Submission – Productivity Commission Inquiry into Barriers to Effective Climate Change Adaptation

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This submission is authored by researchers of the Australian Sea Level Rise Partnership (ASLRP) from the Global Change Institute at The University of Queensland. The ASLRP project aims to explore and develop the ecological, economic, industry, planning and legislative responses required to advance preparation for the challenge of rapid sea level rise. As such, this submission will address issues surrounding adaptation to the impacts of sea-level rise, climate change-induced extreme weather events and flooding. This submission will not address all questions posed by the Issues Paper, but will instead focus on the issues relevant to the authors' expertise.

Making adaptation effective and dealing with uncertainty

1. How can uncertainty be addressed in the context of adaptation of coastal wetlands to climate change?

In some instances, uncertainty can be readily addressed through the acquisition of better data to support decision-making. For example, better conservation of wetlands can occur through the acquisition of relevant data. Coastal wetlands are an essential ecosystem, but are threatened by sea level rise. A key goal of Australian governments is to maintain ecosystem services and biodiversity,[1] and maintaining coastal wetlands facilitates this, as they provide a range of ecosystem services including supporting fisheries, coastal protection and

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carbon sequestration.[2] Therefore effective adaptation requires decision-makers to ensure that coastal wetlands are maintained, and plan for coastal wetlands migration to prevent coastal squeeze between the sea and urban development.

Uncertainty is a recognised barrier to adaptation to climate change.[3] To conserve these ecosystems and to reduce uncertainty around the impact of sea level rise, it is necessary to obtain greater knowledge of the future distribution of wetlands so that managers and planners can make cost effective decisions. Enhanced understanding of the biophysical processes that determine wetland adaptation to sea level rise and models that incorporate new knowledge and provide visualisations of future landscapes can help to aid planners and decrease uncertainty. For Australian governments to adequately plan for wetland conservation, we need to develop a sophisticated tool kit for predicting wetland change with sea level rise. The methods are available to do this. Methods include field measurements, acquisition of remotely sensed data and modelling.

The Rod Surface Elevation Table – Marker Horizon ("RSET") technique provides a method to determine whether wetland surfaces are keeping up with sea level rise (or losing elevation relative to sea level) and to understand which underlying biophysical processes are important for wetland stability. This method was developed by the United States Geological Survey[4] and is used extensively in the USA but has only had limited use in Australia.[5] *It is recommended that Australian governments invest in an RSET-MH network*

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1 See for example the South-East Queensland Regional Plan, the *Environment Protection and Biodiversity Conservation Act 1999* (Cth)

2 Daniel M Alongi , 'Present state and future of the world's mangrove forests' (2002) 29 *Environmental Conservation* 331.

3 W Neil Adger, Nigel W Arnell and Emma L Tompkins, 'Successful adaptation to climate change across scales' (2005) 15 *Global Environmental Change* 77.

4 Donald R Cahoon et al, 'High-precision measurements of wetland sediment elevation: II the rod surface elevation table' (2002) 72 *Journal of Sedimentary Research* 730.

5 See exceptions in K Rogers, N Saintilan and H Heijnis, 'Mangrove encroachment of salt marsh in Western Port Bay, Victoria: the role of sedimentation, subsidence, and sea-level rise' (2005) 28 *Estuaries and Coasts* 551; A.J. Howe, J.F. Rodriguez, P.M. Saco, 'Surface evolution and carbon sequestration in disturbed and undisturbed wetland soils of the Hunter estuary, southeast Australia' (2009) 84 *Estuarine, Coastal and Shelf Science* 75; CE Lovelock et al, 'The role of surface and subsurface processes in keeping pace

across Australia, including Western Australia, the Northern Territory, and North Queensland. A RSET-MH network would aid in predicting landscape change in the coastal zone with sea level rise.

The data derived from RSET instruments can be used to parameterise spatial models of wetland change that can be used as planning tools. One model that is currently in use is the Sea Level Affects Marshes Model ("SLAMM").[6] This model was developed in the USA and has only been adapted for Australian wetlands[7]. This model was used by researchers in South-east Queensland, who found a general decline in wetland communities with sea-level rise, except for mangroves, which migrate inland over time.[7] Given the significance of these findings, *it is also recommended that Australian governments invest in development of an Australian version of SLAMM* (or similar). Managers and planners need a freely available modelling tool that can incorporate the dynamic processes of the coastal zone. The basic requirements for an a SLAM model are:

- Land-use maps that include fine-scale vegetation mapping which is available in many of the States (e.g. Wetland Info http://www.epa.qld.gov.au/wetlandinfo/site/index.html);
- Digital Elevation Models (DEM) of coastal landscapes; and
- Process data (accretion, subsidence) from the RSET-MH instruments.

Digital elevation models (DEM) provide highly accurate three dimensional representations of the elevation of the landscape relative to sea level. They are derived from light detection and ranging (LIDAR) technology and the subsequent processing of LIDAR data to create three dimensional models of the land surface. Our research has shown that while the creation of DEMs required to run SLAMM models is expensive (compared to using pre-existing 1

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with sea-level rise in intertidal wetlands of Moreton Bay, Queensland, Australia' (2011) 14 *Ecosystems* 745.

6 C Craft et al, 'Forecasting the effects of accelerated sea-level rise on tidal marsh ecosystem services' (2009) 7 *Frontiers in Ecology and the Environment* 73.

7 Lochran W Traill et al, 'Managing for change: wetland transitions under sea-level rise and outcome for threatened species' (2011) 17 *Diversity and Distributions* 1225.

m scale elevation models of the coast), they are worth the investment.[8] *We therefore also recommend investment in collection and processing of LIDAR data collection to create DEMs of coastal wetlands Australia-wide.*

Facilitating insurance markets

This part of the submission will focus on insurance for sea-level rise, climate change-induced extreme weather events and flooding. It will not consider broader issues regarding climate change and insurance. The focus of this submission will be predominately on home insurance, although some of the observations are relevant to a broader range of insurance products.

There have been several key publications released this year by the Commonwealth Treasury and the National Disaster Insurance Review, including:

- Commonwealth of Australia, *Reforming flood insurance: clearing the waters* (April 2011);
- Commonwealth of Australia, *Inquiry into flood insurance and related matters* (June 2011); and
- Commonwealth of Australia, *Reforming flood insurance: a proposal to improve availability and transparency* (November 2011).

As there has already been a significant amount of research in this area, this submission will explore some of the key recommendations proposed in these documents, and will also provide some independent recommendations.

1. Are any existing regulatory arrangements (including state-based insurance taxes and disaster recovery policies) impeding the efficient operation of the Australian insurance market, or reducing incentives to take up insurance?

Disaster recovery policies were addressed by the National Disaster Insurance

[8] See for example Rebecca Runting, *Does Less Mean More? Process-based models and high- resolution data for conservation planning* (Honours thesis, University of

Review. The Review refers to the Queensland Premier's Fund established during the Queensland flood disaster, which was funded by donations, and distributed to homeowners whose homes were destroyed or damaged. Other payments made were funded through the taxation system.[9] It was suggested in the Review that these schemes act as a disincentive for homeowners to purchase insurance.[10] The authors do not wish to comment on this further on this issue, beyond noting the need for further research to determine whether this has in fact acted as a disincentive for flood-affected homeowners to obtain flood insurance.

2. What kinds of government intervention, if any, would be most appropriate for addressing any market failures or regulatory barriers? What are the costs and benefits of these interventions?

Climate change is expected to contribute to sea-level rise and an increase in the frequency and intensity of extreme weather events. As these events have the potential to cause widespread flooding, the focus of this submission will be on the provision of flood insurance. The appropriate level of government intervention in the private insurance market has emerged as a key issue for policy-makers following the Queensland flood disaster in 2010-2011, and this submission will discuss some of the measures proposed by government review bodies.

The focus of the Commonwealth Treasury and the National Disaster Insurance Review has been on developing a common definition of flood, and exploring the potential for mandatory flood insurance.[11] The most recent proposal put forward

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Queensland, 2011).

9 Commonwealth of Australia, *Inquiry into flood insurance and related matters* (June 2011) National Disaster Insurance Review, 8 < http://www.ndir.gov.au/content/issuespapers/NDIRIssuesPaper.pdf >.

10 Commonwealth of Australia, *Inquiry into flood insurance and related matters* (June 2011) National Disaster Insurance Review, 43 < http://www.ndir.gov.au/content/issuespapers/NDIRIssuesPaper.pdf >.

11 Commonwealth of Australia, *Reforming flood insurance: clearing the waters* (April 2011) Treasury Department < http://www.treasury.gov.au/documents/1995/PDF/clearing_the_waters_april2011.pdf>; Commonwealth of Australia, *Inquiry into flood insurance and related matters* (June 2011) National Disaster Insurance Review < http://www.ndir.gov.au/content/issuespapers/NDIRIssuesPaper.pdf >; Commonwealth of

by the Commonwealth government requires all insurers to offer flood cover, with an option for consumers to 'opt out' of cover.[12] Where a consumer chooses to opt out, and their property is subject to a flood risk, the insurer is required to notify them of this.[13]

A survey conducted by the authors of this submission identified that 40 different home insurance products are currently available, with 18 products providing flood insurance as standard, and an additional three allowing consumers to purchase flood insurance as an optional extra.[14] To implement the proposal put forward by the Commonwealth government, insurance companies not currently offering flood insurance will need to invest significant resources into developing this product. This will involve not only rewriting policies, but also engaging underwriters to ensure that flood insurance is appropriately priced based on the degree of risk posed to a property. This would also involve insurers having to obtain flood risk data for all properties. The Insurance Council of Australia maintains a National Flood Information Database, but this is not comprehensive.[15] Insurers that offer flood insurance, such as Suncorp, use their own independent data and methods for calculating flood risk.[16]

Requiring insurance companies to enter into the market for providing flood insurance could have two possible consequences:

1. Insurers will invest a significant sum of money into obtaining data and assessing flood risk to individual properties. This could potentially lead to

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Australia, *Reforming flood insurance: a proposal to improve availability and transparency* (November 2011) Treasury Department < http://www.treasury.gov.au/documents/2221/PDF/transparency_november2011.pdf>.

12 Commonwealth of Australia, *Reforming flood insurance: a proposal to improve availability and transparency* (November 2011) Treasury Department, 3 < http://www.treasury.gov.au/documents/2221/PDF/transparency_november2011.pdf>.

13 Commonwealth of Australia, *Reforming flood insurance: a proposal to improve availability and transparency* (November 2011) Treasury Department, 3 < http://www.treasury.gov.au/documents/2221/PDF/transparency_november2011.pdf>.

14 For further information on this survey, see Justine Bell, 'Insurance for extreme weather events in Australia – current policy trends, and future directions' (2011) 8 *Macquarie Journal of Business Law* 339.

15 Commonwealth of Australia, *Inquiry into flood insurance and related matters* (June 2011) National Disaster Insurance Review, 38 < http://www.ndir.gov.au/content/issuespapers/NDIRIssuesPaper.pdf >.

16 Suncorp Insurance, *Flood facts: calculating risk* (2011) < http://www.floodfacts.suncorp.com.au/#/Floodfacts/flood-calculating-risk>.

an increase in premiums across all properties, including those not currently subject to flood risk; or

2. Insurers will base pricing on incomplete data or estimates, which could lead to premiums being higher than necessary, or lower than necessary, resulting in loss to the insurer when a flood occurs.

The recent flood disaster in Queensland has highlighted deficiencies with the current system. However, the model proposed by the Commonwealth Treasury may not be the most cost-effective manner of addressing this issue, due to the necessity for insurance companies to acquire data, or base premiums on estimates. An alternative approach was raised in the Productivity Commission Issues Paper, which suggested that 'governments might provide hazard-related mapping this information could also help insurers properly price those risks'.[17] This would shift the expense of providing data from the insurance company to the government. Provided that the mapping was comprehensive and utilized the best available technology, this would potentially be a good solution, and would allow insurance companies not currently offering flood insurance to enter into the market at a lower cost. *It is recommended that the Productivity Commission further explore the costs of obtaining and providing mapping data to insurance companies.*

However, a more cost-effective solution may be allowing insurers to continue to choose whether to offer flood insurance, using their own data for pricing. This could be supplemented by strong consumer protection measures to ensure that consumers are aware of whether their policy covers flood or not. This could take the form of the original proposal of the Commonwealth Treasury, involving a standard definition of flood, and a requirement for insurers to draw consumer's attention to whether flood is included or not.[18] This approach would save government the expense of developing data for the insurance industry, although

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17 Productivity Commission, *Barriers to Effective Climate Change Adaptation* (October 2011) 16 < http://www.pc.gov.au/__data/assets/pdf_file/0016/113533/climate-adaptation-issues.pdf >.

18 Commonwealth of Australia, *Reforming flood insurance: clearing the waters* (April 2011) Treasury Department < http://www.treasury.gov.au/documents/1995/PDF/clearing_the_waters_april2011.pdf>.

this data may arguably need to be prepared regardless for land-use planning. *It is recommended that the Productivity Commission explore whether this is a more cost-effective solution than providing mapping data, in consultation with the insurance industry.*

In summary, a high degree of government intervention in the private insurance market in the manner proposed by the Commonwealth Treasury and the National Disaster Insurance Review is likely to be inappropriate. However, strong consumer protection measures could be implemented to ensure that consumers are aware whether their policy covers flood insurance or not.

However, it might become necessary for government to consider the effects of climate change on the insurance industry in the longer run. A key issue is whether the expectation that insurance serves a basic social function can be reconciled with business interests under different climate change scenarios.[19] Insurers could suffer from claims due to an increase in extreme events resulting in excessive cash outflows, unmanageable caseloads and potentially even insolvencies within the industries.[20] For instance, even though US insurance companies were used to recurrent hurricane losses, the substantial US$15.5bn insurance loss due to Hurricane Andrew in 1992 lead to the insolvency of 12 insurance companies and significant market disruptions.[21]

Climate change might therefore have significant adverse impacts on insurance availability and affordability in the longer run, potentially shifting more of the adaptation and disaster management burden to governments and individuals and negatively impacting the growth and financial health of the industry.[22] Consequently, there might be demand for risk transfer (from individual to insurer to government) and the need to clarify obligations of different actors (insurer,

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19 E Mills, 'Insurance in a climate of change' (2005) 309 *Science* 1040.

20 A Dlugolecki, 'Climate Change and the Insurance Sector' (2008) 33(1) *The Geneva Papers on Risk and Insurance-Issues and Practice* 71.

21 TJ Wilbanks et al, 'Industry, settlement and society' in ML Parry et al (eds) *Climate change 2007: Impacts, adaptation and vulnerability: Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (2007, Cambridge University Press) 357.

22 E Mills, 'Insurance in a climate of change' (2005) 309 *Science* 1040.

government) in cases of major extreme events, including research, education, land-use planning, disaster preparedness, as well as disaster recovery and reinsurance options. *It is recommended that the Australian government fund further research into these issues.*

3. How well are Australian insurance markets coping with climate change and any associated uncertainties? What new insurance products might be developed by the market in response to climate change? Would regulatory changes be required to accommodate these, or to improve the operation of the insurance market in a changing climate?

Since the 2010-2011 Queensland flood disaster, government reviews have focused on the availability of insurance to ensure that flood-related damage is covered. There has been little attention given to the broader issue of climate change adaptation. The National Disaster Insurance Review briefly dealt with this issue, and referred to the need to 'avoid moral hazard and to maintain incentives for good risk management, including flood mitigation',[23] but did not adequately explore how this can be achieved, beyond noting the possibility of increasing resilience as part of repairs post-claim.[24] There also been little attention given to the issue of insurance for storm surge and actions of the sea. This was briefly dealt with by the House of Representatives Standing Committee on Climate Change, Water, Environment and the Arts, which deferred the matter to the Productivity Commission.[25]

Climate change adaptation is hindered by the fact that new planning instruments aim to reduce vulnerability in new developments, but are unable to adequately address adaptation in existing developments. This submission proposes that insurance companies are well placed to promote climate change

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23 Commonwealth of Australia, *Inquiry into flood insurance and related matters* (June 2011) National Disaster Insurance Review, vi < http://www.ndir.gov.au/content/issuespapers/NDIRIssuesPaper.pdf >.

24 Commonwealth of Australia, *Inquiry into flood insurance and related matters* (June 2011) National Disaster Insurance Review, 42 < http://www.ndir.gov.au/content/issuespapers/NDIRIssuesPaper.pdf >.

adaptation in these existing developments. At present, insurance is reactive in nature. When an insurable loss is suffered, the insurance company makes a payment to the insured party to repair or replace the asset damaged. Traditionally, the insurance industry has not been involved in developing proactive adaptation measures to deal with climate change, such as regulation for construction or development standards or site-specific adaptation decisions.[26]

Theoretically, insurance can be used as a proactive tool, by providing customers with incentives to increase the resilience of their properties to climate change-induced extreme weather events and flooding. Insurance companies encourage this proactive behaviour in other areas of home insurance. For example, customers can receive premium discounts where they have taken measures to decrease their vulnerability to theft, such as by installing alarms and security grilles.

The measures necessary to decrease vulnerability to climate change-related impacts depend upon the context. In areas prone to flooding and storm surge, properties could be retrofitted to withstand flooding. Similarly, in cyclone-prone areas, properties could be retrofitted to withstand strong winds. Standards have already been developed for application to new buildings, and these could be applied to existing buildings.[27]

Whilst it is technically feasible to undertake these measures to decrease vulnerability to climate change-induced extreme weather events, there must be a clear incentive available for the homeowner to do so. A simple reduction in premiums may not be a sufficient incentive, as the cost of retrofitting is high,

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25 House of Representatives Standing Committee on Climate Change, Water, Environment and the Arts, Parliament of Australia, *Managing our coastal zone in a changing climate: the time to act is now* (2009) 114-124.

26 A Dlugolecki, 'Climate Change and the Insurance Sector' (2008) 33(1) *The Geneva Papers on Risk and Insurance-Issues and Practice* 71.

27 See for example David Henderson and John Ginger, 'Role of building codes and construction standards in windstorm disaster mitigation' (2008) 23(2) *Australian Journal of Emergency Management* 40. The Brisbane City Council Temporary Local Planning Instrument 01/11 also addresses measures which can be implemented to reduce vulnerability to flood impacts.

and may not be quickly recovered through this cost saving in insurance. However, where insurance is unavailable as the degree of risk to a property is too high for insurers to take on, there may be an incentive for a customer to undertake measures to retrofit their property. The Insurance Council of Australia has stated that currently there are no 'red-flagged' areas in Australia in which no insurance is available, but has observed this practice occurring in other areas of the world in response to a high degree of risk.[28] Furthermore, in the area of insurance for storm surge and actions of the sea, insurance coverage is extremely limited.[29] As the incidence and severity of extreme weather events increases in Australia, this may lead to some insurers refusing to provide insurance in vulnerable areas. If this occurs, customers may be willing to take measures to decrease the vulnerability of their home to extreme weather events if this will provide them with insurance coverage in circumstances where it would otherwise be unavailable.

In circumstances where flood insurance or insurance for other extreme weather events is available, but unaffordable due to a property's vulnerability, perhaps government intervention may be warranted. The mandatory insurance scheme contemplated by the National Disaster Insurance Review involves provision for compensation to be provided to 'high-risk homes'.[30] This compensation would allow for subsidised insurance premiums, and would be provided through an insurance pool, potentially funded by insurers and government.[31] This approach was described as preferable to post-disaster subsidies, as 'a key disadvantage of such an approach is the absence of incentives for those at risk of future flood

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28 House of Representatives Standing Committee on Climate Change, Water, Environment and the Arts, Parliament of Australia, *Managing our coastal zone in a changing climate: the time to act is now* (2009) 116.

29 See for example Justine Bell, 'Insurance for extreme weather events in Australia – current policy trends, and future directions' (2011) 8 *Macquarie Journal of Business Law* 339.

30 Commonwealth of Australia, *Inquiry into flood insurance and related matters* (June 2011) National Disaster Insurance Review, 19 < http://www.ndir.gov.au/content/issuespapers/NDIRIssuesPaper.pdf >.

31 Commonwealth of Australia, *Inquiry into flood insurance and related matters* (June 2011) National Disaster Insurance Review, 20 < http://www.ndir.gov.au/content/issuespapers/NDIRIssuesPaper.pdf >.

to take personal responsibility to mitigate those risks'.[32] Arguably a better way to promote personal responsibility is to channel this pool of funds into providing grants to assist homeowners to increase their resistance to extreme weather events. This would have the following additional economic benefits over subsidising insurance:

- Ideally retrofitting a home to increase its resistance to extreme weather events will only need to occur once, whereas if there is a succession of extreme weather events, damage may occur and subsequently be repaired multiple times; and
- Increasing resistance to extreme weather events is arguably preferable to compensating damage because of the flow-on effects from flood damage, including depression, anxiety and stress,[33] all of which have can conceivably to lead to an additional economic strain.

It is recommended that the Productivity Commission and Australian government consider the possibility of providing funds to homeowners to 'climate-proof' their homes, rather than using funds to subsidise insurance premiums.

It is also recommended that the Australian government provide funds for research into why insurance companies are reluctant to provide insurance for storm surge and actions of the sea, and what changes would be needed to broaden coverage in this area.

Another way to promote greater personal responsibility to insure against flood risk is for the Commonwealth government and the Insurance Council of Australia to work together in the formulation and implementation of a public education program that makes the general public aware of the benefits of having flood insurance. This type of program has been tried and tested in the UK, whereby the UK government introduced the £12 million Financial Inclusion

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32 Commonwealth of Australia, *Inquiry into flood insurance and related matters* (June 2011) National Disaster Insurance Review, 21 < http://www.ndir.gov.au/content/issuespapers/NDIRIssuesPaper.pdf >.

33 See for example Australian Centre for Posttraumatic Mental Health, *Surviving the trauma of the Queensland floods: the mental health consequences* (2011) <http://www.acpmh.unimelb.edu.au/resources/media.html#media_releases>.

Champions initiative in response to recommendations from the independent flood review by Sir Michael Pitt in 2008.

Such a collaborative scheme allows the government to use any funds more pro-actively, rather than handing them out on an ad hoc basis after extreme flooding events occur. The Insurance Council of Australia's role in the initiative could concentrate on giving advice on the benefits of insurance with respect to extreme events, especially to low income earners and more vulnerable groups that could be potentially affected by flooding. If planned efficiently, such an initiative will decrease financial risk in the insurance and public sectors, as well as providing the general public a visible message that the government are prepared to implement policy that concentrates on autonomously adapting to extreme weather events.

It is recommended that that the Productivity Commission consider the possibility of using government funds to invest in education programs.

Summary of recommendations

Making adaptation effective and dealing with uncertainty

It is recommended that:

- Australian governments invest in an RSET-MH network across Australia, including Western Australia, the Northern Territory, and North Queensland
- Australian governments invest in development of an Australian version of SLAMM
- There is government investment in collection and processing of LIDAR data collection to create DEMs of coastal wetlands Australia-wide.

Facilitating insurance markets

It is recommended that:

- the Productivity Commission further explore the costs of obtaining and providing mapping data to insurance companies to assist with pricing if

companies are required to cover flood damage

- the Productivity Commission explore whether it would be more cost-effective to allow insurance companies to continue to choose whether to provide flood insurance. This would be accompanied by strong consumer protection measures to ensure insureds are aware of whether flood insurance is covered
- the Australian government funds research into the obligations of insurance companies and government in cases of major extreme events, including research, education, land-use planning, disaster preparedness, as well as disaster recovery and reinsurance options
- the Productivity Commission and Australian government consider the possibility of providing funds to homeowners to 'climate-proof' their homes, rather than using funds to subsidise insurance premiums
- the Australian government provide funds for research into why insurance companies are reluctant to provide insurance for storm surge and actions of the sea, and what changes would be needed to broaden coverage in this area
- the Productivity Commission consider the possibility of using government funds to invest in education programs.