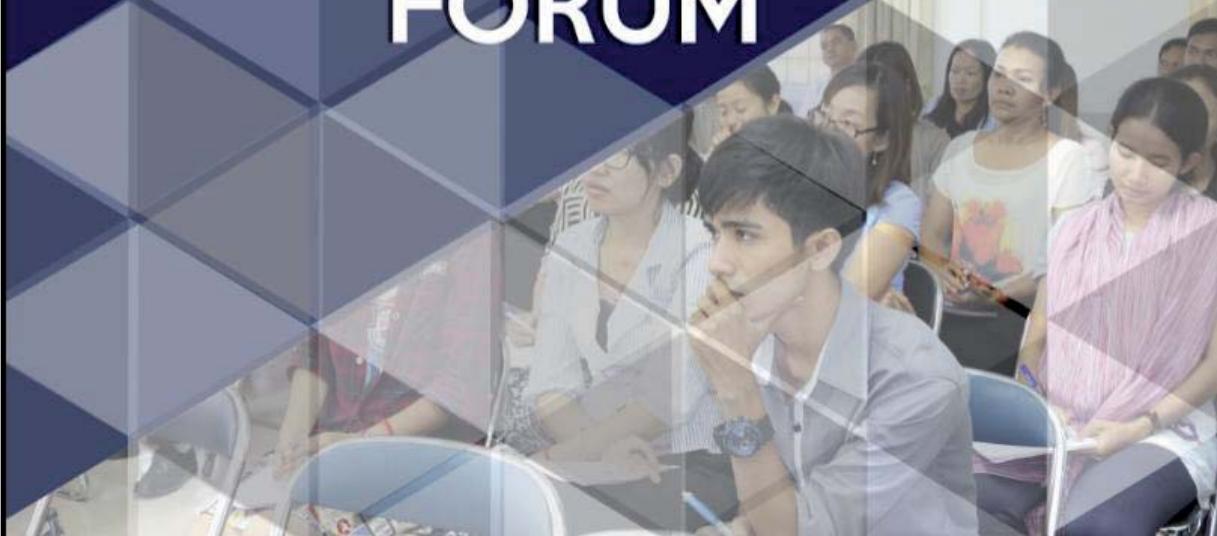


ITC  
21 - 22 Dec  
2015



United Nations  
Educational, Scientific and  
Cultural Organization

# 2<sup>nd</sup> CAMBODIA EDUCATION RESEARCH FORUM



*'Science and Technology for Development'*

# Welcome to the Second Cambodia Education Research Forum

## 'Science and Technology for Development'

**21-22 December 2015**

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### FORUM DETAILS

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#### **ORGANIZER**

Cambodia Development Resource Institute  
Ministry of Education, Youth and Sport

#### **INSTITUTIONAL HOST**

Institute of Technology of Cambodia

#### **FUNDING PARTNERS**

UNESCO, Beltei International University, Brown Café and Mike Burger

#### **SUMMARY PROGRAMME**

##### **Day 1: Monday 21, December 2015**

07:00 – 07:30 Registration

07:30 – 09:00 Welcome Remarks

09:00 – 09:30 *Coffee Break*

09:30 – 10:30 Plenary Session: 'Science as Institution'

10:30 – 12:00 Session 1: 'Promoting Science and Technology at Higher Education Institutions'

12:00 – 13:00 Exhibition and Poster Presentations: 'Meet the Scientists'

Light lunch

13:30 – 15:00 Session 2: 'Promoting Research in Academia'

15:00 – 15:30 *Coffee Break*

15:30 – 17:00 Session 3: 'Science Popularization'

##### **DAY 2: Tuesday 22, December 2015**

08:30 – 10:00 Session 4: 'University-Industry Cooperation'

10:00 – 10:30 *Coffee Break*

10:30 – 11:30 Session 5: Wrap up

#### **INFORMATION**

Contact throughout the Forum 012 93 52 23 or ask at the registration desk.

#### **PRESENTATION**

Allocated time for regular speakers and panellists (unless specified otherwise)

- Maximum 15 minutes for presenters
- 5 minutes for discussants

## **EXHIBITION**

Poster presentations and exhibition are held during lunch and coffee breaks. Exhibition ‘booths’ will be at the entrance to the Conference Room 1 while posters will be displayed on the wall of the Conference hall.

## **PARKING**

## **FORUM TEAM**

Forum Chair: Chhem Rethy

Forum Academic and Programme Co-chairs: Chhem Rethy and Khieng Sothy

Event Organization:

Manager: So Phina

Team members: Tek Muy Tieng, Sengkeo Puthykol, Chuong Chantha, Hannah John, Kang Ji-Hyun, Shin Hyejin

Information Technology: Leng Vanna and Chea Singhtararith

Administrative Support: Sen Sina and Chea Sothy

## **ACKNOWLEDGEMENTS**

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- United Nations Educational, Scientific and Cultural Organization (UNESCO) for the funding
- Institute of Technology of Cambodia for providing the facilities
- Department of Scientific Research – Ministry of Education, Youth and Sport for technical and logistic support
- Beltei International University for sponsoring the Forum
- BROWN Coffee and Bakery for sponsoring all refreshments during the Forum
- Mike’s Burger for their promotional lunch package
- Science and Engineering Festival team
- UK Embassy-MoEYS-IDP STEM Ambassadors

## CDRI Profile

1.	Name of Organization: Address: Phone No: Fax No: Email address: Website:	Cambodia Development Resource Institute (CDRI) #56, St 315, Tuol Kork, Phnom Penh PO Box 622, Phnom Penh, Cambodia Tel: +855-23) 881-384/881-701/881-916/883-603/ 012 867-278 Fax (+855-23) 880-734 E-mail: cdri@wicam.com.kh Website: http://www.cdri.org.kh
2.	Year of establishment of institution	04 <sup>th</sup> July 1990 with letter no. 1215 of Council of Ministers and 06 <sup>th</sup> March 1991 with letter no. 3217 of Ministry of Foreign Affairs, State of Cambodia, and lately granted a Sub Decree no. 94 on 06 <sup>th</sup> December 2000.
3.	Research/Advocacy issues	Focus on six interrelated areas that are key programmes for Cambodia's sustainable development:  1. economics; 2. agriculture; 3. governance; 4. environment; 5. health; 6. education.
4.	Executive director	Dr Chhem Rethy
5.	Number of staff	45 Researchers/activists for all 6 research areas 40 General and support staff for publication, library, administration, external relation, finance, IT and knowledge Management.
6.	Type of organization	CDRI is a non-profit organization and Cambodia's leading independent development policy research institute.
7.	Linkages to networks/coalitions	Greater Mekong Subregion Network (GMS-NET) Development Research Forum (DRF) ArTNet
8.	Linkage to other donor or international NGOs	Swedish SIDA, DFAT, SDC, DFID, WB, ADB, Rockefeller Foundation, IDRC, UN Agencies, AusAID, etc.
9.	Statutes (organizational mandate)	CDRI's Mission:  Cambodia Development Resource Institute (CDRI),

		<p>as Cambodia's leading independent development policy research institute, is to contribute to Cambodia's sustainable development and the well-being of its people through the generation of high quality policy-relevant development research, knowledge dissemination and capacity building.</p> <p>CDRI works to achieve this mission in partnership with Cambodian public institutions and civil society, and their regional and international development partners, with respect for the capacity of the Cambodian people and their institutions, for the value of local knowledge and experience, and for Cambodia's history and culture.</p>
10.	Our core values: MERIT	<p>We create the professional conditions that nurture <b>merit</b>.</p> <p>We foster <b>excellence</b>, as a professional and personal habit.</p> <p>We practice a culture of <b>respect</b> and <b>responsibility</b>.</p> <p>We pledge to live and act with <b>independence</b> and <b>integrity</b>.</p> <p>We build deep <b>trust</b> and <b>teamwork</b>, capable of achieving the mission and vision of the Institute</p>
10.	Major Research conducted and publications produced	<ol style="list-style-type: none"> <li>1. <b>Ke'chhnay Programme: Strengthening the State, Empowering Citizens for Democratic Development:</b> A four-year policy research and capacity-building programme</li> <li>2. <b>Leadership in Local Politics:</b> A study under the Ke'chhnay programme examining how local leaders mobilise resources in a context of constraint</li> <li>3. <b>Governance of Resources: Case Study of Water:</b> Another study under the Ke'chhnay programme, exploring the question: "What factors constrain or enable institutional arrangements of irrigation for poverty reduction?"</li> <li>4. <b>Working Paper 31:</b> Law Harmonisation in Relation to the Decentralisation Process in Cambodia (2004)</li> <li>5. <b>Monograph:</b> The Challenges of Decentralisation Design in Cambodia (2004)</li> <li>6. <b>Working Paper 34:</b> Accountability and Neo-patrimonialism in Cambodia: A critical Literature Review (2007)</li> <li>7. <b>Working Paper 35:</b> Where Decentralisation</li> </ol>

		<p>Meets Democracy: Civil Society, Local Government, and Accountability in Cambodia (2007)</p> <p>8. <b>Working Paper 38:</b> Accountability and Public Expenditure Management in Decentralised Cambodia (2008)</p> <p>9. <b>Working Paper 39:</b> Accountability and Planning in Decentralised Cambodia (2008)</p> <p>10. <b>Working Paper 40:</b> Accountability and Human Resource Management in Decentralised Cambodia (2009)</p> <p>11. <b>Working Paper 42:</b> Leadership in Local Politics of Cambodia: A Study of Leaders in Three Communes of Three Provinces</p> <p>12. <b>Working Paper 47:</b> The Local Governance of Common Pool Resources: The Case of Irrigation Water in Cambodia</p> <p>13. <b>Journal Articles:</b> A number of articles in quarterly Cambodia Development Review, CDRI flagship publications</p>
11.	Geographical focus	Cambodia and surrounding region
12.	How do you translate your research result into policy? How do you advocate your concern?	Development Knowledge Management Program is responsible for managing, producing and disseminating the research knowledge and products of five major areas through a number of communication strategies: conferences, workshops, seminars, broadcast media, print media, library collection and information sharing, small group communication and interpersonal communication.
15.	Other information:	CDRI practices good governance and institutional learning that lead to effective operation and performance. The practices of transparency, accountability and practicality have been carried out through processes including taxation, auditing, and banking system transaction. Moreover, CDRI has worked hard to Cambodianise its senior and middle management. Thus, it is well organized and well equipped to effectively undertake its programmes and projects in partnership with Cambodian government agencies and their international development partners, other research and tertiary education institutions and civil society organisations.

## PROGRAMME DETAILS

### Day 1: Monday 21, December 2015

07:00-07:30	<i>Registration and Seating</i>
07:30-09:00	<p><b>Welcome Remarks</b></p> <ul style="list-style-type: none"> <li>– Announcement of the program: <b>Mr. Sen Sina</b>, Master of Ceremonies</li> <li>– National Anthem</li> <li>– Welcome remarks by <b>Dr. Chhem Rethy</b>, Executive Director, Cambodia Development Resource Institute</li> <li>– Welcome remarks by <b>Ms. Anne Lemaistre</b>, Head of Office and Representative, UNESCO in Cambodia</li> <li>– Opening keynote address and presentation by <b>H.E. Dr. Hang Chuon Naron</b>, Minister, Ministry of Education, Youth and Sport</li> </ul> <p><i>Photo Session</i></p>
9:00-9:30	<i>Refreshments</i>
09:30 – 10:30	<p><b>Plenary Session</b></p> <p style="text-align: center;"><b><i>“Science as Institution”</i></b></p> <p>Moderator: <b>H.E. Dr. Neth Barom</b>, Chairman of Board, Cambodian Chemical Society</p> <p>Keynote address      <b>Dr. Chhem Rethy</b>, Executive Director, CDRI</p> <p>Panellists      <b>H.E. Dr. Tia Phalla</b>, Vice-Chair, National AIDS Authority</p> <p>                        <b>H.E. Has Bunton</b>, Secretary General, General Secretariat, The National Science and Technology Council</p> <p><i>Questions and Discussion</i></p>
10:30-12:00	<p><b>Session 1: Round Table Discussion I</b></p> <p style="text-align: center;"><b><i>“Promoting Science and Technology at Higher Education Institutions”</i></b></p> <p>Moderator: <b>Dr. Chem Phalla</b>, Director of Research, CDRI</p> <p>Panellists: <b>Dr. Nguon Phan Pheakdey</b>, Dean of Engineering Faculty, RUPP</p> <p>                        <b>Dr. Kry Nallis</b>, Head of Engineering Department, ITC</p> <p>                        <b>Dr. Heng Sokbil</b>, Director, Phnom Penh Institute of Technology</p> <p>                        <b>Mr. Bith Socheth</b>, Independent Scholar</p>

	<i>Questions and Discussion</i>
12:00-13:30	<p><b><i>Exhibition and Poster Presentations: "Meet the Scientists"</i></b>  <i>National Geographic Video on "Body Jars - Riddle of the dead"</i>  <i>Lunch</i></p>
	<p><b><i>Session 2: Round Table Discussion II</i></b></p> <p style="text-align: center;"><b><i>"Promoting Research in Academia"</i></b></p>
13:30-15:00	<p>Moderator: <b>H.E. Mak Ngoy</b>, Director General, Directorate General of Higher Education, MOEYS</p> <p>Panellists: <b>Dr. Chan Roath</b>, Director of Scientific Research Department, MOEYS  <b>Dr. Tieng Siteng</b>, Head of Bio-Engineering Department, RUPP  <b>Dr. Hul Sieng Heng</b>, Director of Research, ITC</p> <p><i>Questions and Discussion</i></p>
15:00-15:30	<i>Refreshments</i>
	<p><b><i>Session 3: Round Table Discussion III</i></b></p> <p style="text-align: center;"><b><i>"Science Popularization"</i></b></p>
15:30-17:00	<p>Moderator: <b>Dr. Chhem Rethy</b>, Executive Director, CDRI</p> <p>Panellists: <b>Dr. Ros Soveacha</b>, Independent Consultant  <b>Dr. Yos Phanita</b>, Deputy Director General of Health, Ministry of Health  <b>Dr. Eng Netra</b>, Head of Governance Unit, CDRI  <b>Mr. San Sel</b>, Reporter, Radio Free Asia</p> <p><i>Questions and Discussion</i></p>

**DAY 2: Tuesday 22, December 2015**

08:30-10:00	<b><i>Session 4: Round Table Discussion IV</i></b>
	<b><i>"University-Industry Cooperation"</i></b>
	Moderator: <b>Dr. Ros Soveacha</b> , Independent Consultant
	Panellists: <b>Dr. Seng Bunrith</b> , Managing Director, RLS International
	<b>Mr. Neam Kopy</b> , Founder and CEO, CES Co., Ltd
10:00-10:30	<b>Mr. Im Saroeun</b> , Director, Centre Kram Ngoy
	<b>Mr. Allen Dodgson Tan</b> , Director of Applied Technology, Golden West Humanitarian Foundation
	<i>Questions and Discussion</i>
	<i>Refreshments</i>
10:30-11:30	<b><i>Session 5: Wrap up</i></b>
	<b>Dr. Chhem Rethy</b> , Executive Director, CDRI
	<b>H.E. Yuok Ngoy</b> , Secretary of State, Ministry of Education, Youth and Sport

## **Annotated programme**

Per the recommendation from the 1st CERF to hold the event annually, MOEYS is partnering with the Cambodia Development Resource Institute (CDRI), Institute of Technology Cambodia (ITC) and UNESCO to hold the 2nd CERF in December 2015. The theme of this 2nd CERF is “**Science and Technology for Development.**” This theme has been selected as a result of a recent meeting on “**Science for Cambodia**” organized in November 2015 by CDRI with representatives from MOEYS, SIDA, ITC, RUPP and the private sector. It is aligned with the government’s rectangular strategy (2014-2018) on building capacity and developing human resources through “Strengthening and Enhancing Education, Science and Technology and Technical Training.”

The objectives of the 2nd Cambodia Education Research Forum are to:

- discuss the current status of scientific research in Cambodia and how to promote dialogue, research and mentorship on S&T for young Cambodian students and researchers;
- promote, strengthen and disseminate research practices and capacities of higher education institutions to support young academic researchers;
- provide a venue for engagement with the private sector and the media in promoting S&T.

The discussions will be based on five different but interrelated sub-themes: *science as institution, promoting science and technology in higher education institutions, promoting research in the academia, science popularization, and university-industry cooperation.*

### **Day 1: Monday 21, December 2015**

07:30 – 09:00	<p><b>Welcome Remarks</b></p> <p>In February 2014, the first Cambodia Education Research Forum (CERF) was held under the initiative of the Ministry of Education Youth and Sport (MOEYS), and the Cambodia Higher Education Association (CHEA) with supports from UNESCO and the private sector. The two-day forum was a major milestone in Cambodia’s education reform and provided much needed scientific evidence, best practices and policy options from latest research by local and international scholars to support the government’s reform efforts, particularly at the level of tertiary education. In this opening session, highest level representatives from MOEYS, CDRI and UNESCO will reflect on what has been achieved since the 1<sup>st</sup> forum, agenda for dialogue, remaining challenges and expected outcomes of the 2<sup>nd</sup> forum. H.E. Dr Hang Chuon Naron will deliver an opening keynote address and presentation.</p>
09:00 – 09:30	<p><b>Refreshments</b></p>

	<p><b><i>Plenary Session</i></b></p> <p style="text-align: center;"><b><i>"Science as Institution"</i></b></p>
09:30 – 10:30	<p>At the institutional level, this session focuses on success stories of promotion of scientific research, including on how various institutions can support scientific research and how excellence in research can in turn promote institutions. The session starts with a keynote address on ‘a life in science’ to be delivered by a distinguished international scientist, Dr Chhem Rethy. Dr Tia Phalla, a prominent champion in fighting against HIV/AIDS in Cambodia, will share the experience of the National AIDS Authority in reducing adult prevalence rate of HIV in Cambodia to 0.6 percent (down from 2 percent in 1997). A representative from the General Secretariat of the National Science and Technology Council will discuss the newly established Council, challenges and support needed to implement the Cambodia National Science &amp; Technology Master Plan 2014-2020.</p>
10:30-12:00	<p><b><i>Session 1: Round Table Discussion I</i></b></p> <p style="text-align: center;"><b><i>"Promoting Science and Technology at Higher Education Institutions"</i></b></p> <p>A recent study indicates that only a small percentage of tertiary enrolment in Cambodia is in science and technology (S&amp;T). The majority of students prefer to study popular majors in business, accounting and management. However, there remains a lack of serious discussion with wider stakeholders, particularly the private sector associations, on how to promote scientific research and youth awareness in the hard science field. The purpose of this session is to discuss how to inspire Cambodian youths about S&amp;T and promote S&amp;T as a study major or career choice. Panellists consist of high-level representatives and scholars from a private university, and two public institutions.</p>
12:00-13:30	<p><b><i>Exhibition and Poster Presentations: "Meet the Scientists"</i></b></p> <p>To illustrate the importance of and to inspire youths about science and technology, roughly 30 posters and exhibitions are arranged concurrently with the conference. During this lunch break, we aim to show off some of the most exciting and latest technological and engineering innovations, and scientific research findings by young scientists, innovators and inventors, and application developers from academic institutions, industry and individuals.</p> <p><i>National Geographic Video on "Body Jars - Riddle of the dead"</i></p> <p><i>(Light lunch is served)</i></p>

	<p><b><i>Session 2: Roundtable discussion III:</i></b></p> <p style="text-align: center;"><b><i>Promoting Research in Academia</i></b></p>
13:30-15:00	<p>Scientific research activities and capacity within universities across Cambodia, particularly private ones are at early stage of development due to limited research budget, qualified researchers and laboratories. A tradition of research at universities in Cambodia is much needed but is yet to be established. This session aims to discuss the status, challenges and experience of research promotion at Cambodian universities. The panellists consist of key representatives from MOEYS's Department of Scientific Research, the Royal University of Phnom Penh (RUPP) and the Institute of Technology of Cambodia (ITC).</p>
15:00-15:30	<i>Refreshments</i>
	<p><b><i>Session 3: Roundtable discussion III</i></b></p> <p style="text-align: center;"><b><i>"Science Popularization"</i></b></p>
15:30-17:00	<p>To address the problem of the lack of awareness and interest of youths and parents about the importance of science, this session focuses on how educationalists, researchers and policy makers can engage in the promotion of science and technology in public sphere including through the media, in the government arena, and at home through parenting. In doing so, we particularly acknowledge the influence of the mainstream media and parents on students. This session starts with a trigger presentation on the roles of non-scientists in science promoting and is moderated by Dr Chhem Rethy, a distinguished international scientist and higher education scholar.</p>

**DAY 2: Tuesday 22, December 2015**

	<p><b><i>Session 4: Round Table Discussion IV</i></b></p> <p style="text-align: center;"><b><i>"University-Industry Cooperation"</i></b></p>
08:30-10:00	<p>Collaboration between academia and industry is critical not just for skills development (education and training), but also the generation, acquisition, innovation, technology transfer, and the promotion of entrepreneurship. Additional benefits of university-industry cooperation include expanding the relevance of research carried out in public institutions, fostering the commercialization of public Research and Development (R&amp;D) outcomes, and increasing the mobility of labour between public and private sectors. The aim of this session is to discuss practical approaches to making such collaboration work for Cambodia's economic development. Innovative projects, concepts and proposals for collaboration are presented by representatives from the industry and training institution.</p>

10:00-10:30	<i>Refreshments</i>
	<b><i>Session 5: Wrap up</i></b>
10:30-11:30	The final session will conclude with a summary report by a CDRI representative of the key results of the one and a half day forum and officially closed by a high level representative from MOEYS. A proposed theme for the 3 <sup>rd</sup> CERF is presented.

**KEYNOTE ADDRESS**

**H.E. Dr HANG Chuon Naron**

## **NETH Barom**

H.E Dr. **NETH Barom** is the Chairman of the Board of Cambodian Chemical Society (CCS) and holds the title of advisor to the Royal Academy of Cambodia. Throughout his professional career, Dr. Barom is a former vice rector of the Royal University of Phnom Penh and the vice president of the Royal Academy of Cambodia. Dr. Barom completed his B.Sc. in Physics at the University of Phnom Penh, a M.Sc. in Chemistry at the Pedagogic University in Hanoi, and Ph.D. (Chemistry) from the University of Hochiminh City. He was the Chairman of the Chemistry Committee for Writing Chemistry Textbook for the Ministry of Education, Youth and Sport.

## **CHHEM Rethy**

Dr Chhem Rethy is a medical doctor, biomedical scientist, science diplomat, historian of medicine, and educationalist, with experience in global health policy and ASEAN Higher Education. He has taught radiology at various universities in Canada, Singapore, Japan and Austria for 28 years. He was the Chairman of Medical Imaging Department at Western University (Canada) before joining the International Atomic Energy Agency as Director of the Division of Human Health (2008-2014). He is currently the Executive Director of the Cambodian Development Resource Institute, a leading think tank in Cambodia and the ASEAN region. He holds a MD, a PhD in Education and a PhD in History. He has published more than a hundred scientific articles and edited 17 textbooks on radiology, radiology education, paleoradiology, philosophy of medical imaging and radiation sciences with two on the Fukushima nuclear accident. He is currently a distinguished visiting professor at the Atomic Bomb Disease Institute, Nagasaki, Hiroshima and Fukushima Medical University.

### **ABSTRACT**

#### **A life in science**

Scientist is the pillar of science institution. The purpose of my talk is to share the narrative about my own journey as a scientist who went through different aspects of scientific practices and careers: from clinical care to biomedical research, basic to translational research, and academic to policy research, at the national or global scale. Along a 40 year-journey that still continues, I have been able to reflect on my role as medical scientist in and outside academia, at the interface of science & policy and beyond.

### **TIA Phalla**

H.E Dr. Tia Phalla the Vice Chair of the National AIDS Authority and is significantly recognized for his effort in combating the transmitting rate of HIV in Cambodia. He has twenty years of experience in working in health sector starting from clinical experiences and moving to public health in the last fifteen years. After graduated from Faculty of Medicine in Phnom Penh, he spent 7 years working mostly in Abdominal Surgery. Later, he contributed to the development of National Program on Diarrhea Control and Acute Respiratory Infection. Since 1991, he has been devoted his efforts to provide technical guidance to National Response to HIV/AIDS in the Country.

Dr. Phalla completed Master Degree for Public Health from the University of New South Wales. Recently, he was awarded 'Alumnus of the Year' by the Australian Alumni Association of the year recognizing his contribution into Cambodia development.

## **HAS Bunton**

H.E. Has Bunton is currently the head of the General Secretariat of the National Science and Technology Council (GS-NSTC). Secretary General Bunton began his career as ICT Engineer and Statistician with his last position as Deputy Director General at the National Institute of Statistics, Ministry of Planning.

H.E. Bunton is also a member of the National Science and Technology Council, the highest political decision-making authority in the area of Science and Technology, presided over by the Prime Minister of the Kingdom of Cambodia. His strong interest and background in science and technology has driven him to be a key founder of the National Science and Technology Council and its General Secretariat, established in 2014 and 2015 respectively.

## **CHEM Phalla**

Dr Chem Phalla holds a PhD degree in water resources management from the University of Sydney, Master's degree in Engineering in Hydrology and Water Resources from the University of South Australia, and rural engineering degree from the Institute of Technology of Cambodia.

Phalla has been working at the Cambodia Development Resource Institute (CDRI) since 2006 as a researcher, team leader of water resources management research capacity development programme, water governance and climate change adaptation in Cambodia. Currently, he is an Acting Director of Research of CDRI.

## **NGUON Phan Pheakdey**

Ph.D. in Science, Interdisciplinary Center for Scientific Computing (IWR),  
University of Heidelberg, Germany, 2009.

His field of interest is computational architecture, computational geometry and image processing with main application in cultural heritage. After graduating his diploma degree in architecture and urban planning from the Faculty of Architecture of the Royal University of Fine Arts in Phnom Penh, 2000, he specified his research field on computer 3D modeling, reconstruction and simulation for the support of Khmer historic architecture and monuments.

In 2009 he received his Ph.D. degree in science for completion of research entitled “Computer Modeling, Simulation and Visualization of Angkor Wat Style Temples in Cambodia”. Until 2012 Dr. Nguonphan Pheakdey has been active in postdoctoral research projects of IWR relating to computational scientific and cultural heritage, placing the main focus on collaborating with the Global Heritage Fund (GHF) to support the preservation and restoration of Banteay Chhmar temple complex in Banteay Meanchey, Cambodia. He conducted and contributed to several research projects involving research fields including 3D laser scanning and virtual 3D reassembly of Khmer temple stone blocks, 3D scanning and preservation of ancient Khmer inscriptions, virtual 3D modeling and simulation in architecture, computational methods in Khmer arts. These projects involved several national and international partners: Ministry of Culture and Fine Arts, Royal University of Fine Arts, National Museum of Cambodia, Preah Norodom Sihanouk Angkor Museum, the University of Heidelberg, École Française d’Extrem Orient (EFEO), Educational Broadcast System (EBS) South Korea, and others.

## **KRY Nallis**

Dr. KRY Nallis is the head of the Department of Geo-resources and Geotechnical Engineering of the Institute of Technology of Cambodia. She received her bachelor of Engineering in Geotechnical Engineering from the Institute of Technology of Cambodia in 2007, and Masters and Ph.D in Materials Science at the Universiti Sains Malaysia in 2009 and 2013 respectively.

### **Abstract**

“Promoting Science in the Academia”

Science is important to be promoted in the Academia, Science contribute a lot to human and country development. There are significant social and economic differences between developed and developing countries. Many of the underlying causes of these differences are rooted in the long history of development of such nations and include social, cultural and economic variables, historical and political elements, international relations, geographical factors. These, however, do not tell the whole story. The differences in the scientific and technological infrastructure and in the popularization of science and technology in the two groups of countries are the most important causes of differential social and economical levels. An essential prerequisite to a country's technological progress is early recognition of necessity of a good educational system. Therefore, Science is needed to be promoted in the Academia. By promoting Science in the Academia, it will offers to students the ability to access a wealth of knowledge and information which will contribute to an overall understanding of how and why things work like they do. Science is able to explain the mechanics and reasons behind the daily functioning of complex systems, which range from the human body to sophisticated modern methods of transport. Children and students are able to use this knowledge to understand new concepts, make well-informed decisions and pursue new interests. Science also helps to provide tactile or visible proof of many facts we read about in books or see on the television; this helps to increase understanding and helps children and teenagers to retain that information. Without promoting or introducing Science in the Academia, it will cause the shortage of discovery-oriented science which can limit innovation and it will affect to the development of country. Many students find science extremely inspiring and interesting. Science instills a sense of intrigue and enables students to develop understanding and form questions based both on the knowledge they already have and the insight they wish to gain in the future. Students who excel in science lessons are likely to develop a strong ability to think critically.

Promoting Science in the Academia provides greater hope for ensuring that scientific curiosity is inculcated at the most impressionable ages to stimulate learning in fields that are likely to be most crucial to the development of country.

In summary, the social and economic growth of the developed countries is dependent on an essential emphasis on education, science, and technology. The basic problems of developing countries are the weak educational and scientific infrastructure, and a lack of appreciation of the importance of science as an essential ingredient of economical and social development.

## **HENG Sokbil**

Dr. Heng Sokbil is the director of the Phnom Penh Institute of Technology (PPIT) which actively delivers and promotes technology and science education through Departments of Mechanical Engineering, Electrical and Computer Engineering, Control Engineering, and Civil Engineering. In addition, Dr. Sokbil is a member of General Secretariat of the Supreme National Economic Council. Dr. Sokbil is also the founder of the Young Engineer Committee in 2001 just one year after the establishment of Engineer Institute of Cambodia. His interest is in Research, Academic, and Policy Development. PPIT has shown a great effort in encouraging women in S&T by offering a 50 percent discount in tutoring fee.

## **BITH Socheth**

Mr. BITH Socheth is the Deputy Director of the Department of Energy Technique and Nuclear Science of the Ministry of Mines and Energy. He is also the Vice Chairman of Cambodia CBRN Team (Chemical, Biological, Radiological, and Nuclear) of the National Authority of Chemical Weapons. Besides these important roles, Socheth holds another as a Nuclear Safeguards Inspector for the International Atomic Energy Agency, Vienna, Austria. Socheth completed his Bachelor and Master Degree in Mechanical Engineering from the Drexel University, Philadelphia, Pennsylvania, United States and has a strong working experience in research, tech laboratory, and Power Plant Management.

### **Abstract:**

#### **"Promoting Science and Technology at Higher Education Institutions"**

Science and technology are all round us and have made our daily life so much easier. They provide us with better way to communicate, better way to transport, better health care, cleaner and more efficient energy, etc. In addition to high salary, jobs related to science and technology are usually fun, engaging, and rewarding. They provide opportunities for continuous learning, self-improvement, and career developments. Science and technology play an important role in industrial development and economic growth. Promoting science and technology at Higher Education Institutions is very essential. Local and foreign investors are attracted by science and technology innovation skills. Examples of some jobs and skills are Climate Change Analyst, Emergency Management Specialist, Environmental Scientist, Geoscientist, Hydrologist, Industrial Health & Safety Engineer, Meteorologist, Soil and Water Conservationist, Soil Scientist, Water & Liquid Waste Treatment Plant & System Operator, Chemical Technician, Chemist, Electrician, Food Scientist, Nuclear Monitoring Technician, Occupational Health & Safety Specialist, Physicist, Pilot, Power Distributor & Dispatcher, Power Plant Operator, and Engineers, etc. Cambodia needs more students and people with science and technology background. Those with science and technology background can learn acquire business background in a very short time, but not vice versa in general. Scientific and technological advances are important drivers of economic performance. They provide ability to create, distribute, and exploit knowledge, which is the major source of competitive advantage, increase in productivity, wealth creation, and improvements in the quality of life.

## **MAK Ngoy**

H.E Mak Ngoy is the Director General of Higher Education of the Ministry of Education, Youth and Sport. Within this position, his role in improving the quality of tertiary education in Cambodia is three-fold: administration, policy and strategy formulation for higher education development, the supervision role of overseeing a program which improves the quality of teaching, management and research, and helping disadvantaged students. H.E Mak Ngoy completed his Master degree in Educational Administration at the University of New England in Armidale.

## **CHAN Roath**

Dr. Chan Roath is the Director of Department of Scientific Research, Ministry of Education, Youth and Sport and the President of Cambodian Mathematical Society (CMS). Chan Roath was educated and awarded his doctoral degree from Daghestan State University, Russia, with a major in Mathematics: Partial Differentials Equation. He produces several publications and translation projects on supplementary text books related to Mathematics for grade 11 and grade 12. Additionally, Dr. Chan Roath had participated in international presentations on 'Mathematics Education in Cambodia Today and National Assessment on Mathematics at Primary Schools' at the International Conference on The Open Environment for The Worldwide Mathematical Education, Moscow, Russia, and most recently attended and presented on 'How Cambodian Mathematical Society Contributes toward Technology Integration into Mathematics Education in Cambodia' at the 8th 'International Conference on Science and Mathematics Education in Developing Countries' at Myanmar.

### **Abstract**

The Department of Scientific Research is responsible as following:

1. To ensure that a wide range of research is conducted in all disciplines
2. To promote the capacity of researchers and do develop the research capacity of all higher education institutions
3. To promote respect for research ethics, protection of research achievements and dissemination of research results
4. To encourage the utilization of research results for producing new knowledge and developments

### **Planned activities include:**

Rewards high achieving researchers working within the country

Develop a mechanism and culture of reporting research results regularly and appropriately

Provide opportunities for Cambodia and International researchers to work together

Promote cooperation amongst research institutions and universities.



## **HUL Sieng Heng**

Dr. Hul is the Director of Research and Development of the Institute of Technology of Cambodia. He has a Doctoral Degree in Environmental Engineering from *University of the Philippines-Diliman* and *Shizuoka University-Japan* with high distinction under AUN/Seed-Net JICA Program in 2010. Dr. HUL Seingheng has over 5 years' experience in engineering education. He has been working for a number of research and development projects in Cambodia. He is currently in charge of the Development Research Plan for engineering education, research in Science and Technology, administering research activities, and teaching. He also acts as the focal point for some regional agencies, and main project investigators for many research projects. His research interest is on Water quality Treatment and Management. He has joined and presented at more than 50 scientific conferences and has almost 20 internal journal publications.

## **ROS Soveacha**

Dr. Ros Soveacha is an education and training consultant. He has provided consulting services in many countries such as Austria, Japan, Morocco, Romania, Singapore, and Vietnam. For more than four executive years, he has served the United Nations system through the International Atomic Energy Agency (IAEA) and the United Nations for Educational, Scientific, and Cultural Organization (UNESCO). He has published, edited, and peer-reviewed articles for local, regional, and international publishers such as Cambodia Development Resource Institute, Ministry of Education, Youth, and Sport, Journal of the NUS Teaching Academy, Springer, Canadian and International Education Journal, Seminars in Nuclear Medicine, University of London, and Journal of Southeast Asian American Education & Advancement.

### **Abstract**

#### **The roles of non-scientists in science**

There are ways to unleash potentials of non-scientists in science for development purposes. In this context, the non-scientists refer to educators, information and technology experts, and other personalities outside the scientific fields. To focus on roles of non-scientists in science, a resource triangle has been proposed by combining efforts of three groups: content experts (hard-core scientists), process experts (educators), and information and technology experts. When these three groups have a productive space to collectively work together, science can be more meaningfully constructed for the development purposes. This talk focuses on roles of an educator in science, employing sound educational principles to assure quality, develop curriculum, and strengthen education and training programs. There is a highlight of personal experiences with the International Atomic Energy Agency (IAEA) and the United Nations for Educational, Scientific, and Cultural Organization (UNESCO).

### **YOS Phanita**

Dr. YOS Phanita is a medical doctor and currently the Vice Director General for Health of the Ministry of Health. Dr. Phanita was a former head of the District Hospital Department and was a Deputy Director of National Hospital. He was educated as a medical doctor from the Medical School in Phnom Penh in 1995 and on Medical Specialization from France in 2002.

## **ENG Netra**

Dr Eng Netra is a full-time researcher on governance and politics at CDRI. She is married and has three young children aged 6 to 11. As a researcher, Netra has published several major research projects, including studies on 'The Challenges of Decentralisation Design', 'Fiscal decentralisation reform', 'Accountability and neo-patrimonialism', 'Leadership in Local Politics'; and recently 'Social Accountability in Cambodia'. She has also authored and co-authored several journal articles and book chapters. Dr Eng holds a PhD in political science from Monash University, a degree earned while on the Australian Leadership Awards programme.

### **Abstract**

Title: Raising children's curiosity for and interest in science

There is a growing acceptance and recognition that children's early exposure and learning to science is fundamental to building children's future skills and attitudes for learning. Scientific knowledge nurtures children to build experiences in investigation and problem-solving all of which are important for them to conduct their everyday lives. As parents, it's extremely important that we expand the opportunities for our children to start learning science early in their life even though we may not inspire our children to become biologist, oceanographer, physicist, chemist or engineer. So how do we as parents aspire our children to the world of science? Drawing from my own experience as a mother, I will discuss several practical ways parents can do at home to stimulate your children's curiosity for and interest in science.

## **SAN Sel**

San Sel is a correspondent at Radio Free Asia based in Phnom Penh, Cambodia. His reports focus mainly on education and sustainable development. Previously, he has worked with the local newspaper The Phnom Penh Post and the Manila-based social news network Rappler. He is a bachelor-degree holder in media management from Royal University of Phnom Penh.

### **Abstract:**

#### **Title: How journalism plays its role in science**

People could make a good and right decisions depend on reliable information and accurate facts. Journalism plays a role to give truth. Journalistic truth is a process that begins with the professional discipline of assembling and verifying facts. Journalists try to convey a fair and reliable account of their meaning, subject to further investigation. The journalists deliver what is important in the real context to public to make them understand what is going on and how it influences the future life. There is a sharing session from a media practitioner on how journalism plays its role to popularize science to the public.

## **SENG Bunrith**

Dr. Bunrith is currently a Managing Director of RLS International; a private company providing civil and environmental solutions including water supply, wastewater management and solid waste management. He got his PhD from the University of Yamanashi, Japan and he has been providing consulting service for more than 5 years in the environmental sanitation sector, to various international organizations such as ADB, WHO, The Asia Foundation, SNV Netherland Development Organization and a few others. He is also a lecturer at the Institute of Technology Cambodia.

### **Abstract**

Rural water supply in Cambodia is facing with a number of challenges including technical and management problems. One of the concerns in between technology and management is the distance of toilet and water well. As by Ministry of Rural Development (MRD) guideline, toilet has to be at least 25 m far away from water well. However, it is practically difficult in the rural area. With such situation, scientific and technological research will help solving the problem, in particular at the university level. Hence, to make research interesting, to gain attention from researchers and students, as well as to help solving problems in the real society, it is important to connect researcher to problems or to the responsible agencies/private companies that are looking for solution.

## **NEAM Kopy**

Mr. Neam Kopy is the C.E.O of the CES Co., Ltd., Cambodia, an environmental consultancy helping business and society toward environmental safety focusing on Environmental-Social Impact Assessment and Climate Change. Mr. Kopy held a high level of leadership of group company of C-PRO Co., Ltd and Khmerweb Solution Co., Ltd. He completed his Master of Social Science in M.Sc. Eng. in Civil Engineering and Environment from Nagaoka University of Technology, Nagaoka, Japan under the scholarship from the Kutota Fund and has his Bachelor Degree in Civil Engineering and Environment from the University of Technology, Nagaoka, Japan. Besides, Khmer, his native language, he is fluent in Japanese and English.

### **IM Saroeun**

Mr. Im Saroeun is the director of the Centre Kram Ngoy (CKN), an NGO who has 15 years of experience in training on technology, electronics, electricity, automation, cooling system, rural electricity, renewable energy to youth especially youth in rural area. Mr. Saroeun has been working to promote the interests of young people on science and technology by conduction various exhibition on S&T at many urban and as well as rural areas. With his leadership, CKN has been in partnership with World Bank, UNESCO, UNIDO, OIF, EDF, TOTAL, and Schneider Electric in providing training, installing electricity and electrical equipment for houses, companies, and hotels.

## **Allen Dodgson TAN**

Allen is a Cambodian-American non-profit manager, product designer and passionate advocate for the development of STEM in Cambodia. Allen is the Director of Applied Technology for the Golden West Humanitarian Foundation, a California-based charity dedicated to destroying explosive remnants of war. He founded the Golden West Design Lab (Phnom Penh) which produces innovative, award-winning products in Cambodia which are used by international NGOs and governments worldwide. Allen is also the founder of the Cambodia Science & Engineering Festival, the Kingdom's first and only national-level event designed to encourage Cambodian youth to consider careers in STEM professions.

Prior to Cambodia, Allen served seven years in the United States Army; as both an Infantryman and an Explosive Ordnance Disposal (EOD) Operator with a combined 26 months of combat duty in Iraq and Afghanistan. Allen holds a Master's of Science in risk management from Boston University and a Bachelor's of Science in business administration from Franklyn University. Allen has been presented with multiple honors by the Kingdom of Cambodia for his work. Allen lives with his wife and daughter in Phnom Penh.

### **Abstract**

My main point for fostering University-Industry Cooperation focus on ways to assist you higher education institution in delivering quality human resources to your business

- o Engagement and input into curriculum and degree/certificate development
- o Lab/facilities sponsorship
- o Workshop + train the trainer using expert company staff
- o Meaningful Internships
- o Recruiting / job placement

## **ABSTRACTS - POSTERS**

## **High School Students' and Teachers' Understanding about TVET and Their Access to Its Information**

Khan Samphors  
*Cheasim University of Kamchaymear*

### **ABSTRACT**

The field of TVET (Technical and Vocational Education and Training) is an essential element in reducing poverty and plays dominant roles in sustainable development; however, TVET stream has been put aside for many years by policy makers, donors and private sectors (M. Hartl, 2009). The enrolment rate of TVET program generally plumped and it reflected an extreme mismatch between skills taught and the needs of labor market (ADB, 2004). Only 17% of high school students wanted to continue to vocational training (CAMFEBA, 2008). This situation led to the skill shortages and badly-paid workers in Cambodia.

This thesis attempts to explore why the students don't attend TVET institutions. The study is underpinned by three researching questions aiming at investigating (1) their understanding about TVET, (2) their access to TVET information, and (3) degree of help for them to know TVET.

The research was conducted in two phases. The first was quantitative data collection with 90 students, adopting frequency distribution (yes/no context about the participants' understanding and information access) and Likert-scale (following categories: 1=need to help to 5=need much help) and the second was four in-depth FGD interview with 24 students.

The findings showed that the students' knowledge about TVET and their accessibility to TVET information are limited, but the students are enthusiastic about TVET programs. For example, 61% of the students didn't know what TVET is. Only 8% knew PTCs and 11% knew some fields of train in TVET institutes, and 99% wanted to know TVET stream. The degree of help from TVET stakeholders, which they need from Likert-scale method showed most of them need much help in order to understand about TVET, and none of the 17 item average ranging from "no help" to "some help" was found. For example, (1) wanting to know what is ( $M=4.14$ ,  $SD=1.0234$ ).

*Key words:* *TVET (Technical and Vocational Education and Training)*

## **Krousar Koumrou**

Sum Danny

### **ABSTRACT**

App Krousar Koumrou is a program uses in smartphone and can be downloaded for free. The objective of this app is to educate people and end domestic violence against women and to support victim of domestic violence. The purpose of creating this app are to (1) Promote rights and law focuses on violence against women, (2) Find the information to support victim, and (3) Promote positive behaviour change through education about domestic violence.

In the program there are parts that shows animation, information and sharing. Animation shows the root cause of violence, condition of culture, law and information of supporting when violence happens. Information feature provides list of partners working on rights, law and women's rights and contact number of NGO working on human's right. Sharing icon let users disseminate information or alert to all contacts/accounts that have been saved on the phone.

*Key words: Mobile app, End Violence, Women, Information Sharing, Support*

## Arsenic Contamination and Its Associated Health Risks in Rural Cambodia

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### ABSTRACT

The magnitude of arsenic exposure was investigated along the Mekong River basin of Cambodia. Field sampling of environmental, ecological and biological samples and field survey were conducted in the different arsenic exposure scenarios of Cambodia. Analytical results revealed that groundwater arsenic in Kandal, Prey Veng and Kratie provinces were greater than the regulation limit of the World Health Organization and Cambodian drinking water quality standard. Likewise, rice arsenic in Kandal and Prey Veng could be considered as an additional source of arsenic intake of the study populations. Health risk assessment revealed that 98.7 % and 13.5% of respondents from the Kandal and Kratie province study areas respectively, were at risk of non-cancer effect. The average cancer risk was found to be 5 in 1000 exposure in Kandal; 33.7% of Kratie respondents were threatened by cancer. Concurrently, survey found that females and adults were more likely to be diagnosed with arsenicosis symptoms than males and children, respectively. Among all respondents ( $n = 246$ ), 42.3 % were illiterate, 64.6% were farmers and 84.6% could earn less than 8,000 Riels per day. The majority (72% in dry season and 91.9% in raining season) drank water from various alternative sources (i.e. rainwater, piped water and open well/pond). The discrimination and behavior toward arsenicosis patients were negligible. This study suggests that more actions should be taken to mitigate this pressing public health issue.

*Key words: Arsenic; Groundwater; Rice, the Mekong River Basin, Cambodia*

# Water Quality and Metal Levels in the Natural Wetlands Receiving Sewage from Phnom Penh, Cambodia

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## ABSTRACT

To investigate the seasonal changes of water quality and metals in the natural wetlands receiving sewage from Phnom Penh, water sampling has been conducted in Kob Srov wetland located in the northern part of the capital. Water samples are collected in both dry and wet seasons across the wetlands. Water sample are collected from each point of sampling at a depth of 30 cm below the surface level. Water sample are filled into an acid-cleaned polypropylene bottle after which are acidified with concentrated HNO<sub>3</sub> to pH < 2 and kept in an icebox during field work. Concurrently, on-site measurement of water temperature, pH, conductivity, dissolved oxygen (DO) and turbidity are also conducted at each point of sampling site by AquaRead AP 800. All water samples are transported to a laboratory and then transferred to a fridge where they are stored at 4 °C until analysis. Measurement of metals is performed by atomic absorption spectrometry (AAS). Analytical results revealed that turbidity and ORP of dry season were significantly higher than those of wet season. However, pH, EC and TDS of dry season were significantly lower than those in wet season; temperature and DO were not significantly different between wet and dry seasons. Concurrently, there are not significant differences in Mn, Cd and Cr between dry and wet season; Fe in dry season were significantly higher than that of wet season. This study suggests that wastewater should be treated prior to the discharge into Kob Srov wetland.

*Key words:* Water quality; Metals; Wetland; Phnom Penh; Cambodia

## **Radio Club – Popularizing Telecommunications Study**

Michael S. Adams  
*Family Radio 99.5FM*

### **ABSTRACT**

Many technical students are attracted to the courses that look fun. Robots are fun and now that there are competitions in Cambodia more students are engaging in this study. In an effort to attract students to study and fill a gap in Telecommunications in the Kingdom of Cambodia the author has launched a RADIO CLUB in partnership with the National Polytechnic Institute of Cambodia (NPIC). NPIC already has a RADIO LAB with modern amateur radio equipment but neither the student nor staff knew how to use it or engage in the hobby of Amateur radio. A team from Family radio has started a radio club to give students practical hands on experience with the radio LAB equipment. In the first activity students and staff used the radios to contact people in 35 countries around the world. Make radio fun and students will be more interested to study and pursue a career in telecommunications.

## **Suitcase Radio – Life Saving Information in Disaster**

Michael S. Adams  
*Family Radio 99.5FM*

### **ABSTRACT**

In times of disaster radio not only saves lives, it can also bring hope and critical information to the affected community. When the 2004 tsunami struck Banda Aceh, Indonesia all the radio and TV stations went off the air. During the 2005 South Asian earthquake the only radio station near the epicenter lost its tower and went off the air. In times like these people are in desperate need of news, information on how to get to safety and how to survive. The unfortunate trend seen recently is that when radio is so important, many times it goes off the air and does not come back until well after the emergency is over. A trained First Response Radio (FRR) team is able to begin broadcasting within 72 hours sending out critical information.

It's essential to have portable equipment fit for use in the field. FRR has assembled a complete Radio Station in a Suitcase. One suitcase contains a studio, another has the FM transmitter and the last Bag has the antenna and cables. Each piece is only 20kg and can be carried on any airplane or other mode of transportation.

In this Exhibition FRR will display the full Radio-in-a-Suitcase kit and explain how it is used to provide Critical information to the affected community during disasters.

*Key words: telecommunications, Radio, Amateur Radio, radio club + Disaster, Information, community, Suitcase radio*

## **Application of CROPWAT Model to Estimate Rice Water Requirement at Farm Scale in Cambodia**

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<sup>3</sup>*CSIRO, Irrigation Agriculture Flagship Research Station Road, Australia*

### **ABSTRACT**

Crop water requirement is one of the main factors which the water management and water user must consider to evaluate the efficiency of the irrigation system in the farm. Field experiment with the dimension of 47.7m × 55.5m were performed at Cambodian Agricultural Research and Development Institute (CARDI), Cambodia, from July 2013 to May 2014 to calculate the reference and crop evapotranspiration, and collected required input data for the CROPWAT model to estimate the rice water requirements of the two seasons. Two types of rice crop were selected in this study. Phka Rumdoul rice, which has a 120 days growing period, was observed in rainy season, and Chu'lsa rice, the 100 days growing period, was experimented in dry season. The rice crop coefficients were divided in two types, Kc (wet) were 1.05, 1.1, 1.2, 1.05, and Kc (dry) 0.3, 0.5, 1.05, 0.7; in the initial, development, mid-season and late-season stages, respectively. CROPWAT model was applied to estimate rice water requirement using FAO Penman-Monteith method.

The result showed that in the rainy season, water requirement of Phka rumdoul rice and average of evapotranspiration are 494 mm and 4 mm/day. At the initial stage, ETc is around 70 mm, but ETc quickly increases in late-season, approximately 179 mm since there are high wind flowing; ETc in the mid-season, is around 174 mm at the initial stage, and 72 mm at the development stage. In contrast, water requirements in dry season of Chul'sa rice and average of evapotranspiration are 518 mm and 5 mm/day. And ETc at the initial stage is around 73 mm, then much increases in mid-season, approximately 180 mm, while ETc in the development is around 150 mm, and 116 mm at the late-season stage.

*Key words:* Cropwater Model, Water Management, Penman-Monteith Method, Rice Water Requirement

## **Application of Bowen Ratio Energy Balance for estimating the water requirement of Chulsar Rice Crop**

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<sup>2</sup> Cambodian Agricultural Research Development Institute

<sup>3</sup> Irrigation Agriculture Flagship Research Station Road, Australia

### **ABSTRACT**

Effective water management planning and management require accurate determination of crop water requirement, so it plays an important role for irrigation practice. The water requirement for the Chulsar Rice Crop is becoming an important study in agricultural water management research in Cambodia as it secures productivity and ensures the better understanding of the amount of water use for irrigation. Consumptive water requirement is the amount of water potentially required to meet the evapotranspiration needs of the paddy rice so that the rice does not suffer in its growth through short supply of water and the depth of irrigation water, exclusive precipitation, stored moisture or groundwater, which is required to meet evapotranspiration during the crop period. We have preformed a sensitivity analysis by using and comparing the different technological methods where we employed Lysimeter method (direct method). Bowen Ratio Instrument is using two different equations: Bowen Ratio Energy Balance (BREB) & ASCE Short, and CROPWAT model which is an indirect method. By the way, the observation was undertaken in a small experimental paddy field located in Cambodia Agriculture Research and Development Institute (CARDI), which has an area of 2650 square meter, cultivating Chulsar rice for 100 days. The result showed that the amount of crop water required in using BREB method is ( $ET_o = 491 \text{ mm}$  &  $ET_c = 560 \text{ mm}$ ). Compared to the other methods, we see 15% different overall. Hence, this method is applicable for estimating rice water requirement in Cambodia.

**Keywords:** *Crop Water Requirement; Water Management, Irrigation Practice; Bowen Ration Energy Balance; ASCE Short; CROPWAT*

## Mushroom Cultivation

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### ABSTRACT

To cultivate thermophile mushroom such as oyster mushroom, ear mushroom, deerhorn mushroom, straw mushroom and shiitake, five kinds of spawn were prepared. Spawn is grown in grain media and it is grow faster (13.5cm/15days) than in sawdust media, comparing to rubber trees which are able to grow up to 10.9cm in 15days. Test indicates that saw dust rubber trees have better outputs than the one using spawn media due to its low cost and less contamination. For oyster mushroom, the pinhead formation was observed from 6 to 10 days; then the running and formation of fruiting bodies of the complete spawn will appears for 6 to 8 weeks after pinheads formation.

To investigate new sawdust substrates, various kinds of sawdust are examined. Among them, sawdust rubber tree has the average growing speed of 10.3cm per 15days; similarly sawdust acacia can spring up to 9.6cm in the same period; however, the fastest growing mushroom substrate belongs to sugarcane bagasse.

After oyster mushroom was cultivated for 20-25 days in plastic bag and undergone pinhead formation for 5-10 days, it will be harvested in three fleshes for 4 weeks, and then the biological efficiency of each substrate is obtained. Bagasse produces the best biological efficiency (B.E) at 61.3%, while acacia is much economical. Therefore, acacia would be a more favorable substrate. Other thermophile mushroom such as deerhorn spawn is fruiting, while ear spawn is running in the sawdust substrate bag.

*Key words: Thermophile Mushroom, Cultivation, Substrate, Pinhead, Running, Formation, Biological Efficiency, Sawdust, Bagasse*

## A Systematic Review of the Leaf-Nosed Bats Fauna (Hippotideridae) in Cambodia

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*Department of Biology, Royal University of Phnom Penh*

### ABSTRACT

*Membracoidea* is one of the superfamilies that consists of two main families including: *Cicadellidae* (leafhoppers) and *Membracidae* (treehoppers). *Membracoidea* is a group of insects that more than 25,000 species were recorded and described (about 22,000 species are leafhoppers). According to the ongoing study of CEI, *Membracoidea* were found from natural forests to agricultural areas in Cambodia. To collect these insects, several tools were utilized such as sweeping net, vacuum, light trap and malaised trap. The specimens of *Membracoidea* have been collected from 12 provinces with 61 various locations since 2013 and we expect to have about 200 species of leafhoppers and more for CEI's ongoing study on this group. Based on our current collections and studies, we can estimate that there are about 1,000 species diversity of leafhoppers and treehoppers in the country. If the studies are conducted from natural forests and agriculture landscapes, more species of leaf- and treehoppers will be recorded and identified.

*Key Words:* Leafhopper, Treehopper, Membracoidea, Insect

## An Overview of Species Diversity of Ants (Hymenoptera: Formicidae) in Cambodia

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### ABSTRACT

The exploring of antibiotics from Actinomycetes by Selman A. Waksman in 1944 had effect on curing serious pathogens. However, the rate of antibiotic resistance is threatening on human life in our world. Based on this reason, the research on topic “Isolation of soil Actinomycetes (Chambok Community, Kompong Speu Province) and Screening for their antimicrobial activities against bacteria pathogens” is appeared to find out the presence of soil Actinomycetes which produce bio active compounds in order to against pathogens. In this study, soil samples were diluted then innoculated in International Streptomyces Project medium 4 (ISP medium 4) by using some antibiotics Amphotericin B, Benomyl, and Cycloheximide to inhibit the growth of bacteria and micro fungus. As a result, 69 species of Actinomycetes were tested on 6 pathogens species such as *Acinetobacter* spp 1275, *Escherichia coli* ATCC, *Pseudomonas aeruginosa*, *Staphylococcus aureus* ATCC25923, Methicillin Resistant *Staphylococcus aureus* (MRSA-02 MRSA-1302). As a result, there are 52.17% can be against pathogens. Moreover, there were only 2 species which against gram negative. The other 34 species had ability to protect themselves from both grams positive and negative. The minimum spectrums against pathogens were 10mm while the maximum were 33mm including the spectrum of each agar medium 8mm. Therefore, the result demonstrated that these soil Actinomycetes can against pathogens. Soil in Chombok is interesting object to find new biological active compounds from Actinomycetes which is basic step to create new antibiotic.

**Key Words:** *Actinomycete, Bioactive Compounds, Pathogens, Secondary Metabolites, Antibiotic*

# A Systematic Review of the Leaf-nosed Bats Fauna (Hipposideridae) of Cambodia

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*Department of Biology, Royal University of Phnom Penh*

## ABSTRACT

Bats play very important roles in ecosystem, which clearly benefits us, human being. Moreover, without their help in ecosystem services we will lose massive of benefits and whole ecosystem would be definitely collapsed. In Cambodia, bat research has been gradually growing since 2000. According to the literature reviewed, the number of Cambodian bats has increased up to 70 species in the last decade, which 7 species are from the family Hipposideridae.

The species account of each species in the family is clearly known based on the literature. But not yet combine all of the species together. The aims of the study were (i) to create species accounts and an identification key to Cambodia Hipposideridae bats, (ii) to find the diagnostic characters distinguishing between species, and (iii) to evaluate whether sexual dimorphism occurs in Cambodia Hipposideridae.

This study uses specimens from Centre for Biodiversity Conservation. There are 99 specimens available for the study, including 13 specimens of *H. armiger*, 11 *H. cineraceus*, 6 *H. diadema*, 6 *H. larvatus*, 29 *H. pomona* and 2 *Coelops frithii*. Descriptive statistics was used for describing each character, T-test and Mann-whitney U test were used for sexual dimorphism study and PCA were used for data exploring.

As a result, species accounts and identification key of the 7 species were created. The most diagnostic characters for the species are noseleaf structure, forearm (FA), condylocanine length (CCL), and upper toothrow length (CM3) were included for identification key. The misidentification of *H. cineraceus* was fixed. Based on t-test, there are two species including *H. armiger* and *H. pomona* showed sexual dimorphism. And based on Mann-Whitney U test, *H. galeritus* and *H. larvatus* have no sexual dimorphism.

In conclusion, species account and key identification for each species were created. They are useful and more convenient for bat researchers.

*Key Words: Hipposideridae, Noseleaf Bat, Taxonomy, Species Account, Identification Key, Sexual Dimorphism*

## **SROMAI Library: A Private Library on Palm**

Oeng Leang Hong

### **ABSTRACT**

We all know that reading is key to gain knowledge, but in Cambodia, reading is not much interested by majority which it raises concern to resource development in this country.

To promote book reading, it is not simply to give people books but to create initiative and interesting way that make them feel to read. At the same time, smartphone or tablet is a powerful solution for book reading because of its popularity and availability of the Internet.

Innovated with passion, Sromai Library, Mobile app, is created to provide a great many Khmer books to readers and also add value to book-reading related processes and elements which is catalyst for promoting habit and attention of book reading such as book recommendation and suggestion, book search, writer and publisher profile, reader preferences, etc.

Within own device, User can freely download this app to read and explore a large collection of books from Sromai Library's Server, and it is believed that their reading time will be increased by interesting books and features that will be added and introduced to this app continuously.

Finally, this innovation also faces with challenge and limitation such as financial support, technical, reading resource, and cooperation with stakeholder since it is newly developed by a start-up. However, this app will be a tool to promote book reading in Cambodia.

*Key words: Book Reading, Mobile App, Sromai Library, E-Library, Khmer Language*

## An Overview of Species Diversity of Ants (Hymenoptera: Formicidae) in Cambodia

Heang Phallin, Ly Kang, Kheam Sokha, Phauk Sophany

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### ABSTRACT

Ants (Formicidae) are found almost every landmass except Antarctica. They have potential advantages over vertebrates and other invertebrates in landscape distribution due to the ability of social organization, co-evolution with other species and thriving to every ecosystem type. Cambodia is known to be a very good example of conservation biology in vertebrates while there are a few researches in Entomology, particularly ants. Therefore, this study is aimed to review the latest research findings of Cambodian ants' taxa together with CEI ongoing studies. Materials were collected from different habitats in Cambodia by the Cambodian Entomology Initiatives (CEI) team and other researchers. General collecting, Winkler extraction and other traps were deployed to collect the ant samples. As a result, 53 ant species of ants, belonging to 39 genera in 8 subfamilies were recorded. Within an on-going research, Cambodian ants' taxa are currently collected by CEI team for further morphological identification and verification.

*Key words: Species, Diversity, Ant, Taxa, Invertebrate*

## **Interactive Kid Book Initiative**

Try Sothea

*CamAnt*

### **ABSTRACT**

Forcing your children to read book in paper might be a difficult mission for you. Children tend to play tablet rather than reading book. To solve this problem, CamAnt has adopted a global mobile app concept called Interactive Kid Book. With this concept, we convert paper book into electronic book so that children can access and enjoy reading it. Every kid likes to see things in motion and colorful illustration; therefore e-book would be an encouraging way for them to build their reading habit. With attractive animation pictures, children tend to spend more time reading and learning. Alongside with animation, audio is another important thing to make Interactive Kid Book more favorable. Children can listen to song, music or even storybook narration. These books include rich and interesting features: Animation, Interactivity, Song, Music, Narration, Multi languages support, Challenge and Quiz.

Two outstanding apps that have been created to promote Khmer Language to children are “Learn Kor Ka” and “What Number Am I?” Both Apps can be downloaded in smart phone with Android system or IOS. “Learn Kor Ka” is a mobile app which teaches young children Khmer language consonants, while “What Number Am I?” is an app that urges young children to learn Khmer number with illustration, animation and audio. In this project, numbers from zero to nine are formed in animal shape. It’s not really easy at first to learn the number, so they will try to analyze those shapes and guess what number it is. By learning to analyze them, it will help children to remember those Khmer numbers more efficiency.

*Key words: Reading, Children, E-Learning, Game, Mobile app, CamAnt, Kid Book, Kor Ka, Learn Khmer Language, Khmer Number*

## **ABSTRACTS - EXHIBITIONS**

## Affordable Housing for Bottom-Line People in Cambodia

Hav Kongngy

*My Dream Home*

### ABSTRACT

My Dream Home (MDH) is a social enterprise addressing chronic shelter shortage in Cambodia through production of affordable and easy-to-constructed wall that low and middle-income people can build their dream home achieving stability and dignity of family; improvement of health, safety, and security; and prospects of education and job.

Everyone should be entitled a decent home to live and to look after their family. As MDH is the first specialized social enterprise in Cambodia providing affordable housing, it is projected that more 10% of total market or 150,000 houses will be supply by our bricks in Phnom Penh area and nearby provinces.

MDH develops interlocking bricks similar to the concept behind the famous Lego bricks. The bricks are made from local materials that are abundant everywhere in Cambodia. When put together to form a building, interlocking bricks use less cement, are less labour intensive, take less time and - most importantly - are 20%-40% cheaper than traditional bricks. In addition, the bricks are more resistant to strong winds, insects and fire.

Our product has been designed with our client/beneficiary in mind. All costs have been reduced to a minimum to allow for affordable bricks that poorer families can afford. Low income people can afford to pay for the bricks through government and NGOs project whilst medium and rich are happy to buy bricks that are cost effective, look nicer in aesthetic design

All customers need to pay but with different price scheme – subsidy for the poor. Our team met with several families who built and want to build houses, fences and decoration on their land. They are satisfied with the bricks and the house plan that we draw for them for free. To be transparent, we ask him to keep all record of their expense for the house and it proves that it cost effective compare to traditional method of construction.

*Key words: Affordable housing, Environmental and Easy-to-Construct Bricks*

## **Centre Kram Ngoy: A Technology Training Centre**

Ty Chan  
Im Saroeun  
Suon Phearin  
Meas Sokchan

### **ABSTRACT**

As an NGO, CKN has a 15 years long experience in technology training, in Electronics, Electricity, automation, cooling system, rural electricity, renewable energy,...We aim at promoting technology awareness and technical vocational training. We consider technical and vocational training as fundamental, basic, vital for a country. Implementing it properly is a key solution, to pave the way for sciences and technique development. No efficient and productive science research without good technicians and well equipped workshops.

We have experience in mobile training, for students, rural electricians, BCOs (Batteries charging operators),...We have installed electricity and electrical equipment for houses, flats, hotels. We have worked with enterprises for industrial maintenance (ricemill, plastic plant, cigarettes factory, incenses sticks SME, Tiles enterprises..).We make maintenance in hospitals (Oxygen extractors). We had/have contracts with great institutions: World Bank, UNESCO, UNIDO, OIF, EDF, TOTAL, Schneider Electric,...

We also love raising curiosity and interest in Science and technique among youth. The reason why, since 2008, we used to organize technical exhibitions: in Kompong Cham, Skoun, Prey Totung, Siemreap Kandal high Schools, and at the National Institute of Education (2009 and 2010) with the support of UNESCO, Ministry of Education, Ministry of labor and vocational training.

We wish to share our own experience to promote interest in science and technology for the development of Cambodia.

*Key words: CKN, Technology, Training, Vocational, Technical, Mobile Training*

## **ARUNA Technology**

Sami Sivuth

Suong Sovan

Seng Loch Loch

### **ABSTRACT**

Aruna is a Cambodian and Lao-registered company established in Phnom Penh in 1997. The company is a regional leader for remote sensing, GIS, GPS, web-based mapping software and natural resources management consulting services. Aruna works with a range of private sectors and government partners in Lao PDR and Cambodia in all natural resource management sectors providing mapping products, services and management information systems for forestry, protected area management, and agriculture and topographic survey.

We are a distributor of ESRI Geographical Information Systems (GIS) Software, PCI Geomatics software, Garmin Global Positioning Systems (GPS) equipment, and Trimble Survey equipment, and satellite imagery from Digital Globe, Airbus and Blackbridge.

### **Experience Projects:**

#### **1. Topographic Survey:**

- December 2015, Boundary, topographic and utilities survey about 4517m<sup>2</sup>. Client: Hong Kong Land (Premium Investments) Limited
- August 2015 to October 2015, Transmission Line survey from Stung Treng Sub-Station to Kampong Thom Sub-Station about 191km. Client: S.N.P.D.R.I from China
- August 2014 to October 2014, Transmission Line survey from West Phnom Penh Sub-Station to Stung Hav Sub-Station about 167 km. Client: PESTECH and Pharoth Vattanak Engineering & Construction

#### **2. Geographical Information Systems (GIS):**

- April 2014, Accuracy Assessment of Forest Cover Mapping. Client: Forestry Administration (Cambodia)
- May 2013, REDD Project Development for Central Cardamoms Protected Forest (CCPF). Client: Fintrac USAID-Harvest
- March 2013, Satellite imagery dataset and index maps for the forest monitoring system of Cambodia. Client: FAO Cambodia

*Key words: GIS, Survey, Forestry, Mapping, GPS*

## **The Science and Engineering Team**

Sor Hokly

*Hun Sen Wat Svay High School, Siem Reap*

### **ABSTRACT**

In February 09, 2014, a group of grade 9 students from Hun Sen Wat Svay High School in Siem Reap has gathered and established the “ Science and Recycling” team. The fundamental objective of this establishment is to cluster young students who share interest in science to work together to conduct scientific research as well as share the knowledge and experience to the junior students.

The team then changes the name to “Science and Engineering” and turns their focus to mechanics and electrics. So far, there are two classifications of their innovation: Mechanics (stream engine, turbines...) and Electronics (phone, radio, ...).

Experienced in showcasing scientific products at conference, workshop and forum, the team has received many feedback and advice from senior scientists. With this, more ideas have been formulated and update their innovation to a more advance technology.

Up until now, there are 17 members within the group and all of them are high school students. It will keep expanding since more and more young people begin to be interested in science and engineering.

*Key words: Science, Engineering, High School Students, Innovation, Learning and Teaching Science*

## **The Idea of Architecture for Sustainable Development**

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### **ABSTRACT**

The gift of natural is the technology of human. The source of energy is ; The water, the air, the plant, the sun shine. Sustainable is the main forget of architectural study program in Phnom Penh Institute of Technology. The important thing of sustainable is the way how to absorb the energy of natural such as : water, the air, the plant , and the sun shine. All of that natural can see the living standard of people around if such as: reducing petrol using, global warming and produce the electricity by their own.

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