Policy Brief

Key messages

Integration of Local and Traditional Knowledge (LTK) into climate services development has shown strong potential for improved local relevance, legitimacy, useability, and sustainability of climate services.

So far, LTK has not been integrated systematically into the development of climate services alongside scientific knowledge.

A fully participatory, integrated approach is needed to recognise and utilise LTK in the co-production of climate services. Meaningful investment is required.

Greater understanding of traditional indicators complements the downscaling of seasonal forecasts and improves local relevance. Co-produced forecast metrics must be demand-led, not exclusively scientifically determined.

LTK should be incorporated into the interpretation of scientific climate information and be allowed to contradict scientific forecasts without prejudice.

We take this opportunity to reaffirm the importance of listening to local community voices (language, timing, mode of communication).

This participatory, 'transdisciplinary' multi-stakeholder approach should be institutionalised at both national and sub-national levels.

Integrating diverse knowledge types in the development of climate services for improved agro-pastoral community resilience.

1. Value of integration

Climate related hazards and extreme events such as drought and flooding shape and define the livelihoods of agro-pastoral communities. These communities who live in semi-arid regions bear significant climate risk due to the frequency and severity of hazards, underdeveloped early warning systems, and local socio-economic vulnerability. There are many ongoing efforts aimed at improving climate forecasting and its use. These intiatives support livelihood resilience and climate adaptation in the face of increased climate variability and extremes; some of which have integrated Local and Traditional Knowledge (LTK) into service development, improving the relevance, legitimacy, useability, and sustainability of the service.

Relevance: There is much emergent literature across sub-Saharan Africa that highlights the value of LTK in improving the local relevance of climate forecast information and impact advisories. In Ghana for example, researchers found higher seasonal forecast skill in traditional forecast information versus scientific information at community-level.[1]

More specific to the Greater Horn of Africa (GHA), similar conclusions on improved local forecast relevance have been reached in Ethiopia [2] and by CCAFS in Tanzania. [3]

When combined with LTK of the local agro-pastoral context, the result is often the improved relevance of agro-meteorological advisories.[4] The Agricultural Climate Resilience Enhancement Initiative (ACREI) has resulted in locally specific agricultural planners for improved crop yields (ICPAC, 2019).

Legitimacy: Achieving forecast legitimacy and credibility among local communities is a common and well documented problem faced by producers of scientific forecast information.

Comparatively, traditional forecast information and local impact advisories are culturally familiar and well trusted among rural communities - the extensive use of traditional forecasts for local adaptation strategies across GHA is well documented.[5]

The conclusions of these studies point to the potential for improved legitimacy of scientific forecast information by LTK integration.

Indeed, a major outcome of the Adaptation Learning Programme (ALP) in Kenya was the improved legitimacy of local forecast information and impact advisories through the participatory integration of scientific forecast information and LTK.

Useability: Improving both relevance and

1. Gbangou et al., 2020; Nyadzi et al., 2021 2. Balehegn et al., 2019 3. Mahoo et al., 2015 4. Alexander et al., 2020; Barrett et al., 2020; Matere et al., 2020 5. Gbetibouo et al., 2017.

LTK climate indicators for Borana and Samburu communities include observing goats' intestines, sleeping positions and general behaviour of animals, characteristics exhibited by certain species of trees and flowering plants, astronomical observations of the sun, moon, and stars, wind direction and the colour of clouds and the sky, casting of cowrie shells, tossing of shoes, spanning of rope. Credit: ICPAC

legitimacy has obvious benefits to the useability of the climate service. But here we take the opportunity to highlight the potential value of LTK integration into the communication and timing of service development. For example, work done in Ethiopia and Tanzania explores the use of LTK to produce local analogies for improved understanding of forecast probability and the contextual design of improved forecast infographics.[6]

LTK integration could also result in the identification of local climate drivers that guide the siting of meteorological instruments or sensors. These would detect the atmospheric stimuli that determine the local weather and climate of the area - something which is not currently being done.

Accordingly, there is real value in investing resources into understanding and integrating LTK alongside existing scientific knowledge. By improving relevance, legitimacy and useability, we can also achieve sustainable climate services.

2. State of integration

The examples given above that show the value of LTK integration paint a rosy picture. In reality, the actual state of meaningful integration is limited and scientific knowledge is typically prioritised in forecast production and service development.

When the value of LTK is acknowledged, integration is usually done in the form of participatory workshops, focus groups, and interviews. Participatory workshops in particular offer a forum for meaningful, multi-stakeholder dialogue, engaging all relevant stakeholders on equal footing.

The Participatory Scenario Planning (PSP) approach is one example of a participatory community-based workshop. This method was pioneered by the ALP project, led by CARE International in collaboration with the National Meteorological and Hydrological Services (NMHSs) of Kenya, Ethiopia, Malawi, Ghana, and Niger. It resulted in the PSP approach being adopted in all 47 counties of Kenya for the co-production of the seasonal forecast. The PSP approach has also been used by the WMO, ICPAC, and FAO in the ACREI project in Uganda, Ethiopia, and Kenya.

The PSP provides a consensus-based platform for integrating LTK and scientific forecast information. In the institutionalised workshops held across Kenya, LTK forecast information is compared to 'scientific' downscaled county-level seasonal forecasts across metrics such as on-set dates, distribution and rainfall totals compared to past performance. Results have typically been similar, although the comparison is still based on the subjective forecast.

Though the PSP approach encourages both the use of forecasts and LTK, there is no proper integration of the two.

Therefore, there is room to establish relevant methodologies for proper integration, in line with WMO guidelines that promote objective forecasting.

To achieve this, a systematic and collaborative approach is needed to recognise the importance of transdisciplinarity, or beyond 'science' knowledge types.

3. LTK integration case study

To explore potential areas of integration of LTK with scientific forecasts information, fieldwork with LTK experts, climate scientists, and users of climate information from Isiolo County (Kenya) was carried out between March 29th - April 1st 2022. The LTK experts were from the Borana and Samburu communities. PSP workshops are hosted in the area, where LTK and scientific

6. Alexander et al., 2020; Myllynpää et al., 2019

Comparison of LTK and 'scientific' seasonal forecasts being carried out during a PSP workshop. Metrics compared include rainfall onset, rainfall totals, rainfall distribution, and climate extremes like drought and flooding. **Credit: ICPAC**

forecast information are compared to produce a consensus-based seasonal forecast. According to the County Director of Meteorology (CDM), the decentralisation of Kenya Meteorological Department (KMD) has enabled improved LTK integration and increased the access and use of climate information. However, the fieldwork conducted in Isiolo County also provided a case study highlighting the many challenges to LTK integration seen also across wider projects and literature.

4. Challenges to integration

Lack of knowledge of available LTK - little is known regarding LTK forecasting practices across the Greater Horn of Africa. [7] Communities use different contextual indicators when producing forecast information and these have not been documented systematically, limiting the understanding of LTK on local climate drivers among the scientific community and therefore the potential for integration. In Isiolo County for example, no collection of LTK indicators is done.

Lack of funding - historically there has been a significant lack of funding or resources devoted to the integration of LTK into service development across East Africa.

Interviews with the CDM in Isiolo County described the lack of both institutional mandate and resources to collect knowledge of LTK climate indicators despite real interest in doing so. The reality is that PSP workshops across Kenya are held intermittently due to of a lack of stable sponsorship that normally comes from international stakeholders.

Structural barriers - LTK forecasts are typically produced on an informal basis reliant on community triggers rather than at designated points in the calendar, something not well documented. Systematic integration is therefore harder in practice. Additionally, regional and national authorities are implementing impact-based forecasting whereas indigenous communities produce consensus-based forecast information.

Finally, **communication of forecast information** is a common problem across the region, particularly in rural agro-pastoral communities.[8]

Currently, the communication channels for LTK and scientific forecast information are not well integrated, limiting the potential for use of both knowledge types.

5. Recommendations

The potential for benefits following the integration of LTK and scientific knowledge are considerable, but there exist many challenges to doing so. The following recommendations could promote integration, improving the development of relevant, legitimate, usable, and sustainable climate services.

Improved collection and documentation of LTK of local climate indicators - this could be done through institutional mandates and/or the provision of specific funding for systematic data collection.

Integration of LTK and scientific knowledge throughout the climate service value cycle - promote meaningful and truly participatory forums for knowledge integration through all stages of service development. This includes forecast production, interpretation, communication, and feedback.

Institutionalisation of LTK integration - enable sustainable integration by empowering national and sub-national institutions to adopt the transdisciplinary production of seasonal forecast information. The decentralisation of meteorological services in Kenya is one example of a relatively good integration of LTK and provides a positive regional model to build upon.

Integration of communication channels - enable better access to diverse knowledge types by integrating the communication channels of both LTK forecast information and scientific forecast information.

Training of intermediaries - encourage the training of climate intermediaries across the value cycle of climate services to act as a bridge between LTK and scientific knowledge.

7. Ayal et al., 2015; Radeny et al., 2019 8. Hansen et al., 2011; McKune et al., 2018; Oladele et al., 2018

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About CONFER

CONFER is an EU-funded research project focusing on climate adaptation through co-production of climate services in East Africa. Our main objective is to co-develop dedicated climate services for the water, energy, and food security sectors with stakeholders and end-users, enhancing their ability to plan for and adapt to seasonal climate fluctuations. With the help of statistical and machine learning tools, we want to improve the accuracy of weather forecasting in the region, in order to reduce impacts associated with extreme weather.

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