Linking data to decision making

Water Use Efficiency – factsheet

Spatial data

Spatial data such as elevation and EM38 data are an important first step in understanding and providing detailed insights into landform and soil variability. Topographic data helps identify elevation, slope, and drainage patterns, which are critical for managing erosion, water flow, and irrigation design. EM38 data measures soil electrical conductivity, revealing variations in texture, moisture, salinity, and compaction. When used together, these datasets enable farmers to map management zones, optimise input use, prevent waterlogging or salinity issues, and design effective drainage and irrigation systems.

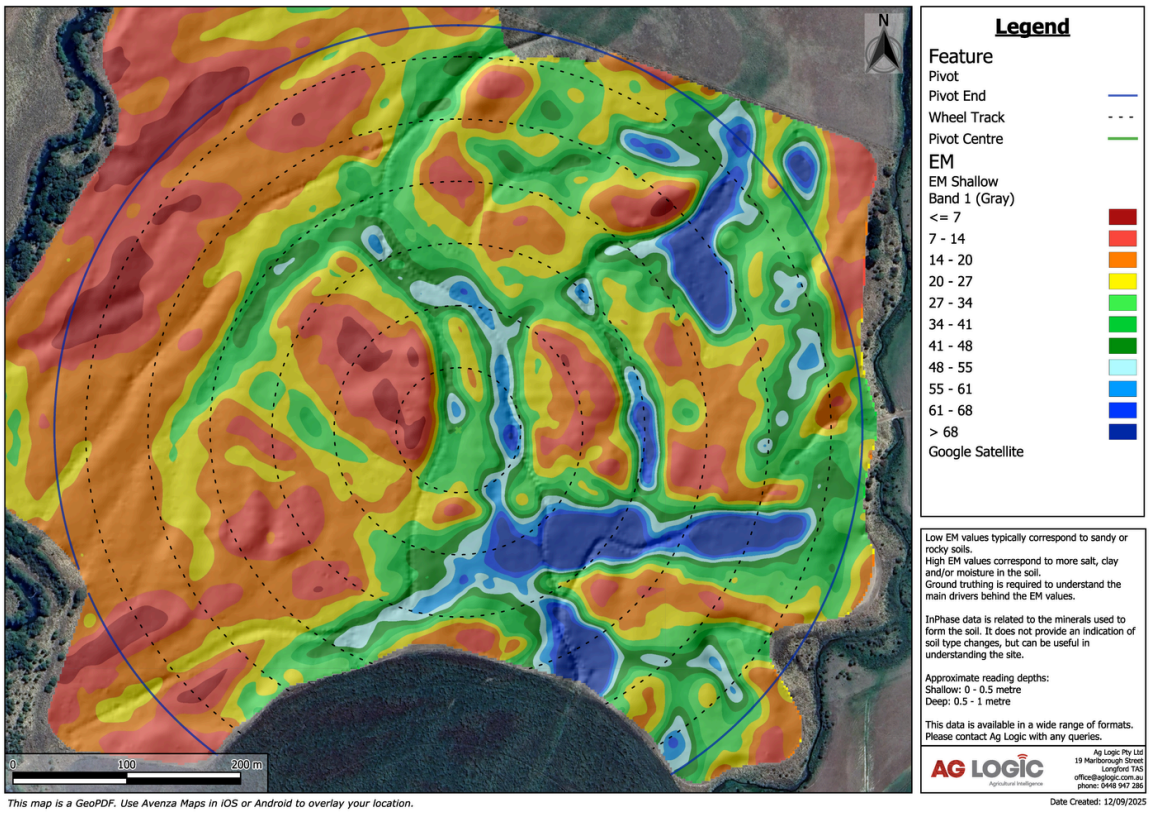

Figure 1: An example of an EM38 map and how that data can be displayed to help understand your paddock variability (Image source: Ag Logic).

Once you understand your spatial variability this enables you to identify where specific conditions or changes are occurring in the field and gives you the ability to collect relevant data through the integration of monitoring systems such as soil moisture probes. This integration supports the creation of management zones, targeted interventions, and adaptive decision-making.

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Soil type	Basic infiltration rate (mm/hr)
Sand	< 30
Sandy loam	20 – 30
Loam	10 – 20
Clay loam	5 – 10
Clay	1 – 5

Table 1: Showing how infiltration rate varies with change in soil type to link it back to your irrigation application rate (Source: FAO).

Understanding your soils and how they respond to irrigation is critical to maximise water use efficiency. Poor infiltration is one of the greatest limitations and most overlooked barrier in irrigated agriculture. Knowing how infiltration rates vary across a paddock due to soil or cropping history can help improve irrigation techniques to get water into the rootzone where it is needed.

Monitoring data - you can't manage what you don't measure

Weather data is the first port of call when it comes to monitoring data, as it directly impacts crop growth, irrigation, pest and disease management, and overall farm productivity. Accurate, real-time weather information helps you make timely decisions about planting, spraying, harvesting, and protecting crops from extreme weather events like frost or heatwaves. It also supports efficient irrigation scheduling, through calculating evapotranspiration.

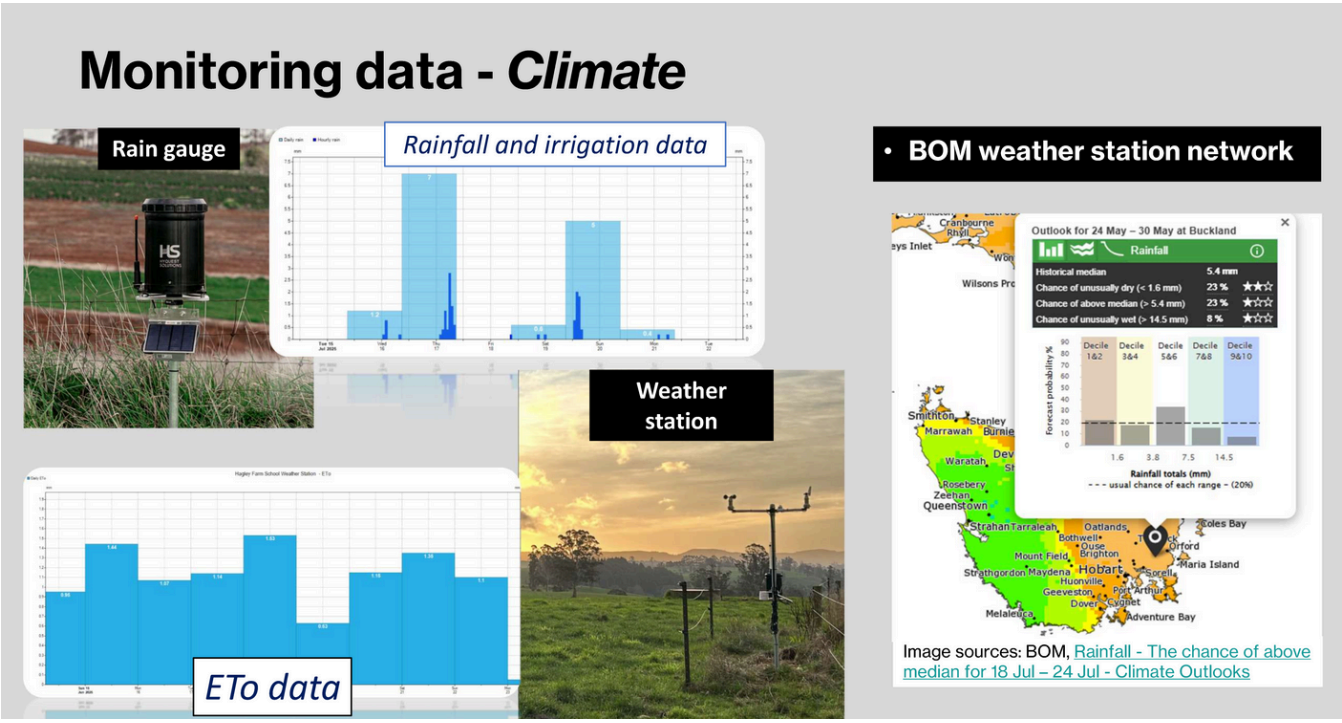

Figure 2: On-farm sensors such as rain gauges and full weather stations collect localised data for decision making with BOM data giving a regional overview (Image source: Ag Logic and Bureau of Meteorology).

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Soil moisture probes take precision agriculture to the next level by providing real-time, in-ground data that complements weather and spatial insights. They help verify whether rainfall or irrigation effectively reaches crop root zones, enabling more accurate and efficient water use. When combined with topographic and EM38 data, probes allow for zone-specific irrigation based on soil type and water retention differences.

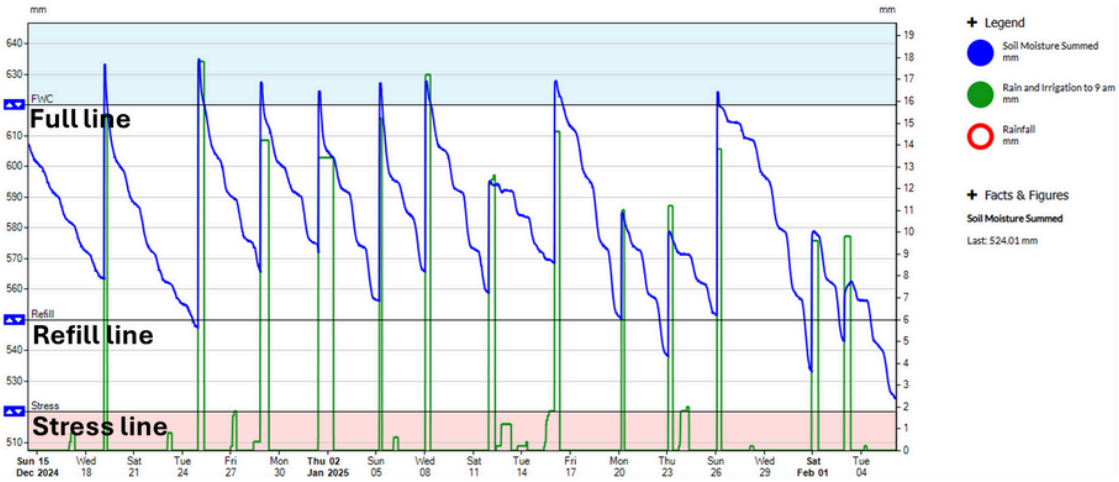

Figure 3: Summed soil moisture data is a practical way to accurately track plant water use to match water supply from irrigation and/or rainfall to ensure effective irrigation scheduling (Image source: Ag Logic).

Free data resources for decision making

Farming Forecaster is a decision support tool that provides livestock producers with current pasture condition updates, and forecasts for up to four months ahead. It continuously reports soil moisture and rainfall data from sites around the country to detail current growing conditions. Farming Forecaster also models pasture growth rates (kg DM/ha/day) based on seasonal conditions and historical weather averages to assist producers with feed budgeting for coming months and to inform tactical decision making.

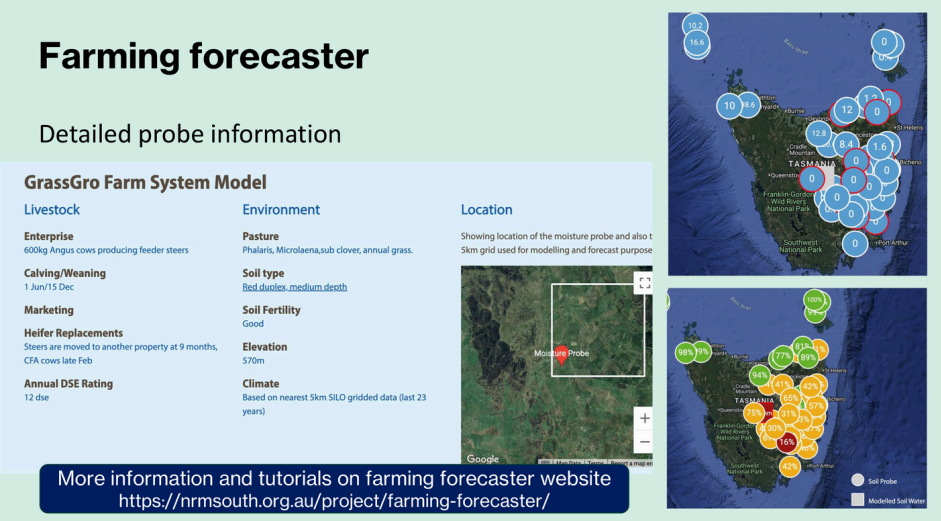

Figure 4: Farming Forecaster is a valuable dryland grazing resource that uses rainfall and modelled pasture data to forecast pasture growth (Source: Farming Forecaster).

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The LISTmap is a free online mapping tool provided by the Land Information System Tasmania (The LIST), enabling you to view and customise maps using a wide range of spatial datasets. It has a range of enterprise suitability maps to assess land for various farming activities based on soil, climate, and topography. The platform also provides land capability data, rainfall records, slope, and soil information, helping you to make informed land-use decisions. The LISTmap is accessible via desktop and mobile browsers.

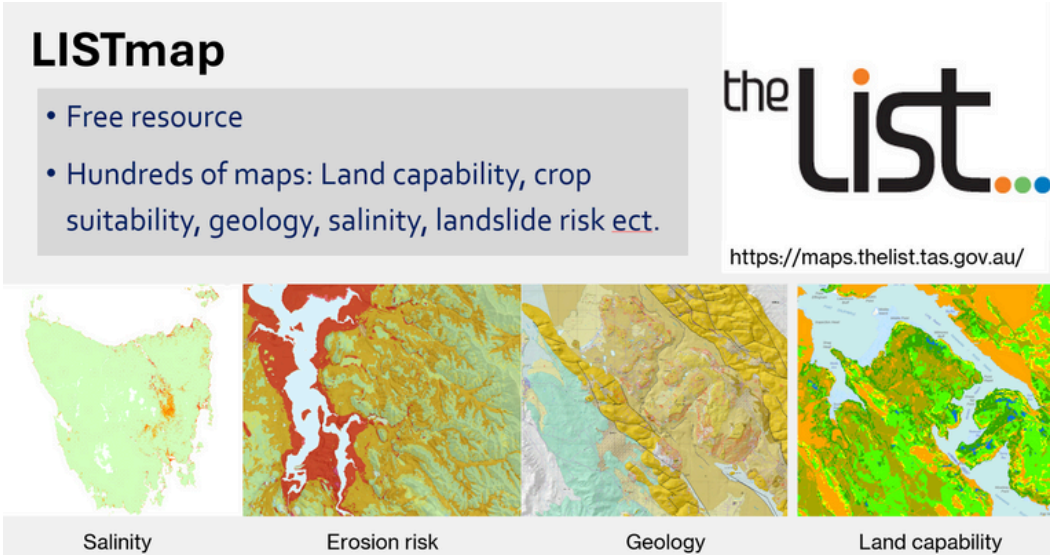

Figure 5: LISTmap is a free resource containing a wide range of spatial data (Image source: The LISTmap)

For more resources to assist with optimising water use efficiency visit:

https://www.tasfarmhub.com.au/water-use-efficiency-project/

References

Food and Agriculture Organisation of the United Nations, *Annex 2: Infiltration rate and infiltration test (Table 7 basic infiltration rates for various soil types).*

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