CSIRO submission to Measuring what matters

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Introduction

CSIRO welcomes the opportunity to contribute to the Australian Government's *Measuring what matters* consultation on the application of the OECD well-being and progress framework to Australia. As Australia's National Science Agency, CSIRO's purpose is to solve the greatest challenges through innovative science and technology. As Australia's most trusted research agency (Roy Morgan, 2022) with a unique national role in the innovation ecosystem, CSIRO's submission draws on our expertise in the environmental, and health and well-being domains, including our work to develop indicators to track progress. Our submission only refers to indicators where we have commentary supported by published research.

CSIRO welcomes the development of a national well-being and progress framework, that complements existing specialised reporting processes, to measure what matters for Australia. Wider sets of measures and indicators, built into national accounts, could provide a richer and clearer picture of well-being, and the way this varies across a population. Our response provides overall commentary on the applicability of an adapted OECD framework to the Australian context, identifying key considerations around the challenges associated with the aggregation of measures. It provides comments on the applicability of specific well-being and progress indicators across a range of areas in which CSIRO has expertise, including life expectancy at birth, knowledge and skills, exposure to outdoor air pollution and extreme heat, greenhouse gas emissions, material footprint and access to green spaces. Our response also outlines data availability opportunities and challenges impacting Australia's ability to include certain metrics in a national framework.

Additional resources which could inform the development of a national framework include the following CSIRO publications:

- The CSIRO Reconciliation Action Plan (CSIRO, 2021) which includes Indigenous leadership and Indigenous data sovereignty as key commitments;
- CSIRO's the Future of Health report (CSIRO, 2018) which provides a vision for how Australia can shift from a focus around illness treatment to one of health and well-being management over the next 15 years;

- CSIRO and the Bureau of Meteorology's 2022 State of the Climate report (CSIRO and the Bureau of Meterology, 2022); and

- CSIRO's Australian National Outlook 2019 (CSIRO, 2019) which brought CSIRO's research methodology in forecasting, combined with social, environmental and economic data and perspectives, to predict where Australia might be in decades to come.

CSIRO welcomes the opportunity to discuss these matters in more depth with the Treasury. Please see the contact details on the cover page.

CSIRO response to the application of the OECD framework to Australia

1.1   Measuring well-being and progress in Australia – general considerations

The development of well-being and progress measures is important to enable societies to move 'beyond GDP' and to advance a broad set of societal outcomes. Research on well-being and progress consistently demonstrates that, above a relatively modest threshold, greater levels of GDP or income per capita are not always associated with increased well-being (Posner and Costanza, 2011; Kubiszewski et al., 2013; van den Bergh and Botzen, 2018; Jackson, 2016; Max Neef, 1995). GDP accounts only for economic activity and includes components such as the economic activity caused by disasters, while excluding many of the activities, processes and outcomes that people value, including unpaid caring work within families and volunteering in communities. Wider sets of measures and indicators, built into national accounts, could provide a richer and clearer picture of well-being, and the way this varies across a population.

Contemporary frameworks such as the OECD's or the System of Environmental Economic Accounting (SEEA, 2023), tend to focus more on outcomes than drivers. As a nation with rich and varied data sources and strong civic and governmental capacity, Australia could start with implementing such a framework, with the intention of moving towards wider sets of systemic measures that link drivers and outcomes. The development of a comprehensive well-being framework that is connected to policy, could incorporate drivers and outcomes of societal well-being in measurement approaches and also help target areas of investment, innovation and development. Developing leading indicators associated with drivers could also support anticipatory capacity and governance and help to manage complex systems change. Such comprehensive, scientific, and systemic approaches to measuring what matters could enable improved policy and outcomes.

If the OECD framework is to be adopted and adapted to Australia's governance purposes, consideration could be given to Indigenous data sovereignty, which is the right of Indigenous peoples to determine the means of collection, access, analysis, interpretation, management, dissemination and reuse of data pertaining to the Indigenous peoples from whom it has been derived, or to whom it relates. Indigenous data sovereignty centres on Indigenous collective rights to data about our peoples, territories, lifeways and natural resources (Kukutai and Taylor, 2016). CSIRO is committed to working ethically and responsibly with Aboriginal and Torres Strait Islander peoples and communities. Indigenous leadership and Indigenous data sovereignty are key commitments of the CSIRO Reconciliation Action Plan (CSIRO, 2021).

CSIRO recognises the OECD framework is based on standardised and aggregated metrics to capture data and provide an overarching measure of the predominant factors that determine well-being status and progress of the majority. The aggregation of measures may not adequately consider the key challenges faced by certain priority populations including Aboriginal and Torres Strait Islander people and people with poor socioeconomic conditions. To ensure data sovereignty, Treasury could consult National Indigenous-led groups, such as the Maiam Nayri Wingara and apply CSIRO's principles of Indigenous data sovereignty and Indigenous data governance across each of the OECD framework indicators. CSIRO can provide further support as required, given our role as a member of the Improving Indigenous Research Capabilities: An Aboriginal and Torres Strait Islander Research Data Commons, a project led by the University of Melbourne.

1.2   Applicability of well-being and progress indicators in Australia

This section provides comments on the applicability of specific progress and well-being indicators, where CSIRO has expertise, to the Australian context. CSIRO welcomes the opportunity to discuss these comments in further detail where relevant.

1.2.1 Life expectancy at birth

This metric can provide a good general country to country comparison. However, it is important to recognise that each country has unique strengths and challenges that contribute to life expectancy at birth.

All countries in the OECD have advanced healthcare systems, and could consider assessing metrics that contribute to national average life expectancy and impact the quality of life, including:

- The number of years Australians spend in poor health due to chronic disease (quality adjusted life years – QALY) (AIHW, 2022)
- The life expectancy of disadvantaged and minority groups in Australia, in particular Indigenous populations, rural/remote communities, and lower socio-economic groups (these are typically significantly lower life expectancy at birth) (NIAA, 2022)

The Treasury may also consider reviewing CSIRO's the Future of Health report (CSIRO, 2018) which provides a vision for how Australia can shift from a focus around illness treatment to one of health and well-being management over the next 15 years.

1.2.2   Knowledge and skills indicators

The following three indicators relate to knowledge and skills, and as already identified by the Treasury, could provide a sufficient starting point for an Australian national framework:
- Educational attainment among young adults (the share of people aged 25 -34 with at least an upper secondary education);
- Students with low skills (the share of 15 year old students below Level 2 of the OECD Programme on International Student Assessment (PISA) in reading, maths and science); and
- Student skills in science (the mean score of 15 year old students for Program for International Student Assessment (PISA) in science)

CSIRO notes the Treasury's assessment that the fourth skills-related indicator in the OECD framework (on the gap in life expectancy by education) has data availability challenges making it difficult for easy adoption in Australia. Furthermore, CSIRO observes several key trends impacting skills and knowledge in Australia[1] that, while beyond the scope of a national framework, may give rise to additional indicators being adopted by relevant line agencies in particular policy areas such as:

- Preparedness for life and work (ensuring health and well-being, lifelong learning, quality transitions, transversal skills, and addressing skill shortages/mismatches);
- Education landscape trends and disruption (leveraging emerging technologies and advances in education sciences)
- Equity in access, experience and outcomes (addressing inequality and reducing barriers to learning); and
- Supporting learning (improved understanding of students' well-being and impact on outcomes, focus on learning growth, and addressing education workforce development and retention).

1.2.3 Exposure to outdoor air pollution and extreme heat

State and territory regulatory authorities routinely measure and publish levels of 'criteria' air pollutants at representative sites as part of the National Environment Protection Measure (NEPC, 2022). The OECD indicator is currently focused on PM2.5 (particles with a diameter of 2.5 micrometres or less) only. Other air

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[1] Based on an extensive but unpublished literature review. For specific references for any of these trends, please contact CSIRO.

pollutants that have known adverse health effects such as ultrafine particles and air toxics are not routinely measured and are therefore not captured in the OECD metric for exposure to air pollution. It is important to recognise that in Australia, ozone concentrations can also exceed safe levels and the compounding effects of exposure to more than one air pollutant is not currently accounted for with this metric.

Similarly, the compounding effect of air pollution and extreme heat is not accounted for in the OECD metrics. A metric to measure the impact of extreme weather on well-being could be considered, given:

- Evidence showing that a consistent and significant increase in mortality has been observed during heatwaves in the three largest Australian metropolitan cities (Brisbane, Melbourne and Sydney) (Tong et al, 2014)[2]; and

- CSIRO and the Bureau of Meteorology's 2022 State of the Climate report findings that Australia will experience continued warming, with more extremely hot days into the future (CSIRO and the Bureau of Meteorology, 2022).

1.2.4 Greenhouse gas emissions

We note that the Department of Climate Change, Energy and the Environment has responsibility for reporting Australia's greenhouse gas emissions. Australia currently ranks 38 out of 38 OECD countries for greenhouse gas (GHG) emissions intensity (The Treasury, 2022). Reducing GHG will be critical to abating the worst impacts of climate change, and is becoming central to all facets of Australian society (DCCEEW, 2021). Current emissions estimates are based on 'bottom-up' inventories, with limited evidence-based validation. An expansion of atmospheric GHG observations, coupled with modelling frameworks, could deliver better targeting of emissions reduction strategies along with greater transparency (nationally and internationally) on Australia's successes at reducing emissions, and as part of this, a national approach to measuring emissions more directly could provide improved emission estimates.

1.2.5 Material footprint

CSIRO researchers, in collaboration with the University of Sydney, UNSW Sydney, Vienna University, and the United Nations Environment Programme developed and estimated multiple indicators of material use, including the material footprint of nations (Wiedmann et al, 2015). Various institutions (e.g. OECD, 2020) and countries, including Australia (United National Environment Program International Resource Panel, 2018), use this indicator to track progress towards sustainable development goals 8.4 and 12.2 (Ritchie et al, 2018). This indicator is useful for investigating options to decouple economic growth from environmental degradation and teleconnections between places of production and consumption of raw materials. For an export-oriented economy such as Australia, this indicator helps to understand the flows and impacts of domestic and global consumption of Australian natural resources, and therefore may be useful to include in a national framework to measure what matters.

1.2.6 Access to green spaces

A growing body of literature reports the benefits to human health of access to green space and connection to nature. Most Australian studies on the distribution and access to green space have been undertaken at local to metropolitan scales, using a range of different approaches and metrics. Of the few national scale studies, the 'Parkland' category of the land use classification defined by the Australian Bureau of Statistics is the most commonly used measure of green space. The 2011 census data has previously been used to estimate availability of green space in Sydney, Melbourne, Brisbane, Perth and Adelaide (Astell et al, 2014).
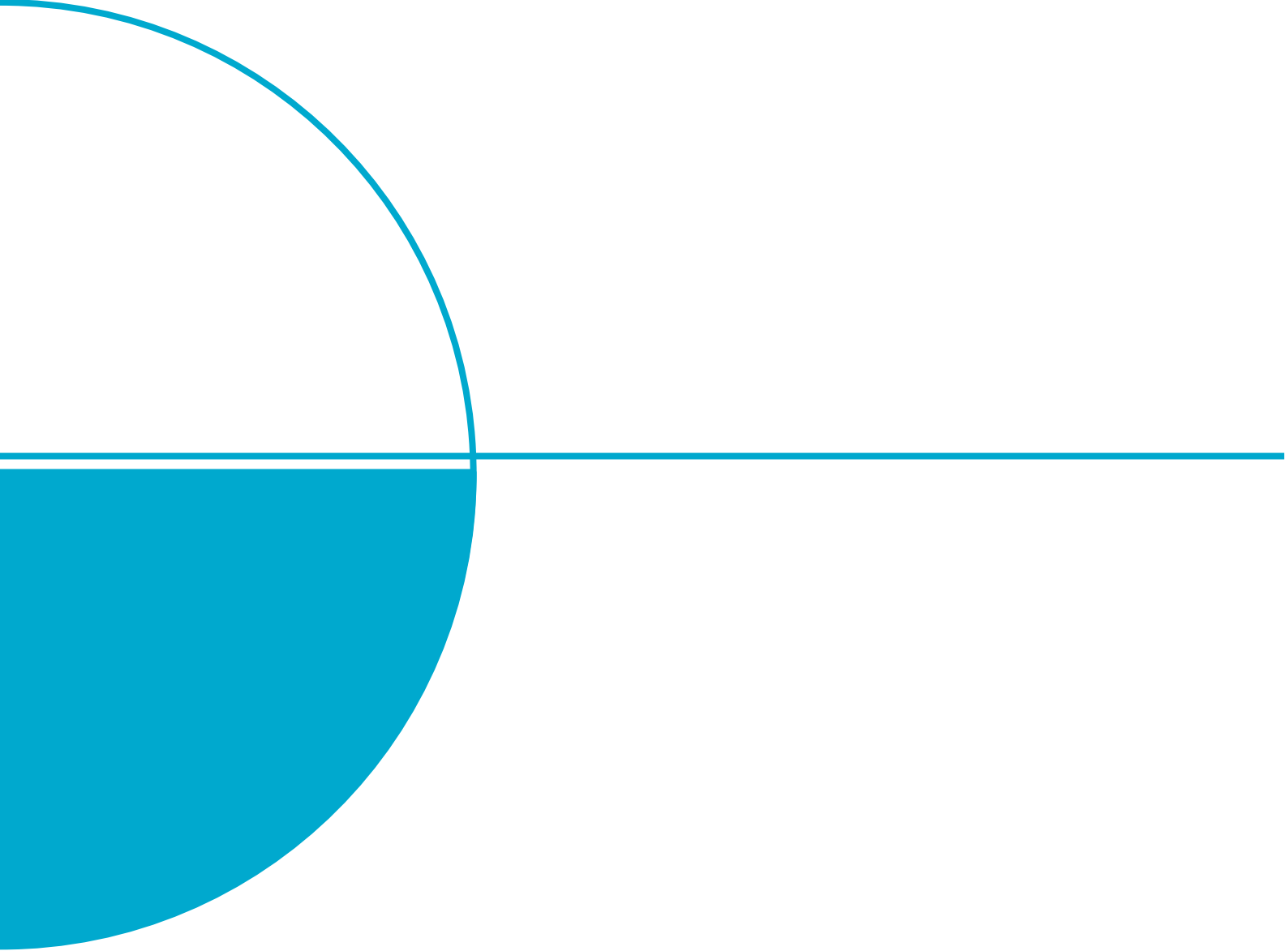
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[2] Tong et al., 2014

Hsu et al (2022) have undertaken a similar study for largely the same cities (excluding Perth) using 2016 census data, and compared a variety of global standards and measures of access to green space. The Australian studies use a 1 kilometre radius as the walkability catchment that defines accessibility.

The OECD framework defines access to green space as the share of urban population within a 10 minute walking distance. It may be useful for Australia to develop a nationally consistent and comparable approach to mapping and monitoring urban green space over time, that capitalises on advances in airborne and satellite remote sensing. This would help to better understand what green space exists, where, and of what type in Australian cities – beyond what is in Parklands – and would support analysis of green space distribution, access, and the relationship with land-use and urban change. This national approach could also enable consistent monitoring over time, that could inform State of Environment reporting, as well as OECD reporting.

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