



Draft Report <topic/theme>

Submission

Queensland Murray-Darling Committee Inc.'s Submission on Barriers to Effective Climate Change Adaptation Draft Report April 2012

8 June 2012

Submission to:

Barriers to Effective Climate Change Adaptation
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This submission is presented by the Chief Executive Officer, Geoff Penton, on behalf of the Queensland Murray-Darling Committee Inc. (QMDC). QMDC is a regional natural resource management (NRM) organisation, which supports communities in the Queensland Murray-Darling Basin (QMDB), to sustainably manage their natural resources.

1.0 Background

QMDC's response to the Barriers to Effective Climate Change Draft Report (the Draft Report) is informed by the Regional NRM Plan and QMDC's regional involvement in climate change issues including, for example, several regional climate science projects (Climate Witness; Granite Belt Climate Refugia; Regional Climate Change Impact Assessment) and engaging landholders to improve rural business practices in the face of regional climate change. The comments offered on the Draft Report also encapsulate QMDC's position on climate change legislation, policies and strategies proposed by both the Australian and Queensland governments.

QMDC asserts that the identification of barriers to effective climate change adaptation must lead to the correlated action of targeting the most pertinent vulnerabilities for a region in order to enable, community-wide building of resilience in the face of climate change and variability challenges.



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QMDC supports current and future climate change responses (mitigation and adaptation) by individuals, industry and government that realise the synergies between responses at all these levels. The Productivity Commission's call for a whole of government approach to climate change within Australia is recognised by QMDC as both necessary and urgent.

Regional NRM Plans clearly offer a mechanism to assist the alignment of legislation, policy, planning and science within Australia's diverse regions. Reference to regional NRM Plans can facilitate a strategic approach to natural resource management and climate change adaptation in Australia.

QMDC is currently engaged with other regional NRM bodies to coordinate how to best advance NRM Plans so that they are "climate change ready", informed by the best available regional climate change information. Getting the best out of NRM planning to develop climate change actions however requires adequate resourcing to not only update NRM Plans but also to implement them.

2.0 Policy reforms should be prioritised (pp.2, 9, 10 & 11)

Many current policies are inconsistent with attempts to mitigate climate change impacts. QMDC therefore supports the strategic prioritisation of policy reforms and believes these priorities should be guided by the following key information and research requirements to inform improved policy:

- Assessment of current knowledge and science to prioritise our landscapes in terms of climate change risk and impact e.g. Are native pasture grazing systems more at risk than lowland floodplain cropping areas?
- Improved mapping information to support property planning and natural resource management. Including information on soil water storage capacity and landscape design impacts on landscape resilience to change in climatic variability.
- Further research to increase the 'skill' of climate forecasting systems when applied at a regional scale. This could greatly enhance the capacity of land managers to incorporate this into their strategic and tactical responses e.g. Southern Oscillation Index is not specific enough for land managers to incorporate into property planning and management practice.
- Improved scale of information for management decision making. Currently mapping of soils and landscapes in parts of Australia are limited in their useful application for planning unit/property based recommendations and assessment. Primarily, improved resourcing into research to better inform Land Capability thus Land Use Suitability at the regional and property scales could enhance self-reliance for land managers to better manage their landscape constraints in their production system while quantification of other landscape values e.g. biodiversity.

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Further review is needed to best place each tier of government in disaster recovery and management. The Australian Government is not necessarily best placed to coordinate disaster recovery. Competency amongst government departments in this key coordination role is not routinely available in QMDC's experience. The Australian Government, however, clearly has a role to play in disaster recovery.

Government drought policy influences and in some cases leads the strategies and tactics employed by landholders in response to drought on their properties and businesses. Government should act responsibly in drought policy to encourage land capability appropriate management practices, rewarding behaviour that supports the long term state of the natural resources and ecosystems and decreases the risk of long term degradation of the resource base. Current drought policy is perceived as rewarding land degradation.

The application of drought support mechanisms can promote innovation for industries and communities to develop self-reliance by encouraging appropriate land management responses for regional based landscapes. Policy should therefore include land condition assessment criteria appropriate at the regional level. Different land types respond differently under drought conditions, therefore regionally relevant baseline data of land condition for non-drought and drought years should be integrated into assessment criteria. The inclusion of Land Condition assessment criteria will improve the transparency of the assessment process when declaration of drought is sought. It will also form a comparative basis for recognizing difference in land management practices and inform the development of incentive or reward based programs for sustainable land practices.

Business support measures should be inclusive of practices defined and in line with industry codes of best management practice for the region being assessed. An expectation of minimum duty of care should be reflected in drought policy in relation to the environment.

Policy should support the ongoing development and provision of incentives for the on-ground adoption of current recommended practices for various industries at a regional to property scale. For example, the adoption of conservation tillage and increased soil water storage may not be recommended in areas of high salinity risk where deep drainage of that water into groundwater tables is more likely and other current recommended practices could be identified and supported for adoption.

However convoluted administrative processes such as the "Exceptional circumstances application process" must be got rid of and a more strategic focus be taken to take the peaks and troughs out of farm income – like payments for ecosystems services.

QMDC values the application of land management practices within the context of land and natural resource capability. This is demonstrated through the organisation's delivery of sub-catchment planning programs providing incentives and rewards for these applied practices in the region. In line with this approach a drought policy should focus on climate risk management strategies in the context of land and natural resource capability for this region. The regional significance of policy implementation should be considered at the federal level.



QMDC asserts the Strategic Cropping Land policy by focussing assessment criteria on existing land use missed the opportunity to secure strategic cropping areas that will prove invaluable as climate refugia for cropping in the future. QMDC asserts that strategic cropping land legislation still needs to seriously address the future impact of climate change and variability on land not only suitable for cropping but grazing also.

QMDC suggests adding the above to the listed priorities as per page 11 of the Draft Report.

3.0 Preparatory action (p.2)

QMDC asserts that more discussion is required on what preparatory action entails, for example who is obligated to undertake such action, where the cost lies and what process needs to be in place to allow relevant follow on.

4.0 Deferring action until better information becomes available(p.2)

QMDC does not necessarily agree with the assumption that because of the high up-front costs, it would be beneficial to the community to defer action. QMDC argues that this can only be ascertained on a case by case basis dependent on locality and associated matters.

5.0 Climate change adaptation definition (p.4)

QMDC believes the definition should be changed in respect of the named groups (households, firms, other organisations, governments) listed. QMDC recommends changing that list to *households, businesses, corporations, community and other organisations, governments*.

6.0 Effective climate change adaptation definition (pp.5 & 28)

QMDC believes the Productivity Commission needs to have more robust discussion on 'market failure', and provide research data that analyses the manner that market forces influence decisions, both in a negative and positive way, on climate change adaptation actions at a local, regional, and national level. Does the term 'market failure' include economists' failure to value environmental and ecosystem services in their measurement of GDP and business profits? What impact on the effectiveness of climate change adaptation actions does placing more importance on the economy than the natural or social capital have?

7.0 Barrier definition (pp.5-6 & 54)

QMDC agrees that barriers may result from one or more of the issues identified in the Draft Report. QMDC however believes that actions considering climate change adaptation should focus on 'optimising' community wellbeing rather than "maximising" wellbeing.

QMDC believes the stated objective could then represent a whole life cycle analysis of for example, food production and climate change and efforts needed to **optimise** community wellbeing by striving for a balance between a range of key factors such as soil health and land capability, water quality and availability, biodiversity and vegetation management.



QMDC submits that by having the **maximisation** of community wellbeing as its primary objective risks promoting a policy that drives investment in food production which may support perverse outcomes, for example, maximising production of one species drives monocultures in agriculture that invariably leads to insect and disease vulnerability or maximising irrigated agriculture based on a fragile seasonal availability of irrigation water.

8.0 Need for government intervention (p.7 & p.8)

QMDC does not necessarily agree with the assumption that “most adaptation would occur without the need for government intervention” and would argue this should not be a key focus of its recommendations.

QMDC argues that this statement should rather be written to address climate change adaptation from the following or similar like angle. Government intervention that is informed by best available information including local knowledge will help communities to prioritise and implement strategic climate change adaptation actions that optimise ecosystem and community wellbeing.

QMDC does not accept the statement at p.8 that “((T)he existence of a ‘barrier’ to effective adaptation only indicates that there is a *potential* for governments to improve outcomes by removing or reducing the adverse impacts of that barrier. In some cases, there may be little that governments can do to address identified barriers.” The existence of a barrier makes it imperative the government acts to remove or reduce the adverse impact. This action is likely to involve a collaborative approach amongst all branches of government, community and the business sector. QMDC does not support the Draft Report creating a scenario where government can opt out because it only has a “potential” obligation.

9.0 Well-functioning, flexible economy (p.8)

What does a well-functioning, flexible economy look like? How does it operate outside the confines of GDP and consider natural capital in its accounting processes?

Results of international research in social and environmental fields of study offer an integrated approach to the impacts of economic development and growth from the point of view of sustainability indicators and threshold limits. This research has emphasised the importance of economic and biophysical limits to human activity. It shows that sustainable economic welfare increases to a point with GDP, beyond which it stagnates, or decreases, due to the environmental and social pressures of economic growth.

For the purposes of sustainability, the biophysical threshold is critical with respect to the economic threshold. Farber et al. (2002), identify a “critical threshold” in the availability of ecosystem services as a limit beyond which irreversible changes and catastrophes may occur, resulting in major environmental and economic consequences.

Emerging from research is the knowledge that environmental conditions, or the availability of natural capital, are essential elements of economic systems, even if they are ignored by economic accounting systems.

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QMDC submits that unsustainable demands for energy, materials and ecosystem services have dangerous consequences, and increased risks. QMDC asserts that at the very least if economic development is to be made sustainable then a well-functioning, flexible economy needs to implement a climate change adaptation framework that acknowledges the existence of extra-economic factors.

QMDC agrees that governments are under a social contract to protect the most vulnerable and disadvantaged groups in society by “managing the distributional impacts of climate change”.

10.0 ‘Real options’ approach (pp.9 -10 & 28)

QMDC’s concern with a ‘real options’ approach as described in the Draft Report is that it may lead to no action. The key to ensuring adaptation actions are strategic and relevant is to provide adequate resources for independent research; for local and regional baseline monitoring; for evaluation process examining actions against outcomes. A planning action, for example, is better than no action. The declaration of “no” or “little confidence” that “benefits” justify the “costs” of an action or series of actions could become political spin that means opportunities to respond within an appropriate timeframe are lost.

QMDC supports the recognition that “effective adaptation” needs to increase the well-being of the community by taking into account “non-market impacts” such as “ecosystem conservation”.

11.0 Quality and coordination of hazard risk information could be improved (p.12)

QMDC wholeheartedly agrees with the above statement.

Regional NRM plans serve as management tools often ignored although readily available to address the complexities of managing natural hazards. These plans should be considered as part of the stated reform priorities and be included in development and improvement of current and future planning schemes. QMDC believes that by giving regional NRM plans statutory recognition will improve the quality and coordination of key information essential to natural hazard management.

QMDC’s Basin flood recovery operations have highlighted that the following issues are important when considering flood hazards in the QMDB region:

- Planning for stronger, more resilient floodplains relies, in part, on legislation and planning schemes that limit development projects or the building of new critical infrastructure or levees on floodplains within established buffer zones.
- The prevention, management or mitigation of climate change impacts whether direct, indirect or offsite should be supported by existing and/or new legislation so that natural assets are adequately protected, within determined threshold limits for the asset, defining the point at which the impact is no longer acceptable.
- That the Floodplain Management Guidelines in this region must be implemented through nominated mechanisms, some of which is enforcement.

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- That appropriate planning and design of infrastructure at the landscape and local level must identify and adequately protect all waterways, floodplain functioning and wetlands, considering values and function, taking into account:
 - In-stream flow regimes
 - Surface water flow systems (e.g. potential contaminants such as salt, erosion, groundwater interface, barriers to movement of flow and in-stream species risks)
 - Ground water flow systems
 - Riparian function (e.g. ground cover, bank stability, habitat, connectivity)
 - Wetland and floodplain function
- Local and regional planning processes and schemes offer mechanisms to promote sustainable use of natural resources, and that local and regional planning schemes need to offer floodplain protection. The effectiveness of these mechanisms is compromised when regional economic development dominates over appropriate floodplain management, which may in turn accelerate the potential for widespread flood damage.
- Regional NRM Plans should be considered by key stakeholder organisations or institutions when they are formulating new regional policies, strategies and plans. Greater regional and nationwide recognition of the role regional NRM Plans play will help to promote conservation strategies that address challenges caused by a changing climate and which serve to identify and protect both regional and national significant floodplain ecosystems.

QMDC supports the identification of natural hazard management areas. However QMDC recommends that when identifying these areas clear, formal hazard definitions are required, for example, “flood event”. The Bureau of Meteorology, for instance, refers to sizes but not a specifically “defined flood event”. It is unclear whether or how the event is to be defined in relation to flood level and size or the probability of experiencing the given flood. Is it, for example, the maximum flood area, or ‘Q100’ level or performance based or a Q100 event plus performance based or more regular inundation? It should be recognised that flood events are almost unique in terms of rainfall distribution within a catchment; flow patterns; and changing development within a catchment. All these factors plus others influence the severity of floods. QMDC suggests a more adaptive approach or definition may be appropriate.

QMDC raised a number of concerns in relation to the Temporary State Planning Policy 2/11 (TSPP) and the associated overlay maps and the determination of Natural Hazard Management Areas (NHMA). The TSPP did not articulate whether these areas and their related overlay maps denote a “fuzzy” or “binary” membership where local governments set development limits within floodplain areas. QMDC recognises that binary membership poses challenges to the outcome sought, for example, the level a freeboard is set. QMDC is concerned that if local government seek development in their region they may want floodplains to be defined as a smaller area than may be necessarily so.

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It is therefore in QMDC's opinion important to design the Australian Government guidelines for flood mapping and State Planning Policies so that future impacts are modelled in order to evaluate proposed development. QMDC suggest if the NHMA denote fuzzy membership, including a "buffer" zone with the NHMA, it could serve to alert where there is potential for error or inaccuracy. Additionally a binary membership, if it is to denote a definitive layer, should include a clear process to update the NHMA with new or improved data after, for example, subsequent floods or more refined mapping.

The spatial resolution of the map imagery also needs to be considered in light of local knowledge needs and end user requirements. The spatial resolution of the map imagery provided with the proposed TSPP, for example, was in QMDC's opinion too broad to catch the smaller upland creeks and streams. QMDC's GIS and mapping flood recovery efforts after the 2010/2011 events observed greater damage than what these TSPP maps illustrated.

The Australian Government guidelines need to clarify what sort of proof is acceptable when local government proposes to define or amend an Interim Floodplain Assessment Overlay Map and Model Code (IFAOM). The Australian Government guidelines also need to identify who will oversee this process.

QMDC also recognises the need for more training of local government staff or the provision of funding for technical expertise to ensure hazard identification mechanisms are informed and facilitated by best available science and appropriately skilled technicians.

Ongoing mapping, modelling and analysis support is essential for State Planning Policies to be useful planning tools to local governments and communities living on floodplains. QMDC supports the application of an extensive mapping process to evaluate floodplains across Australia.

QMDC questions whether the State's power to determine a proposed development as a 'significant project' is improving the resilience of communities in the QMDB. 'Significant project' design should be required to incorporate climate change information into their decision making. Permitting the continuation of development in the floodplains on a large scale such as an open cut mine or a CSG field does not take seriously the vulnerabilities of development in a floodplain.

12.0 Public good (p.13)

Contention exists as to the specific definition of *public good*. QMDC seeks clarity on the meaning of this term in order to provide transparency and certainty for users of climate change information. QMDC believes there should be an emphasis not only on the public good but also on a sustainable environment and the responsibility the government has to protect the environment for future generations.

13.0 Effective local government (p.13)

QMDC believes the capacity for local governments to be effective is compromised by their under-resourcing by state and territory governments. QMDC also believes clarification of legal liability for adaptation and appropriate processes to manage that liability is needed for all levels of government.

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The exercise of defining government legal liability should also include designing a road map showing where the different levels of government can come together collaboratively to deliver climate change adaptation strategies.

14.0 Emergency management arrangements could be improved (p.14)

QMDC agrees with this statement and the comments made within the Draft Report about the need for better coordination and clarification on the roles and responsibilities of emergency service providers.

QMDC would also highlight the role NRM bodies can play in the arena of emergency management. QMDC responded to the 2010/2011 and 2012 events by delivering assistance directly to landholders needing help with flood recovery. QMDC formed partnerships with volunteer organisations such as Landcare, Volunteering Queensland, Conservation Volunteers Australia, BlazeAid, and the Regional Councils of Western Downs, Maranoa, Southern Downs, Goondiwindi, and Toowoomba. We also liaised with a number of State agencies including QRAA, NGOs and local businesses to provide landholders with access to resources and teams of volunteers.

QMDC was able to facilitate flood recovery in its region that empowered local communities to coordinate assistance in a strategic operation. Coordination at this local level enabled QMDC and Landcare staff to utilise already existing networks in order to make direct contact with landholders in flood affected areas to ascertain details of their situation and what sort of assistance they needed to start a recovery process. Landholders were contacted directly by phone or face to face, with hundreds receiving a listening ear with this followed up with voluntary labour help with clean up and recovery activities.

QMDC supports the commissioning of a public review.

15.0 Integrated planning and building regulations (pp.15-16)

QMDC supports better integration of planning and building regulations and the role governments could play in providing local scale projections of climate change. QMDC's recommends including NRM planning mechanisms as a tool to assist this integration and to inform a risk management approach.

QMDC recognises that successful integrated planning relies on independent and best available science. It is QMDC's expectation that the climate change adaptation will rely on a range of information and sources, for example, Aquatic Conservation Assessment (ACA) data, water monitoring, regional water quality guidelines, environmental and cultural values and impact assessments on communities and their social and economic well-being etc.

QMDC supports the need for bioregional assessments and scientific expertise which takes into account local or regional scale ecological impacts. QMDC believes the development of a threshold limit approach in the functions of all branches of government would provide greater clarity and certainty for the region. State and local government would then be able to advise, for example, the building industry on threshold limits for the region's natural resources, which must be based on local and regional scientific data and research.

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These limits based on environmental values and natural resource asset protection values will help to identify whether a new development or existing industries or businesses can operate without causing unacceptable impacts on those assets within the defined threshold limits. It will then be able to define and provide for: “no go” zones; clear and predetermined standard environmental practices acceptable in the region.

16.0 New approaches to manage climate change risks to existing settlements (p.17)

QMDC supports the use of planning tools that allow governments to estimate the number of people a certain area in Australia may be able to support at a national, state and bio-regional scale. QMDC believes governments and communities need to raise their awareness of what a sustainable balance between people and their local environment is. New assessment tools may provide a methodology to assess resource needs and also determine how best to address climate change risks for existing settlements.

Estimation tools may be utilised to:

- influence urban and rural planning policy at all levels of government
- illustrate system boundaries and physical limits to design proposals
- help local government and communities to more clearly define lifestyle changes necessary to ensure more resilient and sustainable societies in the future.

17.0 Implementing adaptation reforms (p.18)

QMDC agrees with the general comments made by the Draft Report with regards to implementing reforms. QMDC would recommend the Productivity Commission design an action plan to correlate to the legal liabilities and key roles and responsibilities of each level of government and which outlines priority actions, timeframes for those actions and outcomes sought.

18.0 Draft recommendations (pp. 19 -22)

QMDC in general supports the intent of the draft recommendations. QMDC suggests the following changes:

18.1 Draft recommendation 4.1

QMDC would remove the proviso at the end of the recommendation (*where they are likely to deliver net benefits*) and does not necessarily agree with the last bullet point and would therefore remove it from the recommendation.

Reforms to address barriers to effective risk management in the current climate should be implemented without delay.

18.2 Draft recommendation 5.1

Until QMDC has a clear understanding on what a “flexible” economy looks like including who controls and drives that flexibility, we cannot support this recommendation in its current form.



18.3 Draft recommendation 6.1

QMDC would remove the words *where feasible* and replace them with the word *accordingly*.

18.4 Draft recommendation 7.2

QMDC would include in this clause a reference to the Australian Government's responsibility to clarify the legal liability of all level of governments including themselves.

18.5 Draft recommendation 8.1

QMDC would add 3 other bullet points:

- *The carry capacity of land*
- *The threshold limits of a region's natural resource assets*
- *The costs and benefits of different types of ecosystem services*

19.0 Uncertainty and precautionary principle

Uncertainty in the context of climate change is prevalent. The characteristics of an ecosystem: its complexity, scale, dynamics etc. make understanding or prediction of outcomes impossible or highly unreliable. The dynamics, behaviour, and responses to disturbance, disease, habitat destruction, extraction etc are frequently poorly understood. Gauging uncertainty encountered in climate change impacts means ecologically sustainable management of Australia's communities is unlikely ever to become a predictive science. Even where the species or ecosystem in question is well understood, decision-making and management must struggle with uncertainties in the economic, political, social and cultural domains.

When governments refer to "Best available information" what information does it refer to? When there is the option to mitigate or manage an adverse climate change impact on, for example, native revegetation, QMDC's concern is that local or indigenous knowledge and experience which may call for prevention, at all costs, are undermined by commercial interests and promises of national economic gain.

QMDC suggests that the development and application of ecologically sustainable management and associated definitions should be underpinned by a number of guiding principles. These principles if clearly defined and understood would assist a consistent and transparent approach within climate change policy, planning and legislative frameworks. QMDC offers two such principles in this submission as examples. The purpose of these examples is to provide adequate scope to ecologically sustainable management.

"Best available information", for example, can then be recognized as building on:

- *Community based processes*; where, for example, indigenous communities and land care groups and other key community organisations are empowered to direct the scope of the definition on the basis of their specific local knowledge and experience.

- *Best available science*; where definitions and criteria are based on peer reviewed scientific research. The aim of such science would be to produce information from data gathered from each specific region. The collection of this information should be used to understand the potential consequences of actions and not advocate for commercial interests of key stakeholders. QMDC would argue that in order for science, and problems addressed by scientists, to effectively influence decision-making and contribute to “best available knowledge”, the science must also have these attributes (Clark et al. 2002)¹:
 - (i) *Saliency*—whether science is perceived as addressing policy relevant questions
 - (ii) *Credibility*—whether science meets standards of scientific rigour, technical adequacy, and truthfulness
 - (iii) *Legitimacy*—whether science is perceived as fair and politically unbiased

QMDC is concerned that the invocation of the “precautionary principle” in policy has had little substantive impact on, for example, practical sustainable management of Australia’s native vegetation. QMDC suggests that that the precautionary principle must therefore be formulated as an obligation, and linked to specified process or outcome standards developed on a regional basis, with respect to, for instance, specific species, sites or landscapes, or protected areas.

The implementation of precaution within a climate change adaptation framework needs to carefully address and outline the specific objectives of precautionary management and the standards to be aimed for, and find ways to address the interaction of competing interest groups with different values, priorities and objectives.

Application and implementation of the precautionary principle if context-specific will enable specific decisions and management or policy measures to support regional interests and natural resource assets. Applying the precautionary principle should be accompanied by efforts to gather more information and reduce uncertainty, and address uncertainty in management. This relies on a supportive legal, policy, institutional, administrative, procedural and technical framework, where governance problems such as poor enforcement, low capacity, or lack of inter-institutional coordination are overcome. Strategies such as education, training, and investment in enforcement capacity are vital as part of QMDC’s recommendation to the Productivity Commission to formulate an action plan.

In the QMDB, what is important is not the abstract existence or interpretation of the precautionary principle in law, but its implementation in concrete policy and management measures. If the precautionary principle is applied within an integrated management and decision-making framework to address the inter-related environmental, social and economic factor, the definition of the precautionary principle should therefore be expanded to address the above inter-related factors and their management.

¹ Clark, W., R. Mitchell, D. Cash, and F. Alcock. 2002. *Information as Influence: How Institutions Mediate the Impact of Scientific Assessments on Global Environmental Affairs*. John F. Kennedy School of Government, Harvard University, Cambridge, MA.



QMDC asserts that social, economic and political aspects while they must be taken into account, they should not determine whether to make the decision as to whether to apply the precautionary principle. It is important that when these aspects are taken into account in decision-making that the precautionary principle will not be weakened and confused but will be reinforced.

Participation of stakeholders is particularly important in decision-making involving the precautionary principle. In particular, less powerful groups and communities who may be negatively affected by decisions should be involved. Typically in our region, different groups have very different perceptions of the role of the precautionary principle and the level of environmental risk they are willing to take.

Long-term, ecologically sustainable management requires consensus to be established between different groups with different perspectives. This process although it may take a long time, allows precautionary decisions to be based on community empowering processes that facilitate the participation of all stakeholders, and therefore reach more stable and sustainable solutions in the long-term. This participation process should also be reflected as a goal of the Australian Government at both a regional and a national level, where all stakeholders should be involved.

Applying the precautionary principle in our region will sometimes require strict prohibition of activities and development. This is particularly important in situations where urgent measures are required to avert imminent damage, where the potential damage is irreversible, where particularly vulnerable species or ecosystems are concerned, and where other measures are likely to be ineffective. This situation is often the result of a failure to apply more moderate precautionary measures at an early stage. However, QMDC recognizes that the precautionary principle should not be used only in a negative sense, to say “no” to all activities or development.

In the context of management of natural resources, the precautionary principle can lead to effective management of potentially damaging activities, rather than complete prohibitions. The precautionary principle should guide a constructive search for alternatives, practical solutions and opportunities involving all stakeholders.

Natural systems because they are complex dynamic entities means their management must constantly deal with uncertainty and inadequate or incomplete information. It is not always possible to know the outcome of a management decision with any certainty. QMDC supports the promotion of “adaptive management” as one method of managing resources under uncertainty and inadequate or incomplete information, with careful monitoring and feedback. Adaptive management, however, will not be appropriate in every context, as some activities or decisions may lead immediately to serious and/or irreversible impacts. However, it is agreed that in most circumstances of biodiversity conservation, for example, adaptive management is the most appropriate mechanism to implement the precautionary principle.

QMDC suggests that because the precautionary principle often reverses the burden of proof that when considering where the burden of proof lies, the cost of bearing the burden of proof, the costs of management, and liability for the threat of environmental damage should be borne either by the party who is in better circumstances to provide information This will usually be the party in a stronger economic position.

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Where relatively powerful private interests propose potentially damaging activities, they should bear the burden of proof. Where poorer or less powerful groups rely on activities which pose potential risks, it may be inequitable to place the burden of proof on them unless full funding is made available to enable that party to fulfil this obligation.

Even though the precautionary principle may place the burden of proof on one party, all stakeholders have a shared responsibility to act transparently and in good faith in assessing evidence of possible harm. Invoking the precautionary principle to reverse the burden of proof should not be used by some groups to avoid constructive engagement.

QMDC suggest that the Draft Report needs to provide further clarity of these terms and principles. This will provide transparency and certainty for those implementing policy and any relevant legislation and those affected by it.

20.0 Cascade of climate change uncertainties (p.45)

QMDC believes the Productivity Commission needs to provide some clarity on how the Australian Government will address this cascade of uncertainties when, for example, setting priorities for policy reform. Additionally what guidance will the Australian Government provide the state or local governments on how to address the cascade when designing appropriate planning instruments or providing information on local projections of climate change.

In the 2011 report *Decisions Made by Farmers that Relate to Climate Change Publication No. 10/208 Project No. PRJ-004546* the authors noted that there are several emerging studies dealing with the social aspects of farmer adaptation to climate change. The authors consider that considerable efficiencies may be gained through creating a meta-database of these emerging datasets. This would facilitate analysis of a larger sample and variables, to develop a multi-faceted measure of farmers' human adaptive capacity. Understanding the factors that underpin adaptive capacity and addressing social uncertainties, such as farmer decision-making processes is critical, particularly in contexts such as climate change, where farmers and landholders face unique pressures.

21.0 Environmental services (p.212)

QMDC supports the key points raised in this section of the Draft Report. QMDC believes further research needs to conduct to explore issues relevant to the concept of payment for ecosystems services and how or even should a fiscal value be placed on ecosystem services, for example, what could the value be for landholders protecting areas of native vegetation for carbon sequestration and biodiversity benefits. These sorts of services would potentially help farmers to deal with the impacts of drought and take some of the variability out of farm incomes. Sequestering carbon is also a mitigating action.