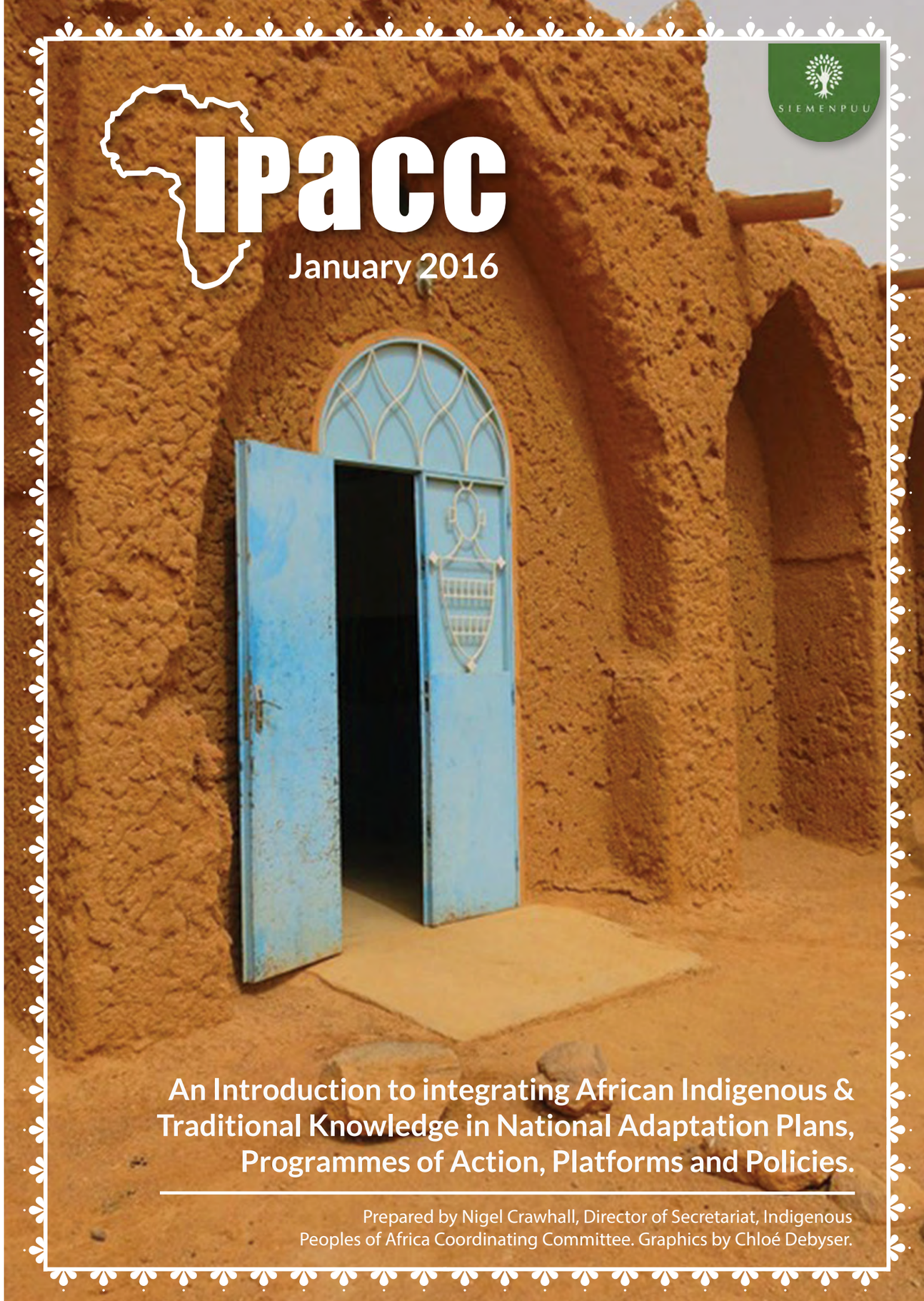
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An Introduction to integrating African Indigenous & Traditional Knowledge in National Adaptation Plans, Programmes of Action, Platforms and Policies.
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Preface

This document has been prepared by the Indigenous Peoples of Africa Coordinating Committee (IPACC) as a resource for African countries interested in the integration of indigenous and traditional knowledge in their national adaptation processes, policy and projects. It is closely associated with the formal framework of adaptation agreed to by the State Parties at various Conferences of the Parties to the UN Framework Convention on Climate Change (UNFCCC).

This introduction is intended to provide support for country-driven approaches to adaptation, with consideration to indigenous and traditional knowledge (ITK) as a cross cutting theme in the elaboration of National Adaptation Plans (NAPs), National Adaptation Programmes of Action (NAPAs), and related instruments, such as national adaption platforms where different stakeholders engage with one another and contribute to an integrate national approach to flexible and sustained adaptation.

The materials here contribute to bridging the knowledge gap experienced by many countries in understanding how indigenous and traditional knowledge can contribute to national policy process and through a synthesis with other types of knowledge – such as meteorological and biological sciences – an integrated, multidisciplinary approach to climate impacts, vulnerability and resilience can help solve real problems experienced by communities dependent on natural resources and ecosystem integrity.

The Indigenous Peoples of Africa Coordinating Committee (IPACC) is a network of 135 community-based organisations of hunter-gatherers and transhumant / traditional pastoralists in twenty-three African countries. IPACC is registered as an NGO in South Africa, and operates as the main regional indigenous peoples' network for the African continent.

Video and print information on indigenous and traditional knowledge can found on www.ipacc.org.za

Indigenous peoples in Africa

2015 Paris agreement, Preamble

> Acknowledging that climate change is a common concern of humankind, Parties should, when taking action to address climate change, respect, promote and consider their respective obligations on human rights, the right to health, the rights of indigenous peoples, local communities, migrants, children, persons with disabilities and people in vulnerable situations and the right to development, as well as gender equality, empowerment of women and intergenerational equity,...

IPACC's membership is highly reliant on natural resources and the communities live in ecosystems where hunting and herding have thrived for thousands of years and in some cases tens of thousands of years. They have survived other major climatic shifts in the past and their civilisations are founded on principles of adaptation and inter-generational cooperation. These communities are rich in knowledge which has evolved from centuries and even millennia from generations of observation, analysis, experimentation, adjustments and reconfiguration. Their languages, cultures and knowledge systems are all shaped by this interaction with nature. ITK is by definition dynamic, innovative and sensitive to changing contexts. It is also fragile in the sense that it can be lost within a single generation if transmission is disrupted.

IPACC was founded in 1997 by indigenous peoples' organisations from Africa, and it is accredited with the United Nations Economic and Social Council (ECOSOC). IPACC and is active in all three of the United Nations Multilateral Environmental Agreements developed in Rio in 1992 – including the UN Framework Convention on Climate Change (UNFCCC).

The term 'indigenous peoples' was adopted by the United Nations and a framework of rights were set out in the historic 2007 UN Declaration on the Rights of Indigenous Peoples (UNDRIP). Though the term 'indigenous' is sometimes confusing in the African context, it remains relevant for recognising peoples who rely on natural resources, sustain their knowledge system and live primarily not of agricultural farming production.

In November 2003, African Commission on Human and Peoples Rights adopted a report on the rights of indigenous communities at its 34th Ordinary Session in Banjul Gambia. The ACHPR Working Group report highlighted the need to protect the human and civil rights of hunter-gatherers and transhumant / nomadic pastoralists. In terms of indigenous and traditional knowledge, these intellectual and cultural resources are spread across the whole of African society, and are particular rich and specialised amongst nomadic or mobile peoples.

IPACC's strategic approach to climate change adaptation and resilience is to highlight the rich and complex traditional knowledge of Africa's rural communities and indigenous peoples and to promote dialogue with scientists and policy makers on how ITK can best be used to find creative adaptation practices. Indigenous peoples did not create climate instability and yet find themselves vulnerable to its impacts; they are choosing to engage with national governments and the UN about approaches to conserve nature, promote resilience, strengthen good governance, peace and security.

The material provided here has been developed through a series of workshops and experiences around Africa, as well as interaction with the UNFCCC Least Developed Countries Expert Group division in the Secretariat and the Nairobi Work Programme. The approach is in harmony with the mandate of the Adaptation Committee, which offers State Parties information on relevant information, knowledge, good practices and considerations for technical guidelines and capacity building.

ITK and adaptation in the architecture of UNFCCC

The Adaptation Committee (AC) in cooperation with the UNFCCC Secretariat and its partners has defined the NAP process as consisting of four distinct phases:

1. Laying the groundwork and addressing gaps as a national mandate;

2. Preparatory elements for understanding impacts, vulnerability and adaptation assessment in cooperation with stakeholders;

3. Implementation strategies for NAPs, with priorities, planning mechanisms, synergies and long term capacity;

4. Reporting, monitoring and review through a national M&E system which contributes to reporting and adjustments to the policies, strategies and prioritising.

(see AC 2015a: 8)

This introduction to ITK in adaptation is a response to UNFCCC policies and guidelines, including the Cancun Adaptation Framework, the National Adaptation Programmes of Action (NAPA), the National Adaptation Plans (NAP), as well as other policy instruments, UN norms and standards on indigenous and traditional knowledge, and IPACC's own experience of indigenous and traditional knowledge (ITK) in rural areas.

Due to ITK being mostly oral and undocumented, it is a massive national resource but often is a gap in national policy, research, projects and M&E. This material is designed to support the development of adaptation policy making and design different types of platforms and processes required to achieve an integrated national approach to adaptation, sustainability and social / ecological resilience.

IPACC first launched a draft version of these materials at a workshop during COP20 in Lima, Perú with Africa Group and LDC countries. That draft has been workshopped and refined into this version for COP22 in Marrakech.

Indigenous and Traditional Knowledge (ITK) is a formal component of UNFCCC COP decisions regarding adaptation.

- At COP7, Parties adopted the decision for Least Developed Countries to elaborate national adaptation programmes of action (NAPAs). Only a few of the African NAPAs made explicit reference to ITK;

- In COP16, Parities adopted the Cancun Adaptation Framework and established the Adaptation Committee (AC). With the mandate and support of the Nairobi Work Programme (NWP), two cross-cutting thematic areas were elaborated in discussion documents – one on gender and adaptation and the other on ITK;

- At COP19 in Warsaw, the AC recommended to the parties that both gender and ITK be adopted as cross-cutting themes and with the cooperation of the Least Developed Countries Expert Group (LEG) a series of workshops and dialogues have been held around the planet to consider how ITK can be taken up within the NAP and NAPA frameworks.

Both ITK and gender are considered cross cutting in these process – i.e. in different sectors, sub-regional context and different ecosystems, ITK has a role to play at each stage. This not only provides a rich contribution of national and local knowledge capacity, it ensures that indigenous and traditional peoples, the repository of what is often purely oral knowledge, are engaged in the processes from initiation to implementation, review and replanning.

Given the uncertainty and unpredictability of the future –we are dealing with unstable climatic, meteorological, biological and social variables which require us to work towards social cohesion and peaceful cooperation in forecasting, responses, disaster risk reduction and disaster management on time scales which we may not easily be able to define in advance.

IPACC has set out in this introduction some:

Principles: What ITK is and how it relates to national adaptation planning and actions

Motivational considerations: Why ITK integration is key to 'best possible solutions' approaches to uncertainty and the resilience of social and biological systems and the ecosystems which form the basis of rural economies in particular;

Modalities; How systems which are sometimes very localised, sometimes held by only a few people or very small communities, usually entirely oral in nature, can be integrated into state planning, policies and actions.

IPACC has developed a policy framework on the importance of ITK in promoting in sustainable development (see Bujumbura Action Plan). This approach to mobilising ITK as a community and a national resource is discussed in greater detail below.

IPACC has benefited from valuable cooperation with the EU-ACP Technical Centre for Rural and Agricultural Cooperation (CTA). CTA has supported IPACC to implement a series of projects in different parts of Africa dealing with geo-spatial technologies. The focus has been on developing African capacity to use participatory 3 dimensional modelling methodologies which allow rural indigenous communities to represent their landscape and land use systems in their own language in a geo-referenced model which has scientific validity, is a helpful planning tool and derives directly from local knowledge systems and local cultural systems.

Introduction

Despite implementation limitations, Africa's adaptation experiences nonetheless highlight valuable lessons for enhancing and scaling up the adaptation response, including principles for good practice and integrated approaches to adaptation (high confidence). Five common principles for adaptation and building adaptive capacity can be distilled: (1) supporting autonomous adaptation through a policy that recognizes the multiple-stressor nature of vulnerable livelihoods; (2) increasing attention to the cultural, ethical, and rights considerations of adaptation by increasing the participation of women, youth, and poor and vulnerable people in adaptation policy and implementation; (3) combining "soft path" options and flexible and iterative learning approaches with technological and infrastructural approaches and blending scientific, local, and indigenous knowledge when developing adaptation strategies; (Niang et al, IPCC 5th Assessment Report; Africa: 1203)

This document provides an introduction and a framework for indigenous peoples, rural communities and governments in Africa to work cooperatively in harnessing ITK to meet the challenges of climate change impacts. The materials have been developed by the Indigenous Peoples of Africa Coordinating Committee (IPACC) to assist African governments and civil society organisations, including indigenous peoples' organisations and traditional leadership, to consider how to mobilise the rich and detailed systems of Africa knowledge to contribute to surviving climate instability and enhancing national adaptation initiatives.

The materials are intended to help policy makers understand how diversity of knowledge helps contribute to problem solving with regards to climate impacts, vulnerability, social coherence and ecological resilience in our unstable future. The ability to draw on diverse knowledge holders and systems of thought and culture all contribute to maintaining peace and security, while conserving the environmental components that support human and other life forms. In addition, knowledge management embeds active engagement by communities in the climate change agenda and promotes a national consciousness about sustainability. Such approaches are meshed with our cultural diversity, our intangible heritage and our systems of decision-making.

IPACC's approach is elaborated in the context that we also have a colonial legacy to contend with. However much Western science and technology have contributed to our lives, it remains a fact that most observation of the interface between climate, weather, biodiversity and ecosystems with human behaviour, social organisation and governance is still held primarily by communities within an oral and inter-generational process. The colonisation of Africa has created perversions in land tenure systems as well as cast doubt on the validity and capacity of indigenous and traditional knowledge. Any serious attempt to integrate ITK into policy making has to contend with prejudices regarding knowledge diversity and validity.

Whereas it is a source of deep concern that rural African communities are already so vulnerable to climate change impacts, if we are able to involve them early on in the development of national programmes and policies, creating synergies between diverse knowledge systems in Africa, it creates a fresh opportunity for peace, security and sustainability throughout our region.

The contribution of African knowledge to national adaptation

1.1 Characteristics of African knowledge

Some examples of traditional knowledge which may be important for national and local adaptation include:

- Observations on the changes to plant and animal behaviour, density, health and vulnerability;
- Local wild food and medicinal knowledge, including threats to such resources and conservation strategies;
- Grazing systems – how communities, livestock and wildlife respond to climate shocks such as severe drought, including related governance systems to protect biodiversity during such shocks;
- Strategies on livestock management and carrying capacity during unstable climatic conditions – animal health, vulnerabilities, species vulnerability, access to veterinary support, sex and species variations;
- Traditional calendars associated with climatic and seasonal patterns, which help show the shifts in different biological process and changes in ecosystem capacity;
- Pollination systems and changes in pollinators' behaviour, altitude, density;
- Hydrological information – underground waterways, water catchment knowledge, wetlands management and changes;
- Changes in migratory patterns of birds, insects and wildlife – reactions to climate related stress or other changing conditions;
- Substitutions of livestock, wild foods and medicines as a result of climate variability – often indigenous peoples can modify their food in-take according to changes in plant or wildlife availability;
- Traditional systems of conflict management and mediation during environmental stress;
- Knowledge on how different types of land and resource users interact to increase social and environmental resilience – inter-ethnic systems of trade and cooperation in risk reduction.

Our modern society has become one where knowledge is highly valued and increasingly accessible. The internet provides an opportunity for an unprecedented amount of information to be shared across space and time. Knowledge is associated with the power to shape one's life, earn a living, live well and generally to be empowered to make decisions. Knowledge is considered a valuable commodity, something which can be exchanged and, though subject to intellectual property rights, can be applied in many different ways and context by different people who get access to it.

Indigenous and traditional cultures do not always look at knowledge the same way. Many indigenous cultures believe that knowledge should be tempered by other mental capacities and virtues, including wisdom, discipline and ethically-based governance which come with responsibilities. Human knowledge exists in a social, ethical and environmental context.

When working towards a national framework for knowledge exchange, we need to be aware of the different cultural contexts in which knowledge is held collectively and by families.

In indigenous cultures around Africa, young people are encouraged to learn, to be curious, and to spend time in nature to develop their senses and their knowledge. Knowledge is shaped by the development of wisdom and communal values – it is the application of knowledge in a moral, cultural and environmental framework which makes African knowledge so important for sustainability. Knowledge is part of a larger system of exchange between members of a community and also between humanity and the larger living world – other species or even spiritual relationships such as with the spirit of the forest.

African knowledge is not meant to be horded or extracted, bought and sold, but rather it is meant to assist the whole of society to sustain itself while conserving the sources of water and life. This is often articulated in terms of being accountable to our ancestors who provided our current opportunities and also our duties to those that will follow us. Knowledge is part of an intergenerational pact.

"The forest is our school, our ancestors are our teachers…" Papa Nze traditional Baka healer, Zangaville, Woleu-Ntem Province, Gabon

Climate change is itself a case study in the misuse of knowledge without the application of wisdom, constraints, discipline or communality. The drivers of climate change show that many people on Earth have no respect for future generations, for poor people or for other species. The greed for wealth in the West and now in the East, is willing to sacrifice our atmosphere and food resources, placing an unbearable burden on coming generations. We struggle to understand that we are only custodians of the land and the resources, that nature / the Creator / our ancestors gave us this abundance but with the warning that we must apply our wisdom faculties, including our attention to the needs of our neighbours, visitors and coming generations. This is the African way of living sustainably.

In our enthusiasm to cope with climate change impacts and bring different perspectives and knowledge systems into national policy and practices, it is important to honour and respect how different peoples handle and restrict access to knowledge. Further, our national science and energy strategies should be informed by our African value systems. We should not be the ones to recreate the world of the colonisers, mistaking having more for having the right quantity and quality.

In her[1] address to the African religious leaders forum in June 2011 at the UNEP headquarters ahead of UNFCCC COP17 in Durban, IPACC Deputy Chairperson, Jeniffer Koinante spoke about African values and our duties toward a sustainable future. *"I am a Maasai woman. In our traditional beliefs we were taught about the Earth and how to honour nature in our religion and culture. I am also a Christian. Christianity and Islam came to Africa and have taught us about our relationship with God and our duty to other human beings. Our challenge now as Africans is to marry these two heritages – to honour the Earth and to live by God's law in how we treat one another."* (2011, personal communication). Knowledge in this sense is placed within a broader set of values, duties and responsibilities, which when well combined, provide us with ways to deal with the climate crisis which we are now confronting.

1.2 Building trust and mutual respect is foundational to cooperation

Though our cultural diversity is generally celebrated throughout the continent, we also know from experience that perceptions about culture and the idea that some people are less educated can be a stumbling block for some countries when trying to work with ITK. Success in the civil service or in research agencies is linked for some people to the idea of getting away from the rural areas and into the 'modern' world. Formal education is highly valued in Africa and a symbol of success. If we continue to see rural communities as ignorant, like the proverbial glass being half-empty, then that is what we will find.

[1] For the full statement see http://safcei.org/african-faith-leaders-a-renewed-moral-vision-is-vital-to-progress-in-climate-talks/

In reality, much of Africa's scientific knowledge about nature, ecosystems, food and sustainability is locked up in our thousands of languages, cultures and oral knowledge systems. It is the people of the rural areas who are the custodians of these treasures of knowledge. If we are to successfully navigate the climate crisis, it requires changing our views about African knowledge and seeing the glass half-full, and seeing rural communities as actors, knowledge-holders and those capable of bringing forth appropriate solutions in combination with new technologies and formal systems of science.

The success of an ITK approach to climate resilience is found in building relationships of trust, mutual respect in both the short term and the long term. This work is a journey of discovery and an opportunity to rethinking the value of African cultural diversity and knowledge systems.

1.3 Knowledge, languages, wisdom and community values

The English language uses a single word *'knowledge'* whereas French and other European languages distinguish between 'connaitre', which is a personal knowledge and 'savoir' which is more an intellectual or theoretical level of understanding or knowledge. Both knowledge and connaissance come from the same Greek root word, γνῶσις, with the same implication having the experience of something, having skills related to knowing something, or to have an awareness of something.

When we examine indigenous and traditional knowledge (ITK) held by indigenous peoples and other rural communities, we often move between the two types of knowledge – the personal and the conceptual. Some knowledge is rigorously structured and coded. It arises from formal systems of mentorship, testing, thresholds of competence, and in some cases formal apprenticeships and specialised training. Other forms of ITK are more cultural in character, transmitted by songs, word games, myths and story-telling. The 'hard' science behind the latter cases of 'connaissances' may require greater attention, or indeed may be too poetic to permit a direct comparison with a scientific approach.

Even though we are discussing indigenous and traditional knowledge, this should not be mistaken for being unreliable, inaccurate, folkloric or imaginary knowledge. Knowledge arises from the combination of usage, experience, observation and with that the elaboration of systems of thought, taxonomies, and methods of intergenerational transmission of knowledge. Africa's complex historical climatic fluctuations have required most African peoples to develop sophisticated systems of understanding cycles of nature, predictive systems related to climate and rainfall, observation and theory building on animal behaviour and detailed taxonomies and systems of knowledge about the properties of plants as medicines, food, poisons or other purposeful applications. Much of Africa's intellectual resources, built on centuries of engagement with nature and biodiversity remain undocumented, locked within the specialised terminology of thousands of local languages. It is this resource which may make the difference between life and death, stability or migrations, sustainability or catastrophes.

Climate variances have been a feature of Africa since time immemorial, particularly in the sensitive dryland territories where rain is infrequent and the biological system and ecosystem diversity has adjusted to this variation. Linguists have demonstrated that human language diversity is directly related to biological diversity. (Nettle & Romaine 2000). Traditional societies both had the need and the time to engage in very detailed observation of natural systems. Their survival depended on this knowledge and the ability to transmit this forward into new generations.

For each human civilisation to establish itself, the community had to find a niche within the natural system that was sufficiently resilient and knowledge-based that they could survive fluctuations in weather and climate cycles. This knowledge has been refined and transmitted for centuries or even millennia. Almost all of the African knowledge systems are unwritten and exist within oral cultural systems. This makes them dynamic but at the same time difficult for outsiders to understand and also fragile in terms of shocks to communities, the loss of languages, or changes in the structure of the societies.

Of the seven thousand human languages thought to exist on the planet at the moment, some two thousand of these are found in Africa (see http://www.ethnologue.com/). A few languages are spoken by tens of millions of people, but the vast majority are localised languages closely associated with specific ecosystems and biological diversity. Their vocabularies contain vitally important information about biodiversity, soil systems, water, weather and climate patterns, as well as a body of lore and observations, often represented in myths, rituals and story-telling which allow generation after generation to survival the particularly local contexts. Considering that Africa has only one tenth of the human population, and yet thirty percent of the languages, it indicates that Africa is exceptionally rich in its ecosystems-specific knowledge systems which relate to the sustainability of the environment.

For each language and its body of scientific, indigenous, local and traditional knowledge, there are related systems of governance. Landscapes are not open and wild as was imagined by colonising Europeans. African landscapes are both natural as well as cultural and mental landscapes for human beings. African peoples know the boundaries of their territories, both natural and social, and these boundaries were negotiated over time to sustain both human and non-human populations. All traditional peoples had to elaborate systems of restraining the use of biodiversity to ensure survival of the human community, often in relation to the biodiversity abundance of the ecosystem. This is described in much detail by Nobel economics laureate, the late Elinor Ostrom (1990, 1994 and 2010).

To talk about indigenous and traditional knowledge involves a complex matrix of knowledge, most of it undocumented, most of it held in cultural systems, which allows humans and nature to interact, with rule-governed behavioural adjustments by the human population, to ensure that nature can go through its cycles and still sustain life (Rambaldi et al 2007).

1.4 Role of national government as enabler / mobiliser

The more one knows about ITK in Africa, the more one realises how very little any of us know about the great body of human knowledge in our world, whether that is biological information, landscape knowledge, or spiritual and cultural values-based knowledge. Africa is immensely diverse and this is the backbone of our resilience to the many challenges we have faced in the past, and we trust, also will give us some defences during this new civilizational challenge which is unfolding now.

In our IPACC focus group discussions with pastoralist and hunter-gatherer representatives, there was some scepticism that national government authorities could understand indigenous knowledge systems and work in a manner which would enable indigenous peoples to successfully cope with climate change. The scepticism comes from a long history of marginalisation from the national political economy.

Colonialism pushed indigenous peoples to the periphery of the political economies in Africa and generated a knowledge hierarchy where European languages and European knowledge systems are still seen as more important and more worthwhile than African languages and knowledge systems which have been used to govern the continent since the origins of our modern human species.

The term *'indigenous peoples'* was adopted by the United Nations as part of a framework for the promotion and protection of human rights. The term comes from Spanish and has not easily fitted the African context. Nonetheless, in African languages there are many terms which are used to designate the same concept of people who are highly reliant on natural resources and have cultures which still know about biodiversity as part of their oral and intellectual heritage. Terms such as *'ndorobo'* in East Africa, or *'Batwa'*, *'Abathwa'*, *'Baroa'* or *'Basarwa'* are used in African languages in Central and Southern Africa to designate types of peoples, mostly hunter-gatherers, as a particular class of people considered to be indigenous to the territory. In French, the term is clearer – *autochthone* – meaning those who are of the Earth (see Schadeberg 1999) In 2003, the African Commission on Human and Peoples' Rights adopted an important policy framework acknowledging the need to redress discrimination against indigenous communities, with particular attention to hunter-gatherers and pastoralists.

We assume that all African peoples are holders of various levels of localised knowledge encoded in their own languages and customs. The emphasis is on the diversity of knowledge and how it links to local environmental, biodiversity and ecosystems specificities. We do nonetheless encourage African governments to acknowledge that hunter-gatherer and transhumant pastoralists are particularly rich in such traditional knowledge and are often excluded from government initiatives and programmes related to environmental conservation, formal education, development and land management planning, and security of tenure rights.

In some cases indigenous peoples may even be vulnerable to violations of fundamental human rights. We would encourage any government serious about climate change adaptation to take pro-active steps to include rural communities, particularly those that are highly dependent on natural resources, to be key and equitable actors in the national adaptation plans and platforms. This not only addresses local needs and local ecosystem specificities, it is also part of a philosophy that climate change requires a healthy social compact to sustain peace and development while facing challenges not of our making.

The role of the national government in adaptation will always be one of facilitating appropriate responses to climate instability, to ensure that climate resilience tops the national agenda in all sectors, to protect citizens from decisions which will make them more vulnerable, and from the perspective of working with ITK in peace, security and our developmental future, the government has a major role to play in reversing prejudices about African knowledge and helping communities support inter-generational transmission of their knowledge, values and culture.

The most obvious role for national government is creating an enabling environment to encourage an ethical and sincere engagement by universities, research centres, agricultural centres and meteorologists to be able to meet with ITK holders, to explore their points of common need, interest and intersection of knowledge systems. It is through a dialogue and sharing process, knowledge sharing but also sharing of agendas, concerns and value systems that the process of aligning national development with climate adaptation will emerge.

The role of the national government is thus not to know everything about the diversity of knowledge systems within the national territory. Greater knowledge of ITK would indeed help many government ministries, but there is a practical limit in terms of language competence and complexity of knowledge and culture. Further, the role of national government is not to attempt extraction of ITK, but rather to find ways in which communities want to be involved in national adaptation and trust the policy and research processes to generate benefits and solutions.

In IPACC's cooperation with the Global Diversity Foundation (http://www.global-diversity.org/), we have noted that some African researchers, government field staff and even NGO staff struggle with issues of why rural communities do not step forward to offer their ITK for application in food security, environmental conservation and agricultural extension. Communities, particularly those who have bad experiences in the past with researchers, are not going to offer knowledge without a foundation of trust and mutuality. This is in some ways the most difficult challenge of the policy process. How does a civil service, based in the urban areas, engage successfully with rural communities that may speak other languages, struggle with issues of poverty and challenges of social cohesion, and achieve a sense of cooperation, trust and problem solving?

One answer which was highlighted in the IPACC workshops and the 2014 NWP dialogues is the role of intermediary bodies. Climate change is going to challenge us in many ways. Africa, particularly the LDCs, have great knowledge and cultural wealth but financing public projects, particularly long-term innovations in knowledge management and climate resilience are going to be big challenges. Universities, technical colleges, national agencies dealing with culture, heritage, science and agriculture, non-government organisations and community based organisations can all play a vital role in capacity building, research, innovative projects and helping with national policy development.

Chadian Government Recommendations and observation from the IPACC N'Djamena Declaration – by Their Excellencies, the National Minister of Urban and Rural Hydrology, General Mahamat Ali Abdallah Nassour and the National Minister of Agriculture and Irrigation, Honourable Dr Djime Adoum

The opportunities for government to respond to the challenges include:

• Adaptation requires drawing on both science and traditional knowledge to find appropriate responses to climate impacts;

• Scientific interaction with pastoralists is important for Chad and the region;

• We are facing policy challenges in a wide range of domains, including the environment, land use, water management, food security and changes to the overall climate. This creates increased risks of conflict. Climate adaptation needs to be conflict-sensitive, with full participation of the concerned communities;

• Atmospheric sciences allow forecasting of weather and seasonal pattern. Efforts need to be made in timely sharing these information with those concerned including in remote rural areas;

• Financing is an important element in building the national adaptation platforms. International solidarity, whether in expertise or financing remains very valuable for Least Developed Countries.

• Part of the challenge for Chad is to accurately cost the adaptation process, identify what national resources are currently available, and what type of gap needs to be addressed.

• Traditional knowledge must be included in science because it is itself a form of science;

• Chad strongly acknowledges the value of traditional knowledge (e.g. local breeds and traditional varieties of crops are emerging as more resistant and less demanding in terms of husbandry);

• Most food production systems, farming, pastoralism and fishing in the country are still run at subsistence levels – this reality needs to shape policy making;

• Traditional varieties and breeds may yield less, but usually they will reliably yield some useful output even under high stress conditions. Under similar high stress conditions modern varieties / breeds may fail leaving no material benefits. The balance of new varieties and traditional varieties needs careful consideration to ensure food security;

• By having an inclusive approach to national adaptation policy making we create a blue print for adaptive and successful implementation – we can address real challenges that the communities and scientists have jointly identified;

• Innovative ICTs will be used to capture and document local knowledge in the framework of the project;

• There is a difference between a drought and a famine. Famine is not always the result of droughts; it is the product of insufficient planning and preparation.

• National budgetary procedures need to take into consideration the inter-sectoral impact of climate change;

International frameworks on Traditional Knowledge

2.1 Definition of ITK in international instruments and treaties

Internationally, there are several instruments which deal with indigenous and traditional knowledge. They are sometimes worded differently but the fundamental approach is similar. The main characteristic of ITK is that it is held within a community or group of communities, and it is transmitted inter-generationally, usually with a focus on sustaining valuable knowledge and skills necessary for the effective management and governance of nature, biodiversity, ecosystems, landscapes or seascapes.

> Indigenous knowledge systems are the complex arrays of knowledge, know-how, practices and representations that guide human societies in their innumerable interactions with the natural milieu: agriculture and animal husbandry; hunting, fishing and gathering; struggles against disease and injury; naming and explaining natural phenomena; and strategies for coping with changing environments. (Nakashima & Roué 2002)

Though the generation, transmission and maintenance of knowledge and associated systems of knowledge management and wisdom / governance arise from practical needs of rural communities, in practice they become vast systems of observation and information which can be applied to a broad range of sectoral initiatives related to climate adaptation and resilience. These include, inter alia, food security, soil management, livestock management, pollination, seed conservation and agro-biodiversity, agricultural security, forest conservation, wildlife conservation including sustaining and conserving plant biodiversity, adult and infant healthcare, water safety and security, disaster risk reduction, conflict prevention, wildlife-human conflict prevention and livelihoods which link conservation with sustainability, including tourism, protected areas employment, anti-poaching skills and ensuring that land planning protects the coherence and integrity of ecosystems capacity.

Multilateral language regarding ITK sometimes refers to Traditional Ecological Knowledge (TEK), Traditional Knowledge (TK) or Indigenous Knowledge Systems (IKS). The last of these puts an emphasis on the interconnectedness of facts and ways of knowledge so that there is a relationship between types of knowledge, and the conservation and transmission of the knowledge is systemic. Some knowledge is specifically restricted to particular types of knowledge holders, often those ritually qualified. Some knowledge is distinguished between whether it is to be held and transmitted by men and women.

Generally speaking, hunter-gatherers tend to ensure that their knowledge is broadly held by many members of their community, using cultural systems to ensure that it circulates regularly and does not break down when groups are far away from each other. Pastoralists tend to have specialised knowledge, for example of animal husbandry, landscapes and metallurgy. Agro-pastoralists and agricultural peoples tend to have more hierarchical societies where chiefs or other senior members of the community may control specific ritually related knowledge.

Useful resource organisations and links

UNESCO is tasked with issues of culture and multilateral treaties. In other IPACC materials we summarise the important treaties dealing with intangible heritage and knowledge systems. The unit that IPACC deals with most regularly at UNESCO is the Local and Indigenous Knowledge Systems (LINKS) which is a joint initiative of both the Culture and Science Divisions: http://www.unesco.org/new/en/natural-sciences/priority-areas/links/

Within the Multilateral Environmental Agreements (MEA), the three Rio Conventions, all three treaties have language on traditional knowledge, of which the UNFCCC is the most recent to come to the party. The IPCC has had several contributions on the role of ITK in climate vulnerability and adaptation. In IPCC AR4 this is found at IPCC: http://www.ipcc.ch/publications_and_data/ar4/wg2/en/ch20s20-8-2.html#box-20-1

The main Nairobi Work Programme tools and COP decisions on ITK are provided here:

Cancun Adaptation Framework:
http://unfccc.int/adaptation/items/5852.php

COP19 decision on the Nairobi Work Programme and policy papers:
http://unfccc.int/resource/docs/2013/sbsta/eng/l34a01.pdf

Joint meeting of the Adaptation Committee and Nairobi Work Programme, report on ITK and gender tools in adaptation: https://unfccc.int/-adaptation/workstreams/nairobi_work_programme/items/8020.php

Scoping report for the joint Adaptation Committee and NWP workshop in 2014:
http://unfccc.int/files/adaptation/nairobi_work_programme/application/pdf/joint_ac-nwp_itk_meeting.pdf

The most elaborated MEA texts and guidelines are found in the UN Convention on Biological Diversity which includes articles 8j, 10c and the Addis Ababa Principles and Guidelines.

Article 8(j) states

Each contracting Party shall, as far as possible and as appropriate:

Subject to national legislation, respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity and promote their wider application with the approval and involvement of the holders of such knowledge, innovations and practices and encourage the equitable sharing of the benefits arising from the utilization of such knowledge innovations and practices.

According to the CBD:

Traditional knowledge refers to the knowledge, innovations and practices of indigenous and local communities around the world. Developed from experience gained over the centuries and adapted to the local culture and environment, traditional knowledge is transmitted orally from generation to generation. It tends to be collectively owned and takes the form of stories, songs, folklore, proverbs, cultural values, beliefs, rituals, community laws, local language, and agricultural practices, including the development of plant species and animal breeds. Sometimes it is referred to as an oral traditional for it is practiced, sung, danced, painted, carved, chanted and performed down through millennia. Traditional knowledge is mainly of a practical nature, particularly in such fields as agriculture, fisheries, health, horticulture, forestry and environmental management in general.

2.2 How is knowledge held by indigenous peoples and rural communities?

Climate variability plays a major role in how ITK is held by rural communities. Long term survival in Africa has meant being able to sustain up to two centuries of climate related knowledge within the living culture, and this in most cases entirely through oral traditions. Knowledge of biodiversity in climate variability requires very complex systems of memorisation and transmission, as well as ensuring that the real skills which go with the knowledge at kept at their peak. Hunting, fishing, tracking, wild food gathering, transhumance, collecting and preparing medicines are all skills-based activities which are part of sustaining the knowledge in a local and applied context.

In a Western education system, the more important one becomes as a knowledge holder, the narrower the field of knowledge. A cardiologist is not likely to spend time on neurology as she or he rises up in the profession. ITK is the opposite. The older one gets, the more things one has to know about more diverse fields of knowledge. Intellectually this is quite challenging and means that elders have to constantly be refreshing their knowledge by recounting it, sharing it, listening to it, and transmitting it.

It is the decline in the access and use of biodiversity which is currently posing a major threat to African knowledge systems. The saying 'use it or lose it' applies dramatically to ITK.

For such complicated systems of knowledge to circulate and be transmitted, particularly over decades and even centuries, so that they remain useful even during climatic fluctuations requires a whole cultural system to support the knowledge. Typically, knowledge is transmitted in two primary methods: didactic instruction and non-linear culturally-based systems of transmission. The former involves fathers, uncles, mothers and aunts taking young people out into the bush and teaching them the names of plants, soils, landscape terminology, how to find water, how to navigate, how to read the stars, how to read signs of natural systems going through cycles. All of this is supported by detailed vocabulary and linguistics systems. The knowledge is often taught in games and tested repeatedly to ensure that the young people are able to assimilate and reproduce with high accuracy the complex knowledge. The latter systems relies on other types of intellectual systems of memory, for example songs, dance and telling of myths.

Megan Biesele in her book **Women Like Meat** (1993) explores how myths are used to transmit knowledge about the environment, animal behaviour and even human psychology over long periods of time. Biesele (1993) estimates that the Ju|'hoan language and their elaborate mythology could maintain up to one hundred and fifty years of experience in the awareness of the community. Information is maintained to inform the band about different food available under different climatic conditions, as well as information on animal and human behaviour in different times and places.

Folklore and other forms of narrative, for instance, provide a kind of scaffolding upon which explicit information about resources can be vividly and memorably hung. The cognitive ability to represent situations removed from the immediate sensory field is, as point out by Robin Ridington (1978:9) and others, basic to the social hunting and gathering adaptation. … Instead of seeing the symbol systems of hunter-gatherers as superfluous aesthetic activity, then, we ought to regard them as enabling features of their adaptation. (Biesele, 1993: 42)

Rituals also often keep information and knowledge flowing. Cults such as the Edzengui forest cult amongst the Baka of northern Gabon involve specialised ritual training for men, and the transmission and even channelling of forest spirits through initiates in the community. Maasai and other traditional pastoralists hold knowledge and landscape management which allow them to have a plan B if there is a sudden climate crisis (such as drought). They can reorganise their society and their impact on biodiversity by changing altitude, spatial distribution, social density, livestock mixes and so forth. The ITK is associated with both the abundance of the landscape, and the variability of climate conditions. All of this is coded into the culture and land management systems. Louis Liebenberg (inventor of Cybertracker) who worked with traditional San trackers and their knowledge systems, has emphasised that didactic instruction and the cultural transmissions are mutually reinforcing. It is not a case that ITK rests on lose systems of songs and myths. Much of the learning is painstaking, requires many hours and eventually years of coaching and training, before a young person begins to emerge as a competent tracker. Liebenberg has argued that tracking is the origin of human scientific capacity (Liebenberg 1990, 2013). The technical training is complemented by the myths relating to animal behaviour and landscape knowledge. Then at a certain point in the evolution of personal expertise, the tracker will be encouraged to leave the rational and didactic framework and move into an intuitive framework. This is a higher level of competence that goes beyond observation and hypothesis building. Typically, knowledge holders will describe the ability of enter into an animal's mind, to see through its eyes, and to intuit its location and movements. Such types of knowledge are documented in all continents but they are rejected is unverifiable by science. Here is a space where respect is of upmost importance not to ask the ITK holders to justify their knowledge against a different epistemological system, a different framework. These will not align and they will cause one side or both to lose confidence in the partnership.

In some hunter-gatherer societies it is considered unlucky and rude to promote one's own expertise and profile. This is related to complex social and psychological issues, and it may be linked to the importance of not allowing the ego-aspects of personality to interfere in the intuitive side of the knowledge application. This may mean that when outsiders approach a rural community, the most gifted knowledge holders will not step forward to be recognised. There are different norms in different communities, and hence the importance of participatory methodologies that let the community people interact with knowledge models according to their own values and norms.

2.3 How do we create national synergies between science, technology and ITK?

IPACC's 2011 climate adaptation workshop in N'Djamena, Chad and subsequent cooperation with CTA and UNESCO has concentrated on how to stimulate synergies between science, new technologies and ITK.

In N'Djamena, the World Meteorological Organisation presented the Global Framework on Climate Services[2]. This valuable initiative helps plan out the type of information which meteorologists can provide to those who need it, as well as the media for such information sharing. The GFCS includes greater attention to information reaching rural areas, improved data collection from remote areas, and getting understandable policy related information to decision-makers. IPACC members emphasised that the WMO initiative, which is needed in Africa, should be conceptualised as a two-way flow of information and decision-making. It is not enough to say that information flows from scientists to decision-makers, the meteorologists themselves need to engage with rural communities about what they are observing, the types of information they are able to generate, the types of information they require, and then how to find a synthesis so that the different forms of knowledge, information and data become a robust basis for informed decision-making.

Chadian meteorologists noted that they know something about what farmers need, as their concern is to do with planting and harvesting seasonal crops. Herders work on different time frames. It does not matter to a herder what day it will rain. It is other types of information over longer time frames which will influence pastoralist choices and risk reduction. A pastoralist generally wants to know that valuable animals can not only be born in a particular season, but that they will be able to mature, breed and that decisions will need to be made about migrations and sex or species distribution.

No one knows what climate change will do to our planet and our communities. There are indeed models but we have never been down this road and natural systems and patterns are so distorted that events can be more complex and more extreme than expected. Typically, such unpredictability puts much strain on a society and can lead to conflicts, violence, despair and migrations.

Science may be improving, for example in climate modelling but it has a minimal impact on rural communities understanding, responses and decision-making. Traditional climate predictions and nature-based ITK is becoming less reliable for forecasting though still important for resilience planning. The next phase of adaptation planning and practice for Africa will require an on-going interaction and dialogue between different knowledge systems.

Part of building a national approach to climate adaptation and resilience means being able to link up ITK with data-observation, being able to create dialogue between rural decision-makers and those who have access to scientific forecasting and information (usually restricted to urban areas), and using climate adaptation platforms at different levels to create a synthesis of ideas and appropriate responses which are understood and coherent to different constituencies.

IPACC's 2008 Marrakech Recommendations on Adaptation
IPACC's conference on climate change, climate adaptation and indigenous knowledge systems was held in cooperation with CTA and Conservation International in Marrakech, Morocco. Morocco held the first UNFCCC COP in 2001 which got to grips with adaptation policy. It was a fitting venue for IPACC's first real study of the causes of climate change and indigenous peoples' responses.

- Educate indigenous peoples and leaders about the causes of and likely impacts of climate change;
- Education should include explaining **scientific** and **policy** approaches to Ecosystems-based Adaptation (**EbA**) and how this links up with traditional indigenous knowledge and governance;
- Promote dialogue and planning between indigenous peoples and national meteorological agencies to promote early warning systems and integrate indigenous peoples in national adaptation programmes and planning;
- Help indigenous peoples in Africa map their territories to make visible their traditional governance and stewardship over natural resources;
- Introduce new technologies such as Participatory GIS and Cybertracker to help indigenous peoples get recognised as expert knowledge holders, capable of monitoring, managing, rehabilitating and governing local ecosystems in cooperation with the State;
- In Least Developed Countries (LDCs), focus on lobbying the National Adaptation Programmes of Action (NAPAs) Focal Points and relevant Ministries to integrate community-based approaches to EbA and the application of traditional knowledge and new technologies in monitoring and conserving local ecosystems;
- Cooperate with neighbouring agricultural communities to negotiate conflict reduction and set ground rules for conserving top soil, forests, plant, bird and animal biodiversity, bee populations, fish stocks and water systems;
- Focus on securing land tenure and governance rights for sustainable community-based natural resource management (with effective policing of external poaching of plants and animals and legal protection against extractive industries).
- Negotiate more equitable arrangements to use Protected Areas as biodiversity sinks which can be resources for indigenous territories and maintain connectivity and community-conserved areas.

N'Djamena Declaration on Adaptation to Climate Change, Indigenous Pastoralism, Traditional Knowledge and Meteorology in Africa - 2011

Key findings included:

- Traditional knowledge and climate science are both critically important for adaptation policy and supporting resilience building of rural communities necessary to cope with climate change;
- Traditional knowledge and climate science need to be shared to create synergies that can inform adaptation policy, monitoring and assessment. It is through a combination of both knowledge systems that we are likely to achieve better synchronisation between forecasting, anticipatory responses, appropriate governance responses and feed-back. Both knowledge systems need to be converted into media that is understandable and usable in national adaptation platforms and for public use;
- Climate change amplifies social and economic vulnerability, with the risk of serious conflict and poverty. An essential element of climate adaptation is ensuring good governance, human rights and social equity to maintain local, national and regional harmony during times of stress;
- The United Nations' Cancún Adaptation Framework, the National Adaptation Programmes of Action (NAPAs) and National Adaptation Plans (NAPs) may be best effected through well designed and funded national adaptation platforms;
- National adaptation platforms need to include a diverse range of rural and urban communities, with particular attention to participatory approaches to facilitate the contributions of pastoralists, hunter-gatherers, farmers and fisherfolk.
- National adaptation platforms need to facilitate a two-way flow of ideas, information and strategies for resilience building and equitable sharing of costs and benefits. The inputs to and outputs from the platforms need to be meaningful and relevant.

[2] See http://www.wmo.int/pages/governance/ec/global-framework-for-climate-services_en.html

2.4 What types of knowledge could be useful for national adaptation?

In theory, any participatory planning exercise in landscape / coastal conservation, rehabilitation and restoration of ecosystem capacity can be done in concert with ITK. The problem is often that ITK is locked into particular systems of culturally-based communications which may not be transparent to researchers and facilitators.

IPACC in cooperation with its partners has identified several valuable technologies and methodologies that help move oral traditional knowledge into formats and technologies which are powerful and user-friendly for adaptation work. These include:

1. Landscape / seascape modelling, notably the building of participatory 3D models;

2. The use of Cybertracker technology to record tracking and trailing ITK;

2.4.1 Landscape modelling

CTA has developed and refined a methodology for helping rural communities build three dimensional geo-referenced models of their own landscapes and seascapes. This is achieved through a participatory methodology and is done through the local language to bring the ITK to the fore. The methodology has been used in Asia, the Pacific, the Caribbean and Africa to great effect. The methodology, known as Participatory 3 dimensional modelling creates a physical manifestation of people's landscape knowledge, and in so doing allows complexities of knowledge and governance systems to become visible and to remain usable for planning purposes. The maps can be done with near zero-literacy capacity, so long as the knowledge is held by some people in the community and others are able to assist with coding and transcription.[3]

A complete online training kit for trainers in participatory mapping is available from CTA in cooperation with IFAD.[4]

Landscape model A: Ogiek mapping of the Mau Forest Escarpment, Kenya

ERMIS Africa assisted Ogiek people in Nessuit, Kenya to map their traditional territory of the Mau forest escarpment. This was done in 2006, while the map, relayed by elders to the youth of the villages, focussed on a historic recreation of the ecosystem prior to its modern deforestation. As such, the map provided an historical and heritage perspective on how the ecosystem, cultural landscape and natural resource governance used to function.

It took several days for the research support team to fully understand the complexity of the Ogiek terminology that refers to different altitude sensitive biological-ecosystems in the mountains. The Ogiek elders, whose language encodes their complex knowledge of the territory, found it difficult to express this in Swahili through an interpreter. The challenge was that the Ogiek system was multifactorial, including aspects of altitude, temperature, rainfall, plant varieties. The designation of the zone seemed to be a cross-referencing of these different aspects and characteristics. Finally, after some interviewing, elders agreed that the key determinant of a zonal (polygon) identity was the taste of the honey in that part of the escarpment, which indeed would have been the result of the other characteristics in combination. This is explained in detail in the online report, Through the Eyes of Hunter-Gatherers (Ramaldi et al 2007).

The complexity was acutely related to the polygons, named in the local language *Mosop*, *Moou*, *Gaporowo*, *Ing'utngutioit*, *Rogroget*, *Teegeg*, *Tuimasat*, *Logomo*, *Tiriig*, *Saapo*, *Isawanit*, *Sooywo*. It was a major exercise with men and women to tease out the meaning behind this complex multivariant taxonomy which at the same time was very precise in its geo-referencing. The interpretation team required geographers, cartographers, people with botanical knowledge and a socio-linguists to work out the logic behind the system.

A breakthrough with the Ogiek map was related to the terminology used for describing different types of mountain swamps. The mappers had high-level swamps termed 'ing'utngutioit' and 'isawanit' respectively. The one turned out to be a high altitude permanent swamp, like a vast sponge that would store rainy season precipitation and then make this available all year round for the major streams which fed many of the most important rivers in Kenya. Isawanit were temporary lower level swamps which would normally be dry in summer. The elders only casually mentioned that the high level permanent swamps no longer exist, due to massive deforestation in Kenya's highlands. Indeed, this simple piece of embedded ITK explained much about the water crisis that Kenyans experience downstream. From an adaptation and restoration point of view, allowing the forests that protect the ing'utngutioit to be re-established would have a major strategic impact on water security for the region. The major NGO working on the Mara river catchment area had not included the Ogiek elders in their programme of consultations and mobilisation – leaving out the people with the most sophisticated knowledge of how the water towers function, or at least should function.

This anecdote indicates the complexities and opportunities for working with elders to bring ITK into a medium which can be explored, interrogated, discussed and from which conclusions can be drawn, not just by villagers but also by professionals who can help with national policy interventions to secure restoration and resilience building.

Landscape model B: Yiaku mapping of the Mukogodo Forest, Kenya

the Yiaku community in Laikipia District of Kenya to map the community conserved territory of the Mukogodo Forest, one of the last intact natural forests of Kenya.

The Mukogodo mapping was unusual in that there is a nearly extinct language present, surrounded by a new dominant language from a different language family. The old Cushitic Yiaku language was used by hunter-gatherers and the land use system and knowledge system is different from that held by the now dominant Laikipia Maasai who speak a Nilotic language. Landscape mapping is a valuable way to stop valuable knowledge from going extinct when languages are under pressure.

In the mapping, elders and youth were able to see how traditional systems of responding to drought and erosion have broken down. In the old days, when a drought started, all of the herders were obliged to keep their livestock at the bottom of the valleys. The logic was that the acacias needed to bloom undisturbed by grazing animals, and thus provide wild honey if the drought were to drag on for long.

This pattern of using different types of wild food to buffer against drought conditions is important for the survival of animals and humans. Changing social patterns and the breakdown of knowledge and customary governance poses unnecessary strains on the environment. Traditional knowledge, when supported by effective governance, can help reinforce the natural capacity of the landscape to recover from shocks and to support people during weather extremes.

Landscape model C: M'bororo mapping of Baïbokoum, Chad

In 2012, IPACC worked with the Association of Fulani Indigenous Women of Chad (AFPAT) to help nomadic herders in the southern district of Baïbokoum to conduct a P3DM. The mapping dealt primarily with land use changes over the last decade in relation to climate change and rain scarcity. The pattern in southern Chad, as in many countries in Africa is that as soils become depleted, farmers are encouraged to encroach on forests and drylands which historically have been conserved for other ecosystems functions, and are rarely good environments for sustainable farming. The nomadic M'bororo showed on their map how conflict has emerged due to farmers cutting off herders from getting their animals to reliable watering locations. Traditionally there was a good balance between farmers and herders, including using the cattle dung as manure for fields, and ensuring animals had access to water year-round. Overtime, and due to both social and environmental changes, the farmers have occupied the banks of the river, blocked off transhumance corridors and violence sometimes flares when water is scarce.

The model helped government officials realise how this slow transition in land use was promising to be a source of potential violence and

[3] See the CTA site on P3DM http://goo.gl/HYu83H and http://pgis.cta.int/completed-initiatives/78-p3dm-handbook-2010-edition

[4] For the training kit consult: http://pgis.cta.int/completed-initiatives/81-pgis-tk-launched see also http://pgis-tk.cta.int

conflict should there be any climate shock to the territory. It was also evident that a well-managed landscape could actually improve soil, water, biodiversity and livelihoods, i.e. create the ground work for resilience of the social and environmental systems. The M'bororo demonstrated a sophisticated knowledge of hydrology of the territory, including the capacity of flat lands to capture rain water and how long such water would remain accessible to livestock.

The map also surfaced a little discussed issue of how nomadic M'bororo conserve certain tree species. This is a common behaviour in Africa but rarely features in land planning and conservation. Such traditional systems of culturally-based conservation can play a major role in ecosystem conservation. Nomads were angry that farmers were cutting down or burning down these protected trees. This is a growing problem in Africa and using the maps and the cultural dialogues can help raise awareness about conservation and governance rules.

Perhaps the most dramatic outcome of the Baïbokoum mapping was that chiefs in the area who had been stressed and with feuds over land and water issues, found that by working on the map together that they held their ITK as part of a common heritage. They felt united in their project and pledged to work to resolve conflicts and to conserve their ancestral lands. The exercise created a meta-awareness of the relationship between natural resources, culture and custodianship.

Other additional benefits came out of the mapping. The government realised for the first time looking at the map that there was an important and well conserved primary forest area in the mountains nearby, but that there was steady encroachment and that this area would need attention to conserve it and the associated spring-water.

2.4.2 Cybertracker technology to record tracking and trailing ITK;

Cybertracker is a software invented in South Africa by Louis Liebenberg and adjusted to run on a series of different handheld devices, from palmpilots to smart phones. It was modified in Australia and is known there as i-Tracker. Cybertracker was developed based on Liebenberg's time with !Xõó trackers in central western Botswana. Liebenberg noted that people with no formal written literacy were experts at identifying animal spoor, being able to determine information about the age, sex and health of the species, as well as its particular behaviour and when the trail had been left. He developed the computer capacity to use symbols and icons for trackers to rapidly collect on a GPS enabled device, the information they were seeing in the field. Cybertracker thus became a major breakthrough in being able to move from observed information, supported by sophisticated skills and knowledge systems, and to convert this into valuable electronic data .

Cybertracker is designed to be quick and easy to use in the field, being the most efficient way to gather large quantities of geo-referenced data for field observation, even by non-literate users. It enables trackers to choose from a selection of screen icons on a handheld computer to conduct a specific analysis. It can combine texts and icons to give more detailed information about the characteristics of the species. Data are recorded in both local and national languages.

Cybertracker system is very flexible and can serve different purposes. Its most obvious use is determining wildlife densities, game counting and endangered species data with much higher reliability and much cheaper than other systems of knowledge management. Data collected by trackers in Lossi Sanctuary in the Republic of Congo showed the extent of gorilla mortality due to the ebola. The date system meant that infected or dead gorillas did not have to be touched, and yet enough data could be collected safely to create maps of the trajectory of the disease distribution. It also can be used to collect data on flora and fauna in a specific area, in order to control their periodical variations. Cybertracker generates employment opportunities for trackers from indigenous communities as its icon language allows the use of the software also to people belonging to oral cultures.

Liebenberg has not only provided the Cybertracker technology for African trackers, he has also developed a reliable system of assessing and certifying the holders of tracking and trailing knowledge, whether held traditionally or from formal apprenticeship. This is discussed in a number of publications and online films (see References section).

These tools which link geo-referenced data and knowledge with ITK can be used to complement:

- **Monitoring and responding to changes in plant and wildlife density and diversity due to climate impacts;**
- **Developing longitudinal and accurate studies of plant, wildlife and human behaviour changes;**
- **Human, wildlife and livestock disease monitoring and management;**
- **Anti-poaching programmes;**
- **Traditional and inter-community water management;**
- **Customary resource regimes (who has the right / duty in which geographic area underwhat rules and circumstances);**
- **The role and function of traditional institutions in conflict avoidance associated with destabilised natural resource governance regimes.**

[5] Home page is http://www.cybertracker.org/

Windhoek Conference on TEK / GIT / ICTs

In August 2008, IPACC in cooperation with CTA, ran the African Indigenous Peoples' Workshop on Effective Use of ICTs in Environmental Advocacy in Windhoek, Namibia (25-28 August 2008). The conference produced training, film and publications on ITK / TEK in relation to environmental advocacy and the use of new technologies, particularly geo-spatial information technologies (GIT). The conference had case studies and field work on participatory mapping, tracking and cybertracker technology. The observations of the Windhoek conference can be seen as parallel to the results of the UNESCO Education for Sustainable Development projects which are also available online.

Observations on TEK / ITK

1. Knowledge, as transmitted traditionally, is inseparable from norms, values, customs, practices and beliefs. Knowledge without wisdom and respect for or adherence to cultural norms and practices destabilises both human culture and natural systems. The goal in advocating for sustaining TEK does not only concern knowledge documentation and transmission (or trading and commercialising it) but also ensuring transmission of values, ethics and wisdom about sustainability. Cultural integrity, social relations and self-determination are foundations on which TEK transmission rests;

2. Traditional ecological knowledge and its cultural / normative framework are threatened by changes in local economies, land alienation, invasion by agricultural neighbours, invasion and negative impacts of extractive industries, degradation of lands, forests and biodiversity (mostly through human activity but also from climate instability). In some communities, there is a sharp break between knowledge and culture held by elders and the younger generation who are not competent in sustaining equilibrium in the territories;

3. There were no examples of where national governments actively valued and supported maintenance and application of TEK in biodiversity conservation – CBNRM in Southern Africa is more progressive than other parts of Africa but still has a tendency to being top-down and bureaucratic;

Observations on GIT / ICTs

4. Maps and other Geo-spatial information technologies (GIT) are powerful tools for valorising the complexity and functions of traditional ecological knowledge;

5. Participatory GIT helps communities value what they know and re-affirm their commitment to managing and conserving their natural and cultural heritage. It creates a strong platform for dialogue between local and indigenous peoples and those who hold policy and decision-making power;

6. Mapping can create dialogue between indigenous communities, affirming shared values and knowledge, which contributes to alliance building and solidarity of rural communities;

7. The ability of GITs to represent spaces and territories in a geo-referenced format, drawing on local knowledge can easily be understood by both elders and youth regardless of literacy; participatory GIT is an asset in intergenerational dialogue and understanding;

8. Approaches such as Participatory 3 Dimensional Modelling (P3DM) which were more open ended, had the advantage of taking youth more deeply into tutelage with elders and left a physical model behind which stimulated ongoing learning and dialogue both between generations and with outside agencies and stakeholders;

9. Pastoralists expressed concern that P3DM is a good methodology for small territories with high relief but they would like to see similar methods adapted to large flat territories typical of the Sahara and Sahel;

10. Delegates were impressed with Cybertracker technology – it is a powerful tool for creating an interface between traditional oral tracking and biodiversity knowledge and data outputs relevant to both mapping and abundance monitoring;

11. One of the strengths of Cybertracker is that it creates a digital memory of a single trackers expert knowledge: a master or senior tracker can work with Cybertracker and create an archive or his or her own knowledge repertoire which can be used to train younger people and even survive after the elder passes on;

12. There is a bias in both GIT and Web2 that these are men's domains, women need equal access to technology;

Recommendations

- The relationship between mapping and the main international treaties on the environment and rights (the 'Rio' Conventions: FCCC, CBD CCD) – how to use maps effectively to engage with policy opportunities such as Articles 8j / 10C of CBD, or the National Action Plans on drought and desertification under the CCD;

- More inter-African learning and exchange on GIT, TEK, environmental governance and advocacy would be valuable;

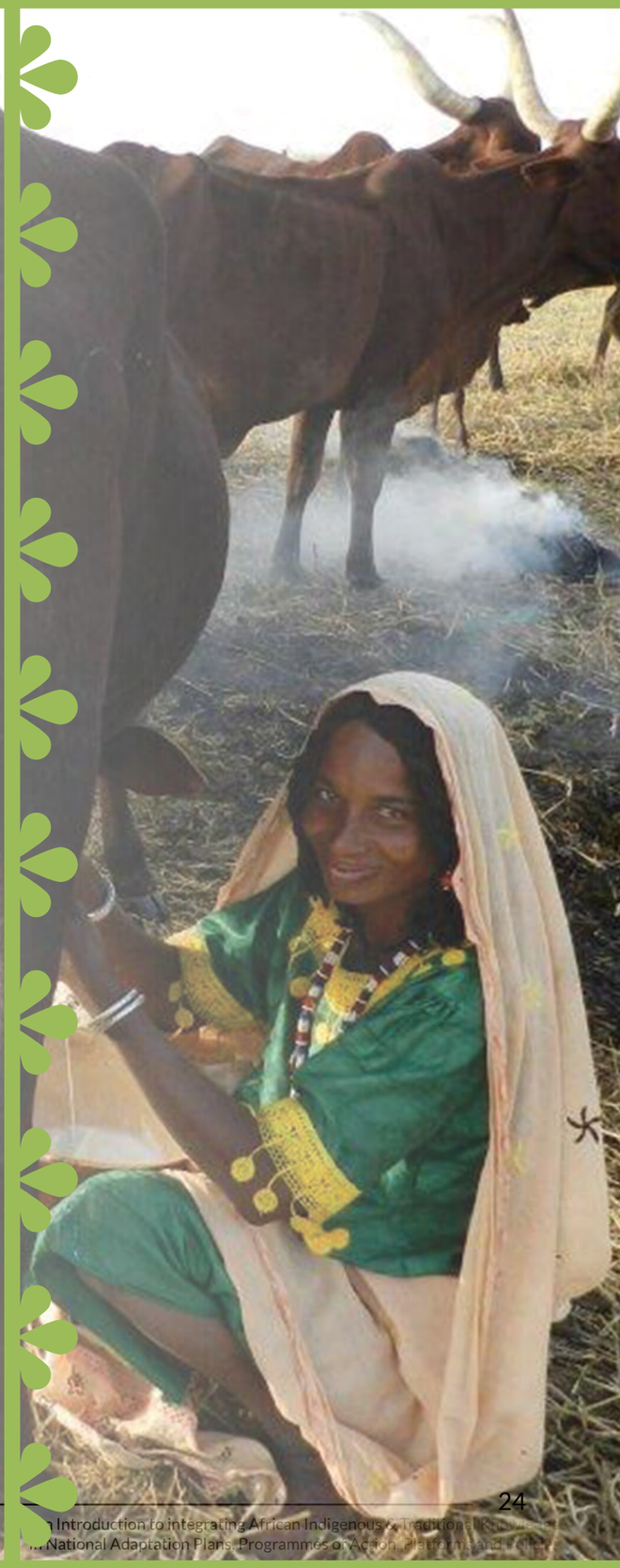
- More advocacy coaching, particularly in how to link up local needs, with national policy and multilateral instruments, norms and standards;

- IPACC, partners and allies should lobby major conservation NGOs to adopt participatory mapping approaches and create standards on consultation and consent. NGOs should be discouraged from 'extractive' mapping which uses local knowledge in ways that may adversely affect indigenous and local communities;

- Existing P3DM maps should be revisited to see how they can be used in climate related preparations, early warning systems, disaster prevention and advocacy;

- P3DM style mapping methodology for pastoralists and large transhumance zones;

- IPACC, partners and members should push for stronger representation and inclusion of women in GIT, climate and advocacy work



IPACC's Recommendation to African countries on the application of ITK in national adaptation policies, programmes and platforms

3.1 Ten Principles for working with ITK in NAPs / adaptation policy platforms

Based on the different workshops, consultations and international forums where IPACC leaders and delegates have engaged, we have put together the following approach to integrating ITK in national climate policy. The approach is described here as a series of principles to assist with planning and design

i. Community control, a rights-based approach & an ethical framework will build trust and co-operation: ITK is both a community resource and a national resource. The ability of the community to control, value, transmit and benefit from its knowledge will influence both the sustainability of the local resources and the willingness to share and explore its applications. If communities fear that their knowledge will be extracted or misused they will not trust the process. Working with ITK requires allowing the community (in its complex diversity) to stay at the centre of the decision-making and developing a transparent and trust-based platform for cooperation. An approach which affirms the rights of communities, considers elements of human and peoples' rights within adaptation policy making, and is supported by a transparent and workable ethical framework will help in both the trust building and problem-solving between different stakeholders and rights-holders;

ii. An intersectoral approach will create greater coherence: ITK and climate adaptation are both cross-sectoral opportunities. Communities are sometimes puzzled about how one part of government seems to hear them and want to work together, while another part of government does something that may break up the landscape plans necessary for climate resilience. Both the national and the local policy intervention should involve different levels of government as well as different sectors and ministries. Local Adaptation Plans of Action (LAPAs) can be a productive way to create synergy between national planning and an integrated approach to local / district level planning. A holistic plan for climate resilience, integrated landscape / coastal planning, and policy platforms for learning and coherence will all contribute to success. National authorities understand the treaty based guidelines whereas local government often deals with issues such as policing and security, conflicts, resource allocation, traditional authorities and inter-community relationships. The lower levels of authority may feel they need permission from the national level before developing integrated planning platforms.

iii. Facilitate interaction of science and ITK: No one has lived through this type of climate change. It is difficult to predict the speed, intensity, frequency and complexity of climate impacts, shocks, slow onset patterns and how we will cope. Science and technology offer us models of certain type of information, while ITK offers a complementary set of observations that are anchored in human cultures and institutions for decision-making. For both the sake of national and local needs, it is likely that there needs to be a dialogic (two-way) interaction of science and ITK. Communities are increasingly wanting information about climate change and the risks and opportunities they face. At the same time, their ITK is a toolkit they have already mastered and know how to apply. Sustained interaction of different types of knowledge can lead to well-informed and triangulated strategies for climate adaptation and resilience. Some African countries are making forecasting more available for rural communities by means of fax, radio broadcasts and sms. The best way to create synergies are through initial face to face interactions between science specialists and ITK holders, and then elaborate systems of regular interaction, planning and assessment.

iv. Conserve wild resources and ecosystems: The tendency is to see adaptation in narrow terms of food security. Climate change impacts and human behaviour can place entire ecosystems or critically important nodes such as water catchments or reefs at risk. Government resources are often limited so there needs to be a strategic approach to initial work on ITK and adaptation. Attention may need to go to particularly sensitive ecosystems that sustain important national or sub-national ecosystem services. For example, protecting tropical forests and water catchments, ensuring migratory routes and conservation of dryland aquifers and oases, prioritising reef and mango conservation, while working with ITK holders will have both social and ecological benefits.

A common assumption is that all Africans live off farming. In practice, many African rural communities use undocumented wild resources and their agricultural / pastoralist resources also rely on ecosystem, hydrological and soil stability. Wild honey, insects, wild fruit and traditional medicines are examples of important wild resources that are subject to ecosystem and biodiversity well-being. Along with a rights and duties based approach, adaptation needs to work with effective custodianship and a precautionary principle to conserve biophysical and ecosystems which underpin human life. Some infrastructure and extractive industries threaten fragile ecosystems and wild food resources. This may be invisible to national policy makers, hence ITK plays a role in assessing vulnerability and hidden resource reliance which can make a major difference in times of climate impacts;

v. Conflict-sensitive adaptation and ITK need to be linked: Climate impacts and vulnerability can exacerbate or create tipping points in human conflict, as well as human-wildlife conflict. ITK in its broader sense of natural resource governance and community based value systems can be important in identifying potential flashpoints of conflict, and drawing on customary and traditional decision-making to prevent or mediate conflict. Conflict can be between those with shared land use patterns, such as farmers or pastoralists, or between such communities. Africa historical has sophisticated systems of customary land use and reciprocity rights, which even enter into the clan lineage systems. These are part of the ITK toolkit for conflict sensitive adaptation.

vi. Security of tenure and legal considerations of customary land management will influence long-term sustainability: One of Africa's major challenges is the disconnect between traditional land tenure and custodianship, and the way that land and resource tenure was reshaped by colonialism. A key difference is that customary systems of land and resource management always include rules regarding biodiversity and sustainable use. Some of these have degraded overtime, but they represent an aspirational norm that any land / river / coastal use is not only anchored in a fair and transparent legal system but that it also has built into it environmental values and the principle of custodianship – hence both rights and duties attach the community to the landscape. This is a major challenge in the era of climate change which is paralleled by increasing problems of landscape fracturing which reduces biodiversity regeneration, genetic flow and ecosystem functions. A forward looking African approach to integrating ITK and climate resilience will require local, sub-national and national reviews of how to revitalise custom-

ary tenure systems within national legal and tenure frameworks. For ITK to be sustainable, communities need security of tenure. Insecurity leads to overuse of fragile resources, and displacements can quickly lead to the loss of valuable ITK which in most cases is irreplaceable.

vii. Customary natural resource governance is part of ITK approaches to adaptation: Tenure is one component of conflict-sensitive adaptation and keeping ITK in situ so that it may be applied. Customary natural resource governance regimes are also inherent to all African rural communities. These are rule governed systems of who has rights and responsibilities for the environment and sustainable use. It also usually implies the right to exclude others who are not legitimately members of a community governance system. These systems are related to tenure (vi above) but they also are sustained by indigenous and local institutions and mechanisms which are rich in ITK. In practice, knowledge does not exist disconnected from either the landscape / seascape / natural resource base, nor from a human governance system. These common pool resource regimes are likely our strongest institutional mechanisms for coping with climate change and building up both social and ecological resilience. Like with tenure rights, they pose a challenge to African legal systems and they provide opportunities for national governments to have greater capacity at smaller scales. Mapping of indigenous and local customary governance systems, in concert with biophysical knowledge, is the foundation for activating such knowledge systems and empowering local communities to consider themselves as resilience actors.

viii. Technology can be a useful bridge between oral ITK and the need for data and physical planning tools: Working with ITK in policy and application to climate challenges requires 'intercultural' mediation. Any party in the cooperation can become disconnected if they do not understand the relevance and sophistication of the knowledge they are working with. Some types of technology, for example participatory uses of geo-spatial technology can allow different types of knowledge holders to meet, work with scaled models and learn how different cultures engage with the same landscape issues in different ways;

ix. Gender-sensitive approach: NWP's mandate includes developing tools, guidelines and approaches to the use of ITK and gender-sensitive approaches to climate adaptation. The gender aspect of the adaptation frameworks was launched in Cancun and continues to build momentum in the treaty body. When dealing with ITK, we enter into a complex territory of the gendered character of knowledge in African communities. In terms of principles, the community norms and values need to be respected. Some cultures make strict distinctions between knowledge management between men and women. These vary substantially from one community to another and it is problematic to make assumptions. Our experience is that women are required to spend more time out in the bush looking for resources, and hence their tracking and observation skills may be superior to men who are traditionally held to be leaders in certain knowledge types. In other communities, it is the men who have to do the long distance transhumance, for example in regrouping camels after the dry season is over, and hence their large-scale landscape knowledge may be more advanced.

In practice, a gender-sensitive approach to ITK in adaptation means that knowledge research, consultations and practices need to continually balance gender-based approaches in their design, actions and conclusions. Women and men will both need to be involved in the research, design, focus-groups and implementation strategies. Gender should not be taken as a fixed or static condition. Gender in culture has always been dynamic and flexible within the context of the environmental demands. Work will benefit from a transparent approach to promoting awareness of gender in climate change (including gender-based violence in families under climate stress, changing roles of girls and boys, access to education as well as traditional apprenticeships, and so forth) and in defining the gender norms we are building with the next generation.

x. Involve the schools to facilitate linkages between ITK, skills development and formal schooling: ITK has not been easily integrated into African school curricula or even into educational culture. Most African languages may not be used in formal schooling. While there is attention to practical adult challenges of soils, water, agriculture, wild resource conservation, it is an ideal opportunity to help local schools see how ITK and science can be better integrated in the life of the school. Schools seem to put more emphasis on the human built environment than the rich and complex biological and geographical knowledge held by rural communities. Improving school – ITK relations can help lead to long term transformation of problem solving and affirmation of diverse knowledge systems.

3.2 Five Challenges for integrating ITK into NAPs

IPACC is enthusiastic that most African countries and particularly the LDCs would like to see indigenous and traditional knowledge as part of their national adaptation frameworks and action plans. There are however some pitfalls which can either cause an ITK initiative not to be fully successful or which can do damage to trust relationships and make it harder for the next initiative or adaptation team to win back community confidence. Paying some attention to the challenges can pay dividends in the results.

i. ITK goes beyond government capacity: It is not realistic that any government department is going to be able to recreate the social processes necessary to fully understand, manage and transmit ITK. The role of government is as a facilitator – helping communities to see how their ITK can be applied to contemporary challenges of climate instability and change. Within this approach, we emphasise the need for innovative approaches to consultation, participatory methodologies and allowing custodians of ITK to bring their knowledge, values and cultural framework into national and local adaptation planning. This can be cross-referenced and in dialogue with scientific models but it needs to be the point of departure that the indigenous and traditional system has survived and adapted for centuries and we are most effective when we create an enabling framework for its application;

ii. Custodians are the owners of the knowledge: Attempts to nationalise ITK or otherwise legislate that authority over ITK will shift from the traditional custodians to private entities or the state may damage trust relationships with the knowledge custodians. There are emerging frameworks for collective property rights and benefit contracts which help fight rural poverty. The history of Community-based natural resource management in southern Africa tells us that the state must ensure the highest benefit reward possible for rural communities, and from that foundation, new economic opportunities, including taxation of private sector growth, will come in due course.

iii. Consent and transparency – ensure an ethical approach: In the Western fast-paced world of commodifying knowledge, we can see many examples of knowledge being misused and being mistreated. African knowledge sits within ethical and cultural contexts. Knowledge is transmitted because young people or adults have shown themselves mature and qualified to access the trust required for such transmission. This means that the agencies working with ITK, even for developmental goals, must spell out clearly the ethics of their approach, there needs to be free prior and informed consent when working with communities and knowledge custodians, and there must be transparency. If it emerges that there are person gains to be made at the expense of community knowledge, this can break down trust and even stir conflict and misgivings;

iv. Prejudice is harmful: We all try to get on with each other, but hierarchies of power sometimes distort how we see each other. Indigenous peoples sometimes find themselves exposed to ugly displays of prejudice and discrimination. This can range from ignorant comments about their culture to people from dominant society not wanting to touch them, eat at the same table or drink from a cup handled by an indigenous person. It is hard to imagine that in the 21st century such behaviour happens, but it is sadly still common. When working with indigenous peoples in particular, researchers and government officials need to be role models in respecting cultural diversity and having

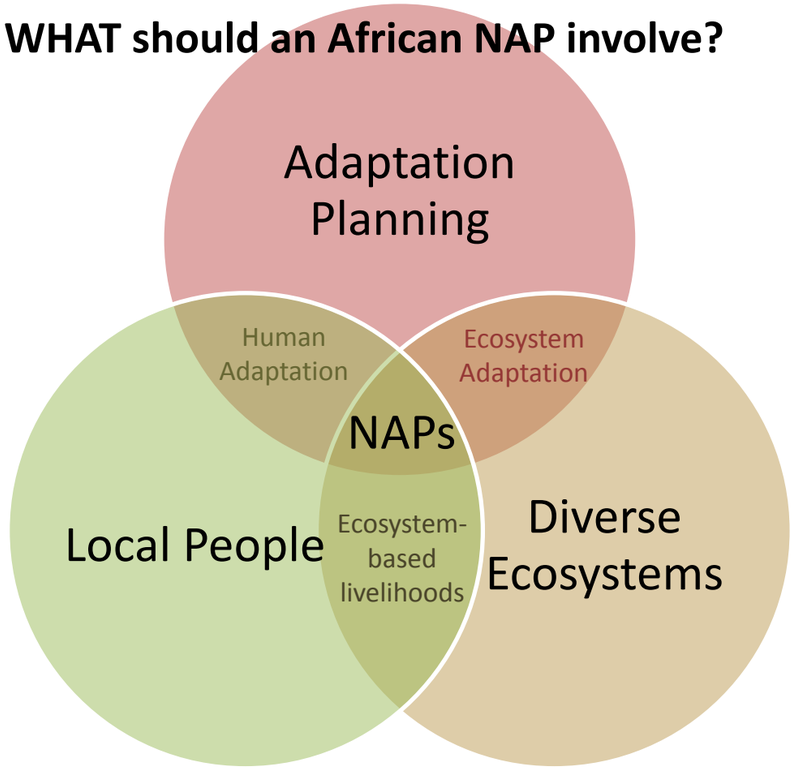
zero tolerance for prejudices and discrimination. Prejudice may have gender dimensions. Women and men are both important to ITK management. How men and women relate varies enormously around Africa. Assumptions can be a problem. It is more serious if outsiders do not respect local norms about gender, while at the same time ensuring gender equity in the project design and implementation;

v. ITK can be obscure – and it is meant to be that way: It is tempting, particularly for researchers and scientists, to want to know everything. People with educations and access to the internet are used to the idea that we have the right to access information. For many societies this is not how it works. Some knowledge is sacred, secret, protected by ritual qualifications. Some ITK, particularly when it touches on the power of the ancestors is associated with competences which may only be appropriate for certain people in the society. It is not unusual that access to the knowledge is linked to the capacity to experience it without ego attachments, greed or the desire for power. Sometimes the ITK requires a whole apprenticeship. As part of the ethical engagement, outsiders must know when it is not appropriate to ask more questions, when information should not be recorded or put in the public domain (particularly not published), and when it is a matter of waiting until the custodians of the knowledge deem that it is the time to share what they know;

1 WHAT?

National Adaptation Plans, Platforms and Policies benefit by looking at local contexts, local resource use, local actors and integrating African Indigenous & Traditional Knowledge

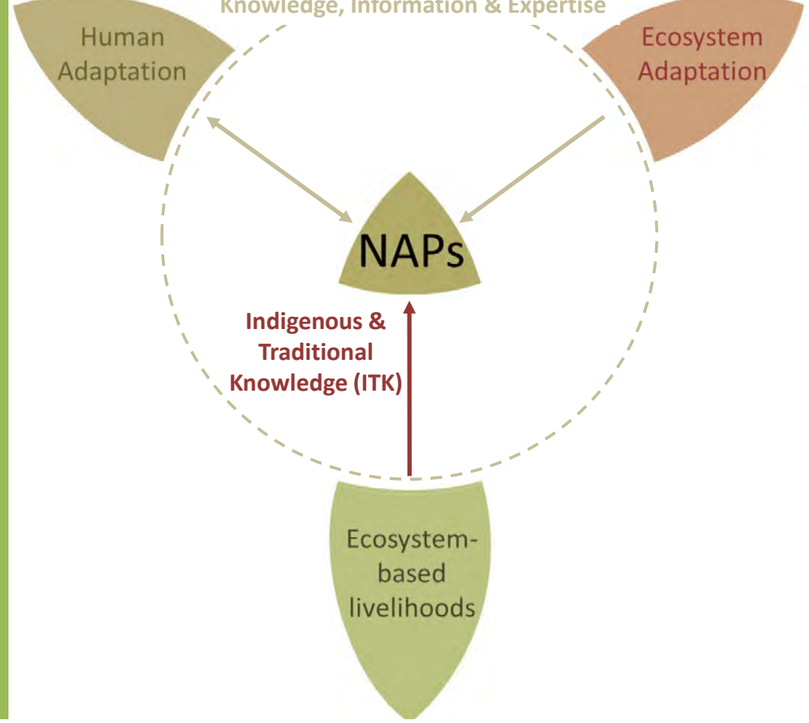
WHAT should an African NAP involve?



1 WHAT?

National Adaptation Plans, Programmes of Action, Platforms and Policies should integrate African Indigenous & Traditional Knowledge

Creating synergies between science, knowledge, behaviour and policy



1 WHAT?

2 WHY?

Opportunities associated with the integration of ITK in National Adaptation Plans

WHY integrate ITK in NAPs?

1 **Place-based and context-specific adaptation solutions with community involvement**

2 **"Best Possible Solutions" allow for non-linear thinking of multiple actors and knowledges**

3 **Meet NAP requirements & achieve targets of other multilateral treaties. Sustainable and flexible results.**

1 WHAT?

2 WHY?

3 HOW?

IPACC proposes knowledge sharing platforms at the local, subnational, national and supra-national level

HOW can ITK be integrated in NAPs?

Knowledge

1 **LOCAL: Workshops & activities enabling oral knowledges to be transformed into usable data and eventually decisions**

Local data

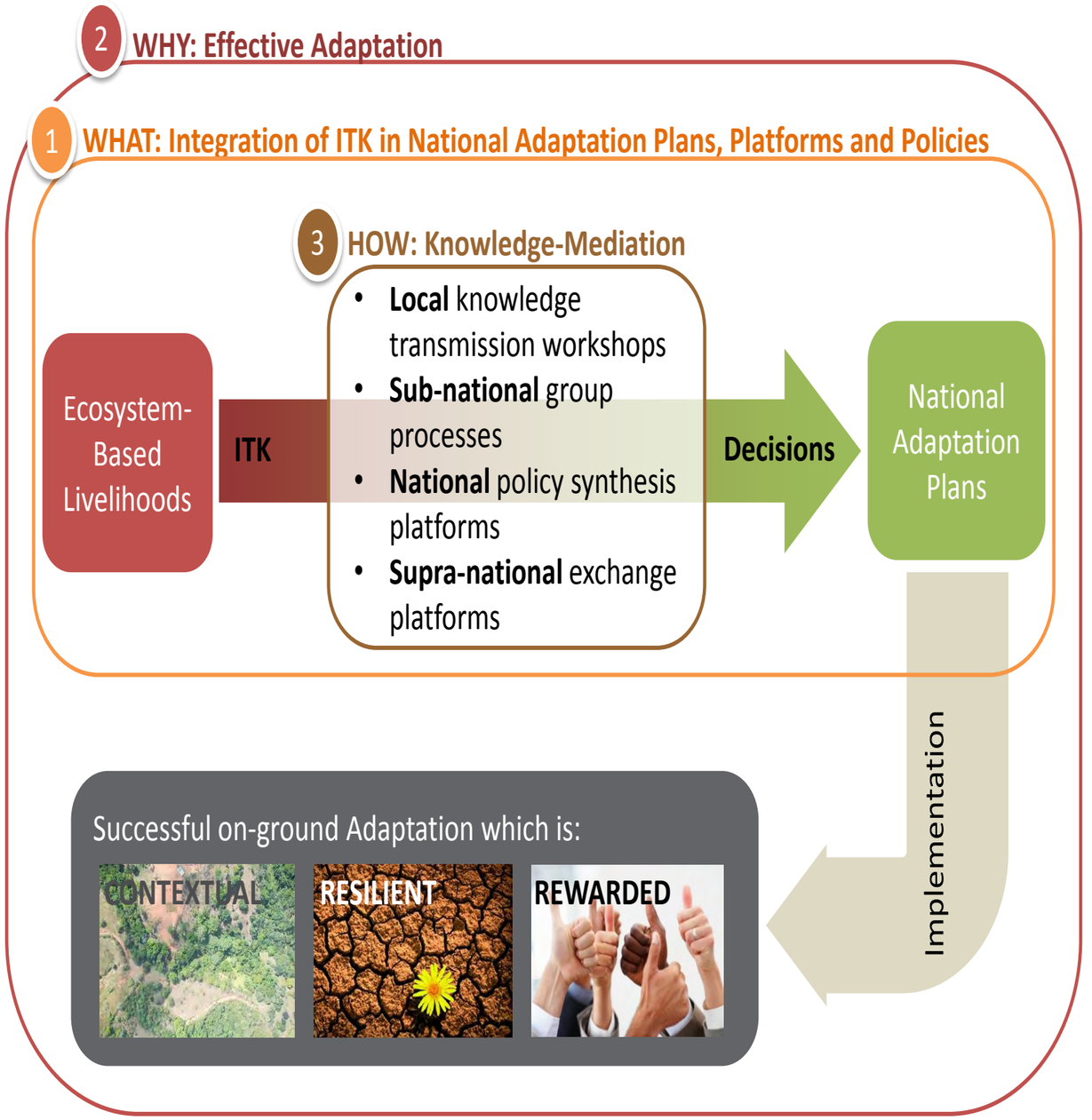
2 **SUB-NATIONAL: Group processes gathering and selecting regional-level data**

Regional data

3 **NATIONAL: Policy platforms allowing for data synthesis and direct interaction with policy-makers**

Decisions

4 **SUPRA-NATIONAL: International platform of knowledge and experience sharing**



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