

How to Use the Small Farm Dam Planning Tool

This guide shows you how to access and use the Small Farm Dam Planning tool, with step-by-step instructions and annotated screenshots.

1. Accessing the Calculator

- Go to the project landing page (<https://fdfdams.cerdi.edu.au/>).
- Click the “Planning Tool” button/link.
- This opens the calculator in your browser.

 Small Farm Dams



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Assessing the suitability of existing dams to prepare for, cope with, and recover from drought

Farm dams are critical to farming properties, but they are limited in their capacity to hold water for extended periods and rely on regular rainfall to fill them.

Their vulnerability during drought periods has researchers looking into small farm dams.

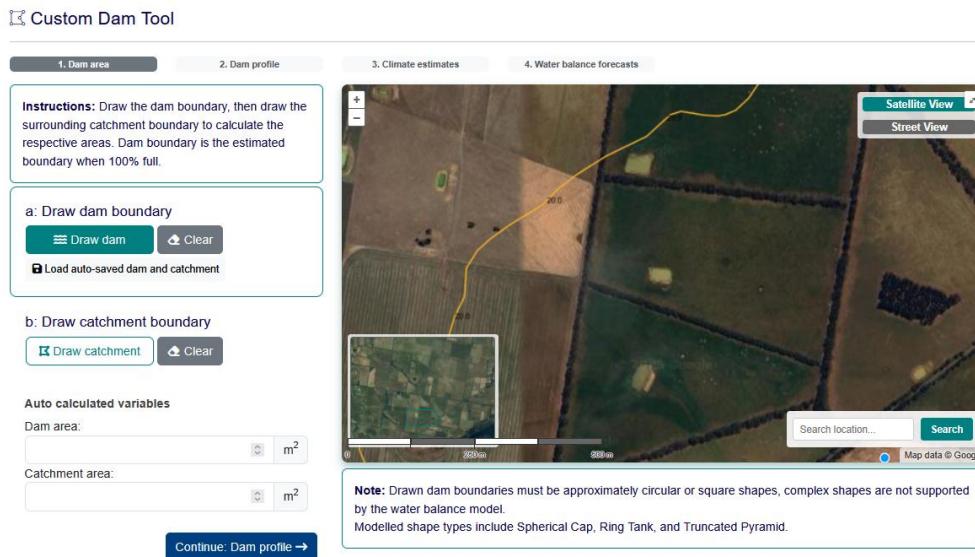
Southern Farming Systems is leading a project with researchers from Federation University, to help understand small farm dam hydrology and help improve decision-making during drought and a future impacted by climate change.



2. Step-by-Step Instructions

Step 1 – Identify Dam Location

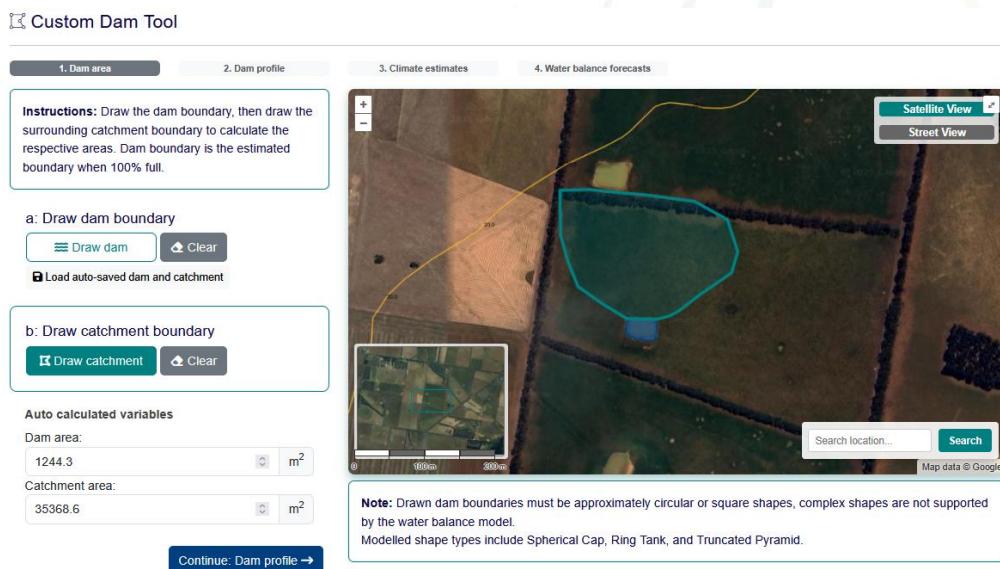
- Use the map to zoom to your farm.
- Place a marker on the dam site.

A screenshot of the 'Custom Dam Tool' interface. The top navigation bar has tabs: 1. Dam area (selected), 2. Dam profile, 3. Climate estimates, and 4. Water balance forecasts. The main area shows a satellite map of a farm with a yellow line drawn around a specific area. A note says: 'Instructions: Draw the dam boundary, then draw the surrounding catchment boundary to calculate the respective areas. Dam boundary is the estimated boundary when 100% full.' Below the map are two sections: 'a: Draw dam boundary' with 'Draw dam' and 'Clear' buttons, and 'b: Draw catchment boundary' with 'Draw catchment' and 'Clear' buttons. On the left, 'Auto calculated variables' show 'Dam area: 1244.3 m²' and 'Catchment area: 35368.6 m²'. A note at the bottom says: 'Note: Drawn dam boundaries must be approximately circular or square shapes, complex shapes are not supported by the water balance model. Modelled shape types include Spherical Cap, Ring Tank, and Truncated Pyramid.' A 'Continue: Dam profile →' button is at the bottom.

Step 2 – Draw Dam & Catchment

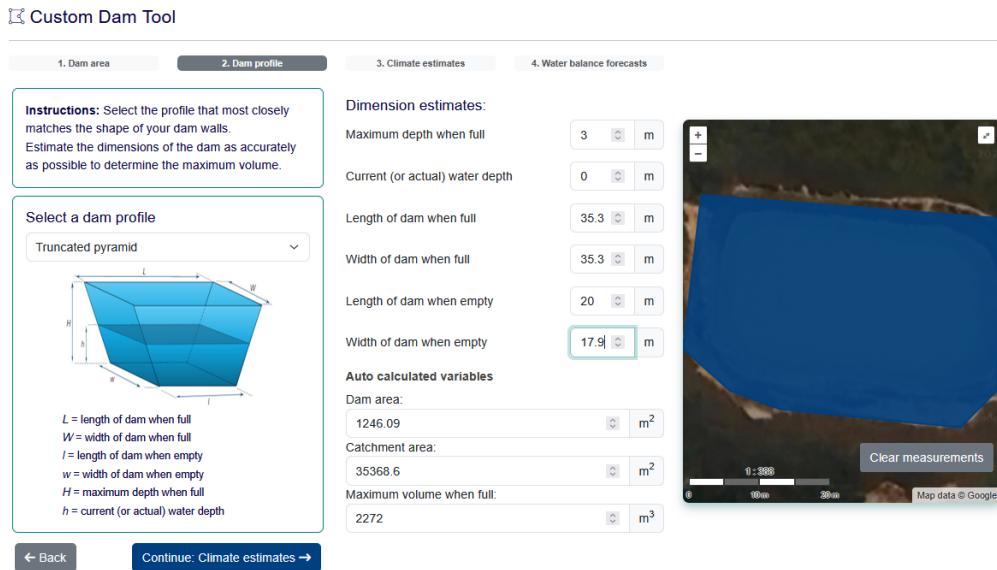
Draw dam surface area (when full) and watershed catchment. Dam area and catchment area are automatically calculated.

- Draw the outline of the dam surface area (when full).
- Draw the outline of the catchment area feeding into the dam.
- The calculator automatically estimates both areas.

A screenshot of the 'Custom Dam Tool' interface, showing the progression to Step 2. The top navigation bar has tabs: 1. Dam area (selected), 2. Dam profile, 3. Climate estimates, and 4. Water balance forecasts. The main area shows the same satellite map as before, but now with a cyan polygon drawn over the yellow dam boundary, representing the catchment area. A note at the top says: 'Instructions: Draw the dam boundary, then draw the surrounding catchment boundary to calculate the respective areas. Dam boundary is the estimated boundary when 100% full.' Below the map are the same sections as Step 1: 'a: Draw dam boundary' and 'b: Draw catchment boundary'. On the left, 'Auto calculated variables' show 'Dam area: 1244.3 m²' and 'Catchment area: 35368.6 m²'. A note at the bottom says: 'Note: Drawn dam boundaries must be approximately circular or square shapes, complex shapes are not supported by the water balance model. Modelled shape types include Spherical Cap, Ring Tank, and Truncated Pyramid.' A 'Continue: Dam profile →' button is at the bottom.

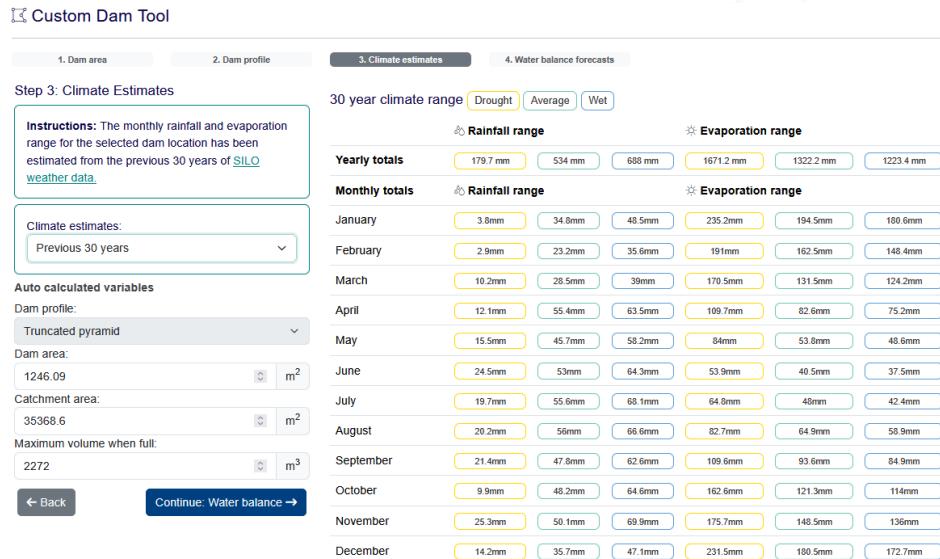
Step 3 – Describe Dam Profile

- Input dam depth and side slopes.
- Select dam type if options are provided.

The screenshot shows the 'Custom Dam Tool' interface at Step 3: Dam profile. The top navigation bar has tabs for 1. Dam area, 2. Dam profile (which is active and highlighted in dark grey), 3. Climate estimates, and 4. Water balance forecasts. The main area is titled 'Select a dam profile' and shows a diagram of a truncated pyramid with dimensions L, W, h, and i. Below the diagram are definitions for these variables: L = length of dam when full, W = width of dam when full, i = length of dam when empty, w = width of dam when empty, H = maximum depth when full, and h = current (or actual) water depth. To the right of the diagram are 'Dimension estimates' input fields for Maximum depth when full (3 m), Current (or actual) water depth (0 m), Length of dam when full (35.3 m), Width of dam when full (35.3 m), Length of dam when empty (20 m), and Width of dam when empty (17.9 m). Below these are 'Auto calculated variables' showing Dam area (1246.09 m²), Catchment area (35368.6 m²), Maximum volume when full (2272 m³), and a 'Clear measurements' button. A map view on the right shows a blue dam structure with a scale bar from 0 to 300 meters and a 'Map data © Google' credit. Navigation buttons at the bottom are 'Back' and 'Continue: Climate estimates →'.

Step 4 – Choose Climate Estimates

- Select a nearby weather station or regional climate dataset.
- This sets rainfall and evaporation estimates.

The screenshot shows the 'Custom Dam Tool' interface at Step 4: Climate estimates. The top navigation bar has tabs for 1. Dam area, 2. Dam profile, 3. Climate estimates (which is active and highlighted in dark grey), and 4. Water balance forecasts. The main area is titled 'Step 3: Climate Estimates' and shows an 'Instructions' box stating that monthly rainfall and evaporation ranges are estimated from the previous 30 years of SILO weather data. Below this is a 'Climate estimates' dropdown menu set to 'Previous 30 years'. To the right are 'Auto calculated variables' for Dam profile (Truncated pyramid), Dam area (1246.09 m²), Catchment area (35368.6 m²), and Maximum volume when full (2272 m³). On the far right are two tables: 'Rainfall range' and 'Evaporation range' for a 30-year climate range. The 'Rainfall range' table shows monthly totals for January to December. The 'Evaporation range' table shows monthly totals for January to December. Navigation buttons at the bottom are 'Back' and 'Continue: Water balance →'.

Step 5 – Estimate Water Use

- Enter number of livestock and domestic water demand.
- The tool will estimate daily/annual use.



Step 6 – Review Capture Likelihood

The tool models how often the dam will fill or dry under wet, average, and dry years. Examine likelihood of volume capture (in this example even in a wet year this dam will not fill if starting from dry). Example:

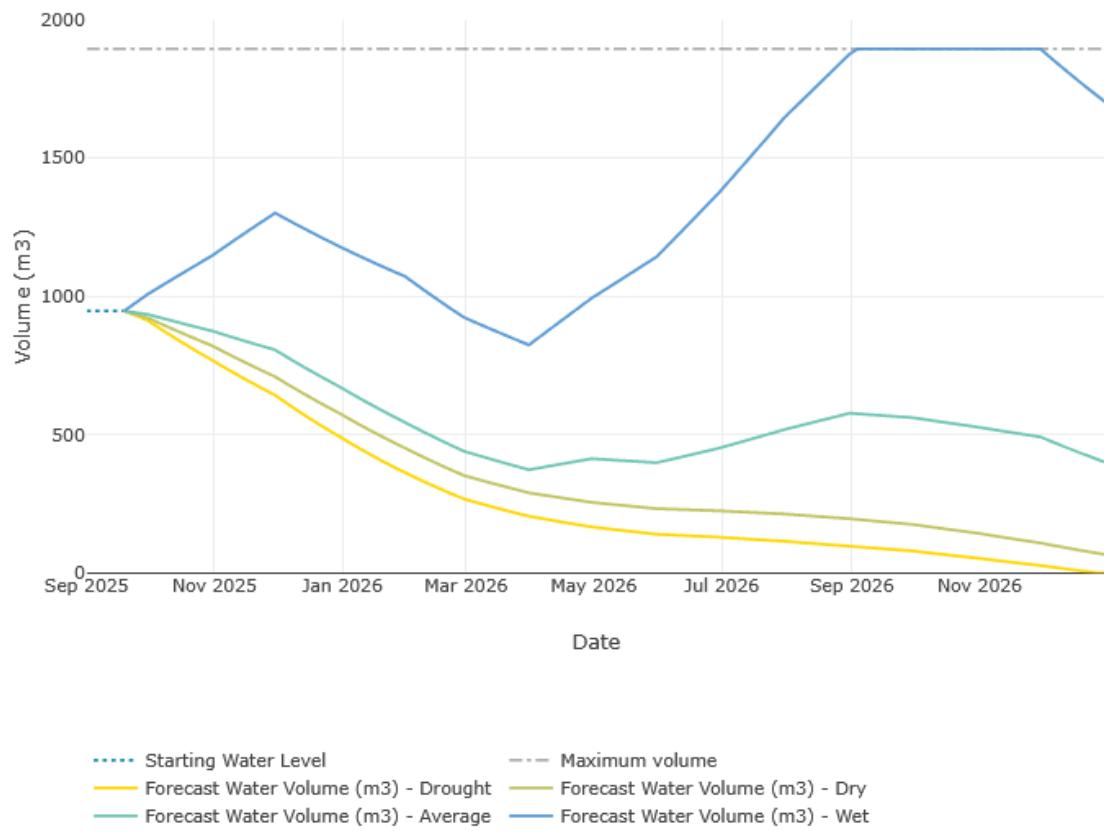
- Starting empty → dam unlikely to fill, even in wet year.



However if the dam was half full then the dam would overflow in a wet year, but decline in an average year and be totally dry in a drought. Example:

- Starting half full → dam overflows in wet year, but empties in drought year.

Water balance forecasts



3. Tips from the developers

- Use the zoom/pan tools carefully to outline accurate catchments.
- Start with smaller catchments if drawing is difficult, then adjust.
- Compare different scenarios (e.g. half full vs empty) for resilience planning.
- Save/export results for future planning discussions.

That's it! You can now estimate your dam's capacity, catchment inflow, and reliability to support water planning.