CORE CONCEPT

Farm Irrigation System Design and Agricultural Water Management Course: Drip, Pivot and Scheduling

16 – 20 November 2026
London - Central London four-star

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Introduction:

Farm irrigation system design and agricultural water management, covering drip, pivot and scheduling, is a 1-week course for irrigation engineering, farm operations and water planning teams that ends with an Irrigation Design and Water Productivity Plan for a case farm. Undersized laterals, mismatched pivot nozzles, oversized pumps and calendar-based watering waste groundwater and energy while leaving parts of each field under-irrigated. Nominees already plan, install or operate pressurised irrigation and learn through a modelling build on case climate, soil and well data. CoreConcept Training Center delivers this farm irrigation system design course.

Course Objectives:

- Calculate crop evapotranspiration and gross irrigation requirements with the FAO Penman-Monteith method and crop coefficient curves
- Size drip emitters, laterals and submains so that pressure variation and emission uniformity stay within design limits
- Specify a centre pivot sprinkler package whose application rate matches soil intake along every span
- Select pumps, filters and fertigation injectors that fit the system curve, the water quality and the dosing need
- Audit distribution uniformity, application efficiency, well yield and pumping energy to quantify crop output per cubic metre
- Prepare an Irrigation Design and Water Productivity Plan that sets layouts, schedules and water budgets for a case farm

Target Audience:

- Engineers responsible for designing and sizing pressurised irrigation networks on commercial farms
- Farm operations staff accountable for running pumps, pivots and drip blocks through the growing season
- Agricultural water planners responsible for allocating well and treated effluent supplies across fields
- Irrigation contractors and installers responsible for commissioning and handing over new systems
- Technical advisers responsible for irrigation performance reviews on agricultural development projects

Course Outline:

Day 1: Crop Water Requirements and On-Farm Water Supply Baseline

- FAO Penman-Monteith Reference Evapotranspiration From Weather Station Records
- Single and Dual Crop Coefficient Curves by Growth Stage
- Net and Gross Irrigation Requirement With Leaching Fraction
- Soil Available Water, Infiltration Rate and Root Depth Survey
- Farm Water Source Inventory of Wells, Storage and Effluent

Day 2: Drip and Centre Pivot Hydraulic Design Principles

- Darcy-Weisbach and Hazen-Williams Friction Loss for Pipe Sizing
- Emitter Discharge Exponent and Pressure-Compensating Dripper Selection
- Lateral Length, Submain Layout and Allowable Pressure Variation
- Centre Pivot Span Flow, Nozzle Sizing and Pressure Regulators
- Pivot Application Rate Versus Soil Intake and Runoff Check

Day 3: Pumps, Filtration, Fertigation Equipment and Irrigation Scheduling

- Pump Duty Point From System Curve and Total Dynamic Head
- Media, Disc and Screen Filter Selection by Water Quality
- Venturi and Proportional Dosing Injector Sizing With Backflow Prevention
- Soil Water Balance Scheduling With Management Allowed Depletion
- Pivot Rotation Speed and Drip Set Run-Time Calculation

Day 4: Water Productivity Audits, Alternative Sources and Field Problem Cases

- Catch-Can Distribution Uniformity Test and Emitter Flow Sampling
- Application Efficiency and Kilograms of Crop per Cubic Metre
- Groundwater Well Pumping Test, Drawdown and Safe Yield Review
- Treated Sewage Effluent Quality Classes and Crop Restriction Rules
- Pumping Energy per Cubic Metre and Variable Speed Drive Savings

Day 5: Modelling Build of the Irrigation Design and Water Productivity Plan

- Case Farm Data Pack With Climate, Soil and Well Records
- Case Drip Block Hydraulic Layout and Pipe Sizing Spreadsheet
- Case Centre Pivot Sprinkler Package and Pump Selection Sheet
- Case Seasonal Irrigation Schedule and Water Budget per Field
- Irrigation Design and Water Productivity Plan Completion and Panel Defence

Skills You Will Gain:

- Crop Water Requirement Estimation
- Drip Hydraulic Sizing
- Centre Pivot Sprinkler Package Design
- Pump and Filter Selection
- Fertigation Injector Sizing
- Water Balance Irrigation Scheduling
- Distribution Uniformity Testing
- Groundwater Yield Assessment

Why Attend This Course:

- Deliver an Irrigation Design and Water Productivity Plan to the farm director, the engineering lead and the water resources manager
- Decide whether a low-yielding block needs a new layout, a nozzle change, a pump retrofit or a revised schedule
- Avoid over-pumped wells, burst mains, runoff under pivots and high energy bills caused by unchecked designs
- Share pipe sizing spreadsheets, catch-can test sheets and scheduling templates with field crews and design colleagues

Conclusion:

Back at work, the participant hands the Irrigation Design and Water Productivity Plan to the farm director, the engineering lead and the water resources manager. They use it to approve new drip blocks and pivot packages, set pump and well operating limits, allocate groundwater and treated effluent between fields and fix the seasonal irrigation calendar. After the first irrigation season, the unit should repeat the uniformity and efficiency tests, compare measured crop output per cubic metre with the plan's targets and revise layouts, nozzles or schedules where the gap is largest.

Frequently Asked Questions FAQ:

What should participants know before a farm irrigation system design and agricultural water management course?

Participants should already work with pressurised irrigation and be comfortable with flow, pressure and unit conversions. No hydraulic software is needed. Bringing a field map, well records or a recent irrigation layout helps them apply the modelling build to their own farm.

How does farm irrigation system design and agricultural water management differ from a precision farming or landscape irrigation course?

It concentrates on the hydraulic engineering and water accounting of commercial field irrigation: crop water demand, pipe and emitter sizing, pivot packages, pumps, wells and productivity audits. Precision farming courses cover sensors, imagery and data platforms, and landscape courses cover parks and green spaces.

Why does farm irrigation system design start from crop water requirements rather than pipe sizes?

The crop's peak evapotranspiration sets the flow that every pipe, pump and well must deliver. Designing from pipe catalogues first produces blocks that cannot meet peak demand, or systems far larger and costlier than the crop needs.

What do participants take back from the farm irrigation system design and agricultural water management course?

Participants take back an Irrigation Design and Water Productivity Plan for a case farm, with a crop water demand sheet, a pipe sizing spreadsheet, a pivot nozzle chart, a pump selection sheet and a seasonal water budget template.