Issue 8 | August 2016

The Institute of Applied Sciences

NEWS letter

In this Issue

Infrastructure and Transport Permanent Secretary in awe with IAS Biofuel lab

IAS delivers Chemical Management Training in Vanuatu, Kiribati and the Marshall Islands

Major Coastal Management Project Launched

Layout and Design

Graphic Artist, Institute of Applied Sciences

CONTACT US

Tel : (+679) 323 2965
Fax : (+679) 323 1534
www.usp.ac.fj/ias

Postal Address:

Institute of Applied Sciences
Faculty of Science,Technology and Environment
Private Bag, Laucala Campus,
Suva, Fiji

Find Us on Facebook:

Institute of Applied Sciences

IAS GIS Officer & 2016 Hibiscus Contestant Leads Coastal Protection Tree Planting Expedition

On Saturday 6 August 2016, staff of the Institute of Applied Science (IAS) spent the day in the province of Ra planting coastal tree seedlings to better protect the coastline for future generations. The tree-planting expedition was led by Ferlisa Valentine, the Geographical Information Systems technincian at IAS, and a contestant in this year's Hibiscus Festival, under the theme of coastal protection. Ferlisa's colleagues at IAS were only too happy to support her in this worthy cause.

"As a GIS technician for the Natural Resource Management Unit, I am passionate about mapping the climate challenges that we face in the Pacific," said Ferlisa. "The Hibiscus Festival is a great platform from which I can advocate on issues that we face and mitigation strategies that we can implement in communities to safeguard our future," she added.

The team left Suva at sunrise, and travelled by bus through the villages along the Kings road towards the province of Ra. Six months on, the aftermath of Tropical Cyclone Winston was still evident: many houses were still damaged, trees stripped of their bark and the constant sound of hammering in those villages where reconstruction is ongoing.

The team began their work at Namuaimada village and Navolau 1 village, before continuing on to Ra Provincial Office. The final stop of the day was at the Ra Maternity Hospital. The

IAS staff and 2016 Hibiscus contestant Miss Samsung Galaxy, Ferlisa Valentine

enthusiasm in the team was evident and at the end of the day a total of 366 seedlings of tavola (*Terminalia cattapa*), vutu (*Barringtonia* sp.), nawanawa (*Cordia subcordata*), vesiwai (*Pongamia pinnata*), and tiri (*Rhizophora* sp.) had been planted by the team of 26 volunteers.

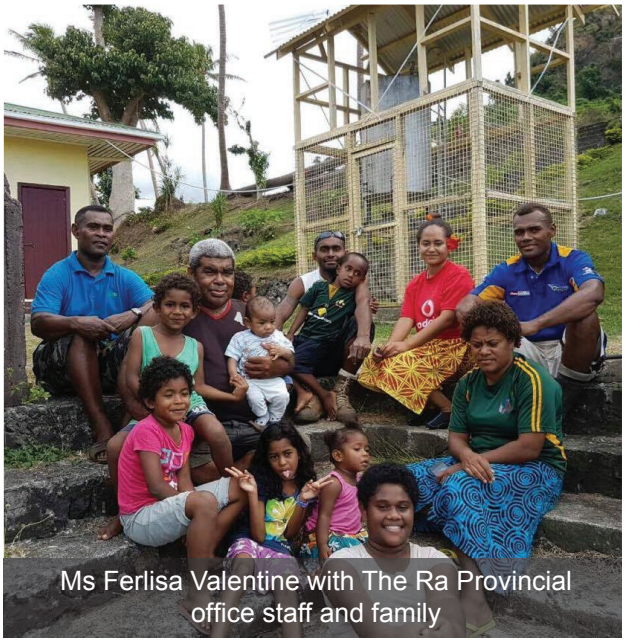
The characteristic mangrove forest in Fiji is divided into three major zones. These zones are determined by salinity, tidal flooding/inundation

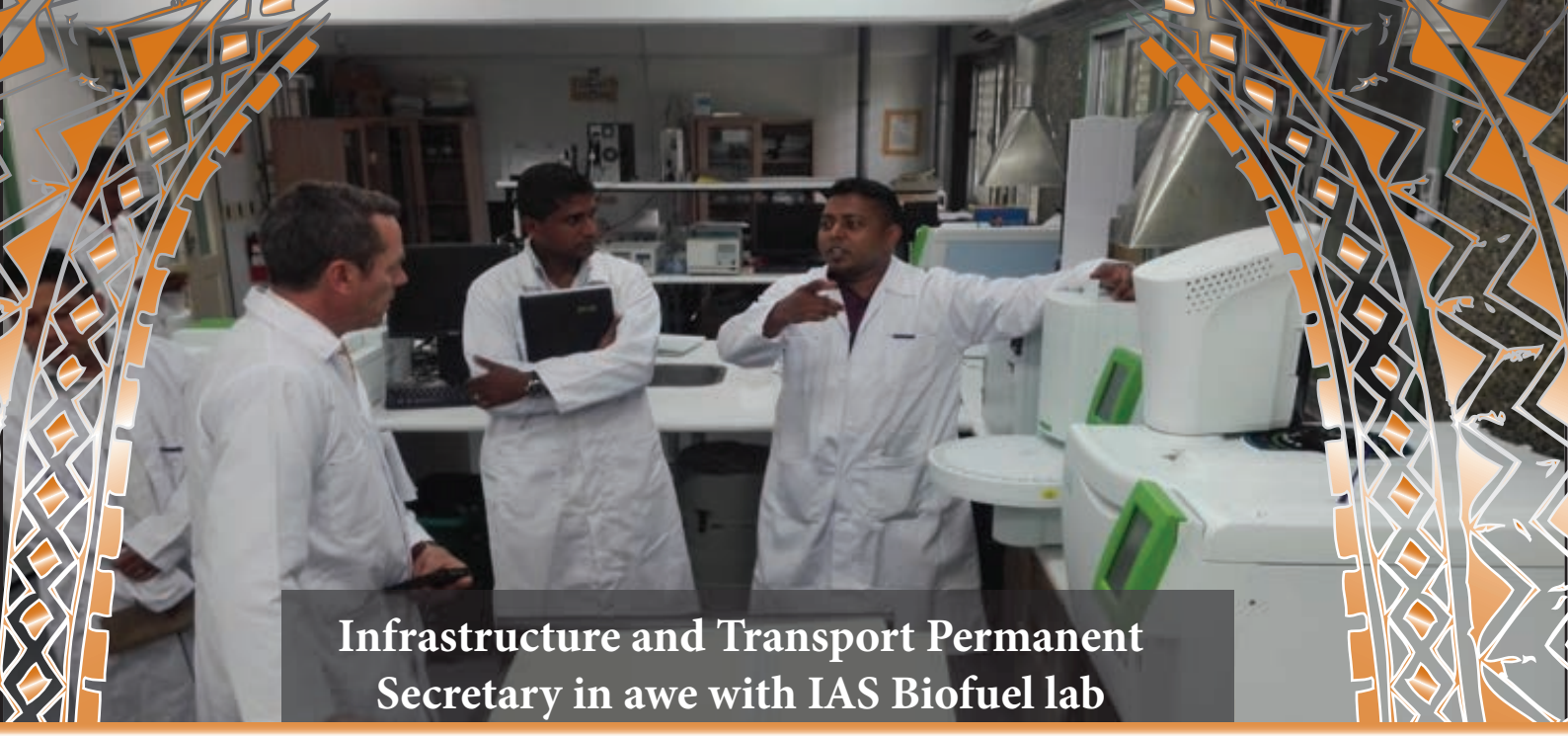

IAS staff and family members planting mangroves at Navolau Village, Ra

effects and also the physical characteristics of the substrate (type and sediment size). The three zones are the *Rhizophora* (tiri), *Bruguiera* (dogo) and landward zones. The seaward-most zone is the *Rhizophora* zone where you find three species of *Rhizophora* , then the *Bruguiera* zone dominated by *Bruguiera gymnorhiza* and then the landward zone (closest to land). The landward zone is where you will find the more common coastal forest strand species like *Barringtonia* spp. (vutu), *Cocos nucifera* (coconut), *Terminalia cattapa* (tavola), *Callophyllum inophylum* (dilo), Hibuscus *tiliaceus* (vau) and many others. Many of these tree species have important cultural uses for the coastal and delta villages in Fiji.

An additional bonus of the day's activity was the fostering of team spirit among the IAS staff who took part. "When we are in the office, everyone is more or less in their own little world, working on their own things, so being able to all go out together to the field and do something tangible for the local community is a big boost to team morale", said Mere Brown, Marketing & Graphics Officer for IAS. Lab Technician, Jerry Koroijiuta added that the expedition allowed staff within IAS to be more familiar with the work of other IAS units that are involved in environmental assessment and conservation such as the NRM Unit and the South Pacific Regional Herbarium".


Ms Ferlisa Valentine leading the tree planting expedition at Namuaimada Village in Ra


Ms Ferlisa Valentine with The Ra Provincial office staff and family



Infrastructure and Transport Permanent Secretary in awe with IAS Biofuel lab

The Institute of Applied Sciences (IAS) was visited by the Fiji Government Permanent Secretary for Infrastructure and Transport Mr Paul Bayly on 30 March 2016 to inspect the IAS Biofuel Laboratory. The World Bank funded through the Fiji Government Department of Energy Biofuel project involves the establishment of a Biofuel Laboratory and the development and accreditation of biofuel tests. Accompanied by senior government officials from the Ministry of Infrastructure and Transport, Mr Bayly was shown the ranges of equipment used for biofuel analysis and briefed on the progress of the project.

Commencing in 2012 and with Phases 1 and 2 completed, Phase 3 of the project began in 2016 with an additional F$700,000 for the development of bioethanol tests and accreditation of the remaining biodiesel tests.

Pleased with the project achievements, Mr Bayly said Fiji is well placed to lead the region in Biofuel production aided now by the availability of a testing facility and technical expertise at IAS-USP for determining the quality of biofuel. The next step he said would be for the Fiji Government to establish the right policies that will encourage overseas investors in the biofuel industry. In that respect, Mr Bayly has kindly requested the assistance of IAS to work with other stakeholders in the development of the National Biofuel Policy.

The Director of IAS, Dr Johann Poinapen thanked Mr Bayly for his Ministry's support and reiterated USP's commitment to further collaborate with the Fiji Government in its quest to promote the use of renewable energy in the country and also in the region. Dr Poinapen also shared that with this project and the establishment of the accredited biofuel laboratory, capacity is being built at many levels in both organisations and that we are slowly but surely progressing towards the vision of sustainable energy.

The Permanent Secretary, Ministry of Infrastructure and Transport Mr Paul Bayly (second from right) with Director IAS, Dr Johann Poinapen (third from right) with the Department of Energy officials at the USP Lower Campus Conference Room.

IAS delivers Chemical Management Training in Vanuatu, Kiribati and the Marshall Islands

The Institute of Applied Sciences (IAS) had recently delivered trainings in Kiribati, Royal Marshall Islands and Vanuatu as part of a Stockholm Convention on Persistent Organic Pollutants (POPs) project. The training to be delivered in 14 Pacific island countries supports the project's overall aims which are to improve regional chemical management. The training course was developed by IAS under a contract to the Secretariat of the Pacific Regional Environment Programme. Funding for the work was provided by the Global Environment Facility and implemented by the United Nations Environment Programme.

The training course for Vanuatu on 9-13 May 2016 was held at the Melanesian Hotel Conference Room, Port Villa and the course presenters were Dr Johann Poinapen, Director, IAS, Usaia Dolodolotawake, Laboratory Manager Services, IAS and Salome Dolodolotawake, a Consultant and former Head of Science Teacher. Local assistance with planning and organisation was provided by the Vanuatu Environment Protection Authority.

The training course for Kiribati from 17-20 May 2016 took place at the USP Kiribati Campus, South Tarawa and the course presenters were Steven Sutcliffe, Chief Technician at the School of Biological and Chemical Sciences and Shalveen Raj, Assistant Project Manager, IAS. Local assistance with planning and organisation was provided by the Ministry of Environment, Lands and Agriculture

Kiribati Training Participants in group work

Chief Technician, FSTE Mr Steven Sutcliffe demonstrating the neutralisation technique at the Cook Islands training

Development (MELAD) and in particular the Environment Conservation Division (ECD).
For the Marshall Islands, the training occurred on 10-13 May 2016 at the Marshall Islands Resort, Majuro and the course presenter was Steven Sutcliffe. Local assistance with planning and organisation was provided by the Republic of the Marshall Islands Environment Protection Authority (RMI-EPA). Participants of the course included those who are directly involved with the storage, handling, use or disposal of chemicals, and especially those who work in laboratories, or as science teachers, or whose work involves the supervision or management of laboratory facilities. It was also relevant to government officials with regulatory responsibilities in this area, including Customs Officers, who were given a more targeted half-day to one-day course.

A 'train the trainers' session was also conducted for half-a-day where interested participants were trained as potential trainers or facilitators for the Chemical Management training course. These people will organise localised and targeted training sessions in their respective organisations and countries.

Participants at the Cook Islands Chemical Management Training with trainer, Mr Steven Sutcliffe
(1st from left, back row)

Feedback received from the participants on the training material and content was very positive and they found the course very relevant and useful to the needs of their organisations and countries. Most comments related to the need in developing and maintaining accurate chemical inventories at organisational and national levels, identified as the most important follow up activity. Others commented on the need for chemical management plans to be developed and implemented, in-house training to be conducted utilising the materials provided in this training and the actual removal of hazardous chemical waste from the country. Participants also stressed the point to have "refresher" training every two years or "more frequently" for sustainability and further capacity building.
Dr Johann Poinapen stated that, in developing and delivering this chemical management training course, IAS continues to strengthen one of its core roles which is to organise short technical and scientific training courses that cannot be met through the normal teaching program of USP. IAS is the consulting arm of the Faculty of Science, Technology and Environment, and it markets the scientific and technical expertise of the Faculty to the region.

UNEP/GEF Workshop on POPs regional participants at the USP Lower Campus

The Institute of Applied Sciences hosted UNEP/GEF Regional Workshop on POPs

The Institute of Applied Sciences (IAS) hosted two Global Project Training workshops on regional support for the monitoring of Persistent Organic Pollutants (POPs). Held from the 4-8 April 2016, the workshops were jointly funded by the United Nations Environment Program (UNEP) and Global Environment Facility (GEF). Participants of the workshops were from 9 regional countries.

Held back-to-back, the training workshops were an outcome of the multilateral environmental agreement, the Stockholm Convention, which aims to lower the global levels of POPs. The Convention also requires that the effectiveness of measures to control POPs must be regularly evaluated.

From 2007 to 2011, a global monitoring plan (GMP) was developed and a first round of regional analyses performed by IAS in collaboration with UNEP and Pacific Island Countries. A data warehouse was launched to share these results. After successfully carrying out the first regional monitoring of POP levels in the region, IAS has developed expertise in this field and its accredited laboratory is recognised as a regional reference laboratory in the analysis of the POPs chemical pesticides and polychlorinated biphenyls.

The first workshop was on the Updating of the National Implementation Plans for POPs for the 9 regional countries. The second workshop was the Inception meeting on the Second Round of the UNEP/GEF project on ´Continuing Regional Support for the POPs Global Monitoring Plan under the Stockholm Convention´ in the Pacific Region. Under the second round of the project (also called GMP2) starting soon, the IAS laboratory will develop expertise in the analysis of newly-designated POPs such as brominated flame retardants. IAS will also be called to provide regional training and support to the Pacific Island Countries in implementing the GMP2 for POPs according to the Stockholm Convention on the effectiveness evaluation, by generating data on the concentrations of POPs in the core media human milk, air and water.

The Director of IAS, Dr Johann Poinapen while acknowledging the guidance of the UNEP/GEF Trainers, said that IAS will continue to provide quality training and technical services to the regional governments in the monitoring and management of POPs in regional environments. He also mentioned that the development of a sustainable monitoring plan for POPs in the Pacific Region is critical if we were to succeed in identifying changes of POPs' concentration with time and assess POPs' regional and global transport.

IAS Staff present at Oceania Biology Conference

Two staff from the Institute of Applied Sciences (IAS) recently participated at the Society for Biology of Oceania (SCBO) conference hosted by the University of Queensland, Brisbane from 4 -8 July 2016. Ms Bindiya Rashni, a Freshwater Macroinvertebrate Ecologist and Mr Albert Whippy, an IAS Graduate Assistant presented on their research thesis findings and its implications on Fiji's resource conservation systems.

Ms Rashni whose thesis focussed on the Fijian riverine ecosystem conservation highlighted the catchment transformations threatening the integrity of rivers and associated ecosystem services and the need to educate and empower user communities. An output of her thesis, the 'Traffic Light Bioindicator Guide' (TLBG) to assist in community based riverine health assessment in Fiji has been included in the RiverCare toolkit published by Live&Learn

Ms Bindhiya Rashni presenting her research outputs at the SCBO Conference

Environmental Education Fiji. The guide is now used to establish and empower young river scientists across local indigenous communities. Three successful riverine ecosystem outreach projects by Live&Learn and Nature Fiji will be used as models to extend riverine ecosystem conservation across user communities in Fiji. It is envisaged that a similar approach will be applied to oceanic countries to enhance sustainable resource management and livelihoods.

Mr. Albert Whippy presented on a chapter of his Masters of Science thesis research 'Comparison of farming and drying methods for the red seaweed Kappaphycus alvarezii 'tambalang' in Ravitaki District and Galoa, Kadavu, Fiji Islands'. His research aims to determine the best method for farming and drying the red seaweed, Kappaphycus alvarezii. Emphasising on the importance of seaweed farming to sustainable livelihood development in Kadavu, he stated that the method of farming and drying employed plays a vital role in terms of the

Mr Albert Whippy giving his presentation at the SCBO Conference

return that it could bring to the community. By identifying the best method of farming and drying, the information would be used by the Fisheries Department and other NGOs to support the idea of introducing seaweed farming project as a sustainable livelihood development initiative and assist in future research.

Both Ms Rashni and Mr Whippy mentioned that SCBO was an enriching experience in terms of knowledge and experience sharing with other participants across Oceania and other parts of the world.

The sentiment was echoed by the Director, IAS Dr Johann Poinapen who also added that IAS will continue take the lead role in the application of scientific research to improve the livelihoods of the people in the region.

Solomon Islands Drug Discovery Research Team

IAS, USP Researchers participate in Solomon Islands Drug Discovery Expedition

In early January 2016, a team of scientists from the Institute of Applied Sciences of USP in early January 2016 participated in a 2-week expedition to remote regions of the Solomon Islands. Alongside collaborators and researchers from the Scripps Institution of Oceanography and Georgia Institute of Technology, USA, the team's goal was to discover marine organisms which could be explored as a potential source of useful drugs.

Drug discovery efforts focus on four major disease areas of importance to the United States and developing nations: infectious diseases including tuberculosis and drug-resistant pathogens; neglected tropical diseases including hookworms, roundworms and malaria; cancer; and neurodegenerative and central nervous system disorders.

The team was led by Dr Katy Soapi. The team, comprising Assistant Project Manager, Mr Klaus Feussner, Scientific Officer Mr Joape Ginigini, Technician Mr Talemo Waqa and their overseas counterparts, collected seaweeds, sponges and marine microbes whose chemical extracts and chemical constituents are now being screened in the therapeutic areas mentioned above.

Mr Feussner while acknowledging the role of IAS's long-term collaborators stated that IAS will continue to take the lead role in the region in the study of plants, marine organisms and bacteria to discover new drugs. Aside from drug discovery efforts, results of the research and ecological surveys will contribute to developing innovative conservation and management options that will help preserve biodiversity and the health of coral reefs in the South Pacific.

IAS hosts Training in DNA Molecular Techniques & GIS

The Institute of Applied Sciences (IAS) in collaboration with the Unitec Institute of Technology, New Zealand facilitated two workshops from 27 - 30 June 2016 focusing on: (1) Geographical Information Systems (GIS), the programming language R and its application for Species Distribution Modelling and (2) Deoxyribonucleic acid (DNA) Molecular Techniques. The workshops are part of an on-going series of workshops between the two institutions that commenced in 2013 and spearheaded by Prof. Linton Winder a former Head of the School of Biological & Chemical Sciences, USP & Mr. Marika Tuiwawa, the Curator, IAS. The workshops targeted young

Workshop participants at the IAS DNA Laboratory

researchers, graduate students and those in the workforce undertaking similar research work who would greatly benefit from these trainings. Workshop participants included personnel from IAS-USP, the Ministry of Agriculture, Department of Forests and SPC. The workshop facilitators were Dr. Stephane Boyer and Dr. Glenn Aguilar of the Unitech Institute of Technology, Auckland, New Zealand and Dr. Hilda Waqa-Sakiti of IAS, USP.

The DNA Molecular training provided a mix of both basic and advanced knowledge and skills in the applications of molecular techniques in research and also introduced new techniques such as Environmental DNA (eDNA) and the Next Generation Sequencing (NGS). The workshop also provided an avenue to introduce partners on a new project being developed i.e.

the MADII project (gut Microbiome As Driver of Insect Invasiveness) which is a joint collaboration between Unitec Institute of Technology (Auckland, NZ), The Bio-Protection Research Centre (Lincoln, NZ), Massey University (Palmerston North, NZ) and The University of South Pacific (Suva, Fiji). The MADII project investigates whether invasiveness in insects is linked to the communities of microbes living in their gut by comparing a range of pest species and non-pest species in New Zealand and in the Pacific Islands. The MADII project is both collaborative and educational as it aims to upskill scientific partners in PSIDS in the area of modern molecular biology and empower local scientists and communities to conduct research relevant to their country. This will also involve a series of workshops.

Mr Daveta from the Department of Forestry commented that the topics covered on DNA barcoding in the training were applicable and something that can be taken up by their Research Division with the Department especially in tracking harvested logs in compliance to CITES and illegal harvesting.

Ms Aradhna from the Ministry of Agriculture stated that the workshop was well structured with a balance of theory and hands-on. She added that the concepts learnt from this workshop will be extremely useful especially with the setting up of the new Molecular Laboratory for the Ministry of Agriculture (Research Division) in the near future. Through this workshop, she also got an opportunity to interact with professionals with similar research interests.

Ms Rashni of IAS stated that the barcoding techniques learnt from the workshop would enhance the freshwater macroinvertebrate identification in Fiji. The techniques can be used to verify the lowest level taxonomic identification and further phylogeny studies. She plans to incorporate the barcoding technique in an upcoming project focused on Fiji's endemic damselfly genus, Nesobasis.

In the GIS workshop, the programming language R and its application for Species Distribution Modelling was covered. R is the most widely used statistical tool and its application for the modelling of important species is critical for the acceptance for publication of articles in high impact journals. The GIS workshop covered the commands used in reading species presence data and environmental layers as well as several algorithms including Bioclim, GLM, Maxent and Random Forest which are all included in the 'dismo' package. R is also free and has a substantial user base that provides the needed support for all aspects of the language. With skills in R, research capabilities are enhanced for future research and advanced studies in local and international graduate programmes.

The Institute of Applied Sciences continues to upskill its staff, graduate students and relevant researchers in the Fiji and regional workforce on techniques new to science and its applications as part of its capacity development goal.

IAS Laboratory Staff and IANZ Assessors enjoying an afternoon tea after the assessment

IAS Laboratory Services recommended for continued accreditation

The IAS Laboratory's Chemical and Biological testing have been recommended for continuing accreditation after a successful 3 yearly reassessment of the Laboratory's Management System. The assessment that took place on 25 – 26 July, 2016 was conducted by the International Accreditation New Zealand. The Laboratory is accredited to ISO/IEC 17025 for food, water & environmental chemical & microbiological testing. Information on laboratory services is available on the IAS website www.usp.ac.fj/ias.

More information may also be obtained from the Manager Laboratory Services, Mr Usaia Dolodolotawake, Ph: 323 2965/ 323 2967, email: dolodolotawa@usp.ac.fj or iaslab@usp.ac.fj.

IAS contributes to Success of 2016 USP Open Day

IAS held displays of services and research activities for students and other visitors to the USP Open Day 2016 on Friday, 29 July along with other departments of the Faculty of Science, Technology & Environment. A huge number of students visited the booth where they learned of the importance of scientific services and research activities and how these contribute to improving the livelihood of the people in the region.

IAS Hockey Team makes it into the semi finals for the Business House Games

CALIBRATION OF LABORATORY TESTING EQUIPMENT

Equipment calibration traceable to **INTERNATIONAL STANDARDS** for the following equipment:

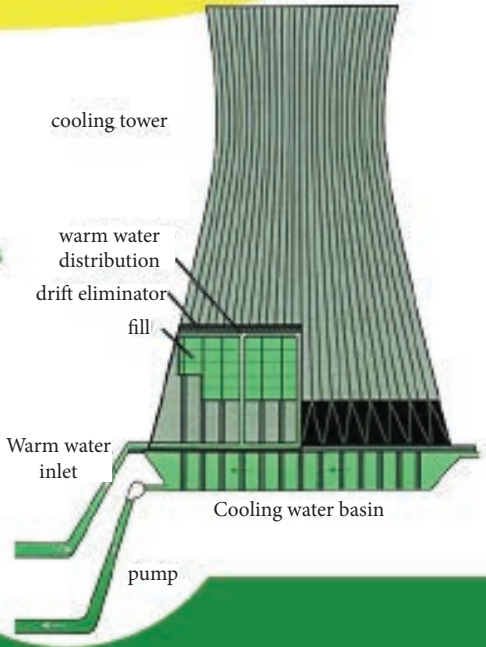
- Thermometers – digital, alcohol/mercury & infrared thermometers
- Brix meters – hand held & bench-top meters
- pH meters
- Conductivity meters
- Turbidity meters
- Chlorine meters
- Incubators
- Water baths
- Muffle Furnaces
- UV-Vis Spectrophotometers
- Ovens
- Pipettes and dispensers
- Micrometers
- Vernier callipers
- Hydrometers
- Iron Testers

For further information contact: Mereoni Degei Gonelevu, QC Coordinator, IAS Phone: 323 2972 Email: gonelevu_m@usp.ac.fj

Cooling Tower Water Analysis for Legionella Available at the Institute of Applied Sciences

COOLING TOWER WATER ANALYSIS FOR LEGIONELLA AVAILABLE AT THE IAS!

Cooling towers, evaporative condensers and fluid coolers use a fan to move air through a reticulated water system. This allows a considerable amount of water vapor and sometimes droplets to be introduced into the surroundings, despite the presence of drift eliminators designed to limit droplet release. This water may be in the ideal temperature range (20 – 50°C) for Legionnaires' disease bacteria growth. Legionella pneumophila a thin, aerobic, Gram-negative bacterium of the genus Legionella is the causative agent of legionellosis or Legionnaires' disease.



For more information contact IAS Laboratory Manager, Mr Usaia Dolodolotawake
Phone No. : 3232967 or 3232971 or email dolodolotawa@usp.ac.fj