



Exploring the Impact of Climate Change on Children in South Africa



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A photograph of three children walking away from the camera through a dry, grassy field. The child in the foreground is wearing a light blue and white hoodie and jeans. The child in the middle is wearing a brown jacket and shorts, carrying a large backpack. The child in the background is wearing an orange shirt. The background shows a hazy landscape with some buildings and hills under a bright sky.

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Abbreviations

AIDS	Acquired Immune Deficiency Syndrome
ANC	African National Congress
AR3	Third Assessment Report
AR4	Fourth Assessment Report
COP17	17th Conference of the Parties
CSG	Child Support Grant
DAERD	Department of Agriculture, Environmental Affairs and Rural Development
DALY	Disability Adjusted Life Year
DBSA	Development Bank of Southern Africa
DoEA	Department of Environmental Affairs
DOST	Department of Science and Technology
ENSO	El Niño Southern Oscillation
FGD	Focus Group Discussion
FOSAD	Forum of South African Director Generals
GCM	Global Circulation Model
GHG	Greenhouse Gas
GIZ	German Agency for International Cooperation
GIRRL	Girls in Risk Reduction Leadership
HAS	Headline Adaptation Strategy
HIV	Human Immunodeficiency Virus
IDASA	Institute for Development in South Africa
IDP	Integrated Development Plan
IDS	Institute of Development Studies
IFRC	International Federation of the Red Cross and Red Crescent
IGCCC	Intergovernmental Committee on Climate Change
ILO	International Labour Organization
IPCC	Intergovernmental Panel on Climate Change
IRIN	Integrated Regional Information Networks
ISS	Institute for Security Studies
LTMS	Long-term Mitigation Scenario
MCCP	Municipal Climate Change Programme
MDG	Millennium Development Goal
MIROC	Model for Interdisciplinary Research on Climate
NCCC	National Climate Change Committee
NCCRS	National Climate Response Strategy for South Africa
NGO	Non-governmental Organisation
NPU	National Population Unit
NWRS	National Water Resource Strategy
ODI	Overseas Development Institute
RCM	Regional Climate Model
SADHS	South Africa Demographic and Health Survey
SAHRC	South African Human Rights Commission
SSA	Statistics South Africa
SSA	Sub-Saharan Africa
STI	Sexually Transmitted Infection
TERI	The Energy and Resources Institute
UHI	Urban Heat Island
UN	United Nations
UNCRC	UN Convention on the Rights of the Child
UNDP	UN Development Programme
UNFCCC	UN Framework Convention on Climate Change
UNICEF	UN Children's Fund
UNISDR	UN International Strategy for Disaster Reduction
WHO	World Health Organization



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Executive summary

Children are disproportionately vulnerable to the impacts of climate change. The specific nature of their vulnerability is multidimensional, shaped largely by the physical, social, and emotional changes that take place over the course of childhood. These changes are intensified by children's heightened sensitivity to negative or high-impact events during the early stages of development and by their general lack of agency and voice.

In the case of South Africa, the impacts of climate change on children need to be considered in relation to wider development pressures affecting the country. Challenges such as international economic shocks and stresses, high levels of poverty and inequality, population changes, effects of HIV and AIDS, management of scarce natural resources and rapid urbanisation will each interact with climate change. The results of those interactions will affect how far the effects of climate change are transmitted to children and households at the local level. With this in mind, an effective response to changing climate and development pressures requires efforts from all stakeholders as well as good coordination across multiple levels of governance, from household and community, through municipal and provincial, to national and international levels.

There is an important international legal framework that underpins the need to focus on how children's well-being can be affected by climate change. It particularly points out the duty of the State to enable children's rights to be met. The UN Convention on the Rights of the Child (UNCRC) commits all signatory states to protecting the right of every child to a safe, healthy environment in which to develop and grow. The African Charter on the Rights and Welfare of the Child (ACRWC) recognises that the development of a child requires particular care with regard to health, physical, mental, moral and social development. It recognises that the child's development also requires legal protection in conditions of freedom, dignity and security. In particular, it recognises the role of the State in protecting and reuniting children who have been displaced as a result of natural disasters. The World Fit for Children declaration, which is a consensus outcome from the UN General Assembly Special Session on Children held in 1992, articulates the commitment of states to protect children and to minimise the impact on them of natural disasters and environmental degradation.

South Africa has already taken steps to understand, recognise and address the challenges that climate change poses. This is evident in its National Climate Change Response strategies and other examples of environmental and developmental policy response actions. Yet, within these strategies, the ability to recognise and address the needs of the country's children is not well established.



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Understanding the impacts of climate change on children in South Africa

Despite the particular vulnerability of children, few studies have investigated how climate change will affect child development and well-being across South Africa, in the short, medium and long term. This study seeks to redress this deficiency by exploring the key challenges that relate to children and climate change in South Africa. In addition to synthesising relevant international and South African literature about impacts, vulnerability and adaptation, the study is complemented by data collected via a series of international and national key informant interviews. Further to this, two case studies were undertaken, involving an urban coastal region and rural agricultural zone.

The analysis of the impacts of climate change on child well-being is divided into primary and secondary impacts. Substantial changes in South Africa's climate are likely to be caused by such variables as rising temperatures, changing patterns of precipitation and differences in the frequency and intensity of extreme events. Each of these changes will have a significantly direct, physical impact on children. Examples of direct, primary impacts may include injury suffered during unusually heavy rainfall events or increases in infectious, vector and water-borne diseases in areas subject to higher annual average temperatures and rainfall intensity. These impacts can also be felt indirectly when climate change interacts with other development pressures. This results in challenges such as rising food prices or issues of local conflict over scarce natural resources where children and households are forced to cope accordingly.

Secondary impacts on children are associated with the coping and adaptation strategies adopted in response to climate change. At the local level, examples of adaptation strategies would be: changing lifestyle and behaviour; seeking other forms of temporary employment to supplement income; permanently migrating to exploit new opportunities; or adopting a new livelihood practice. Though these strategies might be undertaken over longer timescales, they have significant and profound

implications for child development and well-being. Typically, heads of households and caregivers decide these strategies. However, children may have some degree of agency and, when living on their own or in child-headed households, children will often influence the nature of adaptation strategies themselves.

The ability to carry out these adaptation strategies is known as the 'adaptive capacity'. Levels of adaptive capacity vary tremendously from person to person, based on a range of socio-economic characteristics¹. Those from poor households and marginalised groups (including women and girls) are generally considered to have lower adaptive capacity. This study seeks to give value by complementing the analysis of primary impacts with an exploration of how household coping and adaptation strategies will affect children over the short and long term.

How is South Africa's climate changing?

Understanding how the climate is changing is an extremely difficult process because of the complex interactions between land, oceans and the atmosphere, and uncertainties in trying to model and predict the outcome of these interactions, particularly at the local level. The study has relied on observed records of past temperature and on simulated projections of future climate as its two main sources of information. Broadly speaking, observation records show that South Africa's climate has experienced trends of increasing average annual temperatures and slight decreases in average annual precipitation from 1970 to 1990 (McSweeney et al. 2010). However, significant variation, particularly in patterns of precipitation, exists across the country and across different seasons. For example, records point towards positive trends (i.e. more rainfall) over the southwest winter rainfall region and negative trends (less rainfall) over the north-east summer rainfall region. South Africans notice an increasing trend in daily temperature extremes and the number of annual 'hot'² days and nights.

‘One minute it’s hot, the next minute it’s raining and there is hail,
and then it’s hot again’

(From national FGD with children aged 14 to 17 years)³.

Future-climate projections are arrived at by using climate models to simulate the characteristics of the earth's systems. This technique is particularly complicated and projections need to be understood in the context of large uncertainties. To some extent, at the global and the regional scale, climate change projections are fairly well established. Yet there remain many uncertainties about projecting changes at the local level. However, reliable information is available and is good enough to inform adaptation policy across various scales. For South Africa, key climate variables relate to changes in temperature and rainfall patterns (see Table 2, page 42).

Sharp increases in temperature are expected, with rates of increase higher in the interior of the country than along the coast. With regards to projections of rainfall, an imaginary line divides the country in two. Significant increases in the average annual rainfall are projected for the central and eastern regions. Contrasting sharp decreases are expected for the west. More importantly, significant changes in rainfall variability and intensity are projected throughout the country, with consequences for the incidence of floods and droughts. These changes are likely to have considerable implications for the water and sanitation, health, agriculture, residential, transportation and industry sectors.

1 For further information about the characteristics of adaptive capacity at the local level, see the Africa Climate Change Resilience Alliance (ACCRA).

2 A 'hot' day or 'hot' night is defined by those in which the temperature exceeds 10% as compared to that of days or nights in current climate of that region and season.

3 UNICEF South Africa carried out a series of focus group discussions with children at the national level and in the Limpopo and KwaZulu-Natal provinces. The selection of quotes presented in this summary illustrates some of the responses from participants.

‘The consequences of climate change are widespread:
poverty, inequitable land distribution, and agriculture. This will mainly
depend on how the rain falls’
(From national FGD with children aged 14 to 17 years).

South Africa’s development challenges and their impacts on children

In order to understand how children are affected by climate change at the local level, it is important to recognise the interactions and overlaps between climate change and wider development pressures. In many senses, climate change and development have a symbiotic relationship. Climate change is a threat to sustainable development and the achievement of many key development targets, such as the Millennium Development Goals. Furthermore, the impacts of climate change are often mediated through interacting development pressures. For example, individuals seldom respond to climate change directly. At the household level, climate change typically is felt indirectly through other processes resulting from development pressures, such as rising food prices, the spread of disease and conflicts over natural resource management.

‘As a result of the rise in sea level there will be flooding.
Then when floods occur there will be losses in part of the city.
There will also be a reduction in the crop production. This will result in
goods being expensive in the stores and there will also be
the increase in disease’
(FGD with children, KwaZulu-Natal).

South Africa’s children suffer high rates of poverty, inequality and climate change vulnerability, particularly those situated in rural areas, because they lack access to adequate sanitation and water, housing, food, education and health care. This has important implications for childhood development. In nearly all aspects of socio-economic comparison, Black African children are disadvantaged significantly more than children of other racial origins.

Half of all children live in rural areas. KwaZulu-Natal, Limpopo and the Eastern Cape (the locations of the former Homelands) contain 76% of all rural-dwelling children. In urban areas too, children face different development pressures caused by over population, poor urban planning and inadequate infrastructure. This makes them particularly vulnerable to the impacts of climate change.

‘So I come from a poor community and everything,
what am I going to worry about? Feeding my children with the food that I
can afford, or saving the environment?’
(From national FGD with children aged 14 to 17 years).

What are the primary impacts of climate change on children in South Africa?

As South Africa’s changing climate is likely to vary considerably between provinces, so will the primary impacts on children vary. However, we can expect changing climate and development pressures to have profound implications for health, nutrition, education, emotional and social well-being across different parts of the country. Here follows a summary of the likely main primary impacts on children and the regional variations in the types of impact (see Table 3, page 50).

Changes in rainfall patterns will have multiple primary impacts on children in South Africa. For example, the incidence of malaria may rise where higher rainfall is combined with higher temperatures, particularly in the North West and Free States provinces. Similarly, the prevalence of such water-, air- and vector-borne diseases as diarrhoea, cholera and bilharzia may be expected to increase in areas where higher levels of rainfall (in terms of intensity, distribution and annual average) are projected, principally where this coincides with poor levels of and inadequate access to sanitation. These impacts will be particularly detrimental if few response and adaptation policy actions are taken.

‘In my community a lot of people tend to defecate in the local grounds, landfill sites. I can encourage my community to have better sanitation, use of toilets, because most of them they just defecate everywhere they go’
(FGD with children, Limpopo).

Where levels of rainfall are projected to decrease (notably in the west of the country), issues of land degradation, soil erosion and lowered agricultural food production are of particular concern to both children and households. In these contexts, young children are most vulnerable to such threats as an inadequate supply of safe drinking water and malnutrition because of their physical vulnerability and their nutritional needs. Where households face high levels of stress from loss of livelihoods or are displaced to find alternative livelihoods, evidence from other countries shows that children are more exposed to emotional or physical abuse and neglect⁴. Since children, particularly girls, are often responsible for fetching the household supply of water, they will have to travel greater distances as sources become scarcer. As a result, they will have less time to spend on school-work and leisure, both of which are vital for children’s social and intellectual development.

Young children are at higher risk of increasing temperatures, especially heatstroke. Projections of increasing temperatures and the number of ‘hot’ days and nights per year, particularly for the interior of South Africa, are of notable concern. Urban areas could experience pronounced warming effects owing to the ‘urban heat island effect’⁵. Those children already experiencing disproportionate levels of exclusion and underdevelopment will be more severely affected by the impacts of climate change. Children may also be affected by negative changes in intra-household dynamics, the emotional distress linked to reduced access to basic services, illness, displacement or damage to housing from flooding.

‘[Climate change] causes children to drop out of school when there is flooding, which floods away the houses and all that stuff. It causes them to drop out of school and come and look after their families, which will make them suffer, especially educationally or academically so and then another thing is that [...] there will be problems in terms of the infrastructure. So children won’t be able to go to school [...]’
(FGD with children, Limpopo).

What are the secondary impacts of climate change on children in South Africa?

In addition to primary impacts, coping and adaptation strategies in response to a changing climate will have considerable secondary implications for South Africa’s children. Common adaptation strategies at the local level (undertaken by households or by children themselves) include: changes in lifestyle and behaviour; supplementation of livelihood activities and adaptation of current livelihood practices;

4 See Bartlett (2008) for more.

5 See Bartlett (2008).

and seeking of alternative livelihoods. These strategies generally operate over a longer timescale yet have significant and profound implications for child development and well-being.

In areas where effective adaptation responses are lacking, changes in the climate may result in a lowering of household income and livelihood security. Inevitably, the consequences for children would be negative. Small changes made in lifestyle behaviour for the sake of adapting, such as adjustments in the management of resources and in the methods and mix of inputs used in producing goods and services, can have important implications for children. For example, household surveys of rural communities in KwaZulu-Natal, Limpopo and North West provinces show that individuals have reprioritised elements of their production, consumption and ecological systems in response to changing climate and development pressures. Similarly, a drop in income in households is more likely to cause cuts in food expenditure, substituting less nutritious food or consuming less, with profoundly detrimental effects on child development.

Similarly, adjustments in consumption could result in a reduction in spending on health care and school related costs. A shock to incomes often means lower school attendance, performance or even dropout. With that, some children, particularly the older ones, would take up paid work to help support the household. The work can sometimes be exploitative or harmful for girls or boys. Changes in climate may require individuals to modify their existing livelihood practices, either to minimise the consequences of negative impacts or to take advantage of new opportunities. This can often take the form of supplementing livelihoods (seeking other forms of temporary employment to supplement income) or of adapting current practices (changing practices to accommodate the impacts of changing climate and development pressures). For farmers in Limpopo, this can be seen in efforts to modify their planting dates, to increase their irrigation potential and change the amount of land that they cultivate or use for grazing.

These adaptation strategies have profound implications for the division and distribution of reproductive labour. The entry of the primary caregiver (mother or other) into the labour force can result in the intensification of overall domestic workload. This may reduce the time spent on caring for children.



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Alternatively, domestic duties may be redistributed to children, generally girls, who will then dedicate less vital time to school and leisure. However, it is important to note that there are possible positive benefits to be had as, in some cases, children can access an income in this way to help buffer some of the cuts in spending and even learn new skills.

Finally, seeking alternative livelihoods (moving permanently from one livelihood practice to another or switching from one context to another on a permanent basis) is and will continue to be an increasingly important strategy as climate change forces people to adapt the ways in which they sustain themselves and make a living. Households may need to abandon current livelihood practices completely, in favour of opportunities that are more sustainable in the changing climate. For example, in certain areas of North West province, adolescents are moving away from farm work. This redirection is because of doubts over the long-term viability and dominance of rain-fed farming as a livelihood strategy. It is a considerable challenge for them in the context of lower employment and work opportunities⁶. Continued and intensified climate shock and stress is likely to influence patterns of rural to urban migration, within South Africa and without, across the Southern African region. Migration (both temporary and permanent) can have important impacts on children's well-being. The migration of a carer can help to stabilise or improve household economic status but extended absences of carers can also cause emotional distress for children. Depending on the level of their care, children risk being exposed to violence or neglect. These transformational responses are likely to have the largest impact on children's development and well-being (see Table 5, page 59).

National policy responses to climate change

At the national and local levels, the South African government has been active in generating strategies, policies and plans that respond to a growing awareness of the impacts of climate change. The National Climate Change Response White Paper (2011), principally, identifies different vulnerable groups, including children and recognises the need to respond to a changing disease profile, particularly adverse to children as a result of climate change.

In general, however, children remain invisible because the majority of South Africa's climate change policies and programmes, whether they be at national, provincial or district levels, do not yet adequately recognise children's vulnerabilities, specific needs and the role children can play as agents of change at the grassroots level. In policy documents there appears to be a prevailing assumption that children are not individual bearers of rights. Instead, their rights are regarded as being subsumed within households and communities. In this way children are expected to benefit automatically from measures that target vulnerable and poor families as well as from the economic and social development of communities per se. While children certainly can benefit from these community and household level measures, owing to their particular vulnerabilities and household dynamics, they are likely to be affected differently from other members of the household. Children may require additional supportive measures or the creation of spaces in which they can become more active agents of change.

For example, children are not targeted as a priority group currently in national disaster management laws. The heightened risk of children to injury, abuse and neglect in the wake of disasters, linked to climate change, requires that corresponding laws and policies be more child-focused. Similarly, the possible transmission pathways of climate change to children are not yet recognised in such key sectors most relevant to children as food and nutrition; water, sanitation and waste removal; education; and social protection. One notable exception is South Africa's malaria control programme. While the Department of Health acknowledges that there is still much to learn about the impact of

⁶ See Osbhar et al. (2010) for further details.

climate change on malaria, it has put preparatory measures in place already, to deal with the possible consequences of climate change.

At the local level, there are some positive entry points for child-sensitive planning. These relate to the mandate of local governments to plan in key child-focused sectors, such as school and health.⁷ However, there are important knowledge and capacity gaps to be addressed so that local level planners can better be able to consider children's specific vulnerabilities in their plans. They could allow spaces for children's participation to inform this process.

‘What I can say is not only am I the future, I am a human being now.
So the things, like climate change as it affects you, it affects me. If not more.
So that's why I think I should have a voice in this’
(From national FGD with children aged 14 to 17 years).

Children's participation in policy processes

Although children are often considered in terms of their inherent vulnerability, it is a mistake to think of them entirely as victims. There is growing global evidence of the positive role children can play in relation to climate change. They can transfer knowledge to their households and communities, can promote positive change and inform local level planners about how to reduce risks they face with the increased likelihood of disasters. Children not only have an interest in being part of decisions that affect their future, it is also their right to be involved.

In South Africa, spaces are starting to be made for children to participate and become more actively engaged in issues related to climate change. However, they are still limited in scope and scale. Some initiatives, supported by schools, have already inspired children and adolescents to become more active voices about climate change and the protection of the environment. The next step is to incorporate these initiatives in local policy spaces, where the voices of children can be heard. There they can better inform planning and ensure a better focus on children's adaptive capacity.

Hand-in-hand with any call for greater child participation goes the need to ensure that issues of climate change are communicated effectively to children. Studies show that the basic principles of climate change are not well understood by many children and, indeed, by the adult population in South Africa in general. A national survey conducted in 2007 found that 22 percent of the youth (aged 16–24 years) had never heard about climate change or global warming before. Twenty-three percent had heard about it but knew nothing or hardly anything about climate change.⁸ The need for more effective and integrated education and public outreach programmes is imperative. Extensive and successful awareness and communication programmes that are targeted specifically at children are required, to enhance child participation in decision-making.

‘I will ask the President to start a campaign himself to go to the schools
and almost the whole country, to educate the children in the schools about
climate change. Maybe they will try and do something about it’
(FGD with children, Limpopo).

⁷ This study also presents case studies from the Limpopo Province and the city of Durban to illustrate some of the dynamics between national and local level policy making, planning and implementation of climate change actions, including identifying how children's issues can be made more visible. For more information see the main report.

⁸ Seager, J. (2008)

Recommendations for policy

While there is a great deal of uncertainty surrounding climate change in South Africa, two things are known: that change is a certainty and that action is required now, in order for policy decisions to support children and households in adapting to these changes successfully and sustainably.

The projected effects of climate change in South Africa, as well as the global literature on the impacts of climate change on children, indicate the need for focused planning for preventive and responsive measures to enhance child well-being. Shortfalls in basic service provisions, inequities in service access, household poverty, poor housing, protection risks and income vulnerabilities are some of the challenges that millions of children in South Africa face on a daily basis. These challenges undermine their capacity to adapt to possible environmental shocks. Better planning and resourcing within national, provincial and local governments could enable children and their families to cope better with climate change impacts as they arise in the short and medium run.

At the national level, institutional changes are needed. Effective representation and meaningful participation of children is a good starting point. Then representation has to move from passive referencing in development plans to active integration and mainstreaming within all relevant decision making processes. Children must be recognised formally as a unique social group and be formally represented in the climate change policy development process and in processes to advance South Africa's commitment to Disaster Risk Reduction. For example, coordinating structures such as the Intergovernmental Committee on Climate Change (IGCCC) and the National Climate Change Committee (NCCC) could be expanded to include all departments with a child-relevant mandate. Similarly, continuing processes to develop sectoral plans and a National Adaptation Plan by 2013 present an opportunity to better integrate children's issues. Lead agencies of climate change planning (such as the Ministry of Environmental Affairs) should promote the interest and engagement of other sector ministries in this regard. These should be promoted in close collaboration with the Ministry of Women, Children and Persons with Disabilities (MWCPD) and other actors whose work is improving child well-being. Departments' specific capacity for climate change and disaster risk reduction as it relates to children will be required to be strengthened.

Social protection policies should consider any additional rising needs in the context of climate change economic pressures. The National Health Insurance, National Environmental Health Policy and Sanitation Task Team processes offer unique spaces in which to increase the link between climate change and children and to advocate child-focused solutions. Medium term adjustments to social grants should be ready to be made, to respond to environmental shocks. Many opportunities do exist that allow children and youth to take advantage of a potential future green economy. However, ensuring they do so will require significant policy attention.

At the provincial and local levels, options to integrate children's issues related to climate change into development policy processes include:

- The facilitation of participation by children in the development of conventional provincial plans, IDPs and adaptation plans;
- Water, sanitation and waste removal policies prioritising the provision of services to households where children are found, ensuring that the quantity provided in terms of free basic water and sanitation programmes is sufficient to meet the water requirements of children with their attendant risks of high temperatures, overcrowding, water-borne diseases and dehydration (Plans should make provisions for higher demand pressures on basic social services in the medium term in line with climate related risks for children, as identified in this study);
- Social development services becoming an integral part of any provincial and local government adaptation plan, with a clear identification of the protection risks children face in the case of climatic events (This would require, for example, establishing child-safe central gathering points

in the case of an emergency where social workers, health workers and other support services can have easy access to children and children can be protected. Additional measures should include raising awareness of risk through campaigns, develop drills and evacuation procedures as well as promote early warning mechanisms);

- Education for parents and children by the different sectors, to ensure that both are aware of the risks of climate change, such as the heightened risk of abuse and harm, heat stress and others and providing them with clear guidance on how to best avoid these eventualities (this might include, for example, guidance on how to keep children cool in informal settlements and what to do if parent and child get separated during an event. Building codes and policies on school construction should also factor in the physical safety of schools and other places of learning);
- Participatory assessments on disaster risk to which children and adults can contribute, identifying hazards and challenges for children in schools, their households and the community.

As part of these efforts, provincial and local government should be supported so that officials understand their roles and responsibilities to children. How these can best be fulfilled, to maximise the adaptive capacity of children and their families through local development plans and other local programmes, should also be understood. There are numerous training programmes and manuals being developed about building climate change capacity at local government level. It is critical that these integrate child-related issues.



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Access to information is a particular challenge. It inhibits participation by children and even by adults because of the scientific level of the dialogue and the publication in English of documents. Extensive, successful awareness and communication programmes, targeted specifically at children, are required to enhance child participation in decision-making. Furthermore, relevant NGOs and government departments can support current awareness-raising initiatives. These initiatives would ensure that children's voices become the catalysts for change on household, community, local, provincial and national levels. For example, very practical measures include developing child-friendly policy briefs in different languages on core issues, to be disseminated by schools; or using inputs from the school-based State of the Environment competition in the development of policies as well as the awareness-raising material and other advocacy tools of NGOs and government departments.

Overall, given the dynamic context within which South Africa's climate change policy is developing, there is a great opportunity to further understand the impacts of climate change and to deliver positive benefits to vulnerable groups, particularly the children. Change will be driven not only by national government but, rather, provincial and local governments. Other development actors will play an important role in developing and implementing plans that are relevant for children. In responding to climate change, actions are needed across all scales to address the multidimensional needs of children. Importantly, children themselves can play significant roles in relation to climate change, transferring knowledge to their households and communities, promoting positive change and informing local level planners on how to reduce the risks they face in relation to the increased likelihood of disasters.





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1 Introduction

Responding to the impacts of climate change is a principal development challenge. It requires action from all stakeholders and it requires coordination across multiple levels of governance, from household and community, through municipal and provincial, to national and international levels. In the case of South Africa, the impacts of climate change on children need to be considered in relation to wider development pressures affecting the country. Challenges such as poverty and inequality, HIV and AIDS, international economic shocks and stresses, population growth, management of scarce natural resources and rapid urbanisation will each interact with climate change and affect how it is transmitted to children and households at the local level.

Although the impacts of climate change are likely to be widespread and will affect people differently, children are disproportionately vulnerable to the impacts of climate change. Constituting nearly a third of the world's population, and devoid of responsibility for the causes of climate change, children have particular characteristics of vulnerability. These characteristics are multidimensional, shaped by the changes that take place over the course of childhood as well as by their heightened sensitivity to negative or high-impact events during the early stages of development and by their general lack of agency and voice. This results in specific experiences of climate change impacts and unique properties in relation to children's capacity to adapt. The effects of South Africa's changing climate are likely to present particular challenges for children and young people across the country.

Despite children's particular vulnerability, few studies have investigated how climate change will affect child development and well-being across South Africa in the short, medium and long term. This study seeks to redress this deficiency by exploring some of the key challenges relating to children and climate change in South Africa. In addition to synthesising international and South African child-relevant literature about impacts, vulnerability and adaptation, the study is complemented by data collected through a series of international and national key informant interviews. Two case studies, involving an urban coastal region and rural agricultural zone, were undertaken in addition.

Notwithstanding their unique vulnerabilities and the obvious need to give children particular attention during climate change debates, their issues are not well recognised there. Nor are children's issues addressed within existing and emerging international and national policy frameworks. Commitments to children are not always as visible in policy and programming as they should be. However, they are key to holding governments accountable for better addressing the multiple threats that climate change raises for the well-being of children. Indeed, protecting the environment and providing for the health, education and development of children are mutually inclusive goals (Goodman and Ittus 2009). Almost any action taken to enhance environmental quality also helps to meet the basic

needs of children. It is therefore important not to separate climate change from other priorities but, rather, to integrate comprehensive actions that will incorporate climate risk and its management into development planning, programmes and projects.

There is an important international legal framework that underpins the need for focusing particularly on how children's well-being can be affected by climate change. It deliberately points out the duty of the State to enable children's rights to be met. The UN Convention on the Rights of the Child (UN CRC) commits all signatory states to protect the right of every child to a safe, healthy environment, in which to develop and grow. The African Charter on the Rights and Welfare of the Child (ACRWC) recognises that the child and his or her development require particular care concerning health, physical, mental, moral and social development. It recognises that the child requires legal protection in conditions of freedom, dignity and security. In particular, it recognises the role of the State in protecting and reuniting children who have been displaced as a result of natural disasters. The World Fit for Children declaration, which was a consensus outcome from the UN General Assembly Special Session on Children, held in 1992, articulates the commitment of states to protecting children and minimising the impact of natural disasters and environmental degradation on them.

South Africa has already taken steps to understand, recognise and address the challenges that climate change poses. This can be seen, for example, in its National Climate Change Response strategies and other environmental and development policy response actions (see Appendix B for a full list of policy strategies reviewed). Yet the ability of these strategies to recognise and address the needs of the country's children is not well established. This study seeks to fill this gap, by exploring South Africa's policies relevant to climate change through a child's lens. This process will examine the degree to which children's issues are considered and addressed.

The analysis of the impacts of climate change on child well-being is divided into primary and secondary impacts. Substantial changes in South Africa's climate are likely through variables such as rising temperatures, changing patterns of precipitation and the differences in frequency and intensity of extreme events. Each of these changes will have significant direct physical impacts on children. Examples of direct primary impacts may include injury suffered during unusually heavy rainfall events or from increases in infectious, vector and water-borne diseases in areas subject to higher annual average temperatures and rainfall intensity. They can also be felt indirectly, when climate change interacts with other development pressures, resulting in such challenges as rising food prices or issues of local conflict over scarce natural resources, with children and households forced to cope accordingly.

Secondary impacts on children are associated with the coping and adaptation strategies adopted in response to climate change. At the local level, examples of adaptation strategies would be: changing lifestyle and behaviour; seeking other forms of temporary employment to supplement income; permanently migrating to exploit new opportunities; or adopting a new livelihood practice. Though these strategies might be undertaken over longer timescales, they have significant and profound implications for child development and well-being. Typically, heads of households and caregivers decide these strategies. However, children may have some degree of agency and, when living on their own or in child-headed households, children will often influence the nature of adaptation strategies themselves.

The ability to carry out these adaptation strategies is known as the 'adaptive capacity'. Levels of adaptive capacity vary tremendously from person to person, based on a range of socio-economic characteristics⁹. Those from poor households and marginalised groups (including women and girls) are generally considered to have lower adaptive capacity. The characteristics of adaptive capacity at the local level are generally well known. They include: an effective and appropriate asset base; access to relevant knowledge and information; an enabling institutional environment that allows entitlements to

⁹ For further information about the characteristics of adaptive capacity at the local level, see the Africa Climate Change Resilience Alliance (ACCRA).

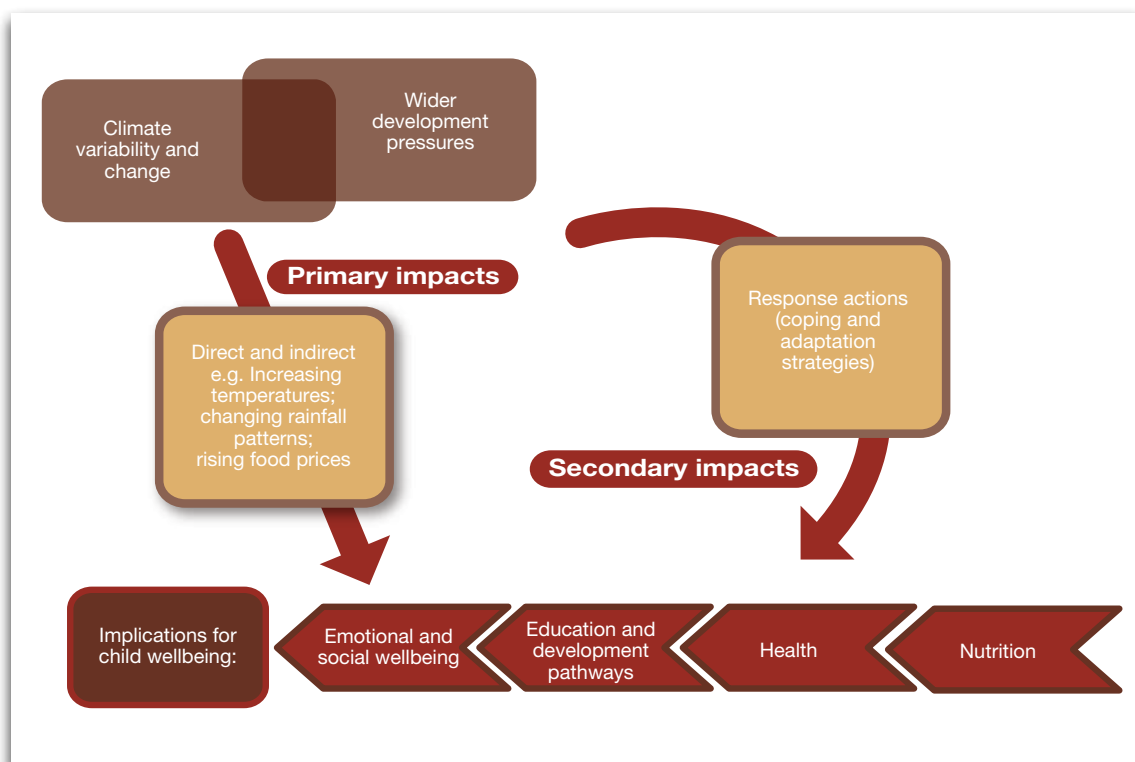


those most vulnerable; support for innovation and exploring new opportunities; and flexible forward-looking decision-making and governance processes (see Jones et al. 2010). By supporting children's and households' adaptive capacity, governments and development actors can play a strong role in strengthening each of these characteristics. Policy actions should ensure that households are more resilient to the different kinds of external shocks and stresses and can prevent negative implications being transmitted to children.

To date, most studies of children and climate change have focused on primary impacts, mainly on children's health. Few have adequately considered and addressed the secondary impacts that children will experience through individual coping and adaptation strategies and responses at the household level. This study seeks to give value by complementing the analysis of primary impacts with an exploration of how children and household response strategies will affect the children. Most of these household strategies will be autonomous (i.e. taken without the aid of a planned intervention, whether by a government, non-governmental organisation [NGO] or civil society) and may have significant and lasting implications for child development and well-being. Indeed, in many cases, these 'secondary' impacts will have more profound consequences for children than many of the primary effects, given that they may alter their livelihoods and their medium-to-long-term plans significantly.

With this in mind, the research applies a dual-stage analytical framework (see Figure 1), seeking to synthesise existing impacts, vulnerability and adaptation literature, both for South Africa and within the wider Southern African region. The analysis is complemented by a series of international and national key informant interviews.

Figure 1: Analytical framework used in the study



The report is structured as follows: Section 2 provides an overview of South Africa's changing climate. Section 3 begins by discussing the interactions of development pressures and climate change impact and then provides a review of the literature of some of the known global-level impacts of climate change on children. It then explores some possible primary impacts of climate change on children, given the current developmental challenges facing children in South Africa and the patterning of projected climate change impacts. The section then provides an analysis of household and community adaptation to climate change and how this links positively and negatively to children. Section 4 contains the two case studies to explore whether children's issues are considered in climate-related planning and to identify spaces where children can be engaged more actively as change agents in relation to climate change. Section 5 contains an analysis of the visibility of children in South Africa's climate change policies, as well as the extent to which children's vulnerability to climate change is incorporated into mainstream development policies and plans. Section 6 discusses the space for children's active participation in relation to climate change. Finally, Section 7 provides some conclusions and recommendations.

1.1 Research methods and scope

The research synthesises and analyses previous studies and merges these with academic peer-reviewed literature. To inform and verify the results of the study, interviews were conducted with a range of international and South African experts from academia, NGOs and government agencies (see Appendix A). Interviewees were selected by means of a snowball sampling method, which enabled key issues to be gathered from all respondents while expanding the range of participants and views. The discussions generated some fruitful insights into national and provincial climate change impacts, the required policy change and some concrete examples of adaptation strategies currently implemented across South Africa and the region.

In analysing the impacts of climate change on children, it is impossible to have a holistic understanding of the dynamics of child development and well-being without considering the households that contain these and the livelihoods that sustain them. The impacts of climate change on the well-being of children are analysed by applying an analytical framework that disentangles primary impacts from the secondary impacts.

Throughout this analysis, new information emerged constantly, as preliminary findings and conclusions were verified with experts working in the field. For example, the interview process confirmed five broad categories of adaptation action being implemented at household level and revealed concrete examples specific to South Africa. A child lens was then applied to identify how children in South Africa could be affected by climate change and variability, adaptation and coping strategies and policy responses. In the absence of primary research on the impact of climate change on children in South Africa, it is important to highlight that the projected impacts discussed in this paper were inferred from two sources: firstly, data on the current situation of children in relation to health status, nutrition, access to water and sanitation services, education and emotional well-being; and secondly, evidence from the international literature of the impact of climate change on children in other countries.

The research was predominantly desk based and did not produce primary data. Instead, it applied the analytical framework to available secondary sources of information and interviews with selected key informants. By way of responding to rural-urban challenges, the report contains two case studies: one of a provincial government in a rural riverine context in Limpopo province, the other involving a metropolitan government in an urban coastal city (Durban). These allowed a more thorough account of impacts and policy development, in different contexts at local levels.

Recognising the broad-ranging scope of the analysis, the report sought to explore some of the key challenges relating to children and climate change that are relevant across South Africa. It did not detail all aspects related to the impacts, vulnerability and adaptive capacity of children. This would not have been possible during a largely desk-based study of this sort. Rather, given a general lack of knowledge, research, and awareness it aimed to use its findings and insights to start a meaningful discussion.

The authors hope this will contribute to effective recognition of and the action to safeguard the immediate and long-term needs of children in South Africa. In doing so, the report seeks to provide valuable knowledge for improving policy and programme design at different levels of government. The hope is that it can ensure that children are visible in climate change-related planning in the different dimensions in which they might be affected.



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2 South Africa's changing climate

“One minute it’s hot, the next minute it’s raining and there is hail, and then it’s hot again.”

“As the icecaps melt the sea level will rise and some cities may be under water, because they are on low land. Climate change also forces the temperature to change and as temperature changes, some organisms and species are not able to adapt and as a result they fall into extinction.”

“I would say that everything we do contributes (to climate change). We all have a footprint. The cars we drive, the food we eat, the houses we live in. Everything. The electricity we use, it all contributes. In South Africa we use electricity generated from coal. So when we use coal we burn it and it releases carbon dioxide which is a greenhouse gas and causes climate change.”

“Climate change may also have a negative impact on the economy since the drastic weather changes may cause things like hurricanes, meaning that state funds will be directed at correcting what has been caused by those events.”

“Droughts are also one of the results of climate change. If environments start changing, this can discourage tourists from visiting certain places.”

Note: The quotes presented here illustrate some of the responses from children (aged 14–17 years) who participated in a series of focus group discussions at the national level and in the Limpopo and KwaZulu-Natal provinces. For further details, see UNICEF South Africa (2011) ‘Change through the Eyes of a Child: South African children speak about climate change.’

South Africa is a country with a diversity of climatic regions. Although classified as semi-arid, conditions range from temperate across the interior plateau, 'Mediterranean' in the southwest, to subtropical in the north-east and arid in certain parts of the north-west. This diversity owes largely to a complex regional topography and interactions with its surrounding oceans, the Indian Ocean to the south-east and the Atlantic Ocean to the southwest. Rainfall varies considerably from east to west, with higher averages in the east (roughly 500mm p.a.) contrasting with low values in certain areas of the north-west (less than 200mm p.a.) (McSweeney et al. 2010). Considerable inter- and intra-annual variability in rainfall exists. One of the key drivers behind this variability is the El Niño Southern Oscillation (ENSO) event, typically resulting in reduced summer rainfall. Increased summer rainfall is associated with La Niña conditions.

Although South Africa is generally not regarded as a country highly prone to disasters, relative to some of its regional neighbours, it is nonetheless beset by a number of hazards and weather related extreme events (Vermaak and van Niekerk 2010). Heat waves, floods, droughts, storm surges and wildfires are examples of 'natural' disasters that have a history in South Africa. Importantly, the extent to which these have an effect on local populations is determined, to a large extent, by human conditions as well as the characteristics of the particular physical hazard. The human cost of weather-related extreme events can be considerable. For example, a drought in early 2004 led to six provinces being declared disaster zones, with an estimated 15 million people being affected nationwide (IFRC 2004). Similarly, flooding across KwaZulu-Natal in 1995 left thousands homeless and killed 207 people (Em-DAT 2011). Extreme events like these also have a heavy impact on livelihoods and assets, with wildfires in late 2008 costing the country in the region of \$430 million (ibid.).

Such climate variability and weather-related extreme events have long been characteristic of South Africa's climate. Dealing with them is part of day-to-day life. However, the prospect of future climate change is likely to have significant implications for South Africa, particularly the frequency and intensity of certain extreme events. Evidence indicates that, globally, climate change is having a strong influence on the strength and frequency of climate variables such as storms, cyclones, floods and droughts (IPCC 2007). The impacts of these hazards depend largely on people's vulnerability and their ability to cope and respond. By building community resilience and helping people to adapt to climate change, we can help to reduce the impact of future disasters. Before exploring how South Africa's climate is likely to change in the near and distant future, it is important to look first at how we have developed an understanding of climate change, and the processes behind projecting future climate change. The following section looks at some of the knowns and, more importantly, the unknowns regarding the status of climate change science.

2.1 Understanding climate change: what we know and what we don't

There is strong evidence that the warming of the Earth over the past half-century has been caused largely by human activity, such as the burning of fossil fuels and the changes in land use through agriculture and deforestation (IPCC 2007a). Measurements of the magnitude of future temperature increases and various other aspects of climate change are still subject to large uncertainties, especially at the regional scale. Nevertheless, the risks associated with some of these changes are substantial (Royal Society 2010). In order to develop a robust understanding of the impacts of regional change over the temporal and spatial scales required for effective policymaking, an integration of a number of different types of information is needed:

- Past trends in climate;
- Changes in driving processes from local to global scales (understanding global processes that interact and give rise to the regional climate);
- Model projections of change;
- Regional expressions of future global change;
- Assessments of uncertainty (all information is limited by a wide range of uncertainty sources).

By drawing on this wide range of information, a better understanding of the climate system, its variability and change on a regional scale can be developed. Ignoring any of these sources of information leads to a risk that key elements will be missed (DoEA 2010a).

One of the main tools with which to assess future climate is climate modelling. Climate models vary considerably in their complexity and accuracy. The more complex seek to simulate interactions between components of the climate system. These represent variations in parameters such as temperature, wind and humidity, with latitude, longitude and altitude, in the atmosphere as well as in the oceans. Global Circulation Models (GCMs) can represent parts of the Earth's climate system. Broadly speaking, these models aim to simplify the behaviour of the climate into a set of mathematical equations as easily understood projections for the past, present and the future. The most widely publicised projections are derived from ensembles of GCMs that assess future climate on a 'global' to 'hundred of kilometres' scale (Calow et al. 2011).

To help understand future climate change at a scale more useful to local decision-making, climate modellers turn to techniques of 'downscaling'. Two methods of downscaling are used to produce regional climate scenarios: embedding Regional Climate Models (RCMs) within a GCM and empirical downscaling. In relation to the former, RCMs work by increasing the resolution of the GCM in a small, limited area of interest (also known as 'dynamic downscaling'). They can resolve the local impacts, given smaller-scale information about local geography, altitude and land use, allowing weather and climate information of resolutions as fine as 25 km². In empirical downscaling, statistical techniques are used to downscale coarse GCM results. Relationships between modelled data and recorded observational data are used to provide local detail (Wilby et al. 2004). Despite the obvious advantages of both techniques in developing detailed climate projections relevant at a smaller scale, the capacity of the existing generation of models to project some aspects of regional climate change is restricted.

Given the localised nature of this study, it is important to outline major sources of uncertainty that currently limit the detail of regional climate change studies. Issues related to determining emissions scenarios, the choice of appropriate climate models, the quality of historic data and methods of downscaling global data are a few of the sources of uncertainty (Schulze et al. 2010). Moreover, while global climate change projections can be downscaled for more meaningful application in policy development, assumptions and errors made at the global level can be inherited. This often means regional simulations have more uncertainty attached to them than global-level simulations, particularly regarding the magnitude of any change. For Africa in particular, uncertainty in the science means there is currently limited understanding about the dynamics of the climate system in and around the African continent, which is controlled by a range of complex maritime and terrestrial interactions that produce a large mix of climates across a variety of regions. More specifically, it is extremely difficult to simulate climate for Sub-Saharan Africa (SSA), given the wide range of feedback mechanisms. For example, up to 90% of current GCMs cannot replicate accurately past or present climatic conditions observed in SSA, suggesting that the models do not yet adequately capture significant feedback between hydrological and climate systems (IPCC 2007a).

Despite these uncertainties, it is clear that the climate is changing and will continue to do so for the foreseeable future. Continued population growth and rapid expansions in economic development are likely to further increase greenhouse gas (GHG) emissions. Indeed, scenarios presented in the

Intergovernmental Panel on Climate Change's (IPCC's) Fourth Assessment Report (AR4) are now widely viewed as conservative. The present GHG emissions are higher than those projected by the worst-case IPCC scenario and are consistent with a rise in global average temperatures of 3–4°C and 3–5°C over SSA (Calow et al. 2011). Importantly, as more of the different GCM and RCM models start agreeing on projection of future climate variables for South Africa, 'there is now an arguable basis for developing appropriate response strategies for incorporating into adaptation policy' (Lumsden et al. 2009: 656).

2.2 Impacts of climate change for South Africa in the present, immediate future and distant future¹⁰

South Africa is situated in the subtropical zone of the Southern Hemisphere. It has a complex climate, influenced by the different rainfall regimes, the wide variety of elevations typical of Southern Africa as well as by the Atlantic and Indian Oceans (McSweeney et al. 2011). Temperatures range from over 32°C in the summer to below freezing in the winter (in the inland plateaus). Different ocean currents mean the east coast experiences temperatures that are about 5°C warmer than those in some parts of the western coast. These currents are also partly responsible for the variation in rainfall from west to east. The north-west generally receives less than 200mm of rainfall per year, whereas over 500mm can fall in the east (ibid.). Rainfall variability is also significantly influenced by ENSO events and sea surface temperature anomalies in the Indian and South Atlantic Oceans. In comparison, there is currently little differentiation between average temperatures in the north and south of the country. However, inland areas have a greater variety of temperature ranges, given weather characteristics associated with the higher elevation.

2.2.1 Recent climate trends

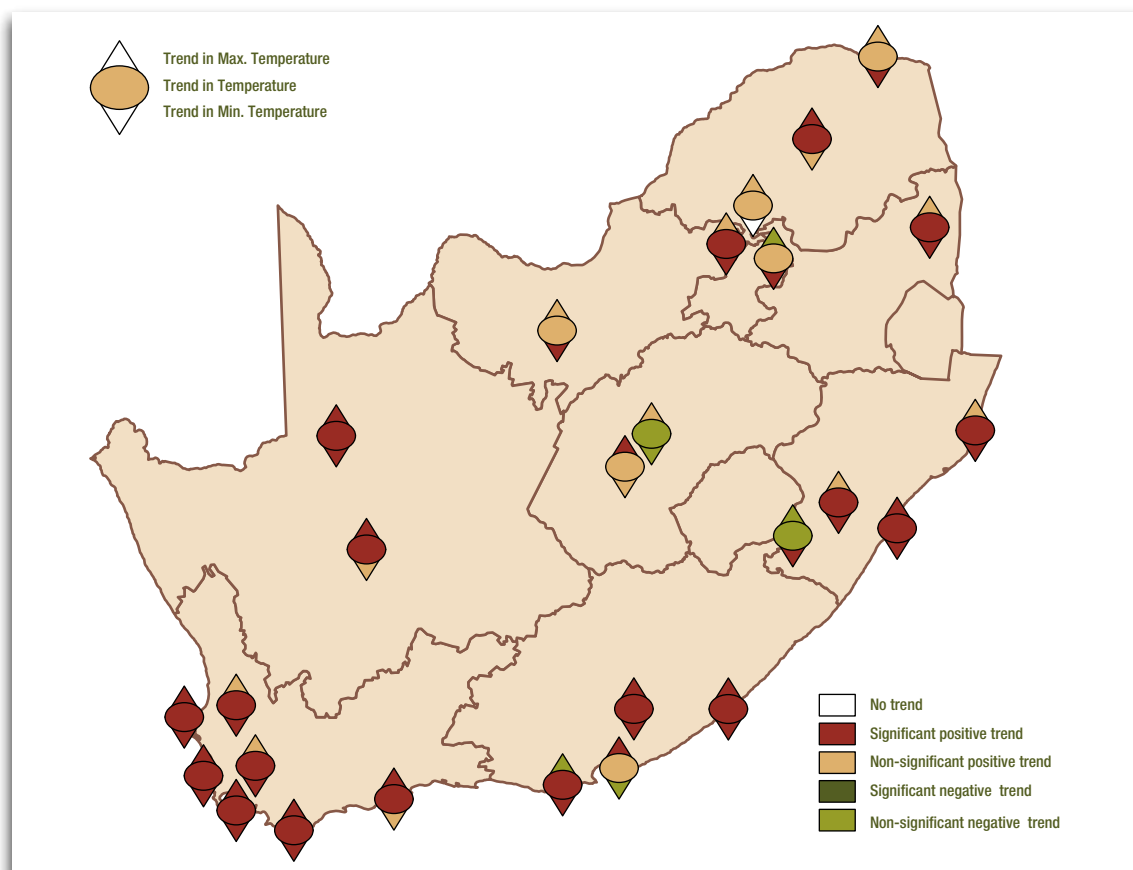
Broadly speaking, South Africa's climate is characterised by a trend of temperatures. The mean annual temperature change in South Africa between 1960 and 2003 was an increase of around 0.6°C at a rate of roughly 0.14°C per decade (Figure 2). More noticeable to South Africans is the growing frequency of days and nights perceived as 'hot'¹¹, with temperature observations showing significant increasing trends in daily temperature extremes across the country (McSweeney et al 2010).

Identifying trends in precipitation is more difficult, as most published studies show no clear evidence of statistically significant trends in total annual rainfall for the country as whole (DoEA 2010). However, significant variation exists across the country and in different seasons. For example, statistically significant changes point towards predominantly positive trends (i.e. more rainfall) over the southwest winter rainfall region and negative trends (less rainfall) over the north-east summer rainfall region (DoEA 2010a). More recently, there has been strong agreement about a historical increase in rainfall intensities and an increase in dry spell duration and drought for particular regions across the country (ibid.).

¹⁰ Current and future climate impacts are presented here based on time horizons used to represent the Earth's climate in the latest regional scenarios developed as part of the AR3 (2001) and AR4 (2007). The terminology used to describe these time periods are 'present' (1960–1990), 'intermediate future' (2046–2065) and 'distant future' (2081–2100).

¹¹ 'Hot' day or 'hot' night is defined by the temperature exceeded on 10% of days or nights in current climate of that region and season.

Figure 2: Trends in mean annual maximum, minimum and average temperatures as obtained from a record of 44 years (1960–2003)



Source: DoEA (2010a) adapted from Kruger and Shongwe (2004).

Sea levels are rising around the South African coast, in agreement with current global trends. However, significant regional differences exist. For example, the west coast is rising by $+1.87 \text{ mm.yr}^{-1}$, the south coast by $+1.47 \text{ mm.yr}^{-1}$ and the east coast by $+2.74 \text{ mm.yr}^{-1}$. These differences are attributed to regional differences in vertical crust movements and large-scale oceanographic processes off the east and west coasts (DoEA 2010a). A number of studies suggest that the intensity and frequency of extreme storms in South Africa are increasing and are projected as rising further, with similar trends likely for wave heights (ibid.).

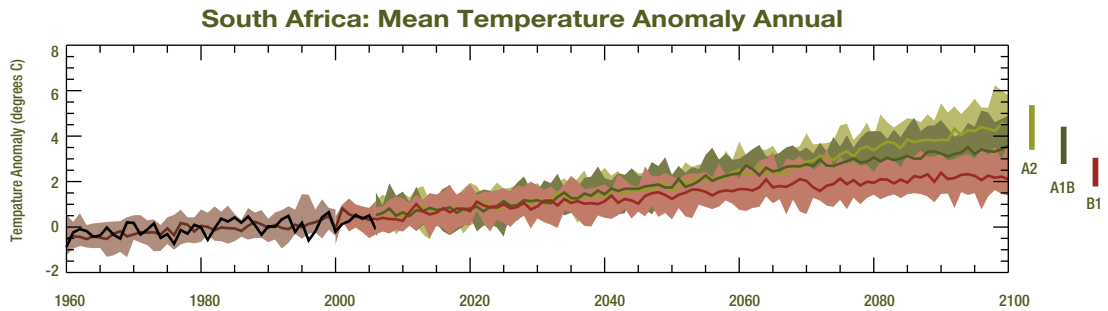
2.2.2 Projections of future temperature change in the immediate and distant future¹²

It is not possible to predict with absolute certainty what will happen at the sub-national level as a result of climate change. Moreover, given the range of feedback mechanisms influencing rainfall variability and change, it is much more difficult to simulate precipitation than temperature. However, using the GCM downscaling and RCM methods described earlier, climate scientists are increasingly able to understand the types of impacts that can be expected and how severe these could be.

¹² Using a review of the recent relevant peer-reviewed climate literature for South Africa, this section summarises the latest knowledge about the implications of rainfall statistics from regional GCM scenarios for South Africa's water resources. The comprehensive literature review also drew on recent climate change policy and strategy documents released by the South African government and data used in the production of the IPCC AR3 and AR4. Information was also obtained during a series of key informant interviews with climate scientists and impact experts.

Box 1: Global Circulation Model (GCM) projections for South Africa's temperature

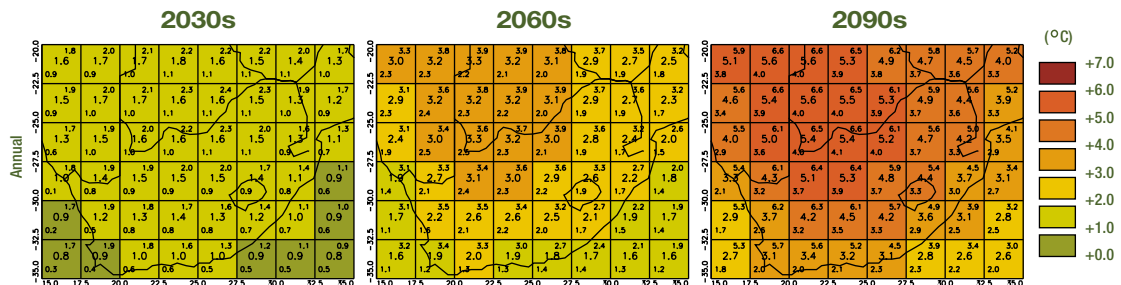
Trends in annual mean temperature for the recent past and projected future



Note: All values shown are anomalies, relative to 1970–1999 mean climate. Black curves show the mean of observed data from 1960 to 2006. Brown curves show the median (solid line) and range (shading) of model simulations of recent climate across an ensemble of 15 models. Coloured lines from 2006 onwards show the median (solid line) and range (shading) of the ensemble projections of climate under three emissions scenarios. Coloured bars on the right-hand side of the projections summarise the range of mean 2090–2100 climates simulated by the 15 models for each emissions scenario.

Source: McSweeney et al. (2011).

Spatial patterns of projected change in mean temperature across South Africa for 10-year periods under the A2 emissions scenario



Note: All values are anomalies relevant to 1970–1999. The numbers in each box give the median values of temperature change (central numbers) and the maximum and minimum values (upper and lower corners) for each grid box.

Source: McSweeney et al. (2011).

Based on a host of different emissions scenarios, GCM projections tell us that, in the medium term, by the 2060s, the mean annual temperature for South Africa is projected as increasing by 1.1°C to 2.4°C countrywide, relative to the baseline period of 1970–1990. As shown in Box 1, the scale of the change is greater over the longer term, with mean annual temperatures projected as increasing by 1.6°C to 4.3°C by 2090 (McSweeney et al. 2011). The projected rate of warming does not change during different parts of the year. However, as the colour-coded charts show, where the extent of temperature change is represented by light green (less change) to darker shades of orange (greater change), the gradual warming over time is expected to be more pronounced inland than at the coastal regions for all time periods (ibid.).

2.2.3 Projections of future precipitation change in the medium and long term

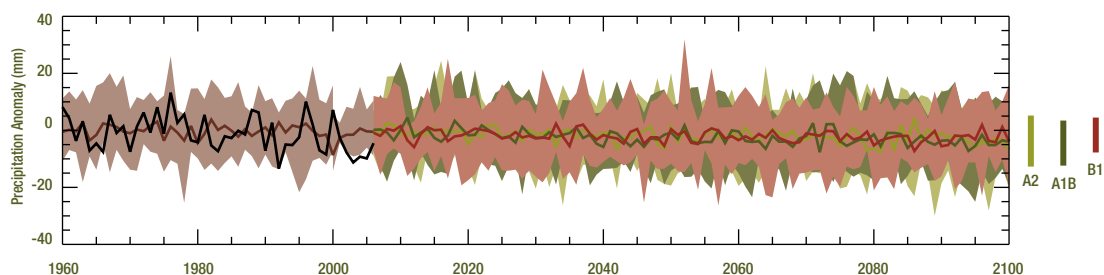
GCM ensembles suggest that South Africa will experience a slight decrease in rainfall in the medium and long term under all emissions scenarios. Established but incomplete GCM projections for the winter rainfall region consistently suggest future rainfall decreases, while summer rainfall region projections deviate less from the present climate. With locally developed regional downscaling techniques, rainfall projections for the summer rainfall region show a tendency towards wetting (DoEA 2010a). However, there are likely to be wide variations across the country, with some areas experiencing an increase in rainfall in heavy rainfall events, for example with more than 5mm, 10mm or 20mm of rainfall in one 24-hour period (McSweeney et al. 2011).

More specific RCM projections based on an A2 scenario, considered most realistic given present international actions and commitments (this scenario of GHG emissions assumes that efforts to reduce global emissions this century are relatively ineffective), show that the west coast and adjacent interior of the country are expected to see a reduction in mean annual precipitation; some catchments in the western interior will experience little or no change in rainfall between now and the 2060s (Lumsden et al. 2009). The south of the Western Cape is expected to have more rainless days by the 2060s, which could exacerbate current water scarcity in that region. Conversely, there could be fewer rainless days in the east of the country during this time period (ibid.). The number of extreme rainfall events, such as the severe flooding of informal settlements as in Alexandra and the Cape Flats, in Johannesburg and Cape Town respectively, in recent years, is expected to increase in central and eastern parts of the country. However, as displayed by the yellow shading in the charts above, by the 2060s and 2090s the west of South Africa is likely to see fewer days where rainfall reaches more than 5mm in a heavy rainfall event (Schulze et al. 2010).

While it is clear that some areas will experience increased average rainfall and rainfall intensity in the 2060s, compared with today, this is not likely to help reduce current water scarcity challenges. This is because projected temperature increases could exacerbate the possibility of drying and increased evapo-transpiration, counteracting any increases in rainfall, with severe implications for agriculture and water resources (Lumsden et al. 2009; McSweeney et al. 2011). It is also important to note that the uncertainty of GCM climate projections for climate variability and change in Southern Africa is increased as a result of disagreements in model outputs on the severity and frequency of future El Niño events (McSweeney et al. 2011).

Box 2: Projections for South Africa precipitation

Observed and projected trends in monthly precipitation for South Africa



Notes: All values shown are anomalies, relative to the 1970–1999 mean climate. Black curves show the mean of observed data from 1960 to 2006. Brown curves show the median (solid line) and range (shading) of model simulations of recent climate across an ensemble of 15 models. Coloured lines from 2006 onwards show the median (solid line) and range (shading) of the ensemble projections of climate under three emissions scenarios. Coloured bars on the right-hand side of the projections summarise the range of mean 2090–2100 climates simulated by the 15 models for each emissions scenario.

Source: McSweeney et al. (2011).

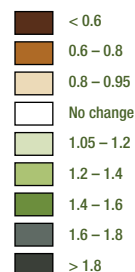
An example of a regional projection for South Africa for 2046–2065: change in mean annual precipitation (left); change in total number of heavy rainfall events – rainfall >20mm (right)



Note: Projections based on empirical downscaling of Model for Interdisciplinary Research on Climate (MIROC) model outputs run for an A2 scenario. Outputs from a single model are not considered suitable enough to generate 'reliable' predictions. An ensemble of a number of different models is needed to gather greater confidence in projected trends and outputs. All figures are relative to 1960–1990 baseline.

Source: Lumsden et al. (2009).

Ratio



Box 3: Summary of projected climate change for South Africa

The projections discussed are based on a synthesis of different climate models, with varying ranges of spatial resolution and accuracy.

Temperature

- Mean annual temperature is projected to increase by 1.1–2.4°C by the 2060s and 1.6–4.3°C by the 2090s.
- All regions are likely to be warmer in the future, although warming is expected to be greater inland than in the coastal regions.
- There will be a substantial increase in the frequency of ‘hot’ days and nights.

Precipitation

- Projected changes in precipitation show wide variations across the country.
- Generally, more rainfall is projected in the east, in terms of both mean annual rainfall and number of heavy rainfall events. In some cases, there will be very large increases in mean annual precipitation (up to 80% for areas such as Limpopo province in some models).
- Less rainfall is projected for the west and the interior (60–80% for western areas of the Northern Cape, Westersveld and Richtersveld in some models).

Extreme events

- Generally, there will be increases in rainfall variability countrywide, with consequences for the incidence of flood and drought events.
- There are wide disagreements among models about the impacts of future El Niño events.

Source: Based on excerpts from DoEA (2010a), Lumsden et al. (2009), McSweeney et al. (2011) and IPCC (2007a; 2007b).



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2.3 How will climate change impact on different sectors in South Africa?

Climate change is not simply an environment issue. Its impacts will be significant and far-reaching, spanning all scales, from the household to the national, regional and international. Similarly, issues of vulnerability and adaptive capacity to climate change will be linked directly to the socio-cultural, political and economic context (UNFCCC 2007). Thus, in understanding what impacts climate change will have on children and households at the local level, it is important to recognise the multi-sectoral nature of these impacts. Below are briefly highlighted a number of key sectoral concerns relevant to South Africa, and their likely vulnerability in light of a changing climate. More detailed discussions of national sectoral impacts can be reviewed in South Africa's Initial and Second National Communications to the UN Framework Convention on Climate Change (DoEA 2000; 2010a) and the South Africa Risk and Vulnerability Atlas (DoST 2010).

2.3.1 Water security

As South Africa's climate is characterised by dry and warm conditions, the country inevitably suffers from periodic water scarcities. The severity of these varies by context but the situation is exacerbated by current patterns of migration, rapid urbanisation and overpopulation, with subsequent impacts on water quality and sanitation. Over three million people still have no access to water, with more than 14 million lacking adequate sanitation (OneWorld Sustainable Investments, 2007). These current water vulnerabilities will become more severe with climate change. Climate-induced pressures on water resources could also increase rural–urban or regional migration.

Related to this, an increase in malaria is expected in some areas, owing to seasonal changes and wetter, warmer climatic conditions¹³ (DoEA 2010). Current health observations related to climate include cholera outbreaks associated with extreme weather events. These have particularly affected individuals and households living in poor, high-density settlements. As a consequence of water scarcity, vulnerability to diarrhoeal diseases is especially high in the parts of South Africa where water quality is poor (*ibid.*). Strategic adaptation to climate change in the water sector is crucial because current surface water resources are already almost fully allocated. As water is a vital natural resource for agriculture and fisheries, there could be severe implications for food security and local livelihoods without adequate response to the climate change challenge (UNICEF 2006).

2.3.2 Agriculture

It is likely that there will be both winners and losers in South Africa's two-tiered agriculture sector as a result of climate change. Largely because of the threat of increased water scarcity and drought, the most vulnerable to climate change are small-scale and homestead dryland farmers situated in either high-potential or marginal lands. These areas accommodate 70% of South Africa's poorest households and very few have year-round self-reliance or adequate capital to invest in agricultural inputs to support productivity (DoEA 2010a). Irrigated farms are less vulnerable to climate change, though still sensitive to water scarcities. However, increasing use of irrigation in agriculture is worsening national water resource challenges. Between 1995 and 2000, 85% of the increase in national water consumption was attributable to irrigated agriculture (*ibid.*). In transitional or other agricultural zones characterised by high rainfall variability, climate change poses even higher risks to agriculture (Schulze 2007).

It is estimated that 50% of South Africans experience hunger and 9% of children experience under-nutrition, despite the country's food-secure status (de Klerk et al. 2004; Goldman 2010). Potential declines in regional food security through adverse impacts of climate change come from the risk

¹³ As of 2008, many of the initial projections had however not materialised, due in part to efforts to combat the disease (DoEA 2010).

of falling maize production in summer rainfall areas and falling fruit and cereal production in winter rainfall areas. On the other hand, significant opportunities exist for the agriculture sector if advantage is taken of regional trading and technology-sharing mechanisms. Further climate vulnerabilities exist in forestry, which is threatened by potential increased frequency of wildfires brought about by increasing numbers of 'hot days', droughts and intensified restrictions of the use of water resources, particularly in the southwest regions. Rangelands are also vulnerable to bush encroachment, brought about by increased concentrations of atmospheric CO₂, which could promote enhanced shrub growth (DoEA 2010a).

2.3.3 Residential, transportation and industry

While rainfall totals may change over time in South Africa, it is the projected increase in heavy rainfall events that poses the most significant risk to the residential, transportation and industry sectors. Between 2000 and 2009, the cost of infrastructural damage as a result of extreme weather events (including flooding, fire, storms and drought) has been estimated at R1 billion per year. Drainage systems in many industrial and residential areas are already over their capacity and flooding on major transportation routes could have wide-ranging economic and social consequences.

Droughts and flood events are also capable of causing structural damage to roads and buildings, preventing the normal delivery of vital services such as health care and schooling. Sea level rises and storm surges will affect the built environment in coastal regions. It is imperative for coastal zone planners and managers to factor the projected impacts of climate change into their work. For example, where increased storm surges are predicted, coastal zone planners might review or establish 'setback lines'. These would represent the closest distance to the sea beyond which development can take place, in order to minimise damage from waves as they reach further inland (DoEA 2010a).

2.3.4 Migration

Climate is believed to be a considerable driver of migration out of the central areas of South Africa, where conditions are very dry and less hospitable than in other parts of the country. Vulnerabilities and lack of opportunities in remote rural areas have resulted in a general trend towards increased townward migration. Population growth is highest in and around the country's economic hubs and along major access routes and corridors (DoST 2010).

However, where population growth is highest, there also tends to be a greater number of people living in poverty, resulting from the detrimental impacts of overcrowding and competition for resources, particularly within informal 'squatter' settlements. Climate change is expected to intensify existing water scarcity pressures in these areas, which will worsen current water quality and sanitation challenges (DoEA 2010a). The overall picture of vulnerability sets out two contrasting types of places with high levels of poverty and increasing vulnerability: major towns and cities, including the six major metropolises; and remote areas situated large distances from major cities and towns, for example the districts of O.R. Tambo, Amathole and Ehlanzeni (DoST 2010).

As South Africa is the only country in the region where refugees and asylum seekers have freedom of movement and the right to work, the country has been receiving a steady flow of immigrants from other African countries. However, as demonstrated by the unprecedented level of immigration of Somali and Ethiopian nationals in 2011 in response to prolonged drought, poverty and war,¹⁴ the impacts of climate change outside of South Africa are likely to intensify population pressures within the country. Furthermore, though xenophobic nationals are present in all countries of immigration, violence against foreigners in South Africa in the recent past casts doubt on the security of vulnerable households, particularly as climate change is expected to continue to increase immigration (Fischer and Vollmer 2009).

¹⁴ Until a recent unofficial change in policy to refuse asylum, at least 1,500 Somalis were entering South Africa each month (IRIN 2011).



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3 How does climate change affect children in South Africa?

“We are the future generation; we are the people who this global warming is going to affect. (...) We are the future scientists; we are the future doctors who are going to have to deal with diseases and our lives because of global warming. We are the people who are going to suffer; we are the economy that is going to suffer.”

“The consequences of climate change are widespread: poverty, inequitable land distribution, and agriculture. This will mainly depend on how the rain falls.”

“Climate change causes children to drop out of school when there is flooding, which floods away the houses and all that stuff. It causes them to drop out of school and come and look after their families, which will make them suffer, especially educationally or academically. If there is flooding and all that stuff, there will be problems in terms of the infrastructure. So children won't be able to go to school.”

“Another result of climate change will be more diseases, especially malaria. Mosquitoes love a wet place.”

“I think as a result of climate change, children may have to move from their areas as their affected families go and look for jobs in other places in order to feed their families.”

Note: The quotes presented here illustrate some of the responses from children (aged 14–17 years) who participated in a series of focus group discussions at the national level and in the Limpopo and KwaZulu-Natal provinces. For further details, see UNICEF South Africa (2011) ‘Change through the Eyes of a Child: South African children speak about climate change.’

This section explores the primary and secondary impacts of climate change on children in South Africa. It first discusses how the broader development pressures, interacting with climate change impacts, might affect children. It then provides a general analysis of the possible primary impacts of climate change on children at the global level, using general literature, before looking at possible impacts on children in South Africa, both directly and indirectly, through adaptation strategies.

3.1 Effects of development pressures on child well-being

In order to understand how people are affected by climate change at the local level, it is important first to recognise the interactions and overlaps between climate change and wider development pressures. The aim of this section is to provide the context for analysing the potential primary and secondary impacts of climate change on children in South Africa, given current patterns of vulnerability.

In many senses, climate and development have a dual relationship. Climate change is a threat to sustainable development and the achievement of many key development targets, such as the Millennium Development Goals (MDGs) (Alexander et al. 2011). The impacts of climate change felt at the local level will also often be mediated through interacting development pressures. Indeed, people seldom adapt to the direct impacts of climate change, such as gradual increases in average temperature, decreases in total annual precipitation or greater seasonal variability. Instead, climate change is typically felt indirectly, through wider development processes, such as rising food prices, the spread of disease and illness and conflicts over natural resources and their management. These indirect impacts are then influenced by a combination of such determinants as age, ethnicity and gender.

In this sense, interventions seeking to promote sustainable development can play an important part in helping people to adapt to the impacts of climate change. This is because the drivers of vulnerability and people's capacity to adapt are determined by socio-economic characteristics. Returning to the MDGs, for example, efforts in "reducing poverty, providing general education and health services, improving living conditions in urban settlements, and providing access to financial markets and technologies, will all improve the livelihoods of vulnerable individuals, households and communities, and therefore increase their ability to adapt" (Ayers and Huq 2009). Recognising this complex relationship means that, in order for communities, governments and civil society agents to understand the impacts of climate change, they need projections of future climate over different timescales and of how various development scenarios are likely to play out over the short, medium and long term. Knowing how water storage capacity is likely to change, understanding rates of population growth and identifying changing patterns of internal and external migration and urbanisation are all equally important because they are likely to be influenced by, and to play a mediating role in, delivering the impacts of climate change at the local level.

Looking at South Africa's specific conditions, it is clear that climate change and development pressures have the potential to contribute to detrimental impacts on children, some of which we explore below. In particular, population pressures can have an impact on children, either directly or through their households. These would be as a result of changes in levels of monetary or income poverty, international or national economic shocks and stress, population pressures and internal migration patterns, for example. Economic shocks can put a strain on livelihoods and put girls and boys, as well as other members of their household, in a worse poverty position. A recent study of the effects of the global economic crisis in South Africa (UNICEF 2010) found that poor children were the most affected population group, adding to the constraints they face as a result of poverty, such as inadequate housing, nutrition and access to health services and education.

In fact, the economic downturn has disrupted the decline of child poverty in South Africa. However, the existence of the Child Support Grant (CSG), a key social protection programme in place before the crisis, contributed significantly to buffering the effect of the crisis. Without it, the impact on child poverty would have been worse, particularly among the poorest. The CSG served as a form of diversified income, helping poor households to be less susceptible to the effect of the shock. Poor households that were not receiving the CSG were affected more negatively by the recession. They were more likely to cut food expenditure, transfer children to a cheaper school or lack transport money for children to go to school, among other negative effects that coping strategies can have on children (UNICEF 2010).

Population pressures are also important to consider in the context of climate change analysis because, as discussed below, they interact to enable (or not) children's and households' adaptive capacity. These, in turn, will allow them to deal with the possible negative implications of climate change over time. In South Africa, the average household size has decreased over the past twenty years but this has been accompanied by a rapid expansion of a number of households as a result of an 'unbundling of households' (Van Zyl et al. 2008). This has increased the demand for social services (e.g. housing, water, electricity, etc.), which are under great pressure and not currently satisfying demand (Jamieson et al. 2011). As will be discussed in sections below, inadequate and insufficient basic services increase vulnerability to climate related impacts. This decrease in household size contributed to a significant increase in the number of households falling under the poverty line because each smaller household has fewer income earners and resultantly lower cumulative earnings. Smaller family households can be linked to lower capacity to absorb and care for those who are suffering from the effects of illness and unemployment and will put an additional burden onto government provision. Economic planning and delivery may become more difficult and more expensive as government is compelled to take over some of the support functions normally exercised by families supported by social capital connections (ibid.). In the context of challenges presented by climate change, shrinking household sizes can deteriorate households' adaptive capacity, primarily through the weakening of networks, with consequences for children's adaptation.

As discussed in section 3.3 below, South Africa has high levels of income inequality, reflected in quality of housing, levels of consumption, access to employment and access to services. Although the South African government has made important pro-poor investments and has a social protection system aimed at reducing some of those inequalities, important disparities remain. Climate change could magnify and reinforce existing inequalities in population and development as it will have greater negative impacts on those who are already more vulnerable and whose adaptive capacity is lower.

Another important development pressure in South Africa is migration. Data on migration into and within South Africa is poorly collected, weakly analysed, and often misleading (Polzer 2010). Internal migration or movements between and within provinces and municipalities is the most common form of migration in South Africa. Although international migration is more politically sensitive, people moving within the borders pose the greatest challenges for government planning, service provision, and social cohesion (ibid.). Migration, particularly into urban areas, when people settle into informal housing, already represents a hazard during natural disasters, such as flooding. As the effects of climate change begin having a greater impact on livelihoods over the medium term, migration from the north and centre of the country could increase, generating greater pressures on resources and services. In the case of children, in addition to the direct consequences posed by the inadequacy of basic services for those who have migrated, migration already means that many children in rural areas do not live with their biological parents, who have relocated to work in urban areas. Weaker care systems, when children are left with friends or families, can negatively affect children's emotional well-being and, in some cases, lead to child protection violations by host families (UNICEF 2011).

Finally, an understanding of the socio-dynamic implications of the above trends, in terms of both impact and response, is crucial to appreciate the range of possible outcomes for children. For instance, there

may be differential impacts on the well-being of girls and boys as a result of deeply embedded cultural roles and values that assign to these cohorts diverging opportunities and vulnerabilities. Equally, these roles and prescribed values will vary across life stages of those boys and girls, particularly during key transition movements (e.g. during graduation from primary to secondary school).

3.2 Global evidence of the primary effects of climate variability and change on child well-being

The primary impacts and effects of climate variability and change on children are explored in relation to a child-centred framework of 'transmission pathways'. Through this framework children (0–18 years) can be affected by climate events, considering their specific vulnerabilities. The analysis below seeks to capture these dimensions of vulnerability, particularly in relation to challenges that evolve over childhood, to adolescence and gender-specific challenges. These pathways look at effects on children themselves, as well as those that are mediated through households and communities.

Our analytical framework looks at five main areas in which climate change-related events can have an impact on children. They are health, nutrition, education, social and emotional well-being, and opportunities. An important point to consider is that 'children' are not a homogenous group. Children in different age cohorts (0–5, 6–11, 12–15, 16–18) have different needs and vulnerabilities and are exposed to different risks. Additionally, different groups of children are able to generate different levels of response in relation to climate change adaptation strategies and participation in their households and communities. Added to these differences, experiences of climate change are highly gendered, resulting from the different roles and life-cycle challenges girls and boys have, which can expose them either more or less to certain types of risks.

It is important to point out that there has been very limited primary data collection and research on the impacts of climate change on children. Most of the primary analysis has focused on the impact of natural disasters, an area that nevertheless remains under-researched. Meanwhile, a great deal of the existing international literature analysing the impacts of climate change on children is based on children's exposure to risk. Some of this research does not sufficiently recognise that the uncertainty of the data on the effects of climate change (particularly in the medium and long term, as discussed in Section 2) should be factored into the analysis. Additionally, existing data make it difficult to attribute directly some natural disasters, for which there is currently more information, to climate change. However, we do know that climate change is occurring and that it has and will continue to have important impacts on children of all ages.

The literature about children and climate change has identified numerous impacts specific to children. Some of these impacts are applicable to the South African context. Others are not. In order to be able to understand better what some of the possible impacts of climate change on children (present and future) in South Africa might be, we first provide a brief overview of the possible primary impacts on children's education, nutrition, health, social and emotional well-being and opportunities based on the global literature.

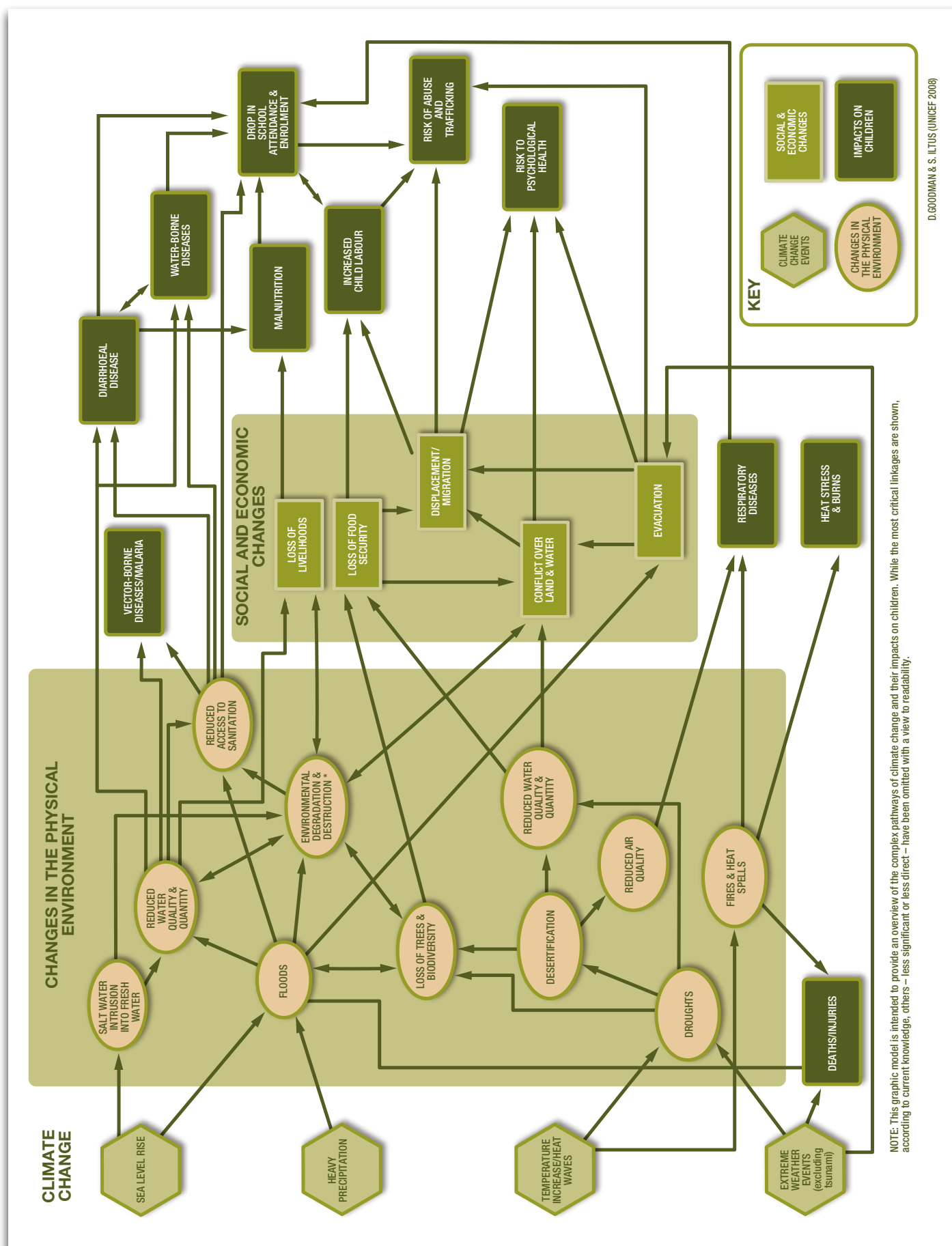
Figure 3 below provides a good starting point for understanding the different transmission pathways. Through these we see that climate change events, particularly sea level rises, heavy precipitation, temperature increases and extreme weather events can have a direct impact on children as a result of changes these events make to the physical environment. Some of these climate change events are mediated through social and economic changes.

Children in developing countries, particularly those under the age of five, are one of the largest and most vulnerable groups in terms of climate change. The reasons are that: 1) more than a fifth of the world's population is under nine years of age and more than a third is under 18; 2) about 85% of the world's youth live in developing countries and 87% live in countries affected by poverty, hunger, disease and violence, meaning that children are over represented among the world's poor and that poverty is a factor that exacerbates vulnerability to climate change by eroding adaptive capacity; 3) young children are more susceptible to the adverse effects of environmental degradation compared with adults, given their physical, cognitive and physiological immaturity, so that they are more vulnerable to adverse environmental conditions such as poor air quality and contaminated water (Children are also psychologically more sensitive to sudden disruptions to their lives caused by natural disasters); and 4) there is increasingly convincing evidence that many of the main killers of children (malaria, diarrhoea and under-nutrition) are highly sensitive to climatic conditions. These conditions are expected to worsen as a result of climate change (Goodman and Ittus 2009). The evidence of children and climate change suggests that potentially millions of children are at a higher risk as a result of water scarcity, malnutrition, disasters, infectious disease and infrastructure destruction, as a consequence of climate change.



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Figure 3: Primary impacts of climate change on children



Source: UNICEF (2008).



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Across the world, children from poorer or rural households are disproportionately vulnerable to disasters and climate change impacts. This is because poorer people often live in marginalised and unsafe settlements. In addition to experiencing higher levels of monetary poverty, children in rural areas also have lower access to basic services, which contributes to their lower attainment across child well-being indicators. Despite high levels of resilience, poorer households lack opportunities to make changes to their lives and livelihoods in difficult times and many traditional livelihood strategies can become unsustainable. These factors imply that they have higher exposure to risks related to climate change.

Although urban children are typically better off than their rural counterparts, this is not the case for the hundreds of millions living in urban poverty (Bartlett 2008). Many poor urban communities and households and the children they support have extremely poor access to basic human development needs. The risks that urban children face are likely to be aggravated by climate change. An example of these risks can be seen in higher temperatures associated with the 'urban heat island' (UHI)¹⁵ effect (up to 10°C higher) being exacerbated by rising temperatures in a changing climate. In addition, large concentrations of people, informal housing (often in marginal areas) and more severe air pollution can expose children to many climate-related risks. Ill health, injury or even death can result from increased floods and landslides. Meanwhile, displaced families, disrupted social networks and household stress expose children to a higher than normal risk of neglect and abuse (ibid.).

3.2.1 Health

According to McMichael et al. (2004), who estimate the possible impacts of climate change on health for a population¹⁶, the health-related effects of global climate change are predicted as being heavily concentrated in poorer populations at low latitudes. This is where the most important climate-sensitive health outcomes (malnutrition, diarrhoea and malaria) are already common and where vulnerability to climate effects is greatest. These diseases mainly affect younger age groups. It follows that the total burden of disease as a result of climate change appears to be borne primarily

¹⁵ A UHI is a metropolitan area that is significantly warmer than its surrounding rural areas, given a combination of radiation retention, thermal properties of surface materials and lack of evapo-transpiration.

¹⁶ The authors use existing and new models that describe observed relationships between climate variations, either over short time periods or between locations and a series of health outcomes.

by children in developing countries. Nevertheless, the authors clarify that it is not yet feasible to base future projections on observed long-term climate trends, for three reasons: 1) a lack of standardised long-term monitoring of climate-sensitive diseases in many regions; 2) methodological difficulties in measuring and controlling for non-climatic influences on long-term health trends; and 3) the fact that the small (but significant) climate changes that have occurred so far are an inadequate proxy for the larger changes that are forecast for coming decades.

Among the most significant potential risks for children are those related to health. Bunyanavich et al. (2003) suggest three pathways through which climate change may affect child health: environmental changes associated with anthropogenic GHGs; direct climate change impacts; and ecological alterations triggered by climate change. Table 1 outlines these and the related possible impacts on children.

Table 1: The relationship between climate change and health

Pathway	Impacts on children
1. Environmental changes associated with anthropogenic GHGs	• Respiratory diseases • Sunburn • Melanoma • Immuno-suppression
2. Primary climate change impacts	• Heatstroke • Drowning • Physical injury • Gastrointestinal disease • Psychosocial maldevelopment
3. Ecological alterations triggered by climate change	• Malnutrition • Allergies • Vector-borne diseases (malaria, dengue, encephalitides, Lyme disease) • Infectious diseases (e.g. diarrhoea)

Source: Bunyanavich et al. (2003).

As a result of the abovementioned risk factors, climate change-related increases in disasters and disease occurrence pose important challenges to the current healthcare infrastructure and place pressure on health service delivery as the demand for health care is likely to rise. It also important to be aware that health concerns may vary by gender. For example, among secondary impacts, the potential dimensions of women's and girls' increased caring roles could increase their time poverty and mediate their normally limited household bargaining power, e.g. for the use of mosquito nets. This could determine alternative health impacts for boys and girls.

3.2.2 Nutrition

Malnutrition is already a leading cause of infant and child mortality and evidence of progress in this area has been slow to date. Malnutrition has significant effects on child development. The likelihood of a child becoming chronically malnourished increases with repeated exposure to disasters (UNICEF, 2008), from slow-onset droughts and desertification to rapid-onset floods. In addition, conditions at household level, brought about by climate change such as loss in livelihoods, could hinder families' ability to provide children with a nutritious diet.

Malnutrition results from food shortages, which can be triggered by reduced rainfall, other changes affecting agriculture or interruptions in supplies during sudden severe events. It is also closely tied

to unsanitary conditions and to children's general state of health, which can be exacerbated by climate change. In countries where there is a son bias, scarcity of food can affect girls more severely. Evidence from some countries indicates that girls often eat least and last, particularly during crisis periods. (Jones et al 2009).

3.2.3 Education

There are links between climate change and education, particularly during and immediately after extreme events or environmental and climate-related disasters. During extreme events, school infrastructure or roads and bridges to schools can be destroyed, limiting children's possibilities of attendance. Children may be removed from school to support the household. These impacts can sometimes be highly gendered as, in some contexts, boys are prioritised over girls. Girls are pulled out of school more promptly, either to provide additional (re)productive work or for cost-ritual concerns such as early marriage. The added burden of disease in areas suffering food and water insecurity can render children too weak to attend school. It can also reduce the time available for education when the household division of labour is restructured to cope with illness. In any case, ill or malnourished children lack the energy to be active learners (Bartlett 2008).

3.2.4 Emotional and social well-being

Climate change can expose children to higher risks of abuse, neglect and exploitation because of separation from parents and caregivers, heightened household stress levels or displacement. As conditions become more challenging so do the burdens facing caregivers, who are more likely to leave children unsupervised and neglected (Bartlett 2008) or to become more aggressive towards them as a result of stress. Sudden disasters can therefore have severe social and psychological effects on child well-being. Additionally, loss of or separation from family members and displacement or relocation (migration) can have a profound effect on children's emotional well-being.

When social safety nets fail during or after natural disasters and resource conflicts, children are particularly vulnerable to trafficking, gender-based violence and physical harm. A lack of household resources is a significant driver of this type of vulnerability, particularly for women and children, who account for 75% of the displaced, following disasters (UNICEF 2008). Women and children also experience a disproportionate risk of physical violence as a direct consequence of their age and gender. Meanwhile, child protection is traditionally an under-funded sector, despite its huge importance in emergencies such as those associated with climate change.

3.2.5 Opportunities

In the case of adolescents in transition from school to the labour force, climate change's impact on work opportunities can present a challenge, transmitted economic shocks. Disadvantaged adolescents who have had fewer opportunities to develop their capabilities can face more difficulty generating an income. This is more particularly the case in rural areas negatively affected by climate conditions or in urban areas to which they might have migrated. In addition to increasing the risk of poverty, this situation can lead to emotional stress. On the other hand, adolescents who have had more access to better quality education might be in a position to reap the benefits of jobs being developed as part of a 'green economy'. Inequalities can imply different abilities to take advantage of these opportunities and therefore need to be addressed in planning for youth development.

We now turn to a more specific analysis of the primary and secondary impacts of climate change on children in South Africa.

3.3 What are the primary impacts of climate change on children in South Africa?

The primary impacts of climate change on children in South Africa can be analysed on the basis of changes anticipated over various time scales. As discussed in Section 2, the main types of projected effects of climate change are changes in precipitation levels, increases in temperature, increases in the number of hot days and sea level rises affecting coastal areas. Regional patterns of these projected effects for the distant future are summarised in the table below.

Table 2: Summary of regional climate change impacts across South Africa on key climate variables for the distant future

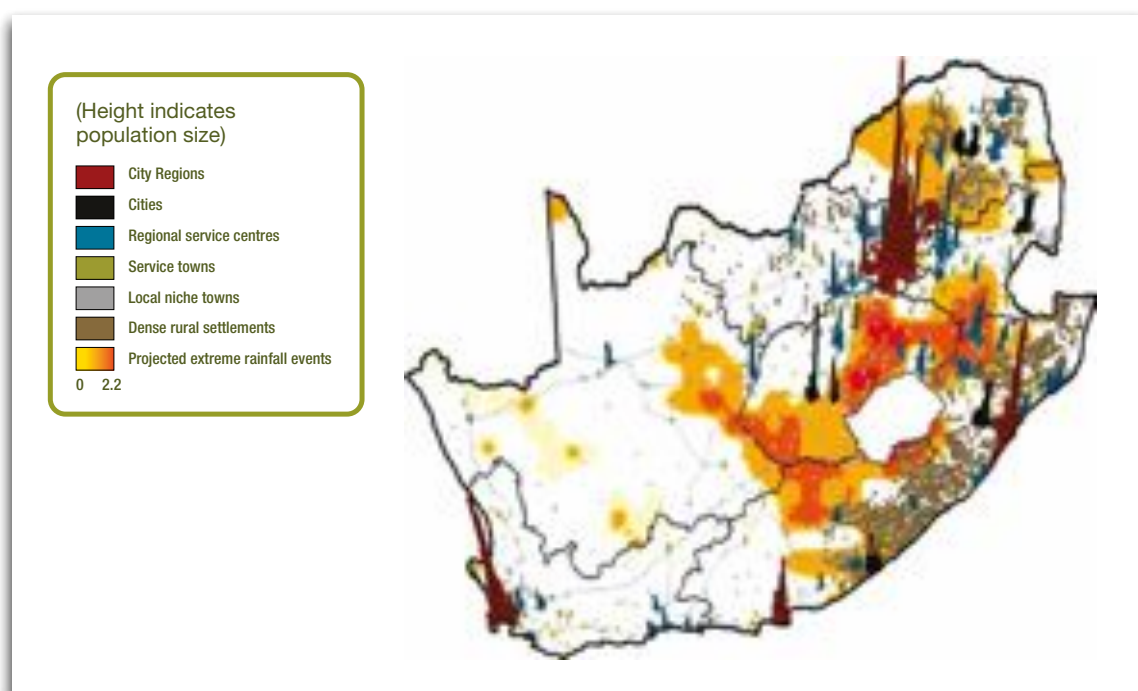
	Average annual temperature & number of 'hot' days and nights	Total annual average rainfall	Rainfall intensity, and number of heavy rainfall events annually	Total days with no rainfall (p.a.)
North-East (Limpopo, Mpumalanga, Gauteng)	Moderate increase	High increase	High increase	Moderate decrease
Interior (Free State, North West)	High increase	Moderate increase	High variation (increase in some areas, decrease in others)	Little/no apparent change
West (Western Cape, Northern Cape)	Slight increase	High decrease	Moderate/high decrease	Moderate increase
South-East (Eastern Cape, KwaZulu-Natal)	Slight increase	High increase	High increase	Moderate decrease

Note: Relative qualifications are not meant as quantitative categories, but reflect a general synthesis of available climate data. The table seeks to summarise a wealth of regional data. Source: Degrees of impact are given as broad qualitative summaries of outputs from DoEA (2010), Lumsden et al. (2009), McSweeney et al. (2010) and Schultze (2010). For a more specific description of regional impacts, refer to the source documents.

The South African Risk and Vulnerability Atlas concludes that the three major environmental consequences of climate change are increased drought, floods and water pollution (DoST 2010). The analysis below draws on the projected regional changes and relates them to the existing challenges facing children that could exacerbate their vulnerability. Although there is no primary evidence of these impacts on children, as data have not been collected, the analysis can be inferred based on research from other relevant disciplines in South Africa, and from the international literature highlighted in Section 3.2.

One of the challenges facing South Africa is that the regions with higher climate risks are often those with the highest population concentration and important human settlements. Illustrating this, many of South Africa's most densely populated areas are situated towards the north-east and south-east of the country and overlap to a degree with 'hotspots' for future projections of extreme rainfall (Figure 4). It is therefore important to recognise the complex relationship between climate change and human systems, to ensure planning that can best help the population prepare and respond to these changes. The analysis below focuses on the situation of children living in poverty and marginalisation. These are the children likely to be amongst those most affected by climate change and who face greater challenges in adapting.

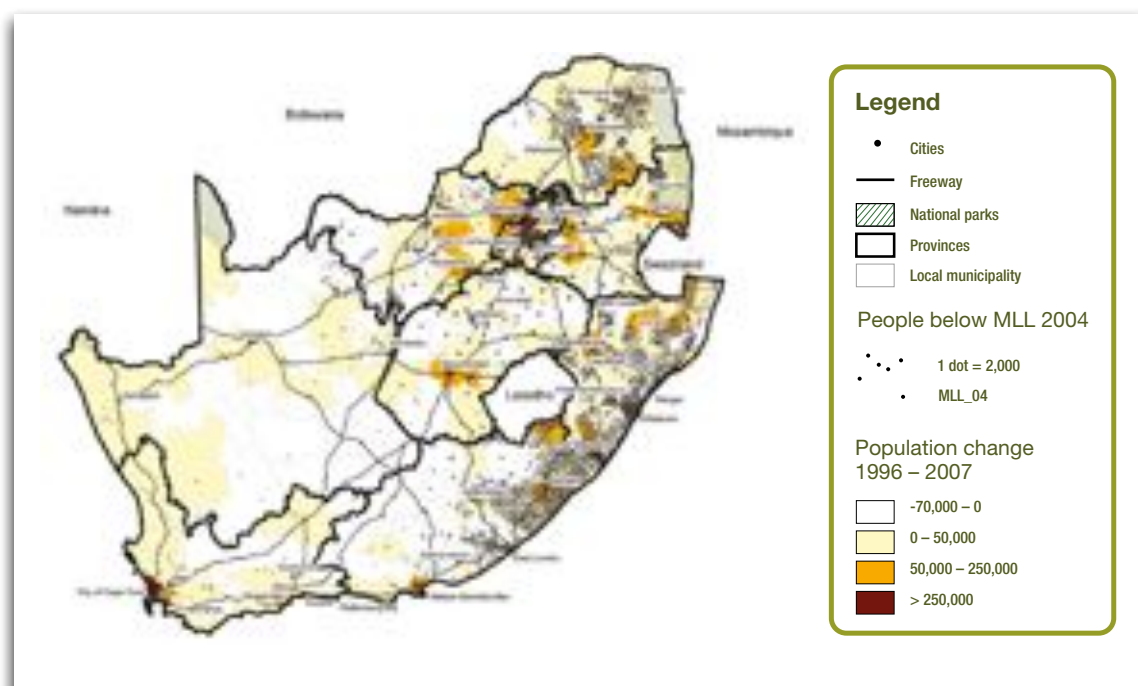
Figure 4: Potential settlements vulnerable to projected extreme rainfall events



Note: Map depicting the total population in 2007 (height of bar graphs) of various South African settlements (Source: CSIR mesoframe 2010) and the projected change in the frequency of extreme rainfall events (here defined as 20 mm of rain or more that occurs within a 24 hour period per 50 x 50 km² grid box) for the near-future period 2011–2040 relative to 1961–1990 (source: CSM&EH). Units of the rainfall variable are number of rainfall events per grid box per year.

Source: South Africa Risk and Vulnerability Atlas, spatial database <http://rava.qsens.net/>

Figure 5: Population growth and geographic distribution of people living in poverty



Source: Based on geospatial analysis platform (CSIR 2006), NSDP 2006 and SSA data taken from DoST (2010).

3.3.1 Child poverty and inequality¹⁷

South Africa has high rates of child poverty, with a national average of 60.5% of children living below the poverty line. Levels are much higher in predominantly rural provinces such as Limpopo (78.7%), KwaZulu-Natal (68.1%) and Mpumalanga (65.2%). The rate of child poverty in Limpopo is the highest in the country (alongside the highest rate of rural residence of children). Urban rates are much lower. In Gauteng and the Western Cape, child poverty rates are 36.2% and 28.4%, respectively, which gives a sense of the spatial inequalities in the country. This patterning of child poverty has an important overlap with the patterning of climate change impacts, particularly affecting the north-east and south-east.

Children are more likely to live in poorer households than in richer households, which renders them more vulnerable to risk, especially since environmental and development pressures are higher in these households. Approximately 7 million children live in the poorest 20% of households, while only 1.7 million children live in the richest 20% (SAHRC and UNICEF 2011:11).

Indeed, poverty has been identified as the primary barrier to access to the services and support necessary to buffer households against the impact of climate change. Since a greater number of children live in poor households, they face challenges that increase their exposure to these impacts. Children in the poorest quintiles are two times less likely to have access to adequate sanitation and water, 17 times more likely to experience hunger, three times less likely to complete secondary education and 25 times less likely to be covered by a medical scheme (*ibid.*: 13). As discussed above, girls are at considerable risk of being over represented within these statistics. Racial disparities are also a major barrier to development, with black children performing significantly worse than white children across a number of variables, including likelihood of living in poverty, likelihood of having access to adequate sanitation and water, risk of experiencing hunger and opportunities to complete secondary education. All of these factors mean that, unless policy measures are taken to reduce disparities in development, climate change impacts on health, nutrition, education and livelihoods will be an additional negative pressure on black children growing up now and on those of the next generation.

Rural areas lag far behind urban areas in terms of access to services such as work opportunities, clinics and schools. Children living in formal settlements are more likely to have access to municipal services than those in informal or remote settlements. Half of South Africa's children live in rural areas. KwaZulu-Natal, Limpopo and the Eastern Cape contain 76% of all rural children. Children in rural areas are much poorer and the spatial distribution of multiple child deprivations (income and material, employment, education, biological parent, living environment) still overlaps to a large extent with the location of the former homelands (SAHRC and UNICEF 2011: 14–15).

While close to 90% of children live in formal housing in Limpopo province, this figure falls to 44.7% in the Eastern Cape and 58.8% in KwaZulu-Natal. This implies that, in some provinces, half the children live in housing that could be at greater risk of damage as a result of severe weather conditions, given the weakness of walls and roofs. This kind of housing leaves children more exposed to the consequences of flooding, which are more likely as a result of projected increases in average rainfall and intensity in the provinces of the Eastern Cape and KwaZulu-Natal. Over 40% of children living in informal housing are in the 0–5 age group. In addition, children living in informal housing are especially vulnerable to environmental hazards such as shack fires, paraffin poisoning and water- and air-borne diseases.

3.3.2 Health-related challenges

The infant mortality rate has decreased steadily since the year 2000, from 52 infant deaths per 1,000 live births in 2000 to 34 in 2010 (ASSA 2008, in Jamieson et al. 2011). However, according to 2008 data, the infant mortality rate varies between provinces, for example between the Eastern Cape (46.5)

¹⁷ Unless indicated otherwise, child development data in this section are taken from Jamieson et al. (2011).

and the Western Cape (19). Similarly, there are provincial variations in the under-five mortality rate, with the Eastern Cape and KwaZulu-Natal having the highest rates (65.3 and 62.7, respectively), compared with 26.5 in the Western Cape and 37.1 in Gauteng. These variations are influenced by the poverty level, living conditions and access to services and resources in the surrounding community. All of these can entail risk factors that impact directly on the child's health through the occurrence of disease, which stands to be exacerbated by changing climate patterns and events. Children living in remote rural areas have less access to health care facilities, compared with those living in urban areas. For example, in the Western Cape and Gauteng, 10–16% of children live far from health facilities. The rate is three to four times higher in Limpopo and KwaZulu-Natal. This represents an obstacle for children and their households seeking medical attention at the occurrence of diseases, such as malaria or diarrhoea, particularly as longer distances are also linked to higher transport costs.

Important factors contributing to children's ill-health include poor access to water and sanitation facilities. In 2009, seven million children lived in households without access to clean drinking water on site. A significantly higher proportion of children (38%) than adults (28%) live in households without water, given that households, particular poorer ones, tend to include a greater number of children than adults. Progress in access to water since 2002 has been slow, and there are stark provincial differences. Over 90% of children in the Free State, Gauteng and the Western Cape have an adequate supply of drinking water, while access to water remains poor in KwaZulu-Natal (46%), Limpopo (44%) and the Eastern Cape (32%) (SAHRC and UNICEF 2011).

Children's access to adequate sanitation facilities rose from 47% in 2002 to 63% in 2009. Yet 6.8 million children still use unventilated pit latrines, buckets or open land, despite the goal to provide adequate sanitation to all. Children (37%) are more likely than adults (29%) to live in households without adequate sanitation facilities.

As with access to water, there are great provincial disparities in access to sanitation facilities. In provinces with large metropolitan populations, like Gauteng and the Western Cape, around 90% of children have access to adequate sanitation. Provinces with large rural populations have the poorest sanitation. The proportion of children with adequate toilet facilities increased from 22% in 2002 to 50% in 2009 in the Eastern Cape and from 36% to 58% in KwaZulu-Natal. In Limpopo, only 37% of children had adequate sanitation in 2009.

This unequal access (which includes gender and racial disparities), to health, water and sanitation services shows important overlaps with the patterning of projected climate impacts and can have many important consequences for girls' and boys' health. Increased prevalence of and susceptibility to diseases, as highlighted below, may put children's health at greater risk, leading to greater pressure to respond to higher demand on already weak health systems.

Malaria

The most important diseases affecting children's health are also those most sensitive to climate impacts. Currently, existing data on the incidence of malaria, which is prevalent in areas with high temperatures and rainfall and is exacerbated by the presence of stagnant water (Grover-Kopec et al. 2005), shows significant provincial variation. While several provinces report no or a small number of malaria infections (the Eastern Cape, Free State, KwaZulu-Natal, North West, the Northern Cape and the Western Cape), the number of infections is higher in Limpopo (45.9 cases per 100,000 people), Mpumalanga (62.7) and Gauteng (13.1) (Department of Health 2011). These are among the provinces projected to receive the highest increase in rainfall, combined with a moderate increase in temperature and the number of 'hot' days.

In addition, Limpopo and Gauteng are the two provinces with the greatest shortfalls in access to sanitation facilities, which could contribute to a favourable environment for the development of malaria. Based on this information and in the absence of adequate planning to respond to this scenario, a

possible scenario in the medium-to-long term is that there is insufficient capacity to prevent or cure malaria infections, particularly where access to health facilities is already inadequate. For example, in Limpopo, 38% of children require more than 30 minutes to get to their nearest health centre. A number of studies suggest that the expansion of vector borne diseases such as malaria, rift valley fever and schistosomiasis are an ever present reality and likely to be further compounded by the impacts of climate change. Simulations already predict an increase in the range of the malaria zone along South Africa's north-east border, though this potential rise has yet to materialise, due in part to expanded government interventions (DoEA 2010). Further evidence of how these diseases are evolving as a result of climatic fluctuations is required, particularly taking into account the complex relationship between people, environment, vector and parasite.

Diarrhoea

Diarrhoea, alongside HIV and AIDS and respiratory diseases, is one of the major causes of child deaths in South Africa (11% of deaths of children under the age of five [Norman et al. 2000]) and is responsible for the majority of childhood illness. Most cases of diarrhoea are caused by inadequate sanitation and poor hygiene, together with unsafe drinking water (WHO 2007). Poor sanitation is also associated with cholera.

As the intensity of rainfall increases in certain parts of the country and, if water is not managed adequately, the overflow of surface sewage systems and flooding, particularly in urban areas, will mean children are more exposed to water-borne and transmittable diseases as water sources become polluted. In particular, higher levels of rainfall, compounded by higher rain intensity in the north-east, south-east and to some extent in the central regions of the country, may increase the risk of water-, air- and vector-borne diseases such as diarrhoea, cholera and bilharzias. Children will be particularly vulnerable in provinces in such as KwaZulu-Natal, Limpopo and Mpumalanga, where water and sanitation facilities are inadequate and below national averages, unless investments in basic infrastructure are made to address current shortcomings. There is likely to be less water availability and a greater incidence of poor-quality water, particularly in the northern and north-western parts of the country, which already have lower than average numbers of households connected to piped water. This means further risks to children's health, particularly where households do not purify or boil water prior to consumption.

HIV and AIDS and respiratory diseases

South Africa is currently the country with the largest number of people living with HIV. Many children are HIV-positive or have become ill and died as a result of AIDS. Based on the 1998 South Africa Demographic and Health Survey (SADHS: Department of Health et al. 1998) and ASSA 2003, it was assumed that mortality rates continued to increase during the 2000s. However, this trend was reversed around 2003. The decreasing child mortality rates correlate with the timing of the national prevention of mother-to-child transmission programme. However, there are significant provincial differences in prevalence. The Western Cape consistently has the lowest rate (1.2% in 2010), while prevalence is highest in KwaZulu-Natal (4.1%). Across South Africa, 438,000 children under 15 years (2.8%) are estimated to have been HIV-positive in 2010.

Rising temperatures and greater numbers of hot days and nights, particularly in inland provinces such as the North West and Free State and inland areas of coastal provinces, might see deteriorating air quality. In larger inland urban areas such as Johannesburg, Pretoria and Polokwane, rising temperatures could generate urban heat islands (UHIs). Furthermore, compounded by issues of increased air pollution, these pressures could negatively affect children's respiratory health and development. In rural areas, poor air quality could induce respiratory diseases, such as asthma and tuberculosis. The higher risk of respiratory disease is particularly challenging where a large number of children are infected by HIV and AIDS as it could complicate a disease's prognosis. HIV and AIDS

are already more prevalent in Mpumalanga and the Northern Cape, where temperatures are likely to see a sharp rise.

Other risks to health

Higher temperatures in some areas could result in a rise in cardio-respiratory complications as a result of heatstroke, particularly as some of these areas are those where water is likely to become scarcer.

A higher intensity of rainfall, compounded in some areas by higher levels of rainfall, can have an impact on both rural and urban areas through flooding. This can pose an important risk to children's health and survival, either directly through drowning, or through the transmission of infectious diseases already discussed. Areas at greater risk include Limpopo, Mpumalanga and Gauteng, where higher rain intensity is combined with poor sanitation and high population density (e.g. Pretoria, Johannesburg) and in the Eastern Cape and KwaZulu-Natal, where there is high population concentration, and in urban areas (e.g. Durban). In urban areas, higher rain intensity can also erode housing and other basic infrastructure such as schools, causing buildings to collapse, which could result in bodily injury to children and adults. Floods also have the potential to destroy infrastructure, preventing the normal delivery of services. Health services that would be vital to respond to cases of injuries and drowning would be slowed. Floods such as those in Johannesburg and Cape Town in recent years could be seen in central and eastern urban areas of the country such as Durban in the near future.

In some rural areas and in localities with dense forests, wildfires caused by the greater number of hot days could cause destruction of livelihoods and infrastructure and could even cause bodily harm and injuries to children who are near.

3.3.3 Food and nutrition

The government of South Africa has introduced a number of programmes to reduce hunger, malnutrition and food insecurity. Yet child hunger continues to be a problem. Nearly three million children (16%) were living in households where child hunger was reported in 2009, despite a significant drop in reported child hunger, down from 30% of children in 2002. There are again large disparities between provinces and population groups. The provinces with the highest reported child hunger rates are the Eastern Cape and the Free State. In the latter, it increased from 13% in 2008 to 21% in 2009. Despite high rates of unemployment and income poverty, Limpopo has the lowest proportion of reported child hunger (8%). This may be related to greater food security in rural households as a result of access to land for subsistence agriculture, which could be at risk as a result of climate change.

In South Africa, the number of Black African children experiencing hunger is greater than for children in any other ethnic group. In 2009, some 2.7 million African children lived in households that reported child hunger. While this is an improvement on the 3.3 million in 2008, it is still 17% of the total African child population in South Africa.

As with health risks, climate change can also pose important risks for children's nutritional status and access to food. Where levels of rainfall decrease, particularly in the south-east, where there is one of the highest population concentrations, there will be more land degradation and soil erosion and a greater likelihood of drought. This will lead to less agricultural production and diversity, impacting on food availability. In the Eastern Cape, the third most populated province, agriculture is one of the most important activities yet child hunger is already a significant problem. Food shortages resulting from droughts could be detrimental to the development of children.

In rural areas in the interior of the country where there is a high proportion of subsistence agriculture, such as in the Free State and North West provinces, projections of rising temperatures and changes in the patterns of rainfall threaten predictability in food production and access. Children in these localities, who are already facing higher-than-average levels of hunger and malnutrition, may be

affected the most by these shortages. In other rural areas, such as Limpopo, even if hunger is currently not prevalent, loss of land productivity could lead to lower food security and, as a result, the higher likelihood of malnutrition among children if adequate adaptation strategies are not supported effectively.

3.3.4 Education

South Africa has high levels of school enrolment and attendance. Among children of school-going age (7–17 years), the vast majority (97%) attended some form of educational facility in 2009, up from 95% in 2002. However, of a total of 11.4 million children aged 7–17 years, 370,000 were reported not to be attending school in 2009. Dropout rates are an important problem, particularly from the age of 14. This increases with age. As schooling is compulsory until the age of 15 or the end of Grade 9, the attendance rate decreases more steeply from age 16 onwards, with 93% of 16 year olds, 85% of 17 year olds and 72% of 18 year olds reported to be attending school. There is no significant difference in dropout rates between boys and girls. The main reason for school dropout has been identified as the cost of education. Children have to pay school-related costs (such as school uniforms, transport, books, etc.) despite the policy of fee elimination. Other children drop out of school because they perceive it to be useless. This is particularly problematic among adolescents, as they then face a difficult labour market. Illness and exam failure are also dropout causes. A national survey on access to education found that only 14% of learners were absent for more than five days during the school year. The main reasons for longer absences were illness, poor weather conditions and floods. These latter factors could be exacerbated as a result of climate change, triggering greater absenteeism.

The primary impacts of climate on children's education are likely to be less significant than the secondary impacts, which we explore in Section 3.4 below. However, it is important to highlight some primary impacts, to enable prevention through better planning. In the north-east and south-east, where rainfall is likely to increase significantly, damage to infrastructure may have significant effects on school buildings and access to schools. In areas with inadequate infrastructure, some schools could be rendered temporarily impassable, leading to absenteeism. For example, recently over 40 schools were reportedly closed and hundreds of school children across the Western Cape province were affected because of floods and snow in the Karoo¹⁸.

Additionally, the higher health burden on children, explored above, can reduce their capacity to learn and concentrate in school and even cause absenteeism linked to illness. As those children whose health is likely to be more significantly affected are already at a disadvantage in terms of poverty and marginalisation, this will compound their likelihood of dropout and poor school attainment, contributing to the intergenerational transmission of poverty.

Additionally, water scarcity might have implications on schooling by causing a greater time burden on children – particularly girls, who may have to travel greater distances to collect water. This affects their capacity to do other activities, such as go to school, do homework or enjoy leisure time.

3.3.5 Emotional and social well-being

Climate change is likely to generate other direct challenges for children beyond health, nutrition and education. While the emotional and social effects of climate change-related events on children are most likely to be triggered by households' and children's own adaptation strategies, as discussed in section 3.4, some direct effects can result from distress and household stress. Members of the household may be distressed from having to face disasters, particularly in the case of such rapid onset events as floods. The destruction of housing, school infrastructure, damage to the community and, in some cases, injury and loss of life might cause children emotional distress, with long term

¹⁸ See <http://www.unisdr.org/archive/22840>

impacts on their development. Within the household, livelihood shocks caused by climate impacts, which also cause stress in the household, can generate episodes of domestic violence, particularly problematic for children and women.

Lack of emotional and social well-being is a phenomenon that has not been studied in the context of South Africa. Nevertheless, given the shortfall in child protection and support services, particularly in poorer areas of the country, children facing these problems are unlikely to receive support. Currently, because South Africa's relatively dry and warm conditions already generate periodic water scarcities, their severity will likely increase in areas where rainfall is projected as decreasing. Droughts will have important impacts on livelihoods, as indicated above. Additionally, important population pressures resulting from higher temperatures and the likelihood of drought are likely to see continued rural-urban migration as well as immigration from other countries. These two issues are explored in Section 3.4, which focuses on adaptation.

3.3.6 Overarching impacts

The combination of precipitation changes and higher temperatures stands to affect significantly the livelihoods of households where children live. There are numerous adaptation strategies that households and children within them can adopt, as discussed below, some of them with positive and others with negative effects on children. However, in most cases, and particularly with rapid-onset disasters, an important impact will be the rise in poverty or income insecurity. This can affect children in a number of significant ways. A drop in household incomes can result in children being withdrawn from school, receiving lower health care (at a time when they might be in greater need) and having less food to eat. All these factors can have severe developmental consequences for children.

Although South Africa is currently performing well in terms of school enrolment, school dropout is a problem and the main cause of this is school-related costs. A shock to incomes that are not buffered by other coping measures (either formal or informal) can lead to further school abandonment. Similarly, health care might become unaffordable for households that face environment-related income shocks.

Importantly, current development indicators show very significant levels of disparity, particularly between rural and urban areas and across levels of income and ethnicity. This means that, in the current context, children who stand to be more severely impacted by climate change through the different pathways explored above are those who are already marginalised and facing worse development conditions, in particular children in poor households and Black African children. Climate-related risks can exacerbate existing inequalities unless efforts to mitigate these vulnerabilities are incorporated into climate change planning across relevant sectors, including health, education and nutrition.

Among the groups of children most at risk are child-headed households¹⁹. An analysis of the 2006 General Household Survey found that 0.67% of children were living in child-headed households. About 90% of all child-headed households are located in three provinces, Limpopo, KwaZulu-Natal and the Eastern Cape. On average, living conditions are worse than those in mixed-generation households. Child-headed households are less likely to live in formal dwellings or to have access to adequate sanitation and water on site, all of which have already been highlighted as risk factors linked to climate change impacts. Money sent by family members or other adults living elsewhere is the main source of income (77%). 95% of children in child-headed households attend school. However, dependence on remittances in the absence of earnings and grants means income may be an unreliable strategy (Meintjes et al. 2010). As a result of these living conditions and their vulnerability to income poverty, child-headed households' exposure to climate change is important, particularly as most are located in the provinces likely to be worst affected by climate change impacts.

¹⁹ Commonly defined as those where all members are under 18 years of age. Despite a common belief that child-headed households consist mainly of AIDS orphans, the 2006 General Household Survey found that only 8% of children living in child-headed households were children who had lost both their mother and father: 80% had a living mother. Most double orphans live in households with adults, suggesting that kinship networks continue to provide care for these children: only 1.5% of children who are double orphans live in child-headed households

Table 3: Main primary impacts of climate change on children in South Africa²⁰

	Areas with increased likelihood of a higher concentration of affected children	Type of impact
Health	Limpopo, Mpumalanga and Gauteng	Incidence of malaria could increase resulting from a moderate rise in temperature and an increase in the number of 'hot' days per annum, combined with increased intensity of rainfall and insufficient sanitation infrastructure, which can lead to an accumulation of stagnant water. Those farthest away from health facilities and with poorer access to water and sanitation will be most affected.
	Free State, North West	Malaria outbreaks. Although malaria cases are currently very few, a steep increase in temperature and of the number of 'hot' days per annum could increase the spread of the disease. Health infrastructure in these regions is currently unprepared to deal with malaria outbreaks given the historically low prevalence in the area.
	KwaZulu-Natal, Limpopo and Mpumalanga, particularly common in informal urban settlements	Vulnerability to infectious diseases such as diarrhoea and cholera could increase resulting from higher intensity rain episodes where water and sanitation facilities are inadequate, in both rural and urban localities, although potentially worse in informal urban settlements where there are greater concentrations of poor.
	Free State and North West and some larger inland urban areas such as Johannesburg, Pretoria and Polokwane	Incidence of respiratory diseases and heat stroke may increase. Higher temperatures and a greater number of 'hot' days over the annual cycle are particularly linked to reduced air quality. Higher levels of pollution can lead to asthma and tuberculosis, which are particularly problematic given the reduction in resilience incurred by a higher prevalence of HIV/AIDS in these areas. Incidents of heatstroke are likely to be exacerbated by deteriorating levels of water due to evapo-transpiration.
	Limpopo, Mpumalanga, Gauteng, Eastern Cape, KwaZulu-Natal – particularly for those living in informal housing	Risk of drowning or injury resulting from damage to infrastructure. Increases in rain intensity, particularly with insufficient water management systems and high population density, can lead to flooding.
Nutrition	Eastern Cape, Free State, North West	Risk of food shortages, linked to child hunger and malnutrition. In rural areas where subsistence agriculture is prevalent, there is greater likelihood of drought linked to higher temperatures and unpredictable rainfall. This is likely to have particularly acute effects where child hunger is already significant.
Education	Limpopo, Mpumalanga and Gauteng, Eastern Cape, KwaZulu-Natal	Potential floods and heavy rainfall could damage school infrastructure and roads or bridges that reach schools. Flooding is already a cause of school absenteeism and this could be aggravated by heavier rainfall patterns. Possible increase in disease and malnutrition could affect school attendance and student performance across the country.
Emotional and social well-being	In different localities where disasters occur and are likely to become more prominent, increased variability likely nationwide, notably across much of the north-east (flood), and south-west (drought).	Children can be emotionally distressed by the occurrence of disasters such as floods or droughts, especially in the absence of counselling, official support mechanisms or a stable, supportive home environment.
Other areas	Free State, North West, Limpopo, Western Cape, Northern Cape	Greater time burden for children (particularly girls) owing to having to travel greater distances to fetch water in those areas where water availability is reduced – particularly where households already experience inadequate access to water sources. In localities with dense forests, forest fires can result in injury or fatality.

20 Based on generalised information; assumes that no adaptation responses are being made.

3.4 What are the secondary impacts of climate change on children in South Africa?

In terms of the secondary impacts on children, how households choose to cope and adapt to changing climate and development pressures will ultimately have great consequences for household security and for intra-household dynamics and children's development and well-being.

3.4.1 How will climate change affect livelihoods?

A holistic understanding of vulnerability in terms of people's livelihoods recognises that people within a society survive and thrive by doing many different things. A person or a household's livelihood is made up of a range of different types of assets, abilities and activities that allow them to maintain their well-being and take advantage of opportunities around them. From a sustainable livelihoods perspective, being able to maintain household livelihoods at the local level requires: the availability of a diverse set of appropriate assets (financial, human, natural, social and physical); the ability to access these assets; and the policies, institutions and processes (including social 'norms') that allow for a suitable enabling environment for households to deliver successful outcomes (DoEA 2010a). Therefore, in understanding vulnerability in the context of South Africa's low-income communities, we have to consider what impact climate change will have on a household's diverse portfolio of activities (Ellis 2000).

Climate can have a considerable effect on both rural livelihoods (see Box 4) and urban settings (see Box 5). Broadly speaking, its impacts are classified into either short- or longer-term stresses. Goodman and Itus (2008) identify a series of key pathways through which climate change creates barriers to the achievement of the child survival, development and protection goals. At the household level, climate change can lead to loss of livelihood and loss of food security (primary transmitters). These can cause increased conflict over key natural resources (such as land and water), with implications for further displacement and migration, either internal or external.

The degree to which these shocks and stresses have an impact on households depends on the coping and adaptation strategies available, as well as their capacities to respond to or buffer the impact (DoEA 2010a). Capacities at the local level are made up of a number of different interrelated characteristics, in terms of the availability of assets but also the access and entitlement to assets. More characteristics would include: information about what changes might occur in the future and the technical knowledge to act accordingly; the ability and willingness to innovate and try new things; and the establishment of mechanisms of flexible forward-looking decision-making and governance (Jones et al. 2010).



Box 4: Vulnerabilities to climate change in livelihood production activities in rural South Africa

- Increased or decreased rainfall can impact on rangelands and cattle health, which can lead to the selling of livestock.
- High variability in rainfall and a change in rainfall patterns can make it hard to manage irrigation and plan for market demands, which impacts profit.
- Drought and the inability to farm as normal may prompt households to find other sources of income, either through migrating for work (e.g. from rural to urban areas) or through other projects such as making bricks, sewing, selling firewood, etc.
- Increased rainfall can require improved shelter for livestock and fodder to be stored in a dry place.
- Decreased rainfall can lead to diversification of agricultural practices, including increasing the amount of irrigated land or finding new locations, sometimes on more marginal land; growing indigenous species; cutting plants to a higher stem level; harvesting less often to prevent nutrient depletion; using local techniques to decrease wind erosion (e.g. mulch strips for shelter belts of natural vegetation); and planting drought-resistant yellow maize, late-maturing fruit trees and winter crops.
- Decreased rainfall will increase the need to store fodder for livestock or to use alternatives (e.g. maize stalks) and to increase food storage for human consumption.
- More frequent droughts will encourage water conservation, altered ground preparation and harvesting times, wind erosion prevention measures, supplemental feed and water for livestock and the shifting of livestock to land with higher carrying capacity.

Source: DoEA (2010a).



Box 5: Summary of urban climate risks in South Africa

- Many of South Africa's urban settlements already host a high population vulnerable to floods on the one hand and scarcity of clean water on the other.
- Poor urban planning (or complete lack of planning in some informal settlements) exacerbates existing vulnerabilities to floods: situating buildings, access routes or service centres in flood or ponding-prone areas, using inferior building materials or constructing on sand dunes or unstable lands are common errors.
- Urban population pressures and competition over resources are fuelled by the town-ward movement of migrants from drier/inhospitable areas (Fischer and Vollmer 2009).
- Climate change is set to worsen current urban vulnerabilities by increasing the frequency of extreme weather events. This presents new challenges for disaster risk management, development planning and climate change adaptation in urban areas (DoST 2010).
- Informal settlements are particularly exposed to localised flooding during and after extreme periods of heavy rainfall. Major risks include ponding, overland surface runoff, upwelling, flooding of streams, rivers or wetlands, overtopping of storm water channels and leakage of rainwater into buildings (DoEA 2010a).
- In highly populated, overcrowded residential areas, many are adversely affected by the increasing numbers of hot days. Vulnerability is higher in areas that are not well ventilated, and where adequate quantities of good quality water are lacking.
- High levels of poverty in urban areas make for highly vulnerable populations with little spare money to replace or repair damaged property. Those who cannot undertake the necessary preventative or responsive measures increase their vulnerability to other hazards occurring in the future (DoEA 2010a).

These characteristics relate strongly to the underlying drivers of vulnerability. For this reason, such factors as unstable economies, fluctuations in the prices of key goods and household inputs and health crises threaten households directly and affect their ability to deal with the impacts of climate variability and change. If a climate shock or stress event, such as a prolonged drought, is imposed on an already vulnerable livelihood, the household may be unable to respond and cope. The strategies that households employ to cope with these shocks and stresses will inevitably affect intra-household relations and dynamics and will have significant and gendered, indirect implications for children's well-being at all stages of their development. For instance, as women and children are often over-represented in non-remunerative labour, they will need to adapt or cope in different ways, potentially leading to increased 'feminisation of agriculture' and the corresponding household, community and national implications this trend might bring. With this in mind, climate change must be considered in the context of wider development pressures, viewed as one of many interacting stressors affecting households at the local level.

3.4.2 Responding to climate variability and change at the household level in South Africa

Having to respond and adapt to change is a constant in the lives of people in South Africa. Whether it is short-term shocks (price spikes, rain failure, civil unrest, etc.) or longer-term stresses (population growth, natural resource degradation, patterns of migration), South African households have had to deal with past and ongoing changes in the local and regional processes that support their livelihoods. Climate change adds an extra layer of complexity to this as it will have a direct and indirect impact on people.

Actions taken to adapt to changing climate and development pressures will be taken typically at the household level, whether that household be male-, female- or child-headed. Those actions will have considerable implications for child development and well-being. Little is known in this regard, as we have seen. This section focuses on the coping and adaptation strategies taken at the household level (autonomous responses) and then discusses the implications for children after each strategy.

Adaptation is relatively easy to describe in principle, yet hard to see in practice and in detail. In this study, adaptation refers to the process by which communities and households reduce the impacts of adverse shocks and stresses, including those of climate change, on their livelihoods and well-being and take advantage of new opportunities provided by a changing environment (TERI 2007). Important to note is that adaptation does not occur spontaneously. A person or community requires agency, ability and willingness to adapt successfully and there is no end point. Change is continual and actions will require constant adjustment.

Responses taken to adapt to climate change can take many forms. In this report, we describe a number of different types of adaptation (see Table 4). With regard to decision-making processes at the household level, most actions taken will be autonomous, without the direct intervention of a public agency. These can be adopting new seed varieties, changes in livelihood activities or temporary migration during periods of climate shock. They will also often not be conscious decisions to respond to climate change but represent wider responses to development pressures.

Adaptation can also be planned. This is usually described as direct action on the part of a public agency, an NGO, government or civil society actor, resulting in a policy decision or action to adapt to the impacts of climate change. Examples of this are typically associated with the erection of sea walls and storm surge barriers to combat sea level rises; improved water storage infrastructure and the promotion of irrigation efficiency to deal with reducing levels of mean rainfall or increased inter-annual variability; and the inclusion of climate change and disaster risk issues in school curricula for children.

Adaptation can be incremental, as people or communities make small adjustments in their livelihoods and structures, largely maintaining the same functional objectives. Examples of this are the farmer's

adoption of new seed varieties or seeking additional supplementary forms of labour during times of hardship. Adaptation can also be transformational, with people or communities making large adjustments that result in a fundamental change in their livelihood functions or objectives. Examples may be permanent migration of a household or of different members of a household to more suitable locations or the adoption of new livelihoods.

Actions taken to adapt at the household level, both incremental and transformative, can have profound effects on household well-being, child development and intra-household dynamics. In practice, the distinctions between autonomous and planned and incremental and transformational adaptation are hard to identify. Many overlaps exist. Nevertheless, this conceptual separation helps to clarify and interpret the multitude of responses that people have in relation to changing climate and development pressures.

Table 4: The different types of responses to climate variability and change

Type of response	Description
Incremental responses	Responses that result in small incremental changes, generally aimed at enabling a person or community to maintain functional objectives under changing conditions.
Transformational responses	Responses that result in a significant change in the individual or community's primary structure and function.

3.4.3 What do projections of future climate mean for households and children in the immediate and distant future?

As parts of South Africa will be affected by climate change in completely contrasting ways (see Section 2), understanding what projections mean for households and children in the immediate and distant future across the country is a significant challenge. It is not possible to describe each of the primary and secondary implications for all people across the country. However, various commonalities and their implications for policymakers can be seen.

Looking to both the immediate (2046–2065) and the distant (2081–2100) future, it is clear that households and individuals (including children) across South Africa are likely to experience continued and exacerbated shocks and stresses. These relate to climate impacts and to wider development pressures and their interactions. As highlighted above, although the impacts may be transmitted both in different forms and to different extents, various general traits can be inferred. For example, if we consider a scenario where little is done to support effective and sustainable adaptation planning and to enhance households' and individuals' adaptive capacity, over the present and immediate future, the coping and adaptation strategies that households employ at the local level are likely to be predominantly incremental in nature (Stakhiv and Pietrowsky 2009). These are often built on existing approaches to managing existing variability and will, in some cases, bring about substantial benefits under 'moderate' climate change (Stokes 2010). Relatively small changes in climate and development pressures are likely to have negative effects on livelihood and household well-being but are unlikely to force households to seek major changes in structure and function.

However, there are limits to the effectiveness of incremental adaptation in a context of more and more severe changes in climate and development pressures (Crimp et al. 2008). Livelihoods or practices may require substantial shifts in terms of their primary functions and structures. Moving from the immediate to the distant future, it is likely that more transformational responses will be required to adapt to more significant change (Stokes 2010). It is impossible to quantify this threshold, and its

level will vary inevitably and tremendously, depending on the household and the context. Indeed, many households across South Africa are already resorting to transformational response strategies of dealing with changes in climate and development pressures (reflected to some extent in rates of internal and external migration, rapid urbanisation, etc.). However, it is likely that these transformational strategies will entail significant shifts in households' livelihoods and income generation activities, particularly in the more distant future.

3.4.4 Livelihood strategies to respond to changing climate and development pressures

In this section, we are concerned largely with exploring examples of autonomous responses in South Africa taken at the household level and by different individuals within the household. Then we want to explore their implications on children. It is important to remember that strategies taken in response to changing climate and development pressures will be diverse. Households' choices of response strategies will be context specific, influenced by location, social makeup, household demographics, gender, socio-political context, landscape, climate, etc. Similarly, multiple responses will be ongoing within a household at any one time. Even so, it is useful to synthesise and group response strategies so as to consider the implications of various common strategies, both for overall household security and intra-household dynamics, as well as the significant implications for child development and well-being.

In doing so, informed by the literature on coping and adaptation in South Africa and supported by information provided by a series of key informants, we identify three main response strategies: 1) lifestyle and behavioural changes; 2) supplementing livelihoods and adapting livelihood practices; and 3) seeking alternative livelihoods.

Lifestyle and behavioural changes

Often, the most common response to the impacts brought about by climate change relate to small changes in lifestyle. These are made up of a range of behavioural adjustments that individuals and households make in response to the primary effects of climate change and variability and the secondary effects on input and output prices. They can take the form of changes in the management of resources; in the methods and mix of inputs used in producing goods and services; in the purchase of goods and services; and in the choice of leisure activities (Leary 1999). Such adjustments are usually made during periods of resource scarcity, whether financial or otherwise, triggered by an immediate shock (such as a flood event) or longer-term stress (such as drought). An example would be changing eating habits through reducing food intake during times of hardship.

Households may also spend less money on food, turning to more readily available or cheaper products (Osborne et al. 2010; Quinn et al. 2011). Other changes can be noticed in efforts to reduce consumption of scarce natural resources such as water or fuel. In this regard, Osborne et al. (2010) found that individuals within rural households surveyed in KwaZulu-Natal, Limpopo and North West provinces had reprioritised elements of the production, consumption and ecological systems they employed.

These lifestyle changes can have important implications for children. Evidence indicates that, when faced with income shocks, poorer households, particularly those that are not receiving government social protection support, are more likely to cut down on food expenditure. This includes shifting to less nutritious food or consuming less food, both of which have the most detrimental effects on children's development. They may transfer children to cheaper schools (which are often of a lower standard) or they might be unable to send children to school at all, owing to insufficient money to pay for school-related costs such as transport (UNICEF 2011). As discussed, girls may eat least and last and be the first to be withdrawn from school. Children may also have less leisure time as they might be more involved in supporting work in the household or be less able to find the energy to do

school homework in the evenings. This could be as a result of greater time burdens or because of consumption of less nutritious food. In the case of children living in child-headed households or in non-household situations, a drop in expenditure might trigger similar lifestyle changes, although given the likelihood that they are already poorer prior to facing the livelihood shock, these adjustments could be more detrimental than to richer households.

Supplementing livelihoods and adapting current livelihood practices

Changes in climate may require individuals to modify their livelihood practices, either to limit the consequences of negative impacts or to take advantage of new opportunities. A common strategy of reducing vulnerability and attaining livelihood security during times of climate stress involves supplementing income generation to reduce reliance on one single practice or livelihood. For a farmer, this may involve household members taking up new and additional non-farm activities or non-farm labour activities such as manual labour or small trading. Children may receive less nurture and care as a result, particularly as women, who typically have a greater share of domestic and care activities, need to spend more hours working to generate income. To compensate for women's changing roles, children, usually girls, might need to increase the time they spend on household work and caring for siblings. They may miss school and leisure time as a result, leading to medium and long term consequences regarding their education, which will leave them further disadvantaged.

The household strategy may require children to participate in an income-generating activity, either on the family land or outside the household in commercial activities. Depending on the time allocated to paid work, this might interrupt children's education, although this is not necessarily the case. Other possible adverse impacts on the child can be linked to the type of work undertaken (harmful if it is physically demanding or in poor conditions). The types of income generating opportunities for girls and boys might be different, with particular challenges for physical and emotional well-being. For example, evidence from research of children's responses to income shocks resulting from the economic recession in 2008–2009 indicated that more girls engaged in commercial sex and relationships with older men as a way of making money (UNICEF South Africa 2010). This can have important health consequences, particularly given the prevalence of HIV/AIDS. The same study also showed that a greater number of boys were involved in the use and sale of drugs as a coping strategy against the shocks to income.

Not all income generation activities in which children engage, are harmful however. In many cases, the additional contribution to household income can also be beneficial for the child and perhaps other siblings as it might help ensure a more stable food supply, more adequate housing and an increased ability to cope with other costs such as health care and school enrolment.

These alternative sources of income are crucial in times of immediate shock and for supporting households to adapt to a wide range of other climate and development pressures. For example in Sekhukhune district in rural, semi-arid South Africa, some households are diversifying their livelihoods by taking on home-based care work during times of climate stress. Others have sought out additional work and some have registered on training courses at their own cost with the long-term objective of expanding their source of income generation (Quinn et al. 2011). In Mantsie village of the Lehurutshe district in North West province, households are responding to the impacts of regular drought and an unpredictable rainy season by adopting the practice of petty trading, an activity in which children, particularly girls, are likely to be more involved. Others are investing in poultry or livestock trading, enabling them to enhance income security (Osahr et al. 2010). Crucially, the differences in outcomes as a result of the gendered control and management of certain livestock and commodities will need to be assessed and catered for as (re)investment and expenditure can vary markedly between girls, boys, women and men (Njuki et al. 2011).

Other common response strategies see people remaining in the same livelihood (such as farming) but making small adjustments in practices (such as switching from rain-fed to irrigated agriculture). This

adjustment process has occurred throughout the past, is ongoing and will continue to be increasingly necessary for households to respond and adapt to changing climate and development pressures. Across South Africa, households are already adapting in this way. For farmers in Limpopo, this might be by modifying planting dates, increasing irrigation or changing the amount of land cultivated or used for grazing (Gbetibouo 2009). If children help on the family farm, these changes could have implications for their ability to attend school regularly. In the Eastern Cape, changing seasonal patterns are seeing some farming households choosing to modify livelihoods by increasing soil conservation practices (Mquadi and Steynor nd). In other areas, traditional knowledge is increasingly applied in decisions about land use and its management. This can have a positive impact on children, particularly those who are more involved in the cultivation of the land as they can learn new techniques for better adaptation, which might be useful when they are heading their own households.

Strategies to supplement livelihoods and those of adapting current practices can both be thought of as incremental responses. Typically, they allow the household to maintain existing functions and do not necessitate a fundamental restructure of the household's primary structure, although they are likely to have specific impacts on individuals according to gender, age and their positions in the household.

Seeking alternative (switching) livelihoods

Of the more transformational responses to climate change, alternative livelihoods are, and will continue to be, an increasingly adopted strategy. Alternative livelihoods can refer to 'an increasing multiplicity of activities (regardless of the sector), or a shift away from traditional rural sectors such as agriculture to non-traditional activities in either rural or urban space' (Start and Johnson 2004). With this in mind, depending on the social, economic and environmental context, the risk of climate impacts can become too great for households to continue a sustainable livelihood. Households may need to completely abandon current livelihood practices in favour of opportunities that are more sustainable in the changing climate. In such instances, households make choices that result in a complete change of normal livelihood activities.

In North West province, for example, doubts over the long-term viability and dominance of rain-fed farming as a livelihood strategy, given a combination of changing climate and development pressures, have led many, particularly youths, to move away from farming activities to pursue other alternative non-farm livelihoods (Osbaahr et al. 2010). Strategies like these are likely to become increasingly relevant in the future, given the likelihood of greater variability in rainfall, increased incidence of floods and drought and uncertainty in seasonality. This poses a challenge for adolescents, particularly in a context of lower employment and work opportunities as they leave school, in both urban and rural areas. Given that unemployment amongst adolescents and youth is already a significant problem, particularly amongst those coming from more marginalised backgrounds, the need to switch livelihoods in the context of climate change might pose significant challenges for them, given higher competition and lower opportunities.

Frequently, forms of migration from rural to urban areas accompany this kind of switch. Returning to the example of North West province, households may migrate temporarily in response to rainfall reductions to take part in labour exchange, work and support or to obtain water for livestock (Osbaahr et al. 2010). Importantly, individuals or households, particularly those of low economic status, seeking to migrate from rural areas permanently, often end up in marginalised areas of urban land in insecure or informal settlements. Subsequently, vulnerability experienced by immigrants can increase temporarily. The practice interconnects rural and urban risks as a result of overcrowding and competition over resources (Quinn et al. 2011).

Migration can have important impacts on children's well-being. Migration of a parent or carer can be positive in that it can help to stabilise or improve household economic status, leaving the child in a better position to access important goods and services that would not have been available otherwise. However, extended absences of carers can cause emotional distress for children. On occasions, children, particularly older boys, also migrate in search for alternative livelihood opportunities. Depending on the conditions of migration, adolescents can face challenging circumstances, including inadequate housing with poor water and sanitation facilities, which exposes them to disease or unstable and exploitative employment, which harms their physical and emotional well-being. Migration is often linked to school dropout. There is some international evidence (Goodman and Ittus 2009) of higher incidence of child trafficking in some developing countries, including for sexual purposes, as a result of climate-induced migration, but this phenomenon has not yet been researched in South Africa.

Table 5: Secondary impacts of different adaptation strategies on children

Adaptation strategy	Indirect impacts on children
Lifestyle changes	Households may resort to reducing expenditure on basic goods and services, including those that are particularly important for children. Similarly, children living on their own or in child-headed households, will need to adjust spending on basic goods and services, which will further exacerbate their already precarious situation.
Supplementing livelihoods, adopting improved and appropriate technology	Increasing the amount of time that caregivers (usually mothers) spend on income generating activities outside of the household reduces the level of time spent on caring for children, leading to vital nurture deficits. The gender division of labour in the domestic sphere implies that girls may be compelled to fulfil the role of caregiver in the absence of an adult, thereby spending more time on domestic and care work, and less on schooling and leisure. Children may also be required to participate in income-generating activities, which may, though not necessarily, interfere with schooling. However, given the systemic nature of climate shocks, the types of work available may be limited or, in some cases, even harmful, either physically or psychologically. On the other hand, additional economic contributions made by children can go some way toward mitigating impacts on other siblings.
Alternative livelihoods and migration	Migration has mixed impacts on children. When one or both parents leave the household, children can face increased levels of emotional distress and instability. However, remittances from parents can contribute to a better quality of life for children, if they are adequately cared for (usually by members of the extended family). Children can also migrate, however this may render them particularly vulnerable to a range of risks associated with losing the support structure of a familiar home environment. These risks include engaging in harmful work, living in inadequate housing with poor services (particularly if further climate disasters are sustained), and a higher possibility of being trafficked for sex work or child labour. Exposure to these risks may result in detrimental impacts on the social and emotional well-being of the child.



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4 Case studies

4.1 Case study 1: Durban – an urban coastal environment

Climate change will affect coastal regions in a number of unique ways and the context and characteristics of vulnerability are likely to be somewhat different from those experienced in rural contexts (as discussed in Section 3). Children in coastal cities have a unique set of multiple and intersecting vulnerabilities owing to the impacts of climate change. In this section we explore the characteristics of climate impacts for Durban and surrounding areas, as well as the vulnerability of Durban's children.

Durban is a coastal city with a population of 3.5 million, 35% of whom are children aged 0–19 (data shared by the Economic Development Unit, eThekweni Municipality). The eThekweni Municipality is the local government responsible for the city and its surrounding areas. While there is great variation in the geography and type of human settlements in eThekweni, there is a marked equity fault matching racial lines.

Poverty and unemployment levels are high in eThekweni and education levels are relatively low. Statistics reveal that it is predominantly Black Africans who live in the most marginalised circumstances. For example, of the 30.5% of (or 1.05 million) people living in poverty, 40.8% are Africans and 0.3% are White. Unemployment rates are 10 times higher among Africans than among the White population. Almost twice the proportion of Whites (70%) to Africans (38.5%) has graduated from high school (data shared by the Economic Development Unit, eThekweni Municipality).

4.1.1 What are the likely future impacts of climate change?

In KwaZulu-Natal, where Durban is located, GCM projections suggest a significant increase in mean annual temperatures of +1.9–2.2°C by 2060 and 3.1–3.7°C by 2090.²¹ In December–February, some areas of the coast could be exposed to 54% more hot days in 2060, relative to the mean climate of 1970–1999 (McSweeney et al. 2010). Model simulations also indicate increases in mean annual rainfall for KwaZulu-Natal. The projected increase is +1–2mm by 2060 and +0–4mm by 2090, with the most pronounced changes during the December–February period. In contrast, projections indicate a

²¹ Under the A2 emissions scenario projections. This scenario of GHG emissions assumes that efforts to reduce global emissions this century are relatively ineffective.



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decrease in monthly precipitation during the June–August period. In 2090, the region could experience a change in rainfall of -6mm during these months (ibid.).

In line with general projected patterns of rainfall for the eastern half of the region, there may be an increase in the number of rainless days in the Durban area but also an increasing number of heavy rainfall events (Lumsden et al. 2009). Warmer days, increasing sea surface temperatures and changes in the distribution of rainfall, altogether mean that Durban is expected to see an increase in flooding and storm events. Some parts of Durban could be negatively affected by rises in sea level, which have already been observed. Since 1970 the sea level in Durban has risen 2.77mm per year (DAEARD 2010). High-risk areas where infrastructural damage could have implications for industry, transportation and the residential or tourism sector include the Umgeni Catchment, Illovo Beach, Amanzimtoti, Isipingo Beach, Bayhead and the Durban beachfront (Naidu et al. 2006).

The following secondary impacts, identified in the literature, have the potential to arise as a result of climate changes. Importantly, each is a consequence of the interaction between climate and development pressures and will, therefore, depend as much on wider socio-economic and political actions as on the resilience of surrounding communities and environments.

- Pressures on water availability and security, owing to changed rainfall patterns and increased evaporation, coupled with greater demand for water;
- Increases in rainfall variability, with consequences for the frequency and intensity of floods and drought events;
- Increases in economic losses owing to property damage and decreased tourism revenue;

- A higher incidence of infrastructural damage caused by climate-related extreme events, storms and rising sea levels;
- Deterioration of food quality, resulting from higher temperatures, alongside any insufficiencies in refrigeration facilities, leading to the increased incidence of food-borne diseases (eThekweni Municipality 2011a);
- Increased numbers of cases of heat stress;
- Respiratory health affected by increased near-surface ozone (O₃) levels;
- A potential reduction in the production of staple crops such as maize, likely to create greater food insecurity;
- A decrease in biodiversity 'as species struggle to adapt to the rapidly changing climate and [...] compete with invasive alien species' (Lewis 2010).

4.1.2 What will be the impacts on children in Durban?

Children in urban areas are more vulnerable to these impacts than adults. In urban locations children have high exposure to hazards and inadequate protective infrastructure and services (Bartlett 2008). For children living in poverty in Durban's informal urban settlements, these risks and consequences are already a daily reality, owing to poor quality and overcrowded housing and a lack of access to water, sanitation, drainage and waste management, factors that create a high burden of preventable disease and injury, which is heightened by climate change. Many of these issues are especially pronounced in the following groups:

- The 30% of households living in poverty on less than \$2 per day (data shared by the Economic Development Unit, eThekweni Municipality);
- Families with high dependency levels because of the 30-40% unemployment rate (Lewis 2010);
- The 27% of households that live in informal dwellings or shacks (eThekweni Municipality 2011b);
- The 21% of households that have no or inadequate sanitation facilities (data shared by the Economic Development Unit, eThekweni Municipality);
- The 11% of households that have no electricity connections (data shared by the Economic Development Unit, eThekweni Municipality);
- The 16.5% of households without access to piped water (data shared by the Economic Development Unit, eThekweni Municipality).

Bartlett (2008) points out that the urban poor often live where they can find land, which means they are often forced to settle in inappropriate and hazardous areas along river banks, in other areas prone to flooding and in areas where services are inaccessible. An interviewee from eThekweni Municipality Water and Sanitation Unit confirmed that a number of Durban's informal settlements were built on flood plains and that, while the municipality has prioritised the relocation of these settlements, the continual influx of immigrants means that new families keep settling on the same, cleared, dangerous grounds. Despite the implementation of preventative measures, expected increases in temperatures and rain intensity could increase the incidence of malaria in Durban, already a risk area (Naidu et al. 2006).

Bartlett (2008) argues that the first line of defence for children is to ensure that they are provided with protective infrastructure and services; protected by child-sensitive disaster preparedness plans; and able to access disaster response services through a capacitated and networked disaster management system. In South Africa, this lies within the mandate of local municipalities, whose role is to provide basic services, create jobs, promote democracy and accountability and to eradicate poverty (Naidu et al. 2006).

Addressing the impact of climate change through building people's, including children's, adaptive capacity, intersects with the development imperative of local governments. Local governments must therefore integrate climate change into their development plans and strategies (Roberts 2008).

4.1.3 How is Durban responding to changing climate and development pressures?

Durban has already integrated climate change into its Integrated Development Plan (IDP)²². This is a necessary strategic first step for the mainstreaming of climate change at all levels of local government, as the IDP is the overarching plan which guides and informs all planning, management and decision making in municipalities (Naidu et al. 2006).

The eThekweni Municipality is unique in its progressive mainstreaming of climate change into all relevant functions of local government, through the development of a local government adaptation plan. This plan is the product of the Municipal Climate Change Programme (MCCP), established in 2004 to assist the municipality in adapting to and mitigating climate change. It started with an assessment of the likely impacts of climate change on Durban and has led to the development of a Headline Adaptation Strategy (HAS), which examines the vulnerability to climate change of all key municipal sectors, being water, health and disaster management. The HAS, in turn, constitutes the framework for the development of more detailed adaptation plans for these sectors (Lewis 2010). The HAS is child neutral. It makes no mention of the specific vulnerabilities facing children in the context of climate change.

The sectoral plans recognise current service delivery backlogs and the resulting heightened vulnerability to climate change of under-resourced households. In addition to prioritising the elimination of these backlogs, they aim to provide adaptive support at household and community level. The support is intended to mitigate the impacts of climate change and to grow infrastructure to meet the projected increased demand for water, health and disaster management services that climate change will drive. For example, for the Water Adaptation Plan, the HAS considers water demand management, infrastructure protection and water storage measures. For the Health Adaptation Plan, it contemplates the provision of disease research, prevention, management and control measures and heat management strategies. For the Disaster Management Adaptation Plan, the HAS proposes a risk assessment for Durban, securing additional resources for the Disaster Management Unit and the development of a reliable early warning system. The early warning system is intended to alert residents to disasters and educate them on how to reduce the impacts (Lewis 2010). However, the plan contains no specific strategy to alert and educate children.

An interviewee from the eThekweni's Municipality's Environmental Planning and Climate Protection Department explained that the greatest adaptive challenge in urban communities is risks to infrastructure, whereas in rural communities it is food security. The municipal and community initial needs assessments culminated in the development of the sectoral adaptation plans as set out in the HAS. Thereafter, various tools were developed to assist different departments within the municipality to implement climate change mitigation in everyday services. In addition, in recognition of the multi-sectoral nature of the impacts, the project is in the process of strengthening and formalising collaborative cross-departmental institutional arrangements. Current arrangements include the Durban Climate Change Partnership, made up of representatives from government, civil society, donors and academia, and an informal working arrangement between the different municipal sectors.

The interviewed official confirmed that the preliminary investigative phase and the subsequent development of plans and coordinating arrangements have not focused on the specific vulnerability of children to climate change, or on the local-level responses necessary to build their adaptive capacity. As yet, the project has not facilitated children's representation or participation in relevant structures.

²² Interview with representative from eThekweni Municipality 2011a (see Annex A)

However, the next phase of the project will focus on the development of community-based adaptation plans, in recognition of the fact that communities see different specific impacts to which adaptation plans must respond. This will include intensive engagement with communities, and the plan is to include youth (defined as anyone younger than 30 years of age) in the identification of needs and necessary adaptive responses. This could be an entry point to consulting children.

The sectoral plans for health, water (both in place) and disaster management (still in development) are concerned mainly with infrastructure, the provision of services and resource mobilisation for the most vulnerable communities. In the case of the water sector, these would be communities living in informal settlements built on the flood plains. Priority interventions include the relocation of these settlements and the improvement of sewer facilities and road access to enable water supply, fire and refuse vehicles to enter the communities. In addition, various water storage, conservation and management initiatives are in place, including desalination projects, recycling water from waste works and public education around water practices and behaviour.

The water sector needs assessments and the resulting plans have not yet taken into account the specific needs of children. Planners involved believe that children are part of the broader community and will benefit through community-based interventions. According to interviews with officials, there are already a number of long-standing programmes that accommodate the needs of children, such as a process for the identification of dangerous river crossings impeding children's access to schools and the building of necessary bridges. Designs take into account the potential future increase in flow as a result of climate change.

The disaster management sector is also focusing on vulnerable communities, such as the South Durban Basin, which has high poverty levels and a dense population of about 250,000 people, surrounded by industrial risks. Concerns about the impact of heat waves on communities such as these are paramount. An interviewee from the Disaster Management Unit said that the unit had established a Disaster Management Advisory Forum, which has three technical task teams, one of which is focusing on climate change adaptation planning. The future vision, in terms of the overarching HAS framework, is for disaster management to play a key role in the context of preparing for and mitigating the impacts of climate change. However, plans are at an immature stage. The unit is insufficiently resourced and still too small to play a meaningful role at this stage.

In terms of the planning that has taken place this far, disaster management, like the water sector, has not specifically considered the heightened vulnerability of children in the case of disasters. Nor does it have any specific and child-sensitive preventative or supportive interventions in place. Examples would be: the education of children about risks and how to deal with them; teaching them to swim to counter their heightened risk of drowning in a flood; or developing joint plans with social services to protect displaced children from abuse and neglect in the wake of a disaster. These are areas in which local planners can provide technical support, to encourage a more child-sensitive lens through which to plan.

The Health Adaptation Plan, on the other hand, does single out children and their heightened vulnerability. Many of its interventions are not part of the plan, however. They are an existing routine part of the services provided by the sector, which has always had a specific concern with the social determinants of child and maternal health. The climate change adaptation planning process aims to assess how existing determinants are aggravated by potential climate change impacts. As a consequence, the strategy is to target the delivery of environmental health services, clinical services and health promotion and education services to children already at risk in informal settlements. The emphasis is on primary health care; the prevention of illness and harm through the promotion of sustainable feeding interventions such as food gardens and nutritional education; education, preventative measures such as spraying and vigilant monitoring and early intervention in malaria

infections and hotspots; and heightened vigilance and education in the case of cholera and bilharzia outbreaks (interview with Department of Health, eThekweni Municipality).

In summary, the eThekweni Municipality has taken a number of progressive steps towards building the adaptive capacity of its communities and households, primarily by prioritising the social and economic determinants of vulnerability. It has not, however, focused on the particular vulnerabilities of children or developed its adaptation plans to meet their heightened risks with respect to its core water, health education and disaster management functions. Disaster management sector representatives recognised that children were more vulnerable, but said that limited resources and the diversity and number of vulnerable groups inhibited their ability to identify and consider their specific needs.

4.2 Case study 2: Limpopo province – a rural riverine environment

4.2.1 Current climate in Limpopo

The climate in Limpopo varies, but is markedly dry and has very hot summers, with temperatures reaching up to 45°C in the Lowveld.²³ The Limpopo valley is one of the warmest areas of South Africa and annual rainfall often falls below 500mm (DoEA 2010a; DoST 2010).

Limpopo province has experienced a range of climate-related disasters in the past. During the period 2000–2009, inhabitants suffered from severe floods (February 2000 and December 2001) and drought (February 2005). In September 2002, a severe storm led to estimated direct damages of R131.1 million in the Mapela area (DoEA 2010a).

Limpopo is likely to become a real ‘hotspot for concern’ under projections of future climate change, according to South Africa’s Second National Communication to the United Nations Framework Convention on Climate Change (UNFCCC). Downscaled projections of GCM models point to significant increases in mean annual precipitation in some parts of the province. Indeed, some models predict increases as high as 80% for the period 2018–2100 relative to 1960–1990 (Lumsden et al. 2009). Climate change however, is expected to lead to slight decreases in rainfall over the summer months across the province (DoEA 2010a). Projections also suggest a marked increase in the number of heavy rainfall events (ibid.; Schulze et al. 2010). Equally, projections point to an increase in rainfall variability, with likely positive trends for exposure to flooding and contamination during and after heavy rainfall events, although a significant amount of variability in projections exists (some parts of the province show significant increases, others significant decreases).

Understanding the effects of climate change on water resource availability in Limpopo is complicated. The north of the province is expected to become water-stressed without factoring in issues of climate change. This would be as a result of increasing water demand associated with population and industrial growth. Moreover, groundwater recharge to deeper aquifers (e.g. in the Karoo and Kalahari) is often controlled by extreme rainfall events rather than mean annual rainfall. Therefore, it is difficult to predict the net effect of climate change on groundwater levels, even in areas where total rainfall declines. If extreme storms become more frequent, then a greater proportion of the annual rainfall may recharge aquifers. As Limpopo already receives a relatively low annual rainfall, springs and wetlands that rely on groundwater may receive greater flows should annual mean precipitation and heavy rainfall events increase in proportion.

²³ www.limpopo.gov.za/provincial.



Projections suggest a significant increase in mean annual temperatures of +2.4°C by 2060 and +4.3°C by 2090. Increases in warming are most pronounced during the September-November period (McSweeney et al. 2010). Slight changes in the climate, particularly warming temperatures, might worsen the current high risk of malaria (DoST 2010).

4.2.2 Anticipated consequences of climate change impacts

Shewmake (2008) observes that the most significant climatic factor, given Limpopo's unique location, geography, history and socioeconomic status, is the projected changing rainfall pattern. This is likely to result in increases in mean annual rainfall as well as increases in variability and the number of heavy rainfall events.

These changes will have significant implications for water security, agricultural productivity, food security and economic growth, and the prevalence of vector-borne diseases such as malaria. It is the most significant factor because the resultant climatic shocks of drought and flood intersect with existing socio-economic vulnerabilities characteristic of the rural province of Limpopo, to create a 'hotspot for concern'.

4.2.3 Vulnerability to climate change in Limpopo

In order to assess a community's vulnerability to these anticipated impacts of climate change, one needs to look at potential exposure to the risks and also capacity to cope with the adverse outcomes. According to these assessment criteria, communities and families in Limpopo province are highly



vulnerable to the adverse impacts of climate change because of their higher than average levels of poverty. The factors creating this situation are poverty, lack of economic activity, poor infrastructure, service delivery backlogs, vast distances between sparsely populated areas and to points of service delivery, reliance on agriculture for food security and household income and consequent reliance on water and other natural resources. These factors significantly undermine the people of Limpopo's resilience to the projected harmful impacts of climate change.

Economists have profiled the households most vulnerable to climate change (Shewmake 2008). Households in Limpopo province fit this profile almost exactly. Limpopo is recognised as highly vulnerable by the South African Risk and Vulnerability Atlas (DoST 2010), given its:

- High levels of poverty – almost 58% of households in Limpopo receive a poverty alleviation social grant (compared with a national average of 44.6%) (SSA 2010a);
- High levels of unemployment – Limpopo's unemployment rate is 21.1% (SSA 2011b);
- Dependence on agriculture for food security and employment – 54.1% of households in Limpopo are engaged in subsistence agriculture (SSA 2010a);
- Inadequate access to services such as health care (DoST 2010);

- Widespread lack of access to basic services such as water and sanitation – Limpopo has some of the lowest access figures in the country: 16.5% of households do not have access to piped water; 8.6% have no access to a toilet facility and only 11.6% have their refuse removed regularly (SSA 2010a).

4.2.4 Impact of adverse consequences of climate change on children

These conditions undermine the adaptive capacity of adults but create an even greater risk for children. In Limpopo, children are very vulnerable and experience high levels of poverty and lack of access to services. Limpopo has the highest proportion of children living in poverty. Almost 80% live below the poverty line of R552 per month and 52.4% live in households where there are no employed adults (Quarterly Labour Force Survey 2009 in Jamieson et al. 2011). This leads to the deterioration of households' and children's own adaptive capacities. The challenging circumstances under which children live expose them to a higher risk of the following impacts of climate change. Below, we explore a few key challenges.

Food insecurity

While Limpopo has the lowest reported rates of child hunger (8.1% of households), nonetheless, it has the highest rates of children who are underweight (12%), who have inadequate access to food (21.1%) and who are stunted (24%) and wasted (4%) (SAHRC and UNICEF 2011). Food security is a problem in many rural areas because of high levels of reliance on small-scale and homestead food production. Many small-scale farmers are already in a precarious position because of their dependence on dryland food production, together with limited capital investment in soil fertilisation as well as seed and weed, pest and disease control. Dependence on water increases their risk (DoEA 2010b). The added impacts of climate change on the availability of water and the seasonal changes are likely to aggravate an already precarious situation. Many children living in these farming households are likely to face a decline in food production and this would have a negative impact on their nutritional and health status.

Disease

A total of 37.9% of children in Limpopo live far from health facilities, compared with 10% of children in the Western Cape (SSA in Jamieson et al, 2011). Children are also at risk of malaria and cholera, with an infection rate of 45.9 per 1,000 in the case of the former and 618 cases of the latter being reported in Limpopo in 2009 (Health Systems Trust 2009). Only 39% of children live in households with access to piped water, compared with a national average of 60%. 36.8% live without access to adequate sanitation. 12% have no access to a toilet facility at all (Hall 2011a; 2011b).

As a result of the diminished water resources that can result from climate change, rural areas are additionally vulnerable because of backlogs in the provision of water infrastructure in homes. Rural communities without access to water and sanitation infrastructure make use of untreated water directly from rivers, wells and wetlands. This has contributed to the existing risk of cholera and other related diseases (DoEA 2010b), which could be exacerbated by the increase in unpredictable heavy rainfall events if water is not managed adequately.

In addition, the decrease in running water, together with expected temperature increases and the anticipated influx of migrants as a result of climate change in neighbouring countries where malaria is more endemic, is likely to increase the risk of malaria in Limpopo (DoEA 2010b; interview with senior manager, Department of Health, Limpopo).

During high intensity rain episodes, flooding may pose additional risks to children's health and well-being, in terms of drowning and loss of livelihoods but also with regard to an already problematic access to remote health centres. This lack of access already poses an obstacle for households trying to seek health attention for their children.

Water

Low availability of water, given limited access to piped water, also means that households will face an additional challenge in collecting water, a task that regularly falls on children. A 2007 study found that the amount of time children spend collecting water (between 12.5 and 40 hours per week) impacts negatively on their education. 85% of children involved in fetching water were not in the appropriate age group for their grade (Department of Labour 2007). Children in rural Limpopo, especially girls, are at risk of having to bear the additional domestic burden of walking further distances to collect water as resources dry up during some months of the year.

Migration and child protection

Migration is a reality in Limpopo as a result of economic pressures. It is anticipated that these pressures and the rate of migration may increase as a consequence of climate change (DoST 2010). Many children are already living without their parents owing to migration and are subject to heightened protection risks, which may increase as a result of climate change.

Education

Access to school remains a problem for children in more remote areas where transport is lacking. A total of 11.6% of primary school and 20.7% of secondary school children in Limpopo have to travel long distances by public transport or on foot to get to school (Murambiwa and Hall 2011). This problem may be worsened where storms or floods make roads to schools impassable or if schools are damaged during such events.

4.2.5 The link between provincial and local government in building adaptive capacity

The Development Bank of South Africa (DBSA) points out that the vertical coordination of climate change responses between national, provincial and local levels of government is critical to developing a successful climate change response. Vertical coordination is the key to developing and implementing climate change responses that are responsive to the regional and local contexts, which determine the specific face of vulnerability in a particular area. Local governments are key because they have the power and the mandate to address critical infrastructural and service backlogs that create heightened levels of vulnerability (such as water and sanitation). Importantly, local governments have the capacity to implement policies that support behavioural change among citizens. As such, municipalities and provinces have very important roles to play to address climate change²⁴.

It is thus a precondition for mounting effective responses to children's heightened vulnerability to climate change and their weak adaptive capacity that their vulnerability be recognised and addressed in both provincial and local policies and plans. This is therefore especially relevant to local government.

4.2.6 Adequacy of the policy responses

In Limpopo, political commitment to tackling climate change is ambiguous at both provincial and local level. Unlike the Western Cape, for example, Limpopo does not have a dedicated climate change response strategy. According to an interview with a representative from the Limpopo provincial government (the Environmental Research and Planning Office), climate change is not very high on the political agenda. Given Limpopo's social and economic challenges, it is not surprising that economic development dominates. To ensure that they can inform planning to some extent, climate change and environmental issues have been packaged in the Green Economic Plan. This is a discussion document in the Office of the Premier, developed through the collaboration of all sector departments,

24 Interview with representative from DBSA 2011 (see Annex A)

which was launched in the middle of October 2011²⁵. The aim is to use this plan to identify concrete projects to create jobs and improve the environment. The plan is for Limpopo to industrialise but in an environmentally friendly and sustainable way (interview with *ibid.*).

With respect to the visibility of child-specific vulnerabilities or development priorities and opportunities, it would seem that, at a provincial and local level, these are not mentioned. Nor do they inform the thinking of government in the development of plans capable of building their adaptive capacity. Current scenario planning of the impacts of climate change in each sector has no specific focus on any vulnerable group. This is because it is expected that any issues in relation to such groups will surface organically within each panel discussion.

At the local government level, the aim is to ensure that climate change is introduced through local planning tools such as IDPs and the various local government by-laws. Currently, half of IDPs make mention of climate change but it is raised and dealt with very differently in each case because of differences in the districts and in their priorities and responses. For example, while one district will focus on mitigation because it is building a new power station, another, more sparsely populated agricultural district may need to focus on the changing habitat. Given this disparity, a tool to provide a standardised adaptation and mitigation framework to cover all the essential areas would be useful²⁶.

In addition to political and attitudinal challenges, most local governments have medium-to-high institutional vulnerability. This poses a further barrier to mounting effective climate change responses at this level. The most vulnerable institutions are found in the areas with the most vulnerable populations. These are the deeply rural areas that coincide with the former Apartheid homelands and the legacy of poor service delivery and underdevelopment (Department of Cooperative Governance and Traditional Affairs 2009). This complicates climate change forward-planning.

While climate change is starting to emerge as an issue on local governments' agendas, children and their specific vulnerabilities to climate change are still invisible. A review of two randomly selected IDPs, Thulamela Municipality 2007/08–2011/12 IDP and the draft Polokwane 2010/11 IDP, reveals that local governments have prioritised addressing infrastructure backlogs for water, sanitation and waste removal but this is not linked to climate change. It is also not informed by an analysis of the needs of particularly vulnerable groups, including children. While both have sections dealing with disaster management, neither refers to the need for revised and adequate disaster management preventive measures, particularly to prevent and mitigate the higher risks of harm to children. In addition, both IDPs address the provision of health services, but do not make any plans to deal with the possible impact that climate change could have on the type of services required or on demand for services. Greater awareness is needed on the part of local government in relation to the impact of climate change on children so that there can be a prioritisation of the delivery of relevant services (including health, water and sanitation and disaster management) to children to lessen the impact.

For this purpose, the provincial government should take the lead in providing direction to the municipalities, to mainstream climate change and children's vulnerability to climate change. This will require political buy-in and commitment to climate change and to the realisation of provincial and local governments' legal obligations to children. While acknowledging the challenges posed by the range of vulnerabilities and the limited resources available, local governments must, in moving forward with their adaptation plans, recognise that there is a heightened legal obligation to identify and address the specific vulnerabilities of children as opposed to other vulnerable groups. Moreover, they should be guided by the recognition that investments in addressing children's specific vulnerabilities to climate change will benefit the sustainable social and economic development of children but also of households and communities.

25 Despite attempts to obtain a copy of the plan, this was not possible.

26 interview with the Limpopo Environmental Research and Planning Office 2011 (see Annex A)



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5 National policy responses to climate change

This section focuses on the adequacy of national policy responses to meet the risks and challenges of climate change for children effectively, with respect to the four dominant child rights areas likely to be affected:

- Child survival: health, food and nutrition;
- Child development: health, education and social protection;
- Child protection: including protection from harm, neglect, abuse and exploitation;
- Child participation.

The analysis is conducted in two phases. The first reviews overarching national policy statements on climate change, to assess whether they specifically recognise the vulnerability of children. If so, it assesses whether they provide sufficient guidance to the multi-sectoral stakeholders responsible for the delivery of the services and the support that will be necessary to build children's resilience to the impact of climate change.

The second phase reviews a selection of national sectoral policies, laws and programmes designed to realise children's rights to health care, education, protection and participation. This determines whether they recognise and respond adequately to the heightened risk caused by climate change.

Both phases seek to assess the adequacy of the content of, and institutional arrangements within, the current policy framework. This is designed to ensure adequate adaptation of children and their families and communities to address children's vulnerabilities to climate change. In addition, they review policy processes, to assess whether they realise the right of children to participate in climate change dialogues that will affect them.

5.1 Obligations to respond to children's vulnerability

The Constitution of the Republic of South Africa responds to international and regional obligations to secure the well-being of children, through the requirement that all organs of state take measures to give effect to the following child-specific rights:

- Family care or parental care, or appropriate alternative care when children are removed from the family environment;
- Basic nutrition, shelter, health care and social services;
- Protection from maltreatment, neglect, abuse or degradation; and
- Protection from exploitative labour practices.²⁷

In addition, the Constitution protects the rights of all people, including children, to an environment that is not harmful to their health or well-being, basic education, sufficient food and water and social security, 'including, if they are unable to support themselves and their dependants, appropriate social assistance', and adequate housing, among others.

The legislature and the executive have responded by developing a host of policies, laws and programmes that, together, constitute a sophisticated, multi-sectoral child protection system. The defining feature of this is its focus on building the resilience and capacity of children and their caregivers to access the necessary services and support, to counter their inherent and acquired vulnerabilities.

These documents constitute national statements of priority concerns that identify children as a particularly vulnerable group and provide guidance to the different sectors on their roles and responsibilities to mitigate the impact of the risk on children. The ultimate objective is to provide sufficient guidance for the integration or mainstreaming of specific child-focused responses into the development of all policies and programmes.

As children are a particularly vulnerable group to the impacts of climate change, the governing policy framework should provide guidance for the effective integration of children's vulnerabilities into relevant mitigation and adaptation policies and programmes.

5.2 Assessment criteria – a child rights framework

The development of an appropriate child-relevant climate change policy and programmatic response, at both local and national level, requires that climate change analyses and policy responses be conducted within a child rights framework.²⁸ This approach recognises that child-specific responses need to cover more than services alone. This runs the risk of perpetuating the perception of children as passive victims of negative climate change.

Rather, the climate change policy framework must create spaces for children to participate in, and be active determinants of, the shape and content of climate change policies, from the grassroots level upward. This is necessary to reinforce child rights and capacities and will also ensure more

²⁷ Items 1-4, Section 28(1) (b)-(e).

²⁸ A child rights framework recognises that children are active bearers of rights. International and regional instruments oblige governments to recognise the right of children to participate in decisions that affect them (UNCRC Art. 12) and to be consulted in decisions determining their best interests (ACRWC Art. 4(2)).

accurate and responsive policies informed by the needs of children on the ground (Baker 2009; IDS 2009). Commentators point to strong evidence that active participation by communities most vulnerable to climate change is essential for the development of adequately responsive adaptation plans. They indicate that, at present, there is wholly insufficient dialogue by affected communities²⁹. These observations apply equally to children.

Moreover, because the impacts of climate change are cross sectoral, as are issues that pertain to children, it is essential that the governing framework provides mechanisms that will facilitate the effective integration or mainstreaming of climate change issues into all areas of administration. This requires effective coordination mechanisms that can deliver a policymaking process that ensures that climate change is on the agenda of all stakeholders. The process should also ensure that integration becomes a reality across the different government departments, and down the different levels of government³⁰. This is a prerequisite to ensuring that the key actors are aware of the issues concerning the integration or mainstreaming of climate change into social and development policies, on the one hand, and the mainstreaming of children's rights into climate change policies on the other (IDS 2009).

Box 6: Child rights framework policy assessment checklist

- Overarching climate change policies must recognise and document children's vulnerability to climate change. Children must be visible as a targeted vulnerable group and the nature and extent of their vulnerability must be documented, pointing out priority domains of particular vulnerability – for example health, education, child labour and child protection. In addition, policies must identify the lead departments responsible for these domains, giving an indication of their primary responsibilities with respect to planning and adaptation.
- Policies must recognise the interdependence of children's environmental, social and economic circumstances and the consequent impact of climate change in the event of insufficient social and economic resilience, through strengthening of their adaptation capacity, including through access to social protection services.
- Children must be recognised as rights holders and active determinants of the shape of climate change policies and strategies that have impact on them, through their recognition as stakeholders and the creation of children's participatory processes.
- Targeted sectoral child-focused measures must be developed in response to risks facing children. The following services and support specifically needed to build children's resilience to climate change (and other shocks) must be provided or further developed when already in place: primary health care prevention and health treatment of infectious diseases; water; sanitation; shelter and housing; food security and nutrition; education; child protection services; child labour protection; social assistance; and disaster risk management.
- Sufficiently representative and effective coordinating of institutional arrangements must be established to facilitate cross-sectoral collaboration of all government agencies and stakeholders with relevant child protection or development mandates and/or an environmental or climate-related mandate.

Source: Authors' compilation.

²⁹ Interview with Madzwamuse 2011.

³⁰ Interview with representative from DBSA 2011.

5.3 An overview of climate change strategies, policies, and programmes in South Africa

South Africa has a range of policies, laws and programmes that relate to climate change or refer to it (see Appendix B). This review does not include a discussion of these documents but, rather, focuses on a selection of the core documents that guide the collective national response to climate change and environmental management. The review does this by stating shared principles, setting priorities and identifying stakeholders and institutional arrangements, *inter alia*.

In addition, a number of sector-specific documents are relevant to climate change, its impact and its mitigation. These are dealt with later in this section under a review of sector-specific policies governing the management and provision of the services and the support that is necessary to augment the adaptive capacity of children to climate change.

5.3.1 How visible and effective are child-based needs in climate change policies and programming?

South Africa's overarching climate change policy framework³¹ has begun to highlight children as a particularly vulnerable group in the context of climate change. However, it still does not meet sufficiently the different criteria set out in Box 6. There are certain points of recognition within individual policies that recognise children as especially vulnerable to a specific set of impacts, especially in sections dealing with health. However, children are generally seen as passive victims of climate change rather than as active and legitimate rights-bearing stakeholders. This view of children is informed by a strong belief among climate change policymakers that children, rather than individual rights holders with specific vulnerabilities and potential, will be reached indirectly through interventions aimed at households and communities. Until this view is changed, it is unlikely that children will be recognised as a vulnerable group with specific characteristics.

A number of interviews with sectoral representatives responsible for the development of adaptation plans, at national, provincial, sectoral and local levels, confirmed that children are seen typically within policymaking circles as part of a bigger whole, either of the household or the community. None of the interviewees, including representatives responsible for delivering adaptation planning at national and regional level³², had considered the specific impact of climate change on children. Nor had they prioritised children's issues or indeed consulted children or agencies (government and non-government) working on children's issues in the development about their respective plans. This is an important gap, since understanding how children are affected can adapt and can contribute to community-level strengthening. Filling that gap is crucial to achieve many of the aims of these plans.

However, the climate change policy framework has, for the most part, made notable development in its overall approach to environmental and development issues. The past ten years have been marked by a busy policy review and development schedule. Acts have been amended and new policies developed so as to:

- Foster a rights-based approach, to ensure the framework is aligned with the constitutional priority given to relevant rights to a clean and healthy environment and related social and economic rights to health, water and food and nutrition;

31 For the purpose of this analysis, 'South Africa's climate change policy framework' refers to the set of strategies, policies, programmes and acts that have been explicitly drafted and/or approved in relation to climate change.

32 These include individuals working on the National Adaptation Plan, on a sectoral adaptation plan for a national department (which bears key responsibilities for children's social and economic development), on a provincial climate change response strategy, and on sectoral local government adaptation plans.

- Ensure equity in the enjoyment of services and benefits relevant to the environment, especially for vulnerable communities and households;
- Ensure that it recognises and promotes sustainable development – the current and operative developmental paradigm;
- Create the necessary institutional arrangements to carry out the multi-sectoral response to climate change;
- Recognise and give effect to the principle of participatory governance by people and communities most affected by climate change.

5.4 Overview of relevant policies in relation to children

5.4.1 White Papers on Environmental Management Policy

The White Paper on Environmental Management Policy (DoEA 1997) aligns itself with the realisation of numerous rights in the Constitution, including direct environmental rights and governance rights such as the right to public participation. It recognises the interdependence of social, economic and environmental factors within its vision.

The White Paper does not, however, articulate a link between children's rights, their vulnerability and environmental management. Nor does it raise the issue of the heightened vulnerability of children to environmental factors and the consequent equity imperative to prioritise children. Finally, its vision of public participation makes no specific mention of the need to ensure children's participation in environmental management.

5.4.2 The National Climate Change Response Strategy for South Africa

The National Climate Change Response Strategy for South Africa (NCCRS) (DoEA 2004) is a comprehensive statement of the government's view of and response to climate change. It views climate change within the sustainable development paradigm and thus recognises, in theory, that climate change has significant social and economic development implications.

It recognises that 'climate change is a cross-cutting issue that requires different government departments to work together in a coordinated manner, to ensure that response measures are properly directed, acceptable to all and carried out with a national focus'. Adaptation is acknowledged as being essential. The NCCRS recognises a need for cross-sectoral adaptation plans and identifies the health sector, maize production, plant and animal biodiversity, water resources and rangelands as areas of highest vulnerability and targets them for adaptation.

Adaptation interventions include: the extension of health protection and promotion (children's health risks are not given a special mention under this intervention); water resource management; adaptation of rangeland practices; agricultural adaptation; protecting biodiversity; and actions to offset economic vulnerability to climate change response measures. There is no identification of types and demographics of economic vulnerability. Rather, the NCCRS proposes conducting economic modelling studies to identify areas of specific economic vulnerability.

Despite recognising the socio-economic developmental imperative of climate change and the need for adaptation, the NCCRS lacks detail on both of these fronts. However, it is silent on children's vulnerability to climate change. Madzwamuse (2011) observes that it is biased towards



the biophysical aspects of climate change and neglectful of the socio-economic aspects that are critical for mainstreaming climate change adaptation into national economic development planning. Many relevant sectors and domains of impact for children are not recognised, such as labour, social development, social services and housing.

In short, the NCCRS as a whole does not respond sufficiently to the socio-economic implications of climate change, ultimately resulting in a failure to provide for strategic interventions ‘that would build the resilience of key sectors [and all] vulnerable groups and ensure adaptation preparedness [including of children]’ (Madzwamuse 2011).

5.4.3 The National Climate Change Response White Paper

The National Climate Change Response White Paper (DoEA 2011) was published by the government in mid-October 2011 after addressing comments to a widely disseminated Green Paper. It is much more progressive than the NCCRS in terms of its recognition of the developmental implications of climate change and its connection with the social and economic fabric of South Africa. Consequently, it has a greater focus on adaptation and a greater acknowledgement of groups made especially vulnerable to climate change by their economic and social circumstances, including children. It recognises that climate change is a crosscutting issue that requires formalised and focused collaboration to ensure an effective and integrated response to the challenges it presents. It provides more concrete direction for the multiple sectors recognised as essential partners in developing an effective national response capable of meeting the mitigation and the adaptive challenges facing vulnerable communities. Moreover, the White Paper recognises that vulnerable communities are essential participants in the construction of a response that is capable of meeting their needs as well as those of future generations. Equity is a key informing principle. The White Paper calls for climate change responses to address the disproportionate vulnerabilities and inequalities that many communities in South Africa experience.

The White Paper has two important governing principles. The first is that climate change must be addressed from a people-centred approach that prioritises mitigation and adaptation actions that



ensure human dignity. Social equity is a central element, holding as key the heightened vulnerabilities of the poor, in particular women, children, youth and the aged.

The second governing principle is that of informed participation at all levels. In particular, ‘the participation of all interested and affected parties must be promoted, and all people must have the opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation’. The White Paper expressly requires that ‘participation by vulnerable and disadvantaged persons must be ensured’.

However, the initial recognition of children as a vulnerable group is not followed through in the body of the policy. This provides no further guidance in the different sectors to prioritise the specific needs and vulnerabilities of children. The one exception is the health sector. The White Paper recognises that children are more vulnerable to the health implications of climate change. Indeed, it calls for the urgent prioritisation of adaptation interventions that ‘address immediate threats to the health and well-being of South Africans including interventions in the water, agriculture and health sectors’. It recognises that, while the Department of Environmental Affairs (DoEA) has a lead role to play, the cross-sectoral ramifications of climate change require a range of departments to work together. It thus calls for the mainstreaming of prescribed climate change adaptation and mitigation responses into the full spectrum of national, provincial and local planning regimes, by a number of departments. However, it also continues to prioritise mitigation over adaptation and to de-prioritise the ranking and role of social and economically mandated departments currently responsible for child well-being.

Health and nutrition

As mentioned above, as a notable exception, the health and nutrition section considers a wide range of impacts on the health of children, covering infectious diseases, water-, air- and vector-borne diseases, malnutrition and poor indoor air quality. It calls for appropriate adaptation measures, including improvements in air quality in terms of national targets, in sound nutritional policies, health care, infrastructure and education through health adaptation strategies (in line with the Second

National Communication on Climate Change (DoEA 2010a). It also calls for public awareness on the risks of high temperatures and appropriate responses, for 'heat health' action plans, for improved knowledge of disease-climate linkages, improvements in the bio-safety of the current malaria control strategy and a programme for strengthened awareness on malaria and cholera outbreaks.

However, the section does not sufficiently highlight health risks related to food security and malnutrition. Nor does it provide enough guidance on the minimum adaptive steps necessary to meet the heightened risk. There is consensus among commentators, reflected in the Second National Communication on Climate Change's description of impacts in relation to malnutrition and infection as a 'twin plague', that the likely reduction in accessible and nutritious food is one of the most serious, anticipated, health-related consequences of climate change. This is because it leads to a heightened risk of infection (DoEA 2010a). The Second Communication provides very clear guidance on the nature of interventions required to meet this heightened risk, particularly mentioning the risk to children and how it can be mitigated. However, this is not captured in the White Paper.

Interventions recognised as necessary by the Second Communication include giving focused attention to children's nutritional status, 'especially girls who will become key determinants of their future family nutritional profiles' (DoEA 2010a). Such measures must include giving support to food production. On the health front, they must also give support to improved food access and food utilisation as well as the provision of food and nutritional supplementation for children. This level of specific and targeted direction ought to be provided in the White Paper. Instead it has a generic requirement that 'sound nutritional policies be developed'.

In addition to malnutrition, the Second Communication identifies a limited health service infrastructure and capacity alongside the inequitable spatial location of health facilities, as key concerns that will impact negatively on the provision of services and support to enable vulnerable people to cope with the impacts of climate change. While the White Paper calls for 'ensured health care infrastructure', it does not focus attention on addressing infrastructure deficits in particularly vulnerable communities such as rural communities and urban informal settlements.

Water and sanitation

The White Paper does not designate sanitation as a separate and defined sector. Therefore it does not provide guidance in relation to equity objectives that could address backlogs in rural households that include children. This is an important omission, given the links that exist between sanitation and health outcomes in the context of climate change. The White Paper provides a child-neutral but well-defined and well-developed set of interventions to improve water storage, its use and monitoring, rather than meeting heightened water deprivations and risks for children. Given the clear relationship between lack of access to clean, running water and health risks for children, this relationship could be highlighted. It could support calls for measures to address water service backlogs for children, which are significant. A further compelling reason for the Paper to highlight children's water needs is the marked inequity in the rate of access between the provinces, as described in Section 3.

Energy

The paper focuses on issues of mitigation rather than on the co-benefits of expanded access to clean energy. There is no recognition of the risks for children (or anyone else) caused by the use of unsafe sources of energy. Nor is there recognition of the likelihood of an increase in such use as climate change impacts on the cost and availability of local energy sources. There is no mention of adaptation measures to address the poor rate of access to clean and safe sources of energy for marginalised and vulnerable groups, including children, despite the health and safety risk that some forms of affordable energy sources have for poor families and particularly children.

Human settlements

The human settlements sector, which is responsible for urban development and planning and the provision of housing and sanitation, is recognised as a dedicated key adaptation sector in the White Paper. The relevant section focuses largely on remedying the legacy of poor Apartheid-based spatial planning and development policies. These policies have left poor, marginalised, densely populated and underserved urban settlements very vulnerable to the various risks of climate change. The section would benefit from recognising the heightened vulnerability of children within these settings and identifying the need for adaptation and mitigation plans to minimise the higher burden of risks they face.

Adaptation

The White Paper deals with a range of adaptation issues, services and risks under the heading 'Human society, livelihoods and services'. It particularly recognises the heightened vulnerability of people living in rural areas. The primary proposed responses are directed at increased food security through agricultural support, expanded green public works jobs and livelihood diversification programmes. The paper therefore envisages dealing with increasing adaptive capacity at a household and community level, by building community and household resilience to pending economic shocks of climate change. The section is largely child neutral, however. It does not identify the impacts of climate change on children at a household and community level. It also does not identify how adaptation strategies might affect children directly as a result of distinct intra-household dynamics or how children can be part of community-level adaptation.

The focus on economic adaptation, while positive, does not take cognisance of the economic and social consequences of adaptation measures by the household on children, as discussed in Section 3. The White Paper could do more to discuss measures related to expanded social services, including social assistance and psychosocial support, for example. As discussed in Section 3, increased migration, increased unemployment and rising household poverty resulting from climate change impacts could impact on children's education and contribute to increased economic and domestic child labour practices (which are higher in rural areas). The White Paper would benefit from recognising these possible impacts and suggesting possible mitigation strategies, in collaboration with sectors such as education, labour and social protection, given the positive effect of social protection mechanisms such as the CSG in supporting households and children to cope with these types of challenges.

Despite global evidence of children's heightened vulnerability, the risk of physical harm and abuse children face in the context of climate change is still not recognised. It requires appropriate planning and programming to be included in policy strategies. The White Paper's section on disaster risk management does not include or call for a children's risk assessment or for appropriate responses to adequately protect children against harm and abuse in the face of climatic disasters. Nor does it recognise the potential for schools and other child-focused forums to increase children's awareness on disaster risk reduction.

Thus, sectors such as social development, labour, education and social protection are currently not included in the planning and development of responses in relation to climate change. However, these sectors are crucial in terms of their links to social and economic adaptive and mitigation measures, in which children's issues could be included. Their omission from the White Paper could imply their broader exclusion from discussion in other climate change processes likely to be informed by the White Paper. In the past, this has resulted in the exclusion of key child-focused sectors from climate change dialogue in South Africa, as is currently the case in the process of the development of the National Adaptation Plan.

5.4.4 The National Adaptation Plan

There is more space for addressing some of the child-focused gaps in the current climate change framework through the National Adaptation Plan. The DoEA (the Adaptation Directorate) is coordinating a parallel process, through which the different sectors identified in the White Paper are developing sector plans. These will be consolidated into a National Adaptation Plan to form the implementation basis for the overarching policy. The sectors involved as primary implementation sectors are rural development, social development, water, health, agriculture and the South African Local Government Association.

The aim is for the various sectoral plans to be ready by 2012 and the National Adaptation Plan by 2013. This is an important timeframe as there are a number of significant gaps in this process which, if not addressed, could lead to 'child-blind' sectoral and national adaptation plans in South Africa. Currently there are no plans in place to engage children in the development of the sectoral or national adaptation plans (interview with the Adaptation Directorate). However, there is the potential to influence a change in this process.

Some critical sectors are not represented in this process. They are the Departments of Basic and Higher Education and Labour. While the Department of Social Development is represented and is in the process of developing a sectoral plan, the National Population Unit (NPU) has assumed that responsibility. In this way, the plan has, so far, been developed largely in isolation from other directorates, including those with a child-focused or service mandate. As such, it does not reflect issues such as social assistance, child protection and the provision of psychosocial support.

5.4.5 National Strategy on Sustainable Development and Action Plan

The climate change policy framework is located within the national sustainable development paradigm, which is documented in the Framework for Sustainable Development in South Africa (DoEA 2008) and in the Draft National Strategy on Sustainable Development and Action Plan 2010–2014. It emphasises the need to adopt a developmental path that improves the quality of life of current generations while preserving resources for the future. It features the importance of horizontal linkages and coordination across sectors; vertical spatial linkages between national, provincial, local and global levels; and the role of partnerships in realising developmental objectives. The purpose of the framework is to 'enunciate South Africa's national vision for sustainable development and indicate strategic interventions to reorient South Africa's development path in a more sustainable direction'. However, it does not recognise child development and investments in child well-being as an essential element of the broader sustainable development paradigm.

5.5 Is there integration with other child-relevant policies? What are some of the gaps?

There is unanimity among commentators, environmentalists, development policymakers and practitioners that climate policy must become an 'integral part of the country's development strategy' (DBSA 2011: page 4). For this to be effective, there is a need for 1) development-focused climate change policies and programmes, and 2) reciprocal climate change-sensitive development policies. This review now considers whether climate change considerations have been integrated into the various sectoral policies and programmes that provide children's health, protection, education and social security services and support. It briefly assesses whether these sectors have considered the

impact of climate change on children in relation to their specific mandate and whether there has been planning on how services and support can mitigate that impact, given new demands on their respective sectors.

5.5.1 The health sector

South Africa's health system is child oriented in that it provides a host of free and supportive maternal and child-care health services, governed by a complex array of policies, laws and programmes (for details see Appendix B).

A number of the services provided are essential to mitigating the impact of climate change on children's health status by strengthening the health of children. As such they would contribute to their capacity to adapt. They would also enable a health-based response to impacts of climate change in this sector. However, none of the governing documents expressly mentions climate change as a current or imminent, national developmental and health issue. There does not appear to be any evidence, on the basis of the current policy documents reviewed, of any assessments of the likely impact that climate change will have on the level of demand for health services in the country. Nor is there evidence of any targeted strategies to address health gaps and deficits that will aggravate children's vulnerability to health risks in the future. Nor is mention made of any planning to ensure an increase in supply to meet elevated demand in the future. As an example, there does not appear to be evidence of any identification and prioritisation of prevention and treatment health services in geographically high-risk areas or to high-risk children such as the very young, or of the development and provision of information and training on the health risks of climate change and how to plan for them to health workers, community-based health care workers and caregivers, especially in high-risk areas and communities.

The one exception is the Department of Health's malaria programme. South Africa has always had a malaria risk and has a long-established successful prevention, control and treatment strategy. Since the programme has effectively reduced malaria in South Africa, this creates a unique risk in the context of climate change. Communities are not immune to it. This means that a child is at risk of contracting malaria if he or she comes into contact with a vector. If contracted, it will be severe and will require treatment (interview with the Malaria Control Centre in Limpopo). Climate change is a threat in this context. The Department of Health acknowledges that there is still much to learn about the impact of climate change on malaria but has already put preparatory measures in place to deal with the possible consequences of climate change, primarily maximising existing interventions:

- Indoor residual spray;
- Surface water sprays;
- Early detection and treatment of possible cases through border post screening of incoming migrants;
- Good monitoring systems to pick up early epidemiological changes;
- Good community-level communication and health promotion strategies.

In summary, the current health system is strong on the policy front. It has a strong equity-based child focus. There are numerous programmes that will build the resilience of children to cope better with the harmful health impacts of climate change. It has a strong and well-prepared malaria programme. The strong, expanded immunisation programme includes immunisation of children against rotavirus diarrhoeal and other diseases.

There are, however, significant gaps between policy and practice that limit the potential of the health system to build the adaptive capacity of children. Planning to meet the demands on the service by children affected by climate change is still insufficient. These responses are in a context of existing

disparities in quality, infrastructure and availability of services (especially in rural areas). Nonetheless, a number of developments are underway that aim to address some of these problems. These include the Draft National Environmental Health Policy; the Draft National Strategic Plan for HIV & AIDS, STI and Tuberculosis 2012–2016; and the National Health Insurance in South Africa Green Paper 2011.

On the whole, health policies would benefit from recognising the pressure and stress that climate change will place on children's health systems and that climate change should therefore feature prominently in prevention, treatment and care and support strategies. There is significant space for revisiting existing programmes, especially those currently in development.

5.5.2 Food and nutrition

An obligation to realise the right to food and nutrition in South Africa is shared among a variety of Departments, including Health, Agriculture, Social Development, Rural Development and Education. There are a host of policies and programmes governing their respective obligations (see Appendix B).

Formal programme documents make no mention of climate change. However, all relevant food and nutrition sectors are developing sectoral adaptation plans, which are likely to address the inevitable food insecurity impacts of climate change and the role of each of the departments in addressing these³³.

Some gaps in the provision of food, nutritional and agricultural support through existing programmes would need to be addressed, to be prepared to provide support in a situation of higher demand. In addition to service delivery gaps, there are a number of crucial policy gaps in the context of securing food and nutrition for vulnerable children. There is no consistent and effective child-focused, community-based programme with which to monitor the nutritional status of vulnerable children or to prevent their slide into malnutrition. Currently programmes provide concrete support only once a child is diagnosed as malnourished. Once the child has gained weight, he or she is excluded from receiving the support and returns to the community. There is no follow-up or ongoing monitoring, even if that child is returning to the same circumstances that caused their malnutrition in the first place (Giese and Hussey 2002). This is particularly important, given that the local circumstances might be challenging in the context of climate-related events over a period of time.

5.5.3 Water, sanitation and waste removal

Three different departments manage water, sanitation and waste removal and the management and provision of these services is governed by various policies (see Appendix B). Madzwamuse (2011) argues that the National Water Act 36 of 1998, together with the Water Services Act 108 of 1997 and the National Water Resource Strategy (NWRS), provide South Africa with a holistic and cohesive water policy framework. While the Water Act does not outline a direct response to water shortages that may occur as a result of climate change, the framework, as a whole, is sufficiently flexible to accommodate the anticipated effects of climate change.

Still, there are a number of challenges of more immediate relevance to vulnerable children's access to water, which will be aggravated in the context of increased demand. Currently, 7 million children in South Africa do not have access to clean, running water (Hall 2011b). A study by the South African Human Rights Commission (SAHRC 2006) found that 49 of the 256 municipalities were not making the free basic water programme available to households in their communities. Municipalities have blamed this on insufficient funds.

Sanitation and waste removal are marked by significant infrastructural and service delivery backlogs, which are especially pronounced in rural areas that are served by under-resourced municipalities. In

33 Sectoral representatives were contacted but it was not possible to secure interviews or further information.

addition, many of these policies do not identify how the sector might be affected by climate change directly although they do have the potential to increase the supply of services to especially vulnerable communities. In some cases, there is the potential to increase the supply of services to households with children, where they are recognised as a priority vulnerable group.

5.5.4 Education

The education sector has developed a host of policies designed to improve access to education. They have a strong equity focus with a positive bias in favour of children living in poverty, with a view to redressing the racially based education inequalities of the past (SSA 2010a). Two factors within the sector are relevant to the educational risks of children affected by climate change. These are the relatively high dropout rate, especially of children older than 14 years at secondary school level (as discussed in Section 3), and poor-quality buildings and basic infrastructure within schools, especially those in marginalised rural communities.

Climate change is likely to exacerbate the risk of dropout, mainly through its economic impacts on households and children. The current enrolment and retention strategy does not adequately meet current financial stresses. It is unlikely to cope with any additional stresses created by climate change. In addition, provinces like the Eastern Cape have not always provided safe, secure and adequately resourced school structures and infrastructure, even basic services such as water and sanitation. Many schools are still mud constructions and lack basic services such as toilets or water.

5.5.5 Child protection against harm, abuse and exploitative labour practices

As discussed in Section 3, as a result of households' and children's own adaptation strategies, climate change could expose children to higher risks of abuse, neglect and exploitation. This requires that protection services, including prevention and early intervention programmes, community-based programmes, counselling and child labour laws be reviewed to assess their adequacy to respond to the needs of children who may become vulnerable to harm as a result of climate change. There is currently very limited recognition of the heightened protection risks for children in the current climate change policy framework. Similarly, the departments responsible for child protection have not yet considered how climate change could impact on children's protection and the demand for support or services. Nor have they put in place plans to mitigate the risk (interviews with the Child Protection Directorate and the Department of Labour).

5.5.6 Disaster risk reduction and children

Children are not targeted as a priority group presently, in terms of current national disaster management laws. The heightened risk of children to injury, abuse and neglect in the wake of disasters linked to climate change requires that corresponding laws be more child focused. The current Disaster Management Act (No. 57 of 2002) and the Disaster Management Framework work together to provide for an integrated and coordinated disaster management policy that focuses on: preventing or reducing the risk of disasters; mitigating their severity; emergency preparedness; and measures to reduce the vulnerability of disaster-prone areas, communities and households. While the framework envisages the notion of vulnerable groups, it is silent about children within this and about measures necessary to address heightened levels of vulnerability. Although it calls for the integration of disaster risk reduction in primary and secondary school curricula, it does not sufficiently recognise the potential for children to participate actively in planning and awareness raising, to contribute to local-level preparation.

There is national recognition of the inadequacy of the current disaster management framework to deal with climate change, which has led to a review of the current framework. It is anticipated that this process will result in the presentation of a draft bill to parliament in 2012 (IFRC 2011). This offers an

ideal opportunity to review the child focus of the framework and to promote children's participation, to inform the drafting process and ensure their visibility in the national disaster management framework.

5.5.7 Social protection

South Africa has a comprehensive social protection framework, which includes a range of instruments, both universal and targeted: free universal primary health care; targeted cash transfers for the vulnerable; public works programmes; subsidised housing; free basic education for the poor; and a universal quota for free basic services (water, electricity and sanitation). Among these, cash transfers are targeted for the poor and the vulnerable, according to specific criteria: old age; disability; care of a disabled child; parents providing foster care; children from poor households (CSG); and households or individuals facing distress as a result of undue hardship, as a temporary emergency benefit.

There is evidence that the system has had important poverty reduction impacts (e.g. Pauw and Mncube 2007), contributing to mitigating the vulnerability facing some of these groups. The CSG in particular, which is payable to children from poor families has been shown to have important positive effects on child well-being, including increased school attendance and decreased child hunger (Williams 2007). Further, the Financial and Fiscal Commission and UNICEF (2010) find that, during the 2008–2009 global recession, the CSG provided a significant buffer to poor households. Without it, the situation of poor households would have been worse. In fact, during 2007, significant reductions in hunger could be linked to the CSG.

The current social protection framework does not recognise climate change impacts as a specific source of vulnerability. However, given that some of the effects on children will relate to a higher demand for basic services (such as health, water and sanitation, as discussed in Section 3), in addition to risks of children falling into poverty as a result of livelihood pressures, there could be a surge in the number of beneficiaries in need of social protection coverage. Indeed, cash transfers and, in particular, the CSG, could provide important social protection to children (within households or out of them) facing economic challenges related to climate change. Thus, the Department for Social Development should plan for changes in poverty and vulnerability profiles that might be triggered by climate change in the medium term to ensure the necessary resources and delivery mechanisms are in place to reach potential new beneficiaries, particularly in the most affected provinces (e.g. in the north and east).

While targets remain focused on the poor and vulnerable, projecting different types of shocks, not only economic (such as the recession) but also environmental, as affecting the social and economic stability of children and their households, would make the social protection system in South Africa a useful response measure to mitigate the impacts of climate change.

5.6 Can the current institutional arrangements bridge the divide?

As previously noted, the current policy framework recognises the multi-sectoral dimensions of climate change and it creates a number of coordinating structures to facilitate multi-sectoral responses and the integration of climate change into all state policies, laws and programmes. As is clear from the discussion above, however, there is insufficient integration of climate change within national policies, laws and programmes that relate to the adaptive capacity of children. The case studies in this report also reveal inadequate vertical integration of climate change and its impacts on children into local government policies, laws and programmes. There are two reasons for these shortcomings. The first relates to the composition of the coordinating structures. The second relates to the need for more and better information, as well as strengthened capacity to integrate planning around the impacts of climate change on children at local government and other levels.

The composition of coordinating structures is essential to their effectiveness. They should include all departments with relevant mandates (DBSA 2011). At present, the Inter-ministerial Committee on Climate Change is limited to six members: Water; Environmental Affairs and Tourism; International Relations; Trade and Industry; Rural Development; and Cooperative Governance and Traditional Affairs. Given its mandate to formulate a national programme of climate change response, the absence of key ministries such as Women, Children and People with Disabilities, Health and Social Development is significant.

Similarly, the broader composition of the Intergovernmental Committee on Climate Change (IGCCC), with the mandate to drive the 'development of the integrated National Climate Change Response Policy' (DoEA 2010b), is missing key child-relevant departments such as Education and Labour.

Finally, the National Climate Change Committee (NCCC), which is designed to provide representation from the main stakeholder groups, is marked by inadequate representation of government departments.

Plans have been developed to ensure that climate change policy development cascades down to provincial and local government level. At local government level in particular, all municipalities are expected to develop climate change risk and vulnerability assessments. In order to do this, they must understand how climate change intersects with their mandate and develop plans to address emerging issues. A key barrier is a lack of awareness and knowledge of the climate change implications for different departments and a lack of capacity to translate that impact into meaningful programme interventions (Roberts 2008).

The DoEA, together with GIZ (German Agency for International Cooperation), is developing a climate change toolkit that will highlight local government responsibilities. However, in the case of the integration of climate change impacts on children, there is a dual knowledge and capacity deficit. Local government officials have insufficient information about climate change and they lack knowledge about their child well-being mandate. As such, it is critical that future capacity-building initiatives address both knowledge gaps simultaneously so as to enable municipalities to conduct child-risk and vulnerability assessments and to develop appropriate child-sensitive local government policies and programmes.

Overall, at a departmental level, there has been insufficient integration of climate change into children's programmes. Meaningful integration requires that the climate change coordinating structures be expanded to include all departments with a child-relevant mandate and that the capacity building of all relevant government officials be mindful of their child well-being and climate change mandates, especially at local government level.



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6 Children's participation in policy processes

“I am the future of this country so every decision that is made I have to be there, I have to speak out and I have to be heard.”

“The Constitution does allow me to take part in decision making. So if you refrain me from making a decision... you are violating my rights as a child and as a human being living in South Africa.”

“I would like to encourage campaigns or workshops or discussions (...) whereby we get educated about climate change.... By doing so we will be able to educate our fellow peers and our fellow families and our fellow communities at our homes.”

“At my school and where I stay, I educate people a lot about climate change. They even gave me a nickname – ‘weather woman’ – because I am so sensitive towards it. I try my best to educate people... about global warming, what it is, how we can help, how we can tell other people and stuff like that.”

“Me and my family use energy saving light bulbs. We use those kind of light bulbs because I heard they use less electricity.”

“I can encourage my family to use public transport instead of letting my dad, my mom, my grandma, each and everyone driving each their own car. Because the cars release carbon dioxide.”

Note: The quotes presented here illustrate some of the responses from children (aged 14–17 years) who participated in a series of focus group discussions at the national level and in the Limpopo and KwaZulu-Natal provinces. For further details, see UNICEF South Africa (2011) ‘Change through the Eyes of a Child: South African children speak about climate change.’

Children are interested in being part of decisions that affect their future but it is also their right to be involved. Despite sceptics' accusations of 'tokenism' and adult 'manipulation', when children are well informed about the issues to be discussed, be they climate change or others, and supported appropriately, they can participate meaningfully in national and global debates. For this purpose, organisations that support children's participation need to provide appropriate knowledge and support to make this participation effective, while also addressing concerns of safety and well-being (Walden et al. 2009).

Going hand-in-hand with any call for greater child participation is the need to ensure that issues of climate change are communicated effectively to children. Studies show that the basic principles of climate change are not well understood by many children or indeed by the adult population, in general, in South Africa (Neville, 2010). A national survey conducted in 2007 found that 22 percent of youth (aged 16–24 years) had never heard about climate change or global warming before. Twenty-three percent had heard about it, but knew nothing or hardly anything about climate change (Seager, 2008). The need for more effective and integrated education and public outreach programmes is imperative. It is through successful awareness and communication processes targeted specifically at children that they will be in a position to identify their own needs, prioritise, make informed decisions and participate effectively in various policy arenas.

6.1 The national legal and policy framework for children's participation on climate change

In South Africa, it is of particular importance that poor children participate in policy decisions about climate change because the latter affects their present and their future and will have an impact on their and their households' capacity to meet their basic socio-economic needs. There are clear legal international, regional and national obligations on all spheres and levels of government to facilitate this. National obligations to ensure children's participation in policy processes include some of the following:

'Constitutionally, both adults and children acquire the right to participate in policy processes through the recognition of their rights to freedom of expression (Sec 16), to join or form a political party and the right to be part of political campaigns (Sec 19 (1)), to demonstrate and protest, and the right to participate in the development and implementation of laws and policies (Sections 59, 72, 118 and 195). In short, they are entitled to participate in social dialogue at all levels' (*Jamieson 2011*).

The Children's Act 38 of 2005 uniquely and expressly provides that

'Every child that is of such an age, maturity and stages of development as to be able to participate in any matter concerning that child has the right to participate in an appropriate way and views expressed by the child must be given due consideration' (*Section 10*).

Local Government Act 32 of 2000 recognises the rights of local communities to participate in the planning of municipal services and gives children, who are part of that community, an equal right to participate.

The National Youth Development Agency Act 54 of 2008 includes the youth (people aged 14-35) in all democratic decision making. In addition, education and health laws require the participation of, or consultation with, children in various sectoral decisions that affect them.

In climate change policies and laws, there is a strong recognition of the right of communities, especially vulnerable ones, to participate in environmental and climate change adaptation and mitigation decisions that affect them. The White Paper provides one of the strongest and clearest statements in this regard:

‘the participation of all interested and affected parties must be promoted, and all people must have the opportunity to develop the understanding skills and capacity necessary for achieving equitable and effective participation.’

The paper expressly requires that participation by vulnerable and disadvantaged persons be ensured.

The principle of participation is central to almost all of the other climate change policy documents. However, the fact that few of them recognise children as a targeted vulnerable group may indicate that facilitating ‘participation’ is not considered by current policy leaders (or participants themselves for that matter) to include facilitating ‘participation by children’. Nevertheless, the White Paper’s recognition of children and youth as an especially vulnerable group should result in their being consulted.

Despite the centrality of the principle of participation in the current policy framework, there is a record of poor compliance, with the resultant obligations on climate change policymakers, especially in the energy sector (ISS 2011). Reasons for the failure to consider the views of even adult stakeholders include insufficient legislative pressure to ensure participation; insufficient provision within programmes for participatory processes; no budget allocations for facilitating participation; and insufficient attention by policymakers to this issue. As such, despite the constitutional and legislative obligation of government to facilitate public participation in policy development processes, the reality is that *‘community participation has been mostly rhetorical, not real, especially in the rural areas of the country where the vast majority of the poorest of the poor live’* (Buccus 2007).



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Box 7: International best practice and lessons learnt about child participation in climate change processes

During the past three to four years, child-centred development agencies have been engaging with children to support their adaptation to the impacts of climate change, drawing heavily on experiences of child-led disaster risk reduction work. Participatory work on disaster risk reduction has been the entry point, challenging common views of children as passive victims with no role to play in reducing risks. Experiences with children in different parts of the world indicate that they are willing and able to participate actively in tackling issues that affect their environment, their communities and the lives of others. However, to maximise the impact of their actions, this requires appropriate education about climate risks, mitigation and adaptation that engages children and provides them with knowledge, skills and confidence.

Promising practices of children's participation in climate change and disaster risk reduction **Mozambique: child-led climate change resilience in action**

Save the Children in Mozambique has been involving children in a variety of sensitisation activities, including identifying causes and effects of flooding and how to prepare and respond as well as a 'child parliament' to develop sensitisation materials on various health and risk reduction issues. Children have also played an important role in decision making in a community grants scheme aimed at supporting livelihood recovery in flood-affected areas. They hold review sessions with children from target communities, who are asked to share their views about the proposed projects and their expected impacts on children. In addition, children have been involved as facilitators during these sessions, with a positive impact on the participation of other children.

The Philippines: the power of children's voices in coping with extreme weather

Heavy rain early in 2007 caused several landslides in the Philippines. The government determined that, out of eight localities facing high risk, the two that had a high school and an elementary school were extremely exposed to landslides, so a decision was made to relocate both schools. With the support of Plan International, the school's headmaster opened the decision to a community-wide referendum, including a vote for each of the children of the school. Children were generally in favour of the relocation, even if some parents were unhappy with children travelling a long distance and local shops feared a loss of business. Children's organisations in the school promoted an education campaign about landslides and their risks. Many students wrote to the local government expressing their desire to relocate. The students' proposal won the vote. Students were pleased that they had influenced this important decision.

El Salvador: children hold back mudslides

In El Salvador, where mudslides have killed thousands of people, destroying homes and livelihoods and disease runs rife, Plan International supported an initiative by youth groups to minimise the worst effects of natural disasters by working with local government and community members to tackle the direct threats to life from floods, earthquakes, landslides and disease. For example, children have contributed to preventing landslides by planting a spiky grass on the slopes of hills. In some areas there, a grassroots movement among children was formed with the objective of reforesting the hillsides. Another initiative in which children participate is visiting households every month, accompanied by a health worker to explain the dangers caused by dumping rubbish and allowing stagnant water to collect. This work seemed to be paying off in Potonico, where town authorities recognised a drop in dengue fever cases while infection rates were rising in the rest of El Salvador.

Some lessons learnt from these participatory processes:

- A growing body of evidence has shown that children have a valuable and unique ability to conceptualise and analyse risk and that, with support, they can play a key role in climate change adaptation and disaster risk reduction.
- While children have the capacity to be agents of change, an adequate enabling environment is needed.
- Experiences in different contexts vary according to the type of spaces that exist, the needs identified by children and the type of support and orientation children receive.
- Until policy spaces exist at a national and regional level for citizens' participation in general, it is very difficult for children to be heard on disaster issues. The research suggests it is unlikely that children will have the experience, capacity or agency to launch advocacy campaigns in isolation.

Source: IDS (2009); Mitchell et al. (2009); and interview with researcher on Children in a Changing Climate.

6.2 Selected examples of children and youth participation in climate change and disaster risk reduction

These challenges for participation highlight in general the obstacles to promoting children's participation in relation to climate change issues. The challenges faced by adult stakeholders do not bode well for the prospects of an environment open to and encouraging of children's participation, despite the strong legal foundation for obligatory participatory processes. A review of practices within the sector reveals a clear lack of participation by children in national climate change policy processes to date. However, there has been formal participation by *youth*. This has been valuable for the development of appropriate, adaptive responses for youth. It also highlights the potential for the effective realisation of the right of children to participate, as has been the case for youth.

The process for the development of the White Paper was consultative to some extent. All targeted vulnerable groups, such as the elderly and women, made submissions to parliament and at provincial hearings. These were given due consideration. Participants included a number of youth groups, including Youth in Climate Change and Youth in Agriculture. However, there were no children in the national or provincial participatory processes³⁴.

A number of initiatives, run by government departments as well as NGOs, facilitate the participation of children in climate change dialogue. At present, these focus largely on educating children about climate change and empowering them to be individual and community-level agents of behavioural change. Many of them have the potential to become more effective children's participation vehicles via which children can become more active agents of change in relation to policy, programme and practice at local, provincial and national levels. For example, the Indalo Yethu project, born out of the DoEA, has the aim to mobilise the country around environmental and sustainability issues, including climate change. It has a number of child- and youth-focused initiatives in this regard. One such is KidsCo, a television programme aimed at a very young audience, which educates them about the importance of conservation and caring for the environment. Issues covered include deforestation and wasting water.

The second initiative is the Eco-Schools project. This is coordinated by the Worldwide Fund for Nature and the Wildlife and Environmental Society of South Africa. It is designed to encourage curriculum-based action for a healthy environment. The primary purpose is to mobilise and empower schools, by empowering teachers and children, to prevent, identify and change environmentally damaging practices. The objective is to encourage this process by integrating climate and environmental issues into the ordinary curriculum and encouraging the transfer of knowledge to communities surrounding the schools, so as to facilitate the collective tackling of environmental problems (interview with Eco-Schools Limpopo coordinator). An evaluation of the programme highlights its potential for primary school children to act as agents of change in community behaviour and practice (Rosenberg 2008). The evaluation report indicates that some of the benefits of the programme are the transfer of knowledge about health risks, ignorance or over consumption to surrounding communities and the provision of opportunities to tackle local environmental issues.

However, while opportunities for local-level advocacy at a community and local government level are available and have been taken up on occasion, interviews with project staff in the case study areas identified as an obstacle the lack of reciprocity or meaningful consideration by local government of the views and concerns put forward by children. For this reason, the adults in the school often undertake advocacy, in practice. Children have not really been able to express their voices in some of these initiatives as a result of cultural constraints. A significant impediment to active children's participation in rural areas is timidity. They are brought up to be respectful and are often afraid to speak up.

³⁴ Interview with deputy director of Adaptation Directorate within the DoEA.

Box 8: The Children's Charter for Disaster Risk Reduction

The Children's Charter for Disaster Risk Reduction has been developed through consultations with more than 600 children in 21 countries in Africa, Asia and Latin America. Children were asked about the impacts of disasters on their lives, the networks that exist in their communities to tackle disasters and their priorities for disaster risk reduction going forward.

The aim is to raise awareness of the need for a child-centred approach to disaster risk reduction and for stronger commitment from governments, donors and agencies to take appropriate steps to protect children and utilise their energy and knowledge to engage in disaster risk reduction and climate change adaptation.

The following points highlight the main priorities and the most common themes children identified:

- Schools must be safe and education must not be interrupted.
- Child protection must be a priority before, during and after a disaster.
- Children have the right to participate and to access the information they need.
- Community infrastructure must be safe, and relief and reconstruction must help reduce future risk.
- Disaster risk reduction must reach the most vulnerable.

The Children's Charter on Disaster Risk Reduction was launched in May at the 2011 Global Platform for Disaster Reduction – a biennial forum organised by the UN International Strategy for Disaster Reduction (UNISDR) for knowledge-sharing and partnership-building across sectors, with the goal of improving implementation of disaster risk reduction through better communication and coordination among stakeholders.

As a result, making children and young people partners in reducing disaster risk was selected by UNISDR as this year's theme for International Disaster Risk Reduction Day. Children and young people have been prioritised as the first key target group in the new UNISDR campaign: Step Up for Disaster Risk Reduction Action, running to 2015.

In South Africa, education was the most commonly occurring theme, prioritised by all children during consultations on the Children's Charter. In particular, children want access to information and training in disaster risk reduction and they want disaster risk reduction and climate change to be included in the curriculum, and they want their schools to be safe and built on higher ground.

A child interviewed for the Charter said 'I felt unhappy when I saw the school destroyed by the storm. I did not go to school because the school was destroyed.'

South Africa's National Disaster Management Framework calls for the integration of disaster risk reduction in primary and secondary schools curricula. An education toolkit will now be piloted in three schools in the Western Cape: Observatory Junior, Helderkuin Primary and Hawston Primary schools. The toolkit includes books, videos and board games and was developed by the African Centre for Disaster Studies at the University of North West.

The African Centre for Disaster Studies is also behind the Girls in Risk Reduction Leadership (GIRRL) project, which is exploring the contributions to disaster risk reduction and community resilience building by marginalised adolescent girls from the Sonderwater informal settlement.

Sources: Ngaka (2011); www.globalnetwork-dr.org/news/263.html; and www.savethechildren.org.uk/en/docs/Childrens_charter.pdf.

Another project run by Indalo Yethu focuses on environmental awareness in primary and high schools. Through this, children are taught about the environment and about legal and policy processes. For example, three students were selected to attend the Minister of Environmental Affairs' budget speech. In preparation for COP17, the children are planting trees in symbolic support of the climate change programme. Moreover, the project will establish food gardens at all schools, to increase their feeding and adaptive capacity and address issues of climate change at the same time.

Save the Children UK's South Africa programme has been working in Limpopo and Free State provinces through school-based Children's Committees, in which between 20 and 60 children get together to discuss issues of concern. They then mobilise key issues identified in discussions. Recently, in the context of Save the Children's work on disaster risk reduction, the international NGO started to sensitise children to their role in this area by providing them with more information. From December, it will start working with some schools to include disaster risk reduction planning, as part of the curriculum. As a result of discussions and work within committees, there is some evidence of the potential role of children in terms of becoming active agents of change in their communities. For example, after the bridge to one of the local schools in Limpopo was destroyed by a flood, the committee effectively organised itself to pressure local authorities to rebuild it, to guarantee their safe access to school. Through such mechanisms, children can be important local actors in disaster risk reduction and contribute to developing local adaptive capacity (interview with Save the Children South Africa's Education Programme).

The Limpopo DoEA runs an annual State of the Environment Report school competition. The objective is to create awareness of climate change among children. Children in schools choose one environmental issue and develop a product around this, based on how the chosen climate change issue will affect them. Products developed include poster presentations, theatre and oral presentations. However, at present there is still no mechanism to feed back the information obtained through the competition, to further climate change advocacy in the province, either at a household, community, local, provincial or national level (interview, Limpopo DoEA). However, this competition provides a potentially valuable vehicle for facilitating children's participation in climate change dialogue. All that is required is the appropriate routing and development of the information for use by different target audiences.

While children's inputs are not used optimally at present, the processes behind this project and the Eco-Schools Project facilitate their participation in climate change dialogue at a household and community level. The information they gain about matters such as permaculture, food gardens and related food security concerns is taken into their homes and communities. In this way, they are already drivers of positive change and adaptation in these localities.

A further project involving children, which has great potential for duplication is Project 90x2030. This facilitates children's dialogue between peers and between youth and policymakers, through a number of environmental clubs in schools, at which children take ownership, with guidance from a school coordinator. The clubs are action oriented, which means that children devise plans to address pressing environmental issues that they identify. The director of the 90x2030 project says that one of the most strategic routes to maximise the energy and effects of the clubs is to get the school management's buy-in. Where this is obtained, the projects are supported organically and sustainably. Awareness is raised and children act as local school and community-based agents of change, given the strong action-oriented focus of the project.

A more policy-focused process run by the project is the Young Leaders Forum. This involves the identification of potential young community leaders who are brought together for a period of three days to hone their environmental advocacy skills. They spend their fourth day with climate change leaders to convey their key messages. The National Youth Development Agency will be taking this year's group to COP 17.

What is evident from this brief assessment of some salient children's participatory initiatives is that there are many potentially valuable vehicles and entry points for the strengthening of children's participation in climate change dialogue in South Africa. Existing initiatives provide an excellent foundation on which a sound culture of children's participation can be built with strategic support from organisations like UNICEF and international NGOs such as Save the Children.

Box 9: Youth and the transition to a green economy in South Africa

Whether and how to make the transition to a green economy has been a topic of heated debate in South Africa as awareness of the significance of its contribution to GHG emissions has grown. South Africa is one of the 20 largest GHG emitters in the world and the largest emitter in SSA, as a result of the large role played by highly energy-intensive mining and extractive industries and the country's dependence on coal to meet its energy needs. Some 40 companies consume 75% of electricity generated in South Africa, while nearly 20% of poor South Africans lack access to electricity altogether (IDASA 2010). In 2007, South Africa's Cabinet gave the DoEA the mandate to develop a set of long-term mitigation scenarios (LTMSs) to outline options through which the country could reduce its emissions to levels 'required by the science' of climate change (DoEA 2007). Decarbonisation of its energy mix and reducing energy consumption are essential to mitigation.

The LTMSs provide an analytical basis for finding new paths to economic growth that are less environmentally damaging through a multitude of policy processes. These include the Department of Trade and Industry-led effort to develop a new Industrial Policy Action Plan and the National Planning Commission's efforts to plan the reconciliation of economic development objectives with other priorities, including environmental sustainability and climate change mitigation (Pienaar and Nakhooa 2010).

While the conversation on green growth has been spurred by the need to take action to address climate change as a matter of urgency, there are many other drivers, including the possibility of finding more inclusive paths to economic development (Winkler 2010). The possibility that investment in renewable energy technologies in particular will create more jobs than conventional energy options, including jobs for unskilled workers through associated maintenance and support functions, has attracted significant interest and attention.* So far, the energy-intensive economic growth path that South Africa has continued to follow has not created employment opportunities for many young people.

Nevertheless, the promise of a green economy is viewed with a degree of reservation by some stakeholders, including the labour unions which, while generally supportive of the notion of a 'just transition' to a more labour-intensive green economy that offers more decent jobs, recognise that the

* See, for example, Minister of Economic Development Ebrahim Patel's 2010 speech suggesting that green energy could create 300,000 jobs and associated coverage: www.bloomberg.com/news/2010-05-18/south-african-investment-in-green-energy-may-create-up-to-300-000-jobs.html.



already established mining and conventional energy industries are already significant employers and that there is a need to find opportunities for those who may face retrenchment if carbon-intensive industries need to be scaled back (Blaine 2011). Yet, if educated and trained with the necessary skills, South African youth can be beneficiaries of the opportunities promised by a new green economy. Achieving this goal is an anchor programme of the Integrated Youth Development Strategy advanced by the National Youth Development Agency, which envisions the need for significant investment in training and education to this end. For example, awareness of job opportunities in renewable energy, water management and energy efficiency could be raised through outreach and the curriculum at the high school level. Training programmes for solar water heater system installation and maintenance are already underway and special efforts could be made to raise awareness and recruit young people into these. Maintenance and installation of other renewable energy programmes can also be considered.

Indeed, South Africa has taken pioneering steps towards spurring job creation in environmental sectors through initiatives such as the Working for Water programme,[†] launched in 1995 to work with local communities to clear invasive species obstructing local waterways. More recently, the Department of Energy, through the South African Energy Development Institute, endorsed the Working for Energy programme,[‡] which seeks to spur renewable energy technology development and energy management through labour-intensive methodologies, although implementation of this programme has been far slower. Furthermore, in a 2011 policy paper, the National Treasury proposed a subsidy for youth employment to reduce its costs to the private sector, to respond to the consequences of youth unemployment. Such a scheme could be harnessed to target 'green' sectors especially.

Renewed progress in extending access to modern energy services in rural areas through off-grid and renewable energy-based systems can offer real benefits for children. For example, access to modern lighting services can improve indoor air quality and make light available to support studies after dark. The potential benefits of a large-scale roll-out of solar water heaters has also been highlighted as an opportunity to create jobs and improve well-being, in light of the growing evidence base that the installation of solar water heaters can improve insulation and roof quality in households. Furthermore, improved access to public transportation systems can present a low-carbon solution to meeting transport needs while improving the access of young people and children to schooling and job opportunities may increase the benefits.

[†] www.dwa.gov.za/wfw/.

[‡] www.saneri.org.za/working_for_energy.html.



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7 Key findings and recommendations for policy

“Climate change, it is not a dream, it is there. So we as South Africans, what is the role that we are playing to combat climate change?”

“I will ask the President to start a campaign himself to go to the schools and almost the whole country, to educate the children in the schools about climate change. Maybe they will try and do something about it.”

“Climate change won’t be stopped by making laws. We can’t sit in parliament all day and make laws that we will never live up to. What needs to happen, action needs to take place.”

“Encourage the government or municipalities to give solar panels to schools, because solar panels absorb solar energy. This can be used as a form of electricity.”

“It also goes back to us consumers. We sometimes buy things and support these companies that cause global warming and bring about disturbance to the nature and the climate change. So it is also up to us, the consumers. We must be aware of what we are buying, what the contents are of the products that we consume.”

Note: The quotes presented here illustrate some of the responses from children (aged 14–17 years) who participated in a series of focus group discussions at the national level and in the Limpopo and KwaZulu-Natal provinces. For further details, see UNICEF South Africa (2011) ‘Change through the Eyes of a Child: South African children speak about climate change.’

This report has explored a number of key issues relating to children and climate change in South Africa. In doing so, it has identified the main climate change impacts and vulnerabilities facing the country. It has outlined how changing climate and development pressures are affecting and will continue to affect children and households through both primary and secondary impacts and it has evaluated the extent to which children's issues are considered within South Africa's policy processes at the national level.

Drawing on insights from our analysis, supported by a review of the existing literature and a series of key informant interviews, we summarise key findings and present a number of recommendations relevant to a host of development actors at different scales.

7.1 Key findings

The exact nature of climate change impacts in South Africa at the local level is not certain. However, appropriate response options are available and action to support effective adaptation is required now. While the general characteristics of climate change are relatively well understood at the global scale and, to some extent at the regional scale, changes in climate at the local level are not yet fully known. It can be said, for example, that it is likely that temperatures will increase nationwide in both the near and the distant future, with rates of increase higher in the interior of the country than in coastal areas. Using downscaling techniques, likely impacts at sub-regional scales can be identified, although relative uncertainties are far higher. However, it cannot be said with absolute certainty what average rainfall in Mokopane town, Limpopo province, will be in 2050 and 2090. To make things more difficult, these changes are likely to interact with, and be transmitted through, wider development pressures, each subject to large uncertainties.

Regardless of these uncertainties, available information is good enough to guide policy in developing appropriate response strategies. Confidence in projections is high enough to differentiate between impacts across different parts of the country, allowing for necessary and tailored policy responses to reduce the negative consequences of climate change. Examples of these adaptation strategies can be seen in the form of better water management and early warning systems in areas likely to be affected by significant changes in precipitation patterns, and in efforts to strengthen access to safe water and health care in areas most likely to witness a rise in water-borne diseases.

Moreover, there are a number of actions that can help households and children adapt to the impacts of future climate change without the need to know what exactly these impacts are likely to be. In supporting children and household's adaptive capacity, governments and development actors can play a strong role in ensuring that households are more resilient to different kinds of external shocks and stresses and preventing negative implications from being transmitted to children. The characteristics of adaptive capacity at the household level are well known³⁵. Efforts to strengthen these characteristics are vital and support can often be delivered through informed planning and delivery of existing development interventions, such as social protection, sustainable livelihoods and disaster risk reduction initiatives. Doing so will bring significant positive contributions to child development and well-being. However, more is needed to understand the specific determinants of children's adaptive capacity and how policy can be best tailored to support it directly.

Impacts, vulnerabilities and capacities of South African households and children vary tremendously across different contexts. In understanding how climate change will impact on children across South

³⁵ See Jones et al. (2010) and Africa Climate Change Resilience Alliance (ACCRA).



Africa, it is important to recognise the considerable diversity in different contexts. Climate impacts are likely to be completely different from one end of the country to the other. For example, projections predict increases in mean annual rainfall in the east and central provinces, with sharp decreases in certain corners of the west of South Africa. As such, policy responses to support adaptation in the Western Cape will likely be completely different to those needed for KwaZulu-Natal or Limpopo provinces.

Similarly, the vulnerability, capacity and needs of households and children will differ tremendously, not only between rural and urban settings but also across different socio-economic, ethnic and gender groupings. This is exacerbated by current inequalities between the living conditions in rural and urban areas, amongst people in different wealth quintiles, with the poor being particularly challenged by inadequate access to basic services such as housing, water and sanitation. Ethnic divides are also significant, with the African population, including children, faring significantly worse than white or coloured children. These inequalities imply that marginalised groups have a lower adaptive capacity to climate change impacts, which should receive heightened attention in any adaptation strategy or policy.

Perhaps most importantly, both the primary and secondary impacts of climate change are likely to change over the short, medium and long term. The likelihood of more profound changes in regional climate is likely to result in the adoption of more transformational adaptation strategies in the longer term as a result. These will have different, and often more profound, implications for child well-being and development than for more incremental adaptation strategies. Each of these multiple dimensions of diversity needs to be recognised by policymakers, ensuring that any ensuing policy process takes into account different perspectives and contexts and does not consider child-related needs and adaptation responses as singular, given that different children, girls, boys, children in different age groups and in different localities, have distinct vulnerabilities and needs.



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The implications of climate change for children in South Africa will be felt through both primary and secondary impacts. Climate change will have considerable primary impacts on child development, affecting all aspects of health, nutrition, education and emotional and social well-being. Many of these impacts have been documented widely in the climate change literature.

In South Africa, the main projected primary impacts on children vary according to the provinces where children are located but, in all cases, will have greater negative effects on children living in a situation of poverty or marginalisation, given their higher exposure to risk and lower adaptive capacity. Without effective and sustained action to promote adaptation across scales, the direct and indirect implications are likely to affect many aspects of children's and households' security. For example, the incidence of vector-borne diseases such as malaria are likely to increase in range along the country's north-east borders as a result of higher temperatures, higher rain intensity and inadequate water and sanitation infrastructure, which can result in stagnant water³⁶. Infectious diseases such as diarrhoea may become more frequent in the north-east and east (KwaZulu-Natal, Limpopo and Mpumalanga), where there are higher rain intensity episodes combined with insufficient water and sanitation infrastructure, in both rural and urban contexts. The incidence of respiratory diseases can be aggravated by pollution and poor air quality, linked to higher temperatures, particularly in the central provinces of Free State and North West.

Without effective and sustained action to promote adaptation across scales, the direct and indirect implications are likely to affect many aspects of child well-being and household security. Climate change impacts on food security and nutrition are likely to be worse in the North West, Eastern Cape and Free State, where there are already an important number of children facing hunger. These areas, where subsistence agriculture is the main livelihood, can be the worst affected by changes in fertility linked to higher heat and unpredictable rains. In different areas of the country facing higher and unpredictable rain intensity, such as Limpopo, Mpumalanga and Gauteng, Eastern Cape, and KwaZulu-Natal, floods are likely to be a rising concern. These can damage housing and infrastructure, limiting access to schools and health centres. Children faced by the different challenges might feel distress and loss of emotional well-being, particularly in the absence of child protection mechanisms to provide support.

³⁶ As of 2008, many of the initial projections had however not materialised owing, in part, to efforts to combat the disease (DoEA 2010).

A gap remains, however, in terms of understanding how response actions (coping and adaptation) at the household level will affect children. We identify three common adaptation strategies (lifestyle and behavioural changes; supplementary livelihoods and adapting current livelihood practices; and seeking alternative livelihoods) and we document how these can have profound and lasting implications for child development and well-being. Indeed, these secondary impacts may, in certain cases, have more of an effect on children's development and well-being than the primary impacts of climate change, particularly if adaptation strategies are maladaptive (i.e. where strategies deliver short term gains but lead to increased vulnerability in the medium to long-term). Children can contribute to strengthening their households' adaptive capacity or, when not living in a household context, can themselves adapt to climate related challenges. Nevertheless, children who are in a situation of poverty, inadequate access to services and limited opportunities, will have a lower adaptive capacity than those who are in a better off situation. This is of particular concern, given prevailing inequalities in South Africa.

The policy context in South Africa in relation to climate change is very dynamic, but children are mostly invisible. The government of South Africa has been very active at the national and local levels in generating strategies, policies and plans that respond to a growing awareness of the impacts of climate change. These have focused largely on infrastructure development, strengthening community adaptation capacity, and mitigation strategies, as well as by identifying new employment opportunities that might arise as South Africa becomes 'greener'. However, children's vulnerabilities, specific needs and the opportunity they present as agents of change at the grassroots level have not been recognised.

Although there are many different vulnerable groups, including children, identified in key documents such as the National Climate Change Response White Paper, there is limited, if any, planning in relation to what their vulnerabilities imply, and how these can be mitigated. The only exception is in terms of health, where there is a more explicit recognition of the need to respond to a changing disease profile, particularly adverse for children, as a result of climate change. However, in key policies driving actions in sectors most relevant to children, such as education, social development and labour, the possible transmission pathways of climate change to children have not been recognised at all, so that there are currently no plans reflecting an effort to adapt to these challenges. As indicated by the Limpopo and Durban case studies, there are some positive entry points for child-sensitive planning at the local level, particularly given the mandate of local governments in relation to planning in key child-focused sectors, such as school and health. However, there are still important knowledge and capacity gaps that need to be addressed for local level planners to be able to consider children's specific vulnerabilities better while planning, and to allow spaces for children's participation to inform this.

Spaces are beginning to develop for children's active participation in issues related to climate change and disaster risk reduction, although these are still limited in scope and scale. There is a growing global evidence base about the positive role children can play in relation to climate change, from sharing knowledge at the household level about how to adapt more effectively to climate change, to informing local level planners of how to reduce the risks they face in relation to the increased likelihood of disasters. Higher-level participation has included the development of a Children's Charter on DRR, based on consultations with children throughout the world. In South Africa, spaces for children to participate and become more actively engaged in these issues are starting to develop. Although still limited, they have potential. Some initiatives, supported by local schools, have already sparked the enthusiasm of children and adolescents to become more active voices on climate change and the protection of the environment. The next step is to articulate these initiatives to local policy spaces where their voices can be heard, to inform better planning and to ensure a better focus of children's adaptive capacity.

7.2 Recommendations for policy

Recommendations for national and international policy-making arenas

Laws must make provision for the recognition of children as affected and vulnerable stakeholders, whose participation must be ensured in the development of national, provincial and local adaptation and mitigation responses to climate change. A similar approach must be adopted by lawmakers as has been the case for the gender and youth sectors.

i) **Understanding children's vulnerability:** In order to promote evidence based planning in this area, it is critical to conduct primary research on the risks, vulnerabilities and likely impacts of climate change on children and youth, including through consultations with children, caregivers, schools and communities. This will provide decision makers with a better understanding about why children are particularly vulnerable, and how planning might help reduce their vulnerabilities, contribute positively to their well-being and development, and utilise their agency.

ii) **Promoting children's participation:** The existing information on the projected effects of climate change in South Africa, the global literature on the impacts of climate change on children and analyses, such as the one presented in this report, make it clear that there is a need to plan preventive and responsive measures that relate particularly to a multiple dimension of risks. Shortfalls in basic service provisions, inequalities in service access, household poverty, poor housing, protection risks and income vulnerabilities are some of the challenges faced by children that undermine their capacity to adapt to possible environmental shocks. Better planning and resourcing in the provision of support systems by national and local governments in the short and medium run can put systems in place so that children and their households are able to cope better with climate change impacts as they arise.

Children's participation must be promoted at national and sectoral level in the current development of sectoral adaptation plans. Participating children must be prepared, informed, and their participation facilitated, to guarantee that their contributions are meaningful. Their voices, through sectoral adaptation plans, should then be reflected in the overall National Adaptation Plan, as well as in climate change dialogue and policymaking at all levels of government. Sector adaptation plans and processes must make provision for relevant processes, capacity, information sharing and budget, to ensure such access. Leading agencies on climate change planning (such as the Ministry of Environmental Affairs) need to promote the interest and engagement of other sector ministries in this regard, in close collaboration with the Ministry of Women, Children and Persons with Disabilities (MWCPD), with the support of other organisations that have experience in promoting children's participation, such as UNICEF, Save the Children and local NGOs.

Effective children's participation by vulnerable children, especially those in rural areas, will require sufficient levels of advocacy, support and sensitivity in the design of relevant programmes, so as to address cultural barriers.

Access to information is a particular challenge. It inhibits participation, even by adults, because of the scientific level of the dialogue and the publication of documents in English. A very practical measure that would facilitate participation is the development of child-friendly policy briefs in different languages on core issues, disseminated by schools. The DWCPD, UNICEF and the Department of Education could work with the Department of Environmental Affairs to develop and disseminate these.

In order for the DWCPD and other sector ministries, departments and local governments, which have not have specific knowledge of climate change, disaster preparedness and how children might be affected, to become more effectively engaged, capacity building and information sharing are

necessary. The Department of Environmental Affairs, as the lead agency in this sector, can coordinate such capacity building but this will require planning and resources to roll out, which could be provided by donors or international institutions working on climate change.

iii) **Improving local capacity to integrate children's issues:** Local and provincial government should be supported to understand their roles and responsibilities to children, and how these can be best fulfilled so as to maximise the adaptive capacity of children and their families through appropriately developed IDPs and other local programmes. There are numerous training programmes and manuals being developed about building climate change capacity at local government level. It is critical that these integrate child-oriented climate change local government development.

iv) **Supporting children as catalysts for change:** Existing policy and planning initiatives should be enhanced to ensure that children's voices are actually heard by policymakers, starting at the grassroots level. Current awareness-raising initiatives can be supported by relevant NGOs and government department, to become stronger advocacy initiatives so that children's voices are the catalysts for change at a household, community, local, provincial and national level. For example, school-based State of the Environment competition inputs should be used in the development of policies, awareness-raising material and other advocacy tools by NGOs and government departments.

Box 10: Integrating children's issues within Municipal government and other local development policy processes

Steps that would facilitate the integration of children's vulnerability into climate change issues could include:

- The facilitation of participation by children in the development of IDPs and local government adaptation plans.
- Water, sanitation and waste removal policies prioritising the provision of services to households where children are found, making sure that the quantity provided in terms of free basic water and sanitation programmes is sufficient to meet the water requirements of children with their attendant risks of high temperatures, overcrowding and water-borne diseases and dehydration. Plans should make provision for higher demand pressures on basic social services in the medium term in line with climate-related risks for children, as identified in this study.
- Social development services becoming an integral part of any local government adaptation plan, with a clear identification of the protection risks children face in the case of climatic events. This would require, for example, establishing child-safe central gathering points in the case of an emergency, where social workers, health workers and other support services can have easy access to children and children can be protected. Additional measures should include raising awareness of risk through campaigns, developing drills and evacuation procedures as well as promoting early warning mechanisms.
- Education for parents and children by the different sectors, to ensure that both are aware of the risks of climate change, such as the heightened risk of abuse and harm, heat stress and others, and to provide them with clear guidance on how to avoid these eventualities best, particularly in an urban setting. This might include, as in eThekweni's health strategy, guidance on how to keep children cool in informal settlements and what to do if parent and child get separated during an event.
- Participatory assessments on disaster preparedness that children and adults can contribute to, identifying risks and challenges for children in schools, their households and the community more broadly, for more effective DRR.

Avenues for child representation in national policy processes

Children must be formally recognised as right holders, with formal representation in current climate change policy development process. With the finalisation of the White Paper and therefore limited spaces to influence national policy to make it child sensitive and to provide sufficient clarity, a useful entry point would be the development of guidance and climate change orientation for all relevant departments and stakeholders. It will be important now to ensure that the National Adaptation Plan and the relevant sectoral or departmental adaptation plans are sufficiently child-sensitive, and result in tangible policy actions and not just passing reference.

Children's interests in the area of climate change and DRR should be represented by the DWCPD so as to ensure sufficient coordination within the sector, across the different sub-sectors, and supported by various sector heads. The department should, in accordance with its coordinating mandate, ensure the development of a children's plan through an inclusive consultative process, which includes civil society and children. Equally, this leadership must be taken in close coordination with the Department of Environmental Affairs, which has the role of coordinating sectors on climate change responses to ensure synergies and cross-sector learning.

This joint representation should be reflected in all relevant climate change coordination structures, including the Inter-ministerial Committee on Climate Change, Forum of South African Director Generals (FOSAD) structures, etc. and at all provincial and local levels. There must also be representation of the environmental affairs sector in coordinating children's structures. The Education Department should be included as an active sector in the development of a National Adaptation Plan.

The children's plan should identify all sectors relevant to the provision of support to build children's resilience, engage with those sectors in the development of their adaptation plans and require all sectors or departments with a relevant mandate to review their policies to align with the aims and objectives of the children's sector adaptation plan.

Of particular importance is the inclusion of the education sector, which plays a critical role in climate change and DRR. National level education plans should include guidelines that inform local level plans and actions, with inputs from children's participation in schools identifying possible risks and spaces for children's active engagement on DRR. For example, with regard to preparedness, schools and children could raise awareness of risk through campaigns, such as promoting early warning. Planning at the local level should also consider the physical safety of the school. Perhaps the most important issue relates to the need to ensure effective integration of climate change and DRR issues as part of national school curriculum. Though aspects of climate change already cut across the curriculum, more is still needed to ensure successful communication and take-up among children. Part of this relates to support for the training and knowledge-development of teachers, and ensuring that they have the time and resources to incorporate climate change into lessons.

Advocacy must begin at home. Children's NGOs and community-based organisations must be encouraged to enter and shape the climate change dialogue and become participants in the NCCC. This will require focused financial support. Donors should be encouraged to provide seed funding for the development of climate change agendas in the children's sector to ensure formal engagement, as a catalyst for community-level and, specifically, children's participation in climate change dialogue.

Meanwhile, various social protection policies are under review. It is critical that these reviews consider any additional needs arising in the context of climate change economic pressures. The National Health Insurance, National Environmental Health Policy and Sanitation Task Team processes also offer unique spaces to raise the connection between climate change and children and advocacy for child-focused solutions. Medium term adjustments to social assistance programmes should also ensure their responsiveness to environmental shocks. On the upside, many opportunities exist to allow children and youth to take advantage of a potential future green economy, though ensuring that they do so will require significant policy attention.

7.3 Recommendations for further research

There is a need to better explore the regional nature of climate impacts in South Africa and implications for children at the local level. Given large uncertainties in simulating climate impacts at the local level, greater research is needed to understand what the latest downscaled models show for South Africa; what can and can't be said; and how to effectively translate these messages to policymakers. Understanding the merits and limitations of these models is crucial to allow policymakers to make informed and effective decisions at regional and local levels, to support adaptation and to secure the development and well-being of children in the face of climate change. South Africa is host to a number of world-leading academic institutes that specialise in the generation of regional climate modelling. More can be done to promote further multidisciplinary and transdisciplinary research among the natural and social sciences relevant to understanding impacts, vulnerabilities and capacities of South Africa's children.

There is a need to explore further the primary and, in particular, the secondary impacts of climate change on children in South Africa with extensive primary research. Little primary research has been conducted into the likely impacts of climate change on children. The studies that have been carried out are informed largely by research and understandings from other countries and contexts and based on secondary research. Moreover, the predominant focus of concern has been on the primary impacts: how changes in particular shocks and stresses will impact immediately on children's 'transmission pathways'. Somewhat lacking is a thorough understanding of the consequences of long-term coping and adaptation strategies for child development and well-being, supported by extensive primary data and analysis.

There is a need to understand better the characteristics of children's and households' adaptive capacity across South Africa. While the general characteristics of adaptive capacity are fairly well known, more research is needed to understand the properties that allow people to adapt to climate change in South Africa. In particular, though the characteristics of adaptation have been explored in some depth at national and household levels, little is known about the specific characteristics that make up children's adaptive capacity.

There is a need to understand the specific impacts, vulnerabilities and capacities of urban children. The majority of research on climate change-related issues in South Africa has focused on rural contexts. Greater evidence and primary research is needed to help understand how children in urban environments are likely to be affected by climate change, and the interactions these impacts are likely to have with other development pressures. Research to explore the differences in capacity between children and households from rural and urban contexts can help to differentiate different policy options from different needs.

There is a need to understand how to better communicate the issue of climate change to children in South Africa. Research suggests that basic principles of climate change are poorly communicated and often misunderstood among the South African public (see Neville et al. 2010). More research is needed to determine the most effective ways and channels through which to deliver knowledge about climate change to children across South Africa. This issue is particularly important because understanding the principles of climate change is vital to being able to make informed decisions and to participate in the appropriate fora.



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Appendix A:

List of interviewees

1. Richard Washington, University of Oxford
2. Mark New, University of Cape Town
3. Tingju Zhu, International Food Policy Research Institute (IFPRI)
4. Matshepiso Makhabane, Lehlohonolo Macmillan Ntema and fellow GENSA network members, Gender and Energy Network of South Africa (GENSA)
5. Katharine Vincent, Kulima Integrated Development Solutions
6. Lewis Makurumure, Africa Youth Initiative on Climate Change and Co-organiser of the Southern Africa 2010 Youth Conference on Climate Change
7. Pierre Mukheiber, Institute for Sustainable Futures, University of Technology, Sydney
8. Henny Osbhar, University of Reading
9. Glwadys Gbetibouo, C4 EcoSolutions, Cape Town
10. Bettina Koelle, Indigo Development and Change
11. Fran Seballos, Children in a Changing Climate, Institute of Development Studies
12. Sharon Shewmake, University of California.
13. Lewis Makurumure, Africa Youth Initiative on Climate Change “Action 24” and Co-organiser of the Southern Africa 2010 Youth Conference on Climate Change
14. Brenda Martin, Director, 90x230 organisation
15. Mathilda Bergman, Department of Labour, Child Labour Programme of Action
16. Steve Hendrikse, Disaster Management, eThekweni Municipality
17. Geoff Tooley, Water Department, eThekweni Municipality
18. Dr Thando Ngomane, Department of Health, eThekweni Municipality
19. Meggan Lewis, Department of Environmental Planning and Climate Protection Department, eThekweni Municipality
20. Phillip Kruger, Department of Health, Limpopo
21. Whyntie Adams, National Population Unit, Department of Social Development
22. Colins Ramavhona, Department of Environmental Affairs, Adaptation Directorate
23. Patrick Lebeya, Indalo Yethu
24. Cathy Dzerefo, Eco Schools
25. Peter Tsheola, Department of Environmental Affairs and Tourism, Environmental Education and Capacity Building, Limpopo
26. Kate Murovhi, Department of Environmental Affairs and Tourism, Limpopo
27. Dr Antoinetta Letsoalo, Limpopo Provincial Government: Environmental Research and Planning
28. Musa Mbere, Department of Social Development, Child Protection Directorate (provided a written reply to questions rather than a formal interview)
29. Buyi Yeni, Mbambo Consulting
30. Melinda Van Zyl, Save the Children UK South Africa Programme, Education Manager

Appendix B:

Policies, strategies and programmes in the climate change and related sectors

Some of the primary documents which articulate the overarching national approach to climate change and environmental management, from a mitigation and adaptation perspective include the following:

1. White Paper on National Climate Change Response (Department of Environmental Affairs and Tourism, 2011)
2. White Paper on Environmental Management Policy for South Africa (Department of Environmental Affairs and Tourism, 1997)
3. White Paper on Integrated Pollution and Waste Management (Department of Environmental Affairs and Tourism, 2000)
4. The National Environmental Management Act (NEMA) (Act No. 107 of 1998)
5. National Environmental Management: Air Quality Act (Act No. 39 of 2004)
6. National Biodiversity Strategy and Action Plan, 2005 (Department of Environmental Affairs and Tourism, 2005)
7. National Framework for Sustainable Development in South Africa, 2008 (Department of Environmental Affairs and Tourism, 2008)
8. National Climate Response Strategy for South Africa, 2004 (Department of Environmental Affairs and Tourism, 2004)
9. Outcome 10: Delivery Agreement (Department of Environmental Affairs, 2010)
10. The National Climate Change Response Green Paper (Department of Water and Environmental Affairs, 2010)

In addition to the core documents listed above, there are a host of technical operational policy documents governing the science, regulation and enforcement of environmental management. These include the National Environmental Management and Amendment Acts (Acts No 46 of 2003, No 8 of 2004, No 44 of 2008, No 14 of 2009), the Protected Areas Act (No 57 of 2003) and Amendment Act (No 15 of 2009), Sea Shores Act (No 21 of 1935), the Biodiversity Act (No 10 of 2004), and numerous others.

Health sector

1. National Health Act No 61 of 2003
2. Breastfeeding Guidelines for Health Workers, 2000 & most recently an Exclusive Breastfeeding policy (2011)
3. Integrated Food Security and Nutrition Programme, 2002
4. Integrated Food Security Strategy for South Africa, 2002
5. Primary Health Care Package for South Africa, 2002
6. Comprehensive HIV and AIDS Care, Management and Treatment Plan, 2003
7. School Health Policy and Implementation Guidelines, Department of Health, 2003
8. Infant and Young Child Feeding Policy, 2007
9. South African National Guidelines on Nutrition for People Living with HIV, AIDS, TB and other Chronic Debilitating Conditions, 2007
10. HIV and AIDS and STI National Strategic Plan, 2007–2011
11. Expanded Programme on Immunisation – Revised National Immunisation Schedule as at 1 April 2009
12. Guidelines for the Management of HIV in Children, 2nd Edition, 2010
13. Clinical Guidelines for the Management of HIV and AIDS in Adults and Adolescents, 2010,

Nutrition

1. Integrated Food Security Strategy for South Africa (IFSS) (2002)
2. Food Security and Rural Development Programme
3. National School Nutrition Programme
4. Land Redistribution and Development Programme
5. Household Food Production Programme
6. Comprehensive Agricultural Support Programme
7. Micro-Agricultural Finance Initiative of South Africa
8. Social Relief of Distress Benefit

Water, sanitation and waste removal

1. National Water Act 36 of 1998
2. White Paper on Water Policy 1997
3. White Paper on Basic Household Sanitation 2001
4. National Water Resource Strategy 2004
5. National Sanitation Policy, October 1996
6. Free Basic Water Policy, 2000
7. National Sanitation Programme, 2001
8. National Water Resource Strategy, September 2004
9. National Policy for the Provision of Basic Refuse Removal Services to Indigent Households, October 2010

Education

Some of the policies in question include:

1. The South African Schools Act, 1996
2. The National Education Policy Act, 1996
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