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Department of Science & Technology
Govt. of India



IIT Gandhinagar
Indian Institute of
Technology Gandhinagar

Royal Society – DST Scientific Seminar on Water, Food and Energy Nexus

2-4 March 2015

IIT Gandhinagar, India

Water, energy and quality life go hand in hand. The food we eat, the house we live in, the transports we use and the things we cannot do without in 24/7/365 determine our quality of life and require sustainable and steady water and energy supplies. Exponential growth in population and the fundamental right of having basic food and standards of living require increasing amount of water and energy. The quantity of available freshwater and energy sources which directly affect the cost of production (irrigation and energy) and transportation (energy) of food are diminishing. In addition, there is water pollution due to industrial use of water. The direct use of such water for human consumption as well as irrigation for food production is prohibitive and requires technological solutions.

Securing sustainable water, food and energy supplies are more important challenges today for scientists and engineers than ever before. This seminar will encourage academic and industrial researchers to present their stimulating and state-of-the-art research and knowledge transfer ideas in water, food and energy. The developments in energy efficient water production, management, waste water treatment, energy efficient processes for food and essential commodities will be discussed.

UK-India Water, Food and Energy Nexus Seminar

2-4 March 2015

Schedule

Day 1

Welcome and Introductions

Session 1: Water

Theme: This session will focus on seawater desalination and water management networks.

P.1: UK (Adel Sharif, Surrey University): Membrane based desalination for making freshwater

P.2: India (Sudipta Sarkar, IIT Roorkee): Addressing the Global Water-Energy Challenge through Energy-Efficient Desalination

Tea break

P 3: India (Munawar A. Shaikh, IIT Delhi): Optimal Water network synthesis

P 4: India (Subhankar Karmakar, IIT Bombay): Rationalization of Water Quality Monitoring Network

Networking and group discussions

Lunch

Session 2: Energy

Theme: This session will focus on sustainable energy sources and production

P1: UK (Sandro Macchietto, Imperial College): Sustainable energy futures – a process systems paradise

P.2: India (Ravindra D. Gudi, IIT Bombay): Green Engineering in process systems

Tea break

P 3: India (Raj Ganesh S. Pala, IIT Kanpur): Electrochemical approaches to Solar-H₂ generation

P 4: India (Naran Pindoriya, IIT Gandhinagar): Renewable energy integration for smart home energy management systems

Presentation by DST representative: Possibility of developing India UK scientific cooperation – available programmes

Open Discussion: Research base in the UK and India in Water, Food and Energy

Day 2

Session 1: Food

Theme: This session will focus on sustainable food production and management

P 1: India (Santanu Bandyopadhyay, IIT Bombay): Bio-energy and food production: Appropriate allocation for future development

P 2: UK (Chris Elliot, Queen's University Belfast): The impact of pollution and climate change on having a safe, secure food supply

Tea break

P 3: India (Pavuluri Srinivasa Rao, IIT Kharagpur): Advances in cereal processing for better value addition

P 4: India: (Punyardarshini Punam Tripathy, IIT Kharagpur): Clean energy technologies for sustainable food security

Lunch

Session 2: Water, Food and Energy Nexus 1

Theme: Water, Food and Energy are inextricably and reciprocally linked; the production of food and energy requires large volumes of water while the transportation of food, treatment and distribution of water is equally dependent on energy. This session will explore the most critical challenges, needs and opportunities associated with the relationship of water, food and energy. Process industries consumes huge amount of freshwater and also produces huge amount of waste water. This session will focus on energy efficient water production and waste water treatment

P 1: UK (Adel Sharif, Surrey University): Innovative technologies for sustainable water, energy and food production

P 2: India (Rajagopalan Srinivasan, IIT Gandhinagar): Water & Food nexus: Challenges and opportunities in the Indian context

Tea break

P.3: UK (Iqbal Mujtaba, Bradford University): Energy efficient design and operation of desalination processes for making freshwater

P 4: India (Ligy Philip, IIT Madras): Appropriate Interventions and Technologies for Providing Safe Drinking Water to Rural and Under Privileged Communities

Workshop Dinner and Networking. Workshop dinner will provide the platform for greater networking between the participants.

Day 3

Session 1: Water, Food and Energy Nexus 2

Theme: Power generation from fossil fuel-fired power plants is the largest single source of CO₂ emissions around the world adding to global warming affecting weather pattern and thus food production. This session will mainly focus on creating awareness of CO₂ emissions, global warming and carbon capture techniques.

P 1: UK (Meihong Wang, Hull University): CO₂ emission, global warming and food security: Carbon Capture with Systems Engineering Techniques

P 2: India (Anil Kumar Dixit, IIT Bombay): Environmental Improvement of Indian Rivers and its banks

Tea break

P 3: India (Babji Srinivasan, IIT Gandhinagar): Advanced control strategies for energy efficient BNR process with minimal greenhouse gas emissions

P4: India (Rajagopalan Srinivasan, IIT Gandhinagar): Resilient Supply chain management for reduction of green house gas emissions in process industries

Networking and International Collaboration

Session 2: Water, Food and Energy Nexus 3

Theme: Energy Savings in Process and Food Industries

P 1: UK (Sandro Macchietto, UK): The effect of fouling in energy consumption in refinery processes and in milk industries

P.2: India (Sunil Shah, GE): Optimization Opportunities in Gas Based Power Plants

Tea break and networking

P 3: India (Nitin Kaistha, IIT Kanpur): Design and operating strategy innovations for Improving the energy efficiency of continuous chemical processes

P 4: UK (Iqbal Mujtaba, Bradford University): Green fossil fuel

**Discussion on where to go next and enhancing collaboration between UK and India
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