

Definition and Approach to Sustainable Groundwater Yield:

Sustainable groundwater yield is defined as:

“The groundwater extraction regime, measured over a specified planning timeframe, that allows acceptable levels of stress and protects dependent economic, social, and environmental values.”

This definition is based on adopting the following approach to its implementation:

Extraction regime

It is recognised that sustainable groundwater yield should be expressed in the form of an extraction regime, not just an extraction volume. The concept is that a regime is a set of management practices that are defined within a specified time (or planning period) and space.

Extraction limits may be expressed in volumetric quantity terms and may further specify the extraction or withdrawal regime by way of accounting rules and/or rates of extraction over a given period and/or impact, water level or quality trigger rules. The limits may be probabilistic and/or conditional.

An often-used means of defining the extraction regime has been by way of a maximum volume that may be taken in any single year. In some cases, where draw beyond the rate of recharge may be acceptable, it may be only for a specified period, after which time the rate may be less than the rate of recharge to compensate. In some cases and under specific circumstances (for example, high or low rainfall years) the amount of water that may be taken may be greater or less than the longer-term value and the conditions for this can be specified.

Acceptable levels of stress

The approach recognises that any extraction of groundwater will result in some level of stress or impact on the total system, including groundwater dependent ecosystems. The concept of acceptable levels of stress as the determining factor for sustainable yield embodies recognition of the need for trade-offs to determine what is acceptable. How trade-offs are made is a case and site-specific issue and a matter for the individual States to administer. The trade-offs will often involve balancing between environmental, social and economic needs. In some cases, the stress may be temporary as the system adjusts to a new equilibrium.

The definition should be applied in recognition of the total system. That is, it should recognise the interactions between aquifers and between surface and groundwater systems and associated water dependent ecosystems. The definition implies that integrated management decisions must be taken to fully satisfy its spirit.

In calculating sustainable yield, a precautionary approach must be taken with estimates being lower where there is limited knowledge. Application of the calculated sustainable yield as a limit on extractions must be applied through a process of adaptive management involving monitoring impacts of extraction. Sustainable yields should be regularly reassessed and may be adjusted in accordance with a specified planning framework to take account of any new information, including improved valuations of dependent ecosystems.

Storage depletion

The approach recognises that extraction of groundwater over any timeframe will result in some depletion of groundwater storage (reflected in a lowering of water levels or potentiometric head). It also recognises that extracting groundwater in a way that results in any unacceptable depletion of storage lies outside the definition of sustainable groundwater yield.

Where depletion is expected to continue beyond the specified planning timeframe, an assessment needs to be made of the likely acceptability of that continuation and whether intervention action might be necessary to reduce extraction. If intervention is likely to be necessary, then planning for that action should be undertaken so that it can be implemented at the end of the specified time-frame.

Major considerations in determining the acceptability of any specific level of storage depletion should be “inter-generational equity”, and a balance between environmental matters identified in the *National Principles for Provision of Water for Ecosystems*, social and economic values.

Protecting Dependent Economic, Social And Environmental Values

The definition recognises that groundwater resources have multiple values, some of which are extractive while others are *in-situ* (eg. associated water-dependent ecosystems) and all have a legitimate claim on the water resource.

In considering trade-offs in resource values, due recognition should be given to environmental dependencies, the risk of irreversible impacts and any decisions shall be made in accordance with the principles of ecological sustainable development.

NOTE: When this definition is reproduced, it should be accompanied with the above explanatory notes to maximise understanding of the definition.