

# Daily News

Wednesday, 24 August, 2011

## The virtual water trade

Ignacio Rodriguez-Iturbe is one of our three keynote speakers today at the water plenary session (IPS080, 8.30am@Main Auditorium). He is the James S. McDonnell Distinguished University Professor of Civil and Environmental Engineering at Princeton University, USA and is world renowned in his field. We are delighted in the **Daily News** to have received the following article from him in which he gives us a sample of some of the discussions that will dominate the Water Theme Day.



### Special Contribution from Ignacio Rodriguez-Iturbe:

My research in hydrology has been strongly oriented towards the

geophysical aspects of the field especially regarding its links to geomorphology, ecology and the atmospheric sciences. Nevertheless I have always been keenly interested in the role of water for food production around the world and how different hydrologic conditions impact the trade in food and thus of the water involved in the production of food commodities.

While some countries have substantial freshwater resources, others need to import water-intensive products to sustain their development. Agriculture is by far the most freshwater consuming process (80% of global use) and the food trade is an efficient way of transferring water resources to water-scarce countries, in a "virtual water trade".

My interest has been focused in the

quantitative modeling of the trade of virtual water among nations. We consider the global virtual water trade as a weighted complex network, accounting for the trade of commodities made from major crops and livestock products. In this network, the nodes represent nations participating in international food trade, and the links, weighted by the volume of water traded, represent the flow of virtual water.

We found that only 4% of the links account for 80% of the volume of virtual water traded globally. A few dominant countries (e.g. the USA, the Netherlands, Japan, and China) tend to trade large volumes of water among themselves rather than with less connected countries; this effect is known as the rich club phenomenon. A small group of nations play a key role in the connectivity of the network and in

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## Virus Warning

If you used the eastern speaker ready room on Monday or Tuesday (am) please ensure that you update your anti-virus software before inserting the memory stick



### Feature

Roundtable discussion



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Dr. Howard Wheater



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ISI General Assembly



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# The Virtual Water Trade

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the global redistribution of virtual water.

Furthermore, we observe that the relationship between the volume of water traded by a nation and the number of trade partners this nation has is highly non-linear. This means that the more trade partners a country has dramatically increases the volume of water that it trades. On average, countries doubled their number of trading partners and tripled their volume of virtual water traded from 1986 to 2007.

Importantly, the food trade has led to enhanced savings in global water resources over the last few decades, mainly from trade of wheat-based commodities. While the USA has remained the world's top exporter of virtual water over these 22 years, China has overcome Japan since 2001 as the world's largest virtual water importer, mostly because of its increasing soybean imports.

What is very interesting and of remarkable potential use, is our finding that the key properties of the global virtual water network are well described

by a model which uses as predictive variables the GDP and the annual rainfall over agricultural area in each node or country. Using these variables and fixing the total number of links among nations involved in the trade as well as the total volume of water being traded in the whole network, one is able to predict the statistical structure of the network. This type of model allows us to study the impact of different scenarios on the global structure of the trade of water for food among the nations of the world.

## Roundtable Discussion Global water crisis - the role of statisticians

The Main Auditorium, today at 17.20 – 18.30



Did you ever wonder how statistical thinking could be useful in formulating water quality and quantity objectives at the national and international water agencies? Or did you ever think statistical methods for data collection and analysis could be made available for use by national and international water agencies? Could collaboration between the ISI and the international water agencies be useful? What are the critical problems related to the ever increasing water demands made by the ever increasing world population.

The above are just some of the questions that will be raised today at the water roundtable today.

The roundtable will consist of eminent members of both the national and international organisations with a specific interest in water issues.

### Editorial

It's the Water Day! This is a first time that a whole day at a World Statistics Congress that has been devoted to one topic and, of course, the Daily News is following suit and devoting the entire issue to the topic of Water.

We are delighted to have secured articles from two of the keynote speakers at this morning's Plenary Session. On page 1, we have an article from Ignacio Rodriguez-Iturbe who is speaking about the virtual water trade and on page 3 there is an article from Dr. Howard Wheeler who is speaking about water security in a changing world.

There are two articles on page 4 related to the theme of water in China. There is an article on water shortages in Beijing and an article that helps us understand the water crisis in northern China.

Don't forget to keep an eye on the pictures that we are including on the front and back pages. Our photographer is roaming the CCD taking photos of delegates to include in these pages. More photographs are available on the [www.isi2011.ie](http://www.isi2011.ie) website.

### The Editor

#### Editorial Team:

Barra Casey, *Editor*  
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### Daily Announcements

1. If you are presenting a paper at the Congress then you must attend the Speaker Ready Room to upload your presentation. Please note it will not be possible to load your presentation in any of the scientific rooms. The further you do this in advance the better. In most cases it would be advisable to load your presentation at least the day before.
2. The ISI General Assembly meeting will be held on Thursday 25 August from 4.00pm to 6.00pm in the Main Auditorium. Members and non-members of the ISI are invited to attend. Voting is reserved to the honorary, elected and ex officio members of the ISI only. All delegates are also invited to attend the ISI and ISI Sections' Awards Ceremony preceding the General Assembly Meeting from 3.00pm to 4.00pm at the Main Auditorium.
3. The Bernoulli Society General Assembly Meeting will be on Thursday 25 August from 1.30pm to 3.00pm in Liffey Hall 2. Members and non-members of the Society are invited to participate; however, voting is reserved to Bernoulli Society members only.
4. Every delegate received a Congress Feedback Survey in their delegates pack at the start of the week. We would be most grateful if you could return the completed surveys to the registration desks in the main lobby of the CCD at your convenience.
5. The Women in Statistics Mixer is on today between 5.30pm and 7.00pm on Foyer Level 5 of the CCD.
6. Please note that the abstracts are available on the USB key in your delegate bag.

# Water security in a changing world



Dr. Howard Wheeler, the world renowned expert in hydrological science and sustainable water resource management, will be one of the keynote speakers at

today's water plenary session (IPS080, 8.30am@Main Auditorium). He has extensive international experience in studying and advising on flood, water resource and water quality issues. Dr. Wheeler currently holds the Canada Excellence Research Chair in Water Security at the University of Saskatchewan and is Director of the Global Institute of Water Security. The Institute's message is that "water is life and water security - both quality and supply - is one of the most critical issues facing our planet". Dr. Wheeler has published over 200 peer-reviewed papers and six books, and has won several academic awards, including

the prestigious Prince Sultan Bin Abdulaziz International Prize for Water.

His talk at the plenary session today will be centred on current global issues of water security related to both water quantity and quality and the implications of increasing population and development in a changing world. There are important challenges for the scientific community. For example, while hydrologists and water managers have well-developed design and simulation tools based on the assumption of stationarity, new approaches are needed to understand natural climate variability and to address non-stationary and uncertain climate futures.

Dr. Wheeler tells us that there has been a long and fruitful history of collaboration between statisticians and hydrologists. Looking to the future, such collaboration is essential, but insufficient, to address the environmental and water security challenges. Environmental change is driven not just by climate, but also by people and policy; a new paradigm of interaction with social science is needed if we are to manage uncertainty in what are complex human environmental systems and meet the challenges of water security in a changing world.

## Climate change at Lake Baikal in Siberia



Stephanie E. Hampton from the National Center for Ecological Analysis and Synthesis, University of California is today presenting the work she is currently undertaking with her colleagues at Lake Baikal in Siberia at the invited paper

session "Modelling and Monitoring Water Quality of Large Lakes and River Basins" (IPS090, 11.15am@Liffey Meeting Room 2B). The name of the paper is "Ecological Effects of Long-Term Warming in the World's Largest Lake – Lake Baikal, Siberia". The paper was co-authored with Marianne V. Moore (Biological Sciences, Wellesley College, US), Lyubov R. Izmet's'eva (Aquatic Biology Laboratory, Irkutsk State University, Irkutsk) and Stephen L. Katz

(Channel Islands National Marine Sanctuary, National Oceanic and Atmospheric Administration, Santa Barbara, US).

Climate change presents complex and uncertain future scenarios in the world's Great Lakes. Major abiotic changes have direct and indirect effects on lake food webs; the nature and extent of such past, present and projected food web changes may be better understood through the analysis of long-term ecological data sets.

An excellent opportunity for such analyses exists for subarctic Lake Baikal, the world's most ancient, voluminous and biologically diverse lake.

The authors have employed several approaches to analyse 60 years of bi-weekly data collected by 3 generations of a single family of Siberian scientists, in order to understand climate-associated changes occurring among the plankton that constitute the base of the food web.

## Developing water accounts in Canada



François Soulard, from the Environmental Accounts and Statistics Division of Statistics Canada, presents his paper today on "Freshwater Supply and Demand in Canada: Statistics and Accounts" at

the invited paper session "Filling the Gaps: Improving Coverage, Data Quality, and Institutional Arrangements for Water Statistics" (IPS091, 11.15am@Wicklow Meeting Room 4).

Canada, more than most countries, benefits from readily available sources of freshwater. This explains why Canada is often perceived as a water-rich country. However, the amount of water that is available to ecosystems and citizens varies widely across the country, and so does

water use. Until recently, there existed no systematic measurement of the spatial and temporal distribution of water renewal and water use for Canada.

The publication of Freshwater Supply and Demand in Canada in September of 2010 was the outcome of years of development and inter-departmental cooperation. The water yield model and time series analysis is the result of innovative work involving different groups inside StatCan, but also

relies on inter-departmental information and cooperation.

A good set of national water use data resulted from several new surveys funded through the Canadian Environmental Sustainability Indicators initiative. The use of a national digital drainage area framework, of standard classifications, and the guidance offered by SEEA-W, all helped to produce statistics that are nationally coherent and internationally comparable.

# Water shortages in Beijing



Beijing is a city which is seriously short of water. So say Professor Minxue Gao and Yachun Gao, both from the School of Statistics at Renmin University of China who are presenting a paper today on "Water Resource Accounting and Statistical

Analysis of Water Use in Beijing" which forms part of the invited paper session on "The Economic and Social Impact of the Water Problem in China" (IPS104, 3pm@ Wicklow Meeting Room 3).

The rapid growth of population together with increasing competition for water between agriculture, industry and domestic users has resulted in unprecedented pressures on water resources in Beijing. In order to ensure the sustainable development of Beijing, the Beijing authorities will need to implement strict water resource management and

substantially increase water use efficiency.

The purpose of the author's paper is to provide a mechanism for decision-making in order to improve the management of water resources in the city given the recent dramatic changes in the industrial structure. Data is sourced from both the Municipal Water Bureau and the Beijing Statistical Bureau.

The paper establishes a water accounting framework by combining the ideas of water resources accounting and input-output accounting. Considering that households

consume a large amount of water, this paper improves the traditional input-output table based on household production and consumption accounting theory by incorporating the household sector into the first quadrant and third quadrant of the Beijing input-output table. Combining the water use data and the improved input-output table, the authors have constructed the water input-output table. The purpose is to discover which sectors should be restricted in the water resources management process and which sectors should be encouraged in the future.

# Understanding the water crisis in Northern China



Jikun Huang and Jinxia Wang are Director and Deputy Director respectively at the Center for Chinese Agricultural Policy in the Chinese Academy of Sciences in Beijing. Both authors have many accolades in research and public service behind them and today they will present their paper on "Understanding the Water Crisis in Northern China:



What Government and Farmers Are Doing" at the invited papers session on "Model Natural Resources with Uncertainty" (IPS096, 3.00pm@Wicklow Meeting Room 1).

The authors tell us that their overall goal of the research is to get the facts correct in relation to whether or not there is a water crisis in China, and to identify the

responses of the different stakeholders; government water officials, community leaders and farmers.

In order to achieve the overall goal, the authors pursue several specific objectives. Firstly, they evaluate the status of China's groundwater economy - examining whether or not the groundwater table is systematically falling. Secondly, in the parts of China that do face a water crisis (or potential crisis) the authors document the regulations and policies that the government have implemented and discuss whether these have been successfully. Thirdly, the authors describe how farmers have responded to

the water crisis and try to assess whether or not their actions have helped alleviate the water scarcities or exacerbated the crisis.

To meet these objectives, the authors use two large field surveys that cover 7 provinces in northern China. Their findings demonstrate that, although the water table is not falling everywhere in northern China, there are still a substantial number of communities that appear to be facing a water crisis. When there is a water crisis, their data show that the government in China has begun to make a number of policy responses, but the implementation is not always effective.

# Limiting water pollution discharges



David Marker from WESTAT in Rockville, US presents a paper today that he co-

authored with colleagues from Westat, John Rogers and Robert Clickner, as well as Marla Smith from the U.S. Environmental Protection Agency (EPA) in Washington DC. The paper is entitled "Statistical Models for Developing Limitations on Water Pollution Discharges by Industry" and it forms part of the invited paper session

"What is in Your Water?" (IPS087, 11.15am@Wicklow Meeting Room 3).

Our lakes, rivers, and streams are used for many purposes. Everyone wants to fish and swim in clean water. Industrial facilities use and then discharge water from the same waters where people fish and swim. By

applying statistical methods, the United States limits the pollutant discharges from industrial facilities by almost 700 billion pounds of pollutants annually.

The EPA promulgates regulations on industrial water discharges that often include numerical limitations that restrict the amounts of

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specific pollutants typically discharged by each industry. In developing these limitations, the EPA uses a statistical framework to evaluate the data. Statistical methods are appropriate for dealing with effluent data

because the quality of effluent, even in well-operated systems, is subject to a certain amount of fluctuation or uncertainty.

The methodology which will be presented today has been used to regulate pollution for

a wide variety of industries, including iron and steel plants, landfills, meat product producers, pharmaceutical manufacturing, pulp and paper mills, and transportation equipment

cleaning facilities. This presentation will describe the statistical methodology and its application to performance data from several industries.

## Tracking the development of water statistics in the Netherlands



Kees Baas and Cor Graveland both work at Statistics Netherlands in The Hague in the areas of Environmental Statistics and Accounts. Today they will present their paper entitled "Living with Water: Not without Water Statistics" at the invited paper session "Water Statistics, Policy and Integrated Water Resource Management" (IPS094, 11.15am@Liffey Meeting Room 5).



After close to four decades of compiling water statistics in the Netherlands, water statistics has established itself as an important source of information for Dutch water policies. The authors' presentation will provide a review of the water statistics and water accounts currently compiled by Statistics Netherlands, the resulting indicators, and its uses for policy making and research.

From its inception in the early seventies, the focus of the water statistics programme has been on water pollution. Statistics on urban waste water treatment as well as discharges by industries were developed and have become embedded in the national Pollutant Release and Transfer Register (PRTR). Recently, PRTR figures have been used for the compilation of water accounts in order to assess the trends and effects of pollution abatement measures in all sectors of the economy.

As the interest in the economic dimension of water has grown, the compilation of (hybrid) water

accounts was initiated. These allow the calculation of a diverse range of indicators such as water-use intensities by industries, the measurement of the success of decoupling of water use and the measurement of emissions to water from economic growth.

During the last two decades, Integrated Water Resources Management (IWRM) has come into fashion in the Netherlands, followed by policies initiated under the umbrella of the European Water Framework Directive. As a result, the need for water data at sub-national level such as river basins has grown rapidly.

## The inverted pyramid challenges of global water monitoring



Professor Mike Muller from Wits University in Johannesburg and the UN World Water Assessment Programme and Global Water Partnership presents his paper entitled "Which Indicators for Whose Policies? The Inverted Pyramid Challenges of Global Water Monitoring" at the invited paper session on "Water Statistics, Policy and Integrated Water Resource Management" (IPS094, 11.15am@Liffey Meeting Room 5).

Policy makers in government and business have recently become more interested in water, driven by threats of

climate induced crisis as well as more immediate pressures of economic and population growth.

They need – and demand – guidance to understand the dimensions of the problems and the effectiveness of their responses. So water resource agencies are expected to report on indicators which identify countries and organisations that are at risk and emerging trends.

Since water is a highly variable, renewable resource with a multitude of different uses and users in many different contexts, this is more difficult than they think.

The UN World Water Assessment Programme (WWAP) convened an Expert Group of policy makers, water managers and data providers to address the challenge of monitoring and reporting on key national level trends in the state of water resources and their use.

A set of indicators were quickly agreed. However, the data to calculate them is rarely available, particularly in poorer countries where water challenges are greatest. Indeed, the policy process in water has been described as an inverted pyramid with much detailed analysis balanced precariously on a tiny base of data.

So the authors recommended a focus on the systematic generation of appropriate data series – not once-off research project "snap-shots" that make it impossible to report on trends. They suggested that it would be useful to focus on generating core "data items" from which different users could calculate indicators for their own particular purposes. Finally, they suggested some innovative data sources that could be developed to fill the gaps. The UN WWAP would be an obvious repository for such data and the statistical community would be well served by a set of common data definitions in this complex area.



# BULLETIN BOARD

## ISI General Assembly

4.00pm-6.00pm Thursday, 25 August 2011, Main Auditorium (CCD)

### Agenda

1. Welcome and Minute of Silence
2. Executive Committee Report
3. Appointment of Member Auditors
4. Report on ISI Finances
5. Report of the Member Auditors
6. ISI Statutes and By-Laws
7. Announcement of Elections of Members of the Executive Committee and the ISI Council
8. Composition of the Nominations Committee
9. Announcements of the Membership Elections
10. Reports by the Presidents of the Sections
  - Bernoulli Society
  - IAOS-SCORUS
  - IASC
  - IASE-ISLP
  - IASS
  - ISBIS
  - TIES
11. Report by the Chair of the WSC Programme Committee
12. Future WSC
  - 2013 Hong Kong Invitation extended to Members
  - 2015 Rio de Janeiro Approval by General Assembly
13. Questions and Comments from the Membership
14. Any Other Business
15. Closing Remarks

## Procedures for ISI General Assembly Meetings

1. The Presiding Officer shall determine the time allotted for introduction of a business item or the presentation of a report. Written reports and other documents that have been circulated before the meeting should not be read from the platform except in unusual circumstances. The Presiding Officer shall clearly indicate when an agenda item is meant for the audience's consent, discussion or for information only.
2. Full participation in discussions and voting in the meetings of the General Assembly is reserved for elected, Honorary, and ex officio members of the ISI.
3. The names of ex officio members who can participate fully in the General Assembly shall be posted near the ISI offices in the Conference Centre. Other ex officio members after making a request in writing to the ISI offices no later than 24 hours before the General Assembly can also participate in the meeting.
4. Members of ISI Sections who are not members of ISI as well as others interested in the proceedings of the General Assembly are welcome to attend as observers. However, they cannot participate in the discussions or voting.
5. To speak at the meeting (present a motion, participate in the discussion, etc.), a member must seek to be recognised by the Presiding Officer. When multiple persons are seeking to participate in a discussion, a member who has not previously contributed to the discussion shall have priority over others who have already spoken.
6. Once recognised, the speaker should announce her/his name, speak slowly, and use the microphone. If it is necessary to conserve time, the Presiding Officer may set time limits for speakers.
7. Speakers may use English, French or any other Conference language for which simultaneous interpretation is available. If a speaker does not use the same language as the previous speaker, s/he should first announce her/his choice of language and then pause briefly before speaking. This will help to facilitate simultaneous interpretation.
8. Any member of the ISI may present a motion (i.e. a proposal for decision). The motion shall be considered only if it is seconded (i.e. supported) by another ISI member.
9. Any member of the ISI may move an amendment (i.e. a modification) to a motion or to a previously proposed amendment. To be considered, it must be seconded by another ISI member.
10. Voting on amendments shall take place in reverse-order of their presentations. When all the amendments to a motion have been voted upon, there will be a final discussion and a vote on the motion together with those amendments that have been carried.
11. If there is a motion to discontinue the discussion of a motion or a business item and it is seconded, that motion shall be voted upon immediately without any discussion.
12. If there is a motion to postpone a motion or business item for consideration (at a later stage of the meeting or at a specified subsequent meeting) and it is seconded, that motion shall be discussed and voted upon before any further discussion of the motion or business item.
13. Any member wishing to request that an item be included in the agenda should submit in writing to the ISI Director at least 48 hours before the opening time of the General Assembly.
14. In case of any ambiguities or differences in views, the Presiding Officer has full discretion in interpreting these guidelines and in the conduct of business.



# BULLETIN BOARD

## The Bernoulli Society

The Bernoulli Society (BS) sponsors several scientific high level standards publications on its own or in strategic association with commercial publishers and other scientific societies. It publishes the Bernoulli Journal and the SPA journal (Stochastic Processes and their Applications). Members have free of charge access to the online versions of these official publications. Equally, it sponsors five free-access electronic journals: Probability Surveys, Statistics Surveys, Electronic Journal of Probability, Electronic Journal of Statistics and

Electronic Communications in Probability.

It also organises regular meetings: the Bernoulli World Congress, every four years: the next one will take place during July 9-14, 2012 in Istanbul, Turkey. There is also a yearly Conference on Stochastic Processes and their Applications (2011 in Oaxaca, Mexico and in Boulder, USA, July 29-August 2, 2013). In addition, its regional committees organise their own meetings, most notably the CLAPEM meeting (the next in Valparaiso, Chile, March 26-30, 2012), the European

Meeting of Statisticians (the next in Budapest, Hungary, July 20-25, 2013), and the European Young Statisticians Meeting (EYSM), this year in Lisbon, Portugal, during September 5-9. It also actively participates in the ISI WSC; in Dublin 12 Invited Papers sessions are sponsored in addition to some Special Contributed Sessions.

The BS is currently planning several activities for 2013 to celebrate the 300th Anniversary of the publication of the Ars Conjectandi by Jacob Bernoulli including a special

issue of the Bernoulli Journal.

BS members profit from several other benefits. For example, they receive a print copy of the twice-yearly Bernoulli Newsletter, the bi-monthly electronic bulletin Bernoulli E-Briefs, and reduced registration fees for meetings organised or sponsored by the BS.

For further information we invite you to visit the new website <http://www.bernoulli-society.org/>

## International Association for Statistical Computing (IASC)

Membership in the IASC is open to all individuals and organisations who are interested in promoting the theory, methods and practice of statistical computing. Our mission is to integrate statistical methodology, advanced computer technology and field specific knowledge in order to extract the maximum of information from data.

The IASC is preoccupied with the areas of computational statistics, exploratory data analysis, data mining, pattern recognition, statistical databases and related fields such as statistical software, computational finance, statistical computing and e-commerce, customer relation management, computer intensive methods, census and official statistics, and quality control. Our main objectives are to foster world-wide interest in statistical computing and to exchange ideas and knowledge through international contacts and meetings between statisticians, computing professionals, organisations, institutions, governments and the general public.

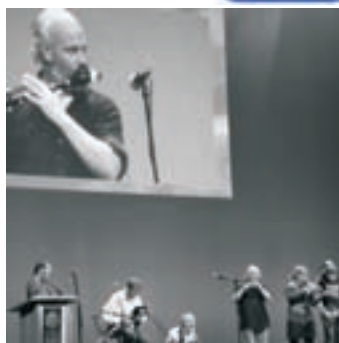
To pursue these objectives we publish Computational Statistics & Data Analysis as our official journal and organise conferences such as the IASC World Conference, the COMPSTAT Conference in Europe and the ARS Conference on Statistical Computing in Asia, as well as Summer Schools and invited or special topics sessions in World Statistical

Congress with a special focus on developing countries.

- The upcoming events organized by IASC include:
- The IASC-ERS Summer School on Robust Methods for Advanced Data Structures in Leuven, Belgium, 6-9 September 2011;
  - 7th Conference of the Asian Regional Section (ARS) of the IASC in Taipei, Taiwan, 16-19 December 2011;
  - Satellite workshop to the IASC-ARS Conference on Statistical Computing in Quantitative Finance in Taichung, Taiwan, 20-21 in December 2011;
  - 4th International Conference of the ERCIM WG on Computing & Statistics (ERCIM'11) in London, UK, 17-19 December 2011;
  - 5th International Conference on Computational and Financial Econometrics (CFE'11) in London, UK, 17-19 December 2011.

If you would like to know more about the IASC, please check <http://isi-web.org> and <http://www.iasc-isi.org>

Yutaka Tanaka  
IASC President 2009-2011



**3,075** Water (in trillions of litres) consumed so far this year

**1.12** Deaths (in millions) for water related diseases so far this year

**858** People (in millions) in the world with no safe drinking water



## SAS Raffle

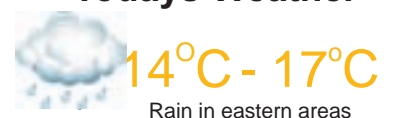
Come and visit the SAS stand where they are raffling off two Statistical programming SAS books. All you need to do is leave us your business card. The draw is taking place on Thursday morning between 10.45 and 11am.



## SUDOKU

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## Today's Weather



Film

**The Inbetweeners Movie** directed by Ben Palmer  
Venue: Cineworld (Phone: 1520 880 444), Parnell Street, Dublin 1 (20 mins walk from CCD)  
Performance times today: 4.10pm, 5.40pm, 6.40pm, 8.10pm, 9.10pm



Theatre

**Curse of the Starving Class** by Sam Shepard (Previews 23 to 26 Aug)  
Venue: Abbey Theatre, Lower Abbey Street, Dublin 1 (10 mins walk from CCD)  
Phone: +353 1 878 7222, Website: www.abbeytheatre.ie  
Performance time today: 7.30pm, Price: €13.00 - 40.00



Live Music

**Flogging Molly (Support from The Minutes)**  
Venue: Olympia Theatre, 72 Dame Street, Dublin 2  
Phone: 0818 719 330  
Website: <http://www.mcd.ie/venues/?c=olympiatheatre>  
Performance time tonight: 8.00pm, Price: €26.00

For further information on entertainment in Dublin please see [www.entertainment.ie](http://www.entertainment.ie)

## Emergency Contact Numbers

**Police, Fire, Ambulance:** Telephone: 112 or 999 **CCD Medical Centre:** Telephone: 01- 819 4999 **CCD Security:** Telephone: 01-818 4999  
**Tourist Victim Support:** Telephone: 1890 365 700 The Irish Tourist Assistance Service (ITAS) offers assistance to tourists who become victims of crime.