

## PARTNER 4: JORDAN

The Jordanian team is a multidisciplinary group consisting of water and environmental economist, chemist, microbiologist and physician of public health. This team can therefore investigate the wastewater problem not only from technical point of view but also following a holistic approach by integrating all the aspects of wastewater reuse.

### The Jordanian Team

#### Prof Dr. Emad Al-Karablieh

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### Short BIO

Prof Dr. Emad Al-Karablieh, Environmental Economist (h-index 11; publications: 110; citations: 645, source: google scholar); Risk assessment and socioeconomic of using TW, policy and awareness program. He has over 20 years of experience in water resources. His academic interests include Natural Resource Economics, Environmental economics, Risk analysis and economics of Integrated Water Resource Management. He published more than 70 articles appeared in peer reviewed international and regional journal. Coauthor of the Arab Water Report-Towards Water Security in the Arab Region, Issues of cost effectiveness (UNDP, 2011) and a book Water Resources in Jordan. He has been principal investigator for international funded research projects for USAID-ISSP, GLOWA JR III, Meditate, SMART II and UNDP-climate change projects. He has worked with many international agencies (UNOEP, USAID, UNDP, World Bank, AFD, ICARDA, IFPRI, GTZ, IFAD and FAO)

### Most Recent Relevant Publications

1. Lienhoop Nele, **Emad K. Al-Karablieh**, Amer Z. Salman and Jaime A. Cardona (2014) Environmental cost-benefit analysis of decentralised wastewater treatment and re-use: a case study of rural Jordan. **Water Policy**. Volume 16, Issue (2), pages 232-339
2. Karsten Schacht , Sven Gönster, Elisabeth Jüschke, Yona Chen, Jorge Tarchitzky, Jawad Al-Bakri, **Emad Al-Karablieh** and Bernd Marschner (2011). Evaluation of Soil Sensitivity towards the Irrigation with Treated Wastewater in the Jordan River Region. **Water** , Volume 3, No (4), pp, 1092-1111. ([www.mdpi.com/journal/water](http://www.mdpi.com/journal/water))

3. Al-Omari Abbas S., **Emad K. Al- Karablieh**, Zain M. Al-Houri, Amer Z. Salman, Radwan A. Al-Weshah (2015). Irrigation water management in the Jordan Valley under water scarcity. *Fresenius Environmental Bulletin*. Vol. 24; No. 4, pp.
4. Salman A. Z., **Al-Karablieh E. K.**,(2014). Assessing the impact of using Treated Wastewater and Fresh water on the socio economics of Farmers in the Jordan Valley. Conference on the Use of Treated Wastewater in the Agricultural Production in the Arab World: Current Status and Future Prospective, 14-16 January 2014, Dubai, United Arab Emirates
5. Wolff, H.-P.; Salman, A.Z., Doppler, W.; Nabulsi, A.; **Al-Karablieh, E.K.** (2004). "Socio-Economic Consequences from Replacing Freshwater By Treated Wastewater in Rural Areas - An Example from the Jordan Valley". In: The 14th Stockholm Water Symposium, August 16-20,2004 "Drainage Basin Management -Regional Approaches for Food and Urban Security", Abstract Volume, pp.129-130
6. Wolff H. P., L. Wolf, A. Subah, J. Guttman, A. Tamimi, A. Jarrar, A.Salman and **E. K. Karablieh** ( 2012). Methodological challenges in evaluating performance, impact and ranking of IWRM strategies in the Jordan Valley. *Water Science and Technology*. Volume 66, Number 2, pp. 1406-1415.
7. **Al-Karablieh Emad**, Amer Salman, Abbas Al-Omari, Heniz-Peter Wolff, Tamer Al-Assa'd, Doukhi Hunaiti, Ali Subah (2012). Estimation of the Economic Value of Irrigation Water in Jordan. *Journal of Agricultural Science and Technology* .Volume 5, B2. pp. 487-497
8. Heinz Peter Wolff, **Emad Al-Karablieh**, Tamer Al-Assa'd, Ali Subah, Amer Z. Salman (2012). Jordan Water Demand Management Study. *Water Science and Technology: Water Supply*. Volume 12, No. (1) pp 38-44
9. **Al-Karablieh, Emad**. K. A.S. Jabarin and M. A. Tabieh (2011). Jordanian Horticultural Export Competitiveness from Water Perspective *Journal of Agricultural Science and Technology*. Volume1, No 7B, pp. 964-974.

**Prof. Dr. Amer Salman**

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**Short Bio:**

Mr. Salman has more than 27 years of experience in agricultural economics. He is capable to conduct studies in the fields of water economics, allocation and pricing and management, as well as in the field of environmental and socio-economic aspects and project appraisal for many dams and water projects. He performed extensive economic analyses for most of the dams in Jordan Rift Valley at the request of the Jordan Valley Authority. In addition, his Ph.D. dissertation was in the field of irrigation water economics of the Jordan Valley. He published several articles appeared in Agricultural Water Management, Agricultural Systems, Journal of Arid Environment, Quarterly Journal of International Agriculture, Water Policy. He is a coauthor of the book Water Resources in Jordan (Evolving policies for development, the environment and conflict resolution), Editor: Munther J. Haddadin, Resources for The Future, Washington DC, and a contributor in a book Liquid Asset published by Resources for The Future.

He has been recruited in many international funded research projects as a team leader for Harvard Middle East Water Project (leader for the economic group) and MEDITATE project, GLOWA Jordan River II, GLOWA Jordan River III, and SMART II and as researcher with many other international agencies such UNDP, World Bank, AFD, ICARDA, GTZ, IFAD, FAO, USAID, and INSTRUPA. For two years, he served as economic task leader of the Jordanian team of Harvard Middle East Water Project. He has excellent computer programming skills, with primary expertise in mathematical programming and economic modeling. He offered teaching courses in mathematical programming, agricultural statistics, production economics of plants and animals, applied agricultural economics, project evaluation, econometrics, regression analysis, mathematical economics, water economics and water allocation and pricing. In addition, he is supervising many M.Sc. and Ph.D. students in different fields of water sector. Last ten years, he has been recruited in many EU funded research projects as a team leader or as researcher such as Meditate, GLOWA Jordan River, SMART and Harvard Middle East Water Project.

**Most Recent Relevant Publications**

1. **Amer Salman**, Emad AL-Karablieh and Munther Haddadin (2008) Limits of Pricing Policy in Curtailing Household Water Consumption. Water Policy, Volume 10, No. (3), pages 295–304.
2. **Amer Salman**, Emad Al-Karablieh , Hans-Jochen Regner, Heinz-Peter Wolff, and Munther Haddadin (2008) Participatory Irrigation Water Management in the Jordan Valley. Water Policy. Volume 10, No. (4),pp 305–322.
3. Stéphanie Aulong, Madjid Bouzit Nathalie Dorfliger, Fadi Comair, Emad Al-Karablieh and **Amer Salman** (2008). Integrating water balance and cost-effectiveness analysis for water

management: An application in Jordan and Lebanon 13<sup>th</sup>, IWRA World Water Congress, 1–4 September 2008, Montpeier, France.

4. Heinz Peter Wolff, Leif Wolf; **Amer Zahi Salman**; Emad Al-Karablieh; Ali M. Subah; Joseph Guttman; Bensabat, Jacob; Aiman Jarrar (2012), Methodological challenges in evaluating performance, impact and ranking of IWRM strategies in the Jordan Valley, Water Science and Technology, Accepted for Publication in April 2012.
5. Emad Al-Karablieh, **Amer Salman**, Abbas Al-Omari , Heniz-Peter Wolff, Tamer Al-Assa'd, Doukhi Hunaiti, Ali Subah, (2012), Estimation of the Economic Value of Irrigation Water in Jordan, Journal of Agricultural Science and Technology, B2 (2012) 487-497.
6. Wolff, H-Peter, E. Al-Karablieh, T. Al-Assa'd, A. Subah, **A. Z. Salman**, (2012) Jordan water demand management study: study: on behalf of the Jordanian Ministry of Water and Irrigation in cooperation with the French Development Agency (AFD), Water Science and Technology: Water Supply, Volume 12, No. (1) pp 38-44.

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### **Short Bio**

Prof. Madi Al-Jaghabir has over 25 years of experience in social and public health. He is the Chairman Department of community and family medicine in the University of Jordan hospital. His academic interests include Environmental hazards, Food pollution, Environmental Epidemiology, Pesticide Pollutions. He participated in many national committees in Jordan. He has been recruited in many international funded research projects

### **Works related to water**

1. Evaluation of water related policies on health. WHO. Oct. 2004.CEHA–Amman-Jordan.
2. Evaluation of Reclaimed water agricultural use in Wadi Musa stage 2 .USAID Feb. 2005
3. Water Quality risk assessment of water sources. Northern Governorate Water Administration . Ministry of water and irrigation water . Jan.-March 2008(41days) .
4. Occupational Health and Safety Plan for Northern Governorate Water Administration workers. Ministry of water and irrigation water. March 2009
5. Preparation of the Feasibility Study and Environmental and Social Impact Assessment for Zarqa Governorate Water Wells Rehabilitation. .Zarqa Governorate Water Wells Rehabilitation Public Health and Environmental Health Assessment Jan, 1-11, 2010
6. Evaluation and management plan for Climate changes impact on Jordan including water sources and wastewater reuse -Environmental expert for the national team- Jordan 2011-2012
7. Estimating minimal domestic water for health. Environmental expert, 2012-2013 sent for publication

## Dr. Nehaya Al-Karablieh

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### Short Bio

Dr. Nehaya Al-Karablieh has over 7 years of experience in plant associated microbiology. She is interested in microbial molecular biology, molecular plant pathology, microbial diversity, bacterial resistant mechanism, extraction of bioactive compounds from plants, beneficiary microbes and microalgae, suitability of wastewater for cultivation of microalgae, downstream bio-processing of novel complex marine carbohydrates with pharmaceutical properties. She is team leader for Molecular Microbiology laboratory at Hamdi Mango Center for Scientific Research. She has been principal investigator for different projects focusing on plant pathogenic bacteria and plant beneficiary bacteria. Her task is detecting microbial contaminations *on* plants and plants products.

### Most Recent Related Publications:

1. **Al-Karablieh N.**, Mutlak I. and Al-Dokh A. (2016). Isolation and identification of *Pseudomonas viridiflava*, the causal agent of fruit rotting of *cucumis sativus*. Jordan Journal of Agricultural Sciences. (Accepted).
2. Mehmood A., Abdallah K., Khandekar S., Zhurina D., Srivastava A., **Al-Karablieh N.**, Alfaro-Espinoza G., Pletzer D. and Ullrich, M. S. (2015). Expression of extra-cellular levansucrase in *Pseudomonas syringae* is controlled by the in planta fitness-promoting metabolic repressor HexR. BMC Microbiology. 15:48-.
3. Coustets M., **Al-Karablieh N.**, Thomsen C. and Teissié J. (2013). Flow Process for Electroextraction of Total Proteins from Microalgae. J. membrane bio. 10.1007/s00232-013-9542-y.
4. Rwehumbiza V. M., Vennapusa R. R., Gavara P. R., Fernández-Lahore Héctor M., **Al-Karablieh N.**, Ullrich M. S. and Thomsen C. (2013). Potential of fibrous adsorbents for the binding and characterization of *Porphyridium purpureum* bioactive polysaccharides. J. Chem. Technol. Biotechnol.. doi: 10.1002/jctb.4120
5. Srivastava A., **Al-Karablieh N.**, Khandekar S. Sharmin A. and Ullrich M. S. (2012). Genomic distribution and divergence of levansucrase-coding genes in *Pseudomonas syringae*. *Genes* 3, 115-137.
6. **Al-Karablieh N.**, Weingart H. and Ullrich M. S. (2009). Genetic exchange of multidrug efflux pumps among two enterobacterial species with distinctive ecological niches. *Int J Mol Sci* 10: 629–645.
7. **Al-Karablieh N.**, Weingart H. and Ullrich M. S. (2009). The outer membrane protein TolC is required for phytoalexin resistance and virulence of the fire blight pathogen *Erwinia amylovora*. *Microb Biotech* 2: 465–475.

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### Short Bio

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Dr. Nivin Al Alami studied Biological Science at Faculty of Sciences/The University of Jordan. She obtained the M.Sc. Degree in Biological & Environmental Sciences at Faculty of Graduate Studies/The University of Jordan. Her Research skills are mainly related to detection and identification of pathogenic microorganisms in water and environment using novel rapid techniques such as Real-Time PCR, ELIZA, FT-IR as well as using advanced microbiological procedures and microscopic techniques for the enumeration and identification of nematode, protozoa, fungi, algae (fluorescence and phase contrast microscopy, membrane and transparent-membrane filtration techniques). She has extensive experience in monitoring environmental microbial quality in hospitals, health care centers and biological laboratories. She has a good experience in quality assurance and accreditation procedures applied at microbiology laboratories. She has an extensive experience working with international agencies (USAID, UNDP, and WHO)

<http://centers.ju.edu.jo/en/weec/Lists/CenterStaff/researchers.aspx>

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### *Most Recent Related Publications:*

1. Hamzah M. Al-Qadiri, Mahmoudreza Ovissipour, **Nivin Al-Alami**, Byju N. Govindan, Setareh Ghorban Shiroodi, and Barbara Rasco. (2016). Efficacy of Neutral Electrolyzed Water, Quaternary Ammonium and Lactic Acid-Based Solutions in Controlling Microbial Contamination of Food Cutting Boards Using a Manual Spraying Technique. Journal of Food Science. Vol. 81, Nr. 5 : 177-183
2. Hamzah M. Al-Qadiri , Murad A. Al-Holy , Setareh Ghorban Shiroodi , Mahmoudreza Ovissipour ,Byju N. Govindan , **Nivin Al-Alami** , Shyam S. Sablani , Barbara Rasco. (2016). Effect of acidic electrolyzed water-induced bacterial inhibition and injury in live clam (*Venerupis philippinarum*) and mussel (*Mytilus edulis*). International Journal of Food Microbiology 231: 48–53

3. Ovissipour, M., Al-Qadiri, H., Sablani, S., Govindan, B., **Al-Alami, N.**, and Rasco, B. (2015). Efficacy of acidic and alkaline electrolyzed water for inactivating *Escherichia coli* O104:H4, *Listeria monocytogenes*, *Campylobacter jejuni*, *Aeromonas hydrophila*, and *Vibrio parahaemolyticus* in cell suspensions. *Food Control*. 53: 117-123
4. Al-Qadiri, H., Sablani, S., Ovissipour, M., Al-Alami, N., Govindan, B., and Rasco, B. (2015). Effect of Oxygen Stress on Growth and Survival of *Clostridium perfringens*, *Campylobacter jejuni*, and *Listeria monocytogenes* under Different Storage Conditions. *Journal of Food Protection*. In Press.
5. Lu, X., Liu, Q., Wu, D., Al-Qadiri, H.M., **Al-Alami, N.I.**, Kang, D-H., Shin, J-H, Tang, J., Jabal, J., Aston, E. and Rasco, B.A. (2011). Using of Infrared Spectroscopy to Study the Survival and Injury of *Escherichia coli* O157:H7, *Campylobacter jejuni* and *Pseudomonas aeruginosa* Under Cold Stress in Low Nutrient Media. *Food Microbiology*. 28: 537-546.
6. Al-Qadiri, H.M., Lu, X., **Al-Alami, N.I.** and Rasco, B.A. (2011). Survival of *Escherichia coli* O157:H7 and *Campylobacter jejuni* in Bottled Purified Drinking Water under Different Storage Conditions. *Journal of Food Protection*. 74: 254-260.
7. Al-Qadiri, H.M., **Al-Alami, N.I.**, Al-Holy, M.A. and Rasco, B.A. (2008). Using Fourier Transform Infrared (FT-IR) Absorbance Spectroscopy and Multivariate Analysis to Study the Effect of Chlorine-Induced Bacterial Injury in Water. *Journal of Agriculture and Food Chemistry*. 56: 8992-8997.
8. Al-Qadiri, H.M., Alami, N.I., Al-Holy, M.A., Lin, M., Cavinato, A.G. and Rasco, B.A. (2008). Studying of the bacterial growth phases using Fourier transform infrared (FT-IR) spectroscopy and multivariate analysis. *Journal of Rapid Methods and Automation in Microbiology*. 16: 73-89.
9. Halalsheh, M., Abu Ghunmi, L., **Al-Alami, N.**, and Fayyad, M. (2008). Fate of pathogens in tomato plants and soil irrigated with secondary treated wastewater. *Efficient Management of Wastewater, Earth and Environmental Science*. 81-89.
10. Al-Qadiri, H.M., Al-Holy, M.A., Lin, M., **Alami, N.I.** and Rasco, B.A. (2006). Rapid detection and identification of *Pseudomonas aeruginosa*, and *Escherichia coli* as pure and mixed cultures in bottled drinking water using Fourier transform infrared spectroscopy (FT-IR) and multivariate analysis. *Journal of Agriculture and Food Chemistry*. 54: 5749-5754.



**Eng. Sana'a Al-Aqqad**

Chemist

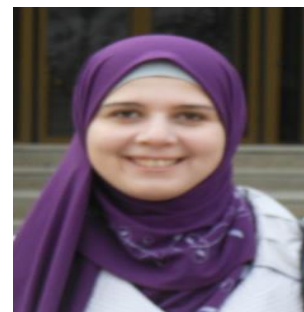
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Msc. Eng. Sana'a Al-Aqqad, Chemist; task: analysis and monitoring soil salinity and heavy metals in the irrigated areas by TW. She is a research assistant, EU project coordinator assistant and technical manager of water chemistry lab at Water Energy and Environment Center (WEEC) of the University of Jordan. She obtained her Master degree in Chemistry/Analytical Environmental Chemistry, 2005. Her research interests are in evaluating and monitoring water and environmental organic and inorganic pollutants.

**Most Recent Related Publications:**

1. Mahmoud Alawi, Manar Fayyad and Sana'a Al-Aqqad, Persistent Organic Pollutants (POPS) in Jordanian Mother's Milk from the Surroundings of Landfill Site at Marka. *Fresenius Environmental Bulletin*: vol.15 -No.2, (118-124), 2006.
2. Mahmoud Alawi, Tawfiq Al-Antary, Hussein Estityha, Sana'a Al-Aqqad and Khalaf Al-Oqlah, Comparative Study for Chlorinated Pesticides in Mother Milk from Jordan in Four Studies between 1993 and 2003 *Fresenius Environmental Bulletin*: vol.22 - No.1A, (279-285), 2013.