# Climate change adaptation planning and cross-sectoral policy coherence in southern Africa

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## Abstract

The post-2015 development agenda requires policy coherence, where achievement of development goals in one sector does not undermine the achievement of the goals of another. It also recognises that cross-cutting issues like adaptation to climate change need to be mainstreamed across multiple sectors. This paper presents a policy analysis using the cases of Malawi, Tanzania and Zambia. It analyses the water management and agricultural strategies and approaches identified in a variety of policies and plans. These include national sector policies for water and agriculture, National Development Plans, and climate change policies and strategies, including National Adaptation Programmes of Action and the Intended Nationally Determined Contributions submitted prior to the 2015 United Nations Framework Convention on Climate Change Conference of the Parties. It assesses the extent to which policies are coherent with one another with regard to their treatment of climate change adaptation using Qualitative Document Analysis. Findings identify that sector policies show some degree of cross-thematic coherence, in particular around their acknowledgement of the importance to address disaster management of floods and droughts. However, policy statements are typified by a relative lack of recognition of the need to develop supporting instruments and strategies that address climate adaptation needs over longer timeframes. Climate change policies explicitly call for significant investment in adaptation from the international community. Where coherence between sector and climate policies and strategies is strongest, the more recent climate policies largely repackage existing sectoral policy statements. These findings can be understood in the context of the uncertainty of climate change impacts for the longer term (for which a wider variety of adaptations are identified), alongside more event-driven disaster management planning where the impacts are more immediate and obviously evident. This prioritisation is also linked to development needs and the short-term nature of political cycles and economic gain. For climate-resilient policy decision-making to make further headway, we argue that governments need to embrace cross-sectoral planning more pro-actively in order to foster greater policy coherence and to deliver more climate resilient agriculture and water management.

## Introduction

Development in southern Africa is occurring against a backdrop of climate change threats and enhanced climate variability (IPCC, 2014; Brown *et al*., 2011). This makes careful adaptation planning imperative, especially as climate change is predicted to exacerbate food insecurity, alter the temporal and spatial distribution of rainfall (and hence water availability) and increase the severity of droughts and flooding. All of these impacts are taking place alongside rapid social, economic and demographic transitions (Ford *et al*., 2015), amidst a paucity of reliable climate information (Jones *et al*., 2015) and uncertainties about the timing of impacts and their spatial distribution (Davis, 2011; Abson *et al*., 2012). This combination of issues creates a challenging context for adaptation planning across government departments and ministries (Stringer *et al*., 2014).

Adaptation can be defined as "*adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities*" (IPCC, 2014). Historically in the international policy framework around climate change, the United Nations Framework Convention on Climate Change (UNFCCC), adaptation has been neglected at the expense of mitigation. Recent efforts have attempted to redress this imbalance (e.g. Cancun Adaptation Framework in 2010). However the 2015 Paris Agreement mentions adaptation only fleetingly, with, for example, Article 7 calling for adaptation

efforts to be enhanced and for Parties to integrate adaptation into relevant socio-economic and environmental policies and actions. In this paper we take the need to integrate climate change adaptation into policies across sectors as our starting point, focusing specifically on countries in southern Africa. We concentrate our analysis on planned adaptation, defined by the IPCC (2014) as "*adaptation that is the result of a deliberate policy decision, based on an awareness that conditions have changed or are about to change and that action is required to return to, maintain, or achieve a desired state*" (ibid:1758).

Effective adaptation planning is needed across all sectors in such a way that recognises sectoral interdependencies and relative country entry points (Conway *et al.,* 2015, Conway and Mustelin, 2014). Indeed, the post-2015 development agenda recognises the complexities associated with the prevailing sectoral approach to policymaking and emphasises the importance of policy coherence in addressing cross-cutting challenges such as climate change (Kalaba *et al*., 2014; OECD, 2015). Policy coherence has been defined as "*the systematic promotion of mutually reinforcing policy actions across government departments and agencies creating synergies towards achieving the agreed objectives*" (OECD, 2015). Analyses of coherence are important to identify where policies in different sectors are horizontally supporting or conflicting with one another, as well as the ways in which they are aligned vertically with national commitments to international agreements (Chasek, 2010; Chandra and Idrisova, 2011). Coherent policy approaches can lead to more efficiency and reduce competition for the same budgets and resources (Akhtar-Schuster *et al*., 2011).

Policy studies within the European Union have identified the importance of strengthening partnerships and collaboration to manage the impacts of climate change as well as developing an appropriate institutional context and supporting policy instruments (Massey *et al.*, 2014; Biesbroek *et al.*, 2010). The need to build such policy activities upon cross-sector dialogue and actions has been recognised by the establishment of inter-ministerial climate change task forces in countries such as Malawi, Zambia and Zimbabwe (Stringer *et al*., 2014). Nevertheless, despite demands that policymakers develop more joined-up approaches that mainstream climate change adaptation concerns in a coherent fashion, analyses are lacking regarding the extent to which this is happening at the national level in southern Africa.

In this paper we present the initial findings emerging from a Qualitative Document Analysis (QDA) of water and agriculture sector policies, as well as National Development Plans (NDPs) and climate change policies and strategies, from three countries in southern Africa, in order to assess coherence in climate change adaptation efforts. We first identify whether climate change adaptation features in sector policies as this is an important first step in moving towards coherence and we elucidate the adaptation approaches intended to be used. We then assess the consistency of approaches across sectors and their coherence with NDPs and climate change adaptation efforts. We focus specifically on water and agriculture sectors due to their sensitivity to climate impacts and because agriculture contributes to around 20 % of the southern Africa region's GDP (SADC, 2012). We hypothesise that sectoral policies and NDPs will show some coherence with each other. This is because NDPs provide an overarching framework and trajectory for a country's development, with policies developed during an NDP's operation following similar approaches and priorities therein. Nevertheless we expect coherence is likely to be greater between sector policies and climate change policies and strategies because sector policies are likely to pre-date the other documents given the evolution of adaptation policy obligations to the international climate governance arena. We nevertheless anticipate that climate considerations will feature in sector policies due to the climate–sensitive nature of the sectors under analysis and expect to see reference made to climate variability and shocks such as floods and droughts, even if adaptation does not always feature substantively.

**Research design and methodology**

Our research design employed QDA to systematically assess a sample of documents from the sectors of interest in order to ascertain: a) whether adaptation was being considered or not; and b) how it was being treated and whether climate change adaptation statements were coherent with the other documents in the sample. QDA is often utilised to facilitate impartial analysis of written documents, including policies (e.g. Altheide *et , al*., 2008; Wesley, 2011) and provides an approach that considers both the meaning and implications of text. It requires the use of subjective scoring but follows several steps to improve rigour and consistency, including: a) setting criteria for the selection of documents; b) obtaining documents; c) analysis of documents; d) validation; e) finalisation (Altheide *et al*., 2008). In this paper we report our preliminary findings

emerging from steps a) to c) only, as validation through expert interviews with policymakers in each country is still underway at the time of writing.

In setting the boundaries of the study and the criteria for the selection of documents (step a), our sample considered official government documents only, within the geographical area of the Southern Africa Development Community (SADC). Within the SADC region, we focused on three countries that form the focus of analysis in the wider projects in which the work reported here is situated: Malawi, Tanzania and Zambia. Our document sample included published and publically available draft versions of national water and agriculture sector policies, as well as action plans and strategies for national development. With regard to national climate change documentation, drafts and/or final versions of National Adaptation Plans of Action (NAPAs), National Climate Change Policies or Strategies (NCCPs) and the recent Intended Nationally Determined Contributions (INDCs) were included. The full selection of documents is presented in Table 1 . To obtain the documents (step b) we searched national government and other websites.

**Table 1: Documents forming the sample for QDA**

| Policy document / Country | Malawi | Tanzania | Zambia |
|---|---|---|---|
| **Water Policy** | National Water Policy. 2005 (GoM, 2005) | National Water policy. 2002 (GoT, 2002) | National Water Policy. 1994 (GoZ, 1994). |
| **Agricultural policy** | National Agricultural Policy. 2011 (GoM, 2011a) | National Agricultural Policy. 2013 (GoT, 2013) | National Agricultural Policy. 2004 (GoZ, 2004) |
| **National Development Plans (NDP)** | Malawi Growth and Development Strategy, 2011-2016. 2011 (GoM, 2011b) | Tanzania Development Vision 2025 (GoT, 1999) | Sixth National Development Plan, 2011-2015. 2011 (GoZ, 2011) |
| **Climate Change policy** | Draft of National Climate Change Policy. 2012 (GoM, 2012) | National Climate Change Strategy. 2012 (GoT, 2012) | National Climate Change Response Strategy 2010. (GoZ, 2010) |
| **National Adaptation Action Plan (NAPA)** | Malawi's National Adaptation Programme of Action. First Edition. 2006 (GoM, 2006) | National Adaptation Programme of Action, 2007 (GoT, 2007) | National Adaptation Programme of Action, Final Report. 2007 (GoZ, 2007) |
| **Intended Nationally Determined Contribution (INDC)** | Intended Nationally Determined Contribution. 2015 (GoM, 2015) | Intended Nationally Determined Contribution. 2015 (GoT, 2015) | Intended Nationally Determined Contribution to the 2015 Agreement on Climate Change. 2015 (GoZ, 2015) |

To analyse the documents (step c), they were first read in detail, looking for the presence of the word 'adaptation' and identifying keywords that described the specific approaches proposed within the policies. Initially, searches began with basic terms such as "water", "agriculture" and "climate change adaptation". As approaches to water and agricultural adaptations were identified, attention turned to the wider discursive context in which those words were found. Detailed readings of these sections of the policies led to identification of further keywords (e.g. "irrigation", "drought") which guided the more in-depth analysis of particular parts of each document where keywords were located. The keywords and approaches were grouped together, and in synthesised form were entered into tables for each of the three countries.

Counts and totals of the presence of each approach in national tables were used as an indication of the priorities of government intentions and provided a useful addition to the QDA. The dates of policies were also recorded to enable a chronology to be developed, allowing us to unravel how climate change adaptation planning has evolved through time within the sample.

To analyse coherence across the documents, a scoring system was developed, building on previous work by Le Gouais and Wach (2013) (Table 2). This used the keywords identified in the previous step as building blocks in which to anchor the analysis. Assessments of coherence were also supported by content analysis of quotations from the documents based on the keyword searches in order to ensure an auditable rationale to support each assessment. Steps d) and e) (validation and finalisation) are being undertaken in the coming months and will

involve expert interviews with policymakers working in each of the study sectors in all three study countries. This will take place in conjunction with an analysis of their wider political economy.

**Table 2: Scoring criteria to assess coherence** (adapted from Le Gouais and Wach, 2013)

| Type of coherence | Description of coherence | Score |
|---|---|---|
| **High coherence** | The policy aligns strongly across water, agriculture and climate change statements. Policy devotes specific attention to both water and agriculture inter-sector alignment and in relation to climate change adaptation. It includes numerous and detailed complementary activities (including projects) for achieving that. | 3 |
| **Partial coherence** | Although the policy supports both water and agriculture inter sector alignment and in relation to climate change adaptation (particular in the form of general statements), it is less clear and distinct how it could be achieved. Relatively fewer details and activities are included within the policy. | 2 |
| **Limited coherence** | The policy supports water and agriculture inter-sector alignment and/or in relation to climate change adaptation. Lack of relative details in terms of activities and plans. | 1 |
| **No coherence** | There is no evidence in the policy to suggest that sectoral statements are co-ordinated and/or aligned. | 0 |

## Results

In this section we present initial findings from the QDA, based on the first three steps (a-c). We provide insights into the presence/absence of adaptation within the policy documents and highlight the national climate change adaptation priorities for water and agriculture that emerged from the keyword analysis. Next, we present the coherence findings.

Adaptation was not specifically mentioned in any of the water policies in the three study countries. It nevertheless appears in the agriculture policies of Malawi and Tanzania. For example, Malawi's Agricultural Policy notes that: "*Since Malawi has a low economic capacity to cope with climate change, the policy therefore seeks to urgently implement adaptation and mitigation interventions to minimize future adverse effects of climate change on agriculture*" (GoM, 2011:20). Tanzania's agricultural policy states that: "*The Government in collaboration with other stakeholders shall strive to improve adaptation measures to climate change effects and deal with all the risks involved*" (GoT, 2013:29). Yet, adaptation does not feature in the agriculture policy of Zambia, which was developed earlier than in the other two countries (2004, as opposed to 2011 in Malawi and 2013 in Tanzania- see Table 1 for the chronology of policy development). Conversely, adaptation is included in several places in Malawi and Zambia's NDPs (both 2009), but not in Tanzania's development vision up to 2025 (developed in 1999 – the earliest policy included in the sample). While the international emphasis on adaptation has grown substantially since 1999, inclusion of adaptation in the later sector policies indicates that it is starting to become mainstreamed. Inclusion is an important first step in the quest for policy coherence (Mickwitz and Kivimaa, 2007).

While adaptation was not specifically mentioned in some of the agriculture and water sector policies, climate change is nevertheless recognised. For example, Malawi's Water and Agriculture policies acknowledge climate change. The Agriculture Policy notes that: "*Malawi is vulnerable to the effects of climate change because of its reliance on rain-fed agriculture. The extreme weather events such as drought and floods have resulted in poor crop yields or total crop failure"* (GoM, 2011:20). Malawi's NDP emphasises the importance of "*mainstreaming climate change adaptation aimed at protecting water and sanitation infrastructure against damages and safeguarding communities against flooding, disease outbreaks and water scarcity during events of heavy precipitation and droughts"* (GoM, 2011:103). Malawi's agriculture policy was finalised after the NAPA in 2011, whereas the water policy preceded the NAPA by a year, so the timings of policy review cycles appear to play a significant role in shaping the policy treatment of adaptation and climate change, and by extension, the level of policy coherence. Similarly, in Tanzania, the agriculture policy published in 2013 recognised climate change impacts, while the water policy, published in 2003 did not.

A large and diverse range of water and agriculture adaptation approaches were identified in the documents for each of the three case study countries (Tables 3 and 4). The majority of the approaches that were first detailed in water and agriculture sectoral policies are mentioned by subsequent climate change documents (NAPA, NCCP and INDCs) as well as the NDPs. As above, an exception to this is Tanzania's NDP, published in 1999 before the water and agricultural policies. NDPs generally tackle climate change and variability less well than the suite of climate change policies, but in most cases, consider climate challenges to a similar degree as the sectoral water and agricultural policies. While the approaches identified constitute policy adaptations in that they recognise that climate conditions are dynamic and that actions are required to attain a desired state, whether adaptations are specifically to climate change or also to broader economic, political, social and environmental changes is still to be established through the validation exercise (step d).

Water and agriculture management approaches that could represent policy adaptations cover both extreme weather events (such as floods and droughts) and longer term climate change trends, through e.g. improved water management, considering projections of drier future climates (IPCC, 2014). We noted that overall the approaches were rather conservative and incremental rather than supporting adaptation as transformation (see Pelling et al., 2015). Longer term approaches were found to be more diverse but approaches that we considered as more event-driven, and with more obvious potential immediate implications, were most commonly mentioned, with risk and disaster management featuring frequently in both agriculture and water facing adaptations. The most frequently mentioned water management approaches across the three study countries include disaster management for floods and droughts, water conservation, groundwater management and rainwater harvesting. Examples of longer term adaptations relating to water include integrated water resources management, improving coverage and access to urban and domestic water supply, increasing reservoir water storage and enhancing hydropower generation capacity (Table 3).

**Table 3: Summary and counts of the approaches to water related adaptation in the documents analysed**

| Thematic focus | Total count in the six documents |
|---|---|
| Disaster management for floods and droughts, early warning systems | 12 |
| Water conservation, recycling/re-use | 11 |
| Groundwater management and recharge | 8 |
| Community-based projects for domestic water supply | 5 |
| Rainwater harvesting | 12 |
| Integrated Water Resources Management | 11 |
| Improve coverage and access of urban and rural domestic water supply | 9 |
| Increase water storage (medium/large reservoirs) | 9 |
| Enhance hydropower | 8 |
| Irrigation efficiency, improved drainage | 7 |
| Water quality and pollution reduction | 7 |
| Equitable allocation between water sectors | 6 |
| Hydrological monitoring, assessment and data management | 6 |
| Conserve wetlands | 6 |
| Inter-basin transfers | 5 |
| Improve efficiency across sectors (agriculture, urban, industry) | 5 |
| Enforce water regulations and laws | 4 |
| Decentralisation of decision making process, greater participation of water users | 3 |
| Operation and maintenance of irrigation and domestic water supply | 3 |
| Promote greater cooperation between ministries/departments | 3 |
| Technological improvements in water delivery and monitoring | 2 |
| Water pricing | 2 |
| Environmental Impact Assessment for water projects | 1 |
| Improve government capacity to understand and plan for climate change impacts | 1 |

The most frequently mentioned approaches for agriculture include food and nutrition security, livestock management, risk management including early warning systems for crops, food and seed storage systems and

the appropriate use of fertilizers and pesticides. Examples of longer term adaptations in the agricultural sector include soil and crop research, the use of appropriate technology and irrigation development (Table 4).

**Table 4: Summary and counts of the approaches to agriculture related adaptation in the documents analysed**

| Thematic focus | Total count in the six documents |
|---|---|
| Livestock production, health, diversification | 12 |
| Risk management including early warning systems | 11 |
| Food and seed storage systems | 8 |
| Appropriate use and access to fertilisers and pesticides | 7 |
| Agricultural extension services | 6 |
| Access to credit for farmers and crop insurance | 5 |
| Information services | 4 |
| Mechanisation | 2 |
| Food and nutrition security | 13 |
| Soil and crop research | 10 |
| Appropriate technology | 9 |
| Irrigation development | 8 |
| Seeds – drought resistant | 7 |
| Diversification of crops | 7 |
| Farmer training | 6 |
| Market access and liberalisation of trade policies | 6 |
| Farmers organisations and cooperatives | 5 |
| Crop resistance against diseases and pests | 4 |
| Increase crop production and efficiency | 4 |
| Foreign investment and private sector involvement | 4 |
| Diversification of agricultural products | 4 |
| Bio-technology and biosafety | 3 |
| Crop information/data collection and dissemination | 3 |

Analysis of climate change documents revealed repeated concerns about an increase in the frequency and incidence of floods and droughts. This was particularly apparent in the INDCs. For example, Zambia's INDC states that the country is "*highly vulnerable country to the adverse impacts of climate change especially droughts and floods"* (GoZ, 2015:7). Tanzania's INDC notes that *"Currently more than 70% of all natural disasters in Tanzania are climate change related and are linked to recurrent droughts and floods"* (GoT, 2015:3), while Malawi's INDC says that the: *"Major climate related hazards that wreak havoc in the country are floods and droughts"* (GoM, 2015:1). Similarly, the NAPAs and NCCPs/strategies of all three countries single out the importance of managing floods and droughts. Zambia's NAPA notes that: "*The critical economic sectors are extremely vulnerable to adverse effects of climate change as induced by global warming. Droughts, floods and to some extent extreme temperatures are the key climatic hazards in Zambia"* (GoZ, 2007:9). A range of water and agriculture management approaches are advocated to manage these climate impacts, but particularly focus is placed on disaster management, including the development of early warning systems for floods and droughts that help to strengthen national and local water and food security. This reinforces the findings from the agriculture and water sector policy analysis and the emphasis within those documents (Tables 3 and 4).

The NAPAs include both detailed single-sector and cross-integrated water and agriculture approaches as potential adaptations to climate change, noting specific projects and activities with a prioritisation and ranking. Malawi's NAPA also mentions numerous water and agriculture approaches within the Lower Shire River Basin set out as a priority. It highlights the vulnerability of rainfed agriculture to climate change impacts and calls for increasing resilience of agriculture to cope with future droughts: "*Malawi relies on rain-fed agriculture, and the current droughts have resulted in poor crop yields or total crop failure, leading to serious food shortages, hunger and malnutrition"* (GoM, 2010:x).

The NCCPs and strategies detail potential climate change impacts and vulnerability across sectors, including various water and agriculture approaches as potential adaptations. However, they generally lack the project

details and prioritisations found in the NAPAs and they also fail to make explicit inter-sector linkages between water and agriculture for climate change adaptation. The INDCs acknowledge the potential vulnerability to and impacts of climate change but they include relatively fewer water and agriculture approaches as potential adaptations than the NAPAs. They also mention fewer inter-linkages between these sectors, as well as providing less detail on project activities.

Results of the analysis that examined the coherence of policies relative to each other with respect to water, agriculture and climate change adaption are presented in Table 5 using the scoring system outlined in Table 2.

**Table 5: Coherence of documents relative to each other** (3=high coherence; 2=Partial coherence; 1=Limited coherence; 0=No coherence)

| | Water Policy | Agriculture Policy | National Development Plans | National Climate Change Policy | National Adaptation Programmes of Action | Intended Nationally Determined Contribution | Total |
|---|---|---|---|---|---|---|---|
| **Malawi** | | | | | | | |
| Water Policy (2002) | | 2 | 1 | 1 | 2 | 1 | 7 |
| Agriculture Policy (2011) | 2 | | 2 | 2 | 2 | 2 | 10 |
| National Development Plans (2011) | 1 | 2 | | 2 | 2 | 1 | 7 |
| National Climate Change Policy (2012) | 1 | 2 | 2 | | 2 | 1 | 8 |
| National Adaptation Programme of Action (2006) | 2 | 2 | 2 | 2 | | 2 | 10 |
| Intended Nationally Determined Contribution (2015) | 1 | 2 | 1 | 1 | 2 | | 7 |
| **Total coherence scores** | 7 | 10 | 7 | 8 | 10 | 7 | **49** |
| **Tanzania** | | | | | | | |
| Water Policy (2012) | | 1 | 1 | 2 | 2 | 1 | 7 |
| Agriculture Policy (2013) | 1 | | 1 | 2 | 2 | 1 | 7 |
| National Development Plan (1999) | 1 | 1 | | 1 | 2 | 1 | 6 |
| National Climate Change Strategy (2012) | 2 | 2 | 1 | | 2 | 2 | 9 |
| National Adaptation Programme of Action (2007) | 2 | 2 | 2 | 2 | | 2 | 10 |
| Intended Nationally Determined Contribution (2015) | 1 | 1 | 1 | 2 | 2 | | 7 |
| **Total coherence scores** | 7 | 7 | 6 | 9 | 10 | 7 | **46** |
| **Zambia** | | | | | | | |
| Water Policy (1994) | | 2 | 2 | 2 | 2 | 2 | 10 |
| Agriculture Policy (2004) | 2 | | 2 | 2 | 2 | 2 | 10 |
| National Development Plan (2011) | 2 | 2 | | 2 | 2 | 2 | 10 |
| National Climate Change Strategy (2011) | 2 | 2 | 2 | | 2 | 2 | 10 |
| National Adaptation Programme of Action (2010) | 2 | 2 | 2 | 2 | | 2 | 10 |
| Intended Nationally Determined Contribution (2015) | 2 | 2 | 2 | 2 | 2 | | 10 |
| **Total coherence scores** | 10 | 10 | 10 | 10 | 10 | 10 | **60** |

In terms of the total coherence scores the six documents for each of the three case study countries, Zambia's are the most coherent with the largest number of '2s' and a total score of 60 out of a possible 90, followed by Malawi with a total score of 49, and finally Tanzania with a score of 46.

Results indicate that the NAPAs are generally the most coherent with respect to the other documents examined. For example, Tanzania's NAPA and National Climate Change Strategy both recognise vulnerability of climate change impacts, with the Strategy referring to the previously released NAPA: "*Tanzania's NAPA ranked agriculture and food security as the most vulnerable and important sector that is severely impacted by climate change and advocated that studies on the impact of climate change in the sector and on food security be a priority activity"* (GoT, 2012:27). Both policies highlight the likelihood of an increase in the severity and

frequency of droughts and floods, including numerous water and agriculture management approaches as potential adaptation, as well as the importance of disaster management. Both documents also explicitly acknowledge the inter-linkages between water and agriculture, as illustrated by the National Climate Change Strategy: "*Severe droughts are increasingly being felt in many parts of the country with negative consequences on, among others, food production and water scarcity"* (GoT, 2012:6).

Overall, our findings suggest that despite some progress, climate change adaptation is not well integrated into sector policies. Policy coherence can still be substantially improved to enhance consistency and foster synergies. While taking a chronological view, the scores appear to reflect increasing policy coherence, particularly relating to the later policies. The next steps of the research, via the national expert panel validation process, will be invaluable in providing greater depth of explanation, as well as helping us to confirm the factors that reduce and enhance coherence.

**Discussion**

Coherence is vital if those groups targeted by the policies are to receive non-conflicting signals from different sectors, and thus for adaptation to be mainstreamed (Heinrich Böll Stiftung, 2014). While our analysis did not reveal any major conflicts between the sector policies examined (as is sometimes the case when trade-offs need to be managed between e.g. energy and water sectors (Hussey and Pittock, 2012)), considerable scope remains to develop a more mutually supportive policy mix across sectors if win-win situations are to be harnessed.

Several factors might explain the lack of coherence and these will be explored in the validation process. For example, reliance on external consultants to develop some of the policy documents can reduce opportunities for consultation across sectors and therefore mean that opportunities for greater coherence are missed. This is often the case for those documents required as part of a country's commitments to international conventions, such as the NAPAs and INDCs within the UNFCCC, because the time pressure for their completion can reduce the time available for comprehensive consultation. This also suggests policy coordination preparedness may be lacking across the study countries and needs to be strengthened to allow greater support to cross-sectoral planning (Stringer *et al*., 2012). Timing is also an issue. Policies often remain in draft form for so long before they are adopted that they can be outdated in relation to dominant paradigms before they have been approved, let alone begun to be implemented. Lack of funding can also cause policy reviews to become long over-due.

As noted in the introduction, we would not necessarily expect coherence between old sector policies and new climate change policies. Confirming our expectations, the NAPAs and NCCPs/strategies were found to be relatively the most coherent with regards to water, agriculture and climate change adaptation. The majority of the water and agriculture sector policies failed to explicitly include consideration of climate change vulnerabilities, impacts and potential adaptations. These documents were created before the policy development process was sensitised to climate change vulnerability and impacts, with the first climate change oriented documents being the NAPAs. Chronological analysis combined with the keyword analysis further indicates that sectoral policies have been viewed as a valuable a basis for developing climate change strategies, policies and actions. However, where coherence between sector and climate policies and strategies are strongest, it appears that more recently published climate policies are largely repackaging existing sectoral policy statements. Other commentators have made similar observations previously for countries such as China (e.g. Hallding *et al*., 2009). Such repackaging seems to be happening in the absence of learning and critical evaluation of the success and appropriateness of sector policy efforts, and does little to channel attention towards mainstreaming climate change adaptation across sectors in a coherent and integrated way. While we have grounded our analysis in the assumption that coherence is inherently desirable, limiting later climate change policies to dominant approaches found in earlier sectoral policies to improve coherence is not necessarily useful, and this has not yet been fully explored in our analysis.

Our findings identify that water and agriculture sector as well as climate change orientated policies and strategies show greatest cross-thematic coherence around disaster management and planning, particularly linked to flooding and droughts. Such a focus permits the uncertainty associated with climate change impacts to be used to justify reactive rather than pro-active responses. Some of the policy documents in our sample considered a wide range of approaches that could be considered long-term investments, such as integrated

water management and efforts to increase crop production efficiency. However, these intentions require further support in the way of new policy instruments, alongside the development of financial and economic mechanisms at both international and national levels that can help to create an overall enabling environment (Akhtar-Schuster et al., 2011). This requires reconciliation between policy statements that target the long term and both the short-term nature of electoral cycles and the need for short- as well as long-term economic gains.

The climate change policies and strategies explicitly call for significant investment in adapting to climate change, often from the international community, without linking into national development plans / spending priorities within the Ministry of Finance / Economic Development. This suggests that greater awareness is needed of the economic context of adaptation if it is to be adequately supported. We note that all of the documents in our analysis presented climate change adaptation as a challenge rather than an opportunity for development and there was little evidence that social and cultural contexts and the vast wealth of indigenous knowledge in the region were considered. This supports findings from research elsewhere in the SADC region (e.g. Stringer et al., 2009).

**Preliminary conclusions**

Overall, our analysis suggests that horizontal climate governance at the national level has some way to go before policies in southern Africa present a coherent approach to adaptation. Taking a step back and looking vertically, the Paris Agreement and the post-2015 development agenda spearheaded by opportunities linked to the Sustainable Development Goals should provide useful entry points for southern African countries. At minimum, they can use these international processes to begin to leverage the necessary resourcing and financial support to further update their policies, improve their adaptation mainstreaming and enhance cross-sectoral policy coherence. Subsequently, the challenge becomes one of policy implementation, in which a range of technical, institutional, economic and political dimensions affected by a wider governance issues need to be understood and negotiated. It is anticipated that insight into implementation challenges will emerge through both the validation exercise in the later steps of our analysis, and through analyses of the political economy of the study countries.

**References**


Abson, D. J., Dougill, A. J., Stringer, L. C. (2012). Using Principal Component Analysis for information-rich socio-ecological vulnerability mapping in Southern Africa. *Applied Geography, 35*, 1-2, 515-524.

Akhtar-Schuster, M., Thomas, R. J., Stringer, L.C., Chasek, P, Seely, M. K. (2011) Improving the enabling environment to combat land degradation: institutional, financial, legal and science-policy challenges and solutions, *Land Degradation and Development*, 22, 299-312

Altheide, D., Coyle, M., DeVriese, K., Schneider, C. (2008). Emergent qualitative document analysis. *Handbook of emergent methods*, 127-151.

Biesbroek, R., Swart, R.J., Carter, T., Timothy, R. (2010). Europe adapts to climate change: comparing national adaptation strategies. *Global Environmental Change*, 20, 3, 440-450.

Chandra, A., Idrisova, A. (2011). Convention on Biological Diversity: a review of national challenges and opportunities for implementation. *Biodiversity and Conservation,* 20**,** 3295-3316.

Chasek, P.S. (2010). Confronting environmental treaty implementation challenges in the Pacific Islands. East-West Centre, Honolulu.

Conway, D., Archer van Garderen, E., Deryng, D., Dorling, S., Krueger, T., Landman, W., Lankford, B., Lebek, K., Osborn, T., Ringler, C., Thurlow, J., Zhu, T., Dalin, C. (2015). Climate and southern Africa's water-energy-food nexus. *Nature Climate Change*, 5, 837-846.

Conway, D. Mustelin, J. (2014). Strategies for improving adaptation practice in developing countries. *Nature Climate Change*, 4, 339-342.

Davis, C. (2011). Climate Risk and Vulnerability: a handbook for southern Africa. Pretoria, South Africa: Council for Scientific and Industrial Research.

Ford, J.D., Berrang-Ford, L., Bunce, A., McKay, C., Irwin, M., Pearce, T. (2015). The status of climate change adaptation in Africa and Asia. *Regional Environmental Change*, 15, 5, 801-814.

GoM, (2015). Intended Nationally Determined Contribution of Malawi. Government of Malawi.

GoM, (2012). Draft of the National Climate Change Policy. Government of Malawi.

GoM, (2011a). National Agriculture Policy. Government of Malawi.

GoM, (2011b). Malawi Growth and Development Strategy, 2011-2016. Government of Malawi

GoM, (2006). Malawi's National Adaptation Programme of Action. First Edition. Government of Malawi.

GoM, (2005). National Water Policy. Government of Malawi.
GoT, (2015). Intended Nationally Determined Contribution. Government of Tanzania
GoT, (2013). National Agricultural Policy. Government of Tanzania
GoT, (2012a). Tanzania Development Vision 2025. Government of Tanzania
GoT, (2012b). National Climate Change Strategy. Government of Tanzania
GoT, (2007). National Adaptation Programme of Action. Government of Tanzania
GoT, (2002). National Water Policy. Government of Tanzania
GoZ, (2015). Intended Nationally Determined Contribution to the 2015 Agreement on Climate Change. Government of Zambia.
GoZ, (2011). Sixth National Development Plan, 2011-2015. Government of Zambia.
GoZ, (2010). National Climate Change Response Strategy. Government of Zambia.
GoZ, (2007). National Adaptation Programme of Action, Final Report. Government of Zambia.
GoZ, (2004). National Agricultural Policy. Government of Zambia.
GoZ, (1994). National Water Policy. Government of Zambia.
Hallding, K., Han, G., Olsson, M. (2009), China's Climate- and Energy-security Dilemma: Shaping a New Path of Economic Growth, *Journal of Current Chinese Affairs*, 38, 3, 119-134.
Heinrich Böll Stiftung, (2014) Policy coherence in tackling climate change in Africa. Factsheet 2. Available online: https://za.boell.org/2014/04/08/climate-change-governance-fact-sheets [accessed 24.04.2016]
Hussey, K., Pittock J. (2012). The Energy–Water Nexus: Managing the Links between Energy and Water for a Sustainable Future. *Ecology and Society*, 17, 1, 31. http://dx.doi.org/10.5751/ES-04641-170131
IPCC, (2014) *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Field, C.B., V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastrandrea, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea,, L.L. White (eds.)]. Cambridge University Press, Cambridge, United Kingdom.
Jones, L., Dougill, A.J., Jones, R., Steynor, A., Watkiss, P., Kane, C., Koelle, B., Moufouma-Okia, W., Padgham, J., Ranger, N., Roux, J-P., Suarez, P., Tanner, T., Vincent, K. (2015). Ensuring climate information guides long-term development. *Nature Climate Change,* 5, 812-814.
Kalaba, F.K., Quinn, C.H., Dougill, A.J. (2014). Policy coherence and interplay between Zambia's forestry, energy, agricultural and climate change policies and multilateral environmental agreements. *International Environmental Agreements: Politics, Law and Economics, 14(2), 181-198*.
Le Gouais, A., Wach, E. (2013). A qualitative analysis of rural water sector policy documents. *Water Alternatives*, 6(3), 439-461.
Massey, E., Biesbroek, R., Huitema, D. (2014). *Global Environmental Change-Human and Policy Dimensions,* 29, 434-443.
Mickwitz P., Kivimaa P. (2007). Evaluating Policy Integration – The Case of Policies for Environmentally Friendlier Technological Innovations, *Evaluation* 13, 1, 68–86.
Pelling, M., O'Brien, K., Matyas, D. (2015). Adaptation and transformation. Climatic Change 133, 1, 113-127
SADC (Southern Africa Development Community) 2012. *SADC Facts and Figures.* Online: http://www.sadc.int/about-sadc/overview/sadc-facts-figures/ [accessed 23 April 2016]
Stringer, L. C., Dyer, J., Reed, M. S., Dougill, A. J., Twyman, C., Mkwambisi, D. D. (2009). Adaptations to climate change, drought and desertification: insights to enhance policy in southern Africa, *Environmental Science and Policy*, 12, 748-765.
Stringer, L. C., Dougill, A. J., Mkwambisi, D. D., Dyer, J. C., Kalaba, F. K., Mngoli, M. (2012). Challenges and opportunities for carbon management in Malawi and Zambia, *Carbon Management*, 3, 159-173. doi: 10.4155/cmt.12.14
Stringer, L.C., Dougill, A.J., Dyer, J.C., Vincent, K., Fritzsche, F., Leventon, J., Falcao, M.P., Manyakaidze, P., Syampungani, S., Powell, P., Kalaba, G., (2014). Advancing climate compatible development: lessons from southern Africa, *Regional Environmental Change* 14, 2, 713-725.