.

Sowing time:

For coarse grain rice varieties the best time of sowing is 20th May to 10th June and for basmati varieties it is 1st June to 25th June.

Seed rate, sowing depth and planting method:

The seed rate for basmati varieties should be 11 to 12 kg and for coarse varieties 13 to 14 kg per acre. Higher seed rate may decrease yield by causing nitrogen deficiency, reduced tillering, higher attack of plant hoppers and increased crop lodging. Before sowing seed treatment with fungicide (Topsin M or Benlate) @2.5 grams per kg seed will save the crop from Brown Leaf Spot disease. Seeding depth should be kept 2-3 cm for better emergence and good crop stand. Deep placement of seed below 3 cm may adversely affect dynamics of seed emergence due to rapid drying of soil surface in peak summers. Seed priming enhances germination and reduces time taken to emergence that eventually results in a uniform and synchronized seedling establishment. During seed priming the seed is soaked in water for 20-24 hours and then partially dried in shade to decrease its moisture content which facilitates its free flow during drilling of seed or broadcast. Drill sowing gives better results than that of broadcast but due to non availability of DSR drill in Pakistan, sowing can be done by broadcast method.

Weed control:

Weeds are a major concern for high productivity of DSR crop. Weed control efficiency depends on timely operations particularly during early growth stages of rice crop. Weeds can be effectively eradicated prior to sowing through "Daab" system which is a common practice in wheat crop. In this system during 2nd week of May, field is irrigated.

Thereafter on completion of weeds emergence two ploughings followed by planking are done to eradicate these weeds.

In case of chemical weed control, it is mandatory to select appropriate herbicides depending upon the weed species, and these herbicides should be applied by using proper spray techniques. A common herbicide to control pre-emergence weeds is Pendimethalin. Whereas, to control all types of post-emergence weeds the recommended herbicides are Clover, Parcel, Zebra etc. (Bispayrabic sodium) or Pyranex (Bispayrabic sodium + Bensulfuron) for broad leaf weeds and sedges, application of Sunstrar gold (Ethoxy sulfuron) or Ryzelon (Phenoxulum) at 18 to 22 days after seeding is recommended. At the time of spray there should be no standing water in the field rather it should be at soil saturation condition(tar wattar) so that the droplets of weedicides are directly sprayed on the leaves of weeds. T-jet nozzle should be used for spray. Irrigation to the crop should be applied 24 to 36 hours after spray. If the weeds still persist or re-germinate after 12-15 days of spray, then repeat the spray at 35 to 40 days after sowing for complete control of weeds.

Fertilizer use

In case of basmati varieties general recommendation is to apply the full dose of phosphatic and potashic fertilizer (35 kg P2O5 and 25 kg K2SO4 per acre) at the time of sowing whereas, nitrogen @60 kg per acre should be applied in 3 equal splits i.e. at 0, 40 and 60 days after sowing, respectively. Five kg of ZnSO4 should be applied 20-25 days after sowing while in case of Boron deficiency three kg Borex powder is recommended to be applied at sowing. Boron deficiency negatively effects paddy yield by increasing number of sterile spikelets in the panicle.

Irrigation management

DSR crop does not require continuous submergence and can be safely grown by applying irrigation when hairline cracks appear on the soil. However, water stress must be avoided at active tillering, panicle initiation and grain filling stages which are very critical for achieving higher yields. First irrigation should be applied five days after seeding to enhance seed germination, and then continue irrigating the field on the appearance of hairline cracks but withhold the irrigation 15 days prior to crop harvest. It is recommended to keep the water standing for 4-5 days on application of granular insecticides. In this way under DSR 18-22% water can be saved as compared to traditional transplanting.

Plant protection

Insect and disease problem associated with DSR are mostly similar to those faced in transplanted rice. Rice stem borers, leaf folder and plant hoppers are common insect pests. For their control Padan or Cartap @ 9 kg per acre should be applied by broadcast method twice i.e. in the 3rd week of August and 2nd week of September. Dry seeded rice is more prone to the diseases of Paddy Blast and Bacterial Leaf Blight (BLB). When environmental conditions are conducive, the diseases spread more rapidly and cause severe damage. At initial stage of Blast and BLB attack, recommended fungicide (Kasumin or Nativo or Rabecide)and bactericide (Cupravit or Copper oxychloride or Champion 77WP), respectively should be sprayed to the crop twice at an interval of 8-10 days to save the crop from further disease spread. Control measures should be adopted to save the crop from vertebrate pests like rats that may cause a considerable damage.

Control of lodging:

DSR crop is more susceptible to lodging during the inter-monsoonal thunderstorms resulting in heavy yield loss. Crop lodging especially at flowering severely decreases grain yield. Lodging is more severe with broadcast sowing than drill sowing and can be controlled by irrigation management at the time of flowering and grain filling stages.

Maturity and harvest

Basmati varieties will mature at the end of October and get ready for harvest in the 1st week of November. At the time of harvesting the grain moisture contents should be 20-22 percent- a visual indication of this stage is that 2-3 grains at the base of panicle are still green but are completely filled.

Economics of DSR

Demonstration of 60 DSR plots at farmer fields in 6 districts during 2011 and 2012 to study the comparative economics of DSR and puddled transplanted rice. It revealed that in 93 percent cases the farmers obtained higher yields from DSR as compared to traditional puddled transplanted rice. However, fewer could not harvest better yield with DSR technology that may be attributed to the adoption of improper technology such as sowing in inappropriate soil moisture, deeper seeding than 3cm, delayed and improper use of weedicides. The study also showed that comparative to puddled transplanted rice, the saving in DSR was Rs.12396/- per acre. It was mainly associated to the decrease in cost of production i.e. reduced expenses incurred in land preparation (18%), irrigation water (18%) and labour charges (77%), as well as a yield increase of 17.68%. Thus the overall benefits of DSR may be summarized as that it saves labour, fuel, time and water. Eventually it is a farmer friendly technology that gives higher net returns as compared to conventional puddled transplanted rice. In the study, it was also observed that grain quality traits in DSR were equally good as in flooded transplanted rice.

Comparison of DSR and traditional transplanted crop

Method	No. of plants acre^{-1}	No. of productive tillers acre^{-1}	Yield (mnds acre^{-1})	Percent increase in yield
Direct seeded rice	280000	1120000	42.6	17.68
Traditional transplanting	59000	826000	36.2	-

Source: Mr. Rana Inayat Ali, Dr.Nadeem Iqbal and Dr. Muhammad Akhter
Rice Research Institute, Kaka Shah Kaku, Pakistan
Corresponding author: nadeemaro@yahoo.co.uk

Institutional Profile

Noakhali Science and Technology University

Noakhali Science and Technology University (NSTU) is a newly established public University in the coastal terrain Noakhali district of Bangladesh. At 11 July 2001 her government passed a law in the parliament. Its construction work was formally inaugurated on 24 March 2005. It is the fifth of 12 such Universities the government decided in 1997 to establish in the 12 greater districts where there was no University. The aim of founding a science and technology University as defined in the project pro-formal is to mold merit into skilled work force and to develop centers of excellence to create and disseminate knowledge. Innovating new technologies and developing the old ones is one of the research and development (R&D) objectives of these Universities. Its academic activities started on 22 June 2006. It has three faculties and fourteen departments.

NSTU (22'47'31"N,91'06'07"E) is being built at Sonapur, 8 kilometers Southwest of Maijdee, Noakhali. It has a land area of 101 acres (0.41 km^2) covering 93 Salla and 95 Noakhali Mouza. The site of the University is in fact a pollution free coastal area of Noakhali. Natural beauty around the University is appreciable in comparison with other Universities. The atmosphere of the University campus is very much convenient and favorable for study.

Mission and Vision

Universities of a country are the place where the leaders of a nation are created. An University is the highest place of education where the students find the world class education and a door to enter the world of immense success. And the world is heading towards a new destination of science and technology. As why science and technology Universities play vital role to create the quality graduates. These graduates will be the key of nation. To build a high quality society the Engineers and Technologist have to give their best. Noakhali Science and Technology University was established with immense hope for maintaining the high quality education. Since its establishment, it is running without any session jam and student politics. This University family is fully determined to gain its ultimate goal of success.

NSTU is one of them and one of the best public universities by virtue of its subjects. It spread the light of modern education of Science and Technology and practising wisdom in every field of knowledge.

Faculties and Departments

Student-Teachers and support staff

NSTU has about 3500 students. Most of them are undergraduate level of 14 departments while few are postgraduate students especially under the four old departments i.e. Fisheries and Marine Science (FIMS), Computer Science and Telecommunication Engineering (CSTE), Pharmacy, and Applied Chemistry and Chemical Engineering (ACCE) department. Currently, NSTU has 107 teachers with high profile academic ground.

Academic and Research Facilities

Library of NSTU is well furnished containing about 8000 books and around 500 local and foreign journals. Most important feature of this library is online library. Its construction has not been completed yet fully. When it will be started with its full bloom, students as well as other registered people of this university will be able to issue books from the library through online, and also can read the books. It is being developed day by day.

The teachers are well educated having good art of presentation. They are also very much amicable and have love and affection for the students. The curriculum of the university is high standard. Different occasions are celebrated with a great festivity. Teachers and students of this university are very united.

The construction of the university is not yet completed. Presently the campus consists of

- One administrative building (4 storied)
- Two academic building
- Two male student halls, Two female student halls (2 of these are under constructions)

Currently NSTU has 3 (three) faculties with 14 (fourteen) departments. These are; Faculty

1. Science Faculty
2. Engineering and Technology Faculty
3. Economics and Business Administration

Departments

1. Department of Pharmacy
2. Department of Fisheries and Marine Science
3. Department of Microbiology
4. Department of Food Technology and Nutrition Science
5. Department of Biotechnology and Genetic Engineering
6. Department of Coastal Agriculture

1. Computer Science and Telecommunication Engineering
2. Department Applied Chemistry and Chemical Engineering
3. Department of ICT
4. Department of Applied Mathematics
5. Environmental Science and Hazards Studies

1. Department of English
2. Department of Business Administration
3. Department of Economics and Poverty Studies

- One teacher's and officer's dormitory
- One Family Quarter
- One VIP guest house
- Vice chancellor's building and
- A Mosque.

Beside these structural facilities, NSTU has-

- Well-furnished language lab
- Rich computer lab (dual lab: Ubuntu + Windows XP) with Internet connection
- Every class room of each department are designed with multimedia projector
- Well-established laboratory in every relevant department

Other Structures and Memorials:

- Sculpture on Independence of Bangladesh.
- Fountain Pen 'Shahid Meenar'

Liberation Monoment

ARD and Emerging Issues Vs NSTU:

Founding a science and technology university in a coastal terrain like Noakhali is significant. A newly accrued coastal system may render this university a versatile field station to study the pattern of changes in the seashore and to harness its opportunities. Keeping these in mind, the NSTU initiated some exclusive department to carry out the coastal research with Coastal Agriculture and Rural Development. Some of the mentionable departments are: Fisheries and Marine Science, Coastal Agriculture, Environment and Hazards Studies, and Economics and Poverty Studies Department. Considering its potential contribution to the coastal Research and Development, NSTU now terms as Coastal Oxford of Bangladesh.

Academic system

Noakhali Science and Technology University follows a semester system for its four-year undergraduate programme. A student would take 160-172 credit hours. The four-year degree will be completed in eight terms of 22 weeks each. The first 15 weeks will be engaged for lectures, lab or fieldwork with a one-week break in the middle. Weeks 16 and 17 will be used for student's preparatory leave for the examination. Examinations will be held during the next two weeks and the results declared within the remaining three.

A course in a Term will be evaluated for 100 marks per credit hour. The evaluation components will be student attendance, 5%; quiz-assignment, 25%; and the term final 70%. Three to four books will be prescribed as the texts for any course although the teacher will follow one in Toto. The lecture schedule will show the length of materials to be covered in each lecture. A lecture not given due to a valid reason will be given on a weekend day to makeup.

Professor A K M Sayedul Haque Chowdhury, Honorable Vice-Chancellor, NSTU

A three credit hour course have three lectures, deliberations or lab exercises per week. The duration of a lab period is twice as much of a lecture period and that for a fieldwork is four times as much. Friday and Saturday are the weekly holiday.

End note: NSTU will be a place of equal opportunity for all students. They will choose and participate in activities to develop their cultural abilities and sportive feats. Jobs or studentships like teaching and research assistance or lab demonstration may be available for meritorious students. Initially the university will run a research centre to cover the research facilities for the departments. Adaptive research may be carried out through this centre based on some burning issues related to the coastal system.

Source: M. Golam Mustafa, Lecturer, Department of Fishires and Marine Science, NSTU (based on NSTU information resources)

Fountain Pen "Shaheed Meenar"

New hybrid maize developed in Nepal

Recently Nepal Agricultural Research Council (NARC) has developed and released a new hybrid maize variety "Rampur Hybrid-2", which was developed by crossing of RML-4 (CA00326) and NML-2 (CML-430). This Rampur Hybrid-2 can be cultivated and is suited for the Terai and Inner Terai (Madesh) region of Nepal. It can produced as high as 7 t/ha of grains when planted in September-Octover with adquate supply of plant nutrients (120:60:40 kg N,P2O5,K2O) along with 10-15 t/ha of compost and good management with plant population of 66,666 plants (NMRP, 2012).

Adhikary et al. (2012) reported that it can yield as high as 11.10 t/ha of grains when supplied with 180:60:40 kg N,P2O5,K2O along with 10-15 t/ha of compost at the plant population of 83,383 plants/ha. This hybrid maize can be harvested within 120-130 days..

Managing termite menace in crops

Even though termites are of great economic importance and distributed widely, very little information is available on different species of termites in India. It is reported that 190 species of termites are there attacking a wide variety of crops like cereals, annuals, shrubs, living trees and timber. Although termites are strictly tropical insects they invade the sub-tropics and to a limited extent, the temperate zone. The insects attack several agricultural and horticultural crops. It is estimated that the loss accumulated due to damage in these crops may run to several millions of rupees per year.

Important species

The important termite species invading different crops includes *Odontotermes obesus, O. wallonensisand Microtermes obesi.* Among them *Odontotermes obesus* is an important termite species which infests wheat, barley, sorghum, cotton, sugarcane, groundnut, coconut, sunhemp, chillies, mango, citrus, grapevine, peach, *O. wallonensis* is a major pest on maize, finger millet, redgram, sugarcane, groundnut, niger, castor, coconut, mango, jackfruit and cashew. *Microtermes obesi* attacks several crops like wheat, barley, oats, maize, pearlmillet, pulses, cotton, jute, sugarcane, groundnut, coconut, sunhemp, chillies, vegetables, plantation crops, potato, cassava, chrysanthemum, rose and fruit trees.

Management

- Deep ploughing or hand tillage exposes termites to desiccation and to predators, thus reducing their number.
- Pre-planting tillage also destroys the tunnels caused by termites and minimises their foraging activities and associated damage.
- Complete destruction of mounds and removal of queen termites are effective control measures against mound building species.
- Partial destruction of mounds is unlikely to solve problem if nymphs are present during the time of dequeening because replacement reproduction may develop.
- High density sowing, followed by thinning of surviving plants reduces anticipated losses due to termites.

Source: Dr. D. N. Kambrekar is Scientist,Agricultural Entomology, Regional Agricultural Research Station, University of Agricultural Sciences, Bijapur-Karnataka, Email: kambrekardn @gmail. com: Phone: 08352 230568)

Bio-remediation of municipal/industrial effluents for safe Agricultural usage in Pakistan

Challenge

Growing of vegetables in peri-urban areas is a common practice in many Asian and African countries including Pakistan. Such crops are invariably irrigated with untreated municipal/industrial wastewater because of its availability, low cost, high concentration of organic components and some nutrient value. However, its excessive and long-term application to arable land can adversely affect soil health and groundwater quality since it contains considerable amount of metals such as cadmium (Cd), chromium (Cr), lead (Pb), nickel (Ni), and copper (Cu) which are serious source of health hazards.

Intervention

A sampling survey was conducted by Land Resources Research Institute, NARC scientists to evaluate the quality of untreated insuatrial/municipal effluent for irrigation used in Gujranwala, Sialkot, Kasure, Multan, Hyderabad and Mirpurkhas peri-urban areas. Chemical analyses of the wastewater when compared with the standard guideline of wastewater irrigation (WHO/FAO, 2001); it was found that about ¾ samples had Cd and Cr, whereas, Cu and Pb contents in almost all the effluent samples were above the recommended permissible limit (RPL). However, more than ½ samples had higher Ni concentrations than RPL. Therefore, the remediation/treatment of the wastewater is vital for their safe use for food and fodder production.

Outcome

For this purpose, LRRI, NARC scientist have isolated and identified fungal strains which exhibit a great deal of heavy metal tolerance and absorption. These high metal tolerant and sorbent fungal isolates can successfully be used for bioremediation of metals contaminated wastewaters for safe use in agriculture. Similarly, lignocellulosic agricultural byproducts materials have also been evaluated for their metal sorption capacity and can also be used for bio-remediation of wastewater.

A new fungal isolate for the management of sucking pests in vegetable crops

Sucking pests of vegetables like whiteflies, jassids, aphids and mealy bugs are one of the major limiting factors that adversely affect production of pesticide free vegetables. It reduces the plant vigour and also transmit a number of dreadful viruses like cowpea mosaic virus, bhindi yellow vein mosaic virus and phytoplasma causing brinjal little leaf curl and phyllody of cucurbits. Kerala Agricultural University, with the financial support from Kerala State Council for Science Technology and Environment, is undertaking the task of isolating native fungi that can cause disease to the sucking pests so that dumping of the environment with pesticides can be reduced.

During the survey a new fungal isolate *Lecanicillium saksenae* (Kushwaha) Kurihara & Sukarno 2009, has been obtained from the soil samples of College of Agriculture, Vellayani., Kerala, India. This fungus was found to be infective to the major sucking pests of brinjal viz. white flies *Bemisia tabaci*, mealy bug *Coccidohystrix insolitus*, brown lace wing, *Urentius hystricellus*, jassids *Empoasca devastens*, chilly mite *Polyphagotarsonemus latus*, aphids *Aphis gossypi*, cowpea aphid *A. craccivora*, pod bug *Riptortus pedestris* and bittergourd leaf footed bug, *Leptoglossus australis*.

Preliminary studies revealed that the fungus is infective at 6.98×10^7 spores ml^{-1}, causing 95 to 100 per cent mortality. The time taken for infection ranged from 24 to 48 h in different insects. The infected insects ceased feeding one day after spraying and were found dead on the second day. White fluffy growth with a colour change of mealy bug from white to black was observed on the dead insect on the third day of treatment.

L. saksenae was found to grow well and sporulate in 14 days in PDA under aerobic conditions. It was found to be amenable to mass production with naturally available substrates like rice bran and wheat bran. The possibilities of utilizing this fungus in the field for the effective management of sucking pests in vegetable crops is being exploited.

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Brinjal Mealy bug *(Coccidiohystrix insolitus)*

Before infection

Infected by *L. saksenae*

Science and Technology

Banana fibre has good market potential

Banana is cultivated in Erode district, Tamil Nadu all through the year. Every year, after the plant bears fruits the main stem (called pseudo stem) needs to be removed, since the main plant starts to wither and the crop continues to grow through offshoots for two or more years.Normally farmers employ labour to either cut or uproot the pseudo stems and throw them by the roadside. For this, a farmer needs to invest Rs. 10,000 per acre as labour charge for cutting and removing the plant from the field. Very few farmers show inclination to use the stem as manure by shredding and incorporating it in the fields. They feel that it is time consuming and laborious.

Not aware

The fibre from the plant has been traditionally used for stringing flowers and in the manufacture of paper and rugs. But farmers are still not aware of the potential of fibre generation from an acre of banana plantation. As part of promoting rural entrepreneurs in the field of agriculture and animal husbandry, the Myrada KVK in Erode designed a skill training programme on banana fibre extraction for unemployed rural youth in the region. Mr. S. Prasath, an unemployed youth from Alukkuli village near Gobichettipalayam, was also a participant of this training programme. Hailing from a farmer's family, Mr. Prasath studied to be an engineer and was dreaming to become an entrepreneur. With the help of Myrada he set up a small banana fibre production unit near his village and initially produced 10 kg of banana fibre from the machine. However, he was not satisfied with the production, so he further approached the institute for a better and more efficient machine and was advised to make changes to his existing machine.

Income

"Since the innovator is basically an engineering graduate he understood our suggestions and made suitable refinements to the machine. This enhanced his production to 120 kg per day and now he produces about 5 tonnes of fibre a month. In a month he earns Rs. 4,200 as net income from this enterprise. "In addition, he provides employment to 25 agricultural labourers on a regular basis," says Dr. P. Alagesan, Programme Coordinator, Myrada. Simultaneously the entrepreneur also worked to utilise the by-products of banana fibre extraction like pith and sap water.

Trials

"In case of managing banana pith, a series of trials has been taken up at the institute to find a suitable method for composting the pith, which can be mulched into the soil. The pith compost is a rich source of soil nutrient as it helps increase the beneficial microorganisms in the soil. The sap water from the stem is being experimented to be used as dyeing material for clothes, and use for as growth promoter in crops," explains Mr. Alagesan. "Since there is a huge

demand and scope for banana fibre I am working on manufacturing bulk production, producing of yarn from the fibre and efficiently managing the waste generated from it. I am trying to manufacture household materials, agricultural inputs and handicrafts from the waste," says Mr. Prasath.

From an acre

An acre of pseudostem is required for generating about 120 kg of banana fibre a day. From an acre of land you can produce about 1,000 to 1,500 stems approximately.Roughly 10-13 stems give you around one to two kg of fibre depending upon the soil, water and plant condition. Companies willingly pay Rs 110--200 for a kg of fibre today, according to Dr. Alagesan. Apart from this Mr. Prasath is using the pith to make banana fibre pots and pellets as growth base material for nursery plants. There is a rising demand among companies to buy the fibre. Very interesting use of an apparent waste material. Nature truly is full of surprises. But it would have been nice to add what the final uses of the fibre are.

For more details please contact to Mr. S. Prasath, Mahalakshmi nagar, Modachur, Gobichettipalayam, Erode district, Tamil Nadu, India
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Visit

SAC team visited BJRI Jute Genome Centre

Professional and technical staff of SAARC Agriculture Centre (SAC) visited special Jute Genome Centre of Bangladesh Jute Research Institute (BJRI). During visit, BJRI Scientists shown the activities and important machineries of the Genome Centre. They informed that Genome Centre in Bangladesh is also working for another genome Securence of the living organisms.

Three scientists Dr. Kailah, Dr. Acharya and Dr. Dasho Namgay Wangchuk, Director General of Council for RNR Research of Bhutan (CoRRB), Ministry of Agriculture & Forests, Bhutan visited Bangladesh Agricultural Research Institute, Bangladesh Rice Research Institute, Bangladesh Agricultural Research Council, SAARC Agriculture Centre and Krishi Gobeshone Foundation on 11 February 2014.

Professional Development

Mrs. Nasrin Akter, Senior Program Specialist (Horticulture), SAARC Agriculture Centre attended a workshop on Intervention in increasing resilience of Agriculture organized by brac Bangladesh.

Agricultural Extension in South Asia (AESA)

Strengthening Extension & Advisory Services in South Asia

The Centre for Research on Science Policy (CRISP), India and the South Asia Institute for Advanced Studies (SIAS), Nepal organized a two-day meeting on "Strengthening Extension and Advisory Services in South Asia" at Kathmandu, Nepal. This was held on 14-15 January, 2014. Dr. Rasheed Sulaiman V, Director CRISP and Kamal Devkota, Research Fellow, SIAS welcomed the participants to this meeting. A total of 28 participants from seven South Asian countries (India,

Bangladesh, Bhutan, Maldives, Nepal, Pakistan and Sri Lanka) and Dr. Muhammad Musa, Senior Program Specialist (Crops), SAARC Agriculture Centre, Dhaka attended the meeting. The meeting was organized under different sessions as introduction, vision, mission, governance, functions and resource generation, issues and challenges in extension and advisory provision, priorities and ways forward

Contribute to SAARC AGRINEWS

SAARC AgriNews is a widely circulated Newsletter devoted for disseminating agricultural research and development findings as well as information on applied technology for the farmers of South Asian region.

SAARC Agriculture Centre has been publishing this Newsletter (formerly SAIC Newsletter) since 1991 and distributing it to about 6,500 readers in SAARC member countries. The Centre has been distributing SAARC AgriNews to the relevant agricultural institutions, scientists and extension service providers of SAARC member countries for better livelihood of the farmers free of cost. Please send your articles, success stories and news on applied research, extension activities, proceedings and/or recommendations of seminars, symposium, consultations and workshops in the field of agriculture with relevant photographs either by post or through e-mail. Please note that unaccepted articles are not returned to the authors.

SAC Provides ABIS through e-mail

SAARC Agriculture Centre has been providing Agricultural Bibliographic Information Service (ABIS) on different CD-ROM database. The following CD-ROM databases are available with SAC: CROP CD (2007/07), HORT CD (2008/06), VET CD (2003/11), PLANT GENE CD (2008/08), SOIL CD (2007/04), PARASITE CD (2005/07), FSTA (2007/10), CAB ABSTRACT (2005/11), TREE CD (2004/10), FOREST SCIENCE CD (2008/07), ANIMAL PROD. CD (2008/11), VETEARINARY CD (2008/8), AGRICOLA CD (2007/6) is also subscribed for renewal. If you wish to avail ABIS, please send your request to sac.cdrom@gmail.com addressing the Director, SAC. Please mention the keywords, title of CD-ROM database and the range of years for which you need the references.

Submit research or review papers to SJA

SAARC Journal of Agriculture (SJA), a half yearly publication from the SAARC Agriculture Centre is envisaged to serve as platform exchange of latest knowledge on breakthrough topics that are of current concern for researchers, extensionists, policy makers and students. It aims to capture the first-hand knowledge on research achievements in the field of agriculture, fisheries, livestock, forestry and allied subjects from the SAARC member countries. You can publish your research or review papers in our esteemed journal without any page charges or other processing cost. For author's guide lines, please visit our website: www.saarcagri.net. You are requested to submit your manuscript in electronic form via e-mail: sja@saarcagri.net or via post addressing to Editor, SAARC Journal of Agriculture (SJA), SAARC Agriculture Centre, BARC Complex, Farmgate, Dhaka-1215, Bangladesh.

Two new varieties of paddy in Sri Lanka

Fresh paddy varieties have been developed by the Ambalantota Paddy Research Institute and these novel paddy strains have been named AT 07695 and AT 06486. AT-07695 is a white samba paddy strain. The harvest can be reaped within three and half months since its cultivation. Over 130 bushels of paddy can be harvested in an acre from the same through the cultivation in the dry zone. In cultivation the above variety in an acre in the wet zone 110 bushels of paddy can easily be reaped. That is also highly resistant to paddy pests, insect and various other diseases.

AT-06486 is also a white and Samba paddy variety. Its harvest can be yielded in three months since cultivation. Over 130 bushels of paddy can possibly be harvested from this paddy strain too through cultivation in an acre in the dry zone. In the wet zone cultivation almost nearly 115 paddy bushels could easily obtained in an acre from the same. It can of resisting to paddy pests, insects and leaf diseases researchers said. According to Deputy Director attached to Ambalantota Paddy Research Station R.F. Hafeel, the paddy strains are currently passing through the final experimental stages and tests. After these tests and researches are over these two strains will be released for cultivation purposes.

Source: Sunday Observer, Sri Lanka's English Newspaper

Regional Training on Advances in Poultry Nutrition and Feed Technology

Poultry production in SAARC member countries has emerged as one of the fast growing sectors among various livestock based vocations as evident from its transformation from traditional backyard rearing to organize commercial farming over the last few decades. This sector comprises of low, medium and high input/ output systems of rearing and is providing employment to millions of people, apart from household income and nutritional security to numerous small poultry keepers in rural and tribal areas of the country. Technological support is, therefore, crucial for the sustained growth of the poultry sector. The existence of this industry is now facing challenges due to rapid increases of feed price and scarcity of feed raw materials.

Feed is the fundamental requirement for commercial poultry farming. Domestic production of raw materials for commercial feed preparation is not enough to meet the demand of feed industry. It is demand of time to produce cost effective commercial feed. To ensure balanced and quality feed production is another challenge for poultry rearers and traders. There is a numerous commercial feed industry among the SAARC region. We are not aware about the quality of the feed due to lack of knowledge and expertise.

Dr. Abul Kalam Azad, Director, SAC is addressing farewell speech.

Considering the issues, SAARC Agriculture Centre (SAC) in collaboration with Central Avian Research Institute (CARI), India organized a ten(10) days regional training on "Advances in Poultry Nutrition and Feed Technology" at CARI, Izatnagar (U.P), India during 6-15 April 2014. Total fifteen (15) participants attended from SAARC member countries namely Bangladesh, Bhutan, India, Maldives, Nepal, and Sri Lanka. The inaugural function was graced by chairperson Dr. J. M. Kataria, Director, CARI, U.P. India while Dr. Md. Nure Alam Siddiky, Senior Program Officer (Livestock) was present as guest of honour. The valedictory session was graced by chief guest Dr. Abul Kalam Azad, Director, SAC while Dr. A. B. Mandal, Principal Scientist, CARI was presided over the session. The training was initiated keeping in consideration to provide hands on knowledge and skill development of the professionals for the production of cost effective quality poultry feed formulation through the adoption of modern demand driven technologies.

The training was a great opportunity for the trainees to refresh and access themselves in newer concepts and innovations in recent techniques and technologies of poultry nutrition and feed. The hands on practical knowledge provided excellent knowledge to the participants to gain first- hand working experiences on various techniques that will broaden research aptitude in the area of poultry nutrition and feed technology. The training included the following aspects

- Determination of proximate principles in feedstuffs
- Fibre and protein assay through fibretech and kjeltech systems
- Measurement of energy value in feedstuffs
- NIR spectroscopy for feedstuff evaluation
- Using computer software for feed compounding
- Atomic absorption spectrometry for mineral analysis.
- Visit to feed plant

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