INTRODUCTION

With the rapid growth rate of the world population; growing demand for adequate supplies of fresh water requires prioritization of efficient management Of water resources to ensure sustainability of both the society and the ecosystems. Integrated Water Resources Management (IWRM) holds promise as an approach to better manage this critical resource. However, since, the concept of IWRM was launched at the United Nations Water Conference in 1977, commitment of different governments to use the IWRM approach has varied. Some countries are able to demonstrate substantial success while others are still at the beginning of their efforts, for a number of reasons.

By 2018, after decades of developing and refining the IWRM approach, there are new global factors such as the Sustainable Development Goals (SDGs), new best practices, models and technologies that could speed up the whole process have also emerged. Yet, the implementation of IWRM plans remains a challenge.

The question that this Forum is posing is how can the new, progressive IWRM tools best prevent water crisis, address water scarcity, enhance efficient water management, and ultimately assist in achieving water security.

It is expected that the papers and discussions at the main forum`s activity “scientific conference” will be a catalyst, and will guide change in water resources management, and will feature some of the largest and most challenging water resources management efforts globally.

FORUM OBJECTIVES

1. Will provide an opportunity to learn about advancements in the practice of IWRM, the tools that have recently been developed to aid in implementing IWRM, and to discuss how IWRM could best serve in addressing water resource challenges.
2. Will contribute to shaping the future of the water sector through presentation, discussion papers, experience sharing and exchange of lessons learnt case studies; keeping peace with the rapid changes affecting the sector globally such as water resources scarcity, climate change and the emerging nexus of ‘’food-energy-water”; in an effort to find the best ways to employ advancements in IWRM to achieve the Sustainable Development Goals (SDGs) and address the challenges of water resources management using the right scientific bases.
3. Assist water providers and institutions in best setting their future strategic plans, enhancing governance and developing their water and wastewater services.
4. Raise awareness of the importance of water non-conventional resources by launching and discussing solutions to develop appropriate new alternative water resources.
5. Set declarations help in catalyst and guide change in water resources management, and will feature some of the largest and most challenging water resources management efforts globally.
6. Opportunities to make new business and networking with decision makers.

FORUM TOPIC

TOPIC 1: Sustainable development of water resource

1.1. Towards improved water demand management

1.2. Non-conventional water resources

1.3. Water harvesting: new opportunities for the future

1.4. Water, Energy, and Food Nexus

1.5. Ecosystems and quality of water

1.6. Building independent states from the water point of view; Opportunities and challenges.

TOPIC 2: Water governance and effective management

2.1. Governance and regulation of water services

2.2. Management of Public Private Partnerships (PPP)

2.3. Non-Revenue Water Reduction

2.4. Water utilities benchmarking

2.5. Utilities asset management tools (Standards of Operation and Maintenance (O&M) And Asset Management Strategies (AM) for water)

2.6. Water integrity

TOPIC 3: Advancing Sustainable Development Goals “SDGs“

3.1. Ensure availability and sustainable management of water and Sanitation (Goal 6)

TOPIC 4: Climate Change and drought management

4.1. Climate Change and drought management: challenges and solutions

4.2. Disaster risk management as it relates to floods and droughts

4.3. Extreme hazardous weather events such as floods drought, etc.

4.4. Modeling of climate change impact on water resources

4.5. Technologies for adaptation to climate change in the water sector and Lessons learnt in adaptation

4.6. Awareness on climate change

ORGANIZER

Government of the State of Palestine represented by the Palestinian Water Authority, in cooperation with the Arab Countries Water Utilities Association (ACWUA).

OUR PARTNER

1. Union for the Mediterranean
2. Kingdom of the Netherlands
3. Agence Française de Développement (AFD)
4. Austrian Development Agency
5. Sustainable Water Integrated Management and Horizon 2020 Support Mechanism 2016-2019 funded by the European Union
6. United Nations International Children's Emergency Fund (UNICEF)
7. Palestine Cellular Communications Company (JAWWAL)
8. Bank of Palestine
9. National Beverage Company (NBC)
10. The United Nations Educational, Scientific and Cultural Organization (UNESCO)
11. Middle East Desalination Research Center (MEDRC)

FORUM PARTICIPANTS

1. Ministries of Water, Agriculture – Eng. Issam Nofal, Energy and the Environment Quality Authority – Eng. Abdulaziz Rayan.
2. Political and economic dignitaries
3. Representatives and ambassadors of Arab and foreign countries
4. Representatives of international and regional organizations
5. Representatives of the ministries and authorities of water
6. Representatives of the ministries and commissions associated with the water sector
7. Representatives of donors and international institutions
8. Representatives of NGOs and civil society organizations
9. Private sector institutions
10. Experts and academics institutions specialized in water and sanitation issues
11. Water and wastewater service providers

SIDE EVENTS

1. Exhibition for local and international companies and institutions
2. Routes for Palestinian Historic Sites

First Palestine International Water Forum

"Integrated Water Resource Management: Best Practices and Technology Transfer"

Date: 26 – 28th June 2018

Venue: Ramallah- Palestine

Day (1) Tuesday 26/6/2018

Time	Hall A	Hall B
9:30 – 11:15	**Session (1):** **Towards improved water demand management. Chairperson: Dr. Hammou Laamrani, League of Arab States.** 1. **Giovanni Cesari** and **Mohammed Amro**, Water master plan for communities in Area C of North-East and South Regions of West Bank. 2. **Mazen Abualtayef**, Households' affordability and willingness to pay for water services in Khan Younis City, Palestine 3. **khair Al-hadidi,** Groundwater tariffing policy: Effects on farmers and groundwater consumption, Case of Jordan. 4. **Amjad Aliewi**, Development of Integrated Water Resources Management Plan for the City of Nablus 5. **Peter van der Steen** and **Jawad Hassan**, Is off-the-grid wastewater collection, treatment and reuse a feasible option for Palestinian towns and villages in the West-Bank? 6. **Eric Pfliegersdoerfer** and **Genevieve Saulus**, Integrated management of water utilities as a response to the upcoming challenges 7. **Fadi Dwiek** and **Mahmoud Bsharat**, Maximizing the Agricultural productivity with less amount of water and Best Technology (Balance Drip Irrigation System) 8. **Muath Abu Sadah**, Water Supply and Distribution Information system (WSDIS) towards fairwater share allocation for water service providers at bulk level	**Session (2):** **Non-conventional water resources. Chairperson: Dr. Miriam Balaban, European Desalination Society.** 1. **Ahmed Al-Busaidi**, Environmental Impacts Associated with Treated Wastewater Applications in Agriculture 2. **Mahmoud Shatat**, Opportunities for Solar Water Desalination Worldwide: Gaza Strip case study. 3. **Mohammed Ahmed**, Drinking water supply through BWRO desalination plants in Gaza Strip 4. **Rehab Thaher** and **Nidal Mahmoud**, Drivers and barriers of house onsite grey water treatment and reuse in Palestinian rural areas 5. **Salim Bouchentouf**, Fast growing seawater desalination capacity in Algeria. 6. **Abdel Halim Fuqaha**, Ground water denitrification with biofilm reactor, impact of packing media and hydraulic condition on the effluent particle size and water quality. 7. **Philippe Goral**, International regulations for sanitary conditions for the Reuse of treated wastewater in Agriculture, experience of Reuse in the Projects of Tayasir and Misiliya sanitation in North Palestine. 8. **Naser Qadous**, Economic analysis of reuse of secondary treated effluent for irrigation of Alfaalfa and lesson learned fro shaping future policy in reuse of reclamid wastewater.

11:15- 11:30	**Coffee Break**	
11:30 -13:15	**Session (3):** **Water, Energy, and Food Nexus.** **Chairperson: Ms. Domitille Vallee, FAO.** 1. **Ahmed Al-Busaidi**, A sustainable Method for Achieving Food Security: A case Study from Oman 2. **Gregor von Medeazza**, Community-scale desalination for Gaza: An off-grid, energy efficient, water conserving solution by MIT and UNICEF. 3. **Fayez Abuhelou**, Water – Energy Nexus projects, As a priority for intervention in the Palestinian water sector 4. **Job Kleijn**, Game changer for water allocation and efficient water use in agriculture 5. **Nada Majdalani**, Opportunities and Challenges for Water - A Pre-feasibility study on renewable energy exchange in Middle East. 6. **Nadia Eshra**, Enhancing the thermal and drinking water station to work with different Nile level condition. 7. **Joel Cuello**, Optimizing Water Use through Integrated Engineered Systems in the Food-Water-Energy Nexus: The Case of the vertical farm for crop and microalgae production	**Session (4):** **Non-conventional water resources.** **Chairperson: Dr. Salim Bouchentouf, Poland representative.** 1. **Rana idais**, Evaluation the Impact of Using Treated Wastewater for Irrigation on Soil Chemical Properties and Crop Productivity in Gaza Strip 2. **Fairouz Slama**, Contribution Of Hydrogeophysics and Numerical modeling to the characterization of Managed Artificial Recharge with Treated Waste Water sites: Case studies from Tunisia. 3. **Hossam Nassar**, Utilization of duckweed (DW) for nutrient removal from agricultural drain surface water and producing alternative economic animal fodder. 4. **Odai Judeh & Marwan Haddad**, Modeling the Relationship Between COD and Output Voltage for a Double Chambered Wastewater-Substrate Microbial Fuel Cell. 5. **Rifaat Abdel Wahaab**, Wastewater Reuse in Egypt: Opportunities and Challenges. 6. **Monther Shoblaq** and **Maher Najjar**, Non-conventional water resources - brackish and sea water desalination the case of Gaza Strip _ Palestine. 7. **Zaidan Abu Zuhry**, **Mohan Peiris and Gregor von Medeazza**, Large-scale Seawater Desalination supported by Renewable Energy in Gaza.

13:15 – 14:30	**Lunch**	
14:30-16:15	**Session (5):** **Ecosystem and quality for water.** **Chairperson: Eng. Hazem Kittani, Palestinian Water Authority,** 1. **Farouk Dawabsheh**, Strategies and Policies to assure safe water quality in Jeddah City/KSA 2. **Rachida Bouhlila**, Hydro-geochemical risks, Advances, Modeling and relevant Cases of study 3. **Fadoua Hamzaoui**, Suitability of groundwater for domestic and agricultural use: Bouficha aquifer (north-eastern Tunisia). 4. **Adnan Aish**, Groundwater quality assessment and mapping of the Gaza coastal aquifer using GIS and Geo-statistical Approaches 5. **Almotasembellah Abushaban**, Monitoring adenosine Triphosphate and bacterial re-growth potential in seawater reverse osmosis plants. 6. **José Rivera** and **Antonio Cardona**, Groundwater flow systems definition and control off deteriorating water quality extracted by boreholes. 7. **Laila Mandi**, Multi-Soil-Layering System: A green and sustainable technology for wastewater treatment in developing countries rural areas.	**Session (6):** **Non-conventional water resources.** **Chairperson: Eng. Naser Qadous, anera** 1. **Jane Hilal** and **Elias Abumohor**, Potential of small scale wastewater treatment plant in Palestine and its Up – scaling feasibility in Central Asia. 2. **Abdelhalim Fuqaha**, Nanofiltration operating conditions and fouling challenges in drinking water treatment. 3. **Lina hiyari**, Wastewater reuse in agriculture: Evaluation of Jordan experience. 4. **Noama Shareef**, Application Biofilm Technology in Wastewater Treatment: A cost-effective Solution. 5. **Ibtisam AbuAlhaija**, The social acceptance in Surda e village for the consumption of products irrigated with treated wastewater. 6. **Jack van de Vossenberg**, Hadeel Fatafta, Samer Khalaf and Jawad Hasan, Performance of a decentralized treatment plant at Ubeidiyah School. 7. **Fasal Al-Syari**, Tunis experiences in reuse treated wastewater in agriculture. 8. **Margaux Chinal** and **Sadi Ali**, and Reuse of treated wastewater from the North Gaza Emergency Sewage Treatment (NGEST) and opportunities in the region.

16:15-16:30	**Coffee Break**	
16:30 – 18:15	**Session (7):** **Governance and regulation of water services.** **Chairperson: Eng. Subha Ghannam, The Netherlands Representative Office to the Palestinian Authority.** 1. **Azzam Shabib**, Palestinian model in drinking water quality surveillance, the right tracks to Palestinian State. 2. **Giovanni Cesari**, Water trucking governance system to support vulnerable communities in the West Bank. 3. **Mohammed Amro,** Efficient access and water distribution modeling. 4. **Rabeh Morrar and Anwar Al-Shaer**, Water tariff in Palestine between social justice and economic efficiency. 5. **Samiya Al-Ghafri and Huda Al-Harbi**, Improving water services and supply resilience in Oman. 6. **Samer Alatout**, Justice-Centered water governance in Palestine under settler colonialism. 7. **Carol Awad and Fadi Amro**, Fair water distribution model "South of the West Bank". 8. **Ismael Abba**, Agreement for Al-Farsha watershed at Morocco.	**Session (8):** **Climate change impact on water resources: management, floods and drought Chairperson: Prof. Dr. Karima Attia, Egypt National Water Research Center**. 1. **khalid Qahman**, A simulation optimization study to assess seawater intrusion management strategies for the Gaza Strip coastal aquifer (Palestine) 2. **Mazin Qumsiyeh**, Climate change and other challenges in a post-apartheid Palestine 3. **Ibtisam Abualhaija**, Drought management In Palestine: challenges and solutions 4. **Danielle Brunton**, Storm water management 5. **Ahmed Mushtaque**, Potential adaptation measure impact on water sector in arid climate: lesson from Oman. 6. **Amin Nawahda and Samar Shanti**. Strengthen the resilience to the adverse impacts of climate change. 7. **Kamal Al-Muqadem**, Drought mitigation on Keer Zees Ghriz on Northern East of Morocco.

Time	Day (2) Wednesday 27/6/2018	
9:30 – 11:15	**Session (9):** **Governance and regulation of water services.** **Chairperson: Eng. Almotaz Abadi, UFM.** 1. **Hala Barhomi and Rashed Al Saed**, Use of economic water allocation models in regional planning – Tulkarm governorate a case study 2. **Mohammd Hmaidi**, Water and wastewater service performance monitoring findings and recommendations 3. **Ali Al Shueili**, Customer role to increase the chance of financial sustainability and water service continuity. 4. **Reem Abu Shomar**, Management of water safety in the Southern governorates: Opportunities and Challenges. 5. **Gul Ozerol**, Palestinian-Dutch Academic Cooperation Program on Water: A Transdisciplinary Approach to Building Capacity in the Palestinian Water Sector. 6. **Issam Nofal**, Date Palms & Water in Jericho; Reality and Future Prospects. 7. **Mohamad Ftohi**, Institutional and legislative for water governance at Morocco. 8. **Julie Trottir**, How can we construct socially equitable reuse system in irrigation?	**Session (10):** **Ensure availability and sustainable management of water and sanitation (Goal 6).** **Chairperson: Dr. Gregor von Medeazza, UNICEF.** 1. **Yaser Kishawi**, Enhancement of the aquifer recharge factor in DRASTIC Model using SWAT and GIS techniques - a method for improving allocation of artificial recharge locations 2. **Majed Abusharkh**, Assessing the resilience of water supply systems in Oman 3. **Tahseen Sayara**, **Saed K. Khayat**, **Jack van de Vossenberg, Muhmmad Slamh and Peter van der Steen**, Testing at pilot scale a photo-activated sludge system for its potential to remove nitrogen from anaerobic effluent 4. **Adel Ghulam**, Ways to enable and enhance Arab Cooperation In order to achieve the sixth goal of Sustainable Development Goals 2030 (SDG–6). 5. **Philippe Goral** : WIMES Hypervision Tool to centralize informations of the Water System for Water Management and Assistance to Decisions Makers, experience of BRL operator of the Occitanie Regional Hydraulic System in France. 6. **Clemens Messerschmid**, Water Malaise in Gaza – Principle Problems, False Promises and Practical Solutions. 7. **Rehab Thaher**, Toward Sustainable Development Goals Achievements and Challenges

11:15- 11:30	**Coffee Break**	
11:30 – 13:15	**Session (11):** **Non-Revenue Water reduction and utilities asset management.** **Chairperson: Eng. Raslan Yasin, JICA.** 1. **Ahmed El Zayat**, Real losses detection technique for reducing Non Revenue Water. 2. **Hatem Abu Eltayef**, Khan Younis municipality Non-Revenue Water reduction Plan for the year 2017 3. **Hamza Halyiba**, Use of GIS applications in developing water management and reducing Non-Revenue Water in Bethlehem 4. **Mohammd Hmaidi**, Water and wastewater tariff national survey findings and recommendations 5. **Mohammed Shafei**, Achieving responsible impact in NRW management through a shared framework. 6. **Abdullah Murrar**, Benchmarking and categorization of the Palestinian water service providers. 7. **Armelle Bernard**, Integrated management of water utilities as a response to the upcoming challenges: the case of Eau de Paris	**Session (12):** **Water harvesting new opportunities for future.** **Chairperson: Dr. Amjad Aliewi, Kuwaiti National Scientific Research Center** 1. **Abdelwahab Habieb**, Determination of suitable water harvesting sites and water resources management by using Geospatial and modeling techniques 2. **Meriem Ameur**, Geochemistry of fluoride and major ion in the groundwater samples of sminja aquifer (North Eastern Tunisia), through hydrogeochemical, GIS and statistical analyzes. 3. **Sami Hamdan**, Socioeconomic aspects of rooftop rainwater harvesting in the Gaza Strip 4. **Musaed Aklan**, Indigenous water harvesting systems lessons from traditional practices. 5. **Omar Tabakhna**, Impact for water harvesting in creating sustainable agricultur sector. 6. **Tareq Bani Yasin**, Mitigation with resources to cover the water shortage for domestic usage. 7. **Marwan Ghanem**, Flooding Protection Management for Risk Prevention in Arid Catchments
13:15 – 14:45	**Lunch**	

14:45 – 16:30	**Session (13):** **Ensure availability and sustainable management of water and sanitation (Goal 6).** **Chairperson: Chairperson: Eng. Rebhy El Sheikh, Palestinian Water Authority.** 1. **Abdessamad Ghacha**, Sewage sludge management issue in Morocco 2. **Gregor von Medeazza**, **Tom Slaymaker, Omar El Hattab,** Global Regional and Palestine's progress towards SDG 6.1 and 6.2 3. **Hanane Benqlilou** and **Samir Bensaid**, Expertise sharing - approaches and best practices to achieve the SDGs cooperation case between ONEE-IEA (Morocco) and WSSA Bethlehem (Palestine). 4. **Bashar Khalil**, Laboratory accreditation for improved decision making in water quality monitoring sector. 5. **Marco Verber**, Evaluating performance and user perception of household water filters in Area C, Palestine: rational and opportunities. 6. **Carol Awad**, Increasing access to water in Palestinian schools. 7. **Imad Adley**, The role of international and regional civil society organizations towards achieving water security in the lands under occupation	**Session (14):** **Building independent state from the water point of view; opportunities and challenge & Water integrity & Management of Public Private Partnership (PPP).** **Chairperson: Dr. Nidal Salim, Global Institutional for Water, Environment and Health (GIWEH).** 1. **Beesan Shonnar**, Public Private Partnership in Palestine: benefits, drawbacks, challenges, enabling environment 2. **Ayaa Hisham**, Assessment of Private Sector Participation through different contracting Models on the sustainability of desalination Plants 3. **Abdel Rahman Tamimi** , Service delivery and legitimacy of State building Process 4. **Philippe Goral**, Transboundary basins experiences for harmonious international sharing of the water (Nil, Niger, Chad Lake, Victoria Lake, Congo,…), factor of peace 5. **Luay froukh**, The regional cooperation through Red Dead water project as an opportunity for Statehood. 6. **Clemens Messerschmid**, What Next, Palestine? – Donor Fatigue in the Water Sector: Threats & Opportunities. 7. **Youssef Al-Nouri**, Challenges and problems for water in Tunis Republic.
16:30 – 16-45	**Coffee Break**	
16:45 - 17:30	**Closing and Wrap up**	
Rapporteurs 17:30 – 18:00	**Chairperson: Dr. Subhi Samhan, Palestinian Water Authority.** **Leen Arafat, Hadeel Fatafath, Israa' Al-Asa, Rinad Hamed, Abdallah Murrar, Walaa' Hamad and Yasmeen Thaher**	
28/06/2018	**Field Trip:** **Track 1: Jerusalem, Irtas springs, Suleiman Pool and Bethlehem.** **Track 2: Marsaba, Irtas springs, Suleiman Pool and Bethlehem.** **Track 3: Al-Qilt springs, Dar Al-Qurontol, Aqbat Jaber filtration, Sultan and Dead Sea.**	

THE PALESTINE CONFERENCE SCIENTIFIC COMMITTEE

1. Dr. Subhi Samhan	Palestinian Water Authority
2. Eng. Hazem Kittani	Palestinian Water Authority
3. Dr. Ziad Faddah	Ministry of Agriculture – Palestine
4. Prof. Dr. Rezq Salimia	Hebron University – Palestine
5. Dr. Nabil M.A. AL - Joulani	Palestine Polytechnic University
6. Dr. Rashed Al-Sa`ed	Birzeit University
7. Dr. Abdel Fattah Al-Mallah	An-Najah National University
8. Dr. Tahseen Sayara	Technical University –Kadoorie (PTUK) - Palestine
9. Dr. Sami Hamdan	Palestinian Water Authority
10. Dr. Jawad Hasan Shoqeir	Al-Quds University

11. Dr. Khaldoun Al Hin	Al Azhar University
12. Dr. Eyad Yaqoub	Arab American University
13. Dr. Abdul Rahman Al -Tamimi	Palestinian Hydrology Group
14. Eng. Deeb Abdel Ghafour	Palestinian Water Authority
15. Dr. Nidal Salim	Global Instututional for Water, Environment and Health (GIWEH)
16. Abdel Aziz Rayyan	Enviroment Quality Authority
Facilitators from PWA:	Suhad Baerat
	Bessan Al-Shonar
	Layla Hamshari

CHAIRPERSONS

1. Dr. Hammou Laamrani

Holding a PhD in Environment and Water Management from Copenhagen University, Denmark. His field of expertise is water management, agriculture/ Food Security, climate change and environment policy in the Arab World and in Sub-Saharan Africa.

He worked for:

1. Holding a PhD from the faculty of Sciences, Copenhagen University,
2. The International Water Management Institute in Sri Lanka and Ghana, www.iwmi.org .
3. The Canadian International Development Research Centre (www.idrc.ca) where he served as Senior Program Officer for the programme Rural Poverty and Environment and then for the programme Agriculture and Food Security, Cairo Egypt.

Currently:

1. Advisor to GIZ (www.giz.de) ACCWaMProgram Adaptation to Climate Change in Water Sector in the MENA Region (www.accwam.com), (Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH),

2. Water and Climate Change Expert, Senior Technical Advisor to the Arab Water Ministerial Council. Department of Environment, Housing, Water Resources,Economic Affairs, League of Arab States (www.las.org), Cairo, Egypt,

3. Coordinator of the regional initiative on the Nexus Water, Energy and Food security in the Arab region, League of Arab States, Economic Affairs, Cairo, Egypt.

CHAIRPERSONS

2. Miriam Balaban

Biography

Miriam Balaban is a graduate in chemistry of the University of Pennsylvania in Philadelphia, PA, USA. She is founder of Desalination, the international journal for desalting and purification of water and was Editor-in-Chief from 1966 to 2009. In 2009 she launched the monthly journal Desalination and Water Treatment to accommodate the growing flood of papers in the expanding field. She has reviewed and edited over 20,000 papers from over 100 countries. She has edited and published several books in the field. She is editor and publisher of the Desalination Directory, the international online database in desalination and water reuse which serves to network over 30,000 individuals and 5,000 academic and government institutions and companies with full access details, a calendar of events and other information.. She is Secretary General of the European Desalination Society at the University Campus BioMedico, Faculty of Engineering, Rome, Italy where she programs and organizes courses, conferences and workshops in desalination. She is associated with the desalination program of the Center for Clean Water and Energy in the Department of Mechanical Engineering of the Massachusetts Institute of Technology (MIT). She has served as a board member and officer of the International Desalination Association and received the Lifetime Achievement Award from the Association in 2009. She is an honorary member of the European Membrane Society and was a member of the review committee for the Desalination Roadmap of the US National Research Council National Academy of Science. In 2012 she was awarded the Star of Italy from the President of Italy, and in 2014 received the Sidney Loeb Award from the European Desalination Society. She has organized numerous desalination conferences around the world, is chairman, member of the Scientific Program Committees and speaker at numerous desalination conferences and is actively involved in paper selection and program composition. She has been a research associate for science communication at Boston University, Center of Philosophy and History of Science. She was president of the International Federation of Science Editors and was Professor and Dean of the School for Science Communication at the Mario Negri Institute for Biomedical Research.

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CHAIRPERSONS

3. Domitille Vallée

Biography

Domitille Vallée is a senior natural resources specialist working for the Food and agriculture organization (FAO), Regional office for Near East and North Africa, Egypt. She works on approaches to address the interlinkages of sustainable food and agricultural development and natural resources. She currently manages a regional project focused on implementing the 2030 agenda for water efficiency/productivity and water sustainability in the NENA region. She previously worked for the UNESCO-WWAP, the International Water management institute (IWMI) and the Mediterranean Action Plan (UNEP/MAP/Blue Plan). She holds a degree in agricultural studies (INA PG) and a postgraduate degree in rural engineering, water and forest management (ENGREF, France), together with a master in environmental technology from Imperial college (UK).

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CHAIRPERSONS

4. Dr. Salim Bouchentouf

Biography

Doctor Salim Bouchentouf is scientist at laboratory of Natural Products and Bioactive at Tlemcen University. Doctor Salim Bouchentouf received his Ph.D degree in Chemistry from Tlemcen University (Algeria). Competent in field of Analytical chemistry and environmental pollution, Doctor Bouchentouf a works on Sea water pollution and water treatment. He works also on Natural products and use of bioinformatic and biotechnology by promoting use of software in the concerned fields. As expert and editorial member board of many American research revue (Journal of Environmental pollution and human Health, American journal of Water resources, International journal of bioorganic chemistry, ...) Doctor Salim Bouchentouf brinks rigorous critical to research for upholding high scientific standard publication. Doctor Salim Bouchentouf is also responsible of exterior relationship of Laboratory of natural products and Bioactive

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CHAIRPERSONS

5. Eng. Hazem Kittani

Biography

Hazem Kittani holds a Masters degree in Civil Engineering majoring in Hydraulics and Fluid Mechanics from the Missouri State University at Columbia in the United States of America. His current position is Director General of Technical Affairs at Palestinian Water Authority . He gained more than 25 years of experiences in civil engineering (construction-sites), and hands-on practical experience in designing, supervising, monitoring, and control manager in infrastructure related to water and wastewater systems in Saudi Arabia, Jordan and Palestine.

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CHAIRPERSONS

6. Dr. Abdelrahman Al-Tamimi

Biography

Abdelrahman Al-Tamimi Worked since graduation in the field of water resources , planning in the Occupied Territories. During the last 29 years the activities were focused more on Public policies , Israeli water and environmental policy , he is active in civil society in terms in nation and state building , his research capacity in planning , future studies and strategic thinking towards socioeconomic issues , community developmemnt , environmental planning and management , he has capacity of teaching training and conducting policy oriented research , He is part time associate professor at alquds university ,Sustainable development Institute –master program and partime lecturer at Arab American university

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CHAIRPERSONS

7. Eng. Subha Ghannam

Biography

Subha Ghannam holds a Master Degree in Water and Environmental Engineering, a Bachelor of Science Degree in Civil Engineering and over 13 years of work experience in the field of water and sanitation infrastructure development and humanitarian assistance.

Throughout her professional career she has been able to cover wide ground under a number of tasks including networking with different stakeholders and program design and implementation. Her duties have varied between coordination of large, diverse groups, the development of programs and follow up on different activities addressing policy and technical issues. She has also accumulated solid experience in gender mainstreaming.

Complementing her technical background, Subha has been working in the diplomatic sphere for the past four years. Merging politics with development, including their complexities has introduced her to a new scope of work for more effective, sustainable impact.

CHAIRPERSONS

8. Prof. Dr. Karima Attia

Biography

- She is Emeritus prof., Nile Research Institute, former director Water Resources Research Institute (WRRI), National Water Research Center. She had her Professor degree in 2007, her Ph.d in 1996, Faculty of Engineering, Ain Shams university, Egypt. Has more than thirty year experience in water resources different disciplines, She worked as a team leader and member for many national and international projects, watershed management project, as a team leader for the study "Windblown Sand to Lake Nasser/Nubia" funded by world bank, Improved Drought Early Warning and FORecasting to Strengthen Preparedness and Adaptation to Droughts in Africa (DEWFORA), Case study of Ethiopia, local consultant for the Nile inland waterway transport by the European Bank for Reconstruction and Development and Ministry of Finance Central Public Private Partnership Unit, 2015, and short term consultant for idiom in support to the reform of the Egyptian Transport Sector (EuropeAid/129-110/SER/CE/G) "Strategy for the Sustainability of the Egyptian Transport System", (Navigation for First Class Waterways), The principle investigator for the project "Enhancing Sediment Transport Modeling in Nile Basin Reservoirs" 2009-2012 funded by ESA through TIGER II initiative.
- She is one of the Principal Authors, of the book "The Regime of the River Nile in Egypt" Egypt 1990, ISBN:0-9696846-1-4, (B. Evans, North Hydraulic Consultant, Canada, and K. Attia, Nile Research Institute, Editor in Chief, M. Rafeek Abdelbary, Nile Research Institute,)
- Published 45 research papers in scientific journals and conferences between 1990 and 2018.
- Member of Egyptian Universities Promotion Committees (EUPC), Member of the World Water Council, 2017, Focal person of Egypt for the ministerial council in the Arab League permeant scientific committee 2016., Focal person of Egypt for the Developing Eight (D-8) Water Cooperation, 2013, Founding member of World Association for Sediment and Erosion Research (WASER), China, 2004.
- Deputy director and member of Egyptian National Committee of Hydrology and Water Resources, UNESCO since 1994.

Email: karima_attia@yahoo.com Almotaz Abadi

CHAIRPERSONS

9. Almotaz Abadi

Biography

Mr Almotaz Abadi is currently holding a Position of Managing Director at at the UFM Secretariat, mainly Responsible on the Water Policies and Development closely working with the Water and Environment Division at the UfM Secretariat. Mr Abadi Was Appointed to this position based on the Understanding between the UFM and the GoP. Academically Speaking, he has a Master degree in water resources management and another certificates in the Governance and public sector services, Also international development.

Mr Abadi has been Acting deputy secretary General for water and environment division during Sept 2015 until Jul 2016. Previously Mr Abadi has been the director of the Aid Coordination and management Unit at Palestinian Water Authority and adviser to the Minster, During the Last five years he was very active in the water sector in the country and also in the region through his active engagement with the regional dialogue and also the bilateral and trilateral relations aiming to enhances the regional cooperation and to enhance the way we govern our water resource as well as the water services. Mr Abadi was one of main drive for the water sector reform and also to the water governance initiative for the Mediterranean.

CHAIRPERSONS

10. Eng. Raslan Yasin

Biography

Raslan is a groundwater hydrologist; his current position is a Chief Program Officer in JICA Palestine Main Office. His expertize widely spearheaded in groundwater modeling and integrated water resources management. His main interest is national planning and implementation of developmental projects in water sector considering PWA & PNA national strategic plans and satisfying SDG's.

He was a core-team-member of SUSMAQ project as researcher and Groundwater modeler, IWRM expert, then consultant for PWA Head on water files for final-status negotiations, Red-Dead Sea Canal project; He also participated in the establishment of the national water council. He conducted several studies and consultancies for international institutions.

Recently, Raslan is working for Japan International Cooperation Agency, JICA, which is widely contributed to different vital sectors in Palestine via capacity building programs. JICA's main goal is building Palestinian institutions towards building Palestinian viable state. He contributed several surveys and missions on water sector in Palestine and abroad.

Lately he was leading a project aims at capacity building and improvement of NRW of Jenin water department. His main work manner is to ethically apply work mechanisms and procedures towards objective-oriented management.

Eng. Raslan got his master degree in Groundwater Hydrology from IHE delft in 1999, and his main concern is contribution to building PA institutions for better service delivery for people.

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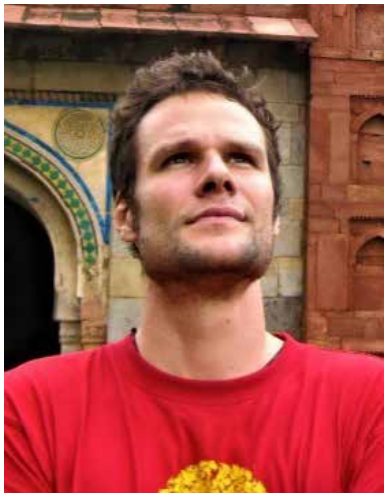
11. Gregor von Medeazza



Biography

Dr. Gregor von Medeazza is the chief of the Water, Sanitation and Hygiene (WASH) program of the United Nations Children's Fund (UNICEF) for the State of Palestine. Over the past 15 years, he has served in a dozen countries, including in New York headquarters, Africa, South Asia, Latin America and the Middle East. Dr. von Medeazza holds a PhD in Ecological Economics and a Masters of Engineering from Imperial College (London), in addition to executive education at SAIS, INSEAD, the London School of Hygiene and Tropical Medicine as well as Harvard University.

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12. Dr. Amjad Aliewi

Biography

Dr. Amjad Aliewi is an expert in water resources engineering, development, management and planning. He has tens of papers published in refereed journals and conferences. At the moment he works as a principle researcher at Kuwait institute for scientific research.

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CHAIRPERSONS

13. Rebhy El Sheikh

Biography

Mr. El Sheikh holds an MSc. in Engineering from the University of Liverpool, England and possesses both academic experience as a lecturer for 11 years at the Faculty of Engineering; Birzeit University, West Bank and a practical professional experience of 22 years in water projects planning and management, in addition to Institutional Management. As a Deputy Chairman of the Palestinian Water Authority (2005-June 2018); and formerly as a Technical Director, he played a role in building the Palestinian Water sector and in the ongoing reform process. He represented PWA in many Multilateral and regional platforms.
Mr. El Sheikh has published a number of articles and papers related to the water sector management including desalination works. He has been awarded an order of merit by the Netherlands Foreign Minister for his dedicated work under such difficult situation in Gaza which is facing blockade and internal division, lack of water resources and continuous emergency status.

CHAIRPERSONS

14. Dr. Nidal Salim

Biography

- Director General and Founder of GIWEH – Global Institute for Water, Environment and Health , Geneva –Switzerland.
- Elected Board of Governance for Asia Water Council (AWC)
- Elected Steering Board Member at Swiss Water Partnership (SWP)
- Vice-Chair Knowledge Base and Dissemination committee at AWC
- Citizen Forum Committee Member of the 8th World Water Forum, Brasil 2018

Before forming GIWEH, Dr. Salim collaborated with different research institutes, universities and international organizations such as the Middle East Peace Process/Water Working Group/EXACT, the World Health Organization (WHO), World Meteorological Organization (WMO), United Nations Environmental Program (UNEP) and many others. Prior to joining the University of Geneva in September 2002, he worked as a Director at the Palestinian Water Authority (PWA), which involved many separate hydrological projects at the local and regional levels.

Dr. Nidal obtained his undergraduate degree from Damascus University (1993) in applied geophysics, his master's degree in Groundwater Hydrology, from UNESCO-IHE, Delft, The Netherlands (1998); and a doctorate in the Application of Remote Sensing and GIS in the water cycle from the University of Geneva, Switzerland (2006).

CHAIRPERSONS

15. Dr. Subhi Samhan

Biography

Subhi Samhan; PhD in Natural Science from Martine Luther University, Halle Wittenberg Institute for Geosciences, Germany. 2013. Working as Director of Research and Development at Palestinian Water Authority since 1997 and represent PWA.
Samhan is national focal point for:

- National focal point for Sustainable Management of Available Water Resource with Innovative Technologies (SMART).
- Building Capacity and Institutional Reform for and Integrated Management of Water and Sanitation services in Rural Communities, 2009-2013, funded by Austrian
- Palestinian-Dutch Academic Cooperation Program in Water (PADUCO) 2013-2020Represent Palestinian Water Authority in Technical Advisory Committee
- Sustainable domestic Water Use in Mediterranean Regions project SWMED projects.
- Academic focal point for Austrian and Middle East Desalination Reseach Center (MEDRC) projects.
- Represent the Palestinian Water Authority in Innovative processes and practices for wastewater treatment and re-use in the Mediterranean region “INNOVA-MED, during 2007-2010. Funded by EU, www.cid.csic.es/innova-med/home.htm.

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BIOGRAPHIES

1. GVC (Gruppo di Volontariato Civile) AAH (Action Against Hunger)

Water Master Plan for Communities in Area C of North-East and South Regions of the West Bank

GVC (Gruppo di Volontariato Civile) is a non-governmental, secular and independent organization founded in Bologna, Italy in 1971. Since its foundation, GVC has been active in international aid projects and programmes, including humanitarian aid, relief and development initiatives for people affected by conflicts and natural disasters, strengthening protection, livelihoods, local development and governance, shelter, and WASH. The guiding principles of GVC's work are the protection of human rights, non-violent and long-term responses to conflict, exploitation, oppression of women and children, expropriation, and destruction of economic and natural resources.

GVC has been active in the occupied Palestinian territory since 1992, and at the moment has offices in Jerusalem, Ramallah, Tubas, Hebron and Gaza.

Action Against Hunger is an international humanitarian organization, founded in Paris in 1979, with branches in Paris, London, Madrid, New York and Montréal.
Action Against Hunger is currently working in over 40 countries worldwide, implementing projects in the sectors of nutrition, water, food security and health.
Our organization set up a mission in the occupied Palestinian territory in 2002. Action Against Hunger has been running food security and water programs in North West Bank since September 2002, in Gaza since July 2005 and in Hebron since May 2006.

Key words

Master plan, water demand, projection, water connection, sustainability

Authors and Corresponding

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Mohammed Amro, WASH Programme Manager, AAH; mamro@pt.acfspain.org

Abstract Text

To this day, the so-called Area C remains under full Israeli security and administrative control, which includes land allocation, planning and construction, directly affecting the livelihoods of the population through limiting any development at individual and community levels. Connecting communities in this area with a piped water service - delivered through a well-maintained water network - is the most sustainable, reliable, sufficiently feasible and effective solution to ensure adequate access to water.
In 2017 Gruppo di Volontariato Civile (GVC) and Action Against Hunger (AAH), in cooperation with the Palestinian Water Authority (PWA), developed a water master plan to identify and promote feasible short-, medium-, and long-term technical solutions to the problems of water accessibility and availability. The methodology included (i) Data collection and verification – baseline; calculation of water demand; (ii) Analysis of the current water supply status; calculation of water availability; (iii) Reporting technical solutions, costs and planning; elaboration of proposed intervention to fill the gap between water demand and water availability.

The proposed technical interventions vary according to the current context for each community, including construction/rehabilitation of water networks and main transmission pipelines, as well as other technical solutions. Data analysis and elaboration were done with a 20-years projection, targeting 247 communities in 7 governorates. The plan also includes a cost analysis of each intervention measuring the efficiency of implementation; total cost for implementing all the master plan is approximately 30 million USD to cover the water needs for about 153,000 inhabitants, while the interventions with the highest priority cost approximately 5 million USD benefiting about 52,000 inhabitants.

The plan, providing technical suggestion to connect marginalized communities, is a step forward for the coordination amongst the WASH agencies, and has been integrated in the PWA Water Strategy 2017-2022.

BIOGRAPHIES

2. Mazen Abualtayef

Biography

Associate Professor of Civil and Environmental Engineering
Dr. Abualtayef has a PhD in Civil Engineering from Japan. He is an Associate Professor at the Islamic University of Gaza in Palestine. Abualtayef got a versatile experience during his 21 years of experience. He has worked for Palestinian and International consultancy firms in projects related to water and wastewater projects.

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Key words
Willingness to pay, affordability to pay, water services

Authors and Corresponding
Mazen Abualtayef, Yousef Oukal, Said Ghabayen, Mohamed Eila, Hatem AbuEltayef

Abstract Text
Willingness and affordability to pay for water services are significant factors in deciding the success and failure of water supply services. Due to the fact that households' willingness to pay for water services are too heavily influenced by specific circumstances, culture, and various social-economic factors, this study aimed at offering a comprehensive picture of the willingness and affordability of household to pay for water services in Khan Younis City. To fulfill the aim of the study, quantitative method where a questionnaire survey was conducted. The questionnaire was distributed to 400 citizens in Khan Younis city. SPSS software was applied to identify the most relevant factors affecting household's affordability, and willingness to pay.

The results indicated that income, water distribution schedule, water quality, water quantity, municipality services, marital status, water network maintenance, water continuity, techniques in the municipality to deliver citizen's complaint satisfaction, staff response speed about the delivered complaint in the suitable time were determinants for household customer's willingness to pay and had an effect on it. Furthermore, results revealed that satisfaction of households towards (water network maintenance, municipality service, available techniques in municipality to deliver citizen's complaint, staff response speed about the delivered complaint in the suitable time and water quality) was not good. Also, results find different reasons for not committing to pay water bills, such as low income with 20.5%, the bad quality of water with 25.2% and bad municipality services with 17.9%. Therefore, it is recommended that the municipality of Khan Younis to make improvements to improve water quality.

BIOGRAPHIES

3. Khair Al-hadidi

Biography

Dr. hadidi has a Ph.D. degree in engineering hydrogeology from Sant - Petersburg University, Russian in 1992. Currently he is working as assistant secretary general for ground water basins at Water Authority of Jordan.
Dr. hadidi has more than 30 years of experience in water resources management. He has published more than 20 scientific papers. His current activities include the participation in integrated water resources management, managing groundwater aquifers and legislative frameworks for groundwater.

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Keywords
Groundwater policy; Jordan; farmers; Groundwater abstraction.

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Abstract Text
Jordan is considering a groundwater tariff policy that will increase the cost of groundwater used for irrigation. The objective of this research was to analyze how this prospective groundwater tariff scheme will affect farmers' incomes and to estimate how farmers would react in terms of groundwater use. To this end, we applied a two-step procedure that combined standard cost-benefit analysis and marginal analysis coupled with a household survey in Mafraq region – north Jordan. The scheme proposes two tariff levels, one for groundwater abstraction between 75,000 and 200,000 m3/well/year and the second for groundwater abstractions that go beyond 200,000 m3/well/year.
We estimated that farmers over-irrigate their crops. Farmers abstracting between 75,000 and 200,000 m3/well/year would be prompted to reduce over-irrigation to profit maximizing levels. Farmers abstracting more than 200,000 m3/well/year would be prompted to eliminate over-irrigation and, further, to apply irrigation levels that are below the profit maximizing ones. In addition, crop production and crop-associated income would be reduced. The government should consider introducing compensatory measures to ensure alternative sources of income for affected households. To successfully implement the prospective tariffing scheme, the government should ensure a proper licensing systems if rationalization of groundwater abstractions is to be achieved.
Jordan is considering releasing a new groundwater tariffing scheme that consists of reducing the amount of groundwater made available to farmers free of charge and increasing the cost of groundwater that is consumed above that free allocation. This policy is a result of several studies that demonstrate that aquifers in Jordan are over-used; the rates of recharge are lower than those of abstraction.

BIOGRAPHIES

4. Amjad Aliewi

Biography

Dr Amjad Aliewi is an expert in water resources engineering, development, management and planning. He has tens of papers published in refereed journals and conferences. At the moment he works as a principle researcher at Kuwait institute for scientific research.
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Key words
Integrated Water Resources Management, Nablus, Plan

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Amjad Aliewi

Abstract Text
Nablus city (as most of the Palestinian Cities) face water shortages which can be severe in the summer months every year. Simple statistics show that the available water resources (springs, wells and purchased water) is about 10 Million Cubic Meter per year (10 Mcm/yr) against estimated water demand of about 11 Mcm for the year 2012 (based of 200,000 capita and 150 litre per capita per day). This means that Nablus city is generating and enjoying natural water resources as it needs in 2012. The expected population of Nablus for the year 2030 is 400,000 capita who needs at least 20 Mcm/yr of water. If Nablus is not allowed to drill new wells to meet its water demand, then from where the water shortages in 2030 will be met. This can be addressed only by developing a comprehensive plan of interpreted water resources management for Nablus City and its region. This plan includes new water resources through harvesting means of rainfall and wadi runoffs in addition to water demand management measures which include socio-economic solutions. Nablus has unique potential solutions that can be utilized in an efficient way. As an example the area of greater Nablus includes 80 springs, many of them are not utilized. Also, the water table underneath most of Nablus city is shallow which enhances the means of harvesting shallow groundwater resources by traditional means. Also, the reuse of treated wastewater is a major solution that can make the difference. This paper will illustrate how an efficient water resources management plan will reduce the water shortages to a minimum level by the year 2030.

BIOGRAPHIES

5. Jawad Hasan Shoqeir

Biography

Dr. Jawad Hasan Shoqeir is the director of Soil & hydrology research(http://www.alquds.edu/en/soil-hydrology-laboratory.html), working at the Department of Earth and Environmental Sciences, Al-Quds University, Palestine. Dr. Jawad finishes his PhD in KTU, Germany. Dr. Shoqeir interests are focused in the field of integrated water resources management (IWRM), groundwater quality, watershed hydrology.

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Key words

off-the-grid, sludge disposal carries, Digital Elevation Maps

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Leonardo Alfonso, IHE Delft Institute for Water Education
Samar Khalaf, Al Quds University

Abstract Text

Many Palestinian residential areas currently discharge wastewater into cess-pits, which are emptied by tanker trucks at varying frequencies. Both the construction and the sludge disposal carries significant costs. In addition, as removal of pollutants in the pit is very limited, the pits are a threat to aquifer water quality. Moreover, as there are no appropriate sludge disposal or treatment sites, illegal dumping is causing additional environmental damage. Therefore it seems logic to connect as many houses, apartment blocks and schools to a sewerage system. In the best scenario the sewer transports the wastewater to a treatment plant for treatment and subsequent reuse in agriculture. In fact, the costs of such a system are in many practical situations prohibitive.

To address this problem, a study was undertaken to calculate the costs and financial benefits of wastewater collection (i.e. a sewer), treatment up to Palestinian standards and reuse for the case of Abu Dis. Objective functions were developed, which were quantified by a software package, based on Digital Elevation Maps, population densities, water consumption. The software was designed to find the best design of the combined collection, treatment and reuse system. It was concluded that for the Abu Dies case, and using a set of best guess assumptions, a decentralized solution with a number of systems scored better than one large (centralized) collection, treatment and reuse system.

The developed method and software will further be improved and applied to the Wadi Nar basin in order to find out how to combine large scale centralized infrastructure with smaller scale decentralized systems, in order to find an optimal overall system design.

BIOGRAPHIES

6. Eric Pfliegersdoerfer

Biography

Head of the institutional and international relations department

Eric PFLIEGERSDOERFER is the head of the institutional and international relations department at Eau de Paris, the public water company that supplies tap water for 3 million users daily in Paris. Graduate from the Strasbourg Institute for Political Studies in 2002 and from Strasbourg European Institute for Commercial Studies in 2003, Eric has since held several management positions in Parisian water related structures.
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Key words
Public water management, transparency

Authors and Corresponding
Eric PFLIEGERSDOERFER

Abstract Text
In reaction to an organization that was at the same time fragmented, lacking transparency and suffering from a deficit of public control since the mid-80's, the city of Paris took the decision in 2008 to put an end to the concession contracts it had entered into with major water groups in order to create a new public operator. Eau de Paris, a 100% public body, was then put in charge of the entire water cycle, from catchment to customer service.
Water is a vital common good of humanity and, as such, should be managed according to fundamental values: performance and quality, of course, but above all transparency, responsibility and sustainability. This essential vision is at the stem of the municipality's project to create a new operator.
This reform bore the ambition to place users, citizens and, more generally, the common good of humanity at the heart of the water service.

While providing water of the highest quality at the fairest cost and guaranteeing universal access to water, exceptionally for the less well-off, Eau de Paris was thus created as a fully integrated operator:

- Integration of the whole water cycle, from the spring to the tap, taking into account externalities and stakeholders at the watershed level;

- Integration of all the skills and competences needed internally to manage the water services efficiently and independently;

- Integration of many public policies connected with the water cycle and contribution to many sustainable development objectives, such as climate change adaptation and mitigation, local economic development, protection of biodiversity, circular economy, citizens participation, etc.

The absence of shareholders or short term return on capital obligation, in addition to an open governance –customer and environment associations representatives are voting members of Eau de Paris' board- allows maximum transparency and citizens control. It also paves the way for a long term vision and guarantees that present and future generations' best interests be at the core of decision-making.

Being a responsible player is also being smart and think at a global scale: in this context Eau de Paris is committed to make Paris and the surrounding area an inclusive, sustainable and resilient territory, able to mitigate climate change consequences.

This approach, which is reflected in each and every of the company's activities, is implemented through a set of transversal and coherent strategies (resource protection, biodiversity, climate and energy action plan, social development plan). Through these strategies, the initial vision to create an operator that would be more than just a provider of drinking water is implemented day by day.

While the way this concept of "integrated operator" is applied to the Parisian context is specific, the approach itself can be adapted to a variety of situations and environments and this case study could usefully contribute to the discussions at the PWF.

BIOGRAPHIES

7. Eng. Fadi Dweik

Biography

Mr. Fadi Dweik is a Research Associate at the Agricultural Research Department at the Applied Research Institute – Jerusalem (ARIJ) in Palestine. His main responsibilities at ARIJ include conducting GIS and RS modeling, conducting scientific researches, writing project proposals, scientific papers and Implementing water and agricultural intervention. He has finished his undergraduate studies in Civil Engineering from the Palestinian Polytechnic University (PPU). He also obtained his post graduate studies in Environmental Management from Mediterranean Agronomic Institute of Chania (MAICH) Greece. Mr. Dweik has a solid experience in vulnerability assessment models, agricultural infrastructure, urban planning, strategic planning in addition to the knowledge and work experience in Palestinian civil society sector

Email : fdweik@arij.org Biography

Key words

Water resources, climate change, balanced drip irrigation system, productivity, water deficitEng. Fadi Dweik (ARIJ)

Authors and Corresponding

Eng. Mahmoud Bsharat (MoA)

Abstract Text

Water resources are considered as a vital component of the Palestinian ecosystem. These sources consist mainly of surface and groundwater resources (springs and wells), and the Palestinian land suffers from a real problem in these resources due to the limited ability of the Palestinians to control and benefit from them; as a direct result of the Israeli occupation. It is important to note here that 85% of the water in the ground water aquifers are controlled by the Israeli occupation. However, the Jordan River is considered as the main surface water resource, it should be mentioned that the Israeli occupation deprives Palestinians from accessing these resources and leaves Palestinians to rely on the available groundwater resources. The groundwater resources in the West Bank consist of 597 wells and 304 springs. In the Gaza Strip, the main dependence of the population is based on underground wells, which amounted to about 10,850 wells, of which 2,850 are licensed and the rest are considered as unlicensed wells. These wells do not meet the water needs of the population. The annual cumulative water deficit in the Gaza Strip is estimated at 80 million cubic meters. This deficit led to the flow of seawater into the groundwater reservoir, which led to a rise in salt and chloride levels by 400 mg / t.

These indicators reflect the critical water situation in the Gaza Strip. However, in the West Bank the amount of renewable water in the aquifer is estimated 679 million cubic meters based on the data of Article (40) under the Oslo II agreement.

Focusing on the reality of water resources in Palestine, there are a number of factors that contributed to witness the water deficit because of the Israeli control on these resources. However, there are a number of other factors that contributed to the increase in demand for water, especially in the agricultural sector. Climate and its impact on decreasing the productivity as a direct result of drought, high temperature, low rainfall and precipitation, and consequently increased water losses and water scarcity in irrigated areas. The study will focus on balanced drip irrigation technology as one of the modern techniques of irrigation, which has achieved significant success in adapting to climatic changes, especially the high temperature and drought in terms of the ability to deal with limited water resources and reduce the water losses and maximize the productivity of agricultural crops.

Balanced drip irrigation system is considered as one of the most modern systems to cope with climate change. This system aims to reduce the consumption and losses of water used in irrigation by adopting a water discharge technique (3-4 liters / hour) instead of the full irrigation as in sprinkler irrigation. The system works under the conditions of fluctuating water pressure and different slopes in various geographical areas, which impacted in reducing the pets and diseases and resulted healthy plants. The well-designed of the balanced drip irrigation system is capable of operating efficiently up to 95%, in addition to reduce the water used for irrigation compared to traditional irrigation ones in 16% and increasing the productivity rate by the same percentage.

BIOGRAPHIES

8. Dr. Muath Abu Sadah

Biography

Dr. Muath Abu Sadah has a PhD in water resources modeling. He has more than 23 year of experience in Hydro-informatics, water resources management and modelling. Currently, he is working as a Technical Advisor at PWA, Palestine. Email: muathas@gmail.com,

Key words
Demand, Supply, Consumption, Fair Allocation, Un Accounted for Water

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Abstract Text
West Bank Water Department (WBWD) is annually managing more than 70 Mm3 for public use for more than 250 water service providers in the West Bank. This includes managing water purchased from Israeli companies (e.g. Mekorot), producing water from PWA wells, operating booster station, maintaining of the water network over the West Bank, suppling water for more than 200 water service providers though more than 500 water meters and collection of the water bills. Consequently, Palestinian Water Authority (PWA) has developed a GIS-Web-Based Application “Water Supply and Distribution Information System (WSDIS) which supports WBWD for managing their complicated system at one side and to improve the fair water share to the service providers. The system is also include modules to calculating the public demand for each service provider based on all related items including population, livestock, health, education, commercial and industrial demands.

The WSDIS provides users with different types of information and at different levels; the map can provide the layout of the water infrastructures including their details, the purchased connections as well as the service providers meters with their daily supply rates, the demand, supply, per capita consumption, financial details of each water service providers in addition to many tools which were developed to make this map dynamic such as search, identify, zoom, pan and measure tools.

Moreover, the system is equipped with more than 50 dynamic reports. These reports can provide users with all information needed regarding purchased supply rates, water supplied rates to service providers with a comparison between the actual supply and the fair water share, leakage at specific routes, and many other types of reports.

9. Ahmed Al-Busaidi

Biography

Ahmed Salim has PhD. in Bioenvironmental Science, Tottori University, Japan is the Researcher, Department of Soils, Water and Agricultural Engineering, College of Agricultural and Marine Sciences, Sultan Qaboos University, Oman.

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Authors and Corresponding

Ahmed Al-Busaidi

Keywords

Salts accumulation, heavy metals, crop quality, environmental risks

Abstract Text

Treated wastewater has shown high potential for reuse in agricultural production, which can thereby contribute to the conservation of surface water and groundwater resources. Therefore, the aim of the study was to optimize treated wastewater reuse in conjunction with other available water resources by taking into consideration their quantity and quality, in addition to the agronomic, environmental, and economic components. It was a joint project between three countries (Oman, Jordan and Tunisia) and funded by USAID. In Oman, the study was done in open field at Sultan Qaboos University. Three types of crops (sweet corn, okra and maize) were grown and irrigated by four types of water (A: 50% groundwater and 50% treated wastewater, B: 100% groundwater, C: 75% treated wastewater and 25% groundwater, and D: 100% treated wastewater). Soil physicochemical properties did not show significant differences with treated wastewater irrigation as compared to groundwater. Heavy metals concentrations for both waters (treated wastewater & groundwater) were very close to each other.

However, some significant differences were found between some treatments which could be an indicator for long term changes in soil chemical properties. On other hand, some chemical properties significantly increased ($p<0.05$) when treated wastewater was applied such as soil electrical conductivity, total carbon and some major elements (N, K, Mg). Soil biological analysis indicated that treated wastewater had no effect in contaminating soil horizons. Whereas, crop physical analysis showed significant increases in plant productivity when plants were irrigated with treated wastewater. The good supply of different nutrients from treated wastewater enhanced plant growth and improved plant productivity. Finally, treated wastewater is a good source of water and can supply soil and plant with many nutrients. However, to avoid any health or environmental problems, reuse of treated wastewater should be subjected to continuous monitoring and fruit qualities should be evaluated.

BIOGRAPHIES

10. Dr. Eng. Mahmoud Shatat

Biography

Dr. Shatat has a PhD. in Sustainable Water and Energy Technologies from the University of Nottingham, UK. His research was focused on solar water desalination. He has MSc in New and Renewable Energy and Environmental Engineering, from the University of Durham, UK.
Dr. Shatat is internationally recognized as an expert in sustainability and water since he has been awarded the international Globe Energy Award in 2015 as a National winner to the United Kingdom. Moreover, he has a wide range of innovative research capabilities since he has published more than 19 papers in the most high impact international journals and conferences such as New and Renewable Energy Journal and Sustainable Cities and Societies journal, Applied Thermal Engineering and the International Journal of Low Carbon Technologies – OXFORD Journal Press.

He is also a Member of Editorial Board for several International Journal such as the International Journal of Future Cities and Environment and a reviewer for many international journals and research institutes such as the Royal Institute of International Affairs Chatham House, London, UK.

Dr. Shatat is the Middle East Organizer and representative for the World Society of Sustainable Energy Technologies (WSSET) in the United Kingdom.

Dr. Shatat is Member of MEDRC Centre - A Center of Excellence: Middle East Desalination and Research Center in Muscat, Sultanate of Oman.

Dr. Shatat is currently working as A Senior Water and Sanitation, Specialist at Oxford Policy Management – OPM with DFID

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Key words
Water, Desalination, Solar Energy, Green Energy

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Abstract Text

The desalination market in the world is rapidly developing to meet the increasing demand for water; especially in the Middle East and the Palestinian Territories. The scarcity of available fresh water resources and the pressures caused by a changing climate mean that sustainable water desalination is increasingly becoming a competitive solution for providing drinking-water. The desalination of saline water has been recognized as one of the most sustainable and new water resource alternative. It plays a crucial role in the socio-economic development for many communities and industrial sectors. Currently there are more than 18,500 desalination plants in operation worldwide producing several billion gallons of water per day.

Almost 60% percent of desalination plants are located in the Middle East and Gulf region, where large scale conventional heat and power plants are installed. Most high capacity desalination plants in the world are driven using fossil fuels, but they are becoming more costly to operate and the emissions they produce are contributing to pollution of the environment and to global warming. In addition, desalination plants are economically unviable in remote areas, even in coastal regions where seawater is abundant.

Many areas experience a shortage of fossil fuels and an inadequate and unreliable electricity supply. The integration of renewable energy resources in desalination and water purification is becoming more viable as costs of conventional systems increase, commitments to reducing greenhouse gas emissions are implemented and targets for exploiting renewable energy are set. Thus, solar water desalination is considered an environmentally friendly, low cost technology to provide clean water in countries which lie on the solar belt such as Palestine (Gaza strip) where the sun is abundant and could be harvested and utilized in water desalination.

This paper explores the challenges and opportunities of solar water desalination worldwide and in the Gaza strip in particular. It also complies well within the specific priorities of renewable energy technologies development for Palestine vision's to generate 10% of its energy demand from renewable sources by 2020.

BIOGRAPHIES

11. Eng. Mohammed Rabia Ahmed

Biography

Eng. Mohammed Ahmed has M.Sc. in Water and Environment Technology from Koeln University in Germany in 1996 and B.Sc. in Mechanical Engineering from Benghazi University in 1989. He worked as a Technical Consultant for GTZ, Germany from 1997 to 1998 and has been a Director of Water Control Department at PWA since 1998. He participated in various international conferences on water and wastewater treatment and technologies in different Arab and European countries.

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Key words

Brackish water, Reverse Osmosis, Water Supply, Small Scale Plants

Authors and Corresponding

Eng. Mohammed R. Ahmed

Abstract Text

The population in Gaza Strip, Palestine faces potable water scarcity throughout the year in general and acute drinking water problems in lean periods of the year. To mitigate this problem, more than one hundred reverse osmosis (RO) desalination plants were installed in various locations of Gaza characterized with high salinity of groundwater. General performance of five plants and in-depth evaluation of two plants was undertaken to focus attention on the physio-chemical quality of water at various stages of treatment, present status with respect to operation and management (O&M) financial implications and overall management in a rural situation.

The study indicated that performance of these RO plants was satisfactory in removing high TDS, though the efficiency deteriorated with time. The average utilization of these RO plants since their installation was about 50% as compared to the design capacity, mainly due to non-availability of power in some areas, time lapsed in repairs of pumps, and non-availability of spares. The average capital cost/m3 and O & M cost/m3 of product water from these eleven plants works out to $0.25 and $0.10 respectively; when plants are utilized as per the design capacity. These costs are high and not affordable by the rural population. However, such RO plants were socially acceptable since the population was satisfied with the treated water quality.

BIOGRAPHIES

12. Rehab Thaher

Biography

Job: Director , Planning Department , Palestinian Water Authority, Ramallah, Palestine
Experience January 2016 till now: Palestinian Water Authority, Director at General Directorate of Water and Wastewater Planning, my job includes follow up of SDG indicators, preparation of tender document, specification, term of reference of water and wastewater projects, follow up projects, I am also involving in preparation of sector strategies and action plans. Follow up of submitted projects from local authorities according to giving priorities.

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Key words
Sustainable, Achievements, Challenges, Goals

Authors and Corresponding
Rehab Azmi Thaher, Palestinian Water authority

Abstract Text
Wastewater network is used by 31% of households in the West Bank. Pours cesspits were used by 60.0% of households, the cost of emptying cesspits have more burden on their poor domestic economy, whereas the cost of emptying 1 m of waste water is up to ten Shekels (2.8$)

Objectives: to assess at the household level; the impacts of house onsite separated wastewater management systems on the environment, health, society and economy (from beneficiaries' perception.

Methodology: Two workshops have been conducted for the purpose of building questionnaire, and two types of questionnaires were distributed, targeted the people who are served with household GWTPs, The second questionnaire targeted the people who used cesspits.

Results: The source separated house onsite sanitation systems have very promising future in Palestine. People's satisfaction with the applied sanitation system is very promising, as the majority of GWTP's beneficiaries (70.4%) are satisfied. The main incentive for applying GWTPs system is for the purposes of reuse treated grey water in irrigation as stated by 88.0% of the beneficiaries, the reduction of cesspit discharge frequency and its financial consequences.

Many barriers were also identified, 66.5% of the interviewed people stated that odor emission and insects infestation is a main brinier; 59.3% mentioned lack of implementing agency follow up, & significant concern on water quality.

People are not satisfied of utilizing cesspits, the average number for emptying the cesspit per year before construction of onsite GWTP is 6.9, more over 6.7% of cesspits owners discharge the cesspits 24 times per year, while the frequency of cesspits' emptying decreased to 4.1 after providing onsite GWTPs.

House onsite grey water management systems is acceptable in rural communities, therefore, a more proper system is required to handle the wastewater and replace cesspits and its harmful implications on environment, ground water and public health.

13. Dr. Salim Bouchentouf

Biography

Doctor Salim Bouchentouf is scientist at laboratory of Natural Products and Bioactive at Tlemcen University.

Doctor Salim Bouchentouf received his Ph.D degree in Chemistry from Tlemcen University (Algeria). Competent in field of Analytical chemistry and environmental pollution, Doctor Bouchentouf a works on Sea water pollution and water treatment. He works also on Natural products and use of bioinformatic and biotechnology by promoting use of software in the concerned fields. As expert and editorial member board of many American research revue (Journal of Environmental pollution and human Health, American journal of Water resources, International journal of bioorganic chemistry, ...) Doctor Salim Bouchentouf brinks rigorous critical to research for upholding high scientific standard publication. Doctor Salim Bouchentouf is also responsible of exterior relationship of Laboratory of natural products and Bioactive

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Key words

Desalination, brackish water, seawater

Authors and Corresponding

Salim BOUCHENTOUF

Abstract Text

Seawater/brackish water desalination has been widely adopted by the Algerian Government in the last few years to supply potable water to municipality for various purposes mainly for domestic and industrial uses especially in areas where demand is high due to shortage of fresh water resources, rapid population growth and development of industry and tourism. Ten years ago, desalination was confined to the industrial use only especially in oil and gas industry as the country was relying on rain water and other available sources to supply fresh water to municipalities. Due to chronic drought conditions, the Ministry of Water Resources reviewed the national water strategy and a strong option for desalination was adopted where an ambitious program was thus put into action. Sixteen mega-plants, with capacities ranging from 100,000 to 500,000 m3 per day, primarily based on Reverse Osmosis technology, were launched in the last few years making the Algerian desalination program one of the world's fastest growing markets. Five desalination plants, including the Africa's largest seawater reverse osmosis project with a total capacity of 200,000 m3 per day, are already in operation and the remaining projects are either under construction or in commissioning. An integrated water resources management was also adopted as additional option to cuter the increasing water demand as there is also a great potential for water reuse and conventional water treatment. An additional benefit of this would be reducing the volume of treated wastewater disposed into the environment.

14. Abdel Halim Fuqaha

Biography

Abdel Halim Fuqaha, has education in Water and chemical process engineering. Univ.Ass. Dipl.-Ing. Dr.techn at Vienna Technical University - the Institute of Chemical, Environmental and Bioscience Engineering in Austria. Abde halim Fuqaha experience in water treatment, membrane technology, biorefinary and nanotechnology.
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Key Words
Biofim denitrification reactor, Packing media, Nitrate, Hydraulic retention time, Particle size distribution, effective particle size.

Authors and Corresponding
Abdel halim Fuqaha – Corresponding author
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Andreas Farnleitner
Anton Friedl

Abstract text
Four packing materials was used as biofilm support material in the denitrification reactors to investigate the technical feasibility of biological nitrate removal from real contaminated ground water. In this research Pall ring. Foam plastic, zeolite and crystal sand were used in a laboratory bioreactor. The effects of hydraulic conditions on the nitrate removal performance were investigated. Ethanol was used as a carbon source for biological denitrification.
The achieved denitrification rate was 0.05, 0.07, 0.11, and 0.20 kg NO3- N.m-3.d-1, respectively for pall ring reactor at a nitrate load rate of 0.06, 0.08, 0.14 and 0.31 kg NO3- N.m-3.d-1, respectively. For the same applied load, the denitrification rate was 0.05, 0.07, 0.10 and 0.19 kg NO3- N.m-3.d-1, respectively for foam plastic media, 0.06, 0.08, 0.12, and 0.17 kg NO3- N.m-3.d-1, respectively for zeolite media and for the sand packing material the denitrification rate was, 0.06, 0.07, 0.13 and 0.17 kg NO3- N.m-3.d-1, respectively.

Strong correlation between the denitrification rate and the effluent effective diameter was detected, the lowest denitrification rate and the smallest diameter was detected for the reactor packed with zeolite media, the reactors with higher denitrification rate had produced effluent with higher effective diameter. The optimum loading for all reactors was 0.2, 0.15, 0.13, 0.1 kg N.m-3.d-1.

BIOGRAPHIES

15. Philippe Goral

Biography

After Engineer Diploma (MSc) in Civil Engineering and Urbanism from INSA (National Institute of Applied Sciences) - Toulouse and Post Graduating in Structural Engineering from CHEC (Center of High Studies in Construction) - Paris and in Urban planning from MAXPU (Institute of Architecture and Urbanism) - Moscow, Philippe has worked for 35 years in consulting companies in Infrastructures, water and environment sector. He has developed activities in Europe, Middle East, Asia, North Africa, and Austral Africa

COMPANY PROFILE

Established in 1955 with its head office in Nîmes France, **BRL group was created to promote the socio-economic development of the Languedoc Roussillon Region** in Southern France. To do so, it has developed a large and complex system of large water infrastructures to bring water resources to the Languedoc-Roussillon region. It has also, and still does, provide technical support to the regional stakeholders (Regional authorities, farmers associations,…) for water infrastructure operation and development (financial & technical studies) and agriculture development (agriculture extension, capacity building, institutional advice,…).

Today, BRL still owns, manages and operates under a concession contract these hydraulic infrastructures consisting of 11 dams, 6 water treatment plants, 125 pumping stations, 8000 km of buried pipes, and a 105 km of canals (Asset around 2 billion Euros).
Thru these infrastructures, BRL distributes 130 millions m3 of water per year for agriculture (140,000 ha of irrigated land), domestic (1.000.000 inhabitants) and industrial use.

BRLingénierie, subsidiary of BRL Group is one of the leading international consulting firms in the water and environment sector. BRLi has references in more than 80 countries with projects financed by multilateral funding agencies or Governments. His permanent staff is around 190 people. BRLi engineering and consultancy activities consist of two main sectors:

- Water engineering: Water resources management- Drinking water supply and sanitation- Mobilisation and protection of water resource- Irrigation projects – navigation and ports infrastructures - Natural risks management, Flood, Drought, Early Warning System
- Land development: Environmental protection - Rural areas and forestry- Development of river basins - Agriculture - Parks and gardens – Coastal areas management – Aquaculture and Fisheries - Biodiversity management – Natural Resources management and sustainable development – Protected Natural Areas.

Key Words

Integrated Water Resources Management, Regulations, Health, irrigationReuse of Treated Wastewater in Agriculture

Abstract Text

International regulations for sanitary conditions for the Reuse of treated wastewater in Agriculture, experience of Reuse in the Projects of Tayasir and Misiliya sanitation in North Palestine

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16. Ahmed Al-Busaidi

Biography

Ahmed Salim has PhD. in Bioenvironmental Science, Tottori University, Japan is the Researcher, Department of Soils, Water and Agricultural Engineering, College of Agricultural and Marine Sciences, Sultan Qaboos University, Oman.
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Authors and Corresponding

Ahmed Al-Busaidi

Key words

Treated wastewater, fish, aquaponics, fruit quality, heavy metals

Abstract Text

The objective of the study was to evaluate the effect of treated wastewater on fish life and later on the effect of the produced effluent coming from fish tank on grown crops. Nine tanks with dimensions of 80*40*40 cm were filled either with freshwater or a mixture of freshwater and treated wastewater (50: 50 & 75:25 %) and 25 Tilapia fish were added to each tank. Each tank was connected with another tank of same dimensions that was used to grow lettuce and bean crops on the top layer. Water was circulating between two tanks. No fertilizer was added to all treatments and all tanks got similar amount of fish feed.

It was found that tanks with treated wastewater got higher values of dissolved oxygen due to algae growth and more salts content due to minerals added from treated wastewater compared to freshwater alone. Therefore, lettuce and bean growth was much better and got higher values of chlorophyll content compared to control tanks. For heavy metal analysis, all waters got similar values but in some samples, the concentration of B, Cu, Mn and Zn were higher in treated wastewater compared to freshwater and that was reflected in lettuce roots. For the edible part, lettuce grown in treated wastewater got higher value of Fe and Ba compared to control. Similar concentrations were found with bean plants with higher values in treated wastewater compared to freshwater. However, low concentrations of heavy metals were found in the edible parts of all treatments and it was within the international standards.

Fish analyses showed that all tested heavy metals were within the safe limit. However, applying this technique in the farming system will support food security and agriculture sustainability and help the environment by utilizing treated wastewater and reducing fertilizer applications. Moreover, farmer income will increase since both fish and crops will be produced with minimum resources.

BIOGRAPHIES

17. Elizabeth Brownell

Biography

Elizabeth Brownell, Devarajan Ramanujan , Natasha Wright, Jeffrey Costello, Susan Amrose , Amos Winter, Gregor von Medeazza

Community-scale desalination for Gaza: An off-grid, energy efficient, water conserving solution by MIT and UNICEF

Dr. Gregor von Medeazza is the chief of the Water, Sanitation and Hygiene (WASH) program of the United Nations Children's Fund (UNICEF) for the State of Palestine. Over the past 15 years, he has served in a dozen countries, including in New York headquarters, Africa, South Asia, Latin America and the Middle East. Dr. von Medeazza holds a PhD in Ecological Economics and a Masters of Engineering from Imperial College (London), in addition to executive education at SAIS, INSEAD, the London School of Hygiene and Tropical Medicine as well as Harvard University.

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Key words

Brackish water desalination, innovation, energy efficiency, water conservation, renewable energy

Authors and Corresponding

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Abstract Text

The water situation in Gaza is dire. The infrastructure and delivery of water services have been severely impacted by years of blockade and recurrent conflicts. Over 95% of the water extracted from Gaza's sole aquifer is unfit for direct human consumption. Consequently, around 90% of Gaza's population purchases desalinated water from private vendors. This poses a heavy financial burden on already impoverished families as well as a health risk due to widespread contamination of those mostly unregulated private service provisions.

This paper presents the first findings of a photovoltaic-powered brackish water electrodialysis reversal (EDR) desalination project, which was developed between the Massachusetts Institute of Technology (MIT, Boston) and UNICEF in the Gaza Strip. The prototype, which has been recently installed, benefits around 3,000 of the most impoverished people in Khan Yunis with an uninterrupted and cost-effective safe drinking water supply.

Most desalination plants in Gaza Strip are powered using electricity from the grid and suffer from intermittent electricity supply. The high-efficiency desalination system presented in this paper utilises solar power to provide safe drinking water allowing for off-grid operation.

This paper outlines the potential advantages of EDR in the context of safe drinking water production in Gaza. In comparison to similarly sized brackish water reverse osmosis (RO) systems, EDR 1) requires less specific energy compared to similarly sized brackish water reverse osmosis (RO) systems, 2) it can be operated off-grid, 3) at lower cost, and 4) it is more efficient in terms of its recovery ratio – meaning that a larger proportion of the brackish water extracted from the ground is transformed into fresh water, as compared to the conventional RO systems currently used in the Gaza Strip.

These combined benefits make the EDR a promising and scalable solution for water- and energy-scarce contexts, such as the Gaza Strip.

BIOGRAPHIES

18. PhD.Eng. Fayez Abuhelou

Biography

Dr. Fayez Abuhelou is an Environmental and Water Resources Engineering and Management Expert. He holds B.Sc. in Civil engineering and a M.Sc. in Water and Environmental Engineering from Birzeit University and another M.Sc. in IWRM from Cologne University for Applied Sciences. In 2016, He obtained his Ph.D. in Water and Environmental Engineering "Geoscience" from the Lorraine University / France. Currently working as Senior Expert, Technical Advisor and Project manager at the Palestinian Water Authority. With14 years of experience and different publications and conference contributions in Water Management and Environmental research.

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Key words
Water and Energy Nexus, PWA, Palestine, Public Awareness, Wind Turbines and PV plants.

Authors and Corresponding
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Abstract Text
The specificity of water problem in Palestine is not only a matter of providing enough water quantities and for vital uses including agriculture and industry sectors. In this area, the water conflict is combined to additional burdens imposed by the Israeli occupation obstacles. Moreover, this area is also highly dependent on imported fossil fuels, which acts as a serious drain on foreign currency reserves as well as a strategic threat and a source of both local pollution and global greenhouse gases.

In light of the special situation, it was necessary to think seriously and directly about the provision of alternatives and options to achieve the independence and independence in the water and energy sectors as a pillar and basis for building the state. The Palestinian Water Authority (PWA) and its partners have just launched the Water Energy Nexus North project in the north of West Bank, with around 18 million euro funded by the French Development Agency and the European Union. The Nexus project will create a sustainable and environmental friendly system that in lines with the UN declaration on the 2014 world water day and obeys the signed by all parties Paris Climate Accords in 2015.
Still the need for public commitment and involvement through public awareness and stakeholder participation are vital strategies to create incentives. Yet, such approaches are probably time and money consuming and require a big change in the national culture. To this end, there is a need to create a national research agenda, enhance the role of contribution and community partnership, and allocate time and money to support the initiatives of academic institutions and researchers in line with the practical and practical needs of the water and energy sectors.

BIOGRAPHIES

19. Job Kleijn

Biography

Coordinator MENA water affairs. Ministry of Foreign Affairs of the Netherlands.

Job Kleijn has a degree in civil engineering the Netherlands and master degree in institutional development from UK – Manchester. Employed by Min of Foreign Affairs, at present coordinating water affairs in MENA. He is involved in water productivity, water diplomacy, conflict resolution and in charge of the satelite initiatives with FAO. Recently the focal point for EU in the CFS Rome. Carried out missions for EU, Worldbank, Asian Development bank.
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Key words
water scarcity, water allocation, water productivity, target setting, satelite infomation

Authors and Corresponding
Job Kleijn and Prof Wim Bastiaanssen

Abstract Text
In the field of water, the Netherlands has committed itself to the objective of achieving a 25% water productivity improvement in its water agricultural development projects. To this end, the Netherlands introduces the indicator of water productivity (WP): The amount of agricultural production per unit of water. To make management and monitoring concrete, NL has launched an initiative together with FAO to develop a WP database using satellite information to monitor this WP and to make data accessible to everyone via the database WAPOR. WAPOR is now online in Africa and the Middle East with the intention that it will be rolled out globally in the future. Farmers as well as policy makers can use these data free of charge. From 2018 onwards, the WP will be the basis for the annual reporting to the Dutch Parliament using satellite data. The Netherlands has chosen within the WP to focus on the production and water consumption of the main staple crops maize, wheat and rice. The ambition is that not only on systematic improvement of water productivity improvement is used in projects with a Dutch financed programmes, but that in the worldwide agriculture more attention is paid to producing with less water. This will serve food security but also make water available for other users and functions.

In particular for countries that today and in future will experience an increasing pressure on water because of population growth and climate change, evidence-based data on water use for policy decisions on choices to decide on allocation to functions is a prerequisite. WAPOR will therefore contribute to the implementation of SDG 6.4

20. Nada Majdalani

Biography

Nada Majdalani, Director of EcoPeace Middle East in Palestine. Nada is specialized in the field of environmental management with a M.Sc. degree in Environmental Assessment and Management from Oxford Brookes University, the UK. Nada served in leading technical positions with several international agencies in the areas of infrastructure development, mainly water and sanitation, solid waste management, sustainable and clean production as well as various tasks on institutional capacity building and policy advisory support.

Key words
Water, Renewable Energy, Nexus, Water Security, Inter-dependence

Authors and Corresponding
EcoPeace Middle East

Abstract Text
New technologies related to water supply, both in treating waste water for reuse in agriculture and in the desalination of marine water for domestic purposes have already revolutionized the water sector worldwide.

Likewise the discovery of natural gas in the Eastern Mediterranean has the potential to be another game changer in the development of the region. However, natural gas reserves are limited and unsustainable. The gas finds in the Eastern Mediterranean should encourage the Levant countries to utilize the present energy windfall from gas to developing long term renewable energy solutions integrated with meeting region wide water needs.

Water-Energy Nexus, is an ambitious project between Jordan, Palestine and Israel where energy generated from renewable sources in Jordan will be exchanged for desalinated water from the Israeli and Palestinian Mediterranean coast. This exchange has the potential to better the livelihood and increase the water and energy security of millions, to create new sustainable business opportunities.

Creating an integrating water and energy economy, could help meet the growing energy needs in Palestine, Jordan and Israel, linked to the needs for more fresh water that can be produced through desalination – and counter the effects of climate change and its potential implications for security and stability in the region.

21. Nadia Eshra

Biography

Dr. Nadia Mohamed Eshra, (Ph.D. - Electric Engineer), She got her B Sc in Power System, M Sc and Ph.D. at Faculty of Engineering, Cairo University, in power system department. Now she is an Associate professor, Head of Hydropower Unit, Nile Research Institute, National Water Research Center. She is Member in different Scientific Committees; 1) Scientific Committee of National Water Research Center for study and assessment the impacts of Upper Nile Projects on the Water Resources and Hydropower station and the Sedimentation in Lake Nasser. 2) Scientific Committee of different authorities; Nile Research Institute (NRI), Reservoirs and Grant Barrages Sector (RGBS), Constructor Research Institute (CRI), Mechanical and Electrical Research Institute (MERI); to studying the construction new small plants on different barrages on the Nile. She has several years of experience in the research fields of Renewable Energy and water resources; Hydropower Generation, Solar energy, Saving, Regulate and Manage water.

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Key words

Thermal Power Station, Drinking Water Stations, First and fourth Reaches of Nile River, GIS, G-Star Model. Regression Model

Authors and Corresponding

Nadia Eshra

Abstract Text

The goal of paper is to propose the measures for thermal and drinking water stations to work under different conditions of low water levels. Thermal power stations are representing the main electricity source in Egypt. The total number of the stations around thirty six distributed overall Egypt in different types; steam, gas and combined. Most of them distributed along the fourth reach of Nile River (extend from Asyut to Delta) and its branches. Total capacity of the stations estimated by 18568 mW. Thermal power stations are constructed near water sources for purposes; using the water for the operation in steam turbines, cooling or for both. Drinking water stations distributed along the Nile River from Aswan to Delta in different capacity of operations. The capacities of some drinking water stations ranged between 1.4 M.m3/day for Imbaba station to 0.15 M.m3/day for kafer Elelo station. Hydro Dynamic flow model is applied to estimate the Nile level in minimum flow through different cross sections along the reach with step 10 km, the cross sections are extracted using GIS from contour maps were produced in 2003-2007, NRI. Regression Equation is created to specify the amount of required water for thermal power stations. The operation status of each station (thermal and drinking water stations) is analyzed and specified the locations of new intakes if it needed.

22. Prof. Joel L. Cuello

Biography

Prof. Joel Cuello is a Professor of Biosystems Engineering and Director of the Global Initiative for Strategic Agriculture in Dry Lands (GISAD) at The University of Arizona in Tucson, Arizona, U.S.A. A globally recognized expert in the engineering of sustainable biological and agricultural systems, Prof. Cuello has designed various engineered systems, including those applied in bioregenerative space life support, industrial mass production of algae cultures, and vertical farming. Prof. Cuello conducted his postdoctoral research as a U.S. National Research Council Postdoctoral Research Associate in the Controlled Ecological Life Support System Division at NASA John F. Kennedy Space Center in Cape Canaveral, Florida. He earned his Ph.D. in Agricultural & Biological Engineering with Minor in Chemical Engineering from The Pennsylvania State University, and earned two M.S. degrees (Agricultural & Biological Engineering; Plant Physiology) also from Penn State.

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Key words
vertical farm, water, food, energy

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Abstract Text
Integrated engineered systems that link food, water and energy into a holistic system show significant potential in fostering resource sustainability in terms of water and energy and in optimizing food production. Vertical Farming constitutes an emerging integrated engineered system that exhibits high potential in realizing a highly efficient and sustainable food-water-energy nexus. This presentation will focus on food-water-energy-linked Vertical Farm designs for the cultivation of crops as well as microalgae for animal feed production and other high-value applications. Vertical Farming is an indoor method of crop production in vertically stacked growing shelves or trays, allowing for maximum crop production per unit land area. With crops grown using hydroponic or aeroponic technniques and supplied with electric lighting typically from energy-efficient light emitting diodes (LEDs), maximum crop productivity and crop quality are achieved constantly throughout the year, independent of the vagaries of local weather and climate, and thus foster economic sustainability. Environmental sustainability is also fostered since water consumption is reduced by 80-90 percent compared with open-field cultivation. Further, the energy demand by the Vertical Farm's LED lighting and nutrient pumping may be supplied sustainably using solar-generated electricity through the use of photovoltaic panels.

BIOGRAPHIES

23. Rana Hassan Idais

Biography

Mrs. Rana Hassan Idais has obtained her bachelor degree in Environment and Earth Science, and Master degree in Environmental Science at Islamic University of Gaza.

She is a Head of Environmental Public Awareness Department at Environmental Quality Authority in Gaza since 2010; she has solid experience in implementing, monitoring and evaluation of environmental public awareness activities. Aim to be an active member at the Gaza Strip's society and enhance behavior conducive to environmental protection.

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Key words
Irrigation; Treated wastewater reuse; Chemical soil properties; Sorghum; Gaza

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- Dr. Abdelmajid R. Nassar, Faculty of Engineering, The Islamic University of Gaza, P.O. Box 108, Gaza Strip, Palestine (anassar@iugaza.edu.ps)
- Dr. Ahmed R. Mughari, BZU Testing Laboratories, Birzeit University, Ramallah, Palestine (amughari@yahoo.com)

Abstract Text
The aim of study is to investigate the impact of using treated wastewater for irrigation on soil chemical properties and plant productivity. An reuse pilot study was carried out in Al-Zaitoun agricultural farm in the Gaza Strip from May to September 2011. A comparison was carried out between the soil properties in two experimental plots; one was irrigated with the effluent from Gaza Wastewater Treatment Plant over a period of four months, and the other was irrigated with fresh water from agricultural well in the same period. The crop used was sorghum. Samples of fresh water and treated wastewater were obtained and analyzed for pH, TDS, EC, Na, Cl, TKN, TP, K, BOD, NO3, TSS, FC, Fe, Mn, Zn. Composite soil samples were taken from depth of 0-30 cm in both plots and analyzed for the main chemical parameters. The results indicated that the level of TDS, Na, Cl, TSS, Zn and Fe were higher in the effluent than the fresh water; it was above the recommended Palestinian standard for dry fodder irrigated by treated wastewater. Also, irrigation with wastewater lead to significant increase in O.M%, CEC, K, TP, Ca, Mg, Na, and Cl in soil than irrigation with fresh water. In addition, the increases of Zn, Fe, Mn, and Pb in soil and sorghum plant irrigated with treated wastewater were significant in comparison with the plants irrigated with fresh water. Further, treated wastewater increased the plants height, and grain weight of sorghum.

24. Fairouz Slama

Biography

Fairouz Slama is a civil engineer graduated from the National Engineers School of Tunis (ENIT). She holds a master in modelling in hydraulics and the environment from ENIT. She obtained her PhD in hydraulic engineering and geology from ENIT and the University of Neuchâtel in 2010 . Her research fields of interest are numerical modelling of solute tranport in porous media, groundwater modelling, soil and groundwater monitoring and remediation and hydrogeophysics.
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Key words
Managed Artificial Recharge (MAR), Treated Waste Water (TWW), ERT imaging; infiltration test, Hydrus2D

Authors and Corresponding
Fairouz Slama, Faten Jaraya Horriche and Rachida Bouhlila

Abstract Text
Managed Artificial Recharge (MAR) with Treated Waste Water (TWW) is generally used to cope with groundwater depletion and seawater intrusion caused by excessive extractions. It is also considered as a climate change adaptation measure. In fact. In Tunisia only an average of 40 MCM per year is used for MAR with both conventional water and TWW. The groundwater artificial recharge with conventional water started in Tunisia at the beginning of the 1970s, whereas the MAR with TWW was only practiced in two sites, Souhil since 1985 and Korba since 2008. However several future sites are in study.

Hydrodynamic Characterization of potential sites intended for MAR projects is of great importance for both engineers and decision makers.

The present work emphasizes the importance and interest of hydrogeophysics, coupled to numerical modeling, in assessing soil infiltration capacity at two surface infiltration system sites in Mornag and Korba plains (Northeast Tunisia). Numerical modeling provides also design and management of the infiltration basins.

The approach is based on time-lapse Electrical Resistivity Tomography (ERT) imaging carried out during two controlled infiltration tests and used afterwards for the calibration of an unsaturated flow model (Hydrus2D). Boreholes (20 m depth) and two ERT sections (perpendicular to each other with low resolution (5m electrode spacing)) were also performed for soil investigations.

Thirty two electrodes with a Wenner configuration and a spacing of one meter (investigation depth of about 5 m) were placed in one line, perpendicular to a variable head flow (Water electrical conductivity was 3.6 mScm-1) infiltrating (total duration of about 38 mn) through a furrow (3.20 x 0.5 x 0.5 m3) in Mornag. In Korba, water, with an electrical conductivity of 9.53 mScm-1 was infiltrated into a furrow (5 x 0.4 x 0.1 m3) with a constant flux of 0.75 ls-1 during 4 hours, using the same ERT protocol. Two ERT reference sections were performed before onset of infiltration. They were followed by 4 ERT measurements during the infiltration test, each with a time lapse of about 20mn in Mornag whereas in korba test duration was about 4hours.

Inversions (using RES2DINV software) and uncertainty calculations were processed. The resistivity difference between the reference and each ERT profile were then computed and mapped to estimate the wetting front velocity. The estimated saturated conductivity Ks ranged from to 6.4 10-6 ms-1 to 2.86 10-5 ms-1and was about 2.4 10-5 ms-1 for respectively Mornag and Korba sites. These results were compliant with sandy-soil values and laboratory measurements.
Water flow was simulated using Hydrus2D and Van Genuchten's parameters were calibrated using water content estimated from ERT data set. The calibrated model will be used to design and manage the future infiltration basins.

25. Prof. Hossam Nassar

Biography

My name is Hossam Nassar, I am an Assistant Professor in the Environmental Sciences and Industrial Development Department, Faculty of Post Graduate Studies for Advanced Sciences (PSAS), Beni-Suef University (BSU), Egypt. I got my Ph.D. and post-doctoral studies from Kanazawa University, Japan. I am acting as a dean of central laboratory in PSAS, BSU. My Major field of study is about water quality, treatment and reuse. Plus environmental risk assessment.

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Key words
duckweed (DW), agriculture wastewater, nutrient removal, alternative animal feed

Authors and Corresponding
*Hossam F. Nassar, Ahmed M. Shaban and Fagr Abdel-Gawad

Abstract Text
Duckweed are small, floating aquatic plants belonging to the family Lemnaceae. Most common duckweed species reproduce asexually, i.e. without flowers or seeds. Under favorable conditions duckweed can reproduce faster than any other higher land plant (Lemna can double its weight in one day). In this study, DW was used for agricultural drain wastewater treatment and for producing an economic animal fodder rich in protein. The achieved values of nutrient (Phosphorus and Nitrogen) removal from raw water in the effluent of duckweed pond (DWP) operated at 10 days hydraulic detention times (HDT) were 76.9% and 68.3% respectively on average. Whereas, the investigated fresh and dry weight yield were about 745.8 and108 kg/ha/d on average, respectively. The dry matter values were ranged from 5.5 to 7.2 with an average value of 6.1%. The contents of protein and phosphorus of such dry matter were 28.1 % and 0.83 %. The total phosphorus in the dry matter of the duckweed was 0. 83 % on average. The results investigated that duckweed is rich in protein and highly digestible; from that perspective it is interesting as fish and cattle fodder. So duckweed can supplement inexpensive feeds like broken rice, rice bran and cassava as an alternative feed ingredient for poultry and fish. Even a partial replacement of livestock feeds with duckweed can save farmers money.

BIOGRAPHIES

26. Odai Judeh

Biography

Eng. Odai Judeh is projects engineer at House of Water and Environment, HWE:(http://www.hwe.org.ps/). Eng. Odai finishes his M.Sc. in Water and Environmental Engineer at An-Najah National University, Palestine. Eng. Judeh interests are focused in the field of wastewater engineering and energy footprints in wastewater.
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Key words
COD, Microbial Fuel Cell, Wastewater Treatment

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Odai Judeh and Marwan Haddad

Abstract Text
Microbial fuel cells (MFCs) technology, is an innovative and relatively new technology by which organic matter can be simultaneously biodegraded anaerobically and generate electrical energy directly. MFCs can be used in various applications such as: water desalination, biosensors as well as water and wastewater treatment. Through this study, MFCs as a wastewater treatment system was investigated for the first time in Palestine.
MFC model used in this research was double chambered-MFC (DC-MFC), it was operated by primary effluent wastewater as substrate, salt bridge was used as proton exchange media and water saturated of dissolved oxygen was used as cathodic solution.
This research aims to model the relationship between COD of substrate in MFC at any time and output voltage from the MFC at the same time. Four different COD-MFCs were constructed, three duplicates for each. Initial COD value was approximately fixed for each 3 duplicates. After 15 days-startup period the MFCs were operated for 30 days. COD was measured for the twelve MFCs each two days and output voltage was measured each 24 hours. Results revealed that the COD of the substrate used in MFC at any time is related proportionally to output voltage from that MFC at the same time, this relationship can be fitted as:
COD (mg/L) = 229.85 Ln (V)-1039.6; where V is output voltage (mV), and this model can be used (with some limitations) to indicate COD for a wastewater sample by measuring output voltage of MFC operated by that sample.
Maximum COD removal percentage achieved in this study was 87.1 % which is comparable to previous achievements. It was found that COD removal behavior in this study was ranged between 1st and 2nd order kinetic reactions. A maximum output power achieved was 0.585 W/m3 with an average output power of 0.251 W W/m3.

27. Rifaat Abdel Wahaab

Biography

Dr. Rifaat ABDEL WAHAAB is currently Sector Head of Research & development at Holding Co. for Water and Wastewater, Cairo, Egypt since 2009. Prior to his appointment as Sector Head at HCWW, he has been served as Project Team Leader of Canadian/Egypt Environmental Initiative Fund (EEIF) for 7 years, focuses on urban and rural sanitation, industrial pollution control, environmental management and strategy, green environmental business; and climate changes initiatives & adaptation. Dr. Rifaat is one of the leading environmental & water experts in Egypt, with more than 30 years' experience combining both academic and practice applications. He has managed and intensively involved in many of donors funded projects (National and International) in water, sanitation & industry. He has chaired international conferences and managed many capacity development training workshops. As an academic Professor at the National Research Center in Cairo, Dr. Rifaat has published over 70 refereed research papers & reports in leading International journals and he is a reviewer for number of scientific journals. He has awarded the country prestigious prize in environment and development; acknowledges his contribution in diverse areas of water & sanitation, industrial wastewater management and sustainable environmental initiatives. Dr. Rifaat has received the BSc. degree in Chemistry from the University of Assiut, Egypt in 1980, MSc degree in "Environmental Sciences" 1987; and PhD. degree in "Hazardous Wastewater Management" 1991 from the University of Wales, UK.
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Key words
Wastewater, reuse,code, Egypt.

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Rifaat Abdel Wahaab

Abstract Text
Egypt covers a very arid region situated between the Sahara and Arabian deserts. Egypt is extremely dependent on the River Nile, being the most downstream country in the Nile basin. 97% of the population lives on 4% of the land of Egypt, around the river Nile. The most pressing challenge facing water resources development in Egypt are rapid growth and unbalanced distribution of the population, rapid urbanization, water quality deterioration, government's policy to reclaim new land, and unsustainable water use practices. Now Egypt is reaching its limits of available water and this will not be possible anymore and Egypt will have to face variable supply conditions.

It is worth mentioning that the availability of renewable water resources in Egypt has dropped from 2189 m3/capita/year in 1966 to 1035 m3/capita/year in 1990. At present population growth rate, this will drop even further to 536 m3.capita/year by the year 2025, if the share of Egypt from Nile waters remains as it is today (55.5 BCM) and levels of per capita consumption are maintained. Various demands for freshwater are exerting excessive pressure on the available water supply.

The government of Egypt is committed to develop and manage its water resources in the interests of all Egyptians by reforming the water and wastewater sector. The change concerned institutional and financial aspects. Thus, a Holding Company for Water and Wastewater (HCWW) along with its 23 subsidiary companies was established in 2004 by a presidential decree to develop and implement a holistic policy, which includes expansion of the service delivery, the introduction of modern technology in operations and maintenance as well as management, and increasing the private sector participation in activities which are not core to its mission. Between 2005 and 2009, about 50 billion Egyptian Pounds (around 9 billion US dollars) were invested in the water and wastewater sectors. The Government of Egypt has also assigned 5 billion Egyptian Pounds (around 0.9 billion US dollars) for networks' rehabilitation projects over the coming five years. The capacity of wastewater treatment plants has increased by more than six times in the last two decades.

Use of treated wastewater has become increasingly important in water resources management for both environmental and economic reasons. Wastewater use in Egypt is an old practice. It has been used since 1930 in sandy soil areas like Al Gabal Al Asfar and Abou Rawash, near Cairo. Interest in the use of treated wastewater, as a substitute for fresh water in irrigation, has accelerated since 1980. Currently, 0.7 BCM/yr of treated wastewater is being used in irrigation, of which 0.26 BCM is undergoing secondary treatment and 0.44 BCM undergoing primary treatment. In general, treated wastewater use is of tremendous potential importance for Egypt.

Wastewater reuse code (501/2015) have been recently issued including guidelines for wastewater reuse, cropping patterns, and health protection measures, irrigation methods and standards specifications.

BIOGRAPHIES

28. Eng. Monther Shoblaq

Biography

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Key words
Gaza Strip, Desalination, Water Status, Aquifer, Future Demand

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Abstract Text
Gaza Strip (GS) is one of the semi-arid area where rainfall is falling in the winter season from September to April. The average rainfall rate in all over GS is about 320mm/year. Groundwater aquifer is considered the only water supply source for all kind of human usage in the GS (domestic, agricultural and industrial).

This source has been facing a deterioration since years in both quality and quantity for many reasons (i.e. low rainfall quantities, urban areas expansion, and massive population growth), which threaten human health and living existence in the area. Seawater had intruded the GS coastal zone and reaches more than 2.5Km inland with an accelerated intrusion rate. The imposed siege on GS has also shared in the current deterioration where no main development infrastructure to improve the water quality is being implemented especially central seawater desalination plant which supposed to replace the water abstracted from the aquifer to relive the stress since year 2004.

The groundwater quality varies from place to another. Chloride concentration varies from less than 250mg/L in the sand dune areas in the north and south-western area of the GS to about more than 10,000mg/L where the seawater intrusion has occurred at coastal area. Also, the nitrate concentration reaches a very high range to around 300mg/L in different areas of the aquifer in the GS whereas intensive use of agricultural pesticides and the use of septic tanks to dispose part of the domestic wastewater.

The current water crisis in GS reaches a very critical situation where the annual demand quantity of around 180 Million Cubic Meter (MCM) of water is abstracted from the aquifer; constitutes four times higher than the annual recharge average (55-60 MCM/Y), the groundwater level elevation drops 3m in the north and more than 16m in the south below mean sea level. Furthermore, there are many water wells along the Gaza coastal line have been contaminated with Strontium (Sr) with more than (5ppm) mainly as a result of seawater intrusion; (Sr) in the fresh water is (.08 ppm) while in the sea water is (8.1 ppm).

Palestinian Water Authority (PWA) in cooperation with Coastal Municipalities Water utility (CMWU) has developed a strategic plan to meet the growing demand and provide sustainable solutions to the water crisis through a Rolling Program of Interventions consists of:

1. Construction of a central desalination plant, 3 short term low volume (STLV) desalination plants in addition to the recently constructed brackish groundwater desalination plants,
2. reduction of non-revenue water,
3. Improvement of wastewater treatment plants and reuse schemes,
4. Increasing imported water from Israel and;
5. Improvement of storm water harvesting

This paper will outline the Palestinian efforts in solving the water crisis by introducing a non –conventional water resources as brackish and sea water desalination which will be integrated with other solutions as indicated in the rolling program to reduce the gap between the demand and the availability of the water resources and enhance the water quality distributed to the population.

29. Zaidan Mohammed Abu-Zuhry

Biography

WASH Officer, UNICEF, Gaza Office
Zaidan Abu-Zuhry hold a B.Sc. and M.Sc. in civil engineering and a Humphrey post graduate certificate in environmental engineering and water resources from Rutgers State University, USA. He has a certified Project Management Professional (PMP) course in project management.

He has a varied academic background and 25 years of diverse, national and international, professional experience in areas of civil engineering, building construction, infrastructure (water, sanitation and roads), environment, strategic planning, total quality, management of projects, emergency and humanitarian response.
He is currently the WASH Officer at UNICEF for the management and supervision of the large-scale seawater desalination plant in Gaza.
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Key words
Zaidan Mohammed Abu-Zuhry

Authors and Corresponding
Large-scale Seawater Desalination supported by Renewable Energy in Gaza

Abstract Text
Water and energy are key challenges in Gaza. They are totally interdependent so that without energy there is no water. This presentation will shed the light on the water energy nexus in Gaza; shaping a pioneering solution.

BIOGRAPHIES

30. Eng. Farouk Dawabsheh

Biography

Certified Consultant Engineer & Trainer

Eng. Farouk Dawabsheh has a bachelor degree in chemical engineering from Anadol University in Turkey, 1980. He is the senior consultant for water quality at Future Environment and Consultant Company in Amman/Jordan. Before this, he worked for the Jordanian Water Authority (WAJ) for 28 years, and the last position was Director of Technical Research & Studies, then he joined Miyahona Company in KSA as a water quality manager for 5 years.

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Key words

WAJ: Water Authority of Jordan WHO: World Health Organization
WQ: Water Quality QA/QC: Quality Assurance & Quality Control
JWS: Jeddah Water Services JCBU: Jeddah City Business Unit
NWC: National Water Company GS: Gulf Standards JC: Jeddah City

Authors and Corresponding

- WHO Guidelines for drinking WQ, 4th edition 2011
- Dr. Saqer Al Salem, Strategies and Policies to assure safe WQ in Urban (WHO Expert)
- Eng. Farouk Dawabsheh (WQ Manager), Strategies and polices to assure safe drinking WQ in JC 2009

Abstract Text

All people, whatever their stage of development and social and economic condition have the right to have access to drinking water in quantities and of a quality equal to their basic needs (UNC 1977).

An estimated 80% of all diseases and over one-third of deaths in developing countries are caused by the consumption of contaminated water. Every 8 seconds a child dies of water related diseases.

Water quality and laboratories main goals are to ensure the safety of supplied drinking water quality to all citizens, and the compliance to national standards and WHO guidelines for the protection of the public health and the water resources from pollution.

This paper will present the role of water quality and laboratories, and describe the valuable achievements of JWS in the area of drinking water, and QA and QC which I was the honor to participate as a WQ manager during my work with the water management team of JWS & JCBU in 2009.

Among the major objectives of the new approaches adopted by NWC-JCBU are to achieve high performance of drinking WQ by the provision of continuous access to high quality drinking water to all citizens of JC according to national and international standards.

The adopted plans and approaches by JCBU for continuous improvement of WQ have resulted in strengthening the coordination and collaboration with all parties in charge of WQ. Also installing on line WQ monitoring systems and implementing a real time SCADA to control the process have resulted in the improvement of WQ for drinking water in JC.

The number of collected samples and analysis has increased rapidly as well as the analytical results became credible. Sampling and analysis results were compliant to GSs and customer satisfaction in drinking water quality has significantly increased.

31. Rachida Bouhlila

Biography

Professor Dr. Ing
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Hydro-geochemical risks, Advances, Modeling and relevant Cases of study

Rachida BOUHLILA is currently Professor of Hydro-geochemistry and Hydraulic. After studies of Hydraulic Engineering in ENIT, she received a Doctorate in Mechanic at INP Toulouse, France. Then, she received a “Doctorat d’état es-sciences” in Hydraulic Engineering from the University of Tunis El Manar.
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Key words
Hydrogeochemistry; reactive modeling; pollution; soil; groundwater

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Abstract Text
Hydrogeochemical, or reactive transport modeling, is an emerging discipline of earth sciences. It consists on the characterization and the quantification of geochemical reactions in the subsurface domain, taking into account the fluid flow. The main motivation for the development of this discipline dates back to the 1970s who witnessed the promulgation of the first laws on the environment protection and the remediation of contaminated sites. When hydrogeologists have been involved in the studies of the remediation actions, the reactive transport modeling was developed as a tool to synthesize the collected informations and data, and give a prior evaluation of the actions to be undertaken. This capability was naturally adopted for the assessment, a priori and with the lowest cost, of the environmental impacts of new projects and installations. For groundwater concerns, especially in arid and semi arid area, the hydrogeochemists contribution is mainly expected in two classes of problems : The analysis and the quantification of the processes of soil and groundwater pollution and salinization, and the design and the evaluation of the required protection and remediation processes. In this presentation, we will first will review the hydrogeochemical modeling state of art and the numerical tools, we develop for this purpose and those available to the scientific community. We will also present several Tunisian cases of study on soil and groundwater contamination and salinization, by seawater intrusion or salts recycling due to irrigation.

32. Fadoua Hamzaoui

Biography

Fadoua Hamzaoui Azaza graduated from the Faculty of Science of Tunis in 2011 with Merit in PhD thesis in groundwater management (geochemistry and modeling) and a Master degree in Environemental geology in 2004. Currently, she's Associate Professor at the Faculty of Science of Tunis. His research is particularly focused on groundwater geochemistry, hydrogeology and groundwater modeling. She has been exposed to excellent opportunities concerning research in both field and laboratory. Author and co-author of several scientific publications and as well as chapters in international books. Reviewer potential in several journals with impact factor. Reviewer potential in several journals with impact factor. Member in the IAH and EAG and co-chair of Africa in the RGFS

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Key words

Groundwater, aquifer, Tunisia

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Abstract Text

The study area of Bouficha is part of a coastal aquifer in northeastern of Tunisia; groundwater is the major source of supply for urban, agriculture and tourist activities. A continuous assessment of groundwater quality response to current abstraction is paramount to ensure a sustainable use of this water source.

To address this goal a Geographic Information System (GIS) tool was applied to indicate sites with high levels of contaminants in groundwater. Sixteen water samples were collected (April 2015) and analysed for their physical and chemically characteristics. Field measurements were made of temperature, pH and Electrical Conductivity. Analytical determinations included major cations and anions, as well as nitrates, fluoride and iron content; their error were within 5% in all samples. Data was used to obtain irrigation alert computations such as Electrical Conductivity, Kelley's ratio, Sodium Absorption Ratio, Magnesium Hazards, as well as Residual Sodium Carbonate.

Regarding drinking groundwater quality the World Health Organization (WHO) standards were applied to define sites within drinking water permissible levels. Information was loaded in an ArcGIS software, and analysed with a Spatial Analyst extension using Inverse Spline interpolation methods.

Fluoride content in most samples has values as high as 1.97 mg/L, with 53% of the samples showing fluoride concentration higher than the level suggested by the WHO for drinking water of 1.5 mg/L and ratified by the National Society of Exploitation and Drinking Potable Water of Tunisia.

Additionally, reported nitrate concentrations are higher than the expected groundwater background level of 10 mg/L; indeed, values are up to 286 mg/L, being hazardous for domestic use and suggesting the presence of anthropogenic sources of water contamination.

Ionic dominance for the major cations and the anions suggest that irrigation activities pose a dual hazard to groundwater: i) return irrigation flow is contaminating the Bouficha aquifer, and ii) resulting groundwater flow quality is proving an additional hazard for irrigation activities. Regarding the WHO and the Tunisian drinking water guidelines this work provides with solid evidence that groundwater quality is posing a significant health threat for local residents. Similarly, results show the chemical content of groundwater to be also unsuitable for economic activities in the Bouficha region, mainly being hazardous for irrigation purposes.

33. Dr. Adnan M. Aish

Biography

Associate Professor
Groundwater Quality Assessment and Mapping of the Gaza Coastal Aquifer Using GIS and Geostatistical Approaches

Dr Adnan Aish has a PhD from VUB University, Brussels, Belgium. He is a researcher at Al Azhar University-Gaza, Palestine. His experience in Water quality, Groundwater modeling and GIS.
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Key words
Water Quality, GIS, Gaza Strip.

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Abstract Text
The aim of this study is to evaluate groundwater quality data in the Gaza coastal aquifer. The data are analyzed by Arc-GIS and AquaChem software's. Geographical Information System (GIS) tool is used to construct thematic maps for groundwater quality in the Gaza Strip. Water quality maps are generated for the following parameters (TDS , Cl , NO3, SO4 , Ca , Na, Mg, K). The GIS maps shows contaminant distributions of the aquifer and the needs to improve the groundwater quality management methods.

AquaChem used to descript the hydrochemical facies and geostatistical analysis. In general the major cations (Ca , Na, Mg and K) and major anions (Cl, NO3, HCO3, and SO4) of the study area are exceed the permissible limits for Palestinian standards and WHO standards in the most places. Groundwater in the Gaza Strip is characterized by main types of hydrochemical facies: Na K Cl SO4, Ca Mg Na Cl HCO3, Na Cl SO4, Na Mg Cl water type. Generally it can be concluded that the quality of groundwater in Gaza Strip in is so bad, except in the northern part of the Gaza Strip. There are factors effects on the quality of water, brackish water flowing from the east is mixed with rainwater which infiltrates through the sand dunes to the aquifer. Other factors are seawater intrusion and extensive pumping, play a minor role in the distribution of the hydrochemical facies.

BIOGRAPHIES

34. Almotasembellah Abushaban

Biography

Motasem Abushaban is a water process engineer who is currently working as a researcher at TU Delft and IHE Delft, the Netherlands. Abushaban has been involved in several projects related to membrane filtration technology including biological fouling and scaling of reverse osmosis

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Key words

Seawater desalination, reverse osmosis, biofouling, Microbial activity, microbial growth potential.

Authors and Corresponding

Almotasembellah Abushaban, Sergio.G. Salinas-Rodriguez, Subhanjan Mondal, Said A. Goueli, Jan C. Schippers, Maria D. Kennedy

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Abstract Text

Standard methods to monitor and predict biological fouling of seawater reverse osmosis (SWRO) membrane do not exist. Monitoring bacterial regrowth potential (BRP) of SWRO feedwater has gained attention as it is directly related to the nutrients present in seawater. In this research, a new BRP method using indigenous bacteria consortium was developed based on microbial Adenosine Triphosphate (ATP), which has been recently developed using seawater-specific reagents (developed by Promega). Moreover, the new developed methods were applied to monitor microbial ATP and BRP in the North Sea and at a full-scale SWRO desalination plant in the Middle East. To measure BRP, seawater samples were pasteurized for 60 minutes and were inoculated with 1×104 intact cells/mL (measured by flow cytometry) using a natural bacterial consortium from seawater. The samples were incubated at 30 °C and bacterial regrowth was monitored using microbial ATP method in seawater. The new BRP method is fast (2 days) compared to the conventional method using bacterial plate counting. Microbial ATP and BRP were monitored in the raw seawater of North Sea, in which a seasonal variations are observed. Microbial ATP ranged between 20 ng ATP/L in the winter and 1,000 ng ATP/L in the spring, whereas BRP ranged between 23 ng ATP/L in the winter and 850 ng ATP/L in the autumn. Moreover, the new methods were successfully applied to monitor microbial ATP and BRP through the pre-treatment trains of an SWRO desalination plant in the Middle East. Significant reduction in microbial ATP and BRP were recorded through the RO pre-treatment. Microbial ATP declined from 500 ng ATP/L in raw seawater to 10 ng ATP/L in the SWRO feedwater and BRP reduced from 250 ng ATP/L in the raw seawater to 100 ng ATP/L in the SWRO feedwater. Overall, the new methods are promising tools to monitor and control pre-treatment of SWRO desalination plants with respect to biological activity.

BIOGRAPHIES

35. José Joel Carrillo-Rivera & Antonio Cardona

Biography

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Key words

Groundwater Flow Systems, Modern Hydrogeology, Water Quality Deterioration, Groundwater Recharge, Mexico

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Abstract Text

Groundwater quality deterioration is often an undesirable component in a water supply project. This response may result in negative effects as population health hazards, or/and undesirable impacts to infrastructure and maintenance costs of economic activities. Present population and economic growth has resulted, in many cities, in substantial groundwater extraction increase. Results show extraction by boreholes produced salinity and/or toxic elements in groundwater, which are significant in areas where the thickness of aquifer units ≥1,000 m. The objective of this work is showing that groundwater quality in extraction boreholes could be controlled when the dynamics of governing flows are defined. The methodology is defining the functioning of the Groundwater Flow Systems (GFS). The GFS acknowledges the need to define under a wide-system view adequate strategies for efficient water use, planning and management. The GFS methodology (Modern Hydrogeology) embraces an agreement among related environmental components manifested in groundwater functioning. GFST requires interdisciplinary analysis of data including groundwater physical-chemical and isotopic characteristics, hydraulic response, and natural expression of soil and vegetation; information requiring an interpretation within prevailing geological boundary conditions (elevation model and basement rock). Results agree with field conditions confirming the hydrogeological model. It was found that the usual response of boreholes to groundwater extraction results in a mixture of flows of different hierarchy, where vertical components of flow increase their importance as drawdown progresses with extraction time. Horizontal/vertical hydraulic conductivities ratio of geological units, flows water density differences, and extraction rate become major controls in achieved water quality. Results of integrative data groundwater management suggest as highly satisfactory using water-levels with selected physical (ie. temperature) and specific chemical signature, to alert expected response conditions due to extraction. These provide solid data for efficient groundwater usage. Examples of GFS application in areas under semi-arid conditions will be presented.

36. Laila Mandi

Biography

Professor of Water & Environmental Sciences at Cadi Ayyad University, Marrakech - Morocco
Multi-Soil-Layering System: A green and sustainable technology for wastewater treatment in developing countries rural areas Pr. Laila Mandi, has a PhD in Water and Environmental Sciences from the Faculty of Sciences Semlalia (University Cadi Ayyad), she is the Head of the National Centre for Studies and Research on Water and Energy at University Cadi Ayyad in Marrakech, Morocco. She is recognised as expert, evaluator of many projects (EU and non EU) in the field of water treatment. She has coordinated several R&D projects at National and international levels.
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Key words
Sanitation ; rural areas ; Multi-Soil-Layering (MSL) system ; green technology; sustainable development

Authors and Corresponding
Laila MANDI (corresponding), Lahbib Latrach, Naaila Ouazzani, Abdessamad Hejjaj, Mustapha Mahi, and Tsugiyuki Masunaga

Abstract Text
In most of developing countries, sanitation and wastewater treatment is one of the biggest environmental problems in rural areas. Wastewater treatment infrastructure is either poorly developed or non-existent in rural areas which causes dramatic water pollution and infectious diseases.

In rural areas of Morocco, conventional centralized sanitation systems are impractical due to the topography and long distances between villages and communities. Classical technologies are very expensive, not adapted to rural conditions and needs a trained staff for operation and maintenance.

Moreover, rural domestic wastewater is characterized by high concentrations of organic matter, nutrients and pathogens. Developing solutions for rural sanitation is a serious global problem that has received limited attention during the recent years. So it's clear that developing treatment techniques adapted to this socio-economic context taking into account both social, technical and financial capacities of rural areas is very challenging.

This paper presents a novel low cost, efficient and ecological wastewater treatment technology called ‘Multi-Soil-Layering (MSL) system that has been developed recently in Morocco. MSL system is an innovative wastewater treatment technology based on water filtration using low cost and available materials. The environmental cleanup capability of soil is maximized in MSL systems, while avoiding many problems encountered in the existing wastewater treatment technologies.

This green innovative technology was tested, optimized and proved as an efficient wastewater treatment method in laboratory scale, in a real application in rural village and in a full wastewater treatment plant. The MSL technology was successful in removing many pollutants for instance: organic compounds, suspended solids, nutrients, metals, and pathogens. The MSL eco-technology could be considered as an efficient and promising domestic wastewater treatment solution in rural areas to promote environmental protection and wastewater reuse.

37. Eng. Jane Hilal & Eng. Elias AbuMohor

Biography

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Key words
Wastewater, Rural areas, treatment

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Abstract Text
The problem of water scarcity in the MENA region is compounded by inadequate levels of management, increasing water deficits, and the deterioration of water quality from pollution sources. The impacts of water scarcity and pollution are not equally distributed. Rural populations and particularly farming communities are especially vulnerable to water scarcity and pollution of water resources. Rural areas in Palestine, which are the home of 35% of the Palestinian population, are particularly suffering from real water crises with water consumption estimated at 73 l/c/d. In addition, the rural population is facing environmental problems related to sanitation.

Only 6.1% of the population has access to adequate sanitation whereas the majority uses cesspits or septic tanks. It is not financially feasible, however, to connect rural housing units to conventional centralized wastewater management systems due to the high capital cost of installing sewage collection networks in rural area with dispersed housing patterns.

Alternatively, household-level small scale wastewater treatment plants "SSWWTP" are economically feasible and can: create an additional water resource for irrigating fruit trees and forages; increase crop yield while decreasing the need for input of synthetic fertilizers; reduce contamination of soil, surface and

ground water resources; and subsequently reduce the health risks of contracting water-borne diseases. This paper summarize the study conduct to prototype a scalable, solar powered, low-cost, small-scale aerated sludge wastewater treatment plant and to evaluate the financial, social, and environmental opportunities and constraints of disseminating the innovative technology and knowhow to other rural communities in the MENA and Central Asia regions. The study resulted with 1) an Innovative, low operational cost, and low maintenance technology to treat and reuse wastewater to irrigate one acre of land from wastewater treatment plant with 5m3/day capacity, 2) improved forage production by intensification of the cropping cycle, and 3) reduced water scarcity and improved the livelihoods of poor rural communities by reducing water cost, the amount of purchased fodder, and simultaneously increasing animal productivity.

38. Abdel Halim Fuqaha

Biography

Abdel Halim Fuqaha, has education in Water and chemical process engineering. Univ.Ass. Dipl.-Ing. Dr.techn at Vienna Technical University - the Institute of Chemical, Environmental and Bioscience Engineering in Austria. Abde halim Fuqaha experience in water treatment, membrane technology, biorefinary and nanotechnology.
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Key Words
Denitrification, membrane, normal flux, particles size distribution, bioparticles

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Abstract text
Two types of nanofiltration membranes had been used to study the influence of cross flow velocity on the membrane filtration of denitrification effluent (NF270 and NF90). Filtration had been conducted at constant transmembrane pressure of 5 bar and variable cross flow velocity (0.03, 0.06, 0.15 and 0.39 ms-1). The obtained normal flux was 0.47, 0.58, 0.59 and 0.77 for NF270 membranes and 0.35, 0.38, 0.41 and 0.39 for NF90 membranes, the increase in cross flow velocity had enhanced flux performance of NF270 membranes more than NF90. The higher cross flow velocity had decreased the rate of fouling in the order of 1.3, 1.5 and 1,6 for NF90 membrane and 1.8, 2 and 4.33 for NF270.

The structure of the accumulated particles on the membrane surface had changed with each increment in the cross flow velocity, The impact of the particles load was more severe in the last section of the membranes due to the reduction in the particles size and the increase in the particles count,the accumulated particle count had decreased on the following percentages 35.65, 43.54 and 56.62% for NF270 and 34.85, 40.10 and 46.71% for NF90 membranes. The achieved active biomass concentrations was 4.65E+07, 1.96E+07, 1.70E+07 and 1.29E+07 ng.m-3 on the NF270 membranes and 7.78E+07, 4.41E+07, 3.74E+07 and 3.54E+07 on NF90. The cross flow velocity higher than 0.06 ms-1 had minor influence on the bioparticles removal rate comparatively to non bioparticles.

39. Eng.Lina Hiyari

Biography

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Key words
wastewater reuse; agricultural irrigation; blended water, wastewater use guidelines, climate change, wastewater use effectiveness

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Abstract Text
Jordan is one of the most water deprived countries in terms of fresh water resources. The fresh water share per capita per year has fallen from 1000 m3 to 500 m3 then to 140m3 in the years 1960, 1975 and 2010 respectively . The share is estimated to be less than 100m3 for all uses in the year 2014. Factors causing the reduced share are the population growth, climate change, socioeconomic development and the influx of refugees due to political unrest in the region. Wastewater reuse in agriculture involves the further use of “treated” wastewater for crop irrigation Treated wastewater generated at existing wastewater treatment plants is an important component of Jordan’s water resources.

Due to the terrain and the concentration of the urban population above the Jordan Valley escarpment, the majority of treated wastewater is discharged into various watercourses and flows to the Jordan Valley where treated wastewater is being used on an increasing scale for irrigation. In 2014 125 MCM of treated wastewater were reused after being blended with fresh water in irrigation or in specific areas directly without blending Thus, this paper presents an assessment that addresses the effects, of wastewater use in agriculture, emphasizing the results of the substitution. The evaluation results reveal that there are benefits from this substitution both economically and environmentally related first to the Coping with the scarcity situation, protecting the environment and considering this process as part of mitigation measures of the effect of climate change and considering Wastewater as a potential water and revenue source.

40. Noama Shareef

Biography

Dr.-Eng. Noama Shareef holds a Ph.D. degree in Civil Engineering –Environmental Engineering from Germany. She has worked more than 12 years in German Water Sector in Frankfurt & Cologne in Germany as Project Manager- Engineering in field of water technologies (Drink water treatment units, Waste Water and sludge treatment & disposal. Experience in details: (commissioning and performance testing of Municipal/ Industrial wastewater treatment and drink water treatment Plants, SBR, RO, Energy & Nutrient Recovery from Anaerobic Treatment of Organic Wastes, Process engineering, Training of external service skilled workers, advanced training water technologies, Bio-filtration technologies, coordinator for research and development projects with the BMBF, German Federal Ministry of Education and Research, in Arabian and in some foreign countries. She has got her master's degree, Diploma degree and BSC in Civil engineering and was lecturing & supervising postgraduate students at Universities more than 7 years and also she supported the Curriculum Development Instructional in 2 Universities.

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Key words
Wastewater, Biofilm technologies, hybrid-reactor, compact unit.

Authors and Corresponding
Noama Shareef

Abstract Text
The increase of the demands on efficiency and cost of waste water treatment and reuse, leads to new interest in the biofilm technology. However, since long time, Biofilms technologies are used in wastewater treatment plants, to degrade organic particles and to improve the nitrification & denitrification processes in the waste water treatment units. Increasing demand for water and limited resources are major barriers to economic and social development in many counties in the MENA region. Therefore treated wastewater can be important alternative water resources for irrigation. This increases the demand of economic wastewater treatment and reuse in the region.

Compact wastewater treatment unit has been designed and developed primarily for countries which are seeking solutions of problems related to wastewater and sewage handling and treatment in tourist areas. This is due to the small size and easy to handle.

The compact, containerised wastewater treatment unit has a capacity of 200 PE, is designed for small villages and similar dry communities. The intention is to have the unit installed and operated under the supervision of educated experts in a foreign country. The idea is to monitor and test the functionality of all plant components under real-life local conditions and verify the effectiveness of the wastewater treatment process. Based on the results and experience gained in the testing phase, the technology will be applied for full scale applications.

Therefore the aim of this paper is to demonstrate & evaluate the wastewater treatment efficiency of the small wastewater treatment plant which is based on a combination of an aerated submerged fixed bed biofilm in nitrification stage and an anoxic moving bed for denitrification stage GEA-Solution.

This leads to demonstrate a new concept on a pilot scale with a capacity of 200 PE and typical municipal waste water type in the MENA region

BIOGRAPHIES

41. Ibtisam Abu Alhaija

Biography

Ibtisam AbuAlhaija, MSc in Water and Environment science, Director of Climate Change and Drought Monitoring Dept. Ministry of Agriculture – Palestine, has been working in the field of water and irrigation for more than 20 years and still working, and in the field of climate change and drought for the past 9 years
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Key words
Accepted, treated wastewater, consumers

Authors and Corresponding
Ibtisam AbuAlhaija

Abstract Text
The shape of the agricultural sector with its various components and branches is still one of the most important pillars of the Palestinian steadfastness in the face of the policies of the Israeli occupation, and this is reflected in the popular saying “If agriculture is fine, the homeland is fine.” The agricultural sector is one of the most important pillars of the Palestinian national economy as it provides employment, livelihood and food and serves different sectors.

Local culture has a clear impact on people’s perception of natural resources such as water and how to manage it. For example, the issue of the provision of non-conventional water resources (especially treated wastewater) to agricultural activities faces a number of problems and complexities, most of which concern the social and cultural aspects of communities. As our region suffers from a scarcity of water resources, the availability of fresh water per capita has declined dramatically, especially in recent years. Therefore, it is necessary to set priorities and start to develop strategies that involve participation and acceptance from all concerned parties, especially in the field of the use of treated wastewater.
During the year 2107 a study was conducted in the village of Surda in the Ramallah area (170 questionnaire) on the social acceptability for the consumption of products irrigated with treated wastewater. The area was chosen due to the diversity of its residents from several governorates.

The results showed that 80% of the sample had no knowledge of the of wastewater, and 80% of the sample had no knowledge of treated wastewater and its potential uses. Therefore, 85% did not accept any products irrigated with treated water. Male accepted more the idea buying products Irrigated with treated water by 60% compared to 40% for females. The ratio of females increased when the purchase was associated with a reduction in product prices to increase the percentage to 80% of the women in the sample.

42. Dr. Jack van de Vossenberg

Biography

Jack has a PhD in microbiology, worked on microbes in drinking water, wastewater and the environment. Jack is senior lecturer at (institute) IHE Delft in The Netherlands. Currently Jack is involved in research on bioleaching of electronic waste, groundwater and wastewater quality and algae for wastewater treatment.
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Key words
microbiology; water quality

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corresponding author*

Abstract Text
During the school season, an average 2.8 m3 per day of domestic wastewater is produced by Ubeidiya primary schools (Yaffan and Alestiqlal). The water is treated with an anaerobic baffled reactor with nine compartments and a constructed wetland.

From 17 September onwards, samples were taken at monthly intervals. Amongst others, the parameters analysed were turbidity, BOD, COD, nitrogen species and E. coli numbers. The samples were taken from the influent of the anaerobic reactor, from the fifth and ninth (final compartment, is influent for the constructed wetland) and from the effluent of the constructed wetland.

After 3 months of operation the system stabilized. The system reduced turbidity, COD and BOD, and E. coli numbers dropped to below105CFU/100 ml, which is just too high for irrigation of crops that are likely to be eaten uncooked. The use of high concentrations of detergent and chlorine by the cleaners in the school negatively affected the microbial community in the system. The lack of flow of influent water due to school holidays is another issue that influences the performance of the system.

43. Sayari Faycal

Biography

Sayari Fayca., has a water resource is the senior technician service manager at Ministry of Agriculture, Water Resources and Fish. in Tunisia (experience) 27 years.

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Key words
Water resources, wastewater.

Authors and Corresponding
Sayari Faycal

Abstract Text
since 1991: technical assistance of the groups with the hydraulic interruptions
in 2000: in charge of the valorization and saving of water in irrigated public perimeters
since 2008 ; responsible for the recovery of treated wastewater in agriculture

44. Margaux Chinal

Biography

Margaux Chinal holds a degree in water and sanitation engineering and has 8 years of experience in the water and sanitation sector. She started her career as a consultant for four years in France before joining the French Development Agency (AFD).
She worked for two years in AFD's office in Comoros where she was in charge of the water projects. She is now working in the water and sanitation division at AFD's headquarters in Paris where she is in charge of the Palestinian projects portfolio as project manager.

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Key words
Water, Sanitation, Reuse, Gaza, AFD support

Authors and Corresponding
Margaux CHINAL

Abstract Text
The Palestinian National Adaptation plan and the initial national communication to the UNFCCC have identified water and food security as the most vulnerable issues in Palestine, with knock-on implications for all sectors. In Gaza, the population has one of the lowest per capita water availability in the world.
Food and water insecurity will increase in the baseline scenario with a "climate contribution", in terms of acceleration of existing anthropic trends, estimated at 30%. The project intends to counterbalance the negative compounding effect of climate change on an already degraded scenario by injecting infrastructure and hydraulic technology to create a new non-conventional water resource to be injected in the aquifer, using a technology called Managed Aquifer Recharge (MAR), and reused for agriculture. The project will increase the resilience of 4 200 farmers and enhance the livelihoods of 11 000 people; it will alleviate the pressure on the aquifer, thereby improving access to domestic water of 200 000 people.

BIOGRAPHIES

45. Eng. Azzam Shabib

Biography

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Authors and Corresponding

Eng. Azzam Shabib

Key words

Surveillance, monitoring, legislation, water quality, pesticide, heavy metals, West bank

Abstract Text

One of the most fundamental challenges facing Palestine State is Lack of access to adequate, safe water. Palestine depends on ground water; Aquifers are already being overused. Palestine is affected by climate change with decrease in rainfallamounts, and this complicates the issue. Access to water and proper sanitation is a basic right enshrined in international covenants to which Israel is a signatory during the Israeli occupation. From 1967-1995, the administration of West Bank was transferred to Palestinians with insufficient system including inadequate human resources for water. Political viability of Palestinian state will be affected by its ability to meet its citizen's needs and services, so water urgently need attention. Several categories of data were utilized to write this study. Different key indicators have been selected to illustrate water quality surveillance; legal reforms, standards, technical and laboratory reform, annual reports and microbiological results of networkssamples. Through Decree Public Health Law, MOH derives its authority as Surveillance agency. Building institutional capacity was done through establishing Central Public Health laboratories (CPHL) in 2002, which composed of number of laboratories aims toprotect and promote public health through a multiplicity of activities. CPHL have national accreditation ISO 17025:2005. Through the microbiology, chemistry, and radiation protection division huge number of water samples are tested using modern equipment's.Developing human resources required increasing districts from 9 to 14, and this required tripling with qualified multidisciplinaryteams.Water-related diseases constitute a major problem. Chemically, only nitrate and chloride exceeding limits for drinking levels but there are long-term health consequences. Networks Microbial contamination percentages 2002-2016, were reduced from 23.1%to 11.7%. With the scarcest renewable water resources, immediate water issues must be addressed to protect health. There are no available data about the concentration of heavy toxic metals, organic compounds and pesticide in water, so they are potentially high health risk. MOH is a good model in building a successful Palestinian State. As high population growth and the lack of sewer systems more extensive efforts are still required to improve the water quality including robust policies, public awareness, catchments protection, Infrastructure Improvements and strict water monitoring system programs.

46. Giovanni Cesari

Biography

GVC - WASH Sector Coordinator
Giovani Cesari is an Italian humanitarian aid worker currently based in Palestine. He holds a Master Degree in Environmental Science from the University of Urbino, Italy, and a Master's Program Degree in Water Resource Management in International Development Aid from the University of Milan – Bicocca, Italy. He has multi-years' experience in WASH-emergency/development activities, coordination and M&E in the humanitarian sector, besides extensive experience in project management, in different developing countries, covering several assignments with progressive engagement and responsibilities. At the moment he is WASH Sector Coordinator in the occupied Palestinian territory for GVC (Gruppo di Volontariato Civile), with the responsibility for coordinating, overseeing and monitoring all WASH activities in the West Bank and in the Gaza Strip.
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Key words
Area C, water access, water governance, trucking, connectivity

Authors and Corresponding
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Gregor von Medeazza, PhD; Chief Water, Sanitation & Hygiene, UNICEF, Jerusalem; gvonmedeazza@unicef.org

Abstract Text
Water trucking governance system to support vulnerable communities in the West Bank Due to restrictions in the so-called Area C of the West Bank, approximately 21,000 Palestinians are un/under-served by the public water network, forced to rely on water trucking, often at extremely high prices. In these vulnerable communities, the majority of which are ranked as "high risk" by the PWA-UNICEF led WASH cluster, residents have limited access to safe water (below 60 litres/capita/day, while WHO's standards are at 100 liters), limited means for water transportation (less than 30% of families own a truck) and insufficient water storage capacity (average of less than 3m3 per person).

The geographical fragmentation of areas' classification hinders the fulfilment of international benchmarks of services provision, still demanding a significant share of international support investments at least in the medium-term. GVC, in partnership with UNICEF and close coordination with PWA, built a water scarcity/access response system for subsidized water trucking during the chronic dry period, enhancing sustainability of service, efficiency of resources' use and predictability of demand.

This multilevel governance system defines roles and responsibilities of all the water trucking chain actors, from the central management of PWA, to the water service provision by the Joint Service Councils, to the right-based holder communities and beneficiaries. The distribution, done via coupons, is based in a structured mechanism of water demand - water provision, where implementation and monitoring are carried out in partnership with actors at national, regional and local levels, allowing PWA to provide water services in remote localities. Geographical connectivity was also enhanced among areas, mitigating the fragmentation generated by the occupation. The humanitarian response is thus embedded in the normal institutional provision of Palestinian Authority's water services, providing for a potential exit pathway from the chronic emergencies, in line with the national reform of the water sector.

BIOGRAPHIES

47. Mohammed Amro

Biography

Mohammed Amro Action Against Hunger is an international humanitarian organization, founded in Paris in 1979, with branches in Paris, London, Madrid, New York and Montréal.
Action Against Hunger is currently working in over 40 countries worldwide, implementing projects in the sectors of nutrition, water, food security and health.
Action Against Hunger WASH programming in the West Bank aims to provide, improve and protect access to safe, sufficient and affordable water and sanitation conditions for the most vulnerable communities.

Authors and Corresponding
Mohammed Amro

Key words
Water distribution, Fair share, Demand, Supply, Availability, Distribution planning, Distribution model

AbstractText
A study undertaken by the Palestinian Water Authority (PWA) and partners in Area C described the context, impact and mitigation measures related to the limited access to water in South and North-East communities of the West Bank. PWA and its partners (Action Against Hunger-AAH and UNICEF) have shown that connecting communities with a piped water service delivered through a well-maintained water network is the most effective solution to ensure adequate access to water. Such piped water distribution systems have been constructed in several locations of Area C overcoming challenges due to the coercive environment (including confiscations and demolitions). Furthermore, in some cases the standards of management, distribution systems and planning has resulted in disproportionate water distribution between communities as planning fails to take account of real demographic and socio-economic data analysis. AAH with PWA, conducted an assessment on the status of water distribution in Hebron and Bethlehem governorates to evaluate existing water distribution systems, highlighting the constraints and develop an efficient water distribution model for targeted communities. PWA data included information on transmission pipelines, supply points, PWA data analysis and management systems. Community data included population and livestock statistics, water received by the community, existing infrastructure and connection points. As this paper details, the results indicated: (i) there was a variation in the real water supply between communities from 20 l/c/d to more than 150 l/c/d; (ii) the planned water distribution and monitoring system was not based on actual data; (iii) more than 30% water leakage recorded in the PWA main transmission pipelines; and (iv) a high number of illegal connections. AAH and PWA have developed an online water distribution model to improve operation, management and monitoring of bulk water distribution in Area C. A water demand calculation mechanism has also been adopted taking into consideration community demographic, socio-economic parameters

48. Rabeh Morrar

Biography

Rabeh Morrar was born in Jerusalem, Palestine, in 1981. He received the B.A degree in Mathematical Applied to Economics from Birzeit university, Palestine, in 2003, and the M.A. in Economics from Birzeit University, Palestine, 2006, and Ph.D. degree in Innovation Economy from Lille 1 University for Science and Technology, Lille, France. In 2011, he joined the Department of Economic, An-Najah National University, Palestine, as an assistant professor in Economics, and in 2011 became the head of Economic Department until 2016. His current research interests include Innovation Networks, Knowledge-based Economy, Economic Development in Developing Countries, Labor Economy, and Service Economy.

Authors and Corresponding
Dr. Rabeh Morrar, Anwar AlShaer

Key words
Water Tariff,Social Justice, Economic Efficiency

Abstract Text
Palestine like other countries in the region suffers from limited water resources. Also, due to occupation, Israel control over the main water resources in Palestine, and limited amount of water is distributed to the Palestinian areas compared with high consumption of water for the Israeli settlements which situated in the Palestinian areas. Meanwhile, rainwater is not enough to provide Palestinian citizens with their needs of clean and fresh water, and since two decades, Palestine has experienced interrupted rainfall which left the Palestinian people mainly in rural areas depends on water comes through the official water distribution system provided by local governments or municipalities.

This paper discusses water tariff in Palestine from perspectives of social justice and economic efficiency. It also finds out the determinants of water demand in West Bank and investigate the repose for payment water meter (PWM) as a solution for managing water demand. For this purpose, we design a questionnaire and face to face interviews with a sample of 500 households in West Bank.

Then, we use quantitative analytical approach on the form of ordinary least square regression analysis (OLSregression) and ANOVA test to find out the determinants of water demand in Palestine. We found that there is a high ratio of households dissatisfied about the existing tariff system, which negatively influence their commitment with paying the water bill. Also, most of the Palestinian households believe that the water bill covers the cost of water.

The result of water demand analysis model finds a negative relationship between water consumption and the monthly payment on water tariff, which is consistent with demand law which states that there is a negative relationship between price and quantity demand. The family size is an important determinant of water consumption, which means that a one more family member will increase the demand of water by 0.9 m3.

The income does not significantly increase water demand or consumption. This result displays an inelastic income demand for water. Water is a necessity good and has no substitute, whatever the income is the people will firstly expense his income to buy his basic needs like water, bread, etc.Results also show that informed people with water tariff system will negatively influence their water consumption.

BIOGRAPHIES

49. Samia Al-Ghafri

Biography

Ms.Samia Al-Ghafri has a bachelor in communication studies/Public relation ; She is working as communication specialist at Public Authority of Electricity and Water (PAEW), Muscat, Sultanate of Oman. And now She is completing her master degree in sultan Qaboos University on international relation and security studies.

She Worked in Training International institute for teaching Arabic for non native speaker.
She Worked in future company (media group) as public relations officer, for organizing international forum and conferences.
She participated in many activities inside and outside Oman such as : project management and innovation studies course in Tampere university of Applied sciences in Finland, Kuwait forum for Water, research council competition and so on…
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Key words
Resilience, performance indicators, long-term strategy

Authors and Corresponding
Samia Al-Ghafri, Bushra Al-Riyami, and Teeba Al-Harrasi

Abstract Text
The water sector and the Sultanate of Oman overall facing a wide range of enormous and complex challenges and is working to ensure the long term resilience of water supply and service. The increased in water demand due to population growth and economic development pose serious risks to the provision of sustainable urban water services. These challenges call for a transition water management including consideration of resilience.

There is a need to evaluate the efficiency of water service and urban water utilities, and assess and improve the resilience of water services and drinking water supplies to customers as part of long-term strategy to ensure service failures are close to zero and meet customers' expectations. The main aim of the present research work is enhancing the resilience of water service in Oman through analysis and assessment of performance indicators for water supply services in Sultanate of Oman.

A method of assessing water service resilience is developed and tested for the water service in Oman. This is done by analysis of service performance data over time and by examination of one particular system. In our research, we highlighted on the indicators related to physical assets, operation and maintenance, quality of service, and financial issues and the performance of PAEW.

The approach used in this work is new and it is an important starting point in assessing the resilience of water services in Oman. Based in the developed system, PAEW should expedite the development of an action plans in order to reduce cost and improve the water service in Oman.

50. Samer Alatout

Biography

Professor Alatout is the Director of the Holtz Center for Science and Technology Studies. He is also on the faculty of Community and Environmental Sociology and the Nelson Institute for Environmental Studies. He has written extensively about the history and politics of water in Palestine and in Israel since the early 1900s. His work appeared in major academic journals including Political Geography, the Annals of American Geographers, Environmental and Space, and Arab World Geographers. At the moment, Alatout focuses his work on water governance, the politics of water infrastructure, and the politics of climate change. He has a number of funded projects on water politics in Palestine and the Midwest in the United States.

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Key words

Palestine, water governance, infrastructure, climate change, national conflict, class, gender

Authors and Corresponding

Samer Alatout

Abstract Text

For decades, the main focus of scholars writing on water politics and governance in Palestine has been on Israeli appropriation of Palestinian water resources and the settler-colonial regulatory regime that produced water injustices in terms of the national struggle. Given the circumstances of occupation, that focus was probably unavoidable for a while.

However, this focus also led to downplaying water governance as a local Palestinian issue that determines (at least to a degree) who controls the water resources and what water uses are considered appropriate, legitimate, and ethical. Little attention has been paid to the effects of the Palestinian water governance structure itself on the Palestinian populations. Questions about whether the Palestinian water governance offers a just distribution of resources were downplayed and neglected. Questions about the different ability to access available water resources between urban and rural communities were not posed or answered. Questions about the gender effects of Palestinian water governance structures were also sidelined to a great degree.

This paper and presentation contribute some preliminary ideas on what factors could lead to a water governance structure that, while taking into consideration the national struggles against settler colonialism, addresses the needs for water justice (gender, urban/rural, the poor).

BIOGRAPHIES

51. AAH (Action Against Hunger) UNICEF

Biography

Action Against Hunger is an international humanitarian organization, founded in Paris in 1979, with branches in Paris, London, Madrid, New York and Montréal.

Action Against Hunger is currently working in over 40 countries worldwide, implementing projects in the sectors of nutrition, water, food security and health.
Our organization set up a mission in the occupied Palestinian territory in 2002. Action Against Hunger has been running food security and water programs in North West Bank since September 2002, in Gaza since July 2005 and in Hebron since May 2006.

UNICEF works in 190 countries and territories to save children's lives, to defend their rights, and to help them fulfil their potential.

Key words
Water modelling , water demand, fair distribution

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Abstract Text
A study undertaken by the Palestinian Water Authority (PWA) and partners in Area C described the context, impact and mitigation measures related to the limited access to water in South and North-East communities of the West Bank. PWA and its partners (Action Against Hunger-AAH and UNICEF) have shown that connecting communities with a piped water service delivered through a well-maintained water network is the most effective solution to ensure adequate access to water. Such piped water distribution systems have been constructed in several locations of Area C overcoming challenges due to the coercive environment (including confiscations and demolitions).

Furthermore, in some cases the standards of management, distribution systems and planning has resulted in disproportionate water distribution between communities as planning fails to take account of real demographic and socio-economic data analysis.

AAH with PWA, conducted an assessment on the status of water distribution in Hebron and Bethlehem governorates to evaluate existing water distribution systems, highlighting the constraints and develop an efficient water distribution model for targeted communities. PWA data included information on transmission pipelines, supply points, PWA data analysis and management systems. Community data included population and livestock statistics, water received by the community, existing infrastructure and connection points. As this paper details, the results indicated: (i) there was a variation in the real water supply between communities from 20 l/c/d to more than 150 l/c/d; (ii) the planned water distribution and monitoring system was not based on actual data; (iii) more than 30% water leakage recorded in the PWA main transmission pipelines; and (iv) a high number of illegal connections.

AAH and PWA have developed an online water distribution model to improve operation, management and monitoring of bulk water distribution in Area C. A water demand calculation mechanism has also been adopted taking into consideration community demographic, socio-economic parameters.

BIOGRAPHIES

52. Abba Ismail

Biography

ABBA Ismail, Hydrogeological Engineer, Head of sustainable management water resources Division at Hydraulic Basin Agency of Guir-Ziz-Rhers in south east of Morocco.

Experience :2001-2007 Engineer of study and works charged, 2007-2012 Head of Water Resources Planning and Management Divisionm 2012-2018 Head of Sustainable Management Water Resources Division

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Key words
Aquifer contract, hydrogeological modeling

Authors and Corresponding
ABBA Ismail

Abstract Text
The objective of establishing an “aquifer contract” is the preservation of underground water resources in the Guir-Ziz-Rheris basins through an integrated and participative management with participating of all water users and the commitment of all stakeholders concerned by water resources issues (public and private partners, central and regional partners, authorities, water users associations ..)
The “aquifer contract” it is a sustainable regional water resources development strategy for managing ground water resources demands in Guir and Ziz basins (irrigation).

Purpose of the “aquifer contract”:

The “aquifer contract” must achieve the following objectives:

- Contribute to the implementation of a participative strategy for preservation and protection of groundwater resources of Boudnib, Tafilalet and Tinjdad aquifers systems;

- Achieve a participatory action plan negotiated and concerted for the protection and preservation of water resources of these aquifers.

53. Khalid Qahman

Biography

Dr. Qahman holds a Bachelor of Science Degree in Civil Engineering from Birzeit University, Palestine, a Masters Degree in Hydrological Engineering from the IHE-Delft University, the Netherlands and a Ph.D. degree in Civil Engineering from Mohamadia School of engineers (EMI)- Mohammad V University, Rabat –Morocco.
He also works as an Assistant Professor in Water and Environment (Part time) at Alquds University, Al Azhar University and Gaza Islamic University (Master study programs).
Dr. Qahman also works as a senior consultant at Engineering & Management Consulting Centers. He carried out several studies and researches in the field of Water and Environment.
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Key words
Coastalaquifers . Palestine . Numerical modeling . Automatic-calibration . Simulation/ optimization(S/O) technique

Authors and Corresponding
Marta Dentoni & Roberto Deidda & Claudio Paniconi & Khalid Qahman & Giuditta Lecca

Abstract Text
Seawater intrusion is one of the major threats to freshwater resources in coastal areas, often exacerbated by groundwater overexploitation. Mitigation measures are needed to properly manage aquifers, and to restore groundwater quality. This study integrates three computational tools into a unified framework to investigate seawater intrusion in coastal areas and to assess strategies for managing groundwater resources under natural and human-induced stresses. The three components are a threedimensional hydrogeological model for densitydependent variably saturated flow and miscible salt transport, an automatic calibration procedure that uses state variable outputs from the model to estimate selected model parameters, and an optimization module that couples a genetic algorithm with the simulation model. The computational system is used to rank alternative strategies for mitigation of seawater intrusion, taking into account conflicting objectives and problem constraints. It is applied to the Gaza Strip (Palestine) coastal aquifer to identify a feasible groundwater management strategy for the period 2011–2020. The optimized solution is able to: (1) keep overall future abstraction from municipal groundwater wells close to the user-defined maximum level, (2) increase the average groundwater heads, and (3) lower both the total mass of salt extracted and the extent of the areas affected by seawater intrusion.

54. Mazin B. Qumsiyeh

Biography

Prof, Mazin Qumsiyeh teaches and does research at Bethlehem University. He is founder and director of the Palestine Museum of Natural History, and Institute for Biodiversity and Sustainability (see palestinenature.org). He previously served on the faculties of the University of Tennessee, Duke, and Yale Universities.

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Key words
Colonialism, environmental justice, conservation, sustainability

Authors and Corresponding
Mazin B. Qumsiyeh

Abstract Text
Palestine has been multi-ethnic, multi-cultural and multi-religious society throughout its history with very minor exceptions (e.g. Crusaders, Zionism). Like all colonial movements, colonizers had major restructuring that effects native flora and fauna (including humans) and in this case of a key section of the Fertile Crescent which was rich in diversity (fauna, flora, and human). Examples are numerous: destroying ancient villages that go back thousands of years, monoculture of introduced pine trees, drying up the Hula wetlands, diversion of the Jordan headwaters in the form of the “Israel National Water Carrier”, and most recently the disastrous Red Sea-Dead Sea Canal. When Zionism ends like its predecessor monolithic movements, some of the 7.5 million native Palestinian refugees will return to their homes and lands as will some of the Western Jewish immigrants/colonizers. But the net will still be increase in population and further stresses on the environment. In this paper we describe why some of the stated historical destruction will not be reversible while others might be through environmental education and awareness and steps at conservation. Finally, using our own experiences at the Palestine Institute for Biodiversity and Sustainability, the paper addresses the way we can meet challenges via welding modern science with ancient practices in areas of water and environmental conservation and management especially dealing with mitigation and adaptation to climate change. Our current projects dealing with early childhood education on climate change and with challenging desertification and soil erosion via permaculture methods are also explored. Finally, we explore scenarios of future sustainability in a rapidly changing and challenging world.

55. Ibtisam Abu Alhaija

Biography

Ibtisam AbuAlhaija, MSc in Water and Environment science, Director of Climate Change and Drought Monitoring Dept. Ministry of Agriculture – Palestine, has been working in the field of water and irrigation for more than 20 years and still working, and in the field of climate change and drought for the past 9 years

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Key words
Accepted, treated wastewater, consumers

Authors and Corresponding
Ibtisam AbuAlhaija

Abstract Text
In vast semiarid regions such as Palestine, years of below-average precipitation are more frequent than years of normal or excess precipitation. The most significant environmental effects of climate change in Palestine are a decrease in precipitation (with a significant seasonal variation) and significant temperature increases. In its Fourth Assessment Report, the International Panel on
Climate Change (IPCC) predicted that for the southern and eastern Mediterranean, warming over the 21st century will be larger than global annual mean warming – between 2.2-5.1ºC. Annual precipitation rates are deemed likely to fall in the eastern Mediterranean – decreasing 10% by 2020 and 20% by 2050 – with an increased risk of summer drought.
According to a research conducted by Dayan, it is expected that climate change will lead to less precipitation in winter and higher temperatures in summer. Temperatures are expected to rise by 2-4 degrees Celsius by the year 2100; this increase will lead to less snow in the area of Jerusalem and the mountains. The risk of rainfall reduction is higher in the south, mainly in areas where the annual rainfall is less than 250 mm. In the last few years, there has been a marked increase in the number of drought events in Palestine, particularly in the southern and eastern slopes of the West Bank.
Palestine has a reactive drought management policy instead of comprehensive and proactive drought risk reduction strategies. The main reasons for this are Israeli's measures who occupies the land and political situation. In addition to constraints imposed by Israelis occupation that distorts performance and hinders development planning, the lack of scientific and technical knowledge bases is another constraint to achieve comprehensive disaster risk reduction, response and recovery processes.
A comprehensive drought management strategy is needed for Palestine because drought directly impacts a great number of humans and animals and a significant portion the environment. Therefore, there is a great need to develop and implement drought management strategies and action plans in order to increase societal and environmental resiliency and enhance drought response and recovery capabilities.

BIOGRAPHIES

56. Danielle Brunton

Biography

Head of Base, Action Against Hunger
MIA (Master in International Affairs), BEng (Bachelor in Engineering), BBA (Bachelor in Business Adminstration), Danielle Brunton, has a Master of International Relations from Australian National University and a Bachelor of Mechanical Engineering from the Royal Melbourne Institute of Technology in Australia. She is the Head of Base for Action Against Hunger in Gaza and has 15 years of experience, as an engineer and manager, both in the humanitarian and private engineering sectors. Danielle has worked with ICRC, UNHCR and UNICEF and was previously involved in design and construction of water and wastewater facilities in Australia.
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Key words
Storm water, wastewater, water design and management

Authors and Corresponding
Gaza based engineering team: Adel Abu Ikmeil, Maha Ashour and Osama Dawoud

Abstract Text
(The sole source of water supply in the Gaza Strip is the underground aquifer, which must provide for the domestic, agricultural and industrial requirements of approximately 2 million residents. However, this source has deteriorated in quality and quantity due to an increase in water demand resulting from population growth; this in turn leading to depletion of the aquifer and consequential seawater intrusion. In addition, urban expansion has increased the area of impervious surfaces that has dramatically increased stormwater runoff, resulting in flooding hotspots and a reduction of aquifer groundwater recharge.

Action Against Hunger has developed a Stormwater Master plan (2017) for all governorates in the Gaza Strip, which identified the major flooding hotspots. This document has been adopted by CMWU, municipalities, the WASH cluster and OCHA in their emergency preparedness and response plans to address the risk of flooding. Action Against Hunger and UNICEF have been involved in the upgrade of stormwater drainage systems designed to strengthen management capacities of public institutions to address the long-term impact of stormwater flooding, and the contamination and depletion of the aquifer. As this paper will detail, the objectives of these stormwater construction interventions are: (i) to prevent stormwater flooding as a Disaster Risk Reduction strategy to support the Gaza Integrated Water Resource Management (IWRM) plan; (ii) improve aquifer quality and quantity by rainwater infiltration to the aquifer; (iii) reduce stress on the aquifer by promoting rainwater harvesting techniques as a substitute for groundwater; (iv) protect vulnerable groups from the risk of flooding in hotspots of the Gaza Strip by construction of stormwater drainage trunk lines; and (v) support public institutions in stormwater management by rainwater harvesting from urban building roofs, with captured water diverted to the aquifer.

BIOGRAPHIES

57. Dr. Mushtaque Ahmed

Biography

Mushtaque Ahmed, has a Ph.D., is the Associate Professor at Sultan Qaboos University in Oman with more than 30 years experience in water resources management

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Key words
Water, Environment, Desalination, Agriculture, Clite Change, Oman

Authors and Corresponding
Mushtaque Ahmed, Ph.D.

Abstract Text
The water problems have always remained an issue of concern to the governments in arid countries especially in the GCC (Gulf Cooperation Council) countries. The reasons for water problems are mainly population growth and an increasing demand for water. The climate change will make the current situation even worse. The key IPCC predictions for the region are the high incidence of reduced flows, declines in rainfall and higher temperatures. Such predictions are based on the agreement of the vast majority of climate models. These changes will make water management even more difficult than what it is today. When renewable surface and groundwater resources are not sufficient to meet the ever-increasing demands from agricultural, industrial and domestic sectors, finding alternative water resources becomes a priority. To overcome these challenges and adapt to new climate realities, besides conservation, use of unconventional supplies should be seriously looked into. By 2025, the estimated water demand in Oman will be nearly 2,500 MCM (million cubic meters) from current demand of 1,700 MCM. Oman is marked with extremely high summer temperatures, low intensity of rainfall, and declining groundwater table levels due to over pumping and obviously high evapotranspiration rates. Groundwater in Oman is over-used and, therefore, continuous abstraction is lowering water table depth and in some cases deteriorates water quality due to seawater intrusion. There are encouraging examples from the GCC countries especially in Oman that if implemented widely will make the water sector more environmentally sustainable and the region more water secure. Use of renewable energy in the desalination industry, wide use of treated wastewater and greywater, adoption of low cost wastewater technologies, managed aquifer recharge with treated wastewater, biosaline agriculture, water conservation at domestic level will lead to significantly better management of water sector. Lessons learnt in Oman have the potential to be applied in similar environment in other parts of the world.

BIOGRAPHIES

58. Amin Nawahda

Biography

Amin Nawahda, has a PhD in Civil Engineering, serves as an Asst. Prof. at Faculty of Engineering in Palestine Technical University- Kadoori in Palestine,
he is experienced in; Environ. Pollution, Risk Assessment, Environ. Modelling and Monitoring, Data Mining, GIS, and Hydrology.
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Key words
Resilience, SDGs, climate change, sustainable development

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Amin Nawahda* & Samar Shanti

Abstract Text
The Middle East, as many regions in the world, is expected to be susceptible to a number of environmental pollution risks and highly vulnerable to the adverse impacts of climate change. Thus; to protect the communities and ecosystems climate change adaptation measures have been viewed increasingly. These measures are based on multidisciplinary approaches and tools to enhance the resilience of economy and infrastructure, and to promote doable alternatives; e.g. the National Adaptation Plans (NAPs). Because Resilience and climate adaptation measures can yield positive co-benefits for sustainable development, the aim of this paper is to shed the light on the following measures; fuel decarbonization, sustainable consumption and production, protecting the ecosystems, reducing pollution, sound waste management, and scientific research.

59. Kamal El Mouquaddam

Biography

Kamal El Mouquaddam is an engineer degree in hydrogeology from school Mohammadia of engineers. The general secretary at hydraulic basin agency of guir ziz rheris in morocco.
Hydrogeologist engineer from 1989 to 1995; Head of Hydrogeology Department; Head of Water Resources Development; Division Secretary General of Guir Ziz Rheris Watershed Agency
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Abstract Text

Drought is a structural characteristic that governs the Moroccan climate, its impacts on the population and the living environment become more and more constraining with regard to the economic activity of the area.

In its most obvious manifestation of water scarcity, drought affects citizens in their daily lives. It also affects the region studied in its economy and sometimes, durably in its development.

This growing impact requires that drought be considered as a phenomenon that needs to be explained, known, and that when it intervenes, manage with the necessary efficiency and take the necessary measures in advance to mitigate its impact

BIOGRAPHIES

60. Hala Barhumi

Biography

Hala Barhumi has MSc. in Water and Environmental Engineering Director of Specification and Standard Department at Palestinian Water Authority in Palestine has experience in:
Developing the water sector project's design criteria.
Developing the water sector project's technical specification.
Follow-up the technical development in the water and wastewater sectors.
Working with the Palestinian standard institute to prepare the specifications for water products.
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Key words
IWRM, DSS, MYWAS, supply and demand management,

Authors and Corresponding
R. Al Sa'ed1, H. Barhumi2

Abstract Text
The shortage of water resources in Palestine in addition to the political situation makes the efficient and sustainable water resources management very difficult and faces many challenges to fill the gap between demand and the existing and available supply. This thesis focuses on developing a model using the MyWAS/WEAP tool which is an optimizing tool designed specifically for Palestine, Jordan and Israel. This model is a powerful and innovative tool that enables the cost- benefit analysis and can be used as a DSS to guide decision makers at all levels of water management. The Tulkarm governorate was divided into four clusters (Al Kafriyyat, Deir Al Ghusun, Tulkarm, and Anabta) and the needed data to build the current account model were collected and analyzed. Three proposed future scenarios were suggested: Status Quo scenario, Full Application of the Oslo Agreement scenario, and Water Spring scenario.
Under each scenario of the above, a set of management options were suggested, such as development of new renewable water resources, wastewater reuse, rainwater harvesting, water import from Mekorot, and demand management. In the Status Quo scenario, the current conditions in Tulkarm governorate is not feasible to continue as it is. The average shadow values for each cluster in the governorate decreased to reasonable values after applying the management options. Under the Water Spring scenario, the shadow values are accepted and feasible. The average shadow value for domestic is 5 NIS and for the agriculture is 3.25 NIS.

Based on the three scenarios, the wastewater reuse is a necessary management option in Tulkarm governorate. Also, the rainwater harvesting is a preferable management option as it has a very low operation and maintenance cost. A leak reduction program should be adapted as soon as possible from the Tulkarm Municipality to reduce the water loss in the governorate.

BIOGRAPHIES

61. Mohammad Said Al Hmaidi

Biography

Mohammad Said Al Hmaidi, has a Master's Degree in Water and Waste Engineering from the University of Loughborough, UK is the Chief Executive Officer (CEO) of the Water Sector Regulatory Council in Palestine with more than 30 years of experience in water and sanitation, development and education.
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Key words
Tariff, financial sustainability, KPIs, connection fee,

Authors and Corresponding
WSRC

Abstract Text
Based on the WSRC mandate as stipulated in law No. 14 for the year 2014 regarding water, the council has completed the 2014, 2015 and 2016 Performance Reports coupled with time based comparative reports for 2014/2015 and 2015/2016 respectively. These reports were based on a set of key performance indicators selected and used by the council and were published within an indicators index manual to be used by service providers.

The 2016 performance report issued in 2017 has covered 64 water and wastewater service providers in the West Bank and the Gaza strip; 22 key performance indicators were used in addition to 9 sub indicators covering the technical, financial and quality issues. In addition, indicator on staff efficiency and gender are included.

A quick overview of the 2016 data shows a regression in the level of performance in several indicators, particularly those related to quality of water. This includes the percentage of samples covering chlorine and bacterial as well as nitrate contamination or number of samples generally taken to be tested.

A decline in the percentage of collection of water fees for a large percentage of service providers was noted, this will inevitably have a negative impact on the overall performance and increase the burden of debt whether for the WBWD or others, and the decline in the follow up on the maintenance of water systems or the capacity to develop and improve performance in general.

The noticeable decline was in the increase in water losses which we noted for most of the service providers. The number of those who managed to decrease water losses in the northern governorates are nine service providers only.

The cost of energy and staff per cubic meter of water is still on a rise for several service providers. This is one of the direct reasons behind the increase of the total cost per cubic meter of water, and necessitates an immediate audit of the power/electricity systems and a quick review of the employment policy of service providers .

At the same time and in 2017, the council has completed the Wastewater National Survey leading to a performance report based on a set of performance indicators developed by WSRC in line with IWA international indicators. This report has also covered a number of key performance indicators including technical, financial, environmental and quality indicators.

The specific objectives of the survey were to conduct a baseline survey on the existing wastewater and desalination systems and operations in Palestine and to develop monitoring indicators, tools and procedures for wastewater and desalination in Palestine.

62. Ali Al Shueili

Biography

Dr. Ali Abdullah Al Shueili has a Ph.D. in Financial Sustainability of Water Sector in the Sultanate of Oman from Loughborough University, Loughborough, UK, Currently; he is working as Senior Manager Project Execution at Public Authority of Electricity and Water (PAEW), Muscat, Sultanate of Oman.

He was working in water sector since 1997 as Maintenance Engineer and then moved in 1998 to Distribution Engineer. In 2003, he was promoted to be a Maintenance Director for water facilities up to 2007.
From 2007 up to 2011, he was working as Assistant Director General of Projects and then as Project Advisor up to 2015. He did his PhD from 2011 up to end of 2014. In 2015, he was assigned as a Senior Manager (Current Position.
Dr. Al Shueili has over 20 years of experience in water sector business including operation, maintenance, customer services, planning and projects
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Key words
Customer role, Customer participation, Involvement, Financial sustainability

Authors and Corresponding
Ali Al Shueili

Abstract Text
The customer is the target of any successful organizations looking for financial and service provision sustainability. Therefore, the organizations should consider and enable their customers to play effective roles in order to achieve the business objectives. Customer involvement has long been considered important for successful product and service development.

Customer involvement in water management is cited to ensure greater effectiveness and sustainability of service provision and contribute to the good governance of water at local level. Water utilities normally adopt the customer involvement approach to achieve a more favorable cost/time product development curve and to reduce the uncertainty that usually surrounds the service development process.

Customer participation, which will be presented, in a form of his cooperation to inform the call center for any leakage or defects have seen or observed in the water network including pipelines, pumping station, reservoirs, well field and their accessories such as fire hydrant, air and boundary valves, electrical and mechanical items with water conservation roles. These roles are one of the key roles to increase the chance of financial sustainability and water service continuity.

The present research work develop new ideas on how the customers could participate in increasing the chance of financial sustainability and water service continuity in the Sultanate of Oman. To achieve this objective, quantitative fieldwork was carried out with the PAEW customers in Welayat Seeb in Muscat Governorate. The questionnaire survey was distributed to get customer feedback about their participation to increase the chance of financial sustainability and service continuity through the roles that can played.

The research concludes that the PAEW customers can play big roles to increase the chance of financial sustainability and water service continuity.

63. Reem Abu Shomar

Biography

Reem Abu Shomar has a master degree in public health from AL Quds University. She is currently working as a public health and environmental specialist at the program coordination unit/Palestinian Water Authority. Her working experience involved national and international organization.
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Key words
Water Safety, Water Quality, Public health, Gaza Strip

Authors and Corresponding
Reem Abu Shomar

Abstract Text
The main water resource, the groundwater, in the Gaza Strip is facing a serious challenge in terms of quantity and quality posing significant health threats on Gaza population. Although, the vast majority of the households in the Gaza Strip are connected to the public water networks, the provided water quality is not fit for human use. Access to safe water is a basic human right and considered fundamental to human development and well being.

Based on analysis of desk and field studies, the status of water safety for the water resources, piped water, and desalinated water used for drinking will be described. The existing roles and responsibilities concerning water quality & public health monitoring will be discussed and the existing gaps in capacities will be documented. In addition, the study will shed the light on the existing gaps in the legal framework and highlight the challenges and opportunities for managing water safety in the southern governorates.

The study will provide solid recommendations to improve water safety management and to mitigate the associated risks. It could give a helpful insight to design evidence-based interventions that contribute in maximizing safety and minimizing the public health risks.

64. Gul Ozerol

Biography

Gül Özerol holds a PhD in Innovation and Governance for Sustainable Development from the University of Twente, an MSc degree in Integrated Assessment from the University of Osnabrück, Germany, and BSc and MSc degrees in Industrial Engineering from the Middle East Technical University, Turkey. Her main research expertise is in actor-based and institutional policy analysis, focusing on politics, power and participation. She is keen to improve the scientific and practical foundations of the political, institutional and behavioural dimensions of sustainability through transdisciplinary research on water, energy and land resources. She has been participating in and managing research, training and consultancy projects in Europe, North America, Middle East and North Africa, and acquired local experience in the Netherlands, Turkey, Palestine and the United States. Currently, she is the country coordinator of the Palestinian-Dutch Academic Cooperation Programme on Water (PADUCO), the governance team lead of the CATCH project on urban climate resilience in the North Sea Region, and the editor of Fanack Water, an online media platform on water in the Middle East and North Africa

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Gul Ozerol

Key words

water sector; capacity building; development cooperation; transdisciplinarity; Palestine; Netherlands

Abstract Text

Development cooperation in the water sector often aims to build institutional capacity in a target country and engages various stakeholders from private, public and academic institutions. Dutch development cooperation policy particularly emphasizes the implementation of projects that involve both academic and non-academic partners in water-related projects. Transdisciplinary research methodologies offer a promising approach to improve the effectiveness of such development cooperation projects and programmes through bringing together the scientific as well as policy- and practice-oriented perspectives from academia, policymakers and practitioners. The Palestinian-Dutch Academic Cooperation Program on Water (PADUCO) is a long-term partnership that aims to improve the capacity of the Palestinian higher education and water sectors. Within the scope of PADUCO, the major component is constituted by applied research projects. These projects are of transdisciplinary nature, starting with the priorities of the key policy makers in the water sector and implemented by Palestinian and Dutch universities, through engaging the relevant ministries, non-governmental organizations and private companies. This paper assesses the degree to which research projects within the first phase of PADUCO (2013–2016) have implemented a transdisciplinary approach. The results are based on a survey of researchers involved in PADUCO projects, and the review of project documents.

65. Issam Nofal

Biography

Eng. Issam Nofal is the Director General of Agricultural Water & Irrigation in the Ministry of Agriculture MoA I Palestine (http://www.moa.pna.ps), working at MoA since 1995. Eng. Issam finishes his BSc. In Middle East Technical University METU, Turkey. Eng and his MSc. in IHE-Delft, The Netherlands. Nofal interests are focused in the field of agriculture water management, irrigation and in the water sector I general specially the integrated water resources management (IWRM).

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Key words

Jericho, date palm, agriculture and water

Authors and Corresponding

Issam Nofal

Abstract Text

The Palestinian farmer in Jericho began to cultivate palm trees, which is considered a successful economic cultivation, and suitable for the Jericho and the Jordan Valley environment, where the weather is relatively warm and dry. The trend of planting dates was initially supported by the Ministry of Agriculture MoA. The palm tree is a tolerant tree for brackish water and salinity of the soil where they are prevailing in Jericho area. MoA has incentivized the date cultivation by providing farmers with specific numbers of seedlings, indeed, MoA tried to direct some of the donor financial support to the palm sector. The economic return from palm cultivation, specially Madjoul variety attract farmers for date palm cultivation in Jericho and the Jordan Valley which is actually done separately and uncoordinated with the MoA, and in uncalculated manner, indeed, on the water expense.

The number of palm trees planted in Jericho between 2010-2016 has increased fivefold, in 2010 it was about 1600 dunums and increased to about 9300 dunums according to the statistics of MoA in 2016, but the rate of increase has decreased to 5% in the last two years. The water available for palm irrigation in Jericho, these figures confirm the fact of the informal expansion of farmers in palm cultivation. The need for one dunum of water for irrigation water is 1200-1400 m3, i.e., the need for cultivated area according to the statistics of 2017 in Jericho exceeds 12 million cubic meters per year, which is estimated at about 70% of irrigation water (estimated at 18 million cubic meters per year).

Water is the main problem facing palm cultivation in Jericho. As a result, water is the biggest challenge for this sector. There is a significant shortage of water year after year as a result of over-pumping by farmers from the surface aquifer available to them and the depletion of this basin through drilling wells under the pressure of the need for irrigation water, in addition to obstructing any development of water resources by the Israeli Occupation Authorities and controlling them for the benefit of the settlers and their cultivation. As a result, palm growing in Jericho is facing a severe short-term crisis in securing the quantities of water needed for existing agriculture, knowing that what is used for irrigation is twice the quantity estimated by the Palestinian Water Authority, which could be reflected negatively on this sector in it and threatening the large investments spend in palm cultivation.

In order to face this bitter reality, there are some short- and medium-term solutions and options that are based on the integrated management of existing and potential water resources, whether traditional sources of groundwater (wells and springs) and non-conventional water harvesting and treated wastewater. The long run, which clashes with the occupation, especially the use of Fashkha springs water and access to the waters of the Jordan River.

In this situation, it is necessary to take some measures and procedures by the relevant government bodies, civil society and farmers to reduce the depletion of the aquifer, as well as to regulate the expansion of cultivation palm in a manner that ensures its cultivation in areas with adequate water resources and to implement procedures regulating the sources of water supply through integrated management manner.

66. Prof. Mohamed Ftouhi

Biography

Prof Mohamed Ftouhi, PhD Geography & Environmental Education
Professor in Mohamed V University Rabat – Morocco for more than 30 years
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Key words
Morocco, water challenges, water governance, watershed agencies

Authors and Corresponding
Prof Mohamed Ftouhi
President of the Moroccan Club for Environment & Development & RAED Deputy Coordinator

Abstract Text
The paper tries to highlight the following points:
1. A general overview of water resources in Morocco –
2. The major challenges facing the water sector in the country
3. The institutional aspects of water governance with a focus on the national water strategy and its link to the national strategy for sustainable development
4. The national water action plan and the relevant sectoral programs
5. The evolution of the legislative framework relating to water in Morocco
6. finally the strong and the weaknesses of the water governance in Morocco

BIOGRAPHIES

67. Yaser S. Kishawi

Biography

Mr. Yaser Kishawi, has MSc in Environmental Engineering (Water Recourses Management) since 2011. He is working as the Environmental Monitoring and Compliance Specialist for PMU-PWA in Palestine. He has experience in GW modelling, environmental monitoring and evaluation in the water sector with nearly 10 years of experience in the field.

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Key words
DRASTIC, Recharge Factor, ArcSWAT, GIS

Yaser Kishawi*1, Ziyad Abunada2, & Tamer M. Alslaibi3,4

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4 Civil Engineering Department, Palestine University, Gaza Strip, Palestine

Abstract Text
The robustness of groundwater vulnerability assessment using the conventional DRASTIC model is highly dependent on the quality of the input data. The current research aims at examining the improvement of the Aquifer Recharge Factor (R) factor by utilizing and incorporating both SWAT model and GIS techniques. Two approaches were used to compare the use of conventional recharge map versus a SWAT-based recharge map in the DRASTIC model as to account for the level of aquifer vulnerability. To prepare a more accurate recharge map, ArcSWAT was used through utilizing four main parameter (Land Use, Soil Cover including vegetation, Slope of surface and Weather). The remaining DRASTIC factor was prepared based on conventional method with reliable data and two final DRASTIC outputs were developed. The results indicated that the newly developed approach using SWAT model for recharging map has resulted in a better resolution of DRASTIC vulnerability classes where the resolution was enhanced by 54%. In order to verify the results, the Nitrate map for the area was used in the model revealed a correlation of 90% match between the high vulnerable areas with high nitrate concentration. Moreover, the new approach resulted in a better understanding of the aquifer protection where proper allocation of the artificial recharging ponds was determined using the new technique.

BIOGRAPHIES

68. Majed Abu Sharkh

Biography

Dr. Majed Subhi Abusharkh has a Ph.D. in Water Resources and Hydraulics from Indian Institute of Technology (IIT), Roorkee, India, Currently; he is working as Hydraulic Expert at Public Authority of Electricity and Water (PAEW), Muscat, Sultanate of Oman.

He was working as Associate professor in Civil and Environmental Engineering Department at College of Engineering and Architecture, University of Nizwa, Nizwa, Sultanate of Oman.
From 1991 up to 2010, he was working as Assistant and then as Associate Professor at the College of Engineering and Technology in Palestine Polytechnic University (PPU), Hebron-West Bank, Palestine.
Dr. Abu Sharkh has over 27 years of experience in water resources and hydraulic engineering, teaching, research and consulting.
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Key words
Resilience, Risk, Risk assessment, Risk management, Likelihood, Desalination plant, Consequence, Water Supply, CRA.

Authors and Corresponding
Majed Abusharkh and Kassim Al Jabri

Abstract Text
All water systems are exposed to a range of threats and hazards due to both natural and man-made hazards. In the Middle East, the principal threats concern the lack of water in desert countries and the problems associated with supplying water principally from desalting sea water. The research reported in this paper developed an integrated approach to identifying and ranking the risks to the water sources, transmission pipelines and distribution networks in Oman with appropriate mitigation measures. The system resilience was evaluated.

The methodology involved mining the data held by the water supply utility for risk and resilience determination and operational data to support calculations of Non-Revenue Water (NRW). Risk factors were identified, ranked and scored at a stakeholder workshop and the operational information required was principally gathered from interviews. The most severe risks to transmission mains were found to be associated with pipe rather than pump failure. The systems in Oman were found to be moderately resilient, the resilience of desalination plants reasonably high but the transmission mains and pumping stations are very vulnerable.

The integrated strategy developed in this study has a wide applicability, particularly in the Gulf area, which may have risks from exceptional events and will be experiencing NRW. Other developing countries may also experience such risks but with different magnitude and the risk evaluation tables could provide a useful format for further work.

BIOGRAPHIES

69. Dr. Tahseen Sayara

Biography

Dr.Sayara is an associate professor of Environmental Science and Engineering at Palestine Technical University-Kadoorie(PTUK). He received a B.S degree in Civil Engineering from Birziet University in Palestine, and M.S and Ph.D degrees in Environmental Science and Technology from Universitat Autònoma de Barcelona, Barcelona, Spain. His principal research and teaching interests are in the areas of soil remediation, solid waste treatment and management, wastewater treatment and reuse and air quality monitoring. He has many research articles published in peer-reviewed journals and international conferences. He is currently works as the dean of Faculty of agricultural sciences and technology at PTUK

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Key words

Algae, nutrients removal, photo-activated sludge system

Authors and Corresponding

Tahseen Sayara*, Saed Khayat, Muhmmad Slamh, Peter van der Steen, Jack van de Vossenberg

Abstract Text

In conventional activated sludge systems a major part of the energy costs is because of the need for extensive aeration, especially if nitrogen removal by nitrification-denitrification is required. In a photo-activated sludge system the mechanical aeration is replaced by algae photosynthesis. Gentle mixing to keep the algal–bacterial biomass in suspension is sufficient and much less energy demanding. The combined biomass of algae and nitrifying bacteria removes ammonium by algal uptake and via ammonium oxidation, which uses the oxygen produced by the algae. At laboratory scale this process was found to be a stable process, in which nitrification, denitrification and even anaerobic ammonium oxidation (anammox) is possible. The calculated energy consumption is up to 30 times less than in a conventional activated sludge system. Therefore the technology is now being tested at pilot scale. The reactor consist of two layers. The top layer is 30 cm deep and is equipped with a propeller mixer, which is used to keep the biomass in suspension and ensure the frequent exposure of the algae to sunlight in the top layer. The reactor is operated as a sequencing batch reactor (SBR). The bottom layer is a 20 cm layer of gravel or other support media to allow the growth of a biofilm. The SBR will be operated such that ammonium will be oxidised to nitrite (partial nitrification) and not to nitrate. Therefore a mixture of ammonium and nitrite will be present in the top layer and will be transported by turbulence and diffusion into the gravel layer. The gravel layer will be inoculated with anammox biomass, which was shown (at lab scale) to be able to quickly remove the mixture of ammonium and nitrite, under anaerobic conditions. As a result the photo-activated sludge process is able to remove nitrogen at a much smaller area (footprint) than for waste stabilisation ponds and with much lower energy consumption that regular activated sludge.

BIOGRAPHIES

70. Dr. Adel Abdulrasheed Ghulam

Biography

Adel Ghulam has a PhD degree in Environmental planning (2008) from University of Algeria. He is a Environmental Adviser at Environment Protection Authority in Yemen. He is also a contributor as a volunteer expert at Department of Sustainable Development and International Cooperation Department – LAS.
Email : adeladen@yahoo.com Biography

Key words
The Sustainable Development Goals (SDGs), (SDG–6) - Arab Water Security- Arab Cooperation

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Adel Ghulam

Abstract Text
The field of cooperation has been given considerable attention in the plan adopted by the United Nations in 2015 entitled " Transforming our world: the 2030 Agenda for Sustainable Development ", which contained a set of global sustainable development goals and targets to be achieved by 2030. As an example, the preamble to the Plan mentioned that all countries and stakeholders will implement this plan in a cooperative partnership framework. As also stated that it will be to mobilize the means required to implement this Agenda through a revitalized Global Partnership for Sustainable Development, based on a spirit of strengthened global solidarity.
In this context, this paper deals with the cooperation and partnership among the Arab countries in the field of achieving the sixth goal of sustainable development 2030. The paper aims to identify ways of enabling and enhancing such cooperation and how to implement it, Through use of The SWOT analysis methodology.

71. Philippe Goral

Biography

After Engineer Diploma (MSc) in Civil Engineering and Urbanism from INSA (National Institute of Applied Sciences) - Toulouse and Post Graduating in Structural Engineering from CHEC (Center of High Studies in Construction) - Paris and in Urban planning from MAXPU (Institute of Architecture and Urbanism) - Moscow, Philippe has worked for 35 years in consulting companies in Infrastructures, water and environment sector. He has developed activities in Europe, Middle East, Asia, North Africa, and Austral Africa

COMPANY PROFILE

Established in 1955 with its head office in Nîmes France, BRL group was created to promote the socio-economic development of the Languedoc Roussillon Region in Southern France. To do so, it has developed a large and complex system of large water infrastructures to bring water resources to the Languedoc-Roussillon region. It has also, and still does, provide technical support to the regional stakeholders (Regional authorities, farmers associations,…) for water infrastructure operation and development (financial & technical studies) and agriculture development (agriculture extension, capacity building, institutional advice,…).

Today, BRL still owns, manages and operates under a concession contract these hydraulic infrastructures consisting of 11 dams, 6 water treatment plants, 125 pumping stations, 8000 km of buried pipes, and a 105 km of canals (Asset around 2 billion Euros).

Thru these infrastructures, BRL distributes 130 millions m3 of water per year for agriculture (140,000 ha of irrigated land), domestic (1.000.000 inhabitants) and industrial use.

BRLingénierie, subsidiary of BRL Group is one of the leading international consulting firms in the water and environment sector. BRLi has references in more than 80 countries with projects financed by multilateral funding agencies or Governments. His permanent staff is around 190 people. BRLi engineering and consultancy activities consist of two main sectors:

- Water engineering: Water resources management- Drinking water supply and sanitation- Mobilisation and protection of water resource- Irrigation projects – navigation and ports infrastructures - Natural risks management, Flood, Drought, Early Warning System.
- Land development: Environmental protection - Rural areas and forestry- Development of river basins - Agriculture - Parks and gardens – Coastal areas management – Aquaculture and Fisheries - Biodiversity management – Natural Resources management and sustainable development – Protected Natural Areas.

Key Words
Integrated Water Resources Management, Assistance to Decision Makers, WIMES, Maintenance & Operation, Tariff, feasibility, Design, Supervision,
Reuse of Treated Wastewater in Agriculture, Flood & Drought

Abstract Text
WIMES Hypervision System, Tool to centralize informations of the Water System for Water Management (resources, reservoirs, plants and networks monitoring, Climate and Hydrometeorology, risks of flood & drought,…) Maintenance & Operation management and Assistance to Decisions Makers, experience of BRL operator of the Occitanie Regional Hydraulic System in France

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72. Clemens Messerschmid

Biography

Clemens Messerschmid senior hydrogeologist, (M.Sc. Germany), lives and works since over 20 years in Palestine (Ramallah), active in the water sector (donor-funded projects, senior advisor, freelance consultant, local governmental institutions and NGOs)
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Keywords
Water Malaise, Gaza, Practical Solutions

Authors and Corresponding
Clemens Messerschmid

Abstract Text
This paper deals with the ostensibly, almost intractable water malaise of Gaza. The paper starts witch charting the hydrological and hydro-political setting and deeper root causes of the catastrophic situation, confined and isolated Gazans face today.
The second part of the analysis etches out the historic development and main hydro-political interests Zionism has held and applied to the battered strip; can we formulate a main Zionist approach to Gaza and water in Gaza and can this inform our strategic longterm and practical short-term planning for the coastal water emergency today?
Thirdly the paper focuses on the current promise to address the water shortage (and salinity) problems, i.e. grand desalination schemes as main donor-funded projects and ask the question: What is practically achievable, to what extent can desalination get rid of the main and urgent water pains, Gazans are forced to suffer? This will be a critical assessment of the practical as well as conceptional shortcomings of the current approach.
Finally and last, but not least, the paper presents a simple, practical but far-reaching proposal for sustainable water supply, as a short-term answer to the emergency but also under consideration of the question of historic Palestinian water rights.

73. Rehab Thaher

Biography

Name: Rehab Azmi Thaher,
Education: MS.c. of Water and Environmental Engineering, Birzeit University, Ramallah, Palestine. & Civil Engineer, Birzeit University
Job: Director , Planning Department , Palestinian Water Authority, Ramallah, Palestine

Experience January 2016 till now: Palestinian Water Authority, Director at General Directorate of Water and Wastewater Planning, my job includes follow up of SDG indicators, preparation of tender document, specification, term of reference of water and wastewater projects, follow up projects, I am also involving in preparation of sector strategies and action plans. Follow up of submitted projects from local authorities according to giving priorities.

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Key words
Sustainable, Achievements, Challenges, Goals

Authors and Corresponding
Rehab Azmi Thaher, Palestinian Water authority

Abstract Text
Palestine since 2016 started adapting the 2030 Agenda in line with national specificities and priorities in partnership with all stakeholders. It was dedicated for 2018 theme: Transformation towards sustainable and resilient societies of goals 6,7,11,12,15.

Palestine was involved and prepared a voluntary national review (VNR) of progress in implementing the 2030 Agenda and achieving its 17 goals in cooperation with all key stakeholders.

Palestinian Water Authority started the calculation related indicators on SDG 6 for those indicators which are applicable for Palestinian case (6.1.and 6.2 targets). Other indicators are not possible to be calculated according to definition and methodology of related metadata of each indicator.

There is an example of direct implication on Israeli Occupation on that. Challenges affecting the water sector and hindering progress towards achieving the SDG 6 are mainly referring to: Major political challenges in the water and sanitation sector, which limit the long-term planning, Rural water and sanitation sub-sectors lack adequate management systems, Availability of Fund, Affordability.

Needs to SDGs:

- Financial gaps and allocation of fund
- Access to resources (UN resolution regarding natural resources under occupation)
- Sharing Arab expertise and regional experience
- Elaboration and clarification of indicator methodologies, especially shared water resources. Reaffirm the need for more coordination on applying shared water resources arrangement
- Capacity building to enable adequate monitoring of the implementation of SDGs and benefiting from existing experience in the region
- Capacity building is highly needed in Applying of Water Accounting System

BIOGRAPHIES

74. Dr. Ahmed El-Zayat

Biography

Dr. Ahmed ElZayat has PhD in Civil Engineering from Cairo University, Egypt Co-Referee Ruhr University, Bochum, Germany) and is working as an assistant professor at Delta University for Science & Technology – Faculty of Engineering – Egypt. He have 30 years of experience in R & D of Water & Wastewater Treatment. He have membership in Professional Societies and he published 15 paper in international journals.

Email : ahmed_el_zayat@yahoo.com Biography

Key words
Non-Revenue Water, Un-accounted For Water, Real Losses, DMA

Authors and Corresponding
Dr. Ahmed El-Zayat

Abstract Text
Substantial savings can be achieved and requirement of extension water supply facilities can be avoided or minimised by reducing Unaccounted-For Water “UFW” (specifically leakage detection and control). By reducing UFW water agency will be in better financial situation and will be stronger position to achieve its financial self-sufficiency and long term sustainability. A low rate of UFW is one of the best overall indicators that a water utility is successful. The main purpose of this study is to gain a better understanding of the practical processes involved in using hydraulic models in a dynamic way for the purposes of localizing bursts for detection teams to target. In addition, the study identified potentially closed valves and investigated the optimum number of pressure loggers required. This study done by using Darwin Calibrator functionality within Bentely System – WaterGEMS. Darwin Calibrator is an optimization module that uses genetic algorithms to calibrate hydraulic models of water distribution networks. One of the operations available in this module is ‘Detect Leakage Node, which enables pinpointing of potential leak locations. With each District Metered Area “DMA” analyzed, the approach became more structured and adjustments were made to the leak analysis process. The robustness of the solutions obtained is highly dependent on the best possible definition of the network configuration (valve status) and its physical condition (i.e. pipe roughness). A refined approach to the night time demand allocation can also have a significant impact on the accuracy of the results.

- Found successful in locating ‘hard to find’ leaks on ‘stubborn’ DMAs.
- Significant benefits to the location of unknown closed valves

75. Hatem T. S. Abu Eltayef

Biography

Hatem Abu Eltayef is my name, Director of Water and Wastewater Department at Khan Younis Municipality, In addition the Regional Office Manager of Khan Younis Area at Costal Municipalities Water Utility (CMWU).
I had a B.Sc. in Architectural Engineering from IUG, Palestine. Post diploma in Urban Environmental Management UEM from IHS, the Netherlands. Post graduate diploma in GIS from Atrois University, France, and M.Sc. in Environmental Management and Control from IUG, Palestine.
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Key words
NRW, Water reduction, Khan Younis

Authors and Corresponding
Hatem AbuEltayef.

Abstract Text
Non-Revenue Water(NRW) is a well-known global problem that resulted in large volumes of water being lost ranging from 30-35% at the global level, which is a real challenge facing most of the water utilities. More than 32 billion cubic meters of water are lost annually, the estimated annual cost is 14 billion USD globally. According to Wyatt (2010) efforts toward conservation and NRW reduction can provide water about one-half to one-third of the cost of water production.

The Palestinian Water Authority (PWA) NRW reduction strategy considered its programs costly. The annual losses of NRW in Palestine are estimated at 160 million shekels, enough to build 38 water reservoirs with 5000 cubic meters per year or replacing 3000 kilometers of 4-inch water networks pipes in the Gaza Strip.

Water Sector Regulatory Council (WSRC) stated in its report “The Performance of Water Service Providers for the years 2015-2016” that the amount of NRW was 58 million cubic meters, with total loss of 33.6%, representing 10.7% for real losses, 18.6% for commercial losses and 4.3% for the authorized unbilled.

In Khan Younis, the percentage of NRW for the years 2015,2016 was 33.19% ,32.14%, respectively. The estimated quantities of NRW were 2.81,2.88 million cubic meters, with estimated cost of 4.8,4.9 million NIS, respectively. Hence, the importance of the implemented procedures for the years 2015,2016 had appositive intervention, and water efficiency has been increased by 4.6%.

The objectives of this study to present Khan Younis Municipality NRW management plan of 2017, to determine and quantify real and commercial losses volume, provide a set of practical recommendations that help water service providers to improve their NRW performance.
The adopted methodology based mainly on descriptive approach through obtaining historical data and analyzing it after the implementation of the intervention plan, which mainly targeted authorized unbilled water Khan Younis city.
Preliminary results indicated that the intervention plan resulted in adding 609,496 cubic meters of water to the collection bill. This amount of water contributed to an overall efficiency increase by 7.08%. Where the yearly increase represented by 3.67%.

The study recommends water service providers to focus on the commercial losses because it requires research and analysis effort and its financial cost is affordable. In addition, to meter all municipal and governmental services and install water meters and finally to install administrative meters - services meters- for occupied housing projects in order to be capable to control and verify its consumption.

76. Eng. Hamza Halaibeh

Biography

Hamza holds a bachelor degree in Civil/Surveying and Geomatics Engineering from Jordan 2004, and a Masters degree in International Cooperation and Development from Palestine 2013. He has fourteen years of experience in GIS analysis and applications, Geo-politics, Urban/Spatial Planning, Surveying, Water and Wastewater Management, Development Studies and Applied Research. He worked for two years with the Greater Amman Municipality in Jordan, and twelve years in Palestine with the private sector and NGO's on development and humanitarian projects. Recently, he worked in water management field with Bethlehem Water Authority in the Planning & Projects Department. He worked for many years on Monitoring Israeli Colonization Activities in the oPt by research, mapping, spatial analysis and cartography. He conducted many training courses in GIS for engineers from Palestinian Ministries, Municipalities, Local and International organizations and Engineers Association. He participated in international conferences and workshops in the fields of Urban Planning and GIS and he has some published studies and papers. He likes reading, travelling, football, ping-pong, cycling, swimming and running.

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Key words
GIS, Non-Revenue Water, Water Management

Authors and Corresponding
Hamza Halaybeh

Abstract Text
This study discusses the experience of Bethlehem Water Authority (WSSA) in using the GIS to improve the performance of water management particularly in non-revenue water. A closed distribution zone (Caritas) has been selected as a case study. Caritas is supplied from Jerusalem HaGihon Israeli Company. A field surveying and data collection for all subscribers' water meters in this zone has been carried out to analyze the technical and financial aspects. All the data has been stored in a GIS database which has been linked to the billing system and subscriber's database. The study revealed important results and shocking figures. A high percentage of non-revenue was measured. The study concluded with some recommendations to the necessary of technical interventions within the network, in addition to have administrative procedures.

BIOGRAPHIES

77. Mohammad Said Al Hmaidi

Biography

Mohammad Said Al Hmaidi, has a Master's Degree in Water and Waste Engineering from the University of Loughborough, UK is the Chief Executive Officer (CEO) of the Water Sector Regulatory Council in Palestine with more than 30 years of experience in water and sanitation, development and education.
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Key words
Tariff, financial sustainability, KPIs, connection fee,

Authors and Corresponding
WSRC

Abstract Text
In the Decree No. 14 of 2014 article No. 24, item 1 WSRC is given the mandate to approve water prices, cost of supply networks, as well as to review and monitor these costs, and in item No. 9 to ensure that the production, transport, distribution and wastewater treatment costs take into consideration the interests of all parties.

In direct response to this mandate and given the unsustainable financial situation of most of the water and wastewater SP in Palestine WSRC conducted a national review of current tariff structures, adopted cost calculation methodologies, connection fees and structures aiming at 1) reaching a tariff system that takes into consideration the interests of all parties. 2) to clarify the gap between the average sale price of one cubic meter of water compared to the operational costs (production, distribution, and management) per cubic meter of water sold.

The outcome of the survey was a database covering 14 related issues; average sale price per one cubic meter of water varies from one service provider to another due to the variation in operational costs. Nevertheless, the principles of calculating the water tariff has been unified in accordance with the water tariff system number (1) of the year 2013 to which all WSP need to comply.

Due to the great gap between the average sale price and the operational costs per cubic meter of water WSP are not able to cover their operational costs.

The survey revealed several problems ranging from incorrect calculation of costs to neglecting some of the costs.

The tariff database now covers the following areas: Water Resources, Water meters, Water supply quantities, Water reservoirs No. and Volume, Water billing system, Tariff system, Water network construction, Tariff system approvals, Water connections, Service, providers categorizations, SP indebtedness, Network Coverage.

Our proposed presentation, will cover the survey findings and the WSRC proposed interventions for the next few years.cost per cubic meter of water, and necessitates an immediate audit of the power/ electricity systems and a quick review of the employment policy of service providers .

At the same time and in 2017, the council has completed the Wastewater National Survey leading to a performance report based on a set of performance indicators developed by WSRC in line with IWA international indicators. This report has also covered a number of key performance indicators including technical, financial, environmental and quality indicators.

The specific objectives of the survey were to conduct a baseline survey on the existing wastewater and desalination systems and operations in Palestine and to develop monitoring indicators, tools and procedures for wastewater and desalination in Palestine.

78. Mohammed Shafei

Biography

Mohammed Shafei has a BSc in Electronic Engineering, and is an independent consultant working with different organizations and projects in the Middle East and Asia. His experience includes the hydraulic design, water master planning, NRW assessment and capacity building, meter technology implementation, and training.

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Key words
NRW, water loss, responsibility, auditing, assessment, planning

Authors and Corresponding
Mohammed Shafei,

Abstract Text
Achieving long-lasting impact in the war against water loss and NRW often stumbles against the challenge of succeeding in the small necessary details that need to be carried out on daily bases in each water utility. The millions spent in investment are often spent on consultants and contractors with little or no knowledge in NRW reduction good practices and best suited designs, on sometimes redundant, outdated, and over-lapping capacity building efforts for the water utility, on electronic equipment that often remain unused or quickly suffer from dysfunction without maintenance follow up, and on disconnected IT solutions that require an extra effort from the water utilities to turn their captured data from these systems into usable knowledge.

There are on the other hand many documented success stories where NRW reduction has been achieved, and moreover sustained in a systematic manner that lives beyond the departure of a venerated water loss expert or a team of champions that started the water utility on its path towards high performance. What caused this sustainability in some water utilities where others failed was the topic of research and implementation that began with the MENA NWC research project on the factors that affect NRW performance, the implementation in Lebanon through the MADAD Miyahcon project, and now in Jordan through the WMI project.

This paper presents a regional framework headed by the Arab Countries Water Utilities Association (ACWUA) that will spearhead a new framework developed by the author called RESPONSIBLE IMPACT.

The framework is based on the methodology developed through experience in the region on NRW cause diagnosis and performance improvement planning, and links water utilities, the local government, regulators, donors, and water expert with a new set of practice performance indicators (PPIs) and a system for evaluating the capacity of each water utility in terms of practice being implemented on the ground and a clear plan for improving capacity.

The framework also builds standards and procedures needed, links water utilities with expert on-the-job coaching, and helps water utilities upgrade their systems to better provide the data needed for continued analysis of technical and financial feasibility.

BIOGRAPHIES

79. Abdullah Murrar

Biography

Abdullah Murrar received Bachelor degree in Finance from
BirZeit university in year 2000. Master Degree in Business Administration from Quds University of Jerusalem in year 2013. He Joint into another master degree in year 2016 at Arab American University Jenin, with concentration I Strategic Planning Fundraising. He has experience more than 15 years in different Financial Management Areas. Supporting municipalities and water providers in Accounting, and financial Auditing, financial software implementation and integration with revenue management systems and human resources system. On the other side, preparing, setting financial procedure, training financial team, and financial planning . Further performed cost calculation of services mainly the water and wastewater for more than 40 municipalities and water regional utilities.
Email : abdullah.murrar@PalCommunitiesThrive.org

Key words
Benchmarking, Categorization, Palestinian Water Providers, Performance, Scoring

Authors and Corresponding
Abdullah Murrar

Abstract Text
The benchmarking can be developed to compare vertically and horizontally many functional areas of water service providers, such as debt collection efficiency, non-revenue water, water quality, and so forth. Benchmarking has many benefits: It encourages increasing the performance of the water providers, directing the donor agencies toward given group of water providers, allowing collecting specific data from targeted group, and overall it simplifies the monitoring of the water regulator or government entities the water providers. The purpose of this paper hence is to deliver model for categorization and benchmarking of Palestinian water service providers based on multiple performance indicators. Therefore, this paper has been prepared with considering desk reviews from regulators, water authorities, published papers, and other published reports. The desk reviews have considered Albania, Portugal, Australia, Kenyan regulators and water authorities. On the other hand, World Bank published papers, United Nation Reports, and other water research centers.

Particularly, many steps in the methodology have been constructed to come up with effective benchmarking and categorization for Palestinian water service providers, firstly: The Palestinian water providers have been categorized into broad three categories, the small which is less than 2,000 connections. However, more than 8,000 connections have been categorized as large. Wherein the medium category was ranged from 2,000 to the 8,000 connections. Secondly, many indicators have been considered to cover all the performance areas of the water providers i.e. collections efficiency of water bills, the revenue coverage ratio, water quality, costing, and so forth. Thirdly, each indicator has maximum and minimum values, therefore, resulting in overall scores for each service provider. The final results from this scoring are three categories based on the overall performance; Category A, B, and C. The strong and weak achievement compared with previous year can be calculated in terms of money value, and translated in official document from Palestinian Water Authorities or other governmental entities to each water provider. Those results can be published in official report and through electronic interactive system.

80. Armelle Bernard

Biography

Armelle BERNARD is the director for external relations and development at Eau de Paris, the public water company that supplies tap water for 3 million users daily in Paris. Graduate in human resources and administration management, Armelle has held several management positions in Parisian water related structures. Head of governance and communication of one of the 4 structures that merged to create Eau de Paris in 2009-2010, she took an active part in the prior studies and in the operational implementation of the water reform.
Email: armelle.bernard@eaudeparis.fr Biography

Key words
Governance, integrated management, transparency, sustainability

Authors and Corresponding
Armelle BERNARD

Abstract Text
In reaction to an organization that was at the same time fragmented, lacking transparency and suffering from a deficit of public control since the mid-80's, the city of Paris took the decision in 2008 to put an end to the concession contracts it had entered into with major water groups in order to create a new public operator. Eau de Paris, a 100% public body, was then put in charge of the entire water cycle, from catchment to customer service.

Water is a vital common good of humanity and, as such, should be managed according to fundamental values: performance and quality, of course, but above all transparency, responsibility and sustainability. This essential vision is at the stem of the municipality's project to create a new operator.

This reform bore the ambition to place users, citizens and, more generally, the common good of humanity at the heart of the water service.

While providing water of the highest quality at the fairest cost and guaranteeing universal access to water, exceptionally for the less well-off, Eau de Paris was thus created as a fully integrated operator: Integration of the whole water cycle, from the spring to the tap, taking into account externalities and stakeholders at the watershed level;

Integration of all the skills and competences needed internally to manage the water services efficiently and independently; Integration of many public policies connected with the water cycle and contribution to many sustainable development objectives, such as climate change adaptation and mitigation, local economic development, protection of biodiversity, circular economy, citizens participation, etc.

The absence of shareholders or short term return on capital obligation, in addition to an open governance –customer and environment associations representatives are voting members of Eau de Paris' board- allows maximum transparency and citizens control. It also paves the way for a long term vision and guarantees that present and future generations' best interests be at the core of decision-making.

Being a responsible player is also being smart and think at a global scale: in this context Eau de Paris is committed to make Paris and the surrounding area an inclusive, sustainable and resilient territory, able to mitigate climate change consequences.

This approach, which is reflected in each and every of the company's activities, is implemented through a set of transversal and coherent strategies (resource protection, biodiversity, climate and energy action plan, social development plan). Through these strategies, the initial vision to create an operator that would be more than just a provider of drinking water is implemented day by day.

While the way this concept of "integrated operator" is applied to the Parisian context is specific, the approach itself can be adapted to a variety of situations and environments and this case study could usefully contribute to the discussions at the PWF.

81. Abdelwahab Habieb

Biography

Abdelwahab Mohammed Date of birth: 1977 Education: BSc civil Engineering, MSc Integrated Water Rsources Management(IWRM). Occupation: Hydrologist, Ministry of Water Resources& Irrigation, Dams Implementation Unit, Water Harvesting Directorate.

Key words

North Darfur State, determination water harvesting suitable sites and water management by using geospatial and modeling, SCS method by WMS, Gumbel maximum daily rainfall analysis

Authors and Corresponding

Abdelwahab Habieb

Abstract Text

North Darfur State is located in arid and semi-arid regions, suffering from water shortage due to low rainfall and uneven distribution throughout the season and climate changes affects. Hence water harvesting must be practiced to conserve this vital source. Consequently, there is need for improved water resources management complemented with rain water harvesting within the catchments, which is consider as one of the most effective solutions to face water scarcity. This study sought to assess sites suitability for surface runoff harvesting using geospatial techniques and modeling (GIS and WMS) and attempts to develop a conceptualized method for water management and selecting suitable sites for developing water harvesting facilities. Digital Elevation Model (DEM) with resolution 90 m used in delineation the catchment area, determination gentle slopes, with hydrological soil groups, landuse data and settlements areas for suitable site selection by GIS. Land use and soils data were used in generating the average curve number of the catchment using WMS, which is found 70.2. The study found that the HSGs B, C and D areas occupied about 43.8 %, 48.7 %, and 7.5 % of catchment area, respectively. The total of suitable areas constitutes about 5% of the total streams catchment area. The high suitable areas constitute about 47%, the medium suitable areas is about 12% and low suitable areas about 41% of the total suitable area. Watershed Modeling System was applied to estimate the runoff volume for three categories (wet, normal and dry) for the catchment area 7,135 km , which are found 56,469,574, 19,206,936 and 6,570,493 m respectively. Four suitable sites were suggested along the valley (wadi), water allocation scenarios applied on site No 2. The harvested water is allocated between drinking water supply and agricultural purposes, the study will rise the average per-capita consumption of the National rural level to 52, 33 and 27 l/d, for North Darfur rural level to 43, 24 and 18 l/d for the three categories (wet, normal and dry) respectively and rise daily water production to 37,600 m . The water availability is estimated to be adequate to irrigate 7,635, 613 and 133 feddans at the categories (wet, normal and dry) respectively as supplementary irrigation. The study suggested some water harvesting suitable sites in wadi Elku area, the methodology is recommended for similar situation in the other parts of the country. In additional this study may help in Decision Support System (DSS).

82. Meriem Ameur

Biography

Meriem AMEUR was born in Tunisia, on January 01, 1985. She obtained her doctorate in Geology in the Research unit of Geochemistry and Environmental Geology, Faculty of Science of Tunis, University of Tunis El Manar.

She has the master degree in Hydrogeology and groundwater geochemistry at Faculty of Science of Tunis and a professional master in geomatics of engineering at the National School of engineers of Tunis. She focused in Geochemical and hydrogeological study of Sminja-Oued Rmel aquifer in Zaghouan (Northeastern, Tunisia).
She has published scientific articles in international journals such as Environmental Geochemistry and Health Journal, Desalination and Water Treatment, and Environmental Earth Sciences.
She is an member of the European Association of Geochemistry and International Association of Hydrogeologists.

Key words
Geochemistry, Fluoride, Hydrochemical facies, Health problems, Sminja aquifer, Tunisia.

Authors and Corresponding
Meriem Ameur,
Fadoua Hamzaoui– Azaza,
Moncef Gueddari

Abstract Text
Like most Mediterranean countries, Tunisia is already being affected by climate change: rising temperatures and recurrent droughts are altering the spatial and temporal distribution of rainfall and consequently of water resources.

Sminja aquifer, located in Zaghouan district in Northeastern Tunisia, has been used to meet the needs of Zaghouan agglomerations for drinking purposes and irrigation uses. On the other hand, the region has suffered from inefficient usage and mismanagement of water resource as result of appropriate legal, political, and economic frameworks take into consideration the regional vulnerability to climate change and population growth. Tunisia is like most North African countries which are characterized by a harsh arid and semi- arid climate with scarce water resources and poor water quality on most of its territory.

The main objective of the study was to evaluate the chemical quality, to identify the sources of dissolved ions of Sminja aquifer and to verify its suitability for many uses, 23 wells and boreholes were collected during the winter and summer of 2013. Chemical analyses have involved many physicochemical variables (temperature, pH, Total Dissolved Solids, Na+, Cl-, Ca2+, Mg2+, SO42- , K+, HCO3- and F-). Two types of facies predominate the water of Sminja aquifer.

The first hydrochemical facies is Na–Ca–Cl–SO4 located in the recharge zone of the aquifer. The second facies is Na–Cl corresponds to the downstream part of the Sminja aquifer (discharge area).

The results showed that the fluoride concentrations in Sminja aquifer have been constantly increased in the last decades as result of the punctual inputs related to mining discharges and diffuse inputs linked to agricultural activity in the district. The soils, the unsaturated zone, and the aquifers have gradually become charged with fluorine over time. The results also confirmed that fluoride contents in Sminja aquifer range from 5 to 25 mg/L in 2013.

These concentrations are very high and exceed allowable standards of World Health Organization (1.5 mg/L) and Tunisian National Standards NT.09.14 (1.2 mg/L). Many medical studies have proved the enormous danger of high doses of fluoride in water on human health among others dental and bone fluorosis.

83. Dr. Sami Mahmoud Hamdan

Biography

Dr. Sami Hamdan has PhD in Water Resources and Environmental Engineering from Berlin Technical University. He is working in the Palestinian Water Authority as Director of Wastewater Planning Department with an experience of 25 years

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Key Words
Public acceptance, water deficit, rainwater harvesting, water desalination

Authors and Corresponding
Dr. Sami Mahmoud Hamdan

Abstract Text
The increasing water demand and the fixed water supply in Palestine, in general and in the Gaza Strip, in particular led to depletion of the water systems in both aspects, quantitative and qualitative. The aquifer in the coastal region (Gaza Strip) suffers from high pressure by domestic and agricultural needs.

As a policy in the water resources management, other non-conventional water resources such as seawater desalination and artificial recharge of groundwater from storm water and reuse of treated wastewater are seeked. Stormwater harvesting, seawater desalination and reuse of wastewater are strategic options as non-conventional water resources.

Rainwater harvesting is still in its early stages of utilization, where only four Mm3/year is utilized from the total available quantity which is 24 Mm3/yr. According to Palestinian water strategy, most of rain will be harvested at three levels. The first one is in-situ from roofs of building which constitutes six Mm3 per year. The second level will be from road runoff through the soak away at streets. The third and last catch exceeding runoff from both roofs and roads in central basins. Combining these three non-conventional water resources together will help in bridging the gab in the water resources balance.

Without involvement of the community in all stages in the development and implementation of rainwater harvesting, it will fail. The majority of peoples in Gaza Strip are well aware of severe water problem and are willing to adopt this technique in the form of on-site rooftop rainwater infiltration around their houses. However, financial incentives are needed from the local authorities to make this option successful. The on-site rooftop rainwater infiltration system is encouraged in individual houses in urban areas where free land is available around the house.

BIOGRAPHIES

84. Musaed M. Aklan

Biography

Eng. Musaed Aklan is specialized in water engineering and management. He pursued his post graduate studies at IWRM- Germany and graduated in 2011 with MSc. degree. Directly after MSc graduation, Aklan manged and coordinate two donor-funded development projects (KFW, UN) just before he joined UN-IHE Delft, Netherlands as a PhD research fellow in Water Science and Engineering Department, where he was nominated as a member of PhD Association Board (PAB) in 2015. Mr. Aklan has more than 10 years of experience in water field. He has worked in various projects with several government institutions, universities, local communities and international donors including KFW, World Bank, GIZ, ESCWA-BGR, USAID and WHO. Email: musaedaklan@gmail.com

Key words

Renewable resources, Water harvesting, drought, Indigenous Knowledge

Authors and Corresponding

Musaed Aklan UN-IHE Delft
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Abstract Text

It is believed that the water scarcity problems in arid countries led previous generations to develop and employ a great variety of indigenous Water Harvesting (WH) techniques. Many old WH structures can still be seen, even big part of them are no longer in use. For example, the remains of indigenous WH structures in Yemen, including dams, reservoirs, diversion structures and mountain terraces confirm how, historically, Yemenis have used a wide variety of Water Harvesting Systems (WHS) to manage their water resources across the various agro-ecological areas. However, since 1970's, with the introduction of deep tube wells and rigs technologies, the people started to rely on groundwater, which become the main water resource for domestic, agricultural and industrial uses. As a result, the groundwater level is declining rapidly. The management of water resources become a complex issue due to limited water sources, rapid population growth, aridity and complex physiographic environment. Nowadays, there is a growing interest in reviving indigenous WH systems and this paper investigates the importance of such systems and to what extent people accept the idea. Beside literature review, a rapid assessment through interviews was conducted in Yemen to collect the primary data. The availability and prices of different water sources keep unstable mainly on time of unstable situations including conflicts and various environmental phenomena. Decentralized systems showed more resilience than public centralized systems. This study verifies the importance renewable resources transition to achieve secure sustainable water management. Public awareness, pilot decentralized projects, reactivate indigenous knowledge of water harvesting and setting appropriate renewable water policies, will help to stabilize people's lives and lead to improve their livelihood in different circumstances, including conflicts and natural disasters. This research ends with a successful stories for revitalization of indigenous WHS in different countries.

85. Omar Tabakhna

Biography

He was born in Palestine- Ramallah in 1962. Graduated from Jordan University with the Bachelor degree in animal production and with a Master's degree in agricultural economics, he conducted a thesis for his masters about "economic and statistical analysis of agricultural exports in Jordan."

Through his professional journey; Omar has worked in Applied Research Institute (ARIJ) in Jerusalem, and was the coordinator for the agricultural department. Then was assigned as the Manager of the agricultural Statistics in the Palestinian Bureau of statistics (PCBS), and later he became the Research officer at the Union of agricultural Work Committees (UAWC).

Omar Yousef Hasan Tabakhna has a Master's degree in agricultural economics. is the (job title)director of studies and planning. at (institute)Union of agricultural working committees YAWC in Palestine
M.S thesis: Economical and Statistical Analysis of the agricultural exports of Jordan, 1988
-Conducted a study about "agricultural rain fed in Palestine" with ARIJ , 1992 Conducted a study about the "economic visibility for hydroponic production" with ARIJ, 1993 Participated in the current statistic report for economic sectors with PCBS, 1994 Participated in current statistics for agriculture with the PCBS.1995 Participated in the submission of series of olive press surveys with the PCBS1997-2000 Participated in the submission of the annual agricultural statistics, PCBS ,1995-2000 participation in different studies related to agricultural issues
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Key words
Water harvesting, , agriculture, occupation, farmer, sustainable

Authors and Corresponding
Omar Yousef Hasan Tabakhna

Abstract Text
The water sector is vitally important for sustainable agricultural development at the national level, particularly under the measures and constraints which imposed throughout the decades by Israel occupation on Palestinian. This situation has been reflecting and contribute to reduce the chances of True development in the agriculture sector.

The plant production in Palestine is suffering from the low productivity per acre due to water scarcity and production structure, weak mechanisms for dealing with disasters and manifestations of the effects of climate change, land degradation and desertification in recent years,

The aim of this paper is to determine the economic impacts through implemented different kind of water harvesting technique within the programme for the development of agricultural land and water resources management in the West Bank funded by NRO with partnership PHG, LRC, ESDC, in coordination with the Ministry of agriculture.

Different kind of water harvesting were implemented as well as its purposes: cisterns for collecting water in marginal localities for subsidized irrigation, livestock breeding, and for irrigate the seedlings, cement and soil pools, for storage and irrigation metal tanks for collecting 1000 m^3 for storage and irrigation, so farmer could control the quantity and time of irrigation and save a lot of time and efforts.

All interventions were conducted are working well, and most of farmers have been achieved a good benefit by implementing these interventions. So, the productivity and quality are improved due to water available at fit time of production. Therefore, many farmers were encouraged to extend the cultivated land and extended their water resources to duplicate the benefit.

Many farmers said that the cost of water, has decrease by at least 25% of the total cost of water, in addition to saving time and effort and cost, this programme was able to increase the average amount of water per dunam from 170 M3 to 180 M3 and lowering the average cost of a (m^3) from 2.3 NIS to 2.0NIS. This program has minimizing the unemployment rate by creating 94 366 working days. Farmers have been confirmed the extent of psychological comfort and satisfaction as a result of farmer control time and quantity required for the crop.

The main recommended of this paper is the need to intensive the advocate for more construction of Cisterns, pools, wells, and collection tanks due to the importance in providing irrigation, especially in c area, in order to encourages farmers to work and increase cultivated area and protect the land from the threat of Israeli colonization and confiscation.

86. Tarik Mustafa Bany Yaseen

Biography

Tarik Mustafa Al.Sebaei Bany Yaseen, has a Marine Diploma / 1972 is the (President of Jordanian Heritage fellows Society at Pakistan Navy - Karatchi in Pakistan 7 years in Jordan Marine Service – 5 years in Merchant Navy – 7 years at Middle East Journal – Municipality Mayor for 4 years – a Member at many organizations related to nature – environment – heritage – local community service – a Participant at a set of conferences and conventions in above mentioned fields .A consultant for the implementation for many projects in line with Water Harvest amd Solar power in my organization called Land and Human Org.for development. A member at Global Network to combat and reduce World Natural Disasters – Coordinator at Arab Network in Jordan

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Key words

Harvest – Practical forms – Challenges – Results – Data Collection – local community in charge – partnership with government – support – statistics – forms – photos – maps

Authors and Corresponding

As mentioned in my presentation – all resources documented.

Abstract Text

The study being presented is concerned with the adaptation to the scarcity of water resources for the fact that Jordan is one of those countries that suffer from the scarcity and lack of water resources taking into consideration natural , environmental and political challenges that encountered Jordan. For instance , and in light of the presence of Syrian Refugees in Jordan , much pressure was there using water resources and this , accordingly , caused much loss. Both Government and Local community (presented by its organizations) that are concerned with facing such problems have worked together as partners to save water as much as they can by following a set of options , techniques and projects such as (Water Harvest using underground reservoirs , individuals saving rain water as well and many other strategies. Challenges were inspirational to find proper solutions such as building dams , using roof water , water usage guidance techniques , wall chains -Aqua Culture system, linear lines , underground reservoir – increase the local awareness to such challenges and how to properly handle them – grants and support to the locals to help them start their own projects in their houses and farms.

BIOGRAPHIES

87. Dr. Marwan Ghanem

Biography

Dr. Ghanem is an associate Prof. at Geography Dep. and Water and Environmental Institute at Birzeit University in Palestine. He has a Ph.D. in Hydrogeology, Hydrology and Hydrochemistry from TU Bergekademie Freiberg in Germany (1999). He works in the Water Resources Management, Groundwater modeling & environmental pollution and socio-environmental multidisciplinary water nexus approach. He has more than 53 international publications published in refereed Journals. He is active in attending the international conferences in the Asian, European and African continents and participated in more than 60 conferences. He has a membership of the of many International organizations among these is Ass. of Hydrogeologists IAH, He supervised more than thirty master students in full or partial supervision and 3 Ph.D. work thesis. His experience is in between the academic and research activities.

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Key words
Marar catchment, floods, risk management, West Bank
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Abstract Text
The integration of hydrological parameters was used for the water balance in arid catchments to assess the storm runoff frequency distributions. A Digital Elevation Model (DEM) for the Marar catchment in the Jordan Rift Valley was used for the rainfall and evaporation simulations. Runoff peak discharge was estimated using the curve number method and unit hydrographs from Ramallah Meteorological Station. The runoff storm average is 2.35 million cubic meters per year in a ten year cycle (2004/2014) representing of 9.8% (183 mm) of precipitation per year. Derivations of unit hydrographs for 10 to 25 years reveals for peak discharge between 22.8 - 29.4 and 35.3 - 45.5 m/s respectively. The annual recharge was calculated for to be between 113.3 – 83 mm/ year using different methodologies. The appropriate method for solving flood control and avoiding flood catastrophe is in constructing small scale retention dams and the availability of stored runoff water will be used for agricultural or touristic use.

88. Abdessamad Ghacha

Biography

Abdessamad GHACHA has Ph.D student – Faculty of Science and Technology, Tangier –Morocco, State Engineer, Head of the Sanitation Department - The North Regional Direction - ONEE: National Office of Electricity and Drinking Water - Morocco.

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Key words
sludge - Treatment plant- valorization - wastewater - sanitation - management

Authors and Corresponding
Abdessamad GHACHA

Abstract Text
In order to overcome the delays accumulated in the field of sanitation, The National Sanitation Program (Programme National d'Assainissement - PNA) was approved by the Moroccan Government in 2005. The PNA has the ambitious objectives of achieving a 60% treatment rate for collected wastewater and an 80% rate for connections to the sanitation network in urban areas by 2020 [1, 2].

The PNA concerns 260 urban centers (excluding private delegates) with total investment cost of 43 billion dirhams until 2020. To achieve PNA goals, efforts have been intensified by all the stakeholders. Indeed, up to the end of 2015, the PNA has achieved a connection rate in urban areas of 74% and a wastewater treatment rate of 38% instead of 8% in 2005 [1].

This remarkable development of sanitation in Morocco has inevitably led to the production of sludge from Waste Water Treatment Plants (WWTPs) in increasing quantities. As a result, the problematic of sludge management becomes persistent and worrying.

The main objective of this work is to identify the various constraints hampering the sustainable management of sludge from WWTPs, and this after explaining the extent of the problematic of sludge management in Morocco To carry out our study, a methodological approach was defined based on the bibliographic research and the interviews and surveys with different stakeholders.

As a result of this study, it became clear that the constraints hampering the sustainable management of sludge are numerous and complex and aren't just technical but also regulatory, institutional-organizational and economic-financial nature.

BIOGRAPHIES

89. Gregor von Medeazza

Biography

Dr. Gregor von Medeazza is the chief of the Water, Sanitation and Hygiene (WASH) program of the United Nations Children's Fund (UNICEF) for the State of Palestine. Over the past 15 years, he has served in a dozen countries, including in New York headquarters, Africa, South Asia, Latin America and the Middle East. Dr. von Medeazza holds a PhD in Ecological Economics and a Masters of Engineering from Imperial College (London), in addition to executive education at SAIS, INSEAD, the London School of Hygiene and Tropical Medicine as well as Harvard University.

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Key words
Safefly managed water and sanitation, WHO-UNICEF Joint Monitoring Programme, Equity

Authors and Corresponding
Gregor von Medeazza, Tom Slaymaker, Omar El Hattab

Abstract Text
This paper presents the main findings of the latest WHO/UNICEF JMP report, which provides the first global baseline assessment for SDG targets 6.1 and 6.2. Globally 2.1 billion people lack access to safe, readily available water at home, and 4.5 billion people lack safely managed sanitation. Billions of people have gained access to basic drinking water and sanitation services since 2000, but these services do not always provide water that is safe to drink or ensure safe management of excreta. Every year, over 270 000 children under 5 years of age die from diarrhoeal diseases related to unsafe drinking water, sanitation and hygiene. In MENA, while around 33% of households have access to safely managed sanitation, around 67 million people still lack access to even basic forms of sanitation. Nearly 10% of households in the Region don't have access to even a basic water service, which means that around 45 million people need to rely on unimproved, limited or surface water sources.

In the West Bank and Gaza, only around half the population is connected by a piped network, the other half is either unconnected to a water network or has to rely on unimproved, limited or surface water sources for their daily needs. Furthermore, around 40% of Palestinian households in the West Bank and Gaza don't have access to even basic sanitation and only around half is connected to a sewer network. Our paper presents further analysis for each of the sub-categories of access to water, sanitation and hygiene, and also in terms of inequities between urban and rural settings, as well as between wealth quintiles. Our paper concludes with a set of recommendations to enhance national systems for monitoring WASH services and to accelerate progress towards the SDGs, with specific considerations for Palestine.

90. Hanane Benqlilou

Biography

Hanane Benqlilou has a PhD in Chemistry - Material sciences is the head of technical assistance department at the International Institute for water and sanitation – IEA under the National electricity and potable water ONEE in Morocco. Hanane Benqlilou has a great experience and a wide research work in different fields: Integrated Water Resources Management – Drinking water monitoring and control – Water Safety Plans (WSP) - Water treatment – Management of drinking water access in rural areas – Traditional and ancestral water and wastewater systems - corrosion of drinking water infrastructure equipment -Governance –Accreditation of water control laboratory - Certification of training and research organizations - Renewable energies - Management of cities and territories – Technical assistance – North – South – South Water Operators Partnerships, …

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Key words

Integrated Water resources Management – Drinking water monitoring and control - Water treatment – Management of drinking water access in rural areas - Water Safety Plans

Authors and Corresponding

Formalization of the heuristic Knowledge on traditional System “The Khettaras” and development by combining with modern techniques
Benqlilou H.,
3rd IWA Specialized conference on water and wastewater technologies in ancient civilizations, 2012.

Thesis on Water in the heart of local and regional development: Methodology for the development of oases in southern Morocco, ESSEC- ISCAE, 2010

Approach for drinking water quality monitoring in rural areas: Morocco’s case
Benqlilou H., Laraki L., Outair A.
Water Science and Technology: Water Supply, 4 (5-6), pp. 415-419 (2004).

Chapitre 11 au niveau du livre intitule : Evolution of sanitation and wastewater technologies through the centuries – august 30, 2014, H. Benqlilou et al.

Abstract Text

The water operators partnerships for expertise and know-how sharing between developing countries – in Sub-Saharan Africa and Arab region in particular - constitute an important lever to achieve Goal 6 “Ensure access to water and sanitation for all” of the 17 Sustainable Development Goals (SDGs).

However, partnerships between countries from the South does not exclude the support of Northern countries in particular for the public sector as part of a non-profit approach. That is why it is interesting to extend the concept of “South-South cooperation” to the “North-South-South”.

This type of triangular partnership makes it possible to pool and share the efforts of the most advanced partners in a given field, whether from the North or the South, to the benefit of another less advanced country.

These efforts must focus first on capacity building and modernization of water and sanitation operators as effective tools for achieving SDGs in the areas concerned.

The partnership action plans adopted concern training and technical assistance in the areas of water resource mobilization, water treatment, desalination, drinking water quality monitoring, collection, treatment and reuse of wastewater ... etc. The topics concern also governance, managerial, financial, integrity, etc.

Thus, integrated management issues related water and sanitation services based on pooling efforts through partnerships between operators from the South or the North, within the framework of a “non-for-profit” approach seems to be an effective tool to help developing countries to achieve the water and sanitation ODDS.

This article highlights the approaches and best practices for initiating and implementing expertise-sharing partnerships in the fields of water and sanitation. It will be mentioned as an illustration some cases like those concerning the expertise sharing between Morocco and Palestine in the field of “Water Safety Plans (WSP)” or the one on Non-Revenue Water for WSSA in Bethlehem.

BIOGRAPHIES

91. Hedia Sassi Chaabouni

Biography

Hedia , has a degree in Hydraulics Engineering from the National School of Rural Engineering of Water and Forests (ENGREF) of Paris, is the director of drinking water studies in rural centers at national water exploitation and distribution company in Tunisia (SONEDE) with 26 years of experience in the field of drinking water supply.

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Key words
Desalination brackish groundwater
Photovoltaic renewable energy

Authors and Corresponding
Hedia SASSI CHAABOUNI
Desalination and Environmental Direction at SONEDE

Abstract Text
The city of Ben Guerdane is located in the South East of the country characterized by a very low rainfall and very limited resources.
This desalination plant makes it possible to reinforce the resources of the city of Ben Guerdane by desalination of brackish saline underground water 14 g/l using photovoltaic energy and the reverse osmosis process.
It was financed by a Japanese donation a value of 1 billion yen, the equivalent of 17 million Tunisian dinars. It was commissioned in June 2013 with a production capacity of 1800 m3 / day.
The use of photovoltaic renewable energy allows the sustainable production of water from the groundwater available in the southern region of Tunisia, it also saves energy and reduces the emission of greenhouse gases.
Currently we are going to extend the existing photovoltaic field in the Ben Guerdane desalination plant to increase energy production and reduce the cost of water production from a field of 210 kWp to 610 kWp (a call for tenders has just been launched in May 2018).

BIOGRAPHIES

92. Marco Verber

Biography

Marco Verber has a master degree in Environmental Engineering. He is a Project Manager at CESVI Palestine, where experiences in improving water access and water quality for Area C communities (water pipeline network, underground cisterns, household water treatment and safe storage). Furthermore, is focusing on solid waste management in UNRWA refugee camps.
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Key words
Water, household, Sustainable Development

Authors and Corresponding
Marco Caniato a, Marco Verber a, Matteo Di Paolo a, Maryna Peter b, Gregor von Medeazza c

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b University of Applied Sciences and Arts Northwestern Switzerland (FHNW)
c UNICEF

Abstract Text
The formulation of the first target of the Sustainable Development Goal 6 has given a relevant push to the monitoring of drinking water quality. WHO-UNICEF's Joint Monitoring Programme (JMP) methodology underlines the importance of testing water quality at both the point of collection and the point of use. In this way, the attention is focused on the quality of water consumed, and how to identify the most efficient and effective ways to achieve it. In Palestine, communities in Area C – especially in the South Hebron Hills – are affected by all the constraints imposed by the Israeli occupation, including the impossibility to be connected to a water distribution network. Moreover, some communities are so small and scattered that it is technically and economically challenging to provide households with access to a water source reliable in terms of quantity and quality.

In a framework of a project initiated and funded by the Humanitarian Innovation Fund (HIF) / ELRHA, 5 different models of innovative filters available on the global market were imported and distributed among 150 households. These filters are evaluated with the use of a specific methodology – including direct observation, interviews as well as water quality and filter use evaluation. While the interventions are still ongoing, our paper presents several indications already collected regarding the simplicity of installation of the different models, the effort required to properly introduce a new technology, and results of the integrity test (i.e. a test to evaluate the water treatment effectiveness in regard to bacteria retention). The combination of both user perception and performance data, is of interest not only for potential users – and the NGOs or international institutions operating in emergency settings – but also for manufactures, willing to receive feedback, and suggestions about how to improve their filters.

93. Imad Adly

Key words
Water Security, Water Governance, Civil Society, Participatory Approach, Palestine, Occupation

Authors and Corresponding
The Arab Network for Environment and Development (RAED)

Abstract Text
Water security is one of the most critical challenges in the Arab world, in light of population increase, water scarcity, climate change, and specifically occupation. "Arab water security" equates to the provision of natural and artificial resources and ensures the fairness of distribution, while providing the necessary measures to protect it in all areas through regional and international agreements.
Regional and International Civil Society organizations are hereby a key player in advocacy for effective governance, addressing society needs, offering alternatives, raising awareness, building capacities, advancing partnerships with all stakeholders, and achieving sustainable development.
In this regard, RAED has demonstrated a participatory approach towards Arab water security strategy by building the capacities of Arab civil society organizations in addition to water workers through various partnerships and implementation of a number of activities in the field of water. RAED has already been part of several initiatives and projects such as SWIM-Horizon2020 along Arab Mediterranean countries including Palestine and advocacy for Palestinian needs; as it is impossible to speak of sustainable development under occupation.
Water governance based on an organized participatory approach ensures that all concerned parties are involved with civil society organizations as key partners and contribute to the successful implementation of sustainable water strategies, while taking into account the role of youth and women. This model will also support the activation and implementation of national and regional strategies and programs based on the promotion of Arab regional cooperation in the field of water, as well as an international policy towards the constrained water needs under occupation that is absurdly occurring in the 21 century.

This goes hand-in-hand with encouraging scientific research utilizing modern technologies, with an institutional system that is capable of dealing with the increasing challenges, as well as unconstrained monitoring systems with clear measurable indicators.

BIOGRAPHIES

94. Eng.Beesan Shonnar

Biography

Eng. Beesan Shonnar is an MSc in Water and Sanitation Engineering – Birzeit University, West Bank. Her MScthesis :"Households' Affordability and Willingness to Pay for Water and Wastewater Services in Ramallah and Al Bireh District, Palestine".
BSc Degree in Civil Engineering / Water Resources and Environment, Jordan University of Science and Technology, Amman, JordanBSc thesis: "Design of Storm Drainage System for the Southern Area Irbid /Jordan".
She has worked in the public sector for the past 20 years and had occupied different positions at PWA.
Her experiences are in various fields including :Public Private Partnerships, Tenders,Training, Policies and Strategic Planning, Wastewater treatment…etc

Email: shonnarbes@gmail,com Biography

Key words
Public Sector, Private Sector, Privatization, Mechanisms, Enabling environment, Challenges, Risk management.

Abstract Text
Public Private Partnership (PPP) is a brand new concept that was heavily discussed in Palestine in the last decade. In spite of its importance in different sectors, the palestinian Cabinet (government) recognized its importance, in supporting the public sector by establishing different types of projects, and services to achieve sustainable development in Palestine. Adopting the Public Private Partnership concept in Palestinian market was due to many crucial factors; one of which is the needed mega scale infrastructure projects require high technologies that are lacked in public sector, not to mention the high investment that the public budgets cannot endure as it is limited (by the international agreements), and obstacled by public debt. Moreover, these mega-scale high Tec projects usually require expertise that public sector may not acquire. Application of this concept would contribute job creation, improvement of services quality; in addition it will accelerate the economy wheel, and will help develop the capacity building. All of the above mentioned factors, triggered pressure to change the standard model of public procurement, which grew rapidly starting from the twelfth palestinian government up to now. These Governments believed that a pioneer role has to be assigned to the private sector in the process of the building the free Palestinian state. This vision was illustrated and applied by initiating national debate on the PPP, these debates generated many important outputs, that will be thouroghly discussed. PPPs Common themes are the development of innovative, long-term relationships between the both sectors, which would mean consequently sharing of risk, and creating an enabling environment for better sustainable developed infrastructure and services. This paper will discuss PPPs in the Palestinian State; a brief of PPP cases in different sectors will be introduced. The above mentioned cases will show the right mechanisms, and factors affecting minimizing the risks to create the appropriate enabling environment for PPPs adopting, which includes: pointing out the related laws, regulations, specifications, requirements.

BIOGRAPHIES

95. Eng. Ayaa Hisham Obeise

Biography

Ayaa Hisham Obeise has Master degree in Water and Environmental Engineering at An-Najah National University , Nablus , 2017. Water and Environmental engineer at Aqua Consulting Center (ACC) , Palestine. Six years experience as Water and Sanitation Engineer and Researcher in Water and Environmental issues.
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Key words

Gaza strip , Private Sector Participation (PPP) , PPP Types , Desalination Plant , Sustainability

Authors and Corresponding

Eng. Ayaa Hisham Obeise
Supervisors : Dr. Abdel Fattah Hasan & Dr. Rabeh Morrar

Abstract Text

Seawater desalination plant plays an important role to meet the growing need of water especially in Gaza strip , where the levels of total dissolved salts have been rising continuously over the last two decades, and became in Gaza strip, far in excess of the WHO standards. Still, there are problems in the application of such technology, including cost, lack of expertise and managerial competence to operate the desalination plant. Therefore, governments look for Public-Private Participation (PPP) expression which means getting the private sector involved in the construction and operation of desalination plants through different contracting models. The main purpose of this research is to study and decide the most efficient and sustainable PPP contracts used for desalination plants in Palestine. So, the adopted approach for selecting the optimal PPP contract was based on extensive literature review to summarize the most well-known PPP contacts and several meetings with experts who have a good background about the desalination process, PPP contracts, sustainability …etc., to finding the beneficial tool to collect the data. Data collected through interview structured, targeted to different organization related to water sectors, or concerned of infrastructure projects and based on five indicators: financial, institutional, technical, socioeconomic, and environmental viabilities. Through the analysis process of the data collected using SPSS program, three points will be assessed; first, the importance rate for sustainability of each of five indicators (financial, technical, institutional, social, and environmental viabilities) for desalination plant in Palestine. Second, sustainability of each of the five indicators that effect on deciding the structural framework of PPP contracts. Third, the different contracting models. By the end of analysis, the concession contract (Green field contract) got the highest score with weighted average 3.3 through overall assessment of PPP contracts, that means this contract is the optimal contract which is simulating the reality of the infrastructure in Palestine, achieving the sustainability of the desalination plant , and improving the efficiency of the service to satisfy the citizens.

96. Abdelrahman Al-Tamimi

Biography

Abdelrahman Al-Tamimi Worked since graduation in the field of water resources , planning in the Occupied Territories. During the last 29 years the activities were focused more on Public policies , Israeli water and environmental policy , he is active in civil society in terms in nation and state building , his research capacity in planning , future studies and strategic thinking towards socioeconomic issues , community developmemnt , environmental planning and management , he has capacity of teaching training and conducting policy oriented research , He is part time associate professor at alquds university ,Sustainable development Institute –master program and partime lecturer at Arab American university

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Key words
service delivery , state building , legitmacy

Abstract Text
State-building is an important process in fragile societies. However, conflicting interests and motivations often hamper state-building efforts. At the bottom end of society, local government structures and traditional institutions are often interlinked. It is in this domain that state-building and civil society activities are coming together and are conflicting both from a civil society point of view as well as from a state-building point of view (De Boer & Pfisterer 2009). The state-society relation that is at the basis of state-building is constantly subject to pressures of change. According to theories of state-building, state formation and maintenance involves a long process of bargaining and struggle between the state, groups in society and among these groups – i.e. that effective states are based on an evolving relationship between the state, citizens and among citizens. It is assumed that the underlying notion of statebuilding reflects questions and challenges in the area of governance, accountability, the role of the state and civil society, the legitimacy of the state and its ability to issue binding rules in a (post) conflict situation with different locations and structures of power. Delivery of services stands at the heart of the social contact between citizens and their leaders. Successful service delivery emerges from institutional relationships in which the actors are accountable to each other. However, service delivery in fragile states is generally performed in the framework of humanitarian aid and implemented by non-state actors, often with a linkage to international agencies. Although this results in a certain level of services, there is the risk of parallel structures that, in the long run, further weaken or undermine the prospects of effective state-building. Moreover, they risk dispossessing local actors of ownership of their services and projects (Hilhorst 2007b).

BIOGRAPHIES

In every society, the delivery of services stands at the heart of the social contract: political leaders provide services as a means of generating and mainstreaming support from citizens, while citizens condition their support of the political leadership based on their satisfaction with the services provided to them (OECD Fragile States Group 2006). When services are provided effectively it is because there is both engagement and accountability between citizens and their leaders. In conflict-ridden countries, however, the state-society relations are often weak or even destructed. Basic accountability relationships are weak, if not broken prevailing political arrangements or social patterns may prevent some – or all – citizens from being able to express their desires about which services they need. Policies of exclusion, corruption, or other preoccupations may deafen political leaders to citizens' voices and strengthen the incentives to provide services only as political rewards (OECD Fragile States Group 2006). Without a minimum degree of legitimacy, states have difficulty functioning; and loss of legitimacy in the eyes of some segment of the population is an important contributor to state fragility. A lack of equilibrium between citizens' expectations of a state, and the state's capacity to fulfill such expectations reflect the collapse of the social contract, contributing to state fragility.

The paper focus on how service delivery will contribute into state building and how this contribution will be achieved under uncertain socioeconomic and political conditions , additional the paper will discuss the relation ship between service delivery and the legitimacy of the public institutions through the case study of water sector

97. Philippe Goral

Biography

After Engineer Diploma (MSc) in Civil Engineering and Urbanism from INSA (National Institute of Applied Sciences) - Toulouse and Post Graduating in Structural Engineering from CHEC (Center of High Studies in Construction) - Paris and in Urban planning from MAXPU (Institute of Architecture and Urbanism) - Moscow, Philippe has worked for 35 years in consulting companies in Infrastructures, water and environment sector. He has developed activities in Europe, Middle East, Asia, North Africa, and Austral Africa

COMPANY PROFILE

Established in 1955 with its head office in Nîmes France, BRL group was created to promote the socio-economic development of the Languedoc Roussillon Region in Southern France. To do so, it has developed a large and complex system of large water infrastructures to bring water resources to the Languedoc-Roussillon region. It has also, and still does, provide technical support to the regional stakeholders (Regional authorities, farmers associations,…) for water infrastructure operation and development (financial & technical studies) and agriculture development (agriculture extension, capacity building, institutional advice,…).
Today, BRL still owns, manages and operates under a concession contract these hydraulic infrastructures consisting of 11 dams, 6 water treatment plants, 125 pumping stations, 8000 km of buried pipes, and a 105 km of canals (Asset around 2 billion Euros).
Thru these infrastructures, BRL distributes 130 millions m3 of water per year for agriculture (140,000 ha of irrigated land), domestic (1.000.000 inhabitants) and industrial use.

BRLingénierie, subsidiary of BRL Group is one of the leading international consulting firms in the water and environment sector. BRLi has references in more than 80 countries with projects financed by multilateral funding agencies or Governments. His permanent staff is around 190 people. BRLi engineering and consultancy activities consist of two main sectors:

- Water engineering: Water resources management- Drinking water supply and sanitation- Mobilisation and protection of water resource- Irrigation projects – navigation and ports infrastructures - Natural risks management, Flood, Drought, Early Warning System
- Land development: Environmental protection - Rural areas and forestry- Development of river basins - Agriculture - Parks and gardens – Coastal areas management – Aquaculture and Fisheries - Biodiversity management – Natural Resources management and sustainable development – Protected Natural Areas

Key Words

Integrated Water Resources Management, Transboundary Basins, Management, Assistance to Decision Makers, WIMES, Maintenance & Operation, Tariff, feasibility, Design, Supervision, Reuse of Treated Wastewater in Agriculture, Flood & Drought

Abstract Text
Transboundary basins experiences for harmonious international sharing of the water (Nil, Niger, Lake Chad, Lake Victoria, Congo,…), factor of peace.
This kind of international agreement aims to strengthen cooperation between the basin States and to achieve a permanent balance between good ecological condition in the river and economic development by meeting the demands for water from abstracting water uses (drinking water, irrigation, industry) and non-abstracting water uses (hydropower, navigation).

The body of the Charter addresses several issues: an enumeration of common principles, the undertakings of the countries regarding water resources (minimum flows, protection of wetlands, underground resources, water quality...), the administration of rights to abstract fresh water and discharge waste water, the way in which the existing and planned bodies will operate and be run, how to ensure conflict resolution between the countries, etc.

The annexes of the Water Charter establish practical provisions, for example on sharing information and data between the member countries or how one State should issue prior notification to the others in the event of projects liable to cause significant effects on water resources

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98. Luay Froukh

Biography

The regional cooperation through Red Dead water project as an opportunity for Satehood

Luay Froukh has Phd in water resources planning and management from Newcastle University in the UK.

He has wide work experience in water, sanitation and environment projects in the MENA region. He worked in Jordan, Palestine, Iraq, Saudi Arabia. He was the group leader for the water resources program for West Bank from 1999 to 2003. He published several papers on water and sanitation issues in the region. Currently, he is leading the Jordan Water and Wastewater Reuse Organization.

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Key words

Desalination, Red Sea, Dead Sea, Wadi Araba, Energy, Brine.

Abstract Text

Currently, groundwater is the only viable source for Palestine. Within the West Bank there are three groundwater basins; the Eastern, Western and North Eastern basins. Both the western and northeastern basins are shared with the occupied parts of Palestine since 1984 under Israel control. The eastern basin is within the west bank which was occupied in 1967 and controlled by Israel as well. Since Oslo agreement in 1993 , and the establishment of the Palestinian Authority and Palestinian Water Authority (PWA), the water issues in the West Bank become under PWA . However, Israel still control the groundwater in the three basins and prevents the PWA from drilling wells or tapping certain aquifers or in certain areas like area B or C in the West Bank. Around 90 % of the recharge to the three basins is from the West Bank, only 10 % come from outside West Bank boundaries.

This makes Palestine as the area which generate water to those basins and make it qualifies for benefiting from most of it. According to the published figures by PWA and carried studies, the PWA only use 20 % of the total abstraction from the three basins while Israel is using 80%. Under such circumstances the PWA purchase water from Israel to provide water supply to Palestinian cities and villages.

The halt of peace process which was started in Oslo in 1993 and the political boundaries between Palestinian Authority and Israel makes the water issues critical and sensitive. Under the Oslo agreement the water file was pushed to the final status negotiations which is still far away to be concluded. As a result the water issues are at the forefront due to transboundary nature and halt of the peace process.

The only opportunity remains is the regional cooperation with neighboring countries specifically Jordan and Egypt to provide the Palestinian cities and villages with water. The Read Dead project can be a step in the way to take state decisions and prove the statehood status considering the international law.

The Dead Sea basin plays a major role for regional cooperation in the region. This potential is threatened by steady drop in Dead Sea water table due to diversion of Jordan river base flow by Israel. The decline level of the Dead Sea is 1m per year. In addition, the decline is affecting the ecosystem and groundwater system.

Since most of the Dead Sea from the western side is within the West Bank which will form the future Palestinian State. the participation in the Dead Read project can be considered as an important step that strengthen the statehood status with the international community. This paper will describe the Read Dea sea project and how the PWA role will strengthen the statehood situation based on the international law.

99. Clemens Messerschmid

Biography

Clemens Messerschmid senior hydrogeologist, (M.Sc. Germany), lives and works since over 20 years in Palestine (Ramallah), active in the water sector (donor-funded projects, senior advisor, freelance consultant, local governmental institutions and NGOs)
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Keywords

Oslo-accords, occupation, donor engagement, post-Oslo landscape, opportunities, water projects, institutional setting, paradigm shift, two-state scenario

Abstract Text

Over the past years, a growing and currently accelerating degree of fatigue with the apparently intractable water problems in the occupied West Bank, Gaza Strip and Jerusalem can be witnessed. This paper asks for the reasons and discursive expressions of this phenomenon. On the one hand, what are the donors frustrated with and on the other hand, how do they present and
articulate their frustration?
The paper also provides the context of the fundamental changes in the political setting and prospects of the water affairs in the State of Palestine, which nonetheless is subjected to ever entrenching measures of occupation and is now exposed to the realistic
threat of full-fledged annexation. The Oslo paradigm is shifting. And it is high time to shed light on the prospects for the water landscape in Palestine, to review the strategies and practical approaches and the institutional setting of the Palestinian water sector.
The retraction of donor engagement appears as an imminent and eminent threat to sustainable water supply, as a consequence not only of lack of funding but more importantly drying-up political engagement and support. The main elements and impacts shall
be identified and evaluated. Therefore, it is important to also emphasise the long-term opportunities and new venues for the water sector this hydro-political turning point offers, i.e. both, the possible new water development approaches on the technical, and water justice approaches on the political level. What will be the main tasks in a post-Oslo water landscape, which are the changes and which the continuities, water actors will face? Last not least, which opportunities will emerge from this new setting?

100. Youssef Al-Nouri

Biography

Mr Youssef Al-Nouri/ APNEK president Doctor geographer, teacher researcher at the University of Tunis. founding president of the Association for the Protection of Nature and the Environment of Kairouan (APNEK) in 1984.
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Key words
Water stress, conventional water, unconventional water, salt water, sanitation and reuse of wastewater

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Abstract Text
Like most southern Mediterranean countries, Tunisia is a water-poor country. She has been experiencing water stress for over a quarter of a century now (25 years).

The traditional water resource limit was at the root of the use of unconventional resources such as salt water, seawater and sanitation and reuse of wastewater. A real problem of water resource management.

المشاركون في المؤتمر

سيوفر منتدى فلسطين الدولي الأول للمياه منصة فريدة تجمع كافة الشركاء من أصحاب القرار والخبراء القادرين على قيادة التطور في واقع المياه عالمياً، مستهدفاً مشاركين من:

- وزارات المياه والزراعة – م. عصام نوفل والطاقة وسلطة جودة البيئة – م. عبد العزيز ريان
- شخصيات سياسية واقتصادية.
- ممثلي وسفراء الدول العربية والاجنبية.
- ممثلي عن المنظمات الدولية والإقلمية
- ممثلين عن الوزرات والهيئات العامة للمياه .
- ممثلين عن الوزارات والهيئات المرتبطة بقطاع المياه.
- ممثلين عن الدول المانحة والمؤسسات الدولية.
- ممثلين عن المؤسسات والمنظمات الأهلية ومؤسسات المجتمع المدني.
- مؤسسات القطاع الخاص .
- الخبراء والاكاديميين المتخصصين بقضايا المياه والصرف الصحي .
- مزودي خدمات المياه والصرف الصحي.

الفعاليات الجانبية

1. معرض لشركات ومؤسسات محلية ودولية.
2. مسارات تعريفية لمواقع تاريخية فلسطينية.

الجهات المنظمة

حكومة دولة فلسطين ممثلة بسلطة المياه ، بالتعاون مع الجمعية العربية لمرافق المياه (أكوا).

الجهات الداعمة

1- الإتحاد من أجل المتوسط
2- الحكومة الهولندية
3- الوكالة الفرنسية للتنمية
4- الوكالة النمساوية للتنمية
5- مشروع الإدارة المتكاملة للمياه المستدامة وآلية دعم آفاق 0202 الممول من الاتحاد الأوروبي .
6- منظمة الأمم المتحدة للطفولة (اليونيسيف).
7- شركة الاتصالات الخلوية الفلسطينية – جوال
8- بنك فلسطين
9- شركه المشروبات الوطنيه كوكاكولا
10- منظمة الأمم المتحدة للتربية والعلوم والثقافة (اليونسكو).
11- مركز الشرق الأوسط لتحلية المياه (ميدريك).

محاور المؤتمر

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5.1 النظم البيئية وجودة المياه
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2.4 التطوير المؤسسي وقياس مؤشرات أداء المرافق المائية
2.5 التقنيات الحديثة في إدارة الأصول لمرافق المياه (معايير التشغيل والصيانة)، واستراتيجيات إدارة الأصول (AM).
2.6 الشفافية والمسؤولية في ادارة قطاع المياه

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4. المحور الرابع: التغير المناخي وإدارة الجفاف

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4.4 نمذجة تأثير تغير المناخ على الموارد المائية
4.5 تقنيات التكيف مع التغير المناخي في قطاع المياه والدروس المستفادة من التكيف
4.6 زيادة الوعي بقضايا التغير المناخي

مقدمة

يتزايد الطلب على موارد المياه العذبة في ظل التضخم السكاني المتسارع ، الأمر الذي بات يشكل تحديا عالميا كبيرا . ولتدارك نضوب هذه الموارد على الأرض ، كان لابد من العمل على تحديد أولويات وتطوير آليات فعالة لإدارة الموارد المائية لضمان استدامة كل من المجتمعات والنظم البيئية (الأيكولوجية). وقد اتفق عالميا على أن الإدارة المتكاملة للموارد المائية ((IWRM تعتبر النهج الأمثل لإدارة هذه الموارد الثمينة. والتي تعتبر أساس الحياة والتنمية. الا أنه ومنذ انطلاق هذا المفهوم في مؤتمر الأمم المتحدة للمياه في عام 1977 ، لوحظ وجود تباين كبير في التزام وقدرة الحكومات والجهات المختصة في تطبيق هذا النهج في إدارة مواردها المائية. ففي حين استطاعت بعض البلدان تحقيق نجاح كبير، ما زالت بعض الدول في بداية الطريق، وبعضها الآخر لا تزال جهودها متعثرة في تطبيق أي من مبادئه.

ومع وصولنا عام 2018، أي بعد عقود من إطلاق إستراتيجية الإدارة المتكاملة للموارد المائية ((IWRM)، لا يزال تنفيذ الخطط المنبثقة عنها يمثل تحديا كبيرا بالإضافة لوجود عوامل عالمية جديدة على رأسها شح الموارد المائية، وعوامل التغير المناخي، وتزايد الطلب العالمي على المياه، بالتزامن مع التوجه العالمي لتحقيق أهداف التنمية المستدامة (SDGs)، كلها أمور مجتمعة تتطلب تكاتف الجهود والتعاون على المستويين الدولي في مجال تفعيل دور هذا النهج من خلال تطبيق مبادئه بالاعتماد على الممارسات الحديثة والتقنيات المتطورة، والاستفادة من تعميم قصص النجاح على هذا الصعيد.

والسؤال الذي يطرحه منتدى فلسطين الدولي الأول للمياه، هو كيف يمكن للأدوات والتكنولوجيا الحديثة تعزيز إدارة الموارد المائية بكفاءة للحد من الأزمة المائية والمساعدة في نهاية المطاف في تحقيق الأمن المائي. وستسهم جلسات المنتدى في تشكيل مستقبل المياه من خلال عرض ومناقشة تجارب وقصص نجاح ودراسات ونقل المعرفة المعتمدة على الممارسات والتقنيات الحديثة والتي تواكب التطورات المتسارعة المؤثرة على قضايا المياه ، وذلك في مسعى لإيجاد أفضل السبل التي يمكن توظيفها لتطبيق مبادئ الإدارة المتكاملة للموارد المائية التصدي لتحديات الموارد المائية عالمياً.

أهداف المؤتمر

- التعرف على التقدم الملموس الذي حققته ممارسات الإدارة المتكاملة للموارد المائية، والتكنولوجيا الحديثة التي تم تطويرها مؤخراً للمساعدة في تطبيق مبادئ الإدارة المتكاملة للموارد المائية من خلال عرض ومناقشة تجارب وقصص نجاح ودراسات ونقل المعرفة المعتمدة على الممارسات والتقنيات الحديثة.

- إيجاد أفضل السبل التي يمكن توظيفها لتطبيق مبادئ الإدارة المتكاملة للموارد المائية لتحقيق أهداف التنمية المستدامة والتصدي لتحديات الموارد المائية عالمياً بشكل مشترك مبني على أسس علمية ممنهجة من خلال طرح ونقاش التطورات المتسارعة المؤثرة على قضايا المياه كشح المصادر المائية وقضايا التغير المناخي، والترابط بين الأمن الغذائي والطاقة والأمن المائي وغيرها،

- مساعدة الهيئات والمؤسسات العاملة في قطاع المياه على التخطيط المستقبلي الشامل، وحوكمة قطاع المياه بشكل أفضل وتطوير أعمالها وخدماتها.

- إيجاد الآليات الكفيلة برفع مستوى الوعي لاستخدام هذه المصادر البديلة من خلال طرح ونقاش حلول لتطوير موارد مياه غير تقليدية مناسبة،

- الخروج بتوصيات مستقبلية عملية وقابلة للتطبيق لقضايا المياه قادرة على احداث التغيير وذات نتائج ملموسة في تطوير أسس وآليات تطبيق مبادئ الإدارة المتكاملة.
- توفير فرص لإنشاء شراكات جديدة والتواصل مع صناع القرار عربياً وعالمياً.