

Curriculum Vitae – Richard Charles Carter

Specialist in rural community water supply and sanitation, farmer-managed irrigation, groundwater resources and water management, with a focus on low-income countries in Africa and Asia.

[last update February 2021]



YEAR OF BIRTH	1953
NATIONALITY	British
PROFESSION	Water Sector Consultant, Researcher & Educator
JOB TITLE	Independent Consultant / Company Director Richard Carter and Associates Ltd (Head of Technical Support Unit, WaterAid, 2009-12) (Professor of International Water Development, Cranfield University, 2002-09)
ACADEMIC	PhD 1995. Cranfield, Water Resources and Water Management. PG Dip. 1980. Regent College, Vancouver. Christian Studies. MSc 1975, Southampton, Irrigation & Water Resources Engineering. BA 1974, MA 1978, Cambridge, Natural Sciences (Geology).
PROFESSIONAL	Chartered Geologist (C.Geol), Fellow of the Geological Society (FGS) Life Member of the Association of Geoscientists for International Development Fellow of the Chartered Institution of Water and Environmental Management (FCIWEM C.WEM)
APPOINTMENTS	Senior Research Associate, Overseas Development Institute (2013 – date). Chair, Rural Water Supply Network (RWSN) (2011-2013). Visiting Professor, Cranfield University (2009-2015). Editor, Waterlines Journal (2008-date). External Examiner at Universities of Birmingham, Cambridge, East Anglia, London, Loughborough, Newcastle, Open University, Southampton and University of Technology Sydney (various dates). Director, DEW Point (DFID Resource Centre for Water and Sanitation, Environment and Climate Change) (2007-2009). Adviser, Vitol Foundation (2013-date). Trustee, Africa Ahead (2013 – date, Chair 2017 - 2020). Trustee, the Humanitarian Centre, Cambridge (2008-2013). Member, International Committee, Tearfund (1990s).
AWARD	International Association of Hydrogeologists Applied Hydrogeology Award 2016
LANGUAGES	English (fluent). French (basic).

KEY EXPERIENCE

I have extensive knowledge of the natural and social science, engineering and management of water resources for rural and urban water supply and irrigation. I manage institutional development and capacity-building activities, consultancies, research projects, and education and training programmes in many aspects of the water sector. I have acted as adviser to numerous NGOs, UN agencies, bilateral and multilateral agencies. I have supervised many successful MSc and PhD students. I have worked in Afghanistan, Algeria, Bangladesh, Burkina Faso, Canada, DRC, Eritrea, Ethiopia, France, Gambia, Honduras, India, Italy, Ivory Coast, Japan, Liberia, Madagascar, Malawi, Mali, Malaysia, Nepal, Netherlands, Niger, Nigeria, Pakistan, Rwanda, Senegal, Sierra Leone, South Africa, Sri Lanka, Swaziland, Switzerland, Tanzania, Timor-Leste, Uganda, Zambia and Zimbabwe. I have published widely in the field of water resources management in low-income countries.

SUMMARY OF PROFESSIONAL CAREER

- 2012 -
date **Director, Richard Carter & Associates Ltd**, Consultants in International Water Development. Company established 2006, since 2012 occupying me full-time. Project work in Afghanistan, Burkina Faso, Ethiopia, Gambia, Madagascar, Malawi, Mali, Nepal, Nigeria, Senegal, Sierra Leone, Tanzania, Timor-Leste and Uganda.
- 2009-12 **Head of Technical Support Unit, WaterAid, London**: providing strategic leadership and support in relation to technologies and good practices in water supply, sanitation and hygiene in WaterAid's country programmes.
Undertook visits to Sudan, Madagascar, Ireland, Tanzania, Uganda, Malawi, Burkina Faso, Liberia, Australia, Netherlands, France, Ethiopia.
- 1981 -
2009 Teaching Associate in 1981, Lecturer in Water Management in 1983, Senior Lecturer in Water Supply and Management in 1990, and Professor of International Water Development in 2002, at Cranfield University (Silsoe), UK. Formed Richard Carter and Associates Ltd, November 2006.
Research and Consultancy in groundwater and surface water resources; low cost groundwater development; community water and sanitation in developing countries; small scale irrigation in Africa.
Education and Training: mainly at Postgraduate level in Surface and Groundwater Hydrology, Community Water and Sanitation, Communities and Development, Water Engineering and Irrigation Management. Designed and developed Cranfield's MSc in Community Water Supply and Sanitation.
Management appointments: at various times Assistant Director of Postgraduate Courses, Assistant Director of Consultancy Services; Course Manager for Postgraduate Diploma in Soil and Water Engineering, MSc in Irrigation Water Management, and MSc in Community Water Supply. Elected Member of Faculty Board. Leader of the Cranfield team responsible for the subject of Community Water Supply. Co-originator and core team member of the University's Trans-Campus Initiative in Disaster Management.
International experience has included: research on shallow groundwater resources, groundwater development and groundwater recharge in Ethiopia, Nigeria, Uganda and Sri Lanka; evaluation, research and consultancy support to community water supply programmes in DRC, Ethiopia, Eritrea, Malawi, Mali, Rwanda, Tanzania, Zambia, Uganda and India, for Governments, international agencies and donors, and NGOs; investigation and strategy development of private-public-community partnerships in rural water and sanitation in Uganda and Ethiopia; evaluation of training programmes funded by multilateral aid projects in Burkina Faso, Tanzania, and India; national water sector institutional support programmes in Nigeria and Tanzania; irrigation management training in Swaziland.
- 1977-79 **Chief Irrigation Engineer with Water Surveys Nigeria Ltd**. Team Leader/team member on Kaduna River Basin Prefeasibility Study, Borno Seven Towns Soils and Water Resource Studies; Kafin Zaki Damsite Investigation; Kaduna State and Bauchi State Agricultural Development Projects; Niger State Natural Resources Survey.
- 1975-77 **Graduate Engineer with Sir William Halcrow and Partners, Consulting Engineers**. Worked in Hydrogeology Unit and in close liaison with Hydrology Unit. Duties involved technical back-up in these fields for overseas and UK based projects.

CONSULTANCY & RESEARCH ASSIGNMENTS 1981-date

- 2020 UK - Cambridge University – teaching module on International Development in the MPhil course Engineering for Sustainable Development.
Research Adviser to Wellcome Trust / Thermofluidics Ltd team.
UPGro Knowledge Broker and Hidden Crisis research project teams – completion.
Strategic support to Kigezi Diocese Water and Sanitation Programme Uganda.
Evaluation of Madzi Alipo rural water sustainability programme, Malawi.
- 2019 Global review and strategy for WASH in United Purpose – completion.
UK – team member for delivery of short courses on groundwater development (RedR).
UK - Cambridge University – teaching module on International Development in the MPhil course Engineering for Sustainable Development.
International - UPGro Knowledge Broker team member (on-going).
Ethiopia, Malawi, Uganda - UPGro Hidden Crisis project team member.
- 2018 Completion of independent evaluation of CAWST
UK – team member for delivery of short course on groundwater development (RedR).
UK - Cambridge University – teaching module on International Development in the MPhil course Engineering for Sustainable Development.
International - UPGro Knowledge Broker team member (on-going).
Ethiopia, Malawi, Uganda - UPGro Hidden Crisis project team member (on-going).
Global review and strategy for WASH in United Purpose
- 2017 International – Team Leader for evaluation of Centre for Affordable Water and Sanitation Technologies (CAWST).
Global – Member of UNICEF’s Technical Review Group for global rural water evaluation.
UK – team leader for delivery of short course on groundwater development (RedR).
UK - Cambridge University – teaching module on International Development in the MPhil course Engineering for Sustainable Development.
International - UPGro Knowledge Broker team member (on-going).
Ethiopia, Malawi, Uganda - UPGro Hidden Crisis project team member (on-going).
UK – Scoping study of links between groundwater access and poverty (in context of UPGro research programme). Client NERC through Skat Foundation.
- 2016 USA – participation in Technical Review Group meetings of UNICEF’s Global Rural Water Supply Evaluation, UNICEF HQ, New York.
Uganda – evaluation country case study for DFID WASH Results Programme – OPML.
UK - Cambridge University – teaching module on International Development in the MPhil course Engineering for Sustainable Development.
International - UPGro Knowledge Broker team member (on-going).
Ethiopia, Malawi, Uganda - UPGro Hidden Crisis project team member (on-going).
UK – revision of WaterAid’s Sustainability Framework.
Global – Member of UNICEF’s Technical Review Group for global rural water evaluation.
UK – team leader for delivery of short course on groundwater development (RedR).
- 2015 Sierra Leone – continuation of water security and Ebola-related work, March - ASI
Madagascar: sustainable services and sector wide approach, on-going – UNICEF
Uganda – visiting water programmes of Water for People and Kigezi Diocese, August – Vitof Foundation
Mali – Community-based Water resources Management training, February – WaterAid
Ethiopia – planning workshop for “Hidden Crisis 2” project - September
- 2014 Timor-Leste: second visit as O&M Adviser to the Besik Programme and Government of Timor-Leste (May-June).
Sierra Leone: continuation of water security project (April).
Uganda: leading training course in supervision of water well drilling (March).

- Timor-Leste: first two visits as O&M Adviser to the Besik Programme and Government of Timor-Leste (February, May).
 UK-based work on Ebola crisis, Sierra Leone
 DFID WASH Results Programme (multi-country, Africa and Asia)
 UPGro Knowledge Broker contract (Africa)
 BESIK programme, Timor-Leste
- 2013 Uganda: led fieldwork for Phase 2 of UPGRO project investigating causes of borehole-handpump failure (November).
 Timor-Leste: led workshop on community-based water resources management for WaterAid and CARE (October).
 Malawi: country case study for WASH / Climate Change project (DFID / ODI / OPM) (July).
 Sierra Leone: continuation of water security project (ASI) (May, August and Dec).
 UK: Drilling Supervision Course (Cranfield University) (April-May).
 Ethiopia: IRC Symposium in Monitoring in the WASH Sector (April).
 Uganda: instructor / consultant in training course on supervision of water well drilling (WaterAid) (March).
 Tanzania: team member in evaluation of Water Sector Development Programme Phase I (Oxford Policy Management) (March).
 Nigeria: initiation of action learning programme in 12 Local Government Areas (Gates/WaterAid) (February-March).
 Uganda: assessment of prospects for sustainability of EU-funded WaterAid post-conflict project (WaterAid) (February).
- 2012 Sierra Leone: continuation of water resources monitoring and management project (ASI) (January).
 Uganda: contributions to water resource management project planning workshop (WaterAid).
 Burkina Faso: evaluation of water resources management project (for WaterAid).
 Sierra Leone: advice on water resources management (for Adam Smith International).
 Nigeria: contributed to official launch workshop for Gates sanitation project (WaterAid).
 Afghanistan: led two project evaluations in Jawzjan and Kandahar Provinces (Tearfund)
 Nigeria: conducted start-up workshop for Gates-funded sanitation project (WaterAid Nigeria)
 Ethiopia: co-presented training on water security, focusing on groundwater monitoring.
- 2011 France: represented Rural Water Supply Network at World Water Forum, Marseille.
 Tanzania: led Joint Technical Review of WaterAid's Country Programme covering water resources management, rural and urban water supply, sanitation and hygiene.
 Liberia: jointly led five-country West African workshop on water supply sustainability.
 Australia: keynote presentation at WASH Conference 2011, Brisbane .
 UK: contributed to panel of 5 in review process 'Oxfam Reflects'.
 UK: made presentation on drilling programme supervision at annual Darcy Lecture.
 Burkina Faso: participated in EU FP7 WASHTech project workshop.
 Uganda: as Chair of RWSN participated in 6th RWSN Forum, Kampala. Made technical visit to Karamoja for WaterAid.
- 2010 Madagascar: Leader of research on rural water supply sustainability (second visit for WaterAid).
 Tanzania: Mid-term review of Sanitation Marketing Project in three rural districts and peri-urban Dar es Salaam (Irish Aid/WaterAid)
 Bangladesh: Participation in WaterAid's Asia Regional Management Team meetings and WaterAid/IRC Hygiene Practitioners' Workshop.
 Uganda: Participation in IRC/Gates Foundation Triple-S/Scaling-up Group Symposium on Sustainable Services at Scale (incl. keynote paper).
 Ireland: Participating in joint colleges Amazzi Bulamu ('Water is Life') Project Steering Committee.
 Ireland: Presentation of 2010 Burdon Lecture (International Association of Hydrogeologists).
 Uganda: Leader of WaterAid Country Programme Evaluation team.
 Tanzania: Country scoping study for DFID/LSHTM SHARE Research Programme Consortium.

- 2009 Madagascar: Leader of research study on sustainability of rural water supply systems (WaterAid).
Zambia: Country Programme Evaluation (WaterAid). Field work and return visit.
Vienna: Rural Water Supply Network Steering Committee.
UK: Keynote presentations at Royal Society of Chemistry, All Party Parliamentary Group on Agriculture and Food Security, Rotary International Water and Sanitation Rotarian Action Group.
- 2008 Uganda: Evaluation of water and sanitation programmes in Pader and Kaabong (Medair)
Uganda: Team Leader, Self-Supply Pilot Implementation (Hifab/GoU).
Ethiopia: Support to consortium-funded water supply and sanitation programme (Tearfund).
Sierra Leone: Support to water and sanitation programmes (World Vision).
Uganda: Keynote paper for conference on Groundwater and Climate Change, Africa
Darfur: Support to local level (groundwater) resource management (Oxfam).
UK: Development of East Africa Regional Strategy for WaterAid; Director of DFID's Resource Centre for Environment, Water, and Sanitation (DEWPoint).
- 2007 From January 2007 my consultancy work has been carried out through Richard Carter and Associates Ltd. My appointment at the university reduced to half-time to facilitate this.
Uganda: Team Leader, GoU/NGO Collaboration Study (WSP/World Bank) – 2 visits
Uganda: Team Leader, Self-Supply Pilot Implementation (Hifab/GoU) – 3 visits
Uganda: Team Leader, Uganda Water and Sanitation Network Evaluation.
Niger: Participation in Drillers' Exchange, Zinder (Enterprise Works).
Malawi: Team Leader WaterAid Malawi country programme evaluation (WaterAid).
Ethiopia: Support to consortium-funded water supply and sanitation programme (Tearfund).
UK: Director of DFID's Resource Centre for Environment, Water, and Sanitation (DEWPoint)
- 2006 Global: Project Director, Landscaping of Water and Sanitation Technologies and Approaches (Bill & Melinda Gates Foundation).
Ethiopia: Team leader for evaluation of SOCODEP programme (IFAD)
Uganda: Team leader for mid-term review of Kigezi Diocese Water & Sanitation Programme
Ethiopia: Completion of Cost-effective Boreholes Case Study (World Bank)
Uganda: Team Leader, Self-Supply Pilot Implementation (Hifab/GoU)
- 2005 Ethiopia: Study Coordinator for RWSN/WSP investigation into borehole drilling costs (3 visits).
Ethiopia: final workshop for FARM Africa Small Scale Irrigation Strategy.
Uganda: lead consultant for study of self-supply in eastern and central districts (World Bank) (2 visits).
Uganda: research into sustainability of water and sanitation programmes (Kigezi Diocese/Tearfund).
Uganda: consultant to RWSN Flagships (RWSN/WSP).
Ethiopia: Final workshop for IFAD SCP II Evaluation.
- 2004 Uganda: evaluation of Kigezi Diocese Water and Sanitation Programme.
Ethiopia: consultant on small-scale irrigation development strategy, for NGO FARM-Africa
Ethiopia: team leader for evaluation of IFAD/GoE Special Country Program II
Uganda: Evaluation of humanitarian aid project, Katakwi District (DanChurchAid)
- 2003 Ethiopia: research supervision for work on cultural issues in water sector development.
Uganda: facilitator at workshop on Sustainable Water Services. Kigezi Diocese Water Department.
Uganda: project manager, study and strategy for support of private sector in rural water and sanitation (4 visits). Sponsors DFID/GoU.
Japan: Third World Water Forum, Kyoto; chaired session on public-private-partnerships for the poor.
Ethiopia: AMCOW conference, Addis Ababa.
- 2002 Professional visits to Switzerland, Italy, and Uganda to develop project proposals, and to Czech Republic to present paper at conference on Groundwater Modelling.
- 2001 Ethiopia: research supervision for work on cultural issues in water sector development.

- Uganda: management of DFID research project on Private Sector Participation in Low Cost Water Well Drilling (3 visits)
- Uganda: member of evaluation team of Kigezi Diocese Water and Sanitation programme.
- UK: invited specialist speaker at high-level workshop on the linkages between technology and sustainable development - Royal Institute for International Affairs (Chatham House)
- UK: invited keynote speaker at Royal Geographical Society 6th form meeting
- 2000 Honduras: supervision of field research in household water quality management.
- Uganda: management of DFID research project on Private Sector Participation in Low Cost Water Well Drilling (4 visits)
- UK: reviews of project evaluation reports and project consultancy reports. Client Tearfund.
- Canada: served on expert panel, Networks of Centres of Excellence, Montreal.
- 1999 Malawi: evaluation of water and environmental sanitation programme. Client: Concern Universal.
- Uganda: manager of research project on Private Sector Participation in Low Cost Water Well Drilling (4 visits). Co-funded by DFID, DANIDA, UNICEF, SIDA, Government of Uganda
- South Africa and Uganda: consultancy assignment as part of review of DFID Research theme W3 Combating Degradation of Water Resources
- Switzerland: invited to present seminar at Institute of Hydromechanics and Water Resources Management, Zurich.
- 1998 Uganda: manager of DFID research project on Private Sector Participation in Low Cost Water Well Drilling (1 visit).
- 1997 Uganda: research and development of groundwater iron removal technology. Client: ODA/Mott MacDonald
- Ethiopia: workshop and further strategy development with KHC water programme. Client Tearfund.
- Nigeria: pre-project mission to set up arrangements for research project in use of shallow groundwater for small scale irrigation. Client IPTRID.
- Ethiopia: visit as part of Silsoe College/Awassa College of Agriculture link (British Council funded)
- Pakistan and Bangladesh: adviser on DFID research project on management transfer of irrigation infrastructure.
- Uganda: team leader for evaluation of community water supply and sanitation programme in Kabale District. Client Kigezi Diocese Water Department/Tearfund.
- 1996 Ethiopia: strategy development with Kale Heywet Church Water Programme. Client Tearfund.
- Nigeria: research supervision as part of continuing University of Maiduguri-Silsoe Link (EU funded).
- Ethiopia: consultancy bid preparation (Ethiopian Social Rehabilitation Development Fund)
- 1995 Sri Lanka: research supervision and technical assistance to development of Open University of Sri Lanka. Client: ODA / British Council.
- Ethiopia and Eritrea: advice to two well-handpump community water supply programmes. Client: Tearfund.
- 1994 Nigeria: Continuing input to Unimaid-Silsoe Research Link. Client: EU
- Uganda: Evaluation of Rural Water Supply Handpump Programme. Client: Busoga Trust.
- 1993 Algeria: initiation of academic link between Silsoe College and Institut National Agronomique. Client: British Council.
- Nigeria: Hydrology/Hydrogeology Research – technical support visit in context of University of Maiduguri - Silsoe College Link. Client: EEC.
- Ethiopia: research/training support for community water supply project in Tigray. Client: FARM Africa.
- 1992 Nigeria: Hydrology/Hydrogeology Research - two visits in context of University of Maiduguri - Silsoe College Link. Client: EEC.
- 1991 Netherlands: Irrigation Design Training - proposal preparation with Wageningen Agricultural University and Institute of Irrigation Studies.
- Nigeria: Hydrology/Hydrogeology Research - two visits in context of University of

- Maiduguri - Silsoe College Link. Client: EEC.
- 1990 Ethiopia: Community Water Supply Evaluation – Client: TEAR Fund.
Tanzania: Irrigation Manpower Planning. Client: FAO.
- 1989 Tanzania: Curriculum Development for Irrigation Training. Client: FAO.
Swaziland: Conducting short course in Management of Irrigation Projects; jointly with Mananga Agricultural Management Centre (MAMC). Client: MAMC.
- 1988 Tanzania: Evaluation of irrigation training opportunities for Government irrigation staff and first phase of preparation of national irrigation manpower plan and structured training programmes. Client: FAO.
Switzerland: Advising on Use of Irrigation Management Games. Client: ILO.
Swaziland: Conducting short course in Management of Irrigation Projects, jointly with Mananga Agricultural Management Centre (MAMC). Client: MAMC.
India: Evaluation of proposed extension to water well drilling programme. Client: Tearfund.
- 1987 UK: Preparation of paper on irrigation scheme staffing levels for manpower planning. Client: FAO.
UK: Compilation of book of case studies and supporting material on small scale irrigation, for non Governmental Organisations. Client: FAO.
Zaire: Appraisal of proposed rural water supply project and preparation of job description for water engineer. Client: Tearfund.
Burkina Faso: Appraisal of proposals for small dam construction by national NGOs. Client: Band Aid.
- 1986 Italy: Review of training activities and development of training policy for Land and Water Service of FAO. Client: FAO.
UK: Chaired, managed, presented two papers, edited and published report of Informal Consultation to develop a curriculum on health management in relation to water resource developments. Client: WHO.
- 1985 UK: Preparation of Working Paper on Manpower and Training Requirements for African Irrigation presented at FAO Regional Conference in Lome, April 1986. Client: FAO.
Tanzania and India: Evaluation of irrigation training of Tanzanian engineers in India. Client: EEC/British Council.
Burkina Faso and Ivory Coast: Evaluation of two regional training institutions in rural engineering. Client: EEC/British Council.
- 1984 Nigeria: Attended Bauchi State Agricultural Development Programme - Fadama Seminar. Chaired discussions on technical and water management issues. Client: World Bank.
- 1983 Nigeria: Investigation into possible support for irrigation training at Ramat Polytechnic. Client: FAO.
Rwanda and Uganda: Studies for three rural community water supply projects. Client: Tearfund.
- 1982 Nigeria: Continuation of MANTRI Project. Client: British Council/Federal Ministry of Water Resources
- 1981 Mali: Survey of groundwater resources and development potential in drought areas. Client: Tearfund.
Nigeria: Major study of manpower needs and training requirements for Nigeria's irrigation developments (MANTRI Project). Client: British Council/Federal Ministry of Water Resources

PUBLICATIONS – PAPERS AND CHAPTERS

- Waterkeyn J., Waterkeyn A., Uwingabire F., Pantoglou J., Ntakarutimana A., Mbirira M., Katarwa J., Bigirimana Z., Cairncross, S. and Carter R.C. (2020) The value of monitoring data in a process evaluation of hygiene behaviour change in Community Health Clubs to explain findings from a cluster-randomised controlled trial in Rwanda. *BMC Public Health* (2020) 20:98 <https://doi.org/10.1186/s12889-019-7991-7>
- Van der Byl W, Carter R C (2018) An investigation of private operator models for the management of rural water supply in sub-Saharan Africa. *Waterlines*, 37:2, 155–174 <http://dx.doi.org/10.3362/1756-3488.18-00005>
- Bonsor H, MacDonald A, Casey V, Carter R, Wilson P (2018) The need for a standard approach to assessing the functionality of rural community water supplies. *Hydrogeology Journal* (2018). <https://doi.org/10.1007/s10040-017-1711-0>
- Oluwasanya G O and Carter R C (2017) Water safety planning for small water supply systems: the framework and control measures. *Water Science & Technology: Water Supply*, 17.6, pp1524-1533.
- Mark Zeitoun, Bruce Lankford, Tobias Krueger, Tim Forsyth, Richard Carter, Arjen Y. Hoekstra, Richard Taylor, Olli Varis, Frances Cleaver, Rutgerd Boelens, Larry Swatuk, David Tickner, Christopher A. Scott, Naho Mirumachi, Nathaniel Matthews (2016) Reductionist and integrative research approaches to complex water security policy challenges. *Global Environmental Change*, Volume 39, July 2016, Pages 143–154, <http://authors.elsevier.com/a/1T8jZ3Q8oPtUtz>
- Carter R C (2016) Water in development. Chapter 10 in Ainger C and Fenner R A (2016) *Sustainable Water*. Institution of Civil Engineers (ICE) Publishing.
- Carter R C and Ross I (2016) Beyond 'functionality' of handpump supplied rural water services in developing countries. *Waterlines Vol 34 No 4*, ISSN: 0262-8104 (print) 1756-3488 (online) Vol 39, 1, 94-110.
- Lapworth D J, Carter R C, Pedley S, MacDonald A M (2015) Threats to groundwater supplies from contamination in Sierra Leone, with special reference to Ebola care facilities. *British Geological Survey Open Report*, OR/15/009. 96pp. <http://nora.nerc.ac.uk/510992/>.
- Parker A H, Smith J A, Verdemato T, Cooke J, Webster J, Carter R C (2014) Menstrual management: a neglected aspect of hygiene interventions. *Disaster Prevention and Management*, Vol 23, No 4, pp 437-454. DOI 10.1108/DPM-04-2013-0070.
- Oates N, Ross I, Calow R, Carter R, Doczi J (2014) *Adaptation to Climate Change in Water, Sanitation and Hygiene - assessing risks, appraising options in Africa*, ODI Working Paper. <http://www.odi.org.uk/publications/8154-climate-change-adaptation-wash-water-sanitation>
- Grace Oluwasanya and Richard Carter (2013): Management of urban self-supply wells in Abeokuta, Nigeria: An assessment and redefinition of roles for water safety planning, *Nigerian Journal of Hydrological Sciences (NJHS)*, Vol. 2, 85 - 109, <http://www.nahs.org.ng/>
- Parker A, Cruddas P, Rowe N, Carter R C, Webster J (2012) Tank costs for domestic rainwater harvesting in East Africa. *Proceedings of the Institution of Civil Engineers – Water Management*, online December 2012, doi 10.1680/wama.11.00113
- Oluwasanya G, Smith J and Carter R C (2011) Self supply systems: Urban dug wells in Abeokuta, Nigeria. *Water Science and Technology: Water Supply*, 11.2, 172-178. IWA Publishing.
- Carter R C, Danert K, Chilton J and Olschewski A (2010) Siting of Drilled Water Wells: a Guide for Project Managers. *RWSN Field Note 2010-5*, June 2010. <http://www.rwsn.ch/documentation/skatdocumentation.2010-12-03.0768183939/file>
- Danert K, Luutu A, Carter R C and Olschewski A (2010) Costing and Pricing: a Guide for Water Well Drilling Enterprises. *RWSN Field Note 2010-6*, June 2010. <http://www.rwsn.ch/documentation/skatdocumentation.2010-07-08.6754105740/file>
- Hunter P R, MacDonald A M, Carter R C (2010) Water Supply and Health. *PLoS Med* 7(11): e1000361 doi:10.1371/journal.pmed.1000361 <http://www.plosmedicine.org/article/info%3Adoi%2F10.1371%2Fjournal.pmed.1000361>

Parker, A H, Youten, R, Dillon, M, Nussbaumer, T, Carter, R C, Tyrrel, S F, Webster, J (2010) An assessment of microbiological water quality of six water source categories in north-east Uganda. *Journal of Water and Health*, 08.3, pp550-560, 2010.

Carter, R C and Parker, A (2009) Climate change, population trends and groundwater in Africa. *Hydrological Sciences Journal* 54 (4), 676-689, August 2009.

<http://www.tandfonline.com/doi/abs/10.1623/hysj.54.4.676?journalCode=thsj20>

Carter R.C. and Bevan J. (2008) Groundwater development for poverty alleviation in sub-Saharan Africa. in Adelana, S M A and MacDonald, A M (Eds) *Applied Groundwater Studies in Africa. Selected papers on hydrogeology* 13, International Association of Hydrogeologists, CRC Press.

Carter, R.C. (2007) Rapid assessment of groundwater opportunities for displaced and refugee populations. *Waterlines* Vol 26 No 1 pp2-4, July 2007.

Eilers, V.H.M., Carter, R.C. & Rushton K.R. (2007) A single layer soil water balance model for estimating deep drainage (potential recharge): an application to cropped land in semi-arid north-east Nigeria. *Geoderma* 140, 119-131.

Carter, R.C. (2006) Investigating options for self-help water supply: from field research to pilot interventions in Uganda. WSP Field Note, October 2006. http://www.streams.net/resources/portal/Uganda_Self_Supply.pdf

Carter, R.C. (2006) Ten-step guide towards cost-effective boreholes: case study of drilling costs in Ethiopia. WSP Field Note, October 2006. <http://www.rwsn.ch/documentation/skatdocumentation.2007-06-04.3136351385/file>

Carter, R.C. (2006) What the Dickens can science and technology offer Africa? A tale of two villages in east Africa, *Science in Parliament*, 63, 1, 26-27.

Rushton, K.R., Eilers, V.H.M. and Carter, R.C. (2006) Improved soil moisture balance methodology for recharge estimation. *Journal of Hydrology*, 318, 379-399.

Carter, R.C., Mpalanyi, J.M. & Ssebalu, J. (2005) Self-help initiatives to improve water supplies in eastern and central Uganda, with an emphasis on shallow groundwater. WSP/RWSN/WaterAid <http://www.rwsn.ch/documentation/skatdocumentation.2005-11-17.7461089382>

Trevett, A.F., Carter, R.C., and Tyrrel, S.F. (2005) The importance of domestic water quality management in the context of faecal - oral disease transmission. *Journal of Water and Health*, 03.3, 259-270.

Trevett, A.F., Carter, R.C., and Tyrrel, S.F. (2004). Mechanisms leading to post-supply water quality deterioration in rural Honduran communities: A case of contamination or bacterial growth? *International Journal of Hygiene & Environmental Health*, 208, 153-161.

Trevett, A.F., Carter, R.C., and Tyrrel, S.F. (2004). Water quality deterioration: A study of household drinking water quality in rural Honduras. *International Journal of Environmental Health Research*, 14(4), 273-283 (August 2004).

Alhassan, A B, Carter, R C, and I Audu (2003) Agriculture in the oases of the Manga Grasslands of semi-arid north-east Nigeria: how sustainable is it? *Outlook on Agriculture*, 32, 3, 191-196.

Danert K, Carter R C, Rwamwanja R, Ssebalu J, Carr G, Kane D (2003) The private sector in water and sanitation services in Uganda: understanding the context and developing support strategies. *Journal of International Development* 15, 1099-1114.

Carter, R.C. and Tyrrel, S.F. (2001) Groundwater: potential but not panacea. *Waterlines*, 20(2), p2.

Carter, R.C., Danert, K.D., Ball, P., Rwamwanja, R., and Ssebalu, J. (2001) Low Cost Water Well Drilling in Africa. *Waterlines*, 20(2), pp7-10.

Tyrrel, S.F., Carter, R.C. and Howsam, P. (2001) Iron in handpump water supplies – prevention or cure? *Waterlines*, 20(2), pp16-18.

Carter R C, Kay, M, and Weatherhead, E K (1999). Water losses in smallholder irrigation schemes. *Agricultural Water Management*, 40, 15-24.

Stephens, William, Hess, T. M., Carter, R. C. and Howsam, P. (eds) (1999). More for less: Better water management. *Agricultural Water Management* 40, 1-150.

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