



ज.प्र.नि. समाचार

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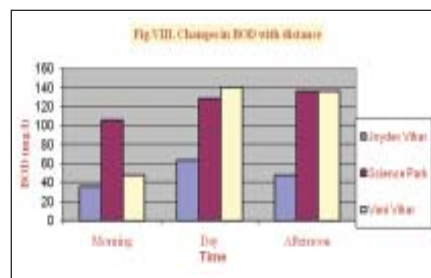
January-March, 2011

“ City wastewater reuse - A case study ”

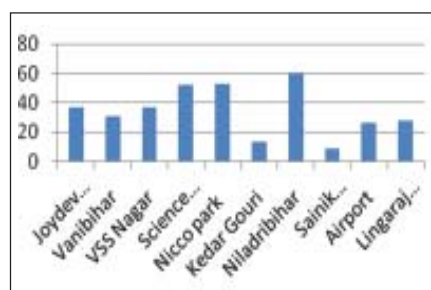
Rapidly growing urbanization leads to more wastewater (sewage water) generation. To cope up with the growing water shortage, recycling of waste and marginal water is a potential option. City wastewater is a large water resource to compensate the water shortage to certain extent. The use of untreated municipal wastewater for agriculture, is the practice in many countries, pose a whole set of different problems. Nevertheless, the contents of plant nutrients in such waters make it valuable resources for the farmers to use untreated wastewater particularly in dry seasons. However, if not managed properly, may have negative impact on environment and health. Thus, mitigation of risks need appropriate measures where the composition of city wastewater is important. In this context a case study was undertaken with the wastewater of Bhubaneswar city with the objective, 1) Characterization of wastewater of Bhubaneswar city, 2) Impact of wastewater irrigation on soil properties, 3) Qualities of paddy grown on wastewater irrigated soils. Bhubaneswar city has an undulating ridge and valley topology and is covered by number of natural drainage channels. The drainage is controlled by the Kuakhai and Daya rivers. Most of the sewage from the city reaches River Khuakai and River Daya through open drains. There are about 10

open drains in the city of Bhubaneswar discharging wastewater. The entire city has not been covered with surface water drain. The level of pollutants varied from drain to drain and spatio-temporal variations of these were also observed.

Wastewater Characteristics



Spatio-temporal variations in BOD5



BOD5 (mg/l) of major drains in Bhubaneswar

Study revealed that all the drain water samples are within normal pH range (6.5 - 8.4) for irrigation. EC and/or DS were within safe limit (0.7 EC, DS 450 mg/l) for use without any restriction. The SAR of all the water samples had less

than 3 value and have slight to moderate restriction. Higher chloride concentrations in some water samples usher slight to moderate restriction on use as irrigation. All the water samples had favorable Ca/Mg ratio (<1) and safe Na level. Fe, Mn and Zn were all within safe limits for even long term use while Cd was found in higher level. The wastewater samples from Lingaraj temple area were found highest Cd level probably contributing maximum Cd discharges to Gangua nala and ultimately to Daya river, which needs special attention. Nonetheless, segregation of Lingaraj Temple Drain from mixing with other major drains or Gangua nala could be an option which needs special treatment.

Effect on soil quality

Laboratory Study: To ascertain the effect of waste water on soil properties a leaching experiment was conducted in laboratory condition. Higher conductivity in leachates indicates some salts are washed out. Laboratory studies showed that Organic matter, Available N, Available P and Exchangeable K are increased in soil showing trend of increased fertility with wastewater irrigation.

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Effect on crop quality

Analyses of straw and grain parts of paddy samples collected from fields irrigated with both the irrigation showed that both the nitrogen and potassium are more in wastewater irrigated paddy grains and straw. Zinc and iron concentration were higher in grains in wastewater irrigated soils. Cadmium was found in lower concentration in grain part. However, while the concentrations of iron, manganese and zinc are within acceptable range, cadmium was found in higher concentration than acceptable limit in grains not only with wastewater irrigated soils but in other soils also.

Drain water samples in general are within safe range for use in agriculture while occasional moderate restrictions may be required for chloride, while Cadmium level sounds caution. Therefore, city wastewater of Bhubaneswar city has good potential for agricultural use and potential reuse options in the city itself are, watering parks, roadside gardens, recreation areas, golf courses, dust control.

Seminar/Workshop/Training

National Level Workshop

A National Level Workshop was organized on 'MDS of Health Indicators for Soil Resources under Varied Agro-climatic Water Regime in India' on 29th-30th January, 2011 sponsored by National Centre for Organic Farming, Dept. of Agril. & Cooperation GoI. Total 39 experts/scientists in the field from different parts of the country attended the Workshop and 'Minimum Data Set' for biological soil health of India was developed through



Meeting on National Initiative on Climate Resilient Agriculture Organized at MPUAT, Udaipur

Under the project "National Initiative on Climate Resilient Agriculture", a meeting was organized at AICRP groundwater centre, MPUAT, Udaipur under the chairmanship of Dr Ashwani Kumar, Director, DWM on 26th-27th March, 2011 where technical programme of two cooperating centres viz, MPUAT, Udaipur and JAU, Junagarh were presented. Dr. G. Kar and Dr. M. Raychaudhuri of the Centre were also present. They also visited the experimental sites along the Ahar River to assess the impact of extent of pollution and its impact on agriculture. They also visited the Green Bridge Project and appreciated their effort in treating the municipal sewage water.



brainstorming sessions. Dr S.Raychaudhuri, Senior Scientist was the organizing secretary for the event.

Zonal ICAR-Industry Meet organized

The third ICAR-Industry interface was held at Directorate of Water Management (DWM), Bhubaneswar under the chairmanship of Dr Ashwani Kumar, Director, DWM on 16th-17th February 2011, jointly organized by DWM, Bhubaneswar and NIRJAFT, Kolkata. The main aim of the meeting was to interact with the entrepreneurs and present the upcoming technologies in front of them and get their feedback. About 60 delegates including incharge, ITMUs or their representatives from ICAR institutes located in Eastern and North-Eastern regions, entrepreneurs and representatives from small agro-based industries participated in the meet.



Dr. Gouranga Kar, Principal Scientist of the Centre was the organizing Secretary of that event.

MoWR sponsored training on 'Irrigation management and prevention of waterlogging'

A 1-week long training programme was organized on 'Irrigation management and prevention of waterlogging' at DWM, Bhubaneswar from 2nd -7th March, 2011 sponsored by CADWM, Ministry of Water Resources, GOI and organized by DWM, Bhubaneswar. Thirty engineers were participated in that training programme. Different aspects of irrigation management for increased productivity and prevention of waterlogging were discussed in that training. Dr. Gouranga Kar, Principal Scientist was the Course Director for that training programme.



Strengthening Statistical Computing for National Agricultural Research System

The 6-days training on "Data Analysis using SAS" was organized during 17th-



22nd January, 2011 at Birsa Agricultural University (BAU), Ranchi followed by the training 2011 at Jawalal Neheru Krishi Vishwa Vidyalaya (JNKVV), Jabalpur during 24th-29th January. The last two training programmes "Data Analysis using SAS" were conducted at Central Inland Fisheries Research Institute (CIFRI), Barrackpore and at Central Agricultural Research Institute (CARI), Port Blair during 14th-19th February and 01st-07th March, 2011, respectively.

Seminar on World Water Day

On the occasion of 'World Water Day' 2011 a one day Seminar on 'Water Use in Agriculture; Challenges Ahead' was organized by the Orissa Chapter of the



Dr Gouranga Kar, Principal Scientist of the centre awarded with ICAR **National Fellow** (2011) for his significant contribution in the field



of water management and for the project "Development of GIS based rules for enhancing productivity and profitability in rainfed and coastal ecosystems and planning of mitigation strategies for climate change resilient in agriculture"

Indian Society of Water Management, DWM, Bhubaneswar. The Souvenir published to mark this occasion was released by the Chief Guest, Dr. D.P. Roy, Vice Chancellor, OUAT. A total of 50

participants were registered and 32 deliberations were held in three technical sessions. Dr. Mausumi Raychaudhuri, Senior Scientist was the organizing secretary.

FARMERS' TRAINING PROGRAMME

- Two one-day training programmes on 'Rainwater Management for Sustainable Agriculture and Rural Livelihood' were conducted in the Nuagaon and Mandapala village on 30.1.2011 and 1.2.2011 respectively under the NAIP (Component-3) project 'Sustainable Rural Livelihood and Food Security to Rainfed Farmers of Orissa'.
- Nine hundred and fifty nine farmers from Cuttack, Khurda, Kendrapada, Bhadrak and Dhenkanal districts of Orissa were trained under 7-days farmers' training programme on 'Scaling up of water productivity in agriculture for livelihood' sponsored by Ministry of Agriculture, Govt. of India.



WATER MANAGEMENT TECHNOLOGIES EXHIBITED

Exhibited DWM accomplishments in AGRIVISION at NBFGR, Lucknow from February 10th-12th, 2011, KRISHI-MAHOTSAV (State level Agricultural Fair) organized by Deptt. of Agriculture, Govt. of Orissa, Bhubaneswar (14th to 17th February 2011), in ICAR-Industry Meet for East Zone held at DWM, Bhubaneswar (17th to 18th February 2011)



AWARDS AND RECOGNITION

Dr S. K. Srivastav, Scientist of the centre awarded with Dr. R.T. Doshi Foundation Award (First Prize) for the best research article (Extent of Groundwater Extraction and Irrigation Efficiency on Farms under Different Water-market Regimes in Central Uttar Pradesh), published in Agricultural Economics Research Review.

"**Gannett Memorial Award**" on the paper entitled "Reuse options of wastewater and impact on Soil-Crop Environment - A Case Study of

Bhubaneswar City Wastewater" by Raychaudhuri, S., Ashwani Kumar, and Mausumi Raychaudhuri, awarded by Institute of Engineers (India), Orissa



Chapter. A medal and certificate handed over by His Excellency, Governor of Odisha during the Annual Day function of Institute of Engineers on 27th February, 2011.

Dr. S. Raychaudhuri and **Dr S. K.Srivastav** of the centre received Best Paper Presentation Award in the National Seminar on Water Use in Agriculture: Challenges Ahead”, 22nd March, 2011 by Indian Society of Water Management (Orissa Chapter), Bhubaneswar.

FOREIGN VISIT

Dr. S.K. Jena, Senior Scientist visited Department of Geoinformatics, and Hydrologic modelling, Friedrich Schiller University, Jena, Germany from 30th March to 5th April 2011 and participated a training programme on "Integrated Land Management System". This programme was sponsored by ICAR, NAIP C-4 project on "Design and development of rubber dams for watersheds"



Visit of Bill and Melinda Gates Foundation team

Dr. Prabhu Pingali, Deputy Director, Agricultural Development, Ellen McCullough, Associate Programme officer, Agricultural Development, and Courtney Phillips-Youman, Program Assistant, Agricultural Development of Bill & Melinda Gates Foundation and Dr. Samarendu Mohanty, Head, Social Science Division, International Rice Research Institute (IRRI), Philippines visited Directorate of Water Management and VLS Project site "Tracking Change in Rural Poverty in Household and Village Economies in South Asia" site at Sogar, Dhenkanal on 9th Feb., 2010.



62nd Republic Day Celebrated

62nd Republic Day of the Country was celebrated at the centre. Dr. Ashwani Kumar, Director, DWM hoisted the National flag and in his Republic Day address he narrated the significance of the day and highlighted the achievements of the Institute. To keep the spirit of the hard work being delivered he appreciated and urged to work more with morals and values for the benefit of the farmers and their livelihood upliftment. He also awarded the winners of the outdoor games activity on that occasion.



FROM THE DIRECTOR'S DESK

I am privileged to present the DWM News of January- March, 2011 covering the highlights of different activities of the Institute during the first quarter (January-March, 2011). The Centre contributed significantly in research, training and extension during that period. During the period a National level workshop was held on 'MDS of Health Indicators for Soil Resources under Varied Agro-climatic Water Regime in India' on 29th-30th January, 2011. The 3rd ICAR-Industry interface for East Zone was held on 16th-17th February, 2011. A one week long training was organized on "Irrigation management and prevention of waterlogging" sponsored by CADWM, MoWR, GoI. Four trainings were organized on strengthening statistical computing for national agricultural research system. On the



“World Water Day”, a National Seminar was organized on “Water use in agriculture: challenges ahead”. Nine hundred and fifty nine farmers from Odisha were trained during last three months under the scheme “Scaling-up of water productivity in agriculture for livelihood”. One Scientist has been awarded with prestigious ‘National Fellow’ of ICAR and three other scientists received awards from professional societies. During the period one scientist visited Germany and received training on “Land Management”.

I appreciate the efforts and hard work of Dr. Gouranga Kar, Principal Scientist and Chairman, Publication Committee to bring out this Newsletter in time.


(Dr. Ashwani Kumar)

Concept
Dr. Ashwani Kumar, Director

Compiled, Edited and Layout by :
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Chairman, Publication Committee