LIST OF PUBLICATIONS AND SOFTWARE SINCE 1980
R.J.Oosterbaan

The list contains references to:
(1) articles in annual reports of the International Institute for Land Reclamation and Improvement, ILRI, Wageningen, The Netherlands, or in journals.
(2) papers/chapters (often presented at workshops, symposia, and conferences, published in journals or as chapters in books)
(3) technical mission reports (if not of confidential)
(4) software

Publications with environmental emphasis are indicated by an asterisk **(*)**.

See also website: http://www.waterlog.info

Table of contents

1. Articles

(*) 2019. Reclamation of a saline vertisol soil rice cropping, interpretation of the data with a salt lecahing model. In: International Journal of Environmental Science, on line: https://www.iaras.org/iaras/filedownloads/ijes/2019/008-0006(2019).pdf

(*) 2019, Software for generalized and composite probability distributions. In: International Journal of Mathematical Methods, on line: https://www.iaras.org/iaras/filedownloads/ijmcm/2019/001-0001(2019).pdf

(*) 2018, Rainfall-runoff relations of a small valley with rice cultivation in Sierra Leone, assessment with a non-linear reservoir model. In: International Journal of Environmental Science, on line: https://www.iaras.org/iaras/filedownloads/ijes/2019/008-0002(2019).pdf

(*) 2018. Crop tolerance to soil salinity,statistical analysis of data measured in farm lands. In: International Journal of Agricultural Science,on line: https://www.iaras.org/iaras/filedownloads/ijas/2018/014-0008(2018).pdf

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2. Papers and chapters

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4. Preprints in ResearchGate

Example of an approximately normally distributed data set to which a large number of different probability distributions can be fitted. On line:
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The groundwater hydraulics of the Garmsar alluvial fan, Iran, assessed with the SahysMod model. On line:
https://www.researchgate.net/publication/336232156_The_groundwater_hydraulics_of_the_Garmsar_alluvial_fan_Iran_assessed_with_the_SahysMod_model

Agro-hydro-soil-salinity characteristics of the irrigated Garmsar alluvial fan, Iran, described with the SahysMod model. On line:
https://www.researchgate.net/publication/336149567_Agro-hydro-soil-salinity_characteristics_of_the_irrigated_Garmsar_alluvial_fan_Iran_described_with_the_SahysMod_model

Discontinuities in time series and probability distributions of temperature in the Netherlands as a result of global warming; analyses with SegReg and CumFreq models. On line:
https://www.researchgate.net/publication/336014164_Discontinuities_in_time_series_and_probability_distributions_of_temperature_in_the_Netherlands_as_a_result_of_global_warming_analyses_with_SegReg_and_CumFreq_models

Comparing drain and well spacings in deep semi-confined aquifers for water table and soil salinity control. On line:
https://www.researchgate.net/publication/335919970_Comparing_drain_and_well_spacings_in_deep_semi-confined_aquifers_for_water_table_and_soil_salinity_control

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https://www.researchgate.net/publication/335789831_The_potato_variety_927_tested_at_the_Salt_Farm_TexelThe_Netherlands_proved_to_be_highly_salt_tolerant

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Trend of annual averages of daily average temperatures in the Netherlands since 1900 first showing slow and then fast increases. On line:
https://www.researchgate.net/publication/335541155_Trend_of_annual_averages_of_daily_average_temperatures_in_the_Netherlands_since_1900_first_showing_slow_and_then_fast_increases

Models and software offered in website waterlog.info for agricultural land, soil, and water management. On line:
https://www.researchgate.net/publication/335527721_Models_and_software_offered_in_website_waterloginfo_for_agricultural_land_soil_and_water_management/comments

Variations of leaching efficiency determined with soil salinity models calibrated in farm lands and related to soil texture. On line:
https://www.researchgate.net/publication/335455972_Variations_of_leaching_efficiency_determined_with_soil_salinity_models_calibrated_in_farm_lands_and_related_to_soil_texture

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Crop yield and depth of water table, statistical analysis of data measured in farm lands. On line:
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Hydraulic equivalent of the law of Joule in electricity for groundwater flow to drains. On line:
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Fitting the versatile linearized, composite, and generalized logistic probability distribution to a data set. On line:
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Methods to evaluate crop salt tolerance from field trials, a critical review of the Salt Farm Texel article. On line:
https://www.researchgate.net/publication/334249995_Methods_to_evaluate_crop_salt_tolerance_from_field_trials_a_critical_review_of_the_Salt_Farm_Texel_article

5. Software

In website waterlog.info, models and softwares are offered for agricultural land and water management in three categories: 1) Irrigation, water logging, soil drainage, and soil salinity, 2) Subsurface drainage equations, well spacing equations for land drainage, and rainfall-runoff relations, 3) Statistics, segmented regression analysis and probability distribution fitting, probability calculators.

These models and softwares, which are free for download and use, are introduced in this article with references to literature in which they were used.

1) Irrigation, waterlogging, soil drainage, and soil salinity

1.1 SaltMod [Ref. 1]

This is a mathematical, numerical simulation model describing the relations between agriculture, crop rotation, and irrigation. Factors like rainfall, potential and actual evaporation (evapo-transpiration), climate, and hydrology play also a role. It is therefore called an agro-hydro-soil-salinity model. The model calculates depth and level of water-table, capillary rise and deep percolation as well as the salt balance in the soil. It gives graphs of soil salinity and subsurface drainage by drains or wells. There is ample attention regarding the reuse

(conjunctive use) of ground and drain water from wells. Finally, the model includes farmers' responses to water logging and soil salinity.

A list of publications in which SaltMod was used can be seen at https://www.waterlog.info/pdf/SaltModlist.rtf

The manual can be seen at https://www.waterlog.info/pdf/saltmod .pdf

Two articles using SaltMod have been uploaded on ResearchGate:

a)
https://www.researchgate.net/publication/332470076_Saltmod_a_Tool_for_Interweaving_of_Irrigation_and_Drainage_for_Salinity_Control

b)
https://www.researchgate.net/publication/294780124_Using_SALTMOD_to_predict_drainage_and_salinity_in_the_Nile_Delta

1.2 SahysMod [Ref. 2]

This is a combination of SaltMod with a hydrological model of ground water flow and hydraulics to account for large spatial variation through a network of polygons. It includes phreatic (unconfined) aquifers as well as soil layers with slow vertical hydraulic conductivity (soil permeability for water) resulting in semi-confined (leaky) aquifers.

A list of publications in which SaltMod was used can be seen at https://www.waterlog.info/pdf/sahyslist.pdf

The manual can be seen at https://www.waterlog.info/pdf/sahysmod.pdf

An article using SaltMod has been uploaded on ResearchGate:

https://www.researchgate.net/publication/335396990_Mapping_facilities_of_the_spatial_agro-hydro-soil-salinity_model_SahysMod

1.3 SaltCalc [Ref. 3]

This is a simplified version of SaltMod with the advantage that calculations are made for shorter time steps (monthly instead of seasonally or even daily). SaltCalc can be used when field observations of irrigation, water table and soil salinity have been made and one wishes to develop a model for that situation and for the maintenance of the salt balance in the soil. Normally, calibration of unknown values must be done using a range of values of the corresponding variable, running the model repeatedly and selecting the optimal value from the range that gives model results closest to observed values.

1.4 PolySalt [Ref. 4]

This is simplified version of SahysMod with the advantage that calculations are made for shorter time steps (monthly instead of seasonally). The application principles are similar as those described before under "SaltCalc".

1.5 LeachMod [Ref. 5]

This model is somewhat similar to SaltCalc. On the one hand the water management options are fewer (e.g. re-use of drainage or well water for irrigation do not feature here), but the model is more modern in the sense that the variable input for each time step is given in a table so that the calculations over all the time steps are done in one go. Moreover, by inserting the observed values of soil salinity in the data table, the model optimizes the leaching efficiency of the soil automatically so that the optimal salt balance can be found.

Two articles using LeachMod have been uploaded on ResearchGate:

a)
https://www.researchgate.net/publication/332466176_Reclamation_of_a_Coastal_Saline_Vertisol_by_Irrigated_Rice_Cropping_Interpretation_of_the_data_with_a_Salt_Leaching_Model

b)
https://www.researchgate.net/publication/335455972_Variations_of_leaching_efficiency_determined_with_soil_salinity_models_calibrated_in_farm_lands_and_related_to_soil_texture

2. Subsurface drainage equations, well spacing equations for land drainage, and rainfall-runoff relations

2.1 EnDrain [Ref. 6]

This hydrological model does calculations on horizontal subsurface drainage systems in agriculture, hydraulic head, as well as depth and level of water-table in agricultural land. It comes up with a drain spacing using the energy balance of groundwater flow, but also the Darcy and continuity equation (mass balance/budget of water). It includes drain entrance resistance and soil anisotropy of hydraulic conductivity (soil permeability for water), i.e. the horizontal and vertical hydraulic conductivity are different. All is applicable to pipe/tile drains (drain pipes) and open ditches.

Four articles using EnDrain have been uploaded on ResearchGate:

a)
https://www.researchgate.net/publication/272507723_Hooghoudt's_drainage_equation_adjusted_for_entrance_resistance_and_sloping_land

b)
https://www.researchgate.net/publication/332470225_The_energy_balance_of_groundwater_flow

c)

https://www.researchgate.net/publication/332470086_THE_ENERGY_BALANCE_OF_GROUNDWATER_FLOW_APPLIED_TO_DITCH_DRAINAGE_IN_ANISOTROPIC_SOILS

d)

https://www.researchgate.net/publication/335321441_Comparing_steady_and_non-steady_state_subsurface_drainage_using_calculations_with_relevant_models

2.2 WellDrain [Ref. 7]

This hydrological model calculates the spacing of wells, the shape, depth, and level of the water table in vertical drainage systems using pumped wells. Like EnDrain, it permits aquifers with various different properties and, in addition, fully/partially penetrating wells.

2.3 RainOff [Ref. 8]

This helps in hydrological modeling of effective rainfall, recharge, and water storage. It calculates runoff, surface drainage and discharge relations in hydrological catchment areas (watersheds) using the concept of a nonlinear reservoir. It contains a calculator for agricultural drainage systems with pipes and ditches.

Two articles using RainOff have been uploaded on ResearchGate:

a) https://www.researchgate.net/publication/332466264_RAINFALL-RUNOFF_RELATIONS_OF_A_SMALL_VALLEY_ASSESSED_WITH_A_NON-LINEAR_RESERVOIR_MODEL

b) https://www.researchgate.net/publication/335321441_Comparing_steady_and_non-steady_state_subsurface_drainage_using_calculations_with_relevant_models

2.4 NashMod [Ref. 9]

The NashModel, like RainOff, calculates surface runoff and stream flow from rainfall. However, instead of a non-linear reservoir it uses a cascade of linear reservoirs, an idea elaborated by Nash. In some cases it yields better results than RainOff, but in other cases absolutely not.

3. Statistics, segemented regression analysis and probability distribution fitting, probability calculators

3.1 CumFreq [Ref. 10]

This model is meant for segmented (in splines, piecewise) cumulative frequency analysis using a breakpoint which serves for example to study discontinuous probability distributions and return periods. It can analyze hydrological factors like rainfall, river and drain discharge, water and river level. Also the depth or level of water table, soil salinity, and the hydraulic conductivity (i.e. soil permeability for water) can be studied. The software uses 20 different probability distributions and selects the best fitting. Preference for a certain distribution can also be expressed. An amplified version (CumFreqA), permitting to express preference for advanced composite distributions, can be made available on request.

Two articles using CumFreq have been uploaded on ResearchGate:

a)
https://www.researchgate.net/publication/332466331_SOFTWARE_FOR_GENERALIZED_AND_COMPOSITE_PROBABILITY_DISTRIBUTIONS

b)
https://www.researchgate.net/publication/335022301_FITTING_THE_VERSATILE_LINEARIZED_COMPOSITE_AND_GENERALIZED_LOGISTIC_PROBABILITY_DISTRIBUTION_TO_A_DATA_SET

3.2 SegReg [Ref. 11]

This model can be used for segmented linear regression, i.e. regression in segments, using a breakpoint (break-point) or threshold value, which serves for example to analyze the relation between plant growth or crop production in agriculture versus soil salinity and depth of water table in agricultural land. The software analyses 2x6 different types of models and selects the best fitting. An amplified version (SegRegA), permitting to express preference for a certain model, can be made available on request.

A list of publications in which SegReg was used can be seen at
https://www.waterlog.info/pdf/segreglist.pdf

Two articles using SegReg have been uploaded on ResearchGate:

a)
https://www.researchgate.net/publication/332466260_CROP_TOLERANCE_TO_SOIL_SALINITY_STATISTICAL_ANALYSIS_OF_DATA_MEASURED_IN_FARM_LANDS

b)
https://www.researchgate.net/publication/335260187_Crop_yield_and_depth_of_water_table_statistical_analysis_of_data_measured_in_farm_lands

3.3 PartReg [Ref. 12]

This software is similar to SegReg but it emphasizes the horizontal part in Type 3 and Type 4 relations with the aim to define crop tolerance levels more precisely and to find the maximum range of "no effect".

Two articles using PartReg have been uploaded on ResearchGate:

a)
https://www.researchgate.net/publication/332466260_CROP_TOLERANCE_TO_SOIL_SALINITY_STATISTICAL_ANALYSIS_OF_DATA_MEASURED_IN_FARM_LANDS

b)
https://www.researchgate.net/publication/335260187_Crop_yield_and_depth_of_water_table_statistical_analysis_of_data_measured_in_farm_lands

3.4 NormDis [Ref. 13]

This is a two-way **calculator** for normal probability distributions with graphics: Value => Probability, and Probability => Value. The calculator can be used for many kinds of statistical probability analysis.

3.5 t-Tester [Ref. 14]

This is a two-way t-distribution **calculator** to perform a t-test on the significance of the difference between means (averages) of series of data using Student's t - probability distribution : t-test-value => Probability, and Probability => t-test-value.

3.6 F-Tester [Ref. 15]

This is a **calculator** for the Fisher's F-test as used in analysis of variance (Anova). The above SegReg model uses this test for the significance of the regression. Like NormDis, it is also a two-way calculator: F-value => Probability, and Probability => F-value.

4. References

[Ref.1] SaltMod, agro-hydro-soil-salinity model, free download from: https://www.waterlog.info/saltmod.htm

[Ref.2] SahysMod, spatial agro-hydro-soil-salinity model, free download from: https://www.waterlog.info/sahysmod.htm

[Ref.3] SaltCalc, simplified version of SaltMod using shorter time steps, free download from: https://www.waterlog.info/saltcalc.htm

[Ref.4] PolySalt, simplified version of SahysMod using shorter time steps, free download from: https://www.waterlog.info/polysalt.htm

[Ref.5] LeachMod, simplified version of SahysMod using shorter time steps, free download from: https://www.waterlog.info/polysalt.htm

[Ref. 6] EnDrain does calculations on horizontal subsurface drainage systems in agriculture. Free download from https://www.waterlog.info/endrain.htm

[Ref. 7] WellDrain calculates the spacing of wells, the shape, depth, and level of the watertable. Free download from https://www.waterlog.info/weldrain.htm

[Ref. 8] RainOff helps in hydrological modeling of rainfall-runoff/drainage relations. Free download from https://www.waterlog.info/weldrain.htm

[Ref. 9] NashMod calculates surface runoff and stream flow from rainfall.. Free download from https://www.waterlog.info/nashmod.htm

[Ref. 10] CumFreq does probability distribution fitting, including composite distributions. Free download from https://www.waterlog.info/cumfreq.htm

[Ref. 11] SegReg can be used for segmented linear regression. Free download from https://www.waterlog.info/segreg.htm

[Ref. 12] PartReg is designed to find the maximum range of "no effect". Free download from https://www.waterlog.info/partreg.htm

[Ref. 13] NormDis is a two-way **calculator** for normal probability distributions. Free download from https://www.waterlog.info/normdis.htm

[Ref. 14] t-Tester is a two-way **calculator** to perform t-tests wit Students t-distribution. Free download from https://www.waterlog.info/t-tester.htm

[Ref. 15] F-tester is a **calculator** for the Fisher's F-test as used in analysis of variance Anova). Free download from https://www.waterlog.info/f-test.htm