

Curriculum Vitae



Name: J.D. van Opstal, Ph.D.
 First Name: Jonna
 Date of Birth: 8 July 1986
 Nationality: Dutch
 Main Disciplines: Irrigation management and engineering, Remote sensing and GIS, Water Productivity, Energy balance modelling
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Key Qualifications

Jonna van Opstal (Ph.D.) has contributed and managed several major international projects. Her major focus is on crop water productivity and using open access spatial data for the irrigation performance assessment. Both research and capacity building projects are executed in various countries mainly on the African continent and the Middle East. Jonna holds a doctoral degree in irrigation engineering and water management. During her research she focused on evaluating irrigation district performance using field measurements (irrigation evaluations, flux towers), energy balance modelling, and irrigation system simulation modelling. Her ambition is to enhance interactions between science and practitioners in the field of agricultural water management, using innovative spatial analysis tools.

Educational Background

2011 – 2016 **Ph.D. Irrigation Engineering**, Civil and Environmental Engineering Department
 Utah State University, Logan UT, USA
 GPA: 3.94/4.00

2008 – 2010 **MSc. International Land and Water Management**
 Wageningen University, Wageningen, The Netherlands
 Major: Irrigation and Water Management

2004 – 2008 **BSc. International Land and Water Management**
 Wageningen University, Wageningen, The Netherlands
 Major: Irrigation and Water Management
 Minor: Water Quality and Treatment

Professional Experience

2018 – present **Senior Water Productivity Expert** (current position)
 FutureWater, Wageningen, The Netherlands

2016 – 2018 **Water Productivity Specialist and Lecturer**
 Water Management Chair Group, Integrated Water Systems and Governance Dept.
 IHE Delft (formerly UNESCO-IHE), Delft, The Netherlands

2011 – 2015 **Research assistant**, Utah Water Research Laboratory, Logan, UT, USA

2011 **Project assistant**, Peutz bv. Zoetermeer, The Netherlands

2010 **Project assistant**, ARCADIS, Hoofddorp, The Netherlands

2009 – 2010 **Graduate student**, CSIRO Land and Water Division, Brisbane QLD, Australia

2008 **Intern**, Agricultural Research Organisation (ARO), Gilat, Israel

Overseas Professional Experience

As resident: USA (4.5 years), Australia (6 months), Israel (5 months)
 As non-resident: Spain, Italy, Turkey, Lebanon, Jordan, Palestinian Territories (West Bank), Egypt, Tunisia, Morocco, Ethiopia, Ghana, Rwanda, Mozambique, Nepal, Indonesia
 As resident (non-professional): Portugal (3 years), China (4 years), Greece (4 years)

Selection of Assignments and Projects

<p>Duration: 2021 Location: Egypt Client: RVO</p>	<p>A Practical Farmers Toolkit – Geodata for climate smart agriculture in Egypt</p> <p>Position: Team Lead, Water Productivity and Remote Sensing Expert</p> <p>Main project features: The 'Farmers Toolkit' as presented in this project contains various geodata tools applicable for farmers to assist their decision-making and adopt climate smart agricultural practices. This project launches a training program on these tools, which are: Flying Sensors, irrigation advisory services (IrriWatch portal), WaPOR Apps, and Climate Risk Assessment. The training providers consortium (FutureWater, IrriWatch, Delphy, Cairo University and HiView) are tailoring the activities towards the requirements of the selected beneficiaries which are private companies, consultants, and NGO's active as extension officers in the agricultural sector of Egypt. The training program is a unique combination of face-to-face training, online teaching, and field schools conducted throughout the growing season.</p>
<p>Duration: 2021 Location: Mozambique Client: TerraFirma</p>	<p>Cadastre mapping with flying sensors and satellite imagery in Zambezia, Mozambique</p> <p>Position: Project leader, Remote Sensing Expert</p> <p>Main project features: Terra Firma is an organization in Mozambique with the task to map and document land rights. In this project, they hired FutureWater and ThirdEye Limitada (Chimoio, Mozambique) to acquire flying sensor imagery over a pilot area near Quelimane, Mozambique. The objective of this pilot is to determine the suitability of using flying sensor imagery for cadastre mapping in an area of small-scale agriculture in Mozambique. This imagery was used as input for various algorithms that can be suitable for classification and segmentation. In addition, comparison is made with satellite imagery to indicate the differences in results.</p>
<p>Duration: 2021 Location: Kenya (online) Client: NUFFIC</p>	<p>Tailor-Made Training on Crop Models and Remote Sensing for Water Management in Agricultural Systems</p> <p>Position: Training provider</p> <p>Main project features: FutureWater, HiView and ThirdEye Kenya partnered with Egerton University (Crops, Horticulture & Soils Department) to conduct a tailor-made training on 'Crop models and remote sensing for water management in agricultural systems'. The training enhances the capacity of Egerton educational staff in accessing and using innovative data and tools in the public domain, to analyse crop performance and irrigation management. During the training, university participants will be specifically supported in developing course modules based on the skills gained.</p>
<p>Duration: 2021 Location: Jordan (online) Client: DUPC (IHE-DGIS)</p>	<p>Drone Pilot: Remote Sensing tools for assessing plant health and monitoring irrigated agriculture to improve water productivity</p> <p>Position: Project leader, training provider</p>

	<p>Main project features: This project consists of providing an online course for NARC (National Agricultural Research Center in Jordan) staff in collaboration with IHE Delft Institute for Water Education. The course covers the topics on flying sensor imagery, processing steps, setting up a drone unit, and using flying sensor imagery for crop monitoring.</p>
<p>Duration: 2021 Location: Rwanda Client: IUCN</p>	<p>Bio-Physical Assessment and Hydrological Analysis for Mukungwa and Akagera Lower catchments in Rwanda</p> <p>Position: Remote Sensing expert</p> <p>Main project features: In this project FutureWater conducts the bio-physical assessment and hydrological analysis for the Mukungwa and Akagera Lower Catchments in Rwanda. The project is the basis for two catchment plans to be developed through the “EIWRM Project”, funded by the Government of the Netherlands and implemented by a consortium led by the International Union for Conservation of Nature (IUCN). As remote sensing expert the remote sensing-based data from FAO’s WaPOR data portal was extracted and used for the calibration of the water allocation modelling.</p>
<p>Duration: 2020 - 2021 Location: Rwanda Client: NUFFIC</p>	<p>Tailor Made Training for the Rwanda Water Resources Board (RWB) on Water Allocation Modelling and Remote Sensing Analysis</p> <p>Position: Training provider, Google Earth Engine expert</p> <p>Main project features: FutureWater provided a Tailor Made Training to water professionals at the Rwanda Water Resources Board (RWB) on Water Allocation Modelling and Remote Sensing Analysis. A total of 20 participants of the RWB worked with the Water Evaluation And Planning model WEAP and the Remote Sensing platform of Google Earth Engine (GEE), state of the art technologies that are excellent for Integrated Water Resources Management (IWRM). With improved knowledge on these tools, the professionals of RWB are able to better quantify current and future impacts on the water resources of Rwanda and thus improve the quality of their advice to their stakeholders.</p>
<p>Duration: 2019 - 2020 Location: Nepal, Iran (online), Viet Nam (online), Malaysia (online) Client: FAO RAP office</p>	<p>New inventory and technical guidance for improving water productivity and achieving real water savings at basin scale for the FAO Asia and Pacific Regional Office</p> <p>Position: Online teaching coordinator, Irrigation and Water Productivity Expert, Training provider</p> <p>Main project features: The impacts of measures to enhance water productivity and increase water savings can differ across spatial scales. Typical examples of such interventions on the interface of water management and agronomical practice, are mulching (plastic, soil, straw), deficit irrigation at specific time, planting density, weed control, fertilizer, cultivar selection, growth enhancers tillage practices, terracing, amongst others. This project aims to provide a technical guidance on those options, including clear and practical guidelines on how to implement and report real water savings of each option. This will be a step forward in the implementation of real water saving solutions under different conditions. The target audience ranges from extension services officers up to water managers and irrigation specialists designing and managing irrigation systems. Pilot areas were selected in Vietnam, Iran, Malaysia, and Nepal.</p>

<p>Duration: 2019 - 2020 Location: Mozambique Client: NCBA Clusa</p>	<p>Flying Sensor Activities for NCBA Clusa in Manica and Zambezia province of Mozambique</p> <p>Position: Project leader, Training provider</p> <p>Main project features: NCBA Clusa is introducing conservation farming practices in various locations of the Manica, Tete, and Zambezia provinces, with the objective to increase agricultural productivity. Flying sensor imagery can provide data at regular intervals to monitor the spatial and temporal improvements in agricultural productivity and quantify the increase in productivity achieved through the farming practices introduced. This project provides NCBA Clusa support, through capacity building activities and technical supervision, for a flying sensor (drone) operators unit. In addition, flying sensor imagery is used to calculate season crop yield of rainfed and irrigation crops.</p>
<p>Duration: 2018 - 2021 Location: Mozambique Client: Agencia de Desenvolvimento do Vale Zambezia (ADVZ)</p>	<p>APSAN-Vale: Piloting innovations to increase the Water Productivity and Food security for Climate Resilient smallholder agriculture in the Zambezi valley of Mozambique</p> <p>Position: Project manager, Water Productivity Expert</p> <p>Main project features: The aim of this project is to increase climate resilient agricultural (water) productivity and food security, with a specific objective to increase the water productivity and profitability of smallholder farmers in Mozambique. As water productivity expert the tasks are to provide water productivity assessments using flying sensor (drone) imagery and crop simulation modelling (AquaCrop). At larger scale (communities and river basins), the water productivity analysis was conducted with FAO's WaPOR portal.</p>
<p>Duration: 2016 - 2018 Location: Africa and Near East (special focus: Lebanon, Ethiopia) Client: FAO HQ office</p>	<p>Water productivity and accounting database project (FAO WaPOR portal)</p> <p>Position: Project manager, Water Productivity Expert, Training provider</p> <p>Main project features: The objective of this project is to make an assessment of the consequences and sustainability of possible increases in water productivity by means of water accounting. Water productivity data was provided through the FAO WaPOR water productivity data portal. The major task as water productivity expert was to make an extensive quality assessment of the WaPOR data by comparison with field data, other satellite products, literature reviewing, water productivity assessments from pySEBAL (energy balance model) and other data products. In addition, capacity building activities by developing training material for the project methodology, providing trainings, and mentoring students on validation of WaPOR data.</p>
<p>Duration: 2016 - 2018 Location: Lebanon Client: DUPC (IHE-DGIS)</p>	<p>Water Intelligence for the Near East: water productivity assessment and capacity building activities in Lebanon</p> <p>Position: Project leader, Water Productivity Expert, Training provider</p> <p>Main project features: The Litani River has a need for a measurement reporting system to provide information on the current status of the water resources. A water accounting and water productivity assessment is provided in this project for the Litani River. The crop-specific water productivity assessment was provided using satellite data and pySEBAL algorithm. Capacity building activities were provided to teach local stakeholders to use pySEBAL for making water productivity assessments and assist with interpretation and field validation.</p>

<p>Duration: 2017</p> <p>Location: Jordan, West Bank, Egypt, Ghana, Rwanda, Kenya, Benin, Mozambique</p> <p>Client: DUPC (IHE-DGIS)</p>	<p>Water Productivity Trainings in DGIS Focus countries</p> <p>Position: Project leader, Water Productivity Expert, Training provider</p> <p>Main project features: A series of trainings (Phase I) were provided for DGIS Focus countries to introduce the concept of water productivity, practical applications, and using the WaPOR data portal for interpretation of water productivity data. A follow-up (Phase II) gave a training-of-trainers curriculum for making water productivity assessments with WaPOR in QGIS.</p>
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Academic Teaching Experience

<p>Duration: 2018</p> <p>Institute: IHE Delft</p>	<p>Online course ‘GIS and Remote Sensing for Water Management’</p> <p>Role: co-developer, coordinator, lecturer</p>
<p>Duration: 2016 - 2017</p> <p>Institute: IHE Delft</p>	<p>‘Water accounting’ summer course</p> <p>Role: lecturer</p>
<p>Duration: 2016 - 2018</p> <p>Institute: IHE Delft</p>	<p>Module on ‘Remote sensing, GIS and modelling for agricultural water use’</p> <p>Role: co-developer, coordinator, lecturer</p>

Students supervised

Name	Level	Institute	Year	Title
Sergio Marcelo Alvarez Carrion	MSc	IHE Delft	2018	Water productivity score computation using spatial remote sensing data sources in the Bekaa valley, Lebanon
Landing Bojang	MSc	IHE Delft	2018	Understanding water scarcity and vulnerability dynamics in the Sahel region
Godwin Adeezele Akuliya	MSc	IHE Delft	2018	Comparison of remote sensing methods for crop coefficient calculations in Ghana
Wubengeda Admasu Yilma	MSc	IHE Delft	2017	Computation and spatial observation of water productivity in Awash river basin
Limbani Kaluwa	MSc	IHE Delft	2017	Irrigation performance assessment using remote sensing – A case study of Gezira irrigation scheme, Sudan
Lynn Duijndam	MSc	TU Delft	2016	Evaluation of two automated remote sensing-based surface energy balance models for estimating daily evapotranspiration

Language Skills

Native: English, Dutch

Computer Skills

Standard software: MS Office
Spatial analysis: ArcGIS, QGIS, ERDAS Imagine, Google Earth Engine, Agisoft Metashape
Programming: R, Python
Online teaching: Moodle
Other software: AquaCrop, Loggernet, SIRMOD, (py)SEBAL, METRIC

Selection of Technical Reports and Publications

Featured publication

- **Van Opstal, J.**, Droogers, P., Kaune, A., Steduto, P. and Perry, C. 2021. Guidance on realizing real water savings with crop water productivity interventions. Wageningen, FAO and FutureWater. <https://doi.org/10.4060/cb3844en>

Technical reports

- **Van Opstal, J.**, K. van Krieken, M. de Klerk, W. Beekman. 2021. Interventions Impact Analysis: Irrigation Season 2020. Technical report.
- **Van Opstal, J.**, J. Beard. 2020. Cadastre mapping with flying sensors and satellite imagery in Zambezia, Mozambique. FutureWater Report 220.
- **Van Opstal, J.D.**, M. de Klerk, A. Kaune, C. Nolet, J.E. Beard. 2021. Water Productivity Analysis: Irrigation Season 2020. FutureWater Report 218.
- **Van Opstal, J.**, J. Beard, M. de Klerk, 2020. Analysis of the Agricultural Crop Productivity Using Flying Sensors. Technical report - Horticultural season 2020. FutureWater Report 214.
- **Van Opstal, J.**, M. de Klerk, K. van Krieken, D. Chale. 2020. Interventions Impact Analysis: Rainfed Season 2019-2020. Technical report.
- **Van Opstal, J.D.**, M. de Klerk, A. Kaune, C. Nolet, J.E. Beard. 2020. Water Productivity Analysis: Rainfed Season 2019-2020. FutureWater Report 204.
- **Van Opstal, J.D.**, J.E. Beard, M. de Klerk. 2020. Analysis of the Agricultural Crop Productivity Using Flying Sensors. Technical report - Rainy season 2019 – 2020. FutureWater Report 203.
- Kaune, A., P. Droogers, **J.D. Van Opstal**, P. Steduto, C. Perry. 2020. REWAS: REal WAtER Savings tool: Technical Document. FutureWater Report 200
- Droogers, P., A. Kaune, **J.D. Van Opstal**, P. Steduto, C. Perry. 2020. Training Manual: Crop Water Productivity Options to Achieve Real Water Savings. FutureWater Report 199
- **Van Opstal, J.D.**, M. de Klerk, A. Kaune. 2020. Water Productivity Analysis: Irrigation Season 2019. FutureWater Report 201.
- Kaune, A., **J.D. van Opstal**. 2020. APSAN Vale – Water Productivity Technical Report Baseline assessment. FutureWater Report 195.
- **Van Opstal, J.D.**, M. de Klerk. 2019. ThirdEye Kenya – Water Productivity Report. FutureWater Report 190.
- **Van Opstal, J.D.** 2019. APSAN-Vale Water Productivity Rainfed season 2018/2019
- FAO and IHE Delft. 2019. WaPOR quality assessment. Technical report on the data quality of the WaPOR FAO database version 1.0. Rome. 134 pp. (contributing author)

Dissertation and thesis

- **Van Opstal, J.D.** 2016. Analyzing irrigation district water productivity by benchmarking current operations using remote sensing and simulation of alternative water delivery scenarios. Doctoral Dissertation, Utah State University, All Graduate Theses and Dissertations, Paper 4920, <http://digitalcommons.usu.edu/etd/4920>
- **Van Opstal, J.D.** 2010. Irrigation with reclaimed water Down Under: a bottom-up approach. MSc Thesis, Wageningen University, <http://edepot.wur.nl/139376>

Journal papers and conference proceedings

- **Van Opstal, J.D.**, A. Kaune, C. Nolet, J. van Til, J.E. Hunink. 2019. Flying Sensors for Smallholder Farming: An Innovative Technology for Water Productivity Assessment. Conference Paper 3rd World Irrigation Forum (WIF3), 1-7 September 2019, Bali, Indonesia.
- Weerasinghe, I. , A. van Griensven, C. Chawanda, W.G.M. Bastiaanssen, **J.D. van Opstal**. 2018. Evaluation of the Soil and Water Assessment Tool Plus (SWAT+) for Evapotranspiration using Remote Sensing derived products for the Blue Nile Basin. SWAT Conference 2018, Brussels Belgium
- **Van Opstal, J.D.**, C.M.U. Neale, S. Lecina. 2014. Improvements in irrigation system modelling when using remotely sensed ET for calibration. Proceedings SPIE 9239, Remote Sensing for Agriculture, Ecosystems, and Hydrology XVI
- **Van Opstal, J.D.**, C.M.U. Neale. 2013. Potential savings of water and nutrients for the Bear River Canal Company. USCID Conference Proceedings, 7th International Conference on Irrigation and Drainage, Phoenix AZ
- R. Erel, U. Yermiyahu, **J. van Opstal**, A. Ben-Gal, A. Schwartz, A. Dag. 2013. The importance of olive (*Olea europaea* L.) tree nutritional status on its productivity, *Scientia Horticulturae* Vol. 159
- **Van Opstal, J.D.**, F.P. Huibers, R.G. Cresswell. 2012. A participatory modelling approach to define farm-scale effects of reclaimed wastewater irrigation in the Lockyer Valley, Australia. *Water International* Vol.37 Iss.7