



Name: **Olli Varis**

Home page: <https://people.aalto.fi/olli.varis>

Languages: English (excellent), Finnish (mother tongue), German & Swedish (good), Spanish & French (moderate)

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#### ACADEMIC EDUCATION

09.12.1991	<b>Dr. Sc.</b> Civil Engineering and Surveying (Water Resources Management), former Helsinki University of Technology (currently Aalto University)
14.03.1988	<b>Lic. Sc.</b> Civil Engineering and Surveying (Water Resources Management) former Helsinki University of Technology (currently Aalto University)
16.12.1986	<b>M.Sc.</b> Agriculture and Forestry (Limnology) University of Helsinki
23.10.1984	<b>M.Sc.</b> Civil Engineering and Surveying (Water Resources Management) former Helsinki University of Technology (currently Aalto University)

#### ACADEMIC AFFILIATIONS

1983 – Present	Aalto University (Helsinki University of Technology until 1 Jan 2009) with a few breaks due to temporary affiliations. <b>Professor</b> since 1 March 2008 – <b>Matti Pursula Professor</b> since 1 July 2015; <b>Vice Dean of the School of Engineering</b> July 2013 – June 2018 (responsibility areas: research & innovations).
Temporary affiliation	International Institute for Applied Systems Analysis ( <b>Austria</b> ); Asian Institute of Technology ( <b>Thailand</b> ), Mekong River Commission ( <b>Cambodia</b> ); World Institute of Development Economics Research UNU/WIDER ( <b>Finland</b> ); among others

#### PUBLICATIONS, WHOLE CAREER

Type of publication	N. whole career	H index and citations
<b>Peer-reviewed scientific articles</b>	<b>256</b>	<b>HI 29</b> from <i>Web of Knowledge</i> , citations <b>3019</b> (2763 excluding self-citations, based on 118 publications).
• <i>International journal articles</i>	130	
• <i>Peer-reviewed book chapters</i>	29	
• <i>Peer-reviewed publications in Finnish</i>	41	
• <i>Peer-reviewed conference articles</i>	55	<b>HI 33</b> from <i>Scopus</i> , citations <b>3491</b> (3185, 126 publications).
<b>Non-reviewed scientific articles</b>	<b>19</b>	
<b>Scientific books</b>	<b>15</b>	
<b>Publications intended for professional communities</b>	<b>109</b>	<b>HI 42</b> from <i>Google Scholar</i> citations <b>6970</b> (334 publications)
• <i>International publications</i>	70	
• <i>Publications in Finnish</i>	39	
<b>Total</b>	<b>394</b>	

In addition, I have published **4 academic theses and dissertations**, and have currently 7 international peer-reviewed articles **forthcoming**.

#### MAJOR COMMITTEE ASSIGNMENTS IN THE DEPARTMENT, SCHOOL, AND/OR UNIVERSITY

1.07.2013 – 30.06.2018	Aalto University, School of Engineering, <b>Vice Dean</b> for research and innovation
11.02.2011 – 31.12.2016	Aalto University, Tenure Track Committee
1.07.2013 – 31.12.2015; 1.01.2017 ->	Chair, Aalto Univ, School of Engineering, Tenure Track Committee
1.01.2011 – 31.12.2013	Aalto University, School of Engineering, Committee for Doctoral Studies
1.08.2010 – 31.12.2010	Aalto University, Doctoral Education Committee

## PRIZES, AWARDS AND IMPORTANT ADVISORY FUNCTIONS

Finnish Water Association, **Literature Prize** (1999). **Expert Counselor** of the Environment, Supreme Administrative Court of Finland 2006-2015; **Invited expert counselor** for: Mekong River Commission; Asian Development Bank; Arab Water Council; InWEnt Capacity Building International, Germany. EU DG RTD FP7, FP6, FP5 evaluator; Finnish Environment Institute, Board member since 2014.

Asian Institute of Technology, Thailand, **Distinguished Adjunct Professor**, since December, 2014.

University of Hong Kong, China, advisor for Centre for Water Technology and Policy, since November 2018.

In June 2005, I was invited by *His Majesty the King of Sweden Carl XVI Gustav* to participate at Royal Colloquium to discuss the threats posed by climate change on the Arctic zone.

In 2002, I worked as an expert on water governance with International Union of Conservation of Nature (IUCN), Ouagadougou, Burkina Faso, and we edited a book on *La gouvernance de l'eau en Afrique de l'Ouest*.

Environmental Research Letters: **Best paper award** 2010; Water International: **Best paper award** 2015.

Aalto University Award on **Business/Design/Engineering Excellence** in 2017 for Water Doctoral Education

**Knight**, First Class, of the Order of the White Rose of Finland; since December 6 2012.

## MAIN SCIENTIFIC ACHIEVEMENTS

My expertise lies in freshwater management and governance, sustainable development, environmental and social impacts, computational modeling, multidisciplinary natural resources and development studies.

My works have been published in 14 languages (English, Finnish, Swedish, Spanish, French, Chinese, Arabic, Russian, Japanese, Vietnamese, Thai, Khmer, Burmese and Lao). I have been very active in Asia over two decades, particularly on research of the **sustainable development of Asia, and its links to freshwater**. I have published widely within that context, particularly on China, Mekong, Brahmaputra, Ganges and the Aral Sea Basins, as well as on regional overviews of Asia-Pacific. Besides, I have been working with water management in the Middle East and North African countries as well as in West Africa. The focal areas have included integrated water resources management, social and environmental impact assessment, water and security studies, sustainability analyses, climatic change studies as well as resilience and vulnerability analyses. I have also investigated and published widely on various **global development issues**, particularly population growth, urbanization, energy, human development, environment and economy as well as comprehensive security.

## SUPERVISED THESIS AND STUDENT COMMITTEE SERVICE

I have supervised 10 Doctoral Dissertations (Matti Kummu 2008, Muhammad Mizanur Rahaman 2009, Ulla Heinonen 2009, Marko Keskinen 2010, Virpi Stucki 2011, Aura Salmivaara 2015, Suvi Sojamo 2016, Mirja Kattelus 2017, Juho Haapala 2018, Mika Jalava 2019), 3 Licentiate Thesis and 50 Master's Thesis, and have served as CoM for 4 Ph.D. students, and acted as an opponent at the doctoral defenses for two students.

## PROFESSIONAL ORGANIZATIONS, TITLES AND PROFESSIONAL LICENSING

*International Water Resources Association*: member since 1999; Director 2004-6; **Vice President** 2007-9. *WMO*: European Rapporteur on Climate & Water 1998-2005. *International Association of Hydraulic Sciences (IAHS)*: Member Water Quality Commission 2000-4. *UNESCO/IHP Working Group on Strategies for water resources management in emergency and conflict situations*, member 1996-2006. *International Water Association (IWA, formerly IAWPRC, IAWQ, IWSA)*: Member: Strategic Planning Task Group (1994-8), Member: Scientific and Technical Committee (1998-2001), Member: Review Group (1999-2003), Member: Strategic Council (2002-4). *Decision Analysis Society of the Institute for Operations Research and Management Sciences (INFORMS)*: member since 1996; *Modelling and Simulation Society of Australia and New Zealand*: member since 1993; *International Society on Multiple Criteria Decision Making*: member since 1988; *Academy of Technical Sciences, Finland*, member since 2009.

## AUTHORSHIP AND PEER-REVIEW ACTIVITIES

I have an **exceptional multidisciplinary track record in scientific work having authored peer-reviewed articles** in an extensive range of scientific disciplines including journals such as Artificial Intelligence; Appl

Energy, Appl Geography; Archiv für Hydrobiologie; Canadian J Fisheries & Aquatic Sciences; Climatic Change; Computational Statistics & Data Analysis; Geomorphology; Global Environmental Change: Human & Policy Dimensions; Ecol Modeling; Economics of Peace & Security J; Environm Modelling & Software; Environm Research Letters; European J of Wildlife Research; J Climatology, Harvard International Review; Natural Resources Forum; **Nature**, PLoS One; Sustainability: Science, Practice & Policy; Water Resources Dev.

I review in average 15 papers/year, and participate in average to 5 conferences/y often as an invited speaker.

#### PARTICIPATION AND ORGANIZATION OF CONFERENCES IN THE LAST 10 YEARS

13<sup>th</sup> IWRA World Water Congress, Montpellier (France) 1-4 September 2008: **Chair, Scientific Committee.**

4<sup>th</sup> Yangtze Forum, Nanjing (China), April 2011, Rapporteur by the EU-China River Basin Management Programme. 3<sup>rd</sup> Global Economic Leaders' Summit, Chanchun (China), September 2013, invited speaker on water and urbanization. After that several per year.

**Editor:** Water International 2008-2010. **Editorial Board membership:** International Journal of Water Resources Development, Water International, Water Security, nature Partner Journal Water Quality.

Speaker in 70 international conferences with 50 invited/plenary/keynote presentations.

Referee in numerous journals with 10-20 reviews per year. Referee for several research organizations. Organizes annually three university courses (17 ETC). Two of them are PhD level courses.

#### MAJOR CONTRIBUTIONS TO EARLY CAREERS OF EXCELLENT RESEARCHERS

*Dr Matti Kummu* graduated in December 2008. He received the *Dissertation of the Year Award* by Oskar Vilamo Foundation in 2009 and I was awarded as the *PhD Supervisor of the year*. He has now ISI H Index 37 with 119 peer-reviewed publications, and has been cited 3596 times. He started as Assistant Professor at Aalto University in June 2013, and received an ERC (European Research Council) Consolidator Grant in 2019.

*Dr Marko Keskinen* graduated in June 2010. He received the *Dissertation of the Year Award* by Oskar Vilamo Foundation in 2011 and I was awarded as the *PhD Supervisor of the year*. His ISI H Index is now 15.

*Dr Virpi Stucki* graduated in September 2011. She started 1<sup>th</sup> January 2012 as Industrial Developer Officer at UNIDO, Vienna. She received the *Dissertation of the Year Award* by Oskar Vilamo Foundation in 2011.

*Dr Muhammad Mizanur Rahaman* graduated in June 2009. He spent part of his PostDoc period at Cambridge University, U.K. Now professor and department head at the University of Asia Pacific in Dhaka, Bangladesh.

*Dr Ulla Heinonen* graduated in 2009. Now Managing Director of sustainable business consultancy Gaia oy.

*Dr Suvi Sojamo* graduated in June 2016. Now coordinator of a Strategic Research Council / Academy of Finland Project "From Failand to Winland" which is a strategic multidisciplinary research project that addresses comprehensive security of Finland and co-led by myself.

#### EXAMPLES OF LEADERSHIP IN INDUSTRIAL INNOVATION

Vice Dean of Research and Innovation of the School of Engineering, Aalto University, from July 2013 to July 2018. Member of Aalto University's Research and Innovation Steering Group, same period.

Leader of *Aalto University's Sustainable Global Technologies Programme* since 2006 involving student collaborative innovation projects with partners such as Ahlström, Nokia-Siemens Networks, Kemira, UPM, Church Aid Finland, Finnish Red Cross, WWF and others.

Invited expert for Siemens AG for the process of developing the corporate water strategy for Asia in 2006.

Aalto Strategic Leader course in 2011.

#### MAJOR EXTERNAL FUNDING IN PAST 5 YEARS

2016: 2M€: Doctoral Education in Water & Development, Land and Water Technology Foundation.

2016: 3.5M€: From Failand to Winland Project, Consortium Co-Leader, Strategic Research Council / Academy of Finland.

2014: New Global Project, member of consortium of 2.4M€ (own subproject 0.3M€), Strategic Openings of TEKES The Finnish Funding Agency for Innovation (now Business Finland).

# List of Publications

Olli Varis, 28 May, 2019

## A International, Peer-reviewed Publications

- 1 Varis, O. 1984. Water quality model for Lake Kuortaneenjärvi, a polyhumic Finnish lake. *Aqua Fennica* 14: 179-187.
- 2 Varis, O., Kettunen, J. & Leonov, A. 1986. On the adequacy of large-scale models identified with incomplete field data – A case study with two lake models. *Aqua Fennica* 16: 157-165.
- 3 Leonov, A., Kettunen, J. & Varis, O. 1987. Dynamics and balance of phosphorus fractions in Lake Kuortaneenjärvi ecosystem (Finland). (in Russian) *Vodnye Resursy* 1987(6): 141-158.
- 4 Varis, O. & Kettunen, J. 1988. DAVID influence diagram processing system in environmental management. *Environmental Software* 3: 81-84.
- 5 Leonov, A., Kettunen, J. & Varis, O. 1988. Dynamics and balance of phosphorus compounds in the ecosystem of Lake Kuortaneenjärvi in Finland. *Water Resources* 14 (6): 603-619.
- 6 Varis, O. 1988. Temporal sensitivity of *Aphanizomenon flos-aquae* dominance – A whole-lake simulation study with input perturbations. *Ecological Modelling* 43: 137-153.
- 7 Kettunen, J., Sirviö, H. & Varis, O. 1989. An analysis of a sampling design – A case study of lake eutrophication. *Computational Statistics and Data Analysis* 8: 81-91.
- 8 Varis, O. 1989. The analysis of preferences in complex environmental judgements – A focus on the Analytic Hierarchy Process. *Journal of Environmental Management* 28: 283-294.
- 9 Varis, O. 1989. Simulated impacts of flow regulation on blue-green algae in a short retention time lake. *Archiv für Hydrobiologie, Beihefte Ergebnisse der Limnologie* 33: 181-189.
- 10 Varis, O., Sirviö, H. & Kettunen, J. 1989. Multivariate analysis of lake phytoplankton and environmental factors. *Archiv für Hydrobiologie* 117: 163-175.
- 11 Varis, O., Kettunen, J. & Sirviö, H. 1990. Bayesian influence diagrams in complex environmental management including observational design. *Computational Statistics and Data Analysis* 9: 77-91.
- 12 Varis, O. & Kettunen, J. 1990. Modeling of water quality in Lake Tuusulanjärvi. *Aqua Fennica* 20: 43-52.
- 13 Mészáros, F., Varis, O., Sirviö, H. & Kettunen, J. 1990. A rule-based water quality model for PC-environment. *Environmental Software* 5: 158-162.
- 14 Varis, O. 1990. Development of phytoplankton in a restored eutrophic lake – a multivariate analysis. *Verhandlungen des internationalen Vereins für Limnologie* 24: 693-697.
- 15 Varis, O. 1991. Associations between lake phytoplankton community and growth factors – a canonical correlation analysis. *Hydrobiologia* 210: 209-216.
- 16 Varis, O. 1991. A canonical approach to diagnostic and predictive modelling of phytoplankton communities. *Archiv für Hydrobiologie* 122: 147-166.
- 17 Kettunen, J., Sirviö, H. & Varis, O. 1992. Evaluation of a model-based method for designing water quality observations. *Hydrobiologia* 243/244: 381-387.
- 18 Kløve, B., Kettunen, J., Varis, O., Vakkilainen, P. & Sirviö, H. 1993. A real-time monitoring system for Kerava river quality. *Environmental Monitoring and Assessment* 24: 167-180.
- 19 Varis, O. 1993. Impacts of growth factors on competitive ability of blue-green algae analyzed with whole-lake simulation. *Advances in Hydrobiology* 77: 127-137.
- 20 Varis, O. 1993. Cyanobacteria dynamics in a restored Finnish lake – a long term simulation study. *Hydrobiologia* 268: 129-145.
- 21 Varis, O., Kløve, B. & Kettunen, J. 1993. Evaluation of a real-time forecasting system for river water quality – a trade-off between risk attitudes, costs and uncertainty. *Environmental Monitoring and Assessment* 28: 201-213.
- 22 Varis, O., Kuikka, S. & Taskinen, A. 1994. Modeling for water quality decisions: uncertainty and subjectivity in information, in objectives, and in model structure. *Ecological Modelling* 74: 91-101.
- 23 Taskinen, A., Varis, O., Sirviö, H., Mutanen, J. & Vakkilainen, P. 1994. Probabilistic uncertainty assessment of phosphorus balance calculations in a watershed. *Ecological Modelling* 74: 125-135.

- 24 Varis, O. 1994. Water quality models: Tools for the analysis of data, knowledge, and decisions. *Water Science and Technology* 30: 13-19.
- 25 Varis, O. 1995. Belief networks for modelling and assessment of environmental change. *Environmetrics* 6: 439-444.
- 26 Varis, O. 1996. Water quality models: Typologies for environmental impact assessment. *Water Science and Technology* 34: 109-117.
- 27 Kuikka, S. & Varis, O. 1997. Uncertainties of climatic change impacts in Finnish watersheds: a Bayesian network analysis of expert knowledge. *Boreal Environment Research* 2: 109-128.
- 28 Varis, O. & Somlyódy, L. 1997. Global urbanization and urban water: can sustainability be afforded? *Water Science and Technology* 35(9): 21-32.
- 29 Varis, O. & Kuikka, S. 1997. BeNe-EIA: A Bayesian approach to expert judgment elicitation with case studies on climatic change impacts on surface waters. *Climatic Change* 37: 539-563.
- 30 Varis, O. & Kuikka, S. 1997. Joint use of multiple environmental assessment models by a Bayesian meta-model: the Baltic salmon case. *Ecological Modelling* 102: 341-351.
- 31 Varis, O. 1997. Bayesian decision analysis for environmental and resource management. *Environmental Modelling and Software*: 12: 177-185.
- 32 Varis, O. 1998. A belief network approach to optimization and parameter estimation: application to resource and environmental management. *Artificial Intelligence* 101: 135-163.
- 33 Varis, O. & Kuikka, S. 1999. Learning Bayesian decision analysis by doing: lessons from environmental and natural resources management. *Ecological Modelling* 119: 177-195.
- 34 Kuikka, S., Hildén, M., Gislason, H., Hansson, S., Sparholt, H. & Varis, O. 1999. Modeling environmentally driven uncertainties in Baltic cod (*Gadus morhua*) management by Bayesian influence diagrams. *Canadian Journal of Fisheries and Aquatic Sciences* 56: 629-641.
- 35 Varis, O. 1999. Water resources management: Vicious and virtuous circles. *Ambio* 28: 599-603.
- 36 Varis, O. 1999. Dreams and reality in water resources management: A critical view to leading paradigms. *Global Environmental Change: Human and Policy Dimensions* 9: 255-259.
- 37 Shen, D. & Varis, O. 2000. World Water Vision: Balancing Thoughts after The Hague. *Ambio* 29: 523-525. (a synopsis article, not scientifically peer-reviewed)
- 38 Varis, O. 2000. The Nile Basin in a global perspective: natural, human, and socioeconomic resource nexus. *Water International* 25: 624-637.
- 39 Somlyódy, L., Yates, D. & Varis, O. 2001. Challenges to freshwater management. *Ecology and Hydrobiology* 1: 65-96.
- 40 Shen, D. & Varis, O. 2001. Climate change in China. *Ambio* 30(6): 381-383. (a synopsis article, not scientifically peer-reviewed)
- 41 Varis, O. & Vakkilainen, P. 2001. China's 8 challenges to water resources management in the first quarter of the 21<sup>st</sup> Century. *Geomorphology* 41(2-3): 93-104.
- 42 Cogels, F.-X., Fraboulet-Jussila, S. & Varis, O. 2001. Multipurpose use and water quality challenges in Lac de Guiers (Senegal). *Water Science and Technology* 44(6): 35-46.
- 43 Varis, O. & Fraboulet-Jussila, S. 2002. Water resources management in the lower Senegal River basin—conflicting interests, environmental concerns, and policy options. *International Journal of Water Resources Development* 18: 245-260.
- 44 Varis, O. & Fraboulet-Jussila, S. 2002. Analysis of eutrophication level and critical loads of Lac de Guiers, Senegal. *Verhandlungen des internationalen Vereins für Limnologie* 28: 462-466.
- 45 Varis, O. & Lahtela, V. 2002. Integrated water resources management along the Senegal River – Introducing an analytical framework. *International Journal of Water Resources Development* 18: 501-521.
- 46 Cogels, F.-X., Fraboulet-Jussila, S. & Varis, O. 2002. Water quality and drinking water production of Lake Guiers (Senegal, West Africa). *Verhandlungen des internationalen Vereins für Limnologie* 28: 773-776.
- 47 Varis, O. & Keskinen, M. 2003. Socioeconomic analysis of the Tonle Sap Region, Cambodia—building links and capacity for targeted poverty alleviation. *International Journal of Water Resources Development* 19(2): 295-310.

- 48 Varis, O., Kajander, T. & Lemmelä, R. 2004. Climate and water: On the search for improved links from climate models to water resources management and vice versa. *Climatic Change* 66: 321-344.
- 49 Rahaman, M.M., Varis, O. & Kajander, T. 2004. EU Water Framework Directive vs. Integrated Water Resources Management: the seven mismatches. *International Journal of Water Resources Development* 20: 565-575.
- 50 Pellikka, J., Kuikka, S., Lindén, H. & Varis, O. 2005. The role of game management on wildlife populations – uncertainty analysis of expert knowledge. *European Journal of Wildlife Research* 51: 48-59.
- 51 Rahaman, M.M. & Varis, O. 2005. Integrated water resources management: evolution, prospects and future challenges. *Sustainability: Science, Practice & Policy* 1(1): 1-9.
- 52 Lundqvist, J., Tortajada, C., Varis, O. & Biswas, A. 2005. Water management in megacities. *Ambio* 34: 269-270. (a synopsis article, not scientifically peer-reviewed)
- 53 Shady, A., Varis, O. & Tortajada, C. 2005. Sustainable groundwater management. *Water Science and Technology* 51(8): 163-164.
- 54 Varis, O. 2005. Are floods growing? *Ambio* 34: 478-480. (a synopsis article, not scientifically peer-reviewed)
- 55 Varis, O. 2006. Megacities, development and water. *International Journal of Water Resources Development* 22: 199-225.
- 56 Varis, O., Biswas, A., Tortajada, C. & Lundqvist, J. 2006. Megacities and water management. *International Journal of Water Resources Development* 22: 377-394.
- 57 Varis, O. & Keskinen, M. 2006. Policy Analysis for the Tonle Sap Lake, Cambodia – A Bayesian network model approach. *International Journal of Water Resources Development* 22: 417-431.
- 58 Varis, O., Kummu, M. & Keskinen, M. 2006. Editorial. *International Journal of Water Resources Development* 22: 395-398.
- 59 Varis, O. 2006. Backyard of the rich north: Climate related vicious circle of the Arctic zone. *Ambio* 35: 176-181.
- 60 Somlyódy, L. & Varis, O. 2006. Freshwater under pressure. *International Review for Environmental Strategies* 6: 181-204.
- 61 Varis, O., Kummu, M., Keskinen, M., Sarkkula, J., Koponen, J., Heinonen, U. & Makkonen, K. 2006. Integrated Water Resources Management on the Tonle Sap Lake, Cambodia. *Water Science & Technology: Water Supply* 6 (5): 51-58.
- 62 Kummu, M. & Varis, O. 2007. Sediment-related impacts due to upstream reservoir trapping, the Lower Mekong River. *Geomorphology* 85: 275-293.
- 63 Varis, O. 2007. Right to Water: The Millennium Development Goals and Water in the MENA Region. *International Journal of Water Resources Development* 23: 243-266.
- 64 Keskinen, M., Kähkönen, M., Tola, P. & Varis, O. 2007. The Tonle Sap Lake, Cambodia: water-related conflicts with abundance of water. *Economists for Peace and Security Journal* 2(2): 49-59.
- 65 Varis, O. 2007. Water demands of bioenergy production. *International Journal of Water Resources Development* 23: 519-535.
- 66 Varis, O. 2007. Urban futures and footprints - Current directions. *Water International* 32: 589.
- 67 Varis, O., Rahaman, M.M. & Stucki, V. 2008. The rocky road from integrated plans to implementation: lessons learned from Mekong and Senegal river basins. *International Journal of Water Resources Development* 24: 103-121.
- 68 Rahaman, M.M. & Varis, O. 2008. Mexico World Water Forum's Ministerial Declaration 2006: A Dramatic Policy Shift? *International Journal of Water Resources Development* 24: 177-196.
- 69 Varis, O., Keskinen, M. & Kummu, M. 2008. Mekong at the crossroads. *Ambio* 37: 146-149.
- 70 Varis, O. 2008. Poverty, economic growth, deprivation and water: the cases of Cambodia and Vietnam. *Ambio* 37: 225-231.
- 71 Rahaman, M.M. & Varis, O. 2009. Integrated water management of the Brahmaputra Basin: perspectives and hope for regional development. *Natural Resources Forum* 33(1): 60-75.
- 72 Varis, O. 2009. Megacities Attract: Urban Challenge for Water Management. *Harvard International Review. Web Edition June 2009.*
- 73 Varis, O. & Abu-Zeid, K. 2009. Socio-economic and environmental aspects of water management in

- the 21<sup>st</sup> century: trends, challenges and prospects for the MENA region. *International Journal of Water Resources Development* 25: 507-522.
- 74 Nuorteva, P., Keskinen, M. & Varis, O. 2010. Water, livelihoods and climate change adaptation in the Tonle Sap Lake area, Cambodia: learning from the past to understand the future. *Journal of Water and Climate Change* 1: 87-101.
- 75 Keskinen, M., Chivanno, S., Kummu, M., Nuorteva, P., Snidvongs, A., Varis, O. & Västila, K. 2010. Climate change and water resources in the Mekong River Basin: putting adaptation into the context. *Journal of Water and Climate Change* 103-117.
- 76 Kummu, M., Lu, X.X., Wang, J.J., and Varis, O. 2010. Basin-wide sediment trapping efficiency of emerging reservoirs along the Mekong. *Geomorphology* 119: 181-197.
- 77 Kummu, M., Ward, P.J., de Moel, H. & Varis, O. 2010. Is physical water scarcity a new phenomenon? Global assessment of water shortage over the last two millennia. *Environmental Research Letters* 5 (034006) 1-10.
- 78 Kummu, M. & Varis, O. 2011. The world by latitudes: A global analysis of human population, development level and environment across the north-south axis over the past half century. *Applied Geography* 31: 495-507.
- 79 Kummu, M, de Moel, H., Ward, P. & Varis, O. 2011. How Close Do We Live to Water? A Global Analysis of Population Distance to Freshwater Bodies *PLoS ONE* 6(6): e20578. doi:10.1371/journal.pone.0020578
- 80 Varis, O., Kummu, M. & Salmivaara, A. 2012. Ten Major River Basins in Monsoon Asia-Pacific: An assessment of vulnerability. *Applied Geography* 32: 441-454.
- 81 Varis, O. 2012. Foreword to a special issue on Water Wars in 21st Century along International Rivers Basins: Speculation or Reality? *International Journal of Sustainable Society* 4(1/2): 1-2.
- 82 Keskinen, M & Varis, O. 2012. Institutional cooperation at a basin level: For what, by whom? Lessons learned from Cambodia's Tonle Sap Lake. *Natural Resources Forum* 36: 50-60.
- 83 Liljeström, I., Kummu, M. & Varis, O. 2012. Nutrient balance assessment in the Mekong Basin: Nitrogen and phosphorus dynamics in a catchment scale. *International Journal of Water Resources Development* 28(2): 373-391. DOI 10.1080/07900627.2012.668649.
- 84 Keskinen, M., Kummu, M., Kähkönen, M. & Varis, O. 2012. Mekong at the crossroads: next steps for impact assessment of large dams. *Ambio* 41: 319–324. DOI 10.1007/s13280-012-0261-x (a synopsis article, not scientifically peer-reviewed)
- 85 Stucki, V., Wegerich, K., Rahaman, M.M. & Varis, O. 2012. Introduction: Water and security in Central Asia: solving a Rubik's cube. *International Journal of Water Resources Development* 28(3): 395-397.
- 86 Varis, O. & Kummu, M. 2012. The major Central Asian river basins: an assessment of vulnerability. *International Journal of Water Resources Development* 28(3): 433-452.
- 87 Barton, D.N., Kuikka, S., Varis, O., Uusitalo, L., Henriksen, H.J., Borsuk, M., de la Hera, A., Farmani, R., Johnson, S., Linnell, J.D.C. 2012. Bayesian Networks in Environmental and Resource Management. *Integrated Environmental Assessment and Management* 8(3): 418-429.
- 88 Varis, O., Rahaman, M.M. & Kajander, T. 2012. Fully Connected Bayesian Belief Networks: The Modeling Procedure with a Case Study of the Ganges River Basin. *Integrated Environmental Assessment and Management* 8(3): 491-502.
- 89 Kummu, M., de Moel, H., Porkka, M., Siebert, S, Varis, O. & Ward, P. 2012. Lost food, wasted resources: global food supply chain losses and their impacts on freshwater, cropland, and fertiliser use. *Science of the Total Environment* 438: 477-489.
- 90 Salmivaara, A., Kummu, M., Keskinen, M. & Varis, O. 2013. Using global datasets in creating environmental profiles for data-poor regions: a case from Irrawaddy and Salween River Basins. *Journal of Environmental Management* DOI 10.1007/s00267-013-0016-x
- 91 Porkka, M., Kummu, M., Siebert, S. & Varis O. 2013. From food insufficiency towards trade dependency: A historical analysis of global food availability. *PLoS One* DOI: 10.1371/journal.pone.0082714.
- 92 Kattelus, M, Rahaman, M.M. & Varis, O.2014. Myanmar under reform: Emerging pressures on water, energy and food security. *Natural Resources Forum* 38: 85-98. doi: 10.1111/1477-8947.12032
- 93 Kummu, M., Gerten, D., Heinke, J., Konzmann, M. &

- Varis, O. 2014. Climate-driven interannual variability of water scarcity in food production potential: A global analysis. *Hydrology and Earth System Sciences* 18: 447-461. DOI: 10.5194/hess-18-447-2014
- 94 Varis, O., Enckell, K. & Keskinen, M. 2014. Integrated Water Resources Management: Horizontal and vertical explorations and the “Water in All Policies” approach. *International Journal of Water Resources Development* 30(3): 433-444. doi: 10.1080/07900627.2014.912130
- 95 Jalava, M., Kummu, M., Porkka, M., Siebert, S. & Varis, O. 2014. Diet change—a solution to reduce water use? *Environmental Research Letters* 9 (2014) 074016, doi:10.1088/1748-9326/9/7/074016
- 96 Varis, O., Kummu, M., Lehr, C. & Shen, D. 2014. China's stressed waters: Societal and environmental vulnerability in China's internal and transboundary river systems. *Applied Geography* 53: 105-116. <http://dx.doi.org/10.1016/j.apgeog.2014.05.012>
- 97 Varis, O. 2014. Curb vast water use in central Asia. *Nature* 514(7520): 27–29 (02 October 2014) doi:10.1038/514027a
- 98 Rockström, J., Falkenmark, M., Allan, T., Folke, C., Gordon, L., Jägerskog, A., Karlberg, L., Kummu, M., Lannerstad, M., Meybeck, M., Molden, D., Postel, S., Savenije, H., Svedin, U., Turton, A. & Varis, O. 2014. The unfolding water drama in the Anthropocene: towards a resilience based perspective on water for global sustainability. *Ecohydrology* 7: 1249–1261. DOI: 10.1002/eco.1562
- 99 Kattelus, M., Kummu, M., Keskinen, M., Salmivaara, M. & Varis, O. 2015. China's south-bound transboundary River Basins – a case of asymmetry. *Water International* 40: 113-138. doi: 10.1080/02508060.2014.980029
- 100 Kattelus, M., Rahaman, M.M. & Varis, O. 2015. Hydropower development in Myanmar and its implications on regional energy cooperation. *International Journal of Sustainable Society* 7: 42-66.
- 101 Salmivaara, A., Porkka, M., Kummu, M., Keskinen, M., Guillaume, J.H.A. & Varis, O. 2015. Exploring the Modifiable Areal Unit Problem in spatial water assessments: a case of water shortage in Monsoon Asia. *Water* 7(3): 898-917; doi:10.3390/w7030898.
- 102 Guillaume, J., Kummu, M., Eisner, S. & Varis, O. 2015. Transferable principles for managing the nexus: lessons from historical global water modelling of Central Asia. *Water* 7(8): 4200-4231. doi:10.3390/w7084200
- 103 Jalilov, S.-M., Varis, O. & Keskinen, M. 2015. Sharing benefits in transboundary rivers: an experimental case study of Central Asian water-energy-agriculture nexus. *Water* 7(9): 4778-4805; doi:10.3390/w7094778
- 104 Kattelus, M., Salmivaara, M., Mellin, I., Varis, O. & Kummu, M. 2015. An evaluation of Standardised Precipitation Index for assessing inter-annual rice yield variability in the Ganges-Brahmaputra-Meghna region. *International Journal of Climatology*. DOI: 10.1002/joc.4489
- 105 Kummu, M., de Moel, H., Salvucci, G., Viviroli, D., Ward, P. & Varis, O. 2016. Over the hills and further away from coast: global geospatial patterns of human and environment over the 20th-21st centuries. *Environmental Research Letters* 11: 034010. doi:10.1088/1748-9326/11/3/034010
- 106 Jalava, M., Guillaume, J.H.A., Kummu, M., Porkka, M., Siebert, S. & Varis, O. 2016. Diet change and food loss reduction: what is their combined impact on global water use and scarcity? *Earth's Future* 4, doi:10.1002/2015EF000327.
- 107 Zheng, X., Wang, C., Cai, W., Kummu, M. & Varis, O. 2016. The vulnerability of thermoelectric power generation to water scarcity in China: Current status and future scenarios for power planning and climate change. *Applied Energy* 171(1): 444-455. <http://dx.doi.org/10.1016/j.apenergy.2016.03.040>
- 108 Keskinen, M., Guillaume, J.H.A., Kattelus, M., Porkka, M., Räsänen, T.A. & Varis, O. 2016. The water-food-energy nexus and the transboundary context: insights from large Asian rivers. *Water* 8(193): 1-25; doi:10.3390/w8050193
- 109 Zeitoun, M., Lankford, B., Krueger, T., Forsyth, T., Carter, R., Hoekstra, A.Y., Taylor, R., Varis, O., Cleaver, F., Boelens, R., Swatuk, L., Tickner, D., Scott, C.A., Mirumachi, N. & Matthews, N. 2016. Reductionist and integrative research approaches to complex water security policy challenges. *Global Environmental Change* 39: 143–154. doi:10.1016/j.gloenvcha.2016.04.010
- 110 Jalilov, S.-M., Keskinen, M., Varis, O., Amer, S. & Ward, F. 2016. Managing the water–energy–food nexus: Gains and losses from new water development in Amu Darya River Basin. *Journal of Hydrology* 539: 648-661. doi:10.1016/j.jhydrol.2016.05.071
- 111 Hyvärinen, A., Keskinen, M. & Varis, O. 2016. Potential and pitfalls of frugal innovation in the water sector: insights from Tanzania to global value chains.



- Sustainability* 8, 888; doi:10.3390/su8090888
- 112 Salmivaara, A., Kummu, M., Varis, O. & Keskinen, M. 2016. Socio-Economic Changes in Cambodia's Unique Tonle Sap Lake Area: A Spatial Approach. *Applied Spatial Analysis and Policy* 9: 413-432. DOI: 10.1007/s12061-015-9157-z
- 113 Cai, J., Yin, H. & Varis, O. 2016. Impacts of industrial transition on water use intensity and energy-related carbon intensity in China: A spatio-temporal analysis during 2003-2012. *Applied Energy* 183: 1112-1122.
- 114 Haapala, J., Rautiainen, S.L., White, P., Keskinen, M. & Varis, O. 2016. Facilitating bricolage through more organic institutional designs? The case of water users' associations in rural Nepal. *International Journal of the Commons* 10(2). DOI: <http://doi.org/10.18352/ijc.688>
- 115 Keskinen, M. & Varis, O. 2016. Water-energy-food nexus in Large Asian River Basins. *Water* 8(10): 446; doi:10.3390/w8100446
- 116 Cai, J., Varis, O. & Yin, H. 2017. China's water resources vulnerability: A spatio-temporal analysis during 2003-2013. *Journal of Cleaner Production* 142: 2901-2910. DOI: 10.1016/j.jclepro.2016.10.180
- 117 Varis, O., Keskinen, M. & Kummu, M. 2017. Four dimensions of water security with a case of the indirect role of water in global food security. *Water Security* 1: 36-45.
- 118 Cai, J.L., Kummu, M., Niva, V., Guillaume, J.H.A. & Varis, O. 2017. Exposure and resilience of China's cities to floods and droughts: A double-edged sword. *International Journal of Water Resources Development* 33: 547-565. DOI: 10.1080/07900627.2017.1353411
- 119 Kummu, M., Fader, M., Gerten, D., Guillaume, J.H.A., Jalava, M., Jägermeyr, J., Pfister, S., Porkka, M., Siebert, S. & Varis, O. 2017. Bringing it all together: linking measures to secure nations' food supply. *Current Opinion in Environmental Sustainability* 29: 98-117.
- 120 Räsänen, T.A., Varis, O., Scherer, L. & Kummu, M. 2018. Greenhouse gas emissions of hydropower in the Mekong River Basin. *Environmental Research Letters* 13: 034030 <https://doi.org/10.1088/1748-9326/aaa817>
- 121 Chan, F.K.S., Joon, C.C., Ziegler, A.D., Dabrowski, M. and Varis, O. 2018. Towards resilient flood risk management for Asian coastal cities: Lessons learned from Hong Kong and Singapore. *Journal of Cleaner Production* 187: 576-589.
- 122 Cai, J., Yin, H. & Varis, O. 2018. Impacts of urbanization on water use and energy-related CO<sub>2</sub> emissions of residential consumption in China: A spatio-temporal analysis during 2003-2012. *Journal of Cleaner Production* 194: 23-33.
- 123 Varis, O. & Keskinen, M. 2018. Discussion of "Challenges in operationalizing the water-energy-food nexus". *Hydrological Sciences Journal* 63: 1863-1865.
- 124 Ahopelto, L., Veijalainen, N., Guillaume, J.H.A., Keskinen, M. & Varis, O. 2019. Can there be water scarcity with abundance of water? Analyzing water stress during a severe drought in Finland. *Sustainability* 2019, 11, 1548; doi:10.3390/su11061548
- 125 Varis, O. & Kummu, M. 2019. The demanding quest for harmony: China's polarizing freshwater resilience map. *Environmental Research Letters* 14: 054015. <https://doi.org/10.1088/1748-9326/ab1040>
- 126 Niva, V., Taka, M. & Varis, O. 2019. Rural-urban migration and the growth of informal settlements: a socio-ecological system conceptualization with insights through a "water lens". *Sustainability* 2019, 11, 3487; doi:10.3390/su11123487
- 127 Zhang, S., Yi, B.-W., Worrell, E., Wagner, F., Crijns-Graus, W., Purohit, P., Wada, Y. & Varis, O. 2019. Integrated assessment of resource-energy-environment nexus in China's iron and steel industry. *Journal of Cleaner Production* 232: 235-249. <https://doi.org/10.1016/j.jclepro.2019.05.392>

## B Peer-reviewed Book Chapters

- 1 Somlyódy, L. & Varis, O. 1993. Modeling the quality of rivers and lakes. In: Zannetti, P. (Ed.): *Environmental Modeling: Computer Methods and Software for Simulating Environmental Pollution and its Adverse Effects*, Vol. I: 141-224. CMP, Southampton & Elsevier, London.
- 2 Varis, O. & Somlyódy, L. 1996. Potential impacts of climatic change on lake and reservoir water quality. In: Kaczmarek, Z., Strzepek, K., Somlyódy, L. & Pryazhinskaya, V. (Eds.): *Water Resources Management in the Face of Climatic /Hydrologic Uncertainties*. 46-69. IIASA, Laxenburg / Kluwer Academic Publishers, Dordrecht.

- 3 Varis, O. 2002. Belief networks: generating the feared dislocations. In: Beck, M.B. (Ed.): *Environmental Foresight and Models: A Manifesto*. 169-205. Elsevier, Amsterdam.
- 4 Varis, O. 2003. La escasez y la vulnerabilidad del agua: México en una perspectiva global. Ávila García, P. (Ed.): *Agua, Medio Ambiente y Desarrollo en México en el Siglo XXI*. 55-89. El Colegio de Michoacán, Zamora, Mich.
- 5 Varis, O. 2004. Basin organization models: the case of the Mekong River. In: Niasse, M., Iza, A., Garane, A. & Varis, O. (Eds.): *La Gouvernance de l'Eau en Afrique de l'Ouest: Aspects Juridiques et Institutionnels – Water Governance in West Africa: Legal and Institutional Aspects*: 223-238. International Union for the Conservation of the Nature IUCN, Gland, Switzerland and Cambridge, UK.
- 6 Varis, O. 2005. Externalities of integrated water resources management in South and Southeast Asia. In: Biswas, A.K., Varis, O. & Tortajada, C. (Eds.): *Integrated Water Resources Management in South and Southeast Asia*: 1-38. Oxford University Press, Delhi.
- 7 Biswas, A.K., Varis, O. & Tortajada, C. 2005. Foreword. In: Biswas, A.K., Varis, O. & Tortajada, C. (Eds.): *Integrated Water Resources Management in South and Southeast Asia*: v-ix. Oxford University Press, Delhi.
- 8 Varis, O. 2006. Megacities, development and water. In: Tortajada, C., Varis, O., Lundqvist, J. & Biswas, A.K. (Eds.): *Water Management for Large Cities*: 18-44. Routledge, London.
- 9 Varis, O., Biswas, A., Tortajada, C. & Lundqvist, J. 2006. Megacities and water management. In: Tortajada, C., Varis, O., Lundqvist, J. & Biswas, A.K. (Eds.): *Water Management for Large Cities*: 191-208. Routledge, London.
- 10 Varis, O. 2006. Agua, medio ambiente y desarrollo: paradigmas, retos y realidades en torno al agua. In: Ávila, P. (Ed): *Agua y Lagos en Michoacán: una Mirada desde lo global hasta lo local*: 15-32. Gobierno de Estado de Michoacán, Morelia.
- 11 Sarkkula, J., Keskinen, M., Koponen, J., Kummu, M., Nikula, J., Varis, O. & Virtanen, M. 2007. Mathematical modeling in integrated management of water resources: magical tool, mathematical toy or something in between? In: Lebel, L., Dore, J., Daniel, R. & Koma, Y.S. (Eds.) *Democratizing Water Governance in the Mekong Region*: 127-156. USER / Mekong Press, Chiang Mai.
- 12 Varis, O., Rahaman, M.M. & Stucki, V. 2008. Integrated water resources management plans: a key to sustainability? In: Kummu, M., Keskinen, M. & Varis, O. (Eds.): *Modern Myths of the Mekong – A Critical Review of Water and development Concepts, Principles and Policies*: 173-183. Water & Development Publications TKK-WD-01 Helsinki University of Technology, Espoo.
- 13 Keskinen, M., Mehtonen, K. & Varis, O. 2008. Transboundary co-operation vs. internal ambitions—the role of China and Cambodia in the Mekong region. Pachova, N.I., Nakayama, M. & Janský, L. *International Water Security: Domestic Threats and Opportunities*: 79-109. United Nations University Press, Tokyo.
- 14 Mehtonen, K., Keskinen, M. & Varis, O. 2008. The Mekong: IWRM and institutions. In: Varis, O., Biswas, A.K. & Tortajada, C. (Eds): *Management of Transboundary Rivers and Lakes*: 207-226. Springer, Berlin.
- 15 Varis, O., Biswas, A.K. & Tortajada, C. 2008. Preface. In: Varis, O., Biswas, A.K. & Tortajada, C. (Eds): *Management of Transboundary Rivers and Lakes*: IX-XIII. Springer, Berlin.
- 16 Varis, O. 2008. Right to water: Millennium Development Goals and Water in the MENA Region. In: Biswas, A.K., Rached, E. & Tortajada, C. (Eds.): *Right to water in the MENA region*: 35-58. Routledge, London.
- 17 Varis, O. & Rahaman, M.M. 2008. The Aral Sea keeps drying out but is Central Asia short of water? In: Rahaman, M.M. & Varis, O. (Eds.) *Central Asian Waters: Social, Economic, Environmental and Governance Puzzle*. Water & Development Publications TKK-WD-03: 3-10. Helsinki University of Technology, Espoo.
- 18 Varis, O., Rahaman, M.M. & Stucki, V. 2009. The Rocky Road from Integrated Plans to Implementation: Lessons Learned from Mekong and Senegal River Basins. In: Biswas, A.K., Braga, B.P.F., Tortajada, C., Palermo, M. (Eds.): *Integrated Water Resources Management in Latin America*: 103-121. Routledge, London.
- 19 Rahaman, M.M. & Varis, O. 2009. Mexico World Water Forum's Ministerial Declaration 2006: A Dramatic Policy Shift? In: Biswas, A.K., Braga, B.P.F., Tortajada, C., Palermo, M. (Eds.): *Integrated Water Resources Management in Latin America*: 177-196. Routledge, London.

- 20 Kummu, M., Varis, O. & Sarkkula, J., 2009. Impacts of land surface changes on regional hydrology - Mainland Southeast Asia. In: Lebel, L., Snidvongs, A., Chen, C.-T.A. & Daniel, R. (Eds.): *Critical States: Environmental Challenges to Development in Monsoon Southeast Asia*: 221-238. SIRD, Petaling Jaya, Malaysia
- 21 Varis, O. & Renko, T. 2009. Megaconferences on water: Perceptions from the Nordic countries. In Biswas, A.K. & Tortajada, C. (Eds.): *Impacts of Megaconferences on the Water Sector*: 217-247. Springer, Berlin and Heidelberg.
- 22 Sarkkula, J., Keskinen, M., Koponen, J., Kummu, M., Richey, J. & Varis, O. 2009. Hydropower in the Mekong region: what are the likely impacts on fisheries? In: Molle, F., Foran, T. & Kähkönen, M. (Eds.): *Contested Waterscapes in the Mekong Region*: 227-249. Earthscan, London
- 23 Varis, O. 2009. More urban and more aged: Demographic pressures to global water resources by 2020. In: Biswas, A.K., Tortajada, C. & Izquierdo, R. (Eds.): *Water Management in 2020 and Beyond*: 35-63. Springer, Berlin and Heidelberg.
- 24 Keskinen, M., Kummu, M., Kähkönen, M. & Varis, O. 2012. Mekong at the crossroads – alternative paths of water development and impact assessment In: Öjendal, J., Hansson, S. & Hellberg, S. (Eds.): *Water, Politics and Development in a Transboundary Watershed – the Case of the Lower Mekong Basin*: 101-126. Springer, Berlin and Heidelberg. DOI: 10.1007/978-94-007-0476-3\_6
- 25 Varis, O., Kummu, M., Härkönen, S. & Huttunen, J. 2012. Greenhouse gas emissions from reservoirs. In: Tortajada, C., Altinbilek, D., Biswas, A.K. (Eds.), *Impacts of large dams: A Global Assessment*: 69-94. Springer, Berlin. DOI: 10.1007/978-3-642-23571-9\_4
- 26 Kattelus, M., Kummu, M., Keskinen, M., Salmivaara, M. & Varis, O. 2015. China's south-bound trans-boundary River Basins – a case of asymmetry. In: Wouters, P., Chen, H. & Nickum, J. (Eds.): *Transboundary Water Cooperation: Principles, Practice and Prospects for China and Its Neighbours*: 113-138. Routledge, London
- 27 Stucki, V., Wegerich, K., Rahaman, M.M. & Varis, O. 2016. Introduction: Water and security in Central Asia: solving a Rubik's cube. In: Stucki, V., Wegerich, K., Rahaman, M.M. & Varis, O. (Eds.): *Water and Security in Central Asia: Solving a Rubik's Cube*: 1-3. Taylor and Francis, London.
- 28 Varis, O. & Kummu, M. 2016. The major Central Asian river basins: an assessment of vulnerability. In: Stucki, V., Wegerich, K., Rahaman, M.M. & Varis, O. (Eds.): *Water and Security in Central Asia: Solving a Rubik's Cube*: 39-58. Taylor and Francis, London.
- 29 Varis, O. 2018. Population megatrends and water management. In: Biswas, A.K., Tortajada, C. & Rohner, P. (Eds.): *Assessing Global Water Megatrends*: 41-59. Springer Nature, Singapore.

## C Edited Books and Journal Special Issues

- 1 Niasse, M., Iza, A., Garane, A. & Varis, O. (Eds.) 2004. *La Gouvernance de l'Eau en Afrique de l'Oest: Aspects Juridiques et Institutionnels – Water Governance in West Africa: Legal and Institutional Aspects*. International Union for the Conservation of the Nature IUCN, Gland, Switzerland and Cambridge, UK.
- 2 Biswas, A.K., Varis, O. & Tortajada, C. (Eds.) 2005. *Integrated Water Resources Management in South and Southeast Asia*. Oxford University Press, Delhi. 353 p.
- 3 Tortajada, C., Varis, O., Lundqvist, J. & Biswas, A.K. (Eds.) 2006. *Water Management for Large Cities*. Special issue: *International Journal of Water Resources Development* 22(2): 181-394.
- 4 Varis, O., Keskinen, M. & Kummu, M. (Eds.) 2006. *Integrated Water Resources Management on the Tonle Sap Lake, Cambodia* Special issue: *International Journal of Water Resources Development* 22(3): 395-519.
- 5 Tortajada, C., Varis, O., Lundqvist, J. & Biswas, A.K. (Eds.) 2006. *Water Management for Large Cities*. Routledge, London.
- 6 Kummu, M., Keskinen, M. & Varis, O. (Eds.) 2008. *Modern Myths of the Mekong – A Critical Review of Water and development Concepts, Principles and Policies*. Water & Development Publications TKK-WD-01 Helsinki University of Technology, Espoo.
- 7 Kummu, M., Keskinen, M. & Varis, O. (Eds.) 2008. Mekong at the Crossroads. Special issue: *Ambio* 38(3): 145-231.
- 8 Varis, O., Biswas, A.K. & Tortajada, C. (Eds.): 2008. *Management of Transboundary Rivers and Lakes*. Springer, Berlin. 304 p.
- 9 Rahaman, M.M. & Varis, O. (Eds.) 2008. *Central Asian Waters: Social, Economic, Environmental and*

- Governance Puzzle. Water & Development Publications TTK-WD-03 Helsinki University of Technology, Espoo.
- 10 Stucki, V., Wegerich, K., Rahaman, M. & Varis, O. (Eds.) 2012. Water and Security in Central Asia: Solving a Rubik's Cube. *International Journal of Water Resources Development* 28(3): 395-576.
  - 11 Keskinen, M., Jalilov, S. & Varis, O. 2016. Water-Energy-Food Nexus in Large Asian River Basins. *Water* 8(10).
  - 12 Keskinen, M., Halme, M. & Varis, O. 2016. Sustainable Development Goals: A Call for Frugal Innovations for a Resource-Scarce World. *Sustainability* 8(9).
  - 13 Stucki, V., Wegerich, K., Rahaman, M.M. & Varis, O. 2016. *Water and Security in Central Asia: Solving a Rubik's Cube*. Taylor and Francis, London. 187 p.
  - 14 Keskinen, M., Sojamo, S. & Varis, O. 2019. Enhancing Security, Sustainability and Resilience in Energy, Food and Water. *Sustainability* 2019 (11).
  - 15 Zhang, J.Y., Liu, J. G., Wang, X.J., Qi, J.G., Zheng, J.M., Varis, O., Yang, H., Du Bui, D. & Cai, J.L. 2019. Water Resources Assessment, Development and Management in Coupled Human-Natural Systems. *Water* (open for submissions until 31 Dec 2019).
- D Conference Publications (partly reviewed)**
- 1 Varis, O. 1987. Sensitivity of N<sub>2</sub>-fixing blue-green algae in competition for growth prerequisites. In: Beck, M.B. (ed.): *Systems Analysis in Water Quality Management*: 339-342. Pergamon, Oxford.
  - 2 Kettunen, J. Sirviö, H. & Varis, O. 1988. Design of observations for discrimination among rival water quality models. In: Dodge, Y., Fedorov, V.V. & Wynn, H.P. (Ed.): *Optimal Design and Analysis of Experiments*: 257-268. North-Holland, Amsterdam.
  - 3 Varis, O., Kettunen, J. & Sirviö, H. 1988. Influence diagrams in environmental management – A review of the DAVID system. In: Zannetti, P. (Ed.): *Computer Techniques in Environmental Studies*: 609-618. CMP, Southampton / Springer-Verlag, Berlin.
  - 4 Varis, O., Malve, O. & Kettunen, J. 1988. Blue-green algae in Lake Enäjärvi – Modeling and analysis of periodicity. In: Marani, A. (Ed.): *Advances in Environmental Modelling*: 507-524, Elsevier, Amsterdam.
  - 5 Kettunen, J., Malve, O. & Varis, O. 1988. Design of field measurements – An application to observing the water quality of a lake. In: Marani, A. (Ed.): *Advances in Environmental Modelling*: 525-534, Elsevier, Amsterdam.
  - 6 Vakkilainen, P. & Varis, O. 1989. Mass curve technique in controlling a multipurpose multireservoir system – Coupling a water quality description with an interactive system. In: Laikari, H. (Ed.): *River Basin Management* 183-188. Pergamon, Oxford.
  - 7 Varis, O. & Kuikka, S. 1989. Application of Bayesian influence diagrams in environmental decision making under high uncertainty. In: Tabucanon, M.T. & Chankong, V. (Ed.): *Multiple Criteria Decision Making: Applications in Industry and Service*: 735-749. Asian Institute of Technology, Bangkok, Thailand.
  - 8 Varis, O. 1990. Incorporation of risk attitude in water resources management models using Bayesian influence diagrams. In: Niemi, J. (Ed.): *Proceedings of the Soviet-Finnish Symposium on Water Research*, Moscow, November 28-30 1989. National Board of Waters & Environment, Mimeograph Series 266: 32-42.
  - 9 Mészáros, F., Sirviö, H. & Varis, O. 1990. A rule-based model developed in Turbo Prolog and Turbo C for predicting limnological processes. In: Zannetti, P. (Ed.): *Computer Techniques in Environmental Studies III*: 299-309. CMP, Southampton / Springer-Verlag, Berlin.
  - 10 Varis, O., Kløve, B. & Kettunen, J. 1991. Bayesian influence diagrams in the socioeconomic evaluation of a real time forecasting system for river quality. Abstract. *Annales Geophysicae* 9 (Suppl.): C 487.
  - 11 Kløve, B., Kettunen, J., Varis, O., Vakkilainen, P. & Sirviö, H. 1991. A real-time monitoring system for Kerava river quality. Abstract. *Annales Geophysicae* 9 (Suppl.): C 577.
  - 12 Varis, O. 1991. Influence diagrams in the analysis of water resources decisions under high uncertainty and varying risk attitudes. In: Shaw L. Yu & Kuo-Kung Shih (Ed.): *Proceedings of the International Conference on Computer Applications in Water Resources, 3-6 July 1991, Vol. 2*: 928-935, Tamkang University, Tamsui, ROC.
  - 13 Varis, O. 1991. Diagnostic and predictive canonical water quality modelling. In: Shaw L. Yu & Kuo-Kung Shih (Ed.): *Proceedings of the International Conference on Computer Applications in Water Resources 3-6 July 1991, Vol. 3*: 1262-1269, Tamkang University, Tamsui, ROC.

- 14 Varis, O. 1991. Merging the diagnostic and predictive property of canonical correlation analysis in modelling of biological high resolution data in environmental studies. In: Wrobel, L.C. & Brebbia, C.A. (Ed.): *Water Pollution: Modelling, Measuring and Prediction*: 313-320. CMP/Elsevier, Southampton.
- 15 Varis, O. 1993. Belief networks for modelling water resources and the environment. Tingsanchali, T. (Ed.): *Environmentally Sound Water Resources Utilization*. Proc. Int. Conf., 8-11 November, Vol 1: 1-19-1-26. AIT, Bangkok.
- 16 Varis, O. 1993. Belief networks for modelling and assessment of environmental change. McAleer, M. & Jakeman, A. (Eds.): *Proceedings, International Conference on Modelling and Simulation*. 6-10 December, Vol. 3: 967-972. University of Western Australia, Perth.
- 17 Varis, O. 1994. Water quality models: tools for the analysis of data, knowledge, and decisions. *Water Quality International '94*, Conference Proceedings, 24-29 June, Budapest, Hungary. IAWQ, London.
- 18 Varis, O. 1995. Water quality models and EIA. In English, with Japanese abstract. Proceedings, vol. 3: 1277-1280. *6th International Conference on Conservation and Management of Lakes*, Kasumigaura, Japan, October 23-27, 1995.
- 19 Varis, O. 1995. Resource management and Bayesian decision analysis. In: Binning, P., Bridgman, H. & Williams, B. (Eds.) *Proceedings of the International Congress on Modelling and Simulation, Newcastle, Australia, 27-30 November, 1995*. Vol. 3: 304-309. University of Newcastle, NSW.
- 20 Varis, O. & Kuikka, S. 1995. Analysis of uncertainty in resource management: Joint use of multiple environmental assessment models by a Bayesian meta-model. In: McAleer, M., Binning, P., Bridgman, H. & Williams, B. (Eds.) *Proceedings of the International Congress on Modelling and Simulation, Newcastle, Australia, 27-30 November, 1995*. Vol. 4: 203-208. University of Newcastle, NSW.
- 21 Varis, O. 1995. Resource management and Bayesian decision analysis. Abstract. In: *Environmetrics Abstracts*: 95, 6th International Conference, December 6-9, 1995, Kuala Lumpur, Malaysia.
- 22 Kuikka, S. & Varis, O. 1995. Uncertainties of climatic change impacts in Boreal watersheds: a Bayesian analysis. Abstract. In: Heikinheimo, P. & Roos, J. (Eds.): *Climate Change and Waters in the Boreal Zone: Abstracts of the SILMU Symposium*, Kuhmo, Finland, 21-24 November 1995. p. 67. Painatuskeskus, Helsinki.
- 23 Varis, O. 1996. Water quality models: typologies for environmental impact assessment. *Water Quality International '96*, Conference Proceedings, vol 6: 117-124. 23-28 June, Singapore. IAWQ, London.
- 24 Kuikka, S., Hanson, S., Hildén, M., Sparholt, H. & Varis, O. 1997. Uncertainty analysis of Baltic cod management by Bayesian influence diagrams. In: *Objectives and Uncertainties in Fisheries Management with Emphasis on Three North Atlantic Ecosystems. An Internastional Fisheries Symposium, Bergen, Norway* 3-5 June. p. 8.
- 25 Varis, O. 1997. Interconnections on water, food, poverty, and global urbanization: a qualitative analysis on driving forces, impacts, and policy tools. *Proceedings. International Conference on Large-Scale Water Management in Developing Countries*: CR35-CR42. October 20-23 Kathmandu, Nepal.
- 26 Varis, O. 1997. Vicious and virtuous circles in water resources development. *Proceedings. International Conference on Large-Scale Water Management in Developing Countries*: WR18-WR25. October 20-23 Kathmandu, Nepal.
- 27 Varis, O. 1997. Integrated assessment of global and regional changes – a Bayesian expert judgment elicitation approach. In: McDonald, D. & McAleer, M. (Eds.): *Proceedings of the International Congress on Modelling and Simulation*: 736-742, Hobart, Tasmania, December 8-11, 1997.
- 28 Vakkilainen, P. & Varis, O. 1998. Water in the hungry, poor, and urbanizing world—a focus on uncertainty and interdisciplinarity. In: Zebidi, H. (Ed.): *Water: A Looming Crisis*: 323-328. UNESCO, Paris.
- 29 Varis, O. 1998. Water in the hungry, poor, and urbanizing world—a probabilistic, Bayesian analysis on driving forces, impacts, and policy tools. In: Zebidi, H. (Ed.): *Water: A Looming Crisis*: 447-452. UNESCO, Paris.
- 30 Varis, O. 1998. What if the trade winds and monsoons change? In: Lemmelä, R. & Helenius, N. (Eds.): *Proceedings of the 2<sup>nd</sup> Conference on Climate and Water*: 1293-1302, 17–20 August, 1998, Helsinki, Finland. Edita, Helsinki.
- 31 Kuikka, S. & Varis, O. 1998. What climate change impacts do scientists anticipate for Finland – A Bayesian approach to expert judgment elicitation. In: Lemmelä, R. & Helenius, N. (Eds.): *Proceedings of the 2<sup>nd</sup> Conference on Climate and Water*: 1412-

- 11419, 17–20 August, 1998, Helsinki, Finland. Edita, Helsinki.
- 32 Varis, O. 1998. Water development trends and paradigms: thoughts on integrated management and sustainability. In: *Proceedings of the International Symposium on Comprehensive Watershed Management*: 100-107, 7–10 September 1998, Beijing, China. IRTCES, Beijing.
- 33 Varis, O. 1998. Escasez y vulnerabilidad del agua: una reseña de las evaluaciones globales. In: Ávila García, P. (Ed.): *Memoria: XX Coloquio de Antropología e Historia Regionales – Agua Medio Ambiente y Desarrollo en México*: 9-20, Zamora, Mich., México, 21-23 octubre, 1998.
- 34 Dooge, J.C.I. & Kuusisto, E.E. (eds.). 1999. Climate and Water: A 1998 Perspective. A Summary of the Second International Conference on Climate and Water in Espoo, Finland (17-20 August 1998). With input from A. Askew, S. Bergström, M. Bonell, D. Burn, W.M. Edmunds, R.A. Feddes, A. Hall, Z.W. Kundzewicz, H.-J. Liebscher, H. Lins, M.-C. Llasat, O. Lucero, P. Pilon, L. Roald, N.R. Saelthun, B. Schädler, I. Shiklomanov, W.G. Strupczewski, R. Vaikmäe, O. Varis, and C.J. Vörösmarty. Helsinki University of Technology, Espoo.
- 35 Varis, O. 1999. The Nile Basin in a global perspective: natural, human, and socioeconomic resource nexus. *Proceedings, The 7<sup>th</sup> Nile 2002 Conference: Comprehensive Water Resources Management in the Nile Basin: The Vision for the Next Century*, Cairo, Egypt, March 15-19, 1999. P10.1-P10.10.
- 36 Varis, O. 1999. Modelling vicious circles. *Civil and Environmental Conference – New Frontiers and Challenges*. Conference Proceedings, Volume 5: Water Engineering and Management, 8-12 November 1999, Bangkok, Thailand. V9-V18.
- 37 Varis, O. 1999. South-East Asia in a global perspective: growing challenges to water resources management. *Civil and Environmental Conference – New Frontiers and Challenges* Conference Proceedings, Volume 5: Water Engineering and Management, 8-12 November 1999, Bangkok, Thailand. V19-V31.
- 38 Varis, O. & Vakkilainen, P. 1999. China's challenges to water resources management in the first quarter of the 21<sup>st</sup> Century. *IAG Yangtze Fluvial Conference*, October 28-November 6, East China Normal University, Shanghai, China.
- 39 Cogels, F.-X., Fraboulet-Jussila, S. & Varis, O. 2000. Multipurpose use and water quality challenges in Lac de Guiers (Senegal). *Managing Water and Waste in the New Millennium – The Challenge for Developing Areas*, May 23-26, Midrand, South Africa.
- 40 Varis, O. 2001. Interconnections of water, food, poverty and urbanization. In: *Abstracts: Challenges of a Changing Earth—Global Change Open Science Conference*, 10-13 July, Amsterdam, the Netherlands.
- 41 Varis, O. 2001. Informal water institutions. *Proceedings of the IWA 2<sup>nd</sup> World Water Congress*, October 15-19, 2001, Berlin.
- 42 Varis, O. 2001. Informal water sector and informal institutions – from a constraint to development to a resource. *9<sup>th</sup> International Conference on the Conservation and Management of Lakes*: 356-359, Proceedings, 11-16 November, 2001, ILEC, Shiga, Japan.
- 43 Varis, O., Keskinen, M. & Sarkkula, J. 2002. *Socioeconomic Analysis of the Tonle Sap region in Cambodia*. 1st ASEM International Conference on Public Participation, June 10-12, Bangkok.
- 44 Varis, O. & Keskinen, M. 2002. Socioeconomic analysis of the Tonle Sap Region, Cambodia—building links and capacity for targeted poverty alleviation. *The 12<sup>th</sup> Stockholm Water Symposium*: 120-122. Stockholm.
- 45 Rahaman, M.M., Varis, O. & Kajander, T. 2002. EU Water Framework Directive vs. international principles concerning IWRM: The seven mismatches. In: Ledoux, L. & Burgess, D. (Eds.): *Proceedings of Science for Water Policy: the Implications of the Water Framework Directive*: 463-473. 1-4 September 2002, Norwich. The Marie Curie Fellowship Association and the University of East Anglia, Norwich.
- 46 Rahaman, M.M., Varis, O. & Kajander, T. 2002. On the search for holistic water management and sustainable environment through women participation in South Asia. *Proceedings: Second South Asia Water Forum*: 605-614. 14-16 December, Islamabad. Pakistan Water Partnership, Lahore.
- 47 Kajander, T, Varis, O. & Rahaman, M.M. 2002. Driving forces behind the groundwater degradation: a comparative analysis on three developing macroregions in Asia. *Proceedings: Second South Asia Water Forum*: 283-294. 14-16 December, Islamabad. Pakistan Water Partnership, Lahore.

- 48 Rahaman, M.M., Varis, O. & Kajander, T. 2002. EU Water Framework Directive vs. international principles concerning IWRM: The seven mismatches. In: Devi, R. & Ahsan, N. (Eds.): *Water and Wastewater: Perspectives of Developing Countries*: 63-72. Water and Environment Management Series. IWA Publishers, London.
- 49 Rahaman, M.M. & Varis, O. 2004. Integrated Water Resources Management: evolution, prospects and future challenges, CD Proceedings of the International Symposium on Environmental Management, 7-8 January 2004, Dhaka, Bangladesh.
- 50 Kummu, M., Sarkkula, J. & Varis, O. 2004. Sedimentation and Mekong upstream development: impacts to the Lower Mekong Basin. *IAG Yangtze Fluvial Conference*, Shanghai, June 2004.
- 51 Kummu, M., Koponen, J., Sarkkula, J., Keskinen M. & Varis, O. 2005. Integrated modelling for impact assessment in Mekong Delta and Cambodian floodplains. *International Conference on Deltas: Geological Modelling and Management*: 16, Ho Chi Minh City, Vietnam, January 10-16, 2005.
- 52 Varis, O. & Keskinen, M. 2005. A Bayesian network model for intersectorial policy analysis in the Tonle Sap area, Cambodia. In: Kachitvichyanukul, V., Purintrapiban, U. & Utayopas, P. (Eds.): *Simulation and Modelling: Integrating Sciences and Technology for Effective Resource Management*: 280-288. International Conference on Simulation and Modelling, January 17-19, Asian Institute of Technology, Bangkok.
- 53 Keskinen, M., Koponen, J., Kummu, M., Nikula, J., Sarkkula, J. & Varis, O. 2005. Integration of socio-economic and hydrological information in the Tonle Sap Lake, Cambodia. In: Kachitvichyanukul, V., Purintrapiban, U. & Utayopas, P. (Eds.): *Simulation and Modelling: Integrating Sciences and Technology for Effective Resource Management*. International Conference on Simulation and Modelling, January 17-19, Asian Institute of Technology, Bangkok.
- 54 Varis, O. 2005. Water and sustainable development: paradigms and Central Asian challenges. *United Nations University for Peace / Central Asia Programme*, Course Development and Training Seminar, 23-27 April, Almaty, Kazakhstan.
- 55 Varis, O. & Vakkilainen, P. 2005. China's challenges to water resources management. In: Söderlund, L., Sippola, J. & Kamijo-Söderlund, M. (Eds.): *Proceedings SUSDEV-China Symposium: Sustainable Agroecosystem Management and Development of Rural-Urban Interaction in Regions and Cities of China*, Xi'an, 1-5 August 2004. Agrifood Research Reports 68: 115-129. MTT Agrifood Research Finland, Jokioinen.
- 56 Sarkkula, J., Koponen, J., Keskinen, M., Kummu, M. & Varis, O. 2005. Integrated Modelling of Lower Mekong Basin Floodplains - Tool for Impact Assessment, Proceedings of International Symposium on Sustainable Development in the Mekong River Basin, Ho Chi Minh City, Vietnam.
- 57 Keskinen, M. & Varis, O. 2005. Socio-economic impact assessment of the Mekong development – Case Tonle Sap Lake. In: Herath, S., Dutta, D., Weesakul, U & Das Gupta, A. (Eds.): *Proceedings of the International Symposium on Role of Water Sciences in Transboundary River Basin Management*: 167-174, Ubon Ratchathani, Thailand, March 10-12 2005, United Nations University / Asian Institute of Technology / Thammasat University, Bangkok.
- 58 Rahaman, M.M. & Varis, O. 2005. The ethics of water: some realities and future challenges. In: Afgan, N.H., Bogdan, Z., Duic, N & Guzovic, Z. (eds): *Sustainable Development of Energy, Water and Environment Systems; Volume II*: 39-51. Dubrovnik, Croatia, 486 pp.
- 59 Varis, O. 2005. The disregarded water use of bioenergy production. In: Mathur, G.N. & Chawla, A.S. (Eds.): *Proceedings of XII World Water Congress: Water for sustainable development - towards innovative solutions*, Vol. 2, pp. 33-48, 22-25 November 2005, New Delhi, International Water Resources Association and Central Board of Irrigation and Power, India.
- 60 Keskinen, M. & Varis, O. 2005. Transboundary water agreements and local realities – case from the Tonle Sap Lake, Cambodia. In: Mathur, G.N. & Chawla, A.S. (Eds.): *Proceedings of XII World Water Congress: Water for sustainable development - towards innovative solutions*, Vol. 3, pp. 1-10, 22-25 November 2005, New Delhi, International Water Resources Association and Central Board of Irrigation and Power, India.
- 61 Koivusalo, H., Kokkonen, T., Laine, H., Jolma, A. & Varis, O. 2005. Exploiting simulation model results in parameterising a Bayesian network – a case study of dissolved organic carbon in catchment runoff. MODSIM05 Conference, 12-15 December 2005, Melbourne, Australia.
- 62 Kokkonen, T., Koivusalo, H., Laine, H., Jolma, A. & Varis, O. 2005. A method for defining conditional probability tables with link strength parameters for

- a Bayesian network. MODSIM05 Conference, 12-15 December 2005, Melbourne, Australia.
- 63 Varis, O., Kummu, M., Keskinen, M., Sarkkula, J., Koponen, J., Makkonen, K. & Heinonen, U. 2005. Integrated Water Resources Management on the Tonle Sap Lake, Cambodia: Experiences from the WUP-FIN Project. *The International Forum on Integrated Water Resources Management of the Mekong River Basin*. 28-29 November 2005, Chiang Rai, Thailand. Mekong River Commission.
- 64 Varis, O., Kummu, M. & Keskinen, M. 2006. A Bayesian Approach to IWRM Policy Analysis: The Mekong Case. *The 16<sup>th</sup> Stockholm Water Symposium*: 161-162, August 20-26, Stockholm.
- 65 Koivusalo, H., Kokkonen, T., Jolma, A., Laine, H., Varis, O., Vakkilainen, P. 2006. CLIME-DSS: A decision support system for assessing impacts of climate change on European lakes. In: Programme and Abstracts of the European Large Lakes Symposium 2006 - Ecosystem changes and their ecological and socioeconomic impacts: 60-61. 11. - 15. September 2006, Tartu, Estonia.
- 66 Varis, O., Kummu, M., Keskinen, M., Sarkkula, J., Koponen, J., Heinonen, U. & Makkonen, K. 2006. Integrated Water Resources Management on the Tonle Sap Lake, Cambodia. *CD Proceedings, IWA World Water Congress and Exhibition*, 10-14 September, Beijing.
- 67 Lamberts, D., Keskinen, M., Koponen, J., Kummu, M., Richey, J., Sarkkula, J., Say, S., Sokhem, P. & Varis, O. 2006. Mekong River Basin Development and Tonle Sap Lake Productivity: Current Knowledge and Future Challenges. In: Proceedings of the Second International Symposium on Sustainable Development in the Mekong River Basin: 187-196. 16-18 September 2006, Phnom Penh.
- 68 Varis, O. & Pres, A. 2007. Middle East and North Africa: Approaching water scarcity problems by developing capacity of experts and organisations. In: Progress and Prospects on Water: Striving for Sustainability in a Changing World: 249-250. World Water Week Abstract Volume, Stockholm, August 12-18, 2007. Stockholm International Water Institute, Stockholm.
- 69 Varis, O. 2007. Water futures for the MENA Region: The vicious circle of economy, urbanisation, employment, governance, environment, climate and water. In: Progress and Prospects on Water: Striving for Sustainability in a Changing World: 289-290. World Water Week Abstract Volume, Stockholm, August 12-18, 2007. Stockholm International Water Institute, Stockholm.
- International Water Institute, Stockholm.
- 70 Varis, O., Tortajada, C., Chevallier, P., Poyaud, B., Servat, E. (Eds.) 2008. Global Changes and Water Resources – Confronting the Expanding and Diversifying Pressures. Proceedings, XIIth World Water Congress, 1–4 September 2008, Montpellier, France. International Water Resources Association / VERSEau Développement, Montpellier.
- 71 Rahaman, M.M. & Varis, O. 2008. Integrated Management Of The Brahmaputra Basin: Constraints And Hope For Regional Development. In: Varis, O., Tortajada, C., Chevallier, P., Poyaud, B., Servat, E. (Eds.) 2008. Global Changes and Water Resources – Confronting the Expanding and Diversifying Pressures. Proceedings, XIIth World Water Congress, 1–4 September 2008, Montpellier, France. International Water Resources Association / VERSEau Développement, Montpellier.
- 72 Varis, O., Kummu, M. & Salmivaara, A. 2008. Ten major river basins in Monsoon Asia-Pacific: The quadrangle of social, economic, environmental and governance challenges. In: Harmonizing River Catchment and Estuary. Proceedings of the EMECS-8 Congress: 32. East China Normal University, Shanghai.
- 73 Kummu, M., Sarkkula, J., Irvine, K., Savuth, Y., Varis, O., & X.X. Lu. 2008. Suspended sediment dynamics at the Mekong floodplains: data analysis. In: Harmonizing River Catchment and Estuary. Proceedings of the EMECS-8 Congress: 100-101. East China Normal University, Shanghai.
- 74 Kattelus, M., Rahaman, M. M. & Varis, O. 2009. Sustainable Water Resources Management of Myanmar: Role of Agriculture and Hydropower. In: Kovar, P., Maca, P. & Redinova, J. (Eds.) Proceedings of Water Policy 2009: Water as a Vulnerable and Exhaustible Resource: 288-293, 23-26 June 2009, Czech University of Life Sciences, Prague.
- 75 Varis, O. 2010. Water and security challenges in Middle East and North Africa with reflections to Iran. In: Korhonen-Kurki, K & Fox, M. (Eds.): Towards New Solutions in Managing Environmental Crisis: 73-83. *Environmentalica Fennica 27*, Helsinki University Printing House, Helsinki.
- Not updated after 2010.

## E Other International Reports

- 1 Andersen, T., Kettunen, J. & Varis, O. 1985. On the



- optimal experimental design of tracer kinetics in a micropredator system. *Helsinki University of Technology, Laboratory of Hydrology & Water Resources Management, Research Report* 1985: 5. 38 p.
- 2 Kaden, S. & Varis, O. 1986. MINE-NEC, A game for the analysis of regional water policies in open-pit lignite mining areas – an improved implementation for NEC PC-8201A. *International Institute for Applied Systems Analysis, Laxenburg, Austria*. WP-86-28.
  - 3 Kettunen, J. & Varis, O. 1986. A recursive Gauss-Newton algorithm for nonlinear parameter estimation. *Helsinki University of Technology, Laboratory of Hydrology & Water Resources Management, Research Report* 1986: 1. 24 p.
  - 4 Varis, O., Kettunen, J. & Leonov, A. 1986. On the adequacy of complex models identified with insufficient field data – A case study with two lake models. *Helsinki University of Technology, Laboratory of Hydrology & Water Resources Management, Research Report* 1986: 2. 24 p.
  - 5 Varis, O. (Ed.) 1986. Abstracts of research reports and completed theses in 1985. *Helsinki University of Technology, Laboratory of Hydrology & Water Resources Management, Research Report* 1986: 3.
  - 6 Varis, O. 1987. Modeling and optimization of water resources management using influence diagrams – Examining the DAVID system. *Helsinki University of Technology, Laboratory of Hydrology & Water Resources Management, Research Report* 1987: 5.
  - 7 Varis, O. & Peltola, A. 1988. Phytoplankton data – Kuortaneenjärvi 1980. *Helsinki University of Technology, Laboratory of Hydrology & Water Resources Management, Research Report* 1988: 3. 7 p. + Appendices 16 p.
  - 8 Kettunen, J. & Varis, O. 1989. *Modeling and Management of Lake and Reservoir Water Quality*. Asian Institute of Technology, Bangkok, Thailand. 247 p + Appendices 18 p.
  - 9 Mutanen, J., Rankinen, K. & Varis, O. 1989. Phytoplankton data – Tuusulanjärvi 1961-1987 – Vantaanjoki 1972-1980. *Helsinki University of Technology, Laboratory of Hydrology & Water Resources Management, Research Report* 1989: 1. 45 p.
  - 10 Kettunen, J., Leonov, A.V. & Varis, O. 1989. Examination of model adequacy and analysis of phosphorus dynamics in Lake Kuortaneenjärvi – a case study with two lake models. *Publications of the Water and Environment Research Institute* 3: 48-54, Helsinki.
  - 11 Mutanen, J. & Varis, O. 1989. Water quality data – Tuusulanjärvi 1960-1988. *Helsinki University of Technology, Laboratory of Hydrology & Water Resources Management, Research Report* 1989: 2. 80 p.
  - 12 Mészáros, F., Sirviö, H., Varis, O. & Kettunen, J. 1989. A rule-based approach to water quality modeling – user manual to a software package. *Helsinki University of Technology, Laboratory of Hydrology & Water Resources Management, Research Report* 1989: 3.
  - 13 Varis, O. & Kuikka, S. 1990. Analysis of sardine fisheries management on Lake Kariba, Zimbabwe and Zambia – Structuring and analysis of a Bayesian influence diagram model. *International Institute for Applied Systems Analysis, Laxenburg, Austria* WP-90-48. 17 p.
  - 14 Kuikka, S. & Varis, O. 1991. Probabilistic assessment of TAC based fisheries management of Baltic salmon stocks. *International Council for the Exploration of the Sea, Anacat Committee* C.M. 1991/M:30, Ref. J.
  - 15 Somlyódy, L. & Varis, O. 1992. Water quality modeling of rivers and lakes. *International Institute for Applied Systems Analysis, Laxenburg, Austria* WP-92-041. 85 p
  - 16 Kuikka, S. & Varis, O. 1992. Use of Bayesian influence diagram in fisheries management – the Baltic salmon case. *International Council for the Exploration of the Sea, Statistics Committee* C.M. 1992/D:5.
  - 17 Varis, O. 1992. Decision analytic modeling of uncertainty and subjectivity in water quality management. *International Institute for Applied Systems Analysis, Laxenburg, Austria* WP-92-054. 11 p.
  - 18 Koivusalo, H., Varis, O. & Somlyódy, L. 1992. Water quality of Nitra River, Slovakia – Analysis of organic material pollution. *International Institute for Applied Systems Analysis, Laxenburg, Austria* WP-92-084. 32 p. + Appendices 5 p.
  - 19 Varis, O. & Somlyódy, L. 1993. Potential impacts of climatic change to lake and reservoir water quality. *International Institute for Applied Systems Analysis, Laxenburg, Austria* WP-93-25.
  - 20 Varis, O., Kuikka, S. and Kettunen, J. 1993. Belief networks in fish stock assessment – the Baltic salmon case. *International Council for Exploration of the Sea, C.M.* D:13 (Mimeo).

- 21 Varis, O. 1994. A belief network approach to modeling of environmental change: methodology and prospects for application. *International Institute for Applied Systems Analysis, Laxenburg, Austria* WP-94-40. 18 p.
- 22 Varis, O. 1995. A belief network approach to optimization and parameter estimation in resource and environmental management models. *International Institute for Applied Systems Analysis, Laxenburg, Austria* WP-95-11. 38 p. + Appendices 5 p.
- 23 Varis, O. & Vakkilainen, P. 1995. Water for cities - from sectorial to holistic thinking. HABITAT II Preparatory Round Table: *Human Resource Development for Better Cities*, Institute for Housing and Urban Development Studies, 4-6 October, 1995, Rotterdam, the Netherlands (mimeo).
- 24 Somlyódy, L., Yates, D. & Varis, O. 1995. Freshwater management: Problems and challenges. *International Institute for Applied Systems Analysis, Laxenburg, Austria* WP-95-120. 42 p.
- 25 Varis, O. 1996. Index of environmental friendliness: the analysis of uncertainties. In: Puolamaa, M., Kaplas, M. & Reinikainen, T. (Eds.): *Index of Environmental Friendliness: A Methodological Study*: Annex VI, 111-118. Eurostat / Statistics Finland, Helsinki.
- 26 Varis, O. 1998. *F.C. BeNe (Fully Connected Belief Networks): A Spreadsheet Toolkit for Problems with Several, Highly Uncertain and Interrelated Variables. Version 1.0 User's Guide*. Helsinki University Press, Helsinki.
- 27 Varis, O. 1998. Water and Third World cities: the expanding puzzle. *Research in Progress RIP16*, United Nations University/World Institute for Development Economics Research, Helsinki.
- 28 Varis, O. 1998. Water scarcity and vulnerability: Mexico in a global perspective. *Helsinki University of Technology, Laboratory of Water Resources, Research Report 1998*: 1. 27 p.
- 29 Vakkilainen, P. & Varis, O. 1999. Will water be enough, will food be enough? *Technical Documents in Hydrology 24*, UNESCO/IHP, Paris.
- 30 Varis, O. & Fraboulet-Jussila, S. 2000. Causal Bayesian network approach to integrated watershed planning and management. In: Al Soufi, R. (Ed.) *Hydrologic and Environmental Modelling in the Mekong River Basin*: 204-214. Mekong River Commission MKG/R.00017, Phnom Penh.
- 31 Vakkilainen, P. & Varis, O. 2001. Preface. In Abeglen, C. & Lahtela, V. *Global Water Questions. Helsinki University of Technology, Water Resources Laboratory, Research Report 2001*: 1. Espoo. 75 p.
- 32 Eloheimo, K., Hellsten, S., Jantunen, T., Jozsa, J., Kiirikki, M., Lauri, H., Koponen, J., Sarkkula, J., Varis, O. & Virtanen, M. 2001. *Data Report*. Water Utilization Program – Modelling the Flow Regime and Water Quality of the Tonle Sap MRCS/WUP-FIN. Finnish Environment Institute, Helsinki and Mekong River Commission, Phnom Penh.
- 33 Varis, O., Kajander, T. & Lemmelä, R. 2002. *Climate and Water—on the Search for Improved Interconnections between Climate Models and Scenarios, Hydrology, and Water Resources Management*. Technical Report of Rapporteurs, Regional Association VI (Europe), Working Group on Hydrology. World Meteorological Organization.
- 34 Varis, O. 2003. *WUP-FIN Policy Model—Finding Ways to Economic Growth, Poverty Reduction and Sustainable Environment*. WUP-FIN Socio-Economic Studies on Tonle Sap 10. Finnish Environment Institute, Helsinki and Mekong River Commission, Phnom Penh. 38 p.
- 35 Hellstén, S., Tarvainen, A., Ahonen, H., Visuri, M., Kettunen, M., Lahtela, V. & Varis, O. 2003. *Policy Research to Identify Conditions for Optimal Functioning of the Senegal River Ecosystem in Mali, Mauritania and Senegal*. Finnish Environment Institute, Helsinki. 37 p.
- 36 Biswas, A., Lundqvist, J., Tortajada, C. & Varis, O. 2004. Water management for megacities. *Stockholm Water Front. 2/2004*: 12-13.
- 37 Biswas, A., Tortajada, C., Lundqvist, J. & Varis, O. 2004. Water management for new megacities. *World Water and Environmental Engineering. 6/2004*.
- 38 Varis, O. & Helmiö, T. 2005. Mega conferences: View from Nordic countries: Denmark, Finland, Iceland, Norway and Sweden. *Sasakawa Peace Foundation USA (SPFUSA) Discussion Paper 3*, Third World Centre for Water Management, Mexico City. 26 p.
- 39 Kuusisto, E. & Varis, O. 2005. *Water: Challenges, Responsibilities, Options*. Overview Report, Water Seminar Helsinki 26-28 January 2005, Finnish Environment Institute and Helsinki University of Technology, Helsinki. 16 p.

- 40 Varis, O. 2005. Water and sustainable development: paradigms, challenges and the reality. In: Hietanen, O. (Ed.): *University Partnership for International Development: Finnish Development Co-operation*. Finland Futures Research Center FFRC-6/2005: 34-60.
- 41 Varis, O. & Helmiö, T. 2005. Climate and Water: Operational hydrology and climate change in Europe. XII-RA VI *Working Group on Hydrology*, World Meteorological Organization, Geneva.
- 42 Tortajada, C. & Varis, O. 2005. Seminar on water and energy. *Hydropower and Dams*, Issue Five 2005: 28-29.
- 43 Tortajada, C. & Varis, O. 2006. Report: International Workshop on Transboundary Water Management. Helsinki, Finland, 17–19 August 2005. *Water Resources Development* 22: 175-180.
- 44 Varis, O. 2006. Social consequences of dams. In: Johansson, B. & Sellberg, B. (Eds.): *Dams Under Debate*: 93-98. Formas, Stockholm.
- 45 Varis, O. & Pres, A. 2006. Workshop Report: Workshop on Integrated Water Resources Management in Latin America. *Water Resources Development* 22: 643-648.
- 46 Varis, O., Stucki, V. & Fraboulet-Jussila, S. 2006. The Senegal River Case. *Case Study for 2006 Human Development Report*. United Nations Development Programme, New York.
- 47 Varis, O., Kummu, M., Keskinen, M., Sarkkula, J., Koponen, J., Heinonen, U. & Makkonen, K. 2006. Tonle Sap Lake, Cambodia: Nature's affluence meets human poverty. *Case Study for 2006 Human Development Report*. United Nations Development Programme, New York.
- 48 Käkönen, M with Keskinen, M., Varis, O., Ngo Thuy Diem Trang, Ngo Thi Thanh Truc, Tran Thi Trieu, Le Truong Giang, Le Duc Toan & Nguyen Van Lanh 2006. Mekong Delta Socio-Economic Analysis - Interconnections between water and livelihoods in the Mekong Delta of Vietnam. WUP-FIN Phase II - Hydrological, Environmental and Socio-Economic Modelling Tools for the Lower Mekong Basin Impact Assessment. Mekong River Commission and Finnish Environment Institute Consultancy Consortium, Vientiane, Lao PDR. 182 pp.
- 49 Varis, O. & Pres, A. 2007. Water Management in 2020 and Beyond. Policy Brief. Ministry of Environment, Government of Aragon / International Centre for Water and Environment (CIAMA-La Alfranca) / Aragon Water Institute / Third World Centre for Water Management, Mexico / Sasakawa Peace Foundation, Japan.
- 50 Varis, O. & Tortajada, C. 2007. *Water Governance in the MENA Region: Critical Issues and Way Forward. Extended Report*. InWEnt Capacity Building International Germany, Bonn.
- 51 Varis, O. & Tortajada, C. 2007. *Water Governance in the MENA Region: Critical Issues and Way Forward. Policy Brief*. InWEnt Capacity Building International Germany, Bonn.
- 52 Varis, O. 2007. Water Resources and Development in Changing Asia. *Asian Water Development Outlook Discussion Paper*. Asian Development Bank, Manila.
- 53 Sarkkula, J., Koponen, J., Keskinen, M., Kummu, M., Käkönen, M., Lamberts, D., Lauri, H. & Varis, O. 2008. *Hydrological, Environmental and Socio-Economic Modelling Tools for the Lower Mekong Basin Impact Assessment. Methodological and Thematic Briefs*. Mekong River Commission and Finnish Environment Institute Consultancy Consortium, Vientiane.
- 54 Sarkkula, J., Koponen, J., Keskinen, M., Kummu, M., Inkala, A., Käkönen, M., Lamberts, D., Lauri, H., Varis, O., Veijalainen, N. & Virtanen, M. 2008. *Hydrological, Environmental and Socio-Economic Modelling Tools for the Lower Mekong Basin Impact Assessment. Final Report – Part 2: Research Findings and Recommendations*. Mekong River Commission and Finnish Environment Institute Consultancy Consortium, Vientiane.
- 55 Varis, O. 2008. Will water be enough? World's megacities and water (in Swedish). *Framtider* 2/2008: 4-9.
- 56 Varis, O. 2008. Congress report: 13<sup>th</sup> IWRA World Water Congress, Montpellier, France, 1-4 September 2008. *Water International* 33: 519-523.
- 57 Varis, O. 2009. Congress report: 2<sup>nd</sup> China Water Congress 2008, Beijing, China, 14-16 May 2008. *International Journal of Water Resources Development* 25: 175-177.
- 58 Varis, O. 2009. Congress report: 13<sup>th</sup> IWRA World Water Congress, Montpellier, France, 1-4 September 2008. *International Journal of Water Resources Development* 25: 179-184.
- 59 Varis, O. & Tortajada, C. 2009. *Water Governance in*

- the MENA Region: From Analysis to Action. Extended Report.* InWEnt Capacity Building International Germany, Bonn.
- 60 Varis, O. & Tortajada, C. 2009. *Water Governance in the MENA Region: From Analysis to Action. Policy Brief.* InWEnt Capacity Building International Germany, Bonn.
- 61 Koivusalo, H., Kokkonen, T., Jolma, A., Laine, H., Varis, O. 2009. Climate and Water: Presentation of climate change and its impacts on quantity and quality of water. Technical Report of Rapporteurs, Regional Association VI (Europe), Working Group on Hydrology. World Meteorological Organization. 26 p.
- 62 Varis, O. 2009. Second China Water Congress 2008, Beijing, China, 14-16 May 2008. *Water International* 34(2): 300-302.
- 63 Varis, O. 2009. Urban Challenge for Water Management. *The Bangladesh Today* 9-6-2009.
- 64 Keskinen, M., Chivanno, S., Kumm, M., Nuorteva, P., Snidvongs, A., Varis, O. & Västilä, K. 2009. Water and Climate Change in the Lower Mekong Basin: Diagnosis and Recommendations for Adaptation, Water and Development Research Group, Helsinki University of Technology (TKK), and Southeast Asia START Regional Center (SEA START RC), Chulalongkorn University. Water & Development Publications TKK-WD-06, Helsinki University of Technology, Espoo, Finland. 71 p.
- 65 Varis, O. & Tortajada, C. 2010. *Water Governance in the MENA Region: Policies and Institutions. Extended Report.* InWEnt Capacity Building International Germany, Bonn.
- 66 Varis, O. & Tortajada, C. 2010. *Water Governance in the MENA Region: Policies and Institutions. Policy Brief.* InWEnt Capacity Building International Germany, Bonn.
- 67 Varis, O. 2010. Water governance under reform pressure: are the Arab societies ready for change? In: Luomi, M. (Ed.): *Managing Blue Gold: New Perspectives on Water Security in the Levantine Middle East. FIIA Report 2010 25:* 86-97. The Finnish Institute of International Affairs, Helsinki.
- 68 Varis, O. 2011. The Yangtze River and Regional Development—4th Yangtze Forum, Nanjing, China, 18–20 April 2011. Conference Report. *International Journal of Water Resources Development* 27: 621-624.
- 69 Varis, O. 2012. Towards Enhanced Regional Development through Integrated River Basin Management: Reflections on the 4th Yangtze Forum. *Yangtze Express Water Resources & Hydropower Information*, 33 (1) pp. 1-2 (Chinese) and pp.3-6 (English). Changjiang Publishing and Information Centre, ISSN1006-0081
- 70 Varis, O. 2012. We must put halving the world's food losses at the top of the political agenda. *Fresh Produce Journal* 30 November 2012.
- Not updated after 2012.
- ## E Academic Theses and Dissertations
- 1 Varis, O. 1984. Water Quality Model for Lake Kuortaneenjärvi. *MSc Thesis, Helsinki University of Technology.* 62 p. + Appendices 9p.
- 2 Varis, O. 1986. An Analysis on the Roles of Limiting Factors on Competition Facilities of Blue-Green Algae in Lake Kuortaneenjärvi by Means of Simulation. *MSc Thesis, University of Helsinki.* 72 p. + Appendices 2 p.
- 3 Varis, O. 1987. Sensitivity of N<sub>2</sub>-fixing blue-green algae in competition – A whole-lake simulation approach. *Thesis for Licentiate of Technology, Helsinki University of Technology.* 12 p. + Appendices 50 p.
- 4 Varis, O. 1991. Computational modeling of the environment with applications to lake eutrophication. *Thesis for Doctor of Technology, Helsinki University of Technology* 1: 1991. 43 p. + Appendices 134 p.
- ## F Peer-Reviewed Publications in Finnish
- 1 Varis, O. & Stenmark, M. 1984. A water quality model for Lake Kuortaneenjärvi. *Vesitalous* 25 (4): 30-32.
- 2 Varis, O., Kettunen, J. & Leonov, A. 1986. Analysis of phosphorus dynamics in Lake Kuortaneenjärvi using a Lake Balaton Model. *Vesitalous* 27 (1): 16-22.
- 3 Varis, O. 1986. The Aral Sea today. *Vesitalous* 27 (4): 35-39.
- 4 Varis, O. 1987. On the floods of the Nile and the sources of hydrology. *Vesitalous* 28 (5): 27-31.
- 5 Varis, O. 1989. Eutrophication, algal problems and restoration of Lake Balaton. *Vesitalous* 30(5): 41-44.
- 6 Kettunen, J. & Varis, O. 1990. Development cooper-

- ation in the academic field - a course in water protection in Asia. *Vesitalous* 31(3): 31-36.
- 7 Varis, O. 1992. Multiobjective planning and decision making. In: Äijö, H., Siivola, L. & Vakkilainen, P. (Eds.): *Environmental Impact Assessment in Water Resources*: 97-126.
  - 8 Varis, O. 1992. Assessment of water quality changes: Introduction. In: Äijö, H., Siivola, L. & Vakkilainen, P. (Eds.): *Environmental Impact Assessment in Water Resources*: 279-282.
  - 9 Varis, O. 1992. Nitrogen, phosphorus, and lacustrine cyanobacteria problems. *Vesitalous* 33(1): 12-21; 33(3):46.
  - 10 Varis, O. 1993. Applicability of belief networks in water resources management. *Vesitalous* 34 (6): 13-16.
  - 11 Varis, O. 1995. The use of water resources models in EIA. *Vesitalous* 36(5): 9-14.
  - 12 Varis, O. 1997. Dreams and reality in water resources management. *Vesitalous* 38(5): 1-4.
  - 13 Varis, O. 1999. Water resources under the pressure of global changes. *Vesitalous* 40(1): 8-12.
  - 14 Varis, O. & Vakkilainen, P. 2000. Challenges facing water management in China. *Vesitalous* 41(1): 26-32.
  - 15 Varis, O. 2002. From one integration to the next. Editorial. *Vesitalous* 43(1): 5.
  - 16 Vakkilainen, P., Keskinen, M., Haapala, U. & Varis, O. 2002. Teaching global water issues—engineering students come to grips with the Mekong River. *Vesitalous* 43(1): 9-11.
  - 17 Varis, O. 2002. From Rio de Janeiro to Johannesburg, from Dublin to Bonn. *Vesitalous* 43(1): 19-20.
  - 18 Varis, O. 2002. Floods grown. *Vesitalous* 43(4): 36.
  - 19 Varis, O. 2003. Will floods grow? *Vesitalous* 44(2): 28-32.
  - 20 Makkonen, K. & Varis, O. 2003. The Third World water Forum In Kyoto – Water, People, and Great Emotions. *Vesitalous* 44(2): 48-51.
  - 21 Varis, O. 2003. Challenges facing water management in South Asia. *Vesitalous* 44(4): 28-34.
  - 22 Varis, O. 2005. From water year to water decade. *Vesitalous* 45(1): 5.
  - 23 Varis, O. 2005. Bioenergy and water. *Vesitalous* 45(5): 37-42.
  - 24 Varis, O. 2005. Will the Arctic ice melt? *Vesitalous* 45(6): 46.
  - 25 Varis, O. 2008. Helsinki University of Technology 100 years. Editorial. *Vesitalous* 49(1): 5.
  - 26 Varis, O. 2008. Middle East: Flammable water? *Vesitalous* 49(1): 19-22.
  - 27 Varis, O. 2008. 13<sup>th</sup> IWRA World Water Congress in Montpellier, France. *Vesitalous* 49(6): 38.
  - 28 Varis, O., Kummu, M. & Salmivaara, A. 2009. Asia's ten major rivers under pressures of changes and development pressures. *Vesitalous* 50(5): 16-21.
  - 29 Kummu, M. & Varis, O. 2010. How far from waters? *Vesitalous* 51(1): 5-9.
  - 30 Varis, O. 2011. The good, the bad, and the ugly (editorial). *Vesitalous* 52(4): 4.
  - 31 Kummu, M. & Varis, O. 2013. Is it possible for a Finn to make a difference to the adequacy of water resources and food? *Vesitalous* 54(4): 32-35.
  - 32 Varis, O. 2013. Challenges of water in Central Asia – looking ahead. *Vesitalous* 54(5): 27-30.
  - 33 Varis, O. 2014. Doctorate in water engineering – what on earth for? *Vesitalous* 55(1): 5-6.
  - 34 Porkka, M., Kummu, M., Siebert, S. & Varis, O. 2014. From food shortages to trade dependency. *Vesitalous* 55(1): 36-39.
  - 35 Liikanen, R. & Varis, O. 2016. Towards more holistic risk management (editorial). *Vesitalous* 57(4): 5.
  - 36 Liski, A., Haapala, J. & Varis, O. 2016. The importance of environmental risks in rural water supply continuity challenges in Nepal. *Vesitalous* 57(4): 15-19.
  - 37 Varis, O. & Kummu, M. 2016. Risk affecting global water reserves and sustainable development. *Vesitalous* 57(4): 20-23.
  - 38 Keskinen, M., Rekolainen, S., Sojamo, S. & Varis, O. 2016. Controlling risks with a water-energy-food nexus? *Vesitalous* 57(4): 24-26.
  - 39 Varis, O. 2016. Continuation to a success story, but

- how? (editorial). *Vesitalous* 57(6): 4.
- 40 Varis, O. 2017. Engineering and water management become accustomed to a flood of data. *Vesitalous* 58(2): 20-23.
- 41 Taka, M., Kumm, M., Keskinen, M. & Varis, O. Tohtorinkoulutuksen ja vesialan tutkimuksen yhteiskäyttäminen. *Vesitalous* 59 (1): 27-29.
- G Other Publications in Finnish**
- 1 Varis, O. 1982. Statistical data on factors impacting water quality of River Kyrönjoki. *Memorandum, National Board of Waters, Vaasa Water District Office*. 13 p. + Appendices 123 p.
- 2 Varis, O. 1984. Water quality data from Lake Enäjärvi 1977-1981 and River Siuntionjoki 1978-1982 - contents and use of files. *Helsinki University of Technology, Laboratory of Hydrology & Water Resources Management, Research Report* 1984: 6. 9 p. + Appendices 9 p.
- 3 Varis, O. 1984. A program for counting bacterial biomasses BAKU1 - User's manual. *Helsinki University of Technology, Laboratory of Hydrology & Water Resources Management, Research Report* 1984: 7. 7 p + Appendices 5p.
- 4 Varis, O. & Kairesalo, T. 1985. A study on nutrient dynamics on the littoral zone of Lake Pääjärvi using a dynamic model. *Helsinki University of Technology, Laboratory of Hydrology & Water Resources Management, Research Report* 1985: 3. 15 p. + Appendices 4 p.
- 5 Forsius, M., Korhonen, M., Mitikka, S. & Varis, O. 1985. Fish cultivation: Water quality impacts and their assessment. *National Board of Waters, Research Report* 324. 38 p.
- 6 Kettunen, J. & Varis, O. 1985. Monitoring software package for waste waters: JÄVE - User's Manual. *Suomen vesiensuojeluyhdistysten liitto ry. Turku*. 17 p. + Appendices 4 p.
- 7 Varis, O. 1985. Introduction to hierarchical, multi-level optimization. *Helsinki University of Technology, Laboratory of Hydrology & Water Resources Management, Research Report* 1985: 4. 15 p.
- 8 Varis, O. 1986. The Aral Sea. In: Tenhunen, J. (Ed.): *Water Resources in Central Asia*: 59-73. *Helsinki University of Technology, Laboratory of Hydrology & Water Resources Management, Research Report* 1986: 9.
- 9 Varis, O. & Rajantie, K. 1986. Principles of linear systems theory. *Helsinki University of Technology, Laboratory of Hydrology & Water Resources Management, Research Report* 1986: 16. 12 p. + Appendix 1 p.
- 10 Varis, O. 1987. The sources of the Nile and hydrology. In: Tenhunen, J. (Ed.): *Water Resources in Israel and Egypt*: 53-62. *Helsinki University of Technology, Laboratory of Hydrology & Water Resources Management, Research Report* 1987: 4.
- 11 Varis, O. 1988. Management of water quality problems in Lake Balaton. In: Lindberg, K. (Ed.): *Water Resources in Eastern Europe*: 72-81. *Helsinki University of Technology, Laboratory of Hydrology & Water Resources Management, Research Report* 1988: 4.
- 12 Varis, O. & Kuikka, S. 1990. Decision making on environmental resources. In: Kuikka, S. & Marttinen, M. (Eds.): *Utilization of Fisheries in Watercourses*: 115-129. *Ympäristöalan ammattijärjestö ry:n julkaisu*.
- 13 Varis, O. 1992. Consideration is needed in nitrogen removal. *Aquarius* 1: 20-21.
- 14 Varis, O. 1992. Impact of agricultural nutrient load to lacustrine cyanobacteria problems. In: Rekolainen, S. & Kauppi, L. (Eds.): *Agriculture and Water Pollution*: 81-85. *National Board of Waters & Environment, Mimeograph Series* 359, Helsinki.
- 15 Varis, O. (Ed.) 1993. Modeling Uncertainty in Decision Analysis. *Helsinki University of Technology, Laboratory of Hydrology & Water Resources Management, Research Report* 1993: 4. 104 p.
- 16 Varis, O. 1993. A decision analytic perspective to modeling of uncertainty. In: Varis, O. (Ed.) *Modeling Uncertainty in Decision Analysis*: 1-7. *Helsinki University of Technology, Laboratory of Hydrology & Water Resources Management, Research Report* 1993: 4.
- 17 Varis, O. 1993. Statistical reliability of research results vs. decision making. In: *Impacts of Environmental Changes on Fish and Fisheries. Proceedings of the 3rd Fish Research Seminar*, 28-29.10.1993, Lahti. Finnish Game and Fisheries Research Institute, Helsinki.
- 18 Varis, O. & Vakkilainen, P. (Eds.) 1994. Environmental Impact Assessment: Approaches and applicability in developing countries and in Finland. *Proceedings of a Seminar* 27.1-4.2.1994. *Helsinki University*

- of Technology, Laboratory of Water Resources, Research Report 1994: 2. 42 p.
- 19 Varis, O. (Ed.) 1995. Assessment of benefits and adverse effects: Seminar 28.11.1994. *Helsinki University of Technology, Laboratory of Water Resources, Research Report 1995: 4.* 29 p.
- 20 Kauppi, L., Kämäri, J., Arvola, L., Bilaletdin, Ä., Frisk, T., Haapala, J., Huttula, T., Hyvärinen, V., Kallio, K., Kuikka, S., Kuivalainen, P., Kuosa, H., Kuusisto, E., Lehtonen, H., Lepistö, A., Leppäranta, M., Ojala, A., Rekolainen, S., Varis, O. & Vehviläinen, B. 1996. Waters. In: Kuusisto, E., Kauppi, L. & Heikinheimo, P. (Eds.): *Climate Change and Finland: 145-178.* Helsinki University Press, Helsinki.
- 21 Varis, O. (Ed.) 1997. Assessment of benefits and adverse effects: Fall 1996 Seminar. *Helsinki University of Technology, Laboratory of Water Resources, Research Report 1997: 1.* 39 p.
- 22 Varis, O. 1997. Water supply must be realized cost-effectively in Eastern Europe. *Helsingin Sanomat* 22 March: D3.
- 23 Varis, O. 1997. The theme of the UN world water day is water availability. *Helsingin Sanomat* 22 March: D3.
- 24 Vakkilainen, P. & Varis, O. 1997. Will there be enough food and water? In: *80 Years of Subsurface Drainage in Independent Finland: 71-102.* Finnish Drainage Foundation, Helsinki.
- 25 Varis, O. 1998. Urban and rural areas compete for water. *Rnet* 2/98: 12-15.
- 26 Vakkilainen, P. & Varis, O. (Eds.) 2000. Global water issues: China and Water. *Helsinki University of Technology, Water Resources Laboratory, Research Report 2000: 2.* Espoo. 75 p.
- 27 Varis, O. 2000. Foreword. In: Turunen, M. (Ed.) *China's Water Resources Challenges: Study tour report from September 2000.* Helsinki University of Technology, Water Resources Laboratory, Research Report 2000: 3. p. 3-5.
- 28 Varis, O. 2001. A water resources excursion to China: From mountains down to cities with water: *Rnet* 1/2001: 68-69.
- 29 Varis, O. 2002. From Rio de Janeiro to Johannesburg, from Dublin to Bonn. *The Annual Report of the Finnish UNESCO Association.* The Ministry of Education, Helsinki.
- 30 Varis, O. 2003. Water, hunger and poverty: out of vicious circles. *Helsingin Sanomat* June 28, pp. A2.
- 31 Varis, O. 2004. From water year to water decade. *The Annual Report of the Finnish UNESCO Association: 9-10.* The Ministry of Education, Helsinki.
- 32 Varis, O. 2005. Bioenergy and water. In: *Pertti Vakkilainen 60.* Salaojituksen tukisäätiö. p. 132-139.
- 33 Makkonen, K. & Varis, O. 2005. China's environmental problems as a hindrance to economic growth. In: Asikainen, R. & Vuori, J. (Eds.): *China's Society Under Changes: 146-148.* Gaudeamus, Helsinki.
- 34 Varis, O., Kumm, M., Keskinen, M. & Heinonen, U. 2007. Water respects no borders. *Polysteekki* 4/2007: 12-15.
- 35 Varis, O. 2008. Water problems of megacities. *Tieteessä Tapahtuu* 26(5): 16-20.
- 36 Varis, O. 2009. North and South, climate change and water. In: Kovanen, T., Kuusisto, E., Seuna, P. & Koskiahho, J. (Eds.). *Water Association Finland 40 Years: 44-54.* Water Association of Finland, Helsinki.
- 37 Rajaniemi, L. & Varis, O. 2015. China is thirsty for clean water. *Kauppalehti* 7 April, p. B18.
- 38 Bäck, J., Damski, J., Haavisto, P., Kauppi, L., Latola, K., Liski, M., Lund, P., Pantsar, M., Pekkanen, J., Tynkkynen, O., Varis, O. & Walls, M. 2016. *Take This Seriously! Expert Views on Impacts of Climate Change.* SITRA, Helsinki. 33 p.
- 39 Bäck, J., Damski, J., Haavisto, P., Kauppi, L., Latola, K., Liski, M., Lund, P., Pantsar, M., Pekkanen, J., Varis, O. & Walls, M. 2017. Finland must be a landmark for ambitious climate policy. *Talouselämä* 31 March: 62-63.