The up-to-date code to generate this document is always available at <https://github.com/Ratey-AtUWA/Learn-R/raw/main/Why-UWAcolgrad.Rmd>.

# Why a UWA colour palette generator for **R**?

Colour palettes with relatively few distinctive colours are often used in the corporate world. Apparently they confer a consistent “look and feel” to company-branded materials, making publications, presentations, and advertising more memorable and the brand more recognisable.

When presenting material clearly from a scientific perspective, however, corporate colour palettes can be problematic if they include colour combinations that are difficult to distinguish for people having colour vision impairments such as red-green colour-blindness. Where colour comparisons are important to interpreting data presented graphically, the contrast between the items being compared should be visible to as many people as possible, regardless of colour-blindness. In addition, the print copies of some scientific journals still reproduce figures as greyscale images, so a colour palette that maintains as much contrast as possible when converted to greyscale is preferable. This is achieved with

1. a uniform gradient, an approximately linear relationship between greyscale value and colour palette index;
2. a wide range of initial contrast (dark to light, or vice versa).

Fortunately for staff and students working at UWA, the standard colours in the UWA brand lend themselves well to generation of themed colour palettes which are colourblind-friendly. The development of a possible UWA colour palette with uniform colour gradient is discussed below.

## 1. Existing palettes available in **R** packages

There are several existing **R** packages and functions which allow generation of uniform-gradient, colourblind-friendly palettes.

### 1.1 RColorBrewer::

The RColorBrewer:: package contains 35 in-built palettes, 27 of which are colourblind-friendly (Figure [1](#fig:rcolorbrewer-cbf)).

library(RColorBrewer)

display.brewer.all(colorblindFriendly = T)

Figure 1: Colourblind-friendly palettes from the RColorBrewer R package, showing the maximum number of colours in each palette.

For comparison, the RColorBrewer colourblind-friendly palettes viewed in greyscale are shown below (Figure [2](#fig:rcolorbrewer-gray):

Figure 2: Colourblind-friendly palettes from the RColorBrewer R package, shown as a greyscale image.

…illustrated by the four versions of the same map shown in Figure [3](#fig:recoloured-map).

Figure 3: Four versions of the same map: (a) original colours from Thebo et al. (2014); (b) original map converted to grayscale; (c) recoloured map used in Rate (2022); (d) recoloured map converted to grayscale.

## References

Rate, A.W. (2022). Urban Ecosystems: Soils and the Rise and Fall of Cities. **In** Rate, A.W. (Ed.), Urban Soils: Principles and Practice. Springer-Nature; Cham, Switzerland. <https://doi.org/10.1007/978-3-030-87316-5>.

Thebo, A. L., Drechsel, P., & Lambin, E. F. (2014). Global assessment of urban and peri-urban agriculture: irrigated and rainfed croplands. Environmental Research Letters, **9**, 9pp. <https://doi.org/10.1088/1748-9326/9/11/114002>