



How insights from the  
**Australian National Outlook** can contribute  
to broadening the conversation globally



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**Prediction is difficult,  
especially the future\***



\* Danish proverb / Neils Bohr, 1922 Nobel Prize in Physics



## integrated modelling explores possible futures providing a balanced scorecard

**2** ZERO HUNGER

**6** CLEAN WATER AND SANITATION

**7** AFFORDABLE AND CLEAN ENERGY

**8** DECENT WORK AND ECONOMIC GROWTH

**9** INDUSTRY, INNOVATION AND INFRASTRUCTURE

**12** RESPONSIBLE CONSUMPTION AND PRODUCTION

**13** CLIMATE ACTION

**15** LIFE ON LAND

**17** PARTNERSHIPS FOR THE GOALS

We link nine national and global models to explore the food-energy-water nexus in the context of global change and economic growth

## integrated modelling explores possible futures

- Linkages and interactions across sectors
- Synergies and trade-offs from integrated policy
- Processes and constraints within sectors
- Impacts and values to different constituencies

**Land use**

42% carbon payment, biodiversity focused with strong abatement, high agricultural prices

**Food (protein output)**

**Water**

**Energy**

**Income (and economic activity)**

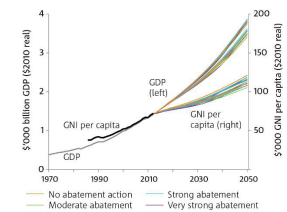


## The challenge of our times.

Can we achieve our global aspirations, within our planetary boundaries?

## Sustainability and economic growth can be partners, not competitors

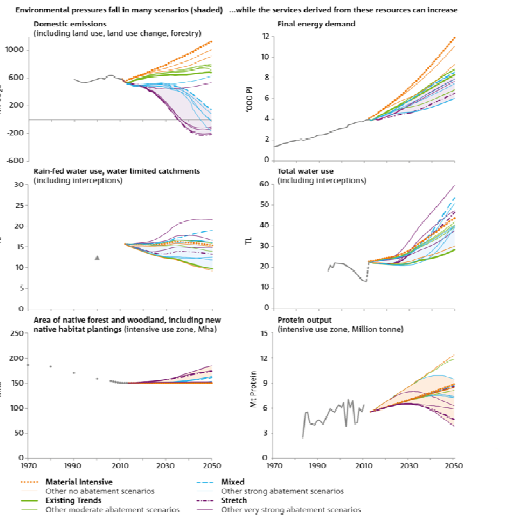
**FIGURE 10. ECONOMIC ACTIVITY AND NATIONAL INCOME GROW STRONGLY ACROSS ALL SCENARIOS**



At least one environmental indicator improves in two thirds (13 of 18) of the scenarios, but all indicators improve in only three scenarios



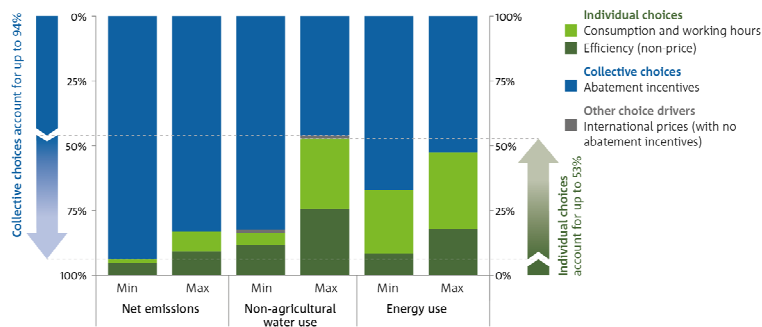
**FIGURE 9. ENERGY, WATER, AND AGRICULTURAL OUPUT INCREASE, WHILE PRESURES DECLINE**



Source: Figures 9 and 10, Hatfield-Dodds et al (2015)

## Decisions we make as a society matter Australia's choices will shape our prosperity

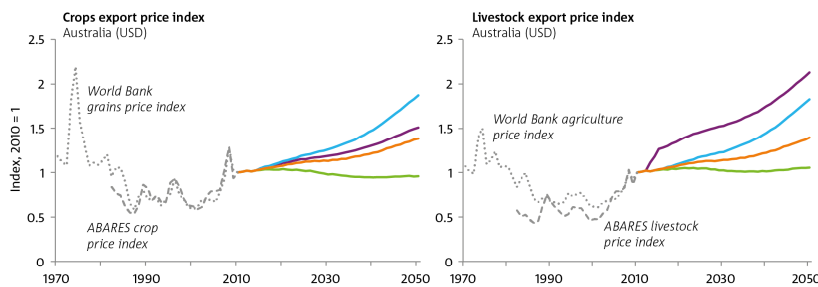
**FIGURE 16 COLLECTIVE CHOICES ACCOUNT FOR THE MAJORITY OF PROJECTED DIFFERENCES IN RESOURCE USE AND ENVIRONMENTAL PRESSURES IN 2050**



Source: Hatfield-Dodds et al. (2015) *Australian National Outlook 2015: Economic activity, resource use, environmental performance and living standards, 1970-2050*.



## Australia is modelled in global context: We project rising agricultural prices in most outlooks, as competition for land increases



**Global scenarios and key assumptions**

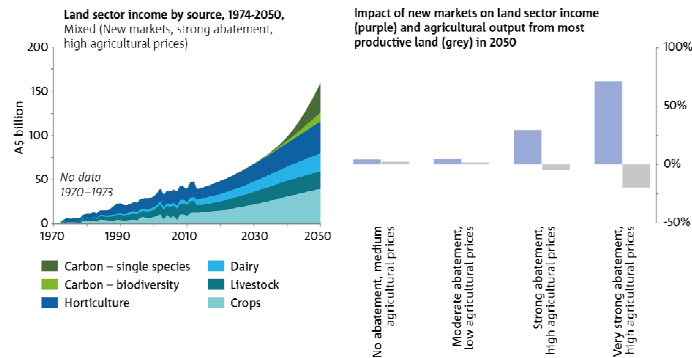
- Low population, very strong abatement (L1)
- High population, strong abatement (M3)
- High population, no abatement action (H3)
- Medium population, moderate abatement, higher global agricultural productivity (M2)

Figure 23) from Hatfield-Dodds et al (2015)  
*Australian National Outlook 2015 – Technical Report*



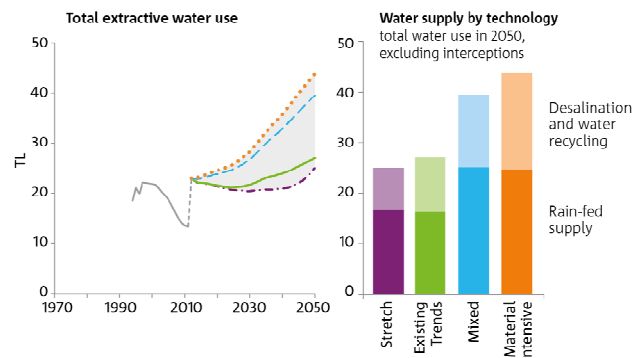
## Agricultural output increases in value and volume, with productivity outpacing changes in land use in all scenarios

**FIGURE 8. NEW MARKETS BOOST AND DIVERSIFY LAND SECTOR INCOME, PARTICULARLY FROM LESS PRODUCTIVE LAND**



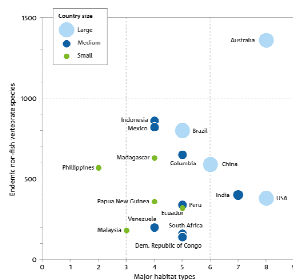
## Water markets allow increased water supply with higher security, while caps prevent increased environmental stress

**FIGURE 17. NON-TRADITIONAL SUPPLY OPTIONS PLAY A SIGNIFICANT ROLE IN MEETING FUTURE WATER DEMAND**



## Carbon payments can be harnessed to restore habitat and biodiversity without large government outlays

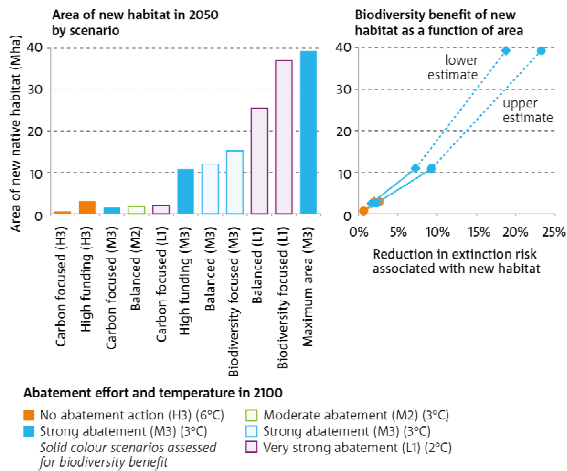
**FIGURE 21 AUSTRALIA HAS GLOBALLY DISTINCTIVE BIODIVERSITY**



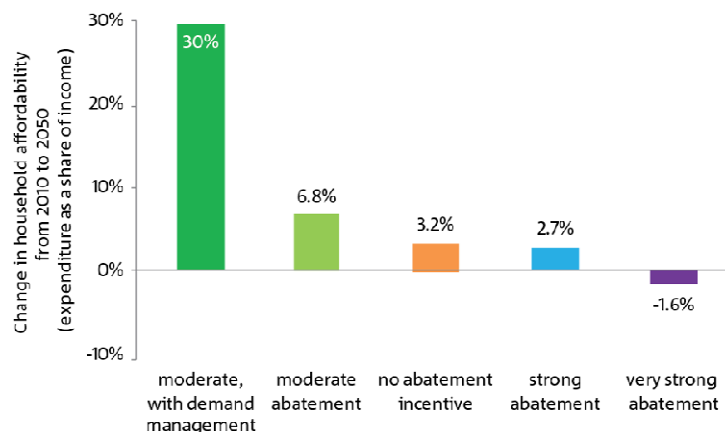
Brauer, Hatfield-Dodds et al. (2016) Australian National Outlook 2016: Economic activity, resources use, environments, performance and Policy alternatives, 19/11/2016.



**FIGURE 22 RESTORING NATIVE HABITAT COULD SIGNIFICANTLY REDUCE THE IMPACTS OF CLIMATE CHANGE**



## Managing peak demand has a greater impact on energy affordability than decarbonisation

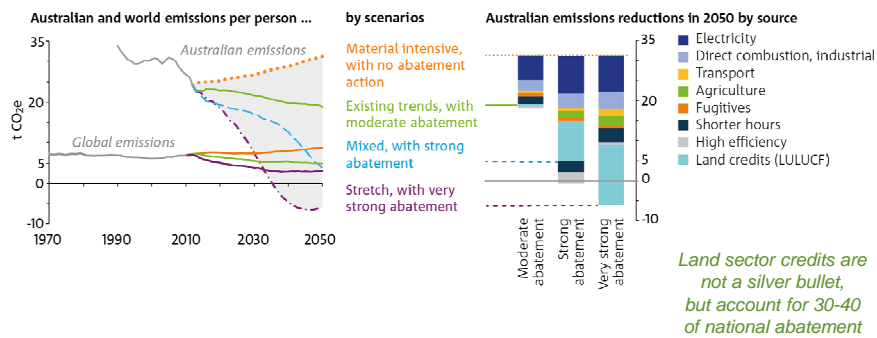


Source: Australian National Outlook – Chart Overview  
D1. Change in electricity affordability to 2050



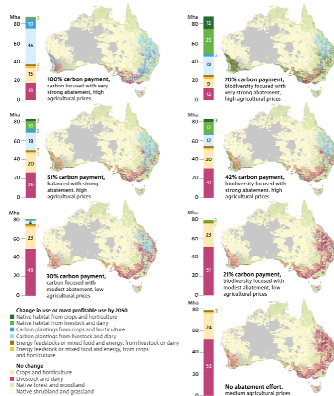
## We find surprising transitions could be possible ...

**FIGURE 19. AUSTRALIAN PER CAPITA EMISSIONS CAN FALL BELOW THE GLOBAL AVERAGE, WITH CONTRIBUTIONS FROM ALL SECTORS**

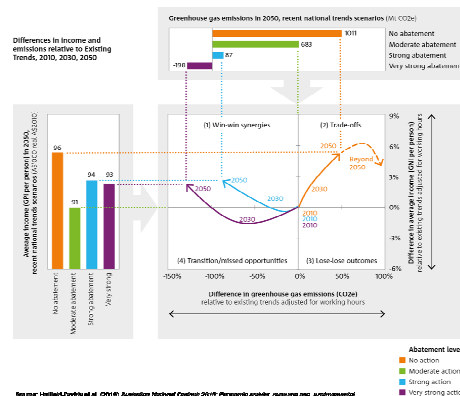


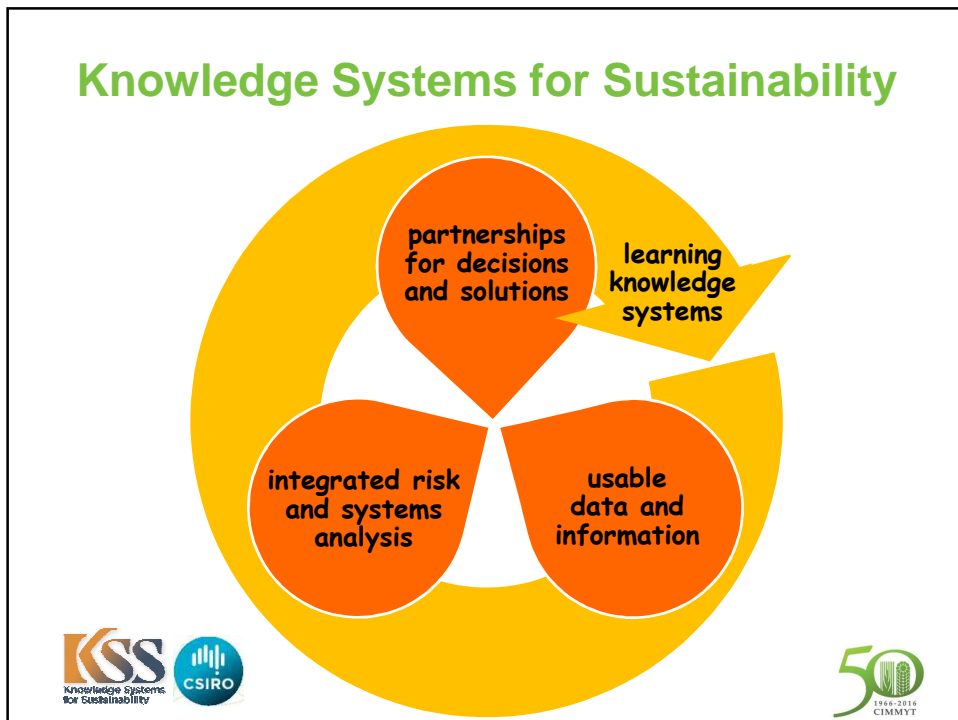
## ... as recognizing the value of environmental services transforms comparative advantage

**FIGURE 14. A PROFITABLE RURAL LAND USE COULD SHIFT DRAMATICALLY, RAISING CHALLENGES AND OPPORTUNITIES**



**FIGURE 20. STRONGER GLOBAL ACTION TO REDUCE GREENHOUSE GAS EMISSIONS PROVIDES WIN-WIN ECONOMIC AND ENVIRONMENTAL OUTCOMES BEFORE 2050**







**50**  
1966-2016  
CIMMYT

Australian National Outlook 2015

nature

integrated risk and systems analysis

partnerships for decisions and solutions

learning knowledge systems

usable data and information

2 ZERO HUNGER

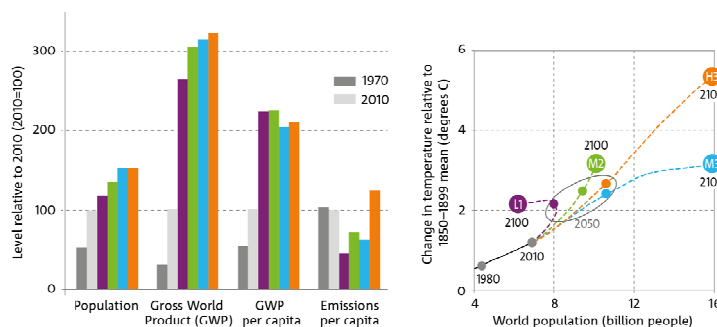
SUSTAINABLE DEVELOPMENT GOALS

**thank-you**

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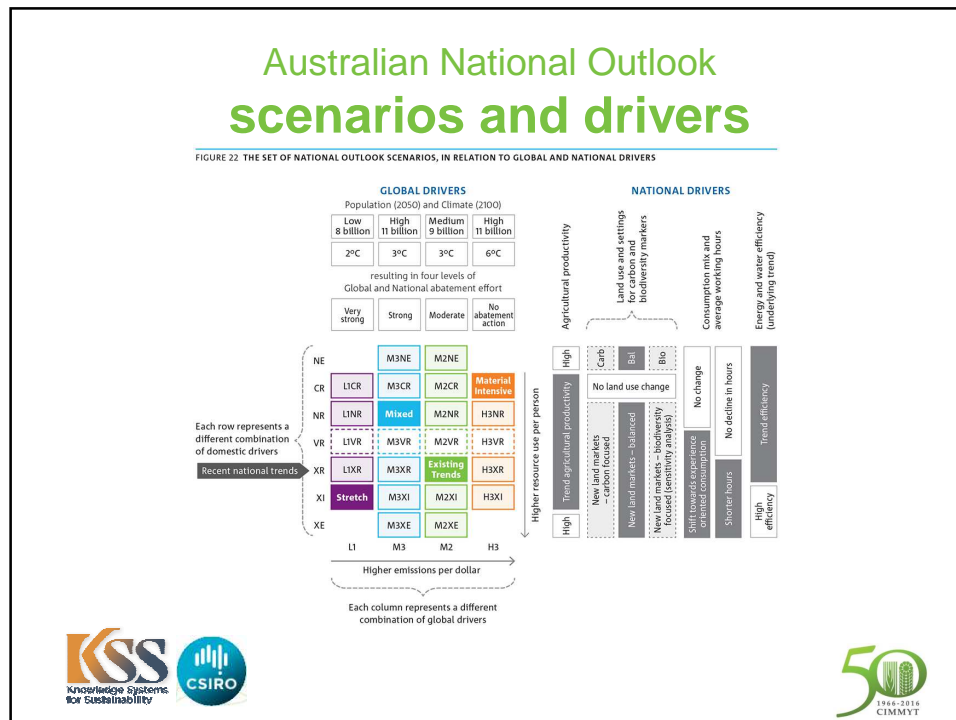
## Global context scenarios

FIGURE 28 KEY INDICATORS FOR THE FOUR GLOBAL CONTEXT SCENARIOS, 1970, 2010, 2050, OR 1980-2100



## Australian National Outlook scenarios and drivers

FIGURE 22 THE SET OF NATIONAL OUTLOOK SCENARIOS, IN RELATION TO GLOBAL AND NATIONAL DRIVERS



## References

Hatfield-Dodds, S., L. McKellar, et al (2015), *Australian National Outlook 2015: Economic activity, resource use, environmental performance and living standards, 1970-2050*, CSIRO, Canberra. <http://www.csiro.au/nationaloutlook/>

Hatfield-Dodds, S., H. Schandl, et al (2015), Australia is 'free to choose' economic growth and reduced environmental pressures, *Nature* 527 49-53 DOI:10.1038/nature16065. <http://www.nature.com/nature/journal/v527/n7576/full/nature16065.html>

### Further reading

Hatfield-Dodds, S., P. Adams, et al (2015) *Australian National Outlook 2015 – Technical Report: Economic activity, resource use, environmental performance and living standards, 1970-2050*. CSIRO, Canberra.

Schandl, H., S. Hatfield-Dodds, et al (2015) Decoupling global environmental pressure and economic growth: scenarios for energy use, materials use and carbon emissions. *Journal of Cleaner Production*. DOI:10.1016/j.jclepro.2015.06.100

Bryan, B.A., M. Nolan, et al (2016). Land use and sustainability under intersecting global change and domestic policy scenarios: Trajectories for Australia to 2050. *Global Environmental Change* 38 130-152. <http://dx.doi.org/10.1016/j.gloenvcha.2016.03.002>

Graham, P.W., T. Brinsmead, S. Hatfield-Dodds (2015) Australian retail electricity prices: Can we avoid repeating the trend of the past? *Energy Policy* 86, 456-469. <http://dx.doi.org/10.1016/j.enpol.2015.07.022>

