



## Mustapha BESBES

Honorary Professor at the National Engineering School,  
University of Tunis El Manar; Tunisia.

*Address : 25, rue Essaida Khadija - El Menzah 9c - 1013 – Tunis ; Tunisie*

*Email: [mbf.besbes@gnet.tn](mailto:mbf.besbes@gnet.tn)*

*Phone : +216.98646120*

Mustapha Besbes is Professor of Hydrogeology then professor emeritus in the Tunis National Engineering School from 1979 to 2015, Director of the school from 1889 to 1995, Research Engineer at the Paris School of Mines from 1972 to 1979, hydro geologist in charge of Central Tunisia, Office of Hydraulic Resources, Ministry of Agriculture of Tunisia, from 1964 to 1971.

M. Besbes received his bachelor's and master's degrees, in Geology and Geophysics, his PhD in Hydrology (1967) and his Doctorat es sciences (1978) from the University Pierre & Marie Curie in Paris. His research topics focuses on groundwater, water management and policies, modelling, water resources in arid regions. He especially developed an original model to study aquifer recharge by floods in ephemeral streams, and his team was able to establish the current recharge of Saharan aquifers whereas they often were assumed to only contain fossil water. He also coordinated works on modelling the NWSAS (the North Western Sahara Aquifer System, covering over one million square kilometres) in order to design an optimal exploitation scheme by Algeria, Tunisia and Libya). During the last fifteen years, he developed new concepts and applications on managing green and virtual water, with an emphasis on water resources globalization, and original findings on the case of Tunisia.

M. Besbes was elected as foreign member of the French Academy of sciences, in 2009, and corresponding member of the Tunisian Academy of Sciences, Letters and Arts Beit AlHikma in 2013. He has published three books and nearly one hundred articles in the field of hydrogeology and water management and protection.

He is member or head of numerous scientific commissions and working groups : President of the Committee for exact and natural sciences of the National Commission of the UNESCO (1989-1993); National commission for Atomic Energy (1991-1996); National committee for scientific research (1994); National committee for higher education assessment (1996-2001); Vice-president of the National Committee of the International Hydrologic Program (1984-1990) ; Member of National boards for higher education In Geological sciences, Hydraulic engineering, Civil engineering, Industrial engineering, Agronomic sciences; President of the International Association of Engineering schools and Technicians formations (1992-1996) ; Member of National committee of scientific Research assessment (1998-2002); Board of Tunisian Institute for Strategic Studies; Member of the National Council for Research & Technology (2006 to now). He is Co-Founder of the Water Resources journal of Tunisia (1971) ; Member of the editorial board of Hydrogéologie journal, France

(1987-2002); Member of the scientific committee of the Journal des Sciences de l'Eau, Canada (1989-1993); Chairman of the Annales Maghrebines de l'Ingénieur (1990-1995); Reviewer for many scientific journals in the hydrological sciences and water management fields ; Associate editor of the Hydrological Sciences Journal.

### **Books :**

Besbes.M., ed. (2015)- *La mesure des risques hydrologiques ; Avancées & applications scientifiques dans le secteur de l'eau* (Hydrological risks assessments ; Scientific Advances & Applications in the water sector.) ; The Tunisian Academy of Sciences, Letters and Arts Editions ; Carthage, 2015.

Besbes.M, Chahed.J, Hamdane.A : (2014)- *Sécurité hydrique de la Tunisie* (Water Security of Tunisia) ; Preface by Ghislain de Marsily ; Edited by l'Harmattan , Paris, 2014.

Besbes.M (2010): *Hydrogéologie de l'Ingénieur* (Hydrogeology for engineers); Preface by Ghislain de Marsily ; Book edited by the « Centre de Publication Universitaire », Tunis, 2010;

### **Main articles and talks :**

Chahed.J, Besbes.M, Hamdane.A: (2015)- *Virtual-water content of agricultural production and food trade balance of Tunisia* ; International Journal of Water Resources Development ; Volume 31, Issue 3, 2015.

Besbes. M (2012) : *L'Humanité va-t-elle manquer d'eau ?* Rubrique Sciences du journal Le Figaro, Paris, 19 Janvier 2012.

Besbes. M (2012): Au sud de la Méditerranée, l'eau est un enjeu sociétal, scientifique, technologique ; Groupement Interacadémique pour le Développement ; 20 Mars 2012 ; Académie des Sciences ; Paris.

Besbes. M (2011): Sécurité Hydrique au Maghreb, les enjeux prioritaires; Conférence inaugurale; Forum « Eau-Santé-Agriculture en Afrique » ; 12-13 Mai 2011 ; Académie des Sciences ; Paris.

Chahed.J, Besbes.M, Hamdane.A: (2011)- Alleviating water scarcity by optimizing "Green Virtual-Water": the case of Tunisia ; in Hoekstra, A.Y., Aldaya, M.M. and Avril, B: Accounting for water scarcity and pollution in the rules of international trade . Value of Water Research Report Series, No. 54, UNESCO-IHE, Delft, the Netherlands.

Besbes. M (2011) : Water Resources Management in Maghreb ; invited lecture in the 250th anniversary of the French Academy of Agriculture ; « Les hommes et l'eau : Agriculture, Environnement, Espace méditerranéen » ; UNESCO, Paris ; 22 Juin 2011.

Chahed J., Besbes M., Hamdane A. (2010): Controlling water scarcity by optimizing Blue and Green Virtual Water fluxes. Strategic Workshop on "Water and Trade". Amsterdam 25-26 November 2010.

Besbes, M., J. Chahed, A. Hamdane, G. De Marsily (2010): Changing Water Resources and Food Supply in Arid Zones: Tunisia; in "Water and Sustainability in Arid Regions; G.Schneier-Madanes & M.F Courel editors; Springer", 2010.

Chahed J., Besbes M., Hamdane A. (2009): Water scarcity and food security: a global assessment of water potentiality in Tunisia. « 4th Marcelino Botin foundation (MBF) Water Workshop». Santander (Spain), 22-24 September 2009.

Besbes.M ; (2008) : Water in Arid Countries ; Pour la Science ; Dossier N°58 ; 2008.

Besbes, Hamdane, Chahed, Hamza (2008): World Water Development Report 3; Case study in Tunisia; prepared for the UN World Water Assessment Program; 2008.

Chahed, Besbes, Hamdane., (2008) : A comprehensive water balance of Tunisia: blue water, green water, and virtual water; Water International, 33:4,415 – 424

Chebbi A., M. Zammouri, M.C. Cunha, Y. Nazoumou, M. Besbes, Z. Bargaoui (2008): Optimization of withdrawals from an aquifer: a case study at Kairouan (Tunisia). Water International; Vol 33 (1):100-115.

Horrache, Besbes (2008): Rationalisation du réseau piézométrique du Système Aquifère du Sahara Septentrional ; Sécheresse 19 (3) 1-9 ;

- Chahed, Besbes, Hamdane., 2007 ; Stress hydrique et sécurité alimentaire, une vision intégrale des ressources en eau; La Houille Blanche ; N° 03-2007
- Kingumbi, Bargaoui, Ledoux, Besbes, Hubert, 2007 ; Modélisation hydrologique stochastique d'un bassin affecté par des changements d'occupation. Cas du Merguellil en Tunisie centrale, Hydrological Sciences Journal, 52(6): 1232-1253.
- Besbes, Horriche-Jarraya., 2007 ; Définition d'un Réseau Piézométrique de Surveillance du Système Aquifère du Sahara Septentrional ; Revue Sécheresse 18(1,13-22)
- Ould BabaSy, Besbes., 2007 : Hydrodynamique du Complexe Terminal saharien et teneurs en 14C. Cahiers du GFHN N° 51-2007.
- Kingumbi, Bargaoui, Ledoux, Besbes, Hubert, 2007 ; Modélisation hydrologique stochastique d'un bassin affecté par des changements d'occupation. Cas du Merguellil en Tunisie centrale, Hydrological Sciences Journal, 52(6): 1232-1253.
- Besbes, M., J. Chahed, A. Hamdane (2007): Bilan intégral des ressources en eau, sécurité hydrique et sécurité alimentaire, Séance de l'Académie d'Agriculture de France ; Paris 4 Avril 2007.
- Besbes M., (2006) : Aquifer Recharge by Wadis Floods (Recharge des aquifères par les crues d'oueds) ; in « Frontiers in Flood Research » ; IAHS « Red Books » publication 305 ;
- Horriche, Besbes., 2006. Analyse du Réseau Piézométrique National Tunisien ; Revue des Sciences de l'Eau, 19(4) (2006), pp. 347-363.
- Mamou, Besbes, Abdous, Latrech, Fezzani, 2006 ; North Western Sahara Aquifer System (NWSAS); in "Non renewable ground water resources", a guidebook on socially-sustainable management for water policy makers; UNESCO series on groundwater N°10, 2006,
- Ould BabaSy.M, Besbes.M, 2006; Holocene recharge and present recharge of the saharan aquifers. A study by numerical modelling. International symposium-Aquifers Systems Management - 2006, Darcy's Law anniversary 150, Dijon, France
- Besbes.M (2006): i) Evolution de la connaissance des ressources en eau de Tunisie ; ii) Aquifères du Sahara Septentrional (en coll. G.de Marsily); in « Les Eaux Continentales ». Rapport sur la Science et la Technologie ; Institut de France, Académie des Sciences ; G.de Marsily éd.
- Kingumbi A., Bargaoui Z., Besbes M., Hubert P. et Ledoux E. (2005), Impact assessment of change in rainfall pattern and land use on water budget in a semi-arid area basin, Int. Conf.on Reservoir optimisation and river management (ICROM) Guangzhou, China.
- M.Besbes, M.Babasy, S.Kadri, D.Latrech, A.Mamou, P.Pallas, M.Zammouri (2004) : Conceptual framework of the North Western Sahara Aquifer System ; in « Managing shared aquifer resources in Africa»; IHP-VI,Series on Groundwater N°8; B.Allegren ed. ;UNESCO.
- Kingumbi, Besbes, Bourges, Garretta, (2004), Evaluation des transferts entre barrage et aquifères par la méthode de bilan d'une retenue en zone semi-aride. Cas d'El Haouareb en Tunisie centrale. « Revue des Sciences de l'Eau » 17/2/213-225\*
- Dakouré, Marsily, Dray, Besbes (2004) : Apports des techniques isotopiques à la connaissance des eaux souterraines dans un bassin sédimentaire ; Intl Workshop on the Application of Isotope Techniques in Hydrological and Environmental Studies; UNESCO
- Besbes et al ; (2003) : Système Aquifère du Sahara Septentrional, Gestion commune d'un bassin transfrontière ; La Houille Blanche, N°5
- Nazoumou, Besbes (2001) : Simulation de la recharge Artificielle en oued par un modèle hydrologique à réservoirs. Rev.Sciences de l'Eau 13(4),
- Zammouri, Besbes (1994) : Représentativité des modèles des grands aquifères . le Continental Intercalaire Saharien; Hydrogéologie , n°3 , 1994.
- Besbes, De Marsily.(1984) : From infiltration to recharge : use of a parametric transfer function. J.of Hydrology, 74, 1984.
- Besbes.M. (1981) : Nos ressources en eau souterraine sont-elles bien connues ? Conf. Inaug. Congrès Nat. Sciences de la Terre. Tunis - 1981.
- Besbes, Delhomme, De Marsily. (1978) :Estimating recharge from ephemeral streams in arid regions. Water Resources Research, Avril 1978.
- Besbes M. (1978) : Un modèle régional d'infiltration efficace. Thèse de Doctorat ès Sciences Naturelles - Université Paris VI, 1978.
- Besbes. M (1969) : L'effet barométrique dans les puits ; Bull. B.R.G.M., 2<sup>ème</sup> série, section III, N°2, 1969.
- Besbes. M (1967) : Contribution à l'étude des ressources en eaux souterraines de la région de Haffouz, Tunisie. ; Thèse 3è cycle, Paris, 1967.