Maintains

Research supporting social services to adapt to shocks

Climate shock responsiveness of the Kenya health system

Working Paper

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August 2020

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About Maintains

This five-year (2018–2023) operational research programme is building a strong evidence base on how health, education, nutrition, and social protection systems can respond more quickly, reliably, and effectively to changing needs during and after shocks, whilst also maintaining existing services. Maintains is working in six focal countries—Bangladesh, Ethiopia, Kenya, Pakistan, Sierra Leone, and Uganda—undertaking research to build evidence and providing technical assistance to support practical implementation. Lessons from this work will be used to inform policy and practice at both national and global levels.

Maintains is funded with UK aid from the UK government; however, the views expressed in this material do not necessarily reflect the UK government's official policies.

Acknowledgments

This working paper results from research conducted by the Centre for Humanitarian Change (CHC) for the Maintains programme, funded by the UK Department for International Development (DFID). The authors are extremely grateful to the research participants in the counties of Marsabit, Turkana, and Wajir, who contributed their time and insights to this research, and to support provided by the National Drought Management Agency (NDMA), the United Nations Children's Fund (UNICEF), Concern Worldwide, and Save the Children in the recruitment of interviewees and retrieval of secondary data. We would like to especially thank Charles Mwangi, for carrying out key informant interviews and preliminary analysis of fieldnotes, as well as our team of transcribers, and Leah Mugo, for logistical and administrative fieldwork assistance. Lastly, we are appreciative of our steering group members and Maintains' external reviewers, for their review of draft versions of the working paper, which helped strengthen the final publication. The authors bear full responsibility for any omissions and inaccuracies contained in this working paper.

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Preface

In Kenya, the Centre for Humanitarian Change (CHC), in partnership with Oxford Policy Management (OPM), is delivering demand-led and highly applied research on health and nutrition. The overarching aim of the Maintains Kenya research is to answer, and develop solutions in relation to, the question: '**How can health systems be made climate shock responsive for all?**'. To answer this overarching question, the research involves answering questions clustered into four interconnected themes: (i) health system impacts of, and responses to, climate-related shocks; (ii) early warning, and health and nutrition information systems; (iii) financing for health system shock responsiveness; and (iv) surge approaches. The Maintains Kenya objectives and methodology are described in an overarching protocol (Fortnam *et al*., 2020).

Maintains' theory of change has three components that aim to ensure the research is translated into practice:

- Component 1: Research activities to build a robust base of empirical evidence.
- Component 2: Targeted support to focal countries to help programmes to learn from the Maintains research.
- Component 3: Research uptake activities to ensure that findings inform policy and practice.

The Kenya research is action-orientated, engaging development and humanitarian practitioners, and national and local government stakeholders as collaborators, with new evidence from Component 1 feeding into Component 2 (targeted support) and Component 3 (research uptake). Component 1 research activities are organised into four work packages that cluster methods to analyse different parts of the Kenya health system, each providing data on the four research themes. This working paper presents analysis from Work Package 1, drawing on a desk review, secondary data analysis, and key informant interviews to analyse the formal health system. The exploratory findings from this study will inform and be triangulated with subsequent Maintains Kenya research, including on the informal community health system (Work Package 3).

Executive summary

The arid and semi-arid lands (ASAL) of Kenya are exposed to recurrent climate shocks, especially drought and floods, which interact with local conditions to cause food, nutrition, and water insecurity, and consequently malnutrition, morbidity, and death. Health and nutrition impacts of climate shocks are distributed unevenly in populations according to patterns of vulnerability defined by geography and social differences, such as gender, socio-economic status, disability, ethnicity, and age. The formal health system must contend with surges in demand for health and nutrition services associated with climate shocks, which are likely to intensify because of climate change, whilst meeting the different needs of these populations. Since provision of health and nutrition services in Kenya was devolved to county governments in 2013, there is an urgent need to understand how the Kenyan health system at the county level can be made more shock responsive so that services can be scaled up to meet climate-related demand surges. Shock responsiveness is determined by the use of resilience capacities to absorb variable caseloads, and to adapt and transform the health system to improve responsiveness during and across shock events.

This first working paper produced by Maintains Kenya presents exploratory research on how county-level actors prepare for and respond to climate shocks. It seeks to provide practical insights on what is working and not working for health system shock responsiveness. Specifically, it analyses experiences and perspectives in relation to recent drought and flood events in 2019 in the northern Kenyan counties of Marsabit, Turkana, and Wajir. Shock responsiveness is investigated within and across the formal health system building blocks of governance, finance, information systems, medical/nutrition products and infrastructure, and the workforce.

The key emerging messages from this analysis are the following:

- New disaster policies and laws have created county-level institutional frameworks for preparing for and responding to climate shocks in the ASAL of Kenya.
- National Drought Management Authority (NDMA) early warning bulletins are used by county government and non-governmental actors to raise awareness of and plan for climate shocks, across sectors.
- With the exception of nutrition services, national and local government does not prioritise the planning and resourcing of capacities to respond to health-related climate impacts.
- Health facilities and services remain under-funded, especially during emergencies, and thus struggle to absorb additional caseloads associated with drought. This means that frontline health staff experience increased workloads, which result in them deploying coping strategies that adversely affect their productivity and wellbeing.
- Because frontline workers are mainly women, coping strategies of working longer hours and reducing leave create additional burdens for women, on top of increased domestic workloads during drought, and reduce the time they have available to fulfil their gendered roles as caregivers, especially as many work at health facilities that are distant from their home.
- There are multiple institutions, procedures, and tools in place for shock responsiveness, but they are not being effectively put to work for health and nutrition. County policies, contingency plans, and disaster financing prioritise other sectors over health, and early

warning information does not provide specific guidance for health system decision-making and early action.

- Responses are predominantly arranged after the onset of drought and floods, frustrating early action. Bureaucratic processes and politics delay financing and action, and coordination meetings and response planning are mainly reactive rather than anticipatory.
- The health system is unable to adequately flex to accommodate surges in demand because of restricted budgets and cumbersome procedures for reallocating funds and temporarily posting staff to hotspots.
- The Integrated Management of Acute Malnutrition (IMAM) Surge approach is increasing health information system capacities, enabling health facilities and county teams to communicate and analyse malnutrition admissions data against capacity thresholds in real time, to effectively detect drought-induced spikes in caseloads early, manage resources within and between health facilities, and alert decision makers to the deteriorating nutrition situation.
- Connections between the formal health system and the informal community health system could be strengthened so that communities better participate in decision-making and share their knowledge to build trust in formal services and ensure the heath system is adapted to the specific contextual needs of communities of the ASAL.

The working paper concludes that the transition from donor-/non-governmental organisation-(NGO-) dependent emergency response to a climate shock-resilient health system is incomplete in Kenya. The ASAL face multiple shocks, overlapping in space and time, that make linear preparation, response, and recovery approaches inappropriate, yet the dominant mode of working is responding once a specific climate shock becomes an emergency, despite enhanced early warning and surveillance capacities. This is apparent in reactive rather than proactive decision-making, and financial and human resource management mechanisms. The challenge moving forward is to adapt and strengthen county mechanisms and decision-making to better include health and nutrition in shock-response arrangements, building on promising innovations such as IMAM Surge. At the same time, deeper transformative change towards a health system resilience paradigm is required, whereby the building blocks support capacities for continuous proactive absorption of and adaptation to surges and contractions in caseloads associated with the multi-shock context and highly variable climate of the ASAL, minimising the occasions when externally led emergency responses are required.

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List of acronyms and abbreviations

Aid organisations	International NGOs and United Nations agencies
ASAL	Arid and Semi-Arid Lands
CHC	Centre for Humanitarian Change
CHEW	Community Health Extension Worker
CHV	Community Health Volunteer
CIDP	County Integrated Development Plan
CSG	County Steering Group
DFID	Department for International Development
DHIS	District Health Information System
EDE	Ending Drought Emergencies
EWS	Early warning system
FEWS-Net	Famine Early Warning Systems Network
GESI	Gender equality and social inclusion
GoK	Government of Kenya
IMAM	Integrated management of acute malnutrition
IPC	Integrated Phase Classification
HSNP	Hunger Safety Net Programme
KEMSA	Kenya Medical Supplies Agency
KNBS	Kenya National Bureau Statistics
KSH	Kenya shilling
LMIS	Logistics management information system
Maintains	Maintaining Essential Services After Natural Disasters
MoH	Ministry of Health
MUAC	Mid-upper arm circumference
NDCF	National Drought Contingency Fund
NDMA	National Drought Management Authority
NGO	Non-governmental organisation

OOP	Out-of-pocket payment
RUTF	Ready-to-use therapeutic food
SMART	Standardised Monitoring and Assessment of Relief and Transitions
USAID	United States Agency for International Development
WASH	Water, sanitation, and hygiene
WHO	World Health Organization

1 Introduction

Kenya is exposed to a variety of shocks, including political and ethnic conflicts, natural hazards (such as drought, floods, and landslides), and disease outbreaks (such as cholera and the COVID-19 pandemic). The counties of the ASAL in northern Kenya are amongst the poorest nationally, with predominantly pastoral and agro-pastoralist livelihoods. The ASAL are especially vulnerable to drought and floods, which cause food, nutrition, and water insecurity, and consequently malnutrition, morbidity and death (Development Initiatives, 2017), which can lead to surges in demand for health and nutrition services. At the same time, climate shocks can affect the functioning of the health system by, for example, damaging infrastructure, increasing morbidity and malnutrition amongst health staff and their families, and overburdening financial, nutrition, and medical supplies, and human resources (Shoaf and Rotiman, 2000; World Health Organization (WHO), 2009).

With climate change likely to further intensify these events in the ASAL of Kenya (Tan *et al*., 2020), there is an urgent need to understand how the Kenyan health system can be made more responsive to climate shocks, so that services can flexibly expand to meet additional demands for health and nutrition services and protect the most vulnerable. Health and nutrition service delivery, and many shock-response responsibilities, were devolved to county governments in 2013. However, there has not been a comprehensive analysis of health system shock responsiveness at the county level until now.

This first working paper of Maintains Kenya presents exploratory research on how county-level actors prepare for and respond to climate shocks. It analyses their general experiences of, and perspectives towards, the shock responsiveness of the health system, as well as those related to recent drought and flood events in 2019, in the northern Kenyan counties of Marsabit, Turkana, and Wajir. The purpose of the working paper is to present operationally relevant findings for validation and discussion amongst key stakeholders at learning workshops. The paper does not discuss the significance of findings related to global knowledge, which will be addressed in subsequent scientific outputs.

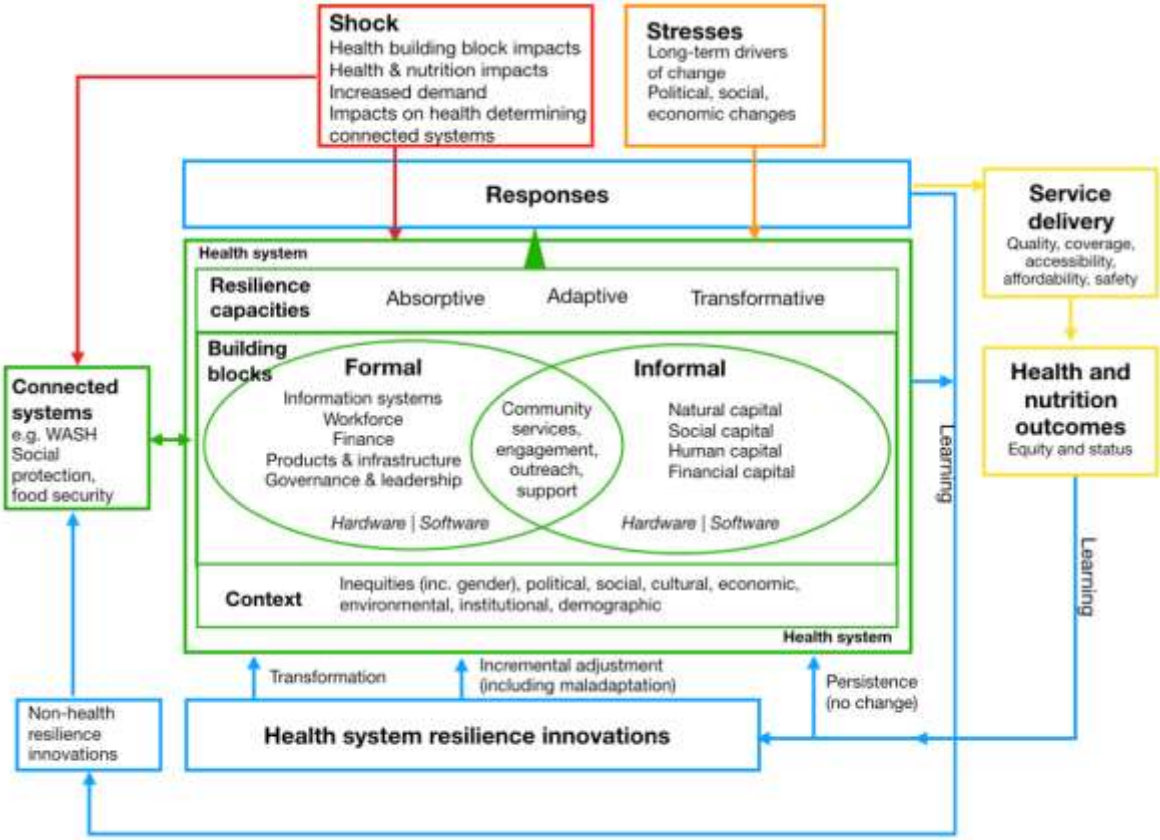
Section 2 of the paper provides background information on: health system shock responsiveness; the ASAL context, the health system, and the impacts of climate shocks; and the methods employed in the research. Section 3 reviews the timeline and food security, health, and nutrition impacts of the 2019 drought and floods, while Section 4 presents the experiences and perceptions of county actors on the responsiveness of five health system blocks: governance, finance, information systems, products and infrastructure, and the workforce. Lastly, Section 5 discusses key findings from the research in relation to building shock responsiveness into the Kenyan health system, to be taken forward in upcoming Maintains Kenya research, including on leadership, relations of trust and power, and information and finance flows in health system actor networks (Work Package 2), and on community informal community health systems (Work Package 3).

2 Background

2.1 Shock-responsive health systems

This section presents a summary of the Maintains Kenya working conceptual framework (Figure 1), further described in the research protocol (Fortnam *et al*., 2020), which adapts an overarching Maintains conceptual framework (Newton-Lewis *et al*., 2020). While the following figures and text provide a starting point for the research, it is expected to evolve throughout the programme.

Figure 1: Maintains Kenya conceptual framework



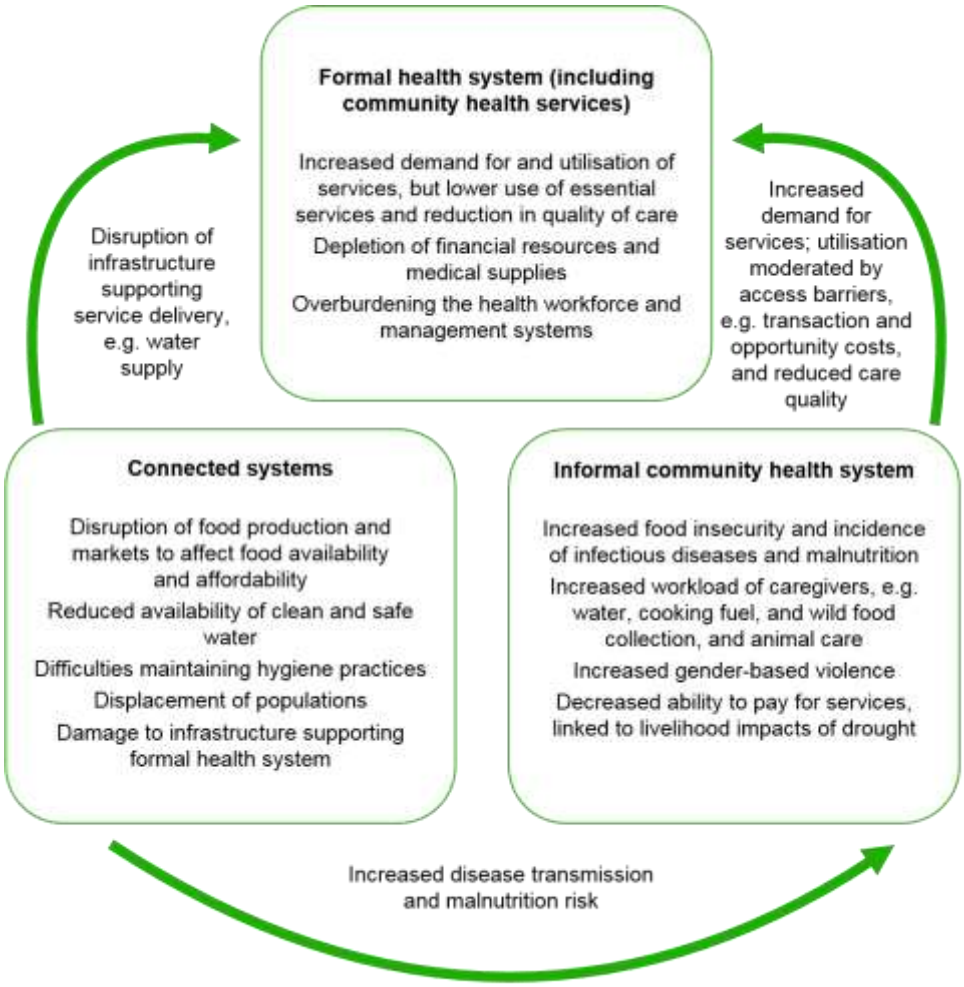
Source: Fortnam *et al.* (2020)

Three interdependent sub-systems are identified. The formal health system comprises the conventional WHO formal building blocks of: 1) service delivery; 2) health workforce; 3) information systems; 4) medical products and infrastructure; 5) finance; and 6) governance and leadership. The building blocks are supported by networks of government, non-government, and private organisations whose primary intent is to promote, restore, or maintain health (WHO, 2007). The formal health system has strong interdependencies with informal community health systems, which refers to community-based organisations, traditional medicine, and healthcare providers in households, recognising the significant contribution that community institutions and women make to the health and nutrition status of families and communities, and their vital role during times of crises, especially in places

that are remote from formal health and nutrition services. The informal and formal health systems are bridged by (formal) community health and nutrition services, such as Community Health Volunteers (CHVs) and outreach services, which can boost supply and utilisation of formal health services within communities. Connected social systems, such as water, sanitation and hygiene (WASH), education, social protection, and food security, influence the health and nutrition status of populations and moderate demand for services, as well as providing infrastructure and resources to support formal and informal health system functions.

A shock affects all parts of these systems, as Figure 2 illustrates for drought. Impacts are distributed unevenly amongst populations/workers according to social differences, such as gender, socio-economic status, disability, ethnicity, and age. For example, women are the primary caregivers in informal systems and comprise the majority of frontline staff in formal systems, and thus can experience increased workloads during shocks, which prevents them from fulfilling gendered healthcare roles and responsibilities in their household (Fatema *et al*., 2019; Geere and Hunter, 2020). Indeed, participation in responses strategies carries different burdens for different staff and volunteers in the health system, with implications for gender equity and social inclusion (GESI).

Figure 2: Drought impacts on health systems



Source: Authors

Hardware and software are found in the building blocks of health systems. Hardware can be defined as infrastructure, commodities, human resources, and finances. Software, on the other hand, can be subdivided into tangible software (such as knowledge and skills, and organisational systems and procedures), and the intangible software of values and norms, relationships, and power (Barasa *et al*., 2018a).

Shock responsiveness is defined as the ability to scale up to meet shock-related increases in demand for health and nutrition services (Newton-Lewis *et al*., 2020). Health system resilience is a broader concept that considers the capacity of the system to absorb and adapt to all kinds of change, including long-term drivers of change (e.g. environmental or social change), everyday stresses (e.g. staff absenteeism), as well as shocks such as droughts and epidemics (Gilson *et al*., 2017). Shock responsiveness is determined by resilience capacities that provide for: the proactive absorption of variable caseloads; adaptability to changing circumstances and new information during shock events; and learning from and reflecting upon past experiences of dealing with shocks to incrementally adapt over time to improve responsiveness to subsequent shocks, and/or transform the health system if the current system is ill-suited to responding to a changing shock context. With increased resilience, health actors, institutions, and populations, including those groups most at risk, can better respond to shocks (Kruk *et al*., 2017). It is important to consider ‘resilience to what?’. A system can have ‘specific resilience’ to a specific shock (Folke *et al*., 2010), such as drought, but remain vulnerable to another shock, such as COVID-19.

We propose that resilience capacities are found within and across the hardware and software of health system building blocks, and community and connected systems, and at multiple levels, from households and individual health workers up to the entire health system. These capacities can be strengthened through health system resilience innovations to improve responsiveness to future shocks (Fortnam *et al*., 2020).

This paper analyses the ‘responses’ (the blue box in Figure 1) of the formal health system building blocks (left-hand side of the health system in Figure 1) of governance, finance, information systems, medical/nutrition products and infrastructure, and workforce in the counties of Marsabit, Turkana, and Wajir in northern Kenya. The acceptable coverage or quality of the final building block, service delivery, during a shock depends on the functioning and shock responsiveness of the other building blocks. Table 1 describes the potential characteristics of these building blocks for shock responsiveness.

The key informant interviews carried out in this work package mostly revealed hardware-related capacities for shock response in the formal health system. Work Package 2 will involve actor network mapping, in which there will be a greater focus on the software components of the health system through analysis of distributed leadership and the relations between health system actors, including trust and power. The community elements of the formal health system (e.g. CHVs and private pharmacies) and the informal community health system, on the other hand, will be investigated through community-level key informant interviews and focus groups, and household surveys in Work Package 3. This working paper therefore provides a partial exploratory understanding of shock responsiveness as a starting point for forthcoming Maintains Kenya research.

Table 1: Characteristics of health system building blocks for shock responsiveness

Building block	Potential capacities for shock responsiveness
Governance	Governance can steer the other building blocks towards becoming more shock responsive. This includes a guiding legal and policy framework, coordination amongst decision-making units, and software such as social networks and trustful relations (e.g. between health actors or between state and citizens) to provide access to multiple (cognitive, material, reputational) resources that can support shock response. Leaders are important during crises as they can mobilise support for strategies, bridge diverse actors, and coordinate collective action. Intangible software, such as norms, values, and relationships, determine the political priority afforded to health during shocks, how decisions are made, and for whose benefit, and underpin collective action.
Finance	Adequate, stable, diverse, flexible, and equitable health system financing is important for responsiveness.
Information systems	Access to timely and accurate early warning and health information, integrated with other sector data, can support health systems in detecting, preparing for, and responding to shocks.
Medical/nutrition products and infrastructure	Accessibility of products and facilities, in terms of availability, proximity, and affordability, is important in order for health services to be protected and delivered at the same quality during shocks for all populations, including the most vulnerable.
Workforce	There is a need for an adequate number of motivated and committed staff, with competence and diverse skills, whose own needs are taken into account so that they are supported to effectively collaborate to deal with a shock.
Service delivery	Service delivery is contingent on the functioning of all the other building blocks. If during a shock, service delivery fails or falls below acceptable coverage or quality, the building blocks and their interactions are likely to be insufficiently shock responsive.

Sources: Ammar *et al*. (2016), Blanchet *et al*. (2017), Chamberland-Rowe *et al*. (2019), Fridell *et al*. (2020) Gilson *et al*. (2017), Hanefeld *et al*. (2018), Kamal-Yanni (2015), Swanson *et al*. (2012)

2.2 The ASAL of northern Kenya[1]

2.2.1 Context

The ASAL of Kenya account for approximately 89% of Kenya's land mass and one-third of its people, covering 23 of Kenya's 47 counties (Republic of Kenya, 2012a). The defining characteristic of the ASAL are their aridity, with rainfall ranging between 150 mm and 550 mm annually, with significant seasonal and interannual climate variability and extremes, which result in drought and floods (see below) (Government of Kenya (GoK), 2015). Table 2 illustrates how the ASAL counties of Marsabit, Turkana, and Wajir, the case study counties for this research, perform worse on most socio-economic, health, and nutrition indicators than national averages. All three counties have some of the highest poverty rates nationwide (Turkana has the highest rates). Pastoralism is the dominant livelihood in the arid lands,

[1] The content of this section summarises content from the Maintains Kenya and Uganda overarching research protocol, where a full description of the health system and climate shocks can be found.

while agro-pastoralism is most common in the semi-arid lands of the case study counties (Munene, 2019; Turkana County Government, 2019). The mobility of pastoralists has enabled them to cope with climate variability and associated fluctuations in water availability and pasture over thousands of years, but there is a trend towards sedentarisation and farming due to insecurity, the degradation of pastures, and national policy incentives, such as food aid and provision of social services (Njoka *et al*., 2016).

The three counties are prone to conflict. Violent clashes between pastoralist nomads are common as a result of conflict over scarce pasture and water resources, and cross-border tensions. Pastoral households and communities have strongly defined gender roles and responsibilities, with the society being strongly patriarchal. Women have key responsibilities for livestock-keeping, income generation, and childcare, but have limited control over productive resources, such as livestock and land, and lack access to healthcare, family planning, and education (Dometita, 2017). Women have sole responsibility for firewood and water collection, and therefore drought increases their workload by forcing them to travel further to source water (Munene, 2019).

Table 2: Kenya and case county socio-economic, health, and nutrition indicators

Socio-economic, health, and nutrition indicators	Marsabit	Turkana	Wajir	National average
Population	316,000	1,084,000	459,000	52,573,973
% population pastoralists	81	60	68	N.d.
% population agro-pastoralists	16	20	N.d.	N.d.
% overall poverty estimates, households (% hardcore poverty)	55.8 (20.4)	70.8 (43.6)	54.6 (8.8)	27.4 (6)
% food poverty, households (%)	46.3	55.9	35.1	23.8
% population literate	37.8	39.6	35.8	84.5
% households receive cash transfers	38.7	64.2	36.2	33.5
% population sick/injured	6.1	23	6.5	21.5
% children that have had diarrhoea	4.1	8.7	2.1	8.5
Undernourished children (6–59 months), weight-for-age, % below -2SD	30.9	25.5	16.1	13

Sources: Kenya National Bureau of Statistics (KNBS) (2018a, 2018b), Munene (2019), County Government of Turkana (2019); N.d (no data available)

2.2.2 Health and nutrition

Since 2013, devolution of decision-making power to the 47 county governments in Kenya has made county officials responsible for health and nutrition service delivery, while the national government has retained responsibility for health policy and regulations. Healthcare is organised into four tiers: community (Tier 1); primary care, including dispensaries, health facilities, and clinics (Tier 2); secondary referral county hospitals (Tier 3); and tertiary referral national hospitals (Tier 4). CHVs act as a link between the community and health facilities.

CHVs live in the community and are organised into community units supervised by Community Health Extension Workers (CHEWs) from Tier 2 health facilities. Other health extension work is managed through an outreach system staffed by health facility staff, with support from CHVs to deliver Expanded Programme on Immunization (EPI) services or integrated services, including nutrition programming, to communities distant from health facilities (Odhiambo, 2013).

Improvements have been achieved in the quality of health services nationally (Yarow *et al*., 2019), but the northern ASAL remain under-serviced. The health system in the three case study counties is beset by challenges, including a shortage of health workers, infrastructure, supplies and equipment, poor health worker competencies, and weak community and referral systems. The vastness of these counties and the remoteness of many communities means that some populations receive little to no formal health services. GoK spends about US$ 2.7 billion on healthcare annually (Appleford and RamaRao, 2019), or about 2.2% of GDP, below the 5% recommended to progress towards universal health coverage (Meheus and McIntyre, 2017). Private and public health insurance coverage is low, so there remains a dependence on out-of-pocket payments (OOPs) for a quarter of total health expenditure (Barasa *et al*., 2018b).

There has been some general improvement in the Kenyan population's health and nutrition status in recent years due to several national policy reforms, and improvements in government health and nutrition programmes, with support from international partners. The Ministry of Health (MoH) national policy calls for universal access to high-impact nutrition interventions to be achieved through the delivery of a comprehensive package of nutrition services. For example, in the ASAL, IMAM programming, including in the three case study counties, emphasises working in partnership with NGOs and CHVs to manage acute malnutrition in children under five years and pregnant and lactating women.

Despite these efforts, malnutrition (chronic and acute) remains stubbornly high in the northern ASAL. Marsabit, Turkana, and Wajir have some of the highest malnutrition rates in Kenya (Table 2). Standardised Monitoring and Assessment of Relief and Transitions (SMART) Nutrition Surveys in 2019 found that Marsabit, Turkana, and Wajir had global acute malnutrition prevalences of 18%, 25.6%, and 16.4%, respectively; Turkana has the highest global acute malnutrition prevalence of any county in Kenya (Munene, 2019; Turkana County Government, 2019; Wajir County Government, 2019). The nutrition status of populations in the ASAL varies by season, but recurrent droughts, high costs of domestic food production, global food price volatility, low purchasing power, and displacement have all contributed to lower health and nutrition statuses (United States Agency for International Development (USAID), 2018a). Families tend to have low dietary diversity, especially for women and children, and poor child care practices. Common to Kenyan ASAL counties (Wayua, 2017), the case study counties also have a high disease burden, especially malaria, respiratory tract infections, and diarrhoea. Waterborne diseases are common due to poor hygiene and sanitation, and the lack of safe drinking water (Munene, 2019). Cholera remains endemic, and while prevention and control of malaria has improved nationally, incidence in the ASAL remains high (WHO, 2017).

2.2.3 Climate shocks and climate change

The ASAL are prone to numerous shocks, including political and ethnic conflicts, and slow-onset (e.g. droughts) and rapid-onset natural hazards (e.g. floods, landslides/mudslides, and disease outbreaks). The north and eastern ASAL are particularly vulnerable to drought, with greater than a 40% annual probability of moderate to severe drought during the rainy season (USAID, 2018b). There were 12 droughts in Kenya between 1990 and 2019, each affecting about 4.8 million people on average (GoK, 2018a). Flood events occur more frequently but tend to be less severe and affect fewer people. Between 1990 and 2015 there were 43 flood disasters, each affecting 68,000 people on average (GoK, 2018a). The global and regional climate phenomena of El Niño Southern Oscillation (ENSO) and the Western Indian Ocean Dipole influence monthly and seasonal rainfall patterns in East Africa. El Niño episodes have tended to increase rainfall and cause widespread flooding, while La Niña events have been associated with drought (Li *et al*., 2016; Mutemi, 2003; Muthama *et al*., 2014).

Changes in rainfall and temperature patterns have been observed in Kenya since the 1960s, with seasonal rainfall becoming increasingly irregular and unpredictable. The ASAL have experienced significant temperature rises and greater rainfall in the October and December short rains, while rainfall has declined and become less reliable during the long rains (March to June) (Ouma *et al*., 2018). The frequency of droughts has increased from once in every 10 years in the 1960/70s to every two to three years in the 1990s (Huho and Mugalavai 2010; Nkedianye *et al.* 2011). Nowadays, every year tends to have at least seasonal extreme dry periods. Moreover, a recent study of projections of drought events in Kenya shows that the occurrence of severe to extreme drought is likely to intensify in the near future, with the northeast ASAL identified as a hotspot (Tan *et al*., 2020).

2.2.4 Health and nutrition impacts of climate shocks

Malnutrition is one of the key areas of concern during drought, particularly for women of reproductive age, adolescents, children, and the elderly. Recent studies have indicated that temperature variation and vegetation cover had the strongest association with child malnutrition compared to other risk factors (e.g. poverty, illiteracy) in the ASAL of Kenya (Harrison *et al*. 2017, Bauer and Mburu, 2017). A one-unit increase in temperature was associated with a 31% increase in malnutrition by Harrison *et al*. (2017). Drought-related malnutrition in the ASAL is linked to food insecurity due to higher food prices, livestock mortality, and worsened terms of trade, and lower household incomes and household production, which results in a higher number of households being unable to meet their minimum dietary needs. Milk plays an important positive role in the diet of most children in the ASAL. Because milk production is timed to coincide with the seasonal rains, when animal foods are most available, poor or failed rainy seasons reduce livestock conception and births, and consequently milk availability. As a result, malnutrition incidence worsens (Sadler *et al*., 2010). Further causal factors for malnutrition associated with drought include: poor access to affordable safe drinking water and food, especially age-specific foods for children 6–36 months; less time for feeding children due to women having to travel further to collect water, fuel, and wild foods; and women often sacrificing their dietary intake for children to eat, and skipping and reducing the size of meals (Dometita, 2017). Indeed, malnutrition tends to affect child, women, and maternal health most (Manners *et al*., 2015). With less time and income available, families must consider the opportunity costs of

spending time and money utilising formal health and nutrition services. Droughts can also increase the transmission of waterborne diseases as access to improved water sources often declines as water availability and affordability reduces, forcing humans to share water sources with animals, which leads to the consumption of unclean water (Balfour and Mutuku, 2018; Marshak *et al*., 2017).

Floods in Kenya cause disease outbreaks, such as malaria, typhoid, Rift Valley fever, dysentery, and cholera; increase demand for health services; and disrupt access for both staff and patients to health facilities by damaging transport and medical infrastructure. During severe flooding, temporary food shortages frequently arise due to displacement and loss of food stocks, and households may experience food insecurity beyond the flood period due to crop damage. Impacts on production and incomes can reduce households' ability to provide nutritious food for children, maintain care and feeding practices, and purchase safe water, which tends to increase in cost. It can also reduce the affordability of OOPs for health and nutrition services, including transport costs and the purchase of drugs from private pharmacies if drugs are out of stock at the health facility[2]. Additionally, livestock disease outbreaks and livestock mortality after periods of heavy rain have an indirect impact on nutrition due to loss of milk production and income.

2.3 National arrangements for shock response

GoK has a well-developed legal and policy framework aimed at addressing climate risks and disasters. Resilience programming and disaster risk management are a key component of the national Medium-Term Development Plan III (2018–2022) (GoK, 2018a) and the national Ending Drought Emergencies (EDE) Framework (GoK, 2014). The EDE has an integrated focus on basic social services, including health and nutrition, and on strengthening systems to respond before a full-scale emergency arises (Dolan and Shoham, 2017). It identifies gender and diversity as a cross-cutting issue but GESI does not appear to be integrated into the framework itself.

Since a major drought in 2005/06, efforts have been made to transition from international aid support towards government-led disaster response, social protection (the Hunger Safety Net Programme (HSNP)), and early warning systems (EWSs). Under the Kenya Constitution (2010), disaster management is a shared function of both the national and county governments. Guided by the EDE, the NDMA, a statutory body, has offices at the county level, headed by drought monitoring officers, who are responsible for the coordination of drought risk reduction, preparedness, and response, working in partnership with the county government and international aid organisations (Section 4.1). The NDMA operates a sophisticated drought monitoring system, developed over the past 20 years, that uses surveillance sites (up to nine in each county) and remote sensing to generate a monthly early warning bulletin (Section 4.3).

Funding for disaster management in Kenya (Section 4.2) comes from international aid, county government budgets, and national disaster funds, among others. Kenya has a National Drought Emergency Fund, managed by the NDMA, and more recently has put in place a national Disaster Risk Financing Strategy (GoK, 2018) to develop pre-arranged financing, but it is yet to be fully implemented. County governments are permitted to retain

[2] This will be investigated in community-level research in Work Package 3 of Maintains Kenya.

up to 2% of their annual budget as a County Emergency Fund to be drawn upon to respond to 'unexpected events' (see Section 4.2). In addition, the Kenya HSNP, a social protection programme, provides regular unconditional cash transfers to 100,000 households in Marsabit, Mandera, Turkana, and Wajir, and emergency payments are made to vulnerable households not benefiting from regular transfers during severe and extreme drought, when specific crisis indicators are triggered (Merttens *et al*., 2013). The role of the HSNP in supporting household spending on health and nutrition services is not addressed in this working paper, but will be investigated in subsequent community and household-level research (Work Package 3).

A severe drought emergency in 2016/17 came soon after devolution in 2013, which meant that county governments took more of a lead in the response than they did during previous events. The response was assessed to be a significant improvement on the previous response to a severe drought in 2010/11, which was attributed to the scale-up of IMAM, stronger government leadership, devolution to counties, initial implementation of the EDE, and scalable social protection (Dolan and Shoham, 2017). In addition, the response was thought to have been improved by the roll-out in the ASAL of the IMAM Surge approach, which involves health facilities setting thresholds for acute malnutrition caseloads, monitoring caseloads against these, and actioning internal health facility plans and/or seeking additional resources (such as medical/nutrition products) from higher levels when thresholds are crossed.

To date, there has been limited analysis of how the disaster and climate institutional arrangements in Kenya support health system shock responsiveness and resilience. Devolved county structures provide for pre-crisis planning and early response to meet local needs without having to wait for national or emergency responses, but it is unclear how central health and nutrition concerns are in responses. The research presented in this working paper provides the first exploratory analysis of the capacities and challenges for shock response within the health system in Kenya.

2.4 Methods

The Maintains Kenya and Uganda Research Protocol details the methodology of the programme of research in Kenya on shock-responsive health systems across four work packages. This working paper draws from Work Package 1, which primarily researches the formal health system using a desk review, secondary data analysis, and key informant interviews. Work Package 2 will investigate some of the issues raised in this working paper in more depth through participatory methods that will enable participants to reflect on findings and devise solutions. Work Package 3 will then focus on community elements of the formal health system and the informal community health system, which, as this paper begins to demonstrate, is likely to be a critical component of health system shock responsiveness in the context of remote and migratory communities in the ASAL of Kenya.

Data collection was undertaken in January and February 2020, providing the opportunity to explore how devolved governance and the transition from a humanitarian to a government-led response performed in 2019, and the progress that has been made since evaluations of responses to the 2016–17 droughts were carried out. 56 interviews with single individuals and five interviews with multiple interviewees were conducted in Marsabit, Turkana, and

Wajir at county and sub-county level (Table 3). The interview guide was semi-structured to enable a conversational, exploratory discussion of health system shock responsiveness. In order to capture the contemporary rather than past capacities for shock response, interviewees were asked questions about responses to the most recent climate shocks in the ASAL – drought and floods in 2019, which are described in Section 3.

Interviews were undertaken by a gender-balanced team at the county level, with county-/district- and sub-county-level health, nutrition, and social protection officers, health facility staff, and aid organisation (United Nations/NGO) staff (Table 3). Some Sub-County Health Teams were interviewed as a group, at the request of participants. At the health facility level, 'facility in charge' nurses and CHEW nutritionists, who are at the frontline of delivery, were interviewed. Categories of interviewee were selected based on field knowledge of the research team and consultations with Maintains partners. To account for the potential incompleteness of the stakeholder list, snowballing sampling was employed, whereby participants were asked to recommend other relevant stakeholders for interview. Table 3 presents a breakdown of county interviewees by gender and position. It shows that 82% of those interviewed at county level were men, indicating that women are underrepresented in senior county-level positions, except as county nutrition coordinators. At the health facility level, CHEW nutritionists were mainly women, while most 'facility in charges', the most senior health facility position, were men. CHVs will be interviewed during community-level research in Work Package 3.

Table 3: Interviewees by position, gender, and level

Interviewee position	Total	Female	Male
County level	32	7	25
County drought coordinator, drought information officer or response officer	3	0	3
County director disaster management and humanitarian coordination/ county planning director[1]	2	0	2
County director ministry of health	1	0	1
County director of public health	2	0	2
County nutrition coordinator	2	2	0
Human resource officer	1	1	0
UN/NGO programme director, manager, or officer	11	2	9
UN/NGO nutrition officer	7	2	5
UN/NGO group of programme managers and/or nutrition officers[2]	3	N/A	N/A
Sub-county level	11	5	4
Sub-county deputy public health nurse	1	1	0
Sub-county nutrition coordinator	4	2	2
Sub-county public health nurse	1	0	1
Sub-county medical officer for health	3	2	1

Sub-county medical team (group)[1]	2	N/A	N/A
Health facility level	18	10	8
Facility in charge	8	3	5
Nurse or patient attendant	2	1	1
CHEW nutritionist	8	6	2
Total individuals	56	22	34
Total groups	5	N/A	N/A

Source: Authors

Notes: [1] County Planning Director assumed the role of County Director Disaster Management and Humanitarian Coordination in Marsabit; [2]Some participants were interviewed as a group.

Verbatim transcripts of audio recordings were analysed in the qualitative analysis software NVivo 12, using a 'flexible coding' approach that combines inductive and deductive coding (Deterding and Waters, 2018). This involved index coding by health system building blocks before conducting analytical coding within each of the index codes inductively to develop a framework of the thematic ideas presented in this working paper.

Whenever possible, claims made by interviewees were triangulated through document analysis (e.g. referring to disaster policies) and analysis of secondary data (e.g. financial data when available), which is still ongoing. The intention of the analysis was not to evaluate or compare counties but to analyse the experiences and perspectives of key county and sub-county actors. The research is intended to be exploratory, providing insights and recommendations from the mouths of practitioners to take forward further in Maintains Kenya. The research received ethical approval from Pwani University Ethics Board (ERC/EXT/001/2020) and followed best practice regarding ethical considerations, as outlined in Section 5.9 of the research protocol (Fortnam *et al*., 2020).

3 Climate shocks in Kenya in 2019

Section 4 presents the experiences and perspectives of county actors in relation to the shock responsiveness of the Kenya health system. The examples provided by respondents relate to drought and floods experienced in 2019, the most recent climate shocks experienced in the northern ASAL at the time of data collection (January–February 2020). This section presents analysis of early warning bulletin information and secondary data analysis of health facility admissions in Marsabit, Turkana, and Wajir during this period.

3.1 Climate variability and food security

Parts of Kenya experienced drier than usual conditions and delayed rains in 2018–19. The 2018 short rains (October to December) were reported as being normal or above normal in many parts of the country, but below average in localised areas of Turkana, Wajir, and Marsabit (FEWSNET, 2019a). An extremely dry period emerged in the north and northeast of Kenya by the end of 2018 and early months of 2019, and the expected relief from the long rains did not arrive until later than normal. When they did arrive, the long rains were intermittent and below average. In Marsabit, Turkana, and Wajir, the onset of the long rains was delayed from around February–March until April–May 2019. The deficient performance of the short rains and the subsequent delayed onset of the long rains therefore caused a long dry period between January and April–May 2019 in the ASAL counties. Figure 3 shows that Marsabit and Wajir were classified as NDMA Early Warning Drought Alarm Phase from March through to September 2019, while this phase was recorded for Turkana in March and April 2019; these phases are designated based on analysis of multiple indicators from remote sensing and surveillance sites. The onset of the short rains in 2019 saw a dramatic shift in the amount of rainfall. The Famine Early Warning Systems Network (FEWSNET, 2020) reported October 2019 as the wettest month on record nationally since 1981. Above-average rainfall and localised flooding was experienced in all three counties. According to UNICEF (2020), 78,624 households were affected by the floods.

In terms of food security, the impact of rainfall deficits in respect of the 2018 short rains was less than might be expected because of the residual effects of good long rains earlier in 2018, according to FEWSNET bulletins. However, during the subsequent extended dry period in early 2019, FEWSNET indicated a deterioration in the situation from Stressed (Integrated Phase Classification (IPC) 2) across the three counties in January 2019 to Crisis Phase (IPC 3) in northern Turkana, Marsabit, and south Wajir in June 2019, and then to Crisis phase across the three counties in October 2019. This dry period also caused water insecurity in the ASAL counties as most open water sources dried up and strategic boreholes broke down due to over-use, which significantly increased average distances to water points. At this time, crop yields were estimated to be 15-25% below average (FEWSNET, 2019b). The Long Rains Assessment of August 2019 (Kenya Food Security Steering Group, KFSSG, 2019) concluded that the food security situation had significantly worsened, particularly in pastoralist areas.

3.2 Health and nutrition impacts

The nutrition situation during the long rains of 2019 in the ASAL counties was significantly worse than in the same period in 2018. According to FEWSNET (2019b), prevalence of global acute malnutrition reached Extremely Critical or Critical phases in Turkana, Marsabit, and Wajir. However, analysis of District Health Information System (DHIS) admissions data paints a more nuanced picture of severe acute malnutrition admissions at health facilities in the three counties. Figure 4 shows how severe acute malnutrition admissions in 2019 were above 2011–2019 averages[3] from March through to November in Turkana, and from May to September in Marsabit, but below or near average throughout 2019 in Wajir[4]. UNICEF (2020) analysis, however, found that, nationally, the number of acutely malnourished children increased from 582,934 in February 2019 to 665,440 by the end 2019.

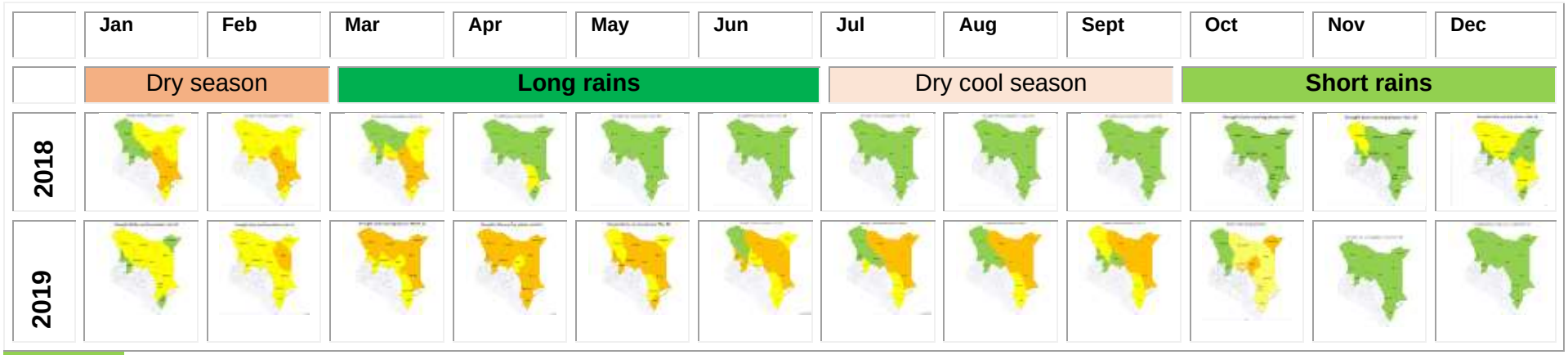
This mixed picture of the relationships between rainy season performance, estimates of the severity of food insecurity, survey-generated estimates of global acute malnutrition prevalence, and changes in health facility admissions for acute malnutrition indicates that the impact of drought on health system demand for nutrition services is complex and there is not a straightforward relationship between rain failures and utilisation of nutrition services. For admissions relating to drought- and flood-associated diseases, the picture is even more variable across the counties. Visual analysis of plots of malaria, respiratory diseases, diarrhoea, and dysentery incidence (Annex A) does not show any obvious association or trends across the counties. However, UNICEF (2020) reported over 5,150 cases of cholera in 2019, and their analysis shows an escalation in cases during flooding seasons in Kenya.

While this descriptive analysis at the county level cannot identify the extent to which climate variability drove malnutrition and morbidity admissions trends, and thus utilisation of health and nutrition services at the health facility level, the significant seasonal and interannual variability in admissions demonstrates how the counties had to manage spikes in caseloads across 2018–19, as demonstrated in Figure 4 for malnutrition. Ongoing Maintains Kenya research is analysing the statistical significance of relationships between climate and vegetation cover indicators and malnutrition and morbidity admissions data to understand the degree to which climate variability explains health and nutrition service utilisation compared to other factors. Clearly, many factors determine utilisation, beyond a climate stressor, including health service access barriers, such as the affordability of health services or the opportunity cost of women's time seeking healthcare when their workloads have been exacerbated by the climate shock itself.

[3] Nutrition and morbidity admissions data are only available from 2011 from the DHIS; this nine-year average is likely to have been affected by the scale-up in the availability of health and nutrition services as a result of devolution starting in late 2013.

[4] The severe acute malnutrition admissions data used in the graphs are obtained from DHIS and curated by UNICEF. The data have been cleaned but it is likely that there are still issues with some of the monthly admissions records.

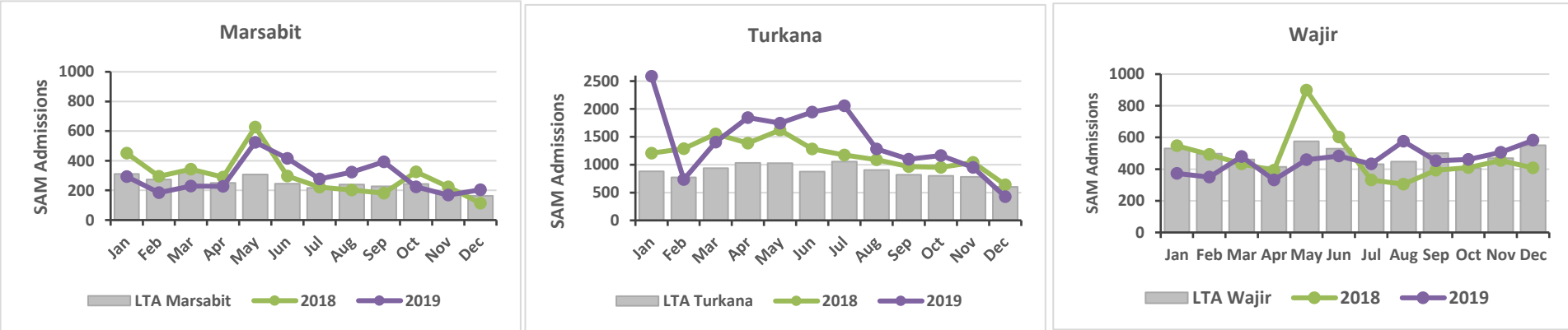
Figure 3: Drought early warning phases in Kenya ASAL, 2018–2019



Data source: NDMA early warning bulletins, https://ndma.go.ke

	Normal	**Normal activity**
	Alert	**Early mitigation measures**
	Alarm	**Dealing with impact of drought**

Figure 4: Severe acute malnutrition admissions in Marsabit, Turkana, and Wajir (2018–2019)



Data source: MoH DHIS, https://hiskenya.org/

4 County building blocks for shock response

This section presents the results of interviews with county-level actors in Marsabit, Turkana, and Wajir in regard to the current capacities and challenges of each health system building block for shock responsiveness. Where possible, perceptions are triangulated with document and secondary data analysis. While the results capture perspectives on building block responses to climate shocks in general, illustrative examples are provided from the recent series of climate shocks in 2019 (Section 3).

4.1 Governance and leadership

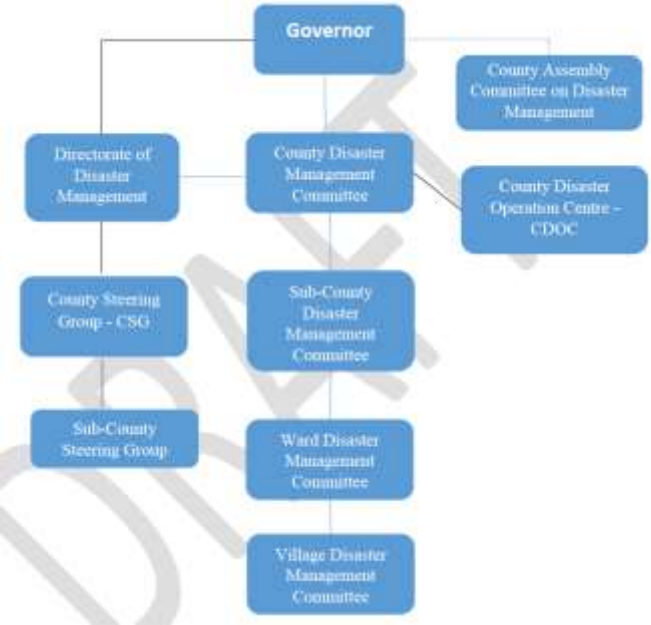
County government-led coordination of drought response has improved because of new county governance arrangements developed since devolution (Table 4). In recent years, the counties have established and operationalised, to varying degrees, Directorates of Disaster Management, and Disaster Management Committees at each governance level, from county down to ward level (Figure 5).

Health and nutrition responses are included as one component of contingency and response plans, and the sector is represented in county coordinative institutions, such as county steering groups (CSGs), by MoH County Coordinators. These coordinators work with sub-county coordinators and aid organisations to organise health facility, outreach, and community health service preparations for and responses to surges in caseloads, including ordering and prepositioning medical and nutrition products at health facilities and depots within the county (Section 4.4). Drought usually triggers a scale-up of integrated health and nutrition outreach sites, whereby nutritionists, health professionals, and CHVs are mobilised to deliver services to communities that are not served by a health facility. At the sub-county level, in addition to disaster management committees, mobile technologies, especially WhatsApp, are used to coordinate actions by health and nutrition actors, and amongst health facility staff.

Several coordinative benefits have been realised by the institutions in Table 4, including: (i) the engagement of an increased number of stakeholders, sectors, and programmes in shock response; (ii) improved cross-sector coordination and sharing of early warning information amongst line ministries and aid organisations through CSGs during emergencies; (iii) stronger coordination between the MoH and aid organisations; (iv) increased sharing of information from field observations and monitoring and evaluation activities; (v) the provision of a central point where existing and new partners can receive answers to their queries; and vi) greater certainty for government and aid actors regarding their roles and responsibilities. Some participants credited the coordinative mechanisms for the improved response timeliness during the 2019 climate shocks compared to previous droughts:

> *'The response for those other years was slow, that's why you will find such a number of children have died because of malnutrition. But from 2018–2019, cases went down just because the response was immediate; they see the [early warning bulletin] alarm stage, they respond.' NGO programme officer, Turkana*

Figure 5: Turkana County disaster management hierarchy



Source: County Government of Turkana (2018)

Table 4: Key county institutional arrangements for shock response

Institutional arrangements	Relevance to health system shock response
Five-year County Integrated Development Plans (CIDPs) (2018–2022) (in all three counties[1])	Guide county development activities and inform the allocation of budgets in each county, including for health and nutrition; identify climate shocks as key development challenges (but limited connections made to health and nutrition).
County disaster risk management policies (Wajir, 2014; Turkana, 2017; and Marsabit 2018)	Approved by the county assemblies, the policies seek to reduce vulnerability to disasters, and increase preparedness for response and recovery, with accompanying legislation defining the roles and responsibilities of various actors and coordinative institutions for emergency preparedness and response.
Directorate of Disaster Management and Humanitarian Coordination	A relatively new structure, with varying degrees of capacity, power, and functionality across the three counties. Responsible for addressing and managing all disaster needs in the county.
CSG	Comprise directors and focal technical officers of line ministries, United Nations agencies, NGOs and other relevant stakeholders. Chaired by the County Governor or delegate. NDMA often acts as the secretariat.
County Disaster Management Committee	Membership includes the County Executive and other senior county officials and representatives of humanitarian agencies. Chaired by the Governor. Provides policy guidance for the management of disasters.
Contingency plans[2] (Marsabit, 2018; Turkana, 2018; Wajir, 2018)	Outline the responsibilities of different actors during the NDMA early warning drought phases – Alert, Alarm, and Emergency. The plans are multi-sectoral, with technical staff from each county ministry

	(including health) contributing a component, with the NDMA facilitating their preparation.
Response plans	When a natural hazard is expected, response plans are drafted based on the provisions in the contingency plan and available information (e.g. NDMA early warning bulletins).

Secondary sources: 1. County Government of Marsabit (2018), County Government of Turkana (2018), County Government of Wajir (2018); 2. NDMA (2018a, 2018b), NDMA (2019)

Notes: The institutions in the table were discussed by participants in the research. Those highlighted in the organogram in Figure 5 but missing from this table are likely to be planned but inactive.

While these experiences suggest coordination has improved, **it was suggested that translating plans into sectoral action is problematic.** For the 2019 drought and floods, the research team only retrieved one county response plan, despite multiple enquiries, suggesting the plans are not widely used or available**. Lack of county government leadership was identified as a barrier to actioning plans**. The NDMA was identified by many respondents as leading coordinative activities by convening CSGs and bridging diverse government and non-governmental actors. However, the implementation of actions included in contingency and response plans depends on the cooperation of county government line ministries, over which the NDMA has no authority. Some respondents reported that this resulted in many actions agreed in response plans and at CSGs not being implemented:

> *'[The NDMA] don't have control of the ministries… county government can promise that they are going to do something in a meeting, come the next meeting they will still have not done it, and will keep saying they are doing it… this leaves the hands of NDMA tied'.* (Anonymous male, county-level, Wajir)

The creation of Disaster and Humanitarian Coordination Directorates to better coordinate responses within county governments was not said to have diminished the collaborative leadership role of the NDMA, which normally is the *de facto* chair of the CSG for drought response when an emergency is declared, rather than the official chair, the County Governor. However, some respondents felt that the county government needed to lead in future because it '*has the stamping authority that we are in control of the business'* (male UN/NGO nutrition officer, Wajir). In Turkana, a male UN/NGO nutrition officer said that in 2019 '*a powerful person from county government led the whole [emergency response] process*', and this made the response 'good'. It was not clear who this was or why it was 'good', but it seems there is interest in building stronger county government leadership of emergency response.

Tensions between the various parts of the drought response architecture were reported. For example, some attributed the lack of sectoral action to the **expectation that the NDMA, Disaster and Humanitarian Directorate, and aid organisations would lead and initiate responses, rather than sectoral line ministries taking responsibility themselves**. An MoH official admitted a tendency to focus on emergency planning and preparedness for disease outbreaks, rather than for climate shocks. Within county drought coordinative institutions, nutrition may also be better represented by the MoH than other health issues. All three counties have a Nutrition Support Officer seconded by UNICEF to support the county nutrition coordinator. These officers are sometimes designated as the only MoH

representative on the CSG. This may reflect the perception that malnutrition is associated with drought more strongly than morbidity and other health issues in the MoH, and that the nutrition sector is well organised through County Nutrition Technical Forums. Consequently, **MoH preparedness activities, response plans, and response activities usually focus on certain nutrition services,** especially services related to IMAM, while supporting outreach services are led by aid organisations.

The lack of sectoral action may also be linked to an **under-representation of health and nutrition in the sections of the CIDP that deal with climate-related disasters/emergencies.** A review of the CIDPs found that drought is principally considered to be a concern for livestock and crop production, social protection, resource conflict, and, to a lesser extent, water management. For health emergencies, the CIDPs primarily refer to outbreaks of infectious diseases, such as malaria, cholera, or Rift Valley fever, with only the Marsabit CIDP linking drought or other natural hazards to the health and nutrition sector.

The health and nutrition sections of the contingency plans in the three counties (NDMA, 2019, 2018a, 2018b) outline response strategies for different phases of a drought, but these are primarily nutrition and WASH activities: there are no responses aimed at supporting health facilities to absorb surges in common morbidities admissions. This may follow from the use of nutrition and WASH thresholds, namely percentage of the population below mid-upper arm circumference (MUAC) and milk consumption thresholds, to trigger response actions under the plans. Marsabit, however, does have cases of diarrhoea and emergency diseases (e.g. Rift Valley fever) as indicators for triggering actions, such as surveillance in hotspots and mobilisation of WASH interventions. Furthermore, the roles and responsibilities of the MoH are poorly defined in the disaster risk management policies of the three counties, beyond addressing infectious disease outbreaks, and the MoH is not identified as being responsible for drought contingency plans. Instead, this responsibility is assigned to the NDMA in Turkana, the Directorate of Disaster Management in Wajir, and the Ministry of Agriculture, Livestock and Fisheries in Marsabit. Health, it seems, is not prioritised in the county institutional frameworks for climate shock response.

Vertical coordination between county and national governments was considered, by research participants, to be strained under the devolved arrangements. For health, a county government respondent said that there was '*no clear structure'* for reporting about disaster activities to the national MoH, and that *'decisions are made [by the national government] with no regard to or consultation with the county government*', while an MoH official said '*there is poor coordination between the two levels of government because of replication of roles, and antagonism'.* These collaborative issues may be affecting the timeliness of releases of finance for disaster response from national-level sources, such as the NDMA Drought Contingency Fund, discussed further under the finance sub-section below (Section 4.2).

Vertical linkages from the community to the sub-county government have been strengthened by the capacity development of CHVs, who work voluntarily or for a small stipend (usually Kenya shillings (KSH) 2,000) with health workers and sub-county coordinators to communicate health and nutrition messages to villagers, refer acute malnutrition and morbidities to health facilities, support integrated outreach activities, and report information on the health and nutrition situation on the ground, especially during a drought. However, some NGO and United Nations staff said that **community participation**

in decision-making for drought management is weak. Without empowerment, they pointed out, the public could not hold the county government to account or advocate increased spending on climate shock response in health and other sectors, or contribute their knowledge to finding solutions to health and nutrition impacts of droughts. A drought officer perceived that part of the problem was the **lack of trust in the government among communities**, which he linked, in part, to pastoralists blaming government policies for the erosion of their livelihoods and undermining their migratory strategies for coping with climate variability by introducing sedentarisation policies and programmes.

A final governance concern conveyed by the research participants was the **preoccupation with emergency response to specific drought events, rather than recognising the multiple, successive, and overlapping hazard context of the ASAL**. There is a bias towards droughts over other hazards in the county contingency plans, despite recent but incomplete efforts to develop multi-hazard disaster management plans in the three counties. Other shocks, such as floods and disease outbreaks, fall outside the official mandate of the NDMA and therefore, whilst a multi-hazard approach has been institutionalised through the disaster management policies and plans, these newer systems have not yet become fully operational, so the NDMA continues to take a lead, with its focus on droughts: '*NDMA mainly focus on drought and it's not a multi-hazard [approach], that's the challenge basically'* (county official). The weakness in governance capacity for dealing with unexpected climate shocks was revealed during the late 2019 floods:

> *'To be very frank, ….there was no early warning, and it was not even in our contingency or response plan, because it was not something that we expected. It started with floods without even rains, …. it rained up in the Ethiopian highlands, they never expected a flood [here], of course we were not really prepared, it was not very common…'*. (anonymous male, Turkana)

Coordinative meetings may also be reactive to NDMA early warning bulletins, rather than being a continuous planning process. CSG meetings are supposed to be convened once a month, but were said to often only happen during drought, when the frequency of meetings increases in line with the severity of the event. Irregular coordinative meetings outside of emergencies was said to hamper the timeliness of discussing and sharing NDMA early warning bulletins and early action, according to United Nations/NGO workers in Turkana and Marsabit. Given the likely increased regularity of various climate shocks, like the drought and floods of 2019, in the context of climate change, some respondents argued that there needs be a shift from the current emergency mode of response to anticipatory planning and deeper integration of shock responsiveness into the governance and leadership structures of line ministries, including the MoH: *'A lot of money has been pumped into it but there is no change. We do the same thing and expect [a different result]'.*

Summary

- Policies, laws, committees, and other institutions have been established, and in some cases strengthened, to improve the coordination of the drought response in the counties. Mobile technologies enable coordination amongst and with frontline staff, who may be too busy to attend meetings during surges.
- However, formal governance structures are not always translated into response actions.

- Health has a focus on outbreak/epidemic response, i.e. 'emergency health', as opposed to 'health in emergencies', such as drought and floods.
- Implementation of plans in the MoH remains an issue, with leadership provided by the NDMA and aid organisations rather than the county government.
- Health is not prioritised in the county institutional frameworks for shock response; contingency plans and activities focus more on nutrition than on wider health issues.
- Vertical collaboration between communities and the county government, and the county government and national government, is strained.
- Whilst progress has been made on the government-led system for preparedness and response, drought response remains mostly reactive and still relies on the NDMA and international organisations to manage several of the response activities.

4.2 Finance

Financing of health and nutrition preparations and responses to climate shocks comes from a variety of sources. In 2018–19, some of these were *ex ante*, pre-arranged disaster financing mechanisms, while most were *ex post*, arranged after the onset of drought and floods.

The national government is in the final stages of establishing a **National Drought Emergency Fund, a national pooled fund for emergency response**; parliament has still to debate and authorise the fund. In the meantime, in 2019 the NDMA administered the European Union-supported **National Drought Contingency Fund (NDCF)**. According to NDMA data, the NDCF allocated KSH 65.8 million (US$ 658,000) in 2019, of which KSH 3.1 million (US$ 31000) (4.7%) was allocated to health and nutrition – an amount dwarfed by the water (KSH 32 million/US$ 320,000) and livestock sectors (KSH 10.3 million/US$ 103,000). Details for the total amount allocated to the three case counties are pending.

An additional source of *ex ante* finance came from the HSNP, which provided KSH 1.6 billion in cash transfers to 97,689 households in Wajir, Turkana, Mandera, and Marsabit between January and June 2019, and an additional KSH 240 million (US$2.4 million) to 89,090 households in Wajir and Turkana under the drought shock response component of the HSNP (Orre, 2019). However, **the contribution of HSNP cash transfers to reducing financial access barriers to health and nutrition services during drought is unknown**. This is a topic that will be explored by Maintains Kenya household-level research in Work Package 3.

The bulk of national government financing for the drought response in 2019 was, however, arranged *ex post*. At the national level, Table 5 shows that total estimated emergency response needs amounted to over KSH 16.2 billion (US$ 160 million), of which the health and nutrition sector's needs were nearly KSH 1.15 billion (US$ 11.5 million) (7.1% of the total). In March 2019, funds were released from the national treasury for food relief (KSH 602 million/US$ 5.58 million) and emergency water interventions (KSH 1.16 billion /US$ 11.5 million), before a KSH 8 billion (US$ 82 million) package was allocated to all sectors for June to December 2019 (Table 5), of which KSH 500 million (US$ 5 million) (6.3%) was allocated to the health and nutrition sector for disease surveillance (see Section 5.3), outbreak management, and therapeutic supplements (for moderate acute malnutrition)

given to children under five (Orre, 2019). These allocations clearly fall short of the estimated requirements for the health and nutrition sector. However, data on actual allocations to Turkana, Marsabit, and Wajir are not publicly available. County allocations tend to be a politically negotiated settlement.

Table 5: Drought response financial requirements and government budget allocation (May–Dec 2019)

Sector (activities with allocated budget)	Response requirements KSH (US$)	Budget approved for eight months (May–Dec 2019), KSH (US$)
Devolution (food relief and cash transfers)	11.3 billion (113 million)	7 billion (70 million)
WASH (water trucking, and repair, rehabilitation and drilling of boreholes)	750 million (7.5 million)	350 million (3.5 million)
Livestock (feed, disease surveillance, and control)	948 million (9.48 million)	320 million (3.2 million)
Forestry (mitigation and suppression of forest fires)	167.2 million (1.67 million)	83.6 million (8.36 million)
Wildlife (livestock drives, fire suppression, and water trucking)	231 million (2.31 million)	100 million (1 million)
Health and nutrition (therapeutic supplements for children over five and disease surveillance and outbreak management)	1.15 billion (11.5 million)	500 million (5 million)
ASAL coordination	48 million (4.8 million)	20 million (2 million)
Drought coordination (NDMA)	88 million (8.8 million)	Not reported
Drought Command Centre (monitoring and evaluation)	12 million (1.2 million)	Not reported
Education	567 million (5.67 million)	Not reported
Interior and coordination of national government (peace and security)	181.4 million (1.81 million)	Not reported
Total	**16.2 billion (162 million)**	**8.02 billion (82 million)**

Source: Adapted from Orre (2019)

Notes: Budget allocated refers to government budget. Thus, while there is a shortfall for each of the budget lines, international finance may have been allocated.

Data on national allocations therefore indicate that the national government provided 43% of the estimated budget requirement for health and nutrition responses in 2019, and that national arrangements are predominantly *ex post*. While further investigations are needed, some research participants expressed frustration regarding difficulties accessing national finance because of bureaucratic processes. According to a senior male county official, the national government delays releasing funds because *'money from the treasury [is] passed through many forums… you pass through 25 procurement lines and this takes time'*. This official added that the national government points to the County Emergency Fund provided for by the Public Finance Act (2012), yet the county government '*doesn't have emergency funds set aside'* (see below). A male drought coordinator said that, while many responsibilities for disaster management have been devolved to county governments, disaster finance has not:

> *'The national government has 80% of the resources, but [responsibility for] 15% of the function, [whereas] the counties have 15% resources, but have 85% of the responsibilities. There is this mismatch. Unless we address those inequalities [the county cannot adequately respond]'.* (Anonymous male)

At the county level, **the three county governments each have a County Emergency Fund**, as provided for under Section 110 of the Public Finance Management Act (2012), which permits a separate county government account for contingency funds to be paid into (Section 111). From this fund, an amount not exceeding 2% of the total county government revenue can be appropriated to respond to '*unforeseen or urgent events*' (Section 113). Three NGO managers said government contingency funds, without clarifying the source of the funds, combined with the NDMA early warning bulletins, made county government responses in Wajir and Marsabit to the 2019 droughts timelier than previous droughts. However, it was widely agreed that the **2% County Emergency Fund budget, even if appropriated in full, is insufficient to meet demand during droughts**, and there were differing opinions as to whether the emergency funds are immediately available or ringfenced in a separate account to ensure they are not reallocated to other county priorities. Indeed, NDMA data on expenditure by county governments in the ASAL show that county allocations to disaster response from January to June 2019 represented 0.8–1.7%, rather than 2%, of their budgets (Table 6). For health and nutrition, it was not clear whether **additional finance had been received by the MoH from contingency funds** during the 2018–19 climate shocks to cope with additional caseloads, and there was no evidence of the MoH withholding contingency budgets for emergencies. In Wajir and Marsabit, these funds were said by some respondents to have been spent on WASH hardware (e.g. water trucking and water point rehabilitation), food relief, and livestock feeding, rather than health and nutrition, which was typical of the ASAL counties more widely (Orre, 2019).

Table 6: County Emergency Fund allocations in Marsabit, Turkana, and Wajir

County	Total county government revenues, KSH (US$)	2% County Emergency Fund allocation, KSH (US$)	Actual budget allocation to emergency response, KSH (US$)	% total county government revenues
Turkana	12,097,220,000 (121 million)	241,944,400 (2.4 million)	100,000,000 (1 million)	0.8
Wajir	8,678,000,000 (87 million)	173,560,000 (1.7 million)	150,000,000 (1.5 million)	1.7
Marsabit	7,142,200,000 (71 million)	142,844,000 (1.4 million)	70,000,000 (700,000)	1.0

Source: NDMA data

Within counties, *ex post* financing, or simply managing surges in demand with existing budgets, was a common strategy in the early months of the response, with *ex ante* mechanisms becoming more common after June 2019: '*the funds are locked up and need a key, which in this sense is death, for an emergency to be acted upon'* (male county public health official). County government financing for climate shock response is typically sourced

from the **redistribution of budgets away from non-essential spending** on administrative tasks (e.g. refreshments for meetings) to create '*supplementary budgets'*. The redistribution of budgets within the MoH was said by the research participants to be difficult because health budgets are fixed annually by the county assembly, with any changes needing to be approved by the Office of the Governor. According to a senior male county government official, '*The office of planning and budget…can't just say, "there is an emergency that has occurred let's allocate [additional budget]", because it will raise a lot of audit queries at the [county] assembly.'*

County budgets therefore provide little flexibility to scale up services during a climate shock. Mobilising county government resources is problematic because technical teams unsuccessfully advocate for additional funds from decision makers, who have limited engagement in the technical discussions on drought preparedness and response, as a United Nations programme manager in Marsabit observed. Instead, there are '*sector tussles over county revenues*' following the onset of a climate shock, with health competing with other priorities, including food relief and WASH. A sub-county public health nurse said that sometimes, by the time they receive funds or commodities from the county government, the situation has already improved.

The **upshot of these issues is limited and untimely emergency funding, meaning that in 2019 the MoH and health facilities used their routine resources, especially human resources (e.g. increased working hours, see Section 4.5), to supplement shortfalls in funding from the national and county governments**. Health receives the largest share of county government budgets, but the **budget is considered insufficient to meet normal demand for health and nutrition services, let alone emergency situations**. An MoH official said that, '*ideally health in the county should be funded to a tune of about 15 billion'* but the current budget is one-seventh of that. This reflects the underfunding of healthcare nationally. Health sector funding shortfalls are manifested in medical/nutrition product stockouts, late payment of health staff and product bills, and inadequate healthcare coverage (Section 4.4 and 4.5). A county nutrition coordinator said the financial situation is so dire she has paid out of her own pocket to transport nutrition products donated by UNICEF to health facilities, and nutrition coordination meetings often do not take place because the costs are shared amongst participants. According to one sub-county public health nurse, without a stable budget, it is difficult to plan ahead for future surges in demand.

Meeting health and nutrition demand surges during climate shocks therefore relies on the finance of aid organisations and donors: *'Without partner support, the emergency response in the county would collapse'* (nutrition officer, Turkana). Because there is insufficient county emergency budget available, response plans were said to be presented to aid organisations in order to leverage their financing. Many sub-county health and nutrition staff recognised that they rely on partners to mobilise resources, provide training, pay for nutrition products, and supervise outreach activities. Nutrition products and integrated outreaches, in particular, were identified as being highly dependent on aid. This may be the result of the deliberate balancing of limited emergency budgets by county governments: UNICEF and other aid organisations expand health and nutrition extension services during drought, while county governments support water service delivery (e.g. water trucking) or other demands that are not met by aid organisations. However, it may also be due to a lower priority given to health compared to food relief and water provision, which were allocated the largest budget by county and national governments in 2019. The visibility of food aid and

water trucking may influence sectoral allocation decision-making, and water trucking is largely contracted through private operators, many of whom are politically powerful or well connected (research team reflection).

Dependence on aid organisations means that some health facilities '*fall between the cracks'* of the geographic ranges of aid organisations. For example, in January 2020, a health facility IMAM Surge dashboard moved to Alert phase and the health facility internal IMAM Surge plan triggered requests for support from the sub-county and county MoH. However, the county government was unable to provide assistance, and no support was available from partner/aid organisations working in the area due to reduced donor funding. Some health facilities and county teams felt that aid organisations concentrate on integrated outreach services and provide less assistance to health facilities (although the premise of the surge approach is to lessen dependence on NGOs). NGO/United Nations staff said a **trend of declining donor financing** related to the World Bank ranking of Kenya as a lower middle-income country, and an accompanying transition of donor funding towards technical assistance and away from funds for implementation, affected their response in 2018 and 2019. As donors withdraw funds for implementation, they fear that funding gaps, especially in terms of integrated outreach to marginalised remote communities, will not be filled by government. Several county and sub-county respondents agreed that the county needs to increase investment in nutrition and integrated outreach services in the future, both during and outside emergencies, given the large distances between settlements and their respective health facilities.

Coverage of integrated outreach services waxes and wanes in accordance with the availability of donor funding. This can result in the termination of health and nutrition services when they are still required. For example, a nurse explained how a partner NGO stopped supporting outreach services in December 2018 so the sub-county had to wait until September 2019 for new assistance. In addition to the trend of reduced donor funding (above), time-limited emergency funding across drought cycles affects certain health and nutrition services, especially outreaches and product supplies, despite malnutrition rates remaining high: *'During the drought season there are multiple donors willing to support, but when the situation improves there are no longer funds available to sustain the gains'* (female CHEW nutritionist). Despite the continuous need for integrated outreach health and nutrition services for communities without a health facility, this suggests some communities are only provided with outreach services during emergencies, when emergency funds become available.

Some **aid organisations operate *ex ante* financing mechanisms** in the three counties. For example, 25% of an NGO's IMAM programme budget is designated as a contingency fund under the assumption that one-quarter of health facilities will surpass their surge threshold and require external assistance. In 2019, the IMAM Surge model alerted aid organisations to increasing caseloads that led to the earlier release of contingency funding, according to an NGO/United Nations worker. In another example, budgets are allocated for stockpiling medical and nutrition commodities for emergencies.

In many instances, however, aid organisations use existing resources and seek donor finance *ex post*. At first, aid organisations tend to finance responses from their county programme budgets or contingency budgets. Permission is normally sought from national offices to reorganise their budgets to meet immediate needs, such as providing outreach

services to the areas most affected by a climate shock. As county-level routine and contingency budgets become exhausted, county aid organisations mobilise resources from their national and global offices. At the national level, aid organisations normally first release internal resources or draw from an 'emergency kitty', while they seek additional donor funding as the programme escalates.

The **turnaround time for aid organisation financing was considered by the research participants to be much faster than county and national government financing**, but there can also be bureaucracy and accountability hurdles before financing is released from national offices and/or donors, which can lead to delays in expanding programmes: '*The situation deteriorated so before we could even get money from donors we had to…use our general rations for three months' (NGO programme manager in Marsabit).* The **time taken for aid organisations in counties to organise and get approval to re-distribute budget or mobilise additional resources can also create delays in county implementation of the county response plan**, according to some county government respondents. However, getting funds in a timely manner was said by a United Nations nutrition officer to depend on the strength of advocacy from a sector within an organisation. She said that they were able to get funds for nutrition faster than other sectors in 2019 because they were proactive in communicating the deteriorating nutrition situation internally.

Financing is a messy and inconsistent process. County-level actors tend to patch together financing from multiple sources, which can, according to an NGO nutrition officer, create '*a very confusing environment … counties doing water tanking, national government does [something else]…, did they really allocate the amount they said they allocate? Did they really use it?'.* County government technical staff expressed frustration about the lack of clarity from aid organisations about what and where they will and will not finance – '*they don't put their resources on the table'* – making it difficult for them to plan. This may reflect the complexities faced by aid organisations themselves as regards securing finance: programmes can have restricted funding for different sectoral and geographic priorities linked to specific donor requirements, reducing the flexibility of financing. For example, an aid organisation was unable to respond to fires in Wajir in late 2019 because it was not included in budget lines. Aid organisations also face a complex task of piecing together funds from various donors, creating inconsistent funding:

> *'Outreaches and mass screening between May and June [were funded] using UNICEF emergency funding. They also had [other donor] funding that ended in September. The Beyond Zero campaign also put additional money towards the end of 2019 but it was quite inconsistent. There is also the bigger World Bank-funded [project], which is also covering outreaches... Their outreaches are irregular.'*
> (Programme director)

This dependence on donor funding and *ex post* financing mechanisms points to the **transition from humanitarian emergency response to government-led anticipatory and adequate financing for shock responsiveness in Kenya being unfinished**:

> *'as a humanitarian community, …we will have to really up our game to make sure that the discussion shifts from "there's emergency, Oh [aid organisation]" to "what are the financing mechanisms when the facilities are overwhelmed by caseloads or even before they get overwhelmed". [For example.], if they see the [Vegetation Cover*

> *Index] VCI [declining], you know communities moving, animals dying whatever… can we shift from responding to humans after they are malnourished…[to being] a few steps, few lines ahead [of that]?'* (United Nations nutrition officer, male)

Summary

- Health system and health emergency needs are under-funded.
- Some financing innovations (e.g. government drought and emergency response and contingency funds) exist to make the release of finances pre-arranged, and therefore rapid, but these are insufficient to meet needs and take time to release, and most financial solutions are still arranged after the onset of a climate shock.
- There remains a dependence on stretching existing health budgets and resources, especially human resources, and on aid organisations and donor finance to provide integrated outreach services and supplies of nutrition products; but aid budgets can often be restricted to certain activities, be inflexible as regards scaling up services, and may only be available when the situation becomes an emergency.
- Securing additional finance is currently a complex, political, *ex post* process, rather than being pre-arranged and automated.
- Government and donor finance remains predominantly reactive rather than anticipatory, with fragmented finance cobbled together from different sources, each with their own processes and conditions, making the release of finance untimely and inflexible.

4.3 Information systems

County actors utilise a range of information systems to inform shock response decision-making (Table 7). Many respondents were satisfied that the **NDMA early warning system is functioning and bulletins and drought phases are referred to and consistently communicated** to partners. United Nations/NGO workers in Wajir and Marsabit said that the bulletins activated coordination and planning activities in 2018 and 2019, attributing the timeliness and successful dissemination of bulletins to the NDMA. This, according to some, enabled the more timely delivery of nutrition services and quicker resource mobilisation in 2019 compared to previous drought events. However, not all agreed. One NGO nutrition officer, for example, said, '*we had already started getting reports of deaths on the ground and spikes [in caseloads]'* before receiving early warning alerts.

The **bulletins were considered by research participants to provide a helpful overview of the drought situation,** but there are **challenges in making them actionable in health and nutrition programming**. The early warning information was considered '*too general*': only indicating that drought is expected during a season, rather than how the drought will progress (timing); and giving limited detail on the location of effects, making it difficult to know where to anticipate surges in demand, and the likely severity and magnitude of drought effects on demand for and utilisation of health and nutrition services. '*[In 2019] we could have had better statistics in terms of what is expected, number of people who would be affected'* (MoH official). In other words, the bulletins are unable to provide predictive information on future trends in food and nutrition insecurity, and the potential knock-on effects on caseloads. Indeed, the NDMA early warning bulletins for the three counties only contain a limited amount of information on nutrition status, using milk consumption and food

consumption as indicators. **Early warning bulletin health and nutrition information is not predictive**, **does not provide information on malnutrition or morbidity rates or health facility admissions, and there is no link made between climate and food security indicators and health and nutrition outcomes**.

Table 7: Information systems for county shock response

Information system		Description	Utilisation
EWSs	NDMA monthly early warning bulletin	Generated using surveillance sites (up to nine in each county) and remote sensing Produced monthly based on data collected during previous month. Up to one-month delay before publication Includes food security, agriculture, livestock production (incl. milk) markets, terms of trade, water availability and nutrition (MUAC), and climate-related indicators Provides Early Warning Phase Classifications (Normal, Alert, Alarm, Emergency, Recovery)	Triggers the convening of coordinative meetings and drafting of a response plan; prioritisation of areas for intervention; information cascaded to sub-county and facility levels to inform planning; activates field assessments of the most affected areas; and informs aid organisation resource mobilisation, and scale-up of outreach services and distribution of WASH commodities
	NDMA medium-term and long-term forecasts	Seasonal forecasts and analyses of long-term trends in, for example, vegetation cover	Regularly published and communicated to partners by the NDMA
	Other EWSs	FEWSNET and Inter-Governmental Authority on Development (IGAD) Publication timed around seasons and quarterly updates	Used primarily by aid workers to monitor food security situation
	Long and Short Rains Food Security Assessments	Seasonal food security surveys Published biannually, with a two- to three-month delay between data collection and publication	Used by GoK and United Nations/NGOs to develop county response plans, funding appeals, and advocacy for emergency responses
	Indigenous	Environmental observations (e.g. pasture cover, water levels, animal behaviours (such as the song and direction of bird flight)) to predict and monitor drought	Used by communities and households
Health information systems	DHIS	Routine data on admissions/attendance for out-patient clinics, diseases, and moderate and acute malnutrition are recorded by health facilities and forwarded to the MoH for inclusion in DHIS	Accessible to county nutrition and health coordinators at county and sub-county levels, but there is a lag time before data become available, and DHIS data are not considered to be of high quality, complete or timely – although resources are

			being invested in strengthening them
	IMAM Surge dashboards	Health facilities set capacity thresholds and monitor monthly severe acute malnutrition (admissions on dashboards) Provide facility-based real-time monitoring of admissions Cover between 45% (Turkana) and 98% (Marsabit) of health facilities in the three counties (MoH/UNICEF, 2019)	Alert county and sub-county level actors of deteriorating situation and identify surge hotspots at county, sub-county, and health facility catchment area level; inform prepositioning of nutrition products and adaptation (timing, frequency) of nutrition clinics at health facilities, and health education campaigns
	Nutrition surveys (SMART Surveys)	Conducted periodically to determine the anthropometric nutritional prevalence of acute malnutrition Several other indicators are surveyed related to the nutrition causal framework (e.g. 14-day morbidity recall and indicators on access to water). Mortality data are usually not collected Surveys usually only conducted in sub-counties or counties where large changes in acute malnutrition are expected; usually total of 8–10 surveys in a season	Usually timed to contribute to the Long and Short Rains Food Security Assessments to provide an overview of food security and nutrition situation in ASAL counties. If a nutrition survey is not conducted in the sub-county or county, the Nutrition Information Working Group uses other information and extrapolates from previous nutrition surveys
	Field observations, food security assessments, and mass screening	Undertaken by county government and aid organisation teams in partnership; health workers observe community coping mechanisms, such as migration patterns and intensified use of shallow wells	Used to validate (ground truth) early warning information and inform resource mobilisation and targeting of interventions by aid organisations

Source: Authors, based on respondents' answers to questions about sources and utilisation of information in shock response. The list is therefore unlikely to be comprehensive.

The NDMA early warning bulletins were also criticised by some research participants for their **lack of engagement of communities and use of community-level knowledge and data**. It was considered that early warning bulletin information is too technical and not communicated to communities in an understandable format, and there is a lack of explicit advice on what actions households should take in response to the alert phases; this limits their utility for grassroots and household decision-making. Information flowing in the other direction from the community to government and aid organisations was considered to be poorly integrated into EWSs. Indigenous knowledge was recognised as often being reliable, with pastoralists migrating in search of water and pasture before early warning information is disseminated:

> *'When we are going to monitor these groups…we're told people have moved….they've gone to search for maybe pasture… maybe [they know] something [is] coming, ,maybe the pasture around has gone down, and the water levels…you*

> *can just read from the people now that's what is coming…it's either a drought, or maybe the short rain if it has extended.'* (Group of NGO program officers, Turkana)

Health and nutrition data are recorded in health information systems in Kenya (Table 7), but are not integrated into EWSs. The national DHIS-2 has improved county disease and malnutrition health and nutrition surveillance and service functionality by databasing health facility data. Regardless of concerns expressed by respondents about missing or inaccurate data, the **DHIS cannot yet inform early action to respond to demand surges** since the data are uploaded to DHIS monthly and they take time to process. SMART Surveys, too, while providing critical information on the health and nutrition situation of households and communities, require time-intensive data collection and analysis, and are only conducted periodically.

The **IMAM Surge approach offers the possibility of supporting more timely responses by collating real-time admissions data**. Participating health facilities set thresholds for how many malnutrition admissions they can cope with before certain capacities are exceeded, and then monitor malnutrition admissions against these thresholds on dashboards that are pinned to the walls of health facilities. This enables immediate visual analysis of data by staff, and collation of data into sub-county and county-level dashboards by MoH officials, with support from UNICEF and NGOs, in order to have a sub-county and county view of how many health facilities have passed thresholds. If lower thresholds are crossed, actions within the health facility are activated, such as increasing the frequency of nutrition clinics and outreach activities, cancelling planned leave, and adjusting orders of nutrition products. If higher thresholds are crossed, support from higher levels is triggered, including redistribution of nutrition products, increased frequency of training and supervision, initiation of mass MUAC screenings, and increasing the number of outreach sites. IMAM Surge **can therefore alert decision makers of the severity, geographic distribution, and magnitude of the utilisation and functionality of nutrition services as a drought progresses through its phases**.

IMAM Surge information was considered by several research respondents as being **effective at detecting spikes in acute malnutrition caseloads in near real-time**, **and triggering responses to support the supply of quality services to manage acute malnutrition**. A sub-county medical team said it helped them detect the 2019 drought, and the team compared not having the approach to '*walking in a black situation where you cannot gauge whether you have high admissions*' until monthly reports for DHIS are completed. A MoH official and nutrition officer agreed that information from **IMAM Surge was more specific, precise, and accurate than other sources of nutrition information**, such as the DHIS and SMART Surveys. Crucially, the approach connects admissions data to service delivery capacity thresholds through four alert phases. This meant that county government and aid organisations were able to coordinate and prioritise assistance to health facilities in the 2019 drought, according to one female nutrition officer. A group of programme managers/officers explained that the approach enabled health staff and visiting NGO/United Nations workers to quickly understand the status and causes of malnutrition caseloads, and a sub-county health team member said:

> *'we used our [IMAM Surge] data to alert the county government that we are entering a new phase where we are getting many cases of malnutrition and that is what*

> *actually informed many responses that the county government utilised during the 2018–19 drought.'* (sub-county medical team member, Marsabit)

However, the research participants identified limitations with the current IMAM Surge model. First, health facility admissions data only **indicate the utilisation of formal services for acute malnutrition, and not admissions for other climate shock-related illnesses, such as malaria and diarrhoea.** Second, because the data only capture the utilisation of formal health services, they **may not reflect the demand or incidence of morbidity and malnutrition in communities, which may be unmet by formal services because of access barriers,** such as OOPs (e.g. for transport and medicines) and the opportunity costs (e.g. lost income) for caregivers to use health and nutrition services**.**

The health system is ill-equipped and slow to respond to population mobility, with immunisation defaults increasing as pastoralists migrate away from health facilities. **None of the principal health and nutrition information systems monitor changes in utilisation or coverage of health and nutrition services due to pastoral migration or climate shock-induced increases in opportunity costs.** Some sub-county actors said that increases in admissions recorded on IMAM Surge dashboards made them suspect rising demand in the community, encouraging them to conduct mass screening in communities, but actual incidence of malnutrition (or morbidity) in the community are unknown. CHVs are the key conduit of community health and nutrition information, and often record information about malnutrition on blackboards in their community, but this information is currently not utilised in IMAM Surge or the early warning bulletins:

> *'Community health [volunteers]… are the members of the community…They collect [data on] how many people are sick and [about] the context [i.e. the on-the-ground situation]. If we can get that data, we can analyse it. [CHVs] usually have a chalkboard where they [record] those indicators…[such as] disease trends… it [would] involve having regular communication… [to have] that link [between] the community and the facilities.'* (Male MoH official)

Many of the above issues for EWSs and health information systems may have technical fixes. However, no matter how good the data, their contribution to shock-responsive health systems depends on actors trusting and using them. For the 2019 floods, an NGO programme manager said there were clear early warnings and weather forecasts from the NDMA and Kenyan Meteorological Department about heavy rains in Turkana from October to December 2019, but few preparations were made until the rains arrived because of a **culture of only responding once affected**. There may also be apathy towards drought response because of the frequency of droughts, according to an MoH official. Media reports contradicting or questioning early warning information, and **political interference, may also play a role in undermining the credibility of information**, and thus the willingness to act upon it:

> *'There have been challenges with the political wing, the leaders, [who] start questioning the validity and the authenticity of the data generated and quality of results presented.'* (Male nutrition officer)

Summary

- The NDMA EWS is functioning and bulletins and drought phases are referred to and consistently communicated, but there are challenges in making the system actionable in health and nutrition programming; it does not incorporate health facility data on malnutrition, morbidity rates, or caseloads, or IMAM Surge data.
- IMAM Surge offers the possibility of supporting more timely responses by synthesising near real-time acute malnutrition admissions data, alerting decision makers of increasing strains on health facility capacity to provide quality care during a drought.
- IMAM Surge only provides an analysis of the impact of admissions for acute malnutrition on service delivery capacity, and not the impact of surges in admissions for other illnesses, and does not capture unmet demand or the incidence of morbidity and malnutrition in communities.
- There is a lack of engagement of communities and use of community-level knowledge and data; in particular, data collected by CHVs and CHEWs, who are often women, are not adequately used in decision-making or fed back to communities.
- Early action is delayed because of mistrust of information, political interference, administrative hurdles, and apathy.

4.4 Medical and nutrition products and infrastructure

The ability, particularly for those most vulnerable and least powerful, to access and use health facilities, medicines, and nutrition products during a climate shock is clearly an important indicator of the shock responsiveness of the health system. The number of health facilities surpasses the WHO target of two health facilities per 10,000 population in Marsabit and Turkana, but not in Wajir (Table 8). However, these facilities serve a vast geographic area that is sparsely populated. The **distances to health facilities make it difficult for many people to access and use formal services at any time, and especially during drought and floods**. In Turkana, for example, the average distance to a health facility is 35 km, but for nomadic and remote populations in the border regions it is much further (NDMA, 2019). During drought and floods, women often prioritise activities such as water, fuel wood, and wild food collection, rather than using hospital services, which can occupy productive members of the household for at least a day, if not several days. Thus, the expansion of outreach activities, geographically and in terms of frequency, is vital during drought and floods in order for services to reach remote communities and address demand surges.

Table 8: Health facilities and inpatient beds in Marsabit, Turkana, and Wajir

County	Number of facilities/10,000 population	Number of inpatient beds/10,000 population	Number of maternity beds/1,000 pregnant women
Marsabit	3.3	18	14.4
Turkana	2.0	6.9	10.6
Wajir	1.5	5.3	3.9
National county average	2.2	13.3	13.8

Source: MoH (2019b)

Access to communities to deliver outreach services was affected by insecurity in parts of all three counties in 2019, linked to inter-tribal and natural resource-related conflict (over water, pasture, and livestock) and security risks from Al-Shabaab militants, especially in the Somali border regions of Wajir. Such insecurity can make it dangerous for local populations and staff to travel to health facilities, can prevent the restocking of facilities with medical/nutrition products, and is a safety concern for outreach activities: '*conflict is a big issue – at one point we were unable to reach one area that had the highest cases of malnutrition'* (male NGO/United Nations nutrition officer, Marsabit).

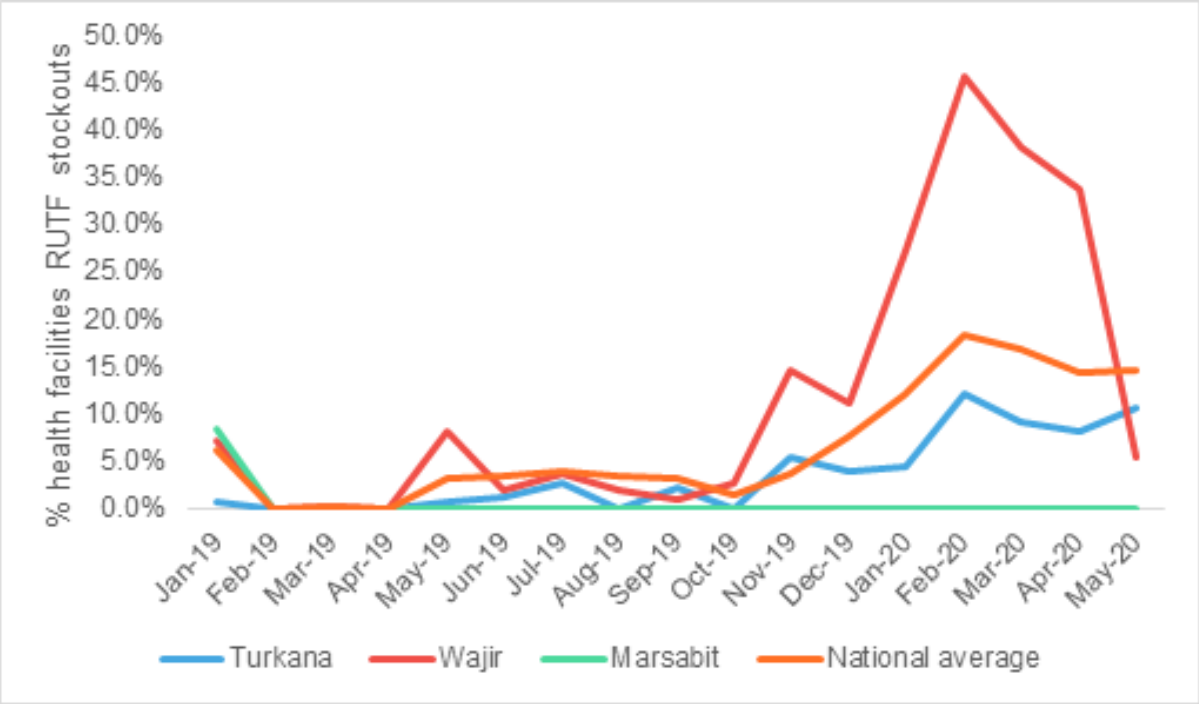
While **outreaches are 'not reaching everyone', including malnutrition 'hotspots'**, coverage of outreach services was said by some research participants to have improved in 2018–19 compared to previous years, and the number of health facilities has increased in recent years. However, some of the new health facilities are disused 'white elephants' (nutrition officer) due to a lack of health staff, although they were used as temporary facilities for six months as an adaptation of weekly outreach services during 2019 to provide services to those areas experiencing a surge in malnutrition cases.

Drugs and medical products for county public health programmes, facilities, and outreach services are procured, warehoused, and distributed (monthly) in Kenya by the Kenya Medical Supplies Agency (KEMSA), a state corporation under the MoH. KEMSA also distributes programme nutrition products, including ready-to-use therapeutic food (RUTF). By collating health facility orders, sub-county medical, public health, or nutrition officers order supplies of products, with approval from the county level, through a national Logistics Management Information System (LMIS). Counties maintain an account with KEMSA and the cost of products and logistics is deducted from the account. While distribution of commodities is organised by county governments, multiple additional actors are involved in the supply chain, including international NGOs, such as Concern Worldwide, Kenya Red Cross, Oxfam, and Save the Children, and United Nations agencies, such as the World Food Programme and UNICEF. At the national level, aid organisations also support logistics and procurement of supplies, and provide technical assistance to GoK and its county teams, particularly for nutrition products.

Surges in demand for health and nutrition services can lead to 'stockouts' in health facilities or across a sub-county and county. Overall, research respondents reported a **limited number of stockouts during 2019 droughts for nutrition commodities**, which is supported by UNICEF data on RUTF stockout rates (Figure 6). However, stockouts did increase in late 2019 in Turkana, and especially in Wajir, due to road disruption from the floods. The escalation in stockout rates in 2020 shown in Figure 6 was attributed to donors withdrawing funding. The promotion of Kenya to a lower middle-income country means that donors are transitioning from direct implementation of programmes to providing technical assistance, so responsibility for product purchasing, including of RUTF, is shifting to government procurement systems (pers. comm). A United Nations nutrition officer said there were '*several instances*' in 2019 when KEMSA's stocks '*went to zero*', but the complexity of supply chains to the most remote health facilities in Kenya means that the MoH and its nutrition partners expect a stockout rate:

> *'In November, I remember 84 facilities had stockouts, so there was [a] pipeline break. But if you see in the overall picture, RUTF stockout rate of 84 facilities [out of 1,900 facilities] not having RUTF for two weeks [it] may not be that significant.'* (Male UN Nutrition Officer)

Figure 6: RUTF stockout rates in Marsabit, Turkana, and Wajir, 2019–20



Source: Data courtesy of UNICEF Kenya (2020). Notes: A health facility is considered to have experienced a stockout if there are no stocks of RUTF in a health facility for at least one day. The data currently collected do not detail the duration of stockouts.

Reasons given for the limited number of nutrition product stockouts included: improved stock projections – a sub-county health team in Turkana, for example, said that ordering was informed by a stock-take of health facilities by the county nutrition coordinator at the outset of the drought; a 'sustained supply' of nutrition products by UNICEF when stocks became lower from July 2019 onwards; and the redistribution of supplies from neighbouring health facilities before stockouts occur. Moreover, stockouts have been reduced because of improved government ordering and monitoring systems for nutrition products resulting from NGO/United Nations technical assistance. A drought monitoring officer reflected that nutrition product management had improved compared to drug management, which, according to a CHEW nutritionist, is because aid organisations are proactive in nutrition product procurement, while drug ordering wholly relies on county procurement processes.

Although stockout data were not available to triangulate qualitative findings, there were **many more reports of medicinal stockouts than nutrition product stockouts** during 2018–19. Facility in charge nurses in all three counties reported shortages of vaccines and drugs, including anti-malarials, antibiotics, paracetamol, flaggyl, and oral rehydration salts. A female sub-county nutrition coordinator in Marsabit explained the different experience for drugs compared to nutrition commodities:

> *'The supplies concerning nutrition [have] not [been] a very big challenge... Medical supplies it can be two [or three] months [when] there is no drugs, [whereas] for nutrition the highest is two weeks [before] KEMSA and WFP [World Food Programme] are in the field'*

Some **stockouts of essential drugs lasted for an extended period of time** – three months or more in some cases. One facility in charge said they had been waiting since September 2019 and had still not received ordered products (in January 2020).

To minimise occurrences of stockouts, products are prepositioned (Table 9) at health facilities and outreach sites, and buffer stocks (mostly of nutrition products) are kept at warehouses, mainly managed by aid organisations. Nowadays, prepositioning is undertaken regularly as '*we normally anticipate drought being in this area*' (nurse, Wajir), with aid organisations and the MoH working in partnership. Prepositioning of water treatment and medication for waterborne diseases was crucial before the 2019 floods, according to a female county nutrition coordinator, because access to areas of the county was later disrupted because of road infrastructure damage.

Table 9: Prepositioned products in 2018–19

Type	Products
Nutrition	Corn Soy Blend, PlumpySUP Ready-to-Use Supplementary Food (RUSF), Plumpynut Ready-to-Use Therapeutic Food (RUTF), Vitamin A supplements
Medical	Vaccines, I.V. fluids, drugs (e.g. ciprofloxacin, paracetamol, and Ibuprofen)
Medical equipment	Anthropometric equipment
WASH	Water treatment chemicals (e.g. Waterguard or Aqua Tabs), soap, jerry cans

Source: Prepositioned products given as examples by respondents. Note: The list is not comprehensive, it is indicative, based on examples provided by interviewees.

Nutrition buffer stocks are used to re-stock health facilities and outreach activities until new supplies are ordered from and delivered by KEMSA. A United Nations programme officer said stocks were ordered and warehoused in the county two to three months in advance of the 2019 drought, which proved crucial because *'at one point we were the only people responding even before the county [government] got resources to respond to the drought'*.

When stockouts do occur in health facilities, products are redistributed and buffer stocks used. First, sub-county coordinators identify and re-distribute surplus stock from neighbouring health facilities using government and aid organisation vehicles, while they '*await the main pipeline*' from KEMSA. Second, they send a request letter to the county health and nutrition coordinators to approve and order additional supplies. According to a programme manager, in the case of nutrition commodities the request is normally sent to UNICEF, which then organises distribution with county nutrition coordinators, nutrition support officers, and sub-county nutritionists. Aid organisations provide nutrition products from their buffer stock or re-distribute them from other programmes in other parts of Kenya, or even from programmes in Somalia.

Aid programmes were considered by research participants to be a more reliable supplier of products than the government because of bureaucracy issues. The counties '*have relied for a long time on UNICEF and other partners*', with the latter playing a vital role in redistributing nutrition products amongst facilities, and supplying supplementary nutrition programmes:

> *'UNICEF is very critical, very helpful in the county with the supply of supplementary supplies…they normally take it from the supplier [KEMSA] …straight to the facility….it's normally the government supply system that is having some challenges because…you can't do anything without passing through somebody [for facilitation]'.* (Male drought officer)

Several causes of the stockouts in 2018–19 were cited. First, there were **issues with the supply chain from KEMSA**. Logistical challenges, such as the frequent breakdown of delivery vehicles and road disruptions, delayed delivery of products to health facilities from warehouses (there are no KEMSA storage warehouses in the three counties, only those managed by the United Nations/NGOs and county governments). There were also instances in 2019 when KEMSA had stockouts itself, creating pipeline breaks that delayed the delivery of orders.

Second, there are often issues of late payment for supplies and some **county governments have outstanding debts with KEMSA**, which in 2018–19 blocked new orders until the debt had been paid. However, a county respondent attributed this debt to the national treasury failing to release the 2019 financial year budget allocation to the county governments on time.

Third, inaccurately projected stock forecasting **and advance ordering makes the supply chain inflexible as regards dealing with demand surges**. Because orders normally need to be made three months in advance, health facilities must either wait or receive redistributed stock from other facilities, but information on KEMSA-managed buffer stocks and KEMSA's ability to address unexpected emergency related stockouts is pending. In some cases, information on stocks at health facilities is not available when distribution plans are prepared at county or sub-county level, meaning they miss the delivery, or the health facility inaccurately estimates demand. IMAM Surge analysis of caseloads, however, was cited as enabling sub-county governments to recognise that additional products are likely to be needed at a health facility, to inform the redistribution of products from other facilities or sub-counties, or from aid organisation buffer stocks. However, a facility in charge said that when surges are abrupt, like during the floods, this information is less helpful. **Advance ordering without contingency mechanisms makes the supply chain inflexible as regards dealing with demand surges**:

> *'Some facilities do not correctly report their numbers, they don't project the exact number of supplies they need. Supplies are done every three months so if they do not order correctly and there is a surge, they cannot get supplies outside this three-month period.'* (Male sub-county medical officer, Marsabit)

Fourth, **the redistribution of products within counties can be inefficient** because of the unavailability of delivery vehicles and budgets for fuel and out-of-office allowances, or poor communication channels and protocols between health facilities, sub-counties, and county managers and leaders. The IMAM Surge approach uses its pre-agreed memorandum of

understanding between health facilities and sub-counties to agree on thresholds and protocols for communication on remedial actions.

Fifth**, buffer stocks at health facilities and county warehouses can be insufficient to address widespread stockouts**. A nutrition officer said health facilities should have at least two months of buffer stocks to mitigate pipeline breaks from KEMSA, but health facilities have limited storage space, making it difficult to preposition adequate stocks, and there is a lack of sub-county storage capacity, which proved problematic during the 2019 floods, when some health facilities in Wajir could not be re-stocked from county warehouses because of road network disruptions. UNICEF (2020) reported their operations being affected by the floods in many ASAL counties, with a total of 53 health facilities and 140 integrated outreach sites in Wajir, Marsabit, Isiolo, Tana River and Mandera counties remaining inaccessible due to floods, affecting access to services for over 14,000 mothers and children. Consequently, United Nations and NGOs are often involved in developing sub-county-level warehousing systems for additional, mostly nutrition, stocks.

Stockouts are, however, not unique to times of climate shocks: '*There are a lot of hiccups in terms of supplies of commodities… even now we go to the health facilities the shelves are empty and there are no floods nor drought, so it's just [the] system'* (sub-county health management team). A drought response officer reflected that the counties must compete to be the first to order limited KEMSA supplies that are distributed on a 'first come, first served' basis, with KEMSA being the only accredited supplier of medicines. Another drought officer said there is constantly a *'push and pull'* over purchasing products between county governments and KEMSA. This means that, while KEMSA may have improved the efficiency of the supply chain, if there is a pipeline break or distribution is affected by vehicle or road network failures, there are no alternative sources of products.

The end or scale back of **time-limited emergency programmes can remove support for emergency outreach services**, and hence the availability of services and medical and nutrition products to communities, even when they are still needed because of high malnutrition and morbidity rates. The rise in RUTF stockouts in 2020 shown in Figure 6, which is attributed to donor realignment of investments to technical assistance, illustrates the dependence on donor support for procurement, particularly for nutrition products, and the risks of reduced procurement funding if GoK does not assume the nutrition product procurement role of aid organisations in the future.

Ultimately, **stockouts negatively impact service delivery quality and utilisation of health and nutrition services**. In May–June 2019, stockouts of medicines or vaccines meant that patients were forced to wait '*another two to three months*', or were referred to another health facility or higher-tier hospital, '*for just malaria*' (for example). News of a lack of supplies at a health facility may also influence household decision-making about prioritising healthcare over other demands on their time and resources (to be investigated in Work Package 3). Ultimately, health facility product shortages result in worse health outcomes for patients. Respondents explained that drug shortages led to delayed management of diseases in 2019, and delays in nutrition product supply resulted in children defaulting from supplementary feeding programmes, reduced rations, or substitute treatments for beneficiaries, and to the cancellation of outreach services to remote and marginalised communities.

Summary

- Distances to health facilities in the three counties present an obstacle to citizens accessing formal health services, which especially affects pregnant women and children, and climate shocks are likely to increase the opportunity costs of using distant health and nutrition services.
- Integrated outreach programmes are critical for serving remote communities, especially when scaled up during drought and floods, but not everyone is reached and emergency scale-ups are time-limited. However, the conversion of disused health facility buildings into temporary outreach sites provided surge capacity close to affected communities during the drought in 2019.
- Improved supply chain logistics, prepositioning, buffer stocks, and the redistribution of products amongst health facilities have reduced stockouts, especially of nutrition products, but stockouts of medicines still occur regularly and for prolonged periods, both during and outside of climate shocks.
- The product supply system has become more sophisticated but it lacks a shock-responsive component. The system consequently has limited flexibility to manage orders and address stockouts at short notice, making stock management mostly unresponsive to surges in health and nutrition service utilisation.
- IMAM Surge data have the potential to inform orders and improve buffer stock management.

4.5 Workforce

The health workforce provides a variety of functions that support responses to the health and nutrition impacts of drought and floods (Table 10), but, like most of Kenya, the **formal health system is understaffed** in the three counties. Marsabit and Wajir have 0.25–0.5 medical officers per 10,000 population, while Turkana has less than 0.25, significantly below the nationally recommended two medical officers per 10,000 (MoH, 2019). The number of health workers has increased in recent years: for example, from 513 to 1,232 in Turkana between 2013 and 2017 (NDMA, 2019). Nevertheless, there are still too few staff for the number of health facilities. Moreover, these figures hide variability within counties, with many remote areas having far fewer health workers, and they also hide the fact that '*health workers are notorious for absenteeism*', according to a United Nations/NGO programme director. Even in 'normal times', the limited number of staff in facilities to undertake multiple responsibilities creates high workloads:

> *'You have to treat patients…give immunisation, go to see the mama in labour… it is a lot of work [for] two or three nurses. This is a health centre where we are supposed to have six to seven nurses and we are only three.'* (Female facility in charge nurse, Marsabit)

Table 10: Roles and responsibilities of key county health workers

Position	Roles and responsibilities in climate shock response
County director of health	Identification of staffing gaps and recruitment or secondment of staff to fill those gaps; coordination with aid organisations about staffing needs. Provides leadership to the Department of Health on technical matters related to the delivery of health services in the county. During shocks, identifies staffing gaps and oversees recruitment or secondment of staff to fill those gaps, and leads coordination with aid organisations about staffing needs.
County nutrition coordinator	Provides technical nutrition support to the County Health Management Committee and participates in the development of county health strategic and investment planning for nutrition activities. Collaborates and coordinates with donors, partners, and national government regarding nutrition services during shocks.
Sub-county medical officer of health	Provides leadership to all healthcare service providers in the sub-county, and supervises and coordinates the delivery of essential health services within the sub-county.
Sub-county public health officer	Collaborates with partners on delivery of public health services and programmes, and the prevention and control of communicable diseases in the sub-county, together with WASH interventions.
Sub-county nutrition officer	Coordinates the implementation, monitoring, and review of nutrition programmes in the sub-county; undertakes nutrition surveillance; and coordinates nutrition emergency services with nutrition partners in the sub-county.
Facility in charge nurse	Provides leadership of health facility, promotes collaboration amongst stakeholders, manages emergency and referral services, and mobilises resources for implementation of planned activities.
CHEW	Supports health facility staff with community mobilisation and sensitisation about a climate shock; undertakes education and mass screening during outreach activities; monitors immunisation and nutrition programme defaulters; makes referrals to health facilities; undertakes disease surveillance (‘active case finding’).
CHV	Supports health facility staff with community mobilisation; communicates, and sensitises communities, on climate shock risks; undertakes education and mass screening during outreach activities; monitors immunisation and nutrition programme defaulters; make referrals to health facilities; and participates in disease surveillance (‘active case finding’) activities. CHVs are supervised by CHEWs and together they form a community unit.

Source: Interview data

Insufficient staff means that the workforce used a range of strategies to cope with increased demand and utilisation of health and nutrition services associated with drought and floods in 2018–19 (Table 11), including those discussed below:

- An increase in health facility opening hours and frequency of clinics, e.g. nutrition clinics changing from bi-weekly to weekly or daily clinics.
- Mobilisation of integrated outreach teams with a diversity of skills to address a range of nutrition and health needs in communities. Diversion of staff to outreaches can

sometimes reduce the range of health and nutrition services provided by health facilities, or even result in their closure. Allowances are paid for out-of-post work, which can incentivise outreach work at the expense of health facility service provision.

- Recruitment of additional staff on temporary contracts, such as nutritionists for health facilities or 'roving' health workers to support outreaches to alleviate pressure on health facilities so that routine service provision can be maintained. This strategy is almost always funded by the United Nations/NGOs. In recent years UNICEF has contracted the Kenya Red Cross Society to provide human resource surge support to hotspot health facilities.
- Staff leave management, including: staff choosing to delay leave; the government not permitting leave, or reducing the number of days of leave, during periods of high caseloads (to be taken once emergency subsides); permitting recuperation days when sub-county staff provide assistance; or having a quota of staff who are permitted to have a day off work at the same time.
- Multitasking, delegation, and task shifting. For example, in 2019 one nutritionist joined an outreach activity and one remained at the health facility, and patient assistants (extra non-qualified staff who are often paid incentives, using the health facility discretionary budget) stood in for the facility staff when they were out of the facility.

All of the above strategies can affect the care quality of services at the health facility because staff become demotivated and stressed, duties are delegated to underqualified staff (such as CHEWs, CHVs, and even health facility cleaners), or the range of routine services decline. Poor quality services are likely to dissuade households, especially women with increased workloads during climate shocks, from utilising services given the OOPs and opportunity costs[5].

Table 11: Perceptions of key workforce coping strategies and impacts

	Gender (% of all women/men interviewed reporting strategy impact)		**Interviewee type** (% of those that reported a strategy or impact)		
	Men	**Women**	**Health facility staff**	**Government ministry**	**NGO/UN staff**
Key workforce strategies					
Additional staff	25%	35%	32%	42%	16%
Leave management	20%	39%	41%	41%	18%
Working longer hours	20%	39%	41%	53%	6%
Multitasking and task shifting	25%	9%	33%	42%	25%
Staff support and guidance	13%	13%	22%	33%	22%
Key workforce impacts					

[5] This will be investigated in forthcoming community-level research in Maintains Kenya Work Package 3.

Overwhelming workloads	65%	87%	43%	36%	17%
Stress and exhaustion	38%	52%	37%	48%	15%

Source: Matrix coding query of interview data in NVivo. Notes: Percentages reflect proportion of respondent type that reported a coping strategy or impact, rather than the percentage that experienced the strategy/impact.

Aid organisations play a key role in supporting these strategies by: providing budgets to the MoH to recruit additional staff; recruiting additional staff directly or seconding their own staff to health facilities when caseloads are high (e.g. Concern Worldwide seconded a staff nurse and nutritionist to facilities that had passed IMAM Surge emergency thresholds during the 2019 drought); and lobbying county governments to recruit and retain staff. When needed, aid organisations bring together teams of their staff and MoH health workers to undertake integrated outreach activities. However, aid workers often face even greater restrictions than public health teams as regards travelling to high-risk remote areas during climate shocks because of strict standard operating procedures; some areas are therefore not serviced by government or aid organisations.

The CHVs have a variety of responsibilities (Table 10), and play a key role as bridges between health facilities and the community. CHV and CHEW (community unit) contributions to shock response have been strengthened in recent years by United Nations-/NGO-financed capacity development, community unit integration in outreach activities, and, in some instances, helping at health facilities when there are surges in caseloads. In Turkana, for example, 1,969 CHVs have been trained (NDMA, 2019). CHVs now undertake monthly mass screening in many places, presented as a monthly report, and actively find cases of malnutrition and morbidity, and refer cases to health facilities. CHVs educate communities about simple steps to prevent and treat common morbidities and malnutrition, and raise awareness of an expected drought and its health and nutrition impacts on children. According to an MoH official, in 2019 the involvement of CHVs enabled them to '*significantly quicken screening of malnourished children or diarrhoea in the villages*'. As a result of understaffing and the dispersed populations, health facility staff roles and responsibilities are increasingly shifted to CHVs, which can increase their workload, decrease their motivation, and affect the quality of their work. A respondent **warned of overreliance on CHVs as their ability to deliver services can be affected by the adverse effects of a climate shock** on them, as members of the community:

> *'The [CHV] has their family to take care of…because of the scarcity of the food and the drought [in 2019], they also had to fend [for themselves] and therefore this disrupted their routine service delivery'.* (Male United Nations programme officer)

The importance of good relations and trust between health workers and communities was recognised by some of the workers interviewed. The training and support to CHVs provides an important link to the community in this respect. A programme manager in Wajir said that the county tries to employ local health workers, there are efforts to deploy workers according to their tribe/clan to minimise the risk of hostilities, and women are sometimes not deployed because of security risks. However, a male NGO programme director said that he had observed that health workers who are non-native to Marsabit are often the '*ones that are thrown [deployed] to the furthest corners [of the county] where [it is] most likely to get the drought*.'

The benefits of training and lunch allowances from NGOs while on outreach can boost staff motivation, although one nutrition officer said there have been demands to increase allowances. However, NGOs topping up salaries with payments for training presents a financial sustainability issue and takes away staff from routine facility duties in already understaffed settings. Turkana became one of the first counties in Kenya to legislate on the payment of monthly stipends to CHVs, through the Turkana County Community Health Services Act (GoK, 2018b), upon the submission of reports to nutritionists, which was said to have boosted motivation. However, there were claims of payments taking two months to be paid, and even of cases where they were not paid until the following financial year. In Marsabit and Wajir, other than lunch allowances, CHVs do not receive a stipend. Temporary staff contracted when there are demand surges could be absorbed into the workforce, but their **retention is a challenge** as they are often unwilling to stay, according to a CHEW nutritionist. Despite efforts to maintain motivation, the strategies used for coping with higher caseloads during drought and floods may have adverse effects on motivation by increasing staff workloads and stress.

Indeed, **caseloads in 2018 and 2019 were above 10-year averages in the counties (Section 3), creating additional workloads for staff**. In addition, health workers' time was diverted towards organising outreach logistics and making an increased number of referrals, while in some cases losing staff, because of their secondment to outreach activities. A programme manager in Turkana reflected that aid organisations often use the same health worker for outreach activities, removing them from their health facility duties. The distances that need to be travelled on outreach activities are often long, meaning lost time for service provision to patients. Communities become quickly aware of, and tend to avoid, health facilities that have reduced quality of care, overworked staff, and long queues.

Many health workers said there were **issues of stress and exhaustion** because of the workloads associated with demand surges, long working hours, and the lack of leave permitted (Table 11), but also because of the pressures of task sharing and dehydration from working in high temperatures. This was most commonly reported by health facility and government ministry staff (Table 11). One facility in charge nurse said staff were unable to buy enough food for their own consumption because of the lack of foodstuff at markets during the 2019 drought. CHVs that only require limited supervision can alleviate workloads during demand surges, but poorly trained CHVs can create additional work: '*I have to put my register down, go and help in measurement, come back and [continue with] documentation. So I spend more time and then it's tiring because I'm doing two works at the same time.*' (Female CHEW nutritionist, Wajir).

Table 11 indicates some potential gendered dimensions to the coping strategies and their impacts. A higher proportion of female respondents compared to male respondents reported working longer hours as a workforce coping strategy, and that workloads become overwhelming and stressful. Of the frontline staff interviewed, the majority were women, except for facility in charge nurses (Table 3). The predominance of women in frontline healthcare positions is typical in Kenya. Most respondents, when asked, said that there were no differences in the impact on staff because of gender because everyone's workload increases during climate shocks. However, it is likely that female staff are affected more than male staff because of their gendered workloads at home, including water collection and care practices, which are exacerbated during drought, and their place of work at health facilities is often far from their home:

> *'[Health workers] have families and many of them don't reside [in the] place [of the health facility]….you are not even getting that chance of going home [because of the amount of work], you see it will affect your family and maybe also you have small kids. I think it will affect you psychologically. Because you cannot even offer quality services because you are not relaxed, maybe you are thinking of going home, maybe the kid is sick, [but] you are not able to go because you are alone [working at the health facility].'* (Female sub-county nutrition coordinator, Turkana)

Table 3, in the Methods section, showed that the majority of senior county positions, with the exception of county nutrition coordinators, are held by men. Gendered impacts on the workforce may be better considered in shock response arrangements if there was greater representation of women in these roles. Subsequent Maintains Kenya research (Work Package 3) will investigate these gendered impacts in relation to gendered household health and nutrition impacts of climate shocks.

Summary

- Health facilities are understaffed, so utilisation and quality of services further decline when caseloads rise during climate shocks.
- To cope with increased demand for services during climate shocks staff work longer hours, have reduced or no leave, and shift and share responsibilities amongst themselves and volunteers; temporary staff are also recruited, and integrated outreach services are scaled up.
- Aid organisations play a key role in supporting workforce coping strategies during climate shocks.
- Coping strategies lead to negative impacts on workforce wellbeing and productively, with most frontline staff reporting overwhelming workloads and stress.
- While the majority of respondents did not recognise gendered workforce impacts, a higher proportion of women interviewed compared to men interviewed reported overwhelming workloads and stress, which may undermine their ability to fulfil gendered healthcare roles in their own households.
- The role of CHVs has increased: they play a key bridging and trust-building role between the community and health facilities, and they provide surge capacity, but their ability to support health system shock response may be limited by their own household responsibilities during climate shocks, and by a lack of remuneration for their contribution.

5 Discussion and conclusion

The health system of the northern ASAL is impacted by multiple, often overlapping and successive, climate shocks, most notably drought, that cause surges in demand for health and nutrition services. This working paper has reviewed the perspectives and experiences of county actors in Marsabit, Turkana, and Wajir on the capacities for and challenges to responding to drought and floods in the formal health system. This section discusses findings on what is and what is not working across the health system building blocks (Table 12) and discusses exploratory insights on how to move towards a shock-responsive health system in Kenya. These emerging findings will be validated and discussed with stakeholders at learning workshops, and taken forward in further Maintains Kenya research.

5.1 What's working

The analysis identifies many shock-response innovations at the county level (Table 12). **New disaster policies and laws have created county-level institutional frameworks for preparing for and responding to climate shocks**. These include coordinative mechanisms for contingency planning, regular meetings and sharing of information across sectors, and county disaster management directorates and sub-committees to coordinate response activities. Such a legal and policy foundation is essential for guiding responses to shocks across actors and sectors (Kruk *et al*., 2015).

New county emergency funds offer pre-arranged financing for climate shock responses. The NDMA provides strong leadership at the county level, bridging county governments and aid organisations to facilitate planning and delivery, and consistently disseminates **NDMA early warning bulletins and Long and Short Rains Assessments used by county government and NGO/United Nations actors to raise awareness of, and plan for, drought shocks across sectors.**

The coordinative mechanisms support county **health officials and workers to partner with aid organisations to maintain buffer stocks and preposition (mainly nutrition) products to mitigate stockouts at health facilities, and to scale up integrated health outreach services**. Indeed, aid organisations working hand-in-hand with the government to support and strengthen the health system, especially for nutrition and outreach activities, has become standard practice during climate shocks. There are positive signs that these partnerships have reduced stockouts of nutrition products at health facilities and have extended emergency integrated outreach services to remote populations not serviced by health facilities during droughts.

The **IMAM Surge approach is increasing health shock response capacities**, enabling health facilities to analyse acute malnutrition admissions data against health facility capacity thresholds in near real-time, effectively detect early onsets of admission spikes associated with drought, make changes to health facility functions (such as extending outreach activities), and alert decision makers to the deteriorating nutrition situation. Amongst other uses, this analysis informs staff leave management and the redistribution and deployment of nutrition products to health facilities, and triggers the deployment of mass screening and integrated outreach services.

5.2 What's not working so well

While there has been substantial progress in building (cross-sector) shock responsiveness, several themes emerged across the health system building blocks that need further investigation and policy attention.

First, there are issues regarding the **underlying inadequacy or strength of the health system building blocks**. Nationwide, health expenditure by GoK increased by 55% between 2012/13 and 2016/16, and the average proportion of county government budgets allocated to health increased from 13% to 25% between 2013/14 and 2015/16 (GoK, 2018b). However, health resource indicators in Turkana and Wajir, and less so in Marsabit, show that there remains insufficient coverage of health facilities and staff for the populations, and regular shortages of medicines, especially during drought and floods. The government health sector struggles to absorb the additional caseloads associated with drought, and county and national contingency budgets are insufficient to address increased demand for services.

County shock-response provisions are inadequately tailored or adapted for health systems. Despite the likely links between climate shocks and utilisation of the formal health system, health issues and the role and responsibilities of the MoH in relation to droughts and floods are inadequately represented in county policies, contingency plans, and disaster financing, compared to food distribution, social protection, conflict mitigation, WASH, and nutrition concerns. County government contingency funds are not used for health to any great extent, meaning that the MoH tends to use its already stretched resources, particularly human resources, to cater for surges in admissions during climate shocks. This means that **health staff deploy coping strategies that adversely affect their productivity and wellbeing**, including working longer hours, not taking leave, and task shifting, which cause stress, exhaustion, absenteeism, and lower standards of care, which can translate into lower utilisation of services by households[6]. This fundamentally points to the long-term need to employ and retain sufficient numbers of staff, particularly at the grassroots level. In the short to medium term, the development of a human resource strategy for emergency response could define thresholds for triggering actions, including leave management and associated compensation, and define procedures for rapid temporary deployment of government and NGO/United Nations health staff. Furthermore, county or MoH contingency plans could include financing for emergency human resource strategies.

In agreement with Development Initiatives (2017), the results of the research show that information is not a challenge as there are many early warning and health information systems. However, the information was said by research participants to be too general – with a focus on food security and productive livelihoods – to support health system decision-making and early action. **The NDMA early warning bulletins describe the current situation and extrapolate the need to prepare, but are not predictive** because of the predominant use of outcome indicators, such as milk prices, and therefore do not project or provide early warning of health and nutrition service demand surges. **IMAM Surge data are not integrated into the early warning bulletins to provide nutrition-specific situational analysis**. Other available health information systems, such as DHIS 2, cannot currently be used to anticipate the need for action or adapt responses to changing needs because of lag

[6] To be investigated further in community-level research in Maintains Kenya Work Package 3.

times between data collection and publication. **Health information systems are therefore poorly integrated with other sectors, and analytics of the data does not produce useful analysis for anticipatory and prioritised (geographic or population group) health system shock response**. The incorporation of DHIS 2 and IMAM Surge data into the NDMA early warning bulletins and Long and Short Rains Assessments could be an immediate step to better connect health to information systems used in the county for shock response. A more detailed analysis of the linkages between spikes in demand for health and nutrition services and predictive analysis of climate data is urgently required.

Third, the timeliness of responses was reported by research participants to have improved as a result of the coordinative mechanisms and contingency funds of the national government, county governments, and aid organisations, but **arrangements still tend to be activated too late after the onset of a climate shock, and therefore frustrate early action**. Participants complained that bureaucratic processes, politics, and conflict between and within national and county governments, and between sectors, delays the release of contingency funds and the reallocation of budgets. International planning, appeals for funds, and actions do not start until after GoK has officially declared a drought. Real-time transparency regarding when and to what sectors government contingency funds are allocated is also weak, creating the potential for gaps, overlaps, and misuse of funds. Many coordinative meetings are triggered by the onset of a drought, rather than being continuous collaborative processes that are ready to initiate anticipatory actions; and, while pre-arranged (*ex ante*) financing mechanisms exist within aid organisations, they involve relatively limited funds and *ex post* arrangements remain dominant, delaying the release of resources while finance is patched together from various donor sources and/or while reallocations of programme budgets are approved. More financial transparency from all responders would reduce risks and increase the efficiency of the use of contingency/emergency funds, and a strengthening of MoH leadership capacity and financial systems is needed to improve the timeliness of responses to climate shocks within the health sector.

IMAM Surge offers a promising approach for improving the timeliness of drought responses to acute malnutrition during drought by monitoring new admissions, but it does not yet monitor morbidity admissions or increases in demand within communities that do not utilise the formal nutrition services because of access and utilisation barriers. There is potential to adapt the IMAM Surge approach for CHVs to monitor malnutrition incidence and thresholds at the community level, and to integrate the monitoring of other morbidities, such as diarrhoea and malaria, at the health facility and community level.

Fourth, in some building blocks, **the lack of timeliness can be linked to systemic inflexibility**. County budgets for health are decided annually and reallocation of funds requires formal approval, while aid organisations' funding is restricted to specific geographic areas, beneficiaries, and goals. The lack of human resource surge systems and systemic inflexibility make temporary posting of staff exceedingly cumbersome. Long lead times on ordering medicinal and nutrition products from a single authorised government supplier, KEMSA, makes ordering inflexible in regard to changing demands, meaning that accurate orders and sufficient buffer stocks are required. It is suggested that KEMSA and the MoH, with the support of donors/the United Nations and NGOs, should develop protocols and tools for a shock-responsive health and nutrition product supply system, including guidance on

buffer and contingency stocks, and that progress towards, and integration of health and nutrition concerns into, disaster risk financing mechanisms should be accelerated.

Fifth, **connections between the formal health system and informal community health system could be strengthened**. CHVs provide a key source of surge capacity by supporting frontline health workers and nutritionists in the delivery of curative and preventative services, and facilitating information exchange with communities. However, data on cases of malnutrition and morbidity in the community that are, or could be, recorded by CHVs are not utilised in IMAM Surge analysis or early warning bulletins, nor is indigenous knowledge of indicators of environmental variability. There are limited opportunities for communities to provide their perspectives or participate in decision-making to ensure health systems cater to their context and remove access barriers to formal services during climate shocks. There may be issues of trust and communication between the two systems, yet institutional trust between communities and the formal health system are thought to be critical for health system resilience, e.g. so that individuals seek formal healthcare during a shock (Kruk *et al*., 2015). Work Package 3 of Maintains Kenya will explore these relations in more detail through research at community and household levels.

In sum, **there are multiple institutions, procedures, and tools in place for shock responsiveness but they are not being effectively connected and put to work for health and nutrition within the health system**. This still imperfect connection between county health systems and national and county-level governance and leadership systems for shock response is probably related to a focus within the health system on infectious disease outbreak response (emergency health), with less focus on the public health impacts of climate shocks and on dealing with associated surges in demand for, and utilisation of, health and nutrition services (health in emergencies). This finding suggests that national and county government should adapt, strengthen, and integrate existing shock response tools, procedures, and institutions into the health system at the county level, especially the financing of health in emergency contingency planning.

5.3 Towards a shock-responsive Kenyan health system

This working paper has analysed the formal health system responses to climate shocks in the three counties. By studying these responses, the analysis suggests that the formal health system predominantly relies on its absorptive capacities within and across the building blocks, whereby health and nutrition services are delivered with existing resources and approaches. In 2019 this involved the MoH using and redeploying existing stocks of products and financial and human resources to absorb (with variable success) surges in utilisation of health and nutrition services. However, the adverse effects on frontline staff in terms of workloads and stress, and shortages of medical products, suggests deficiencies in absorptive capacity, which has knock-on effects on the trust in, and utilisation of, the health system by communities. Gaps in government absorptive capacity are currently addressed by aid organisations' strategies and donor finance. This suggests that in the long term there is a need to create adequate spare (e.g. physical, human, and financial resources) capacity – known as system redundancy – to absorb expected and unexpected spikes in demand for health and nutrition services in a timely manner, in order to minimise the need for emergency response (Fridell *et al*., 2020). Building system redundancy requires basic health system strengthening, such as increasing numbers of staff and budget allocations to health,

as well as shock-specific provisions, including expanding buffer stocks and having additional appropriately skilled health workers available to recruit when demand surges are experienced (Ammar *et al*., 2016; Kamal-Yanni, 2015). In the short or medium term, health system absorptive capacity could be built by improving the functioning of, and better integrating health into, national and county shock response systems, and adopting a public 'health in emergencies' approach in MoH planning, budgeting, human resource management, and supply, logistics, and information processes (as discussed above).

Several of the building blocks support health system adaptive capacities. For instance, the coordinative institutions, such as CSGs, provide a forum for sharing information and adapting strategies in response to new information (e.g. from NDMA early warning bulletins), and the diverse number of aid organisations working in the area can introduce new ideas and mobilise additional resources, e.g. secondment of disused health facilities as temporary sites to address demand surges. However, the capacity of the health system to quickly adapt to changing circumstances on the ground is frustrated by the political nature of emergencies, the inflexibility of government and aid organisation budgets and product ordering systems, the inadequacy of contingency budgets to fund even the expected (let alone unexpected), and the lack of human resource surge systems. Without anticipatory and timely real-time health information, the capacity of the Kenyan health system to anticipate shocks, target the right places, identify response needs, and rapidly adapt strategies to changing circumstances will be hindered. In this respect, IMAM Surge is a promising health system resilience innovation that is improving adaptive capacities by enabling decision makers to anticipate the passing of (absorptive) capacity thresholds at health facility levels for acute malnutrition, to inform the mobilisation and deployment of additional resources (e.g. nutrition products). Learning from responses to shocks, such as the drought and floods in 2019, can inform incremental adjustments to the health system to improve shock responsiveness, but learning is likely to be inhibited by the inconsistency of county coordinative meetings outside of emergencies and the roll-back of emergency assistance when an emergency ends. There is a need to build flexible financing, staff deployment, and product distribution mechanisms that can respond to information from surge dashboards and EWSs to facilitate health system adaptability to variability in health and nutrition demands, and to ensure information sharing and learning occurs as a continuous process to support adaptive health system governance.

The study points to the need for health system response strategies in Kenya to be adaptable to a range of shocks. Currently, health sector contingency plans concentrate on disease epidemics, while county-level disaster management institutional arrangements focus on drought. This may make the health system less responsive to a variety of climate and other shocks. Contingency plans, IMAM Surge arrangements, and surveillance-based EWSs may have improved responsiveness to drought, but the floods in 2019 point to deficiencies in responsiveness to rapid-onset hazards. Building 'specific resilience' to one type of shock may leave the health system exposed to unexpected shocks, including the COVID-19 global pandemic; it may therefore be necessary to consider how to build 'general resilience' in the Kenyan health system to improve responsiveness to multiple types of shock faced in the ASAL.

In the long term, there is a need for the health system to be transformed from having a reactive emergency model of response to one involving government-led anticipatory responses, but this study shows that this transition is incomplete in Kenya. The findings

above on ‘what’s working’ confirm that significant advances have been made towards building government capacity to respond to climate shocks. Nevertheless, the findings also show that the health system remains dependent on international aid to address demand surges, especially for the provision of nutrition products and integrated outreach services for remote communities. Now that Kenya has become a lower middle-income county, donor support to Kenya is shifting from financial and technical assistance to predominantly technical assistance, meaning that health system shock responses will increasingly need to be government-led and financed.

Today, droughts in the Kenyan ASAL are occurring at least every two to three years and extreme dry periods are occurring annually, generating regular surges in demand. The health and nutrition impacts of drought overlap in space and time with the impacts of other expected shocks, like floods and disease outbreaks of cholera and malaria, and unexpected shocks, like the COVID-19 pandemic and industrial action. In this multi-shock context, preparation, response, and recovery happen simultaneously, blurring distinctions between them and calling into question the utility of such linear framings of shock responsiveness. The experience at the county level shown in this working paper points to a preoccupation with emergency response to specific events. The emergency and linear mode is apparent in the dominance of *ex post* financing, intermittent emergency financing, and reactive rather than proactive coordinative mechanisms.

Rather than linear emergency response, the findings from this study support the view that health systems are better viewed as complex adaptive social systems, whereby the building blocks and interactions between them absorb, and adapt to, multiple shocks (and long-term stresses) in a continuous process (Ostrom and Janssen, 2004). The challenge moving forward in Kenya is to strengthen county shock response systems in order that they better include health and nutrition, whilst at the same time transforming the health system from dependence on an emergency mode of operation towards a resilient system that can absorb surges in caseloads, and learn and reflect (during and across shocks) on what is working and what is not to adapt and transform building blocks to make them more shock responsive over time. The development of pre-arranged and automatically released adaptive disaster risk financing mechanisms, the IMAM Surge approach, and building surge capacity by training CHVs are examples of progress in this direction. However, the findings of the working paper suggest it will be necessary to go further by strengthening and adapting existing capacities and mechanisms, and developing new innovations for health system resilience that improve the adequacy, timeliness, and flexibility of health system responses to climate shocks.

This working paper provides a starting point for Maintains Kenya to open up a dialogue with scientific and practitioner communities in Kenya and globally about pathways towards strengthening the shock responsiveness and resilience of the health system in Kenya and in other contexts. Next, learning and participatory methods (under Work Package 2 of Maintains Kenya) will validate, and facilitate the deliberation of, the findings, and the search for solutions, in partnership with stakeholders. While this paper has mainly focused on health system building block hardware, Work Package 2 will analyse *inter alia* tangible and intangible software, such as trust, distributed leadership practices, relationships, and the distribution of power in actor networks, which are likely to underpin some of the barriers to building a shock-responsive health system in Kenya identified in this working paper. This analysis will also look in depth at why formal structures are not put to work for health and

nutrition in practice. Work Package 3 will then analyse the role of the informal community health system, and its connections/relationships with the formal health system.

Table 12: Health system building blocks – what's working, what's not

Building block	What's working	What's not working so well
Governance and leadership	NDMA focal point for drought coordination Multi-stakeholder and multi-sector coordination through CSG Increased stakeholder engagement and information sharing	Strains between county and national governments, and strains between county governments and NDMA Reliance on NDMA and aid organisations Weak community participation Delays in decision-making
Finance	Counties have legal structures to allocate County Emergency Funds National Drought Emergency Funds will soon be available Diverse sources of donor funding for aid organisation responses Internal contingency budgets in aid organisations	Inadequate overall health funding Weaknesses in planning of contingency budgets within health budget planning processes Weaknesses in planning, decision-making, and disbursement of County Emergency Funds and county budgets for disaster management Issues of bureaucracy and politics in release of some national finance Over-dependence on international finance
Early warning and information	NDMA early warning bulletins validated with on-the-ground data, and consistently shared and used IMAM Surge effective at detecting spikes in caseloads in near real time and triggering responses IMAM timelier than DHIS	Early warning too general and not health-specific, time-specific, or location-specific Early warning bulletins present current situation and do not have a clear method to project conditions into the future Lack of investment in local data collection for early warning bulletins Ignorance of warnings and significant weaknesses in translating early warnings into early action Incomplete, inaccurate, and lag times in updating, DHIS database Lack of engagement of communities in any of the information systems
Commodities and infrastructure	Increased number of health facilities Utilisation of disused health facilities for integrated outreach activities Faster ordering through LMIS Limited stockouts and consistent supply of nutrition commodities	Health facilities too far from many populations and too few for population Limited government buffer stock capacity in budgets and at health facility and sub-county levels Many instances of pipeline breaks and stockouts of essential drugs for up to two to three months Inconsistent or untimely delivery by KEMSA

Workforce	Integrated multi-skill teams conducting outreaches Capacity development of CHVs in mass screening and outreach activities Stipends, allowances, and support for CHVs Gender- and ethnic-sensitive deployment of staff for outreach (in some cases)	Insufficient number of staff Workforce stress and exhaustion, particularly for women who also have household responsibilities Lack of retention of temporary staff Delays in paying CHV stipends Lack of flexible human resource system for surge/temporary allocation of staff to hotspots

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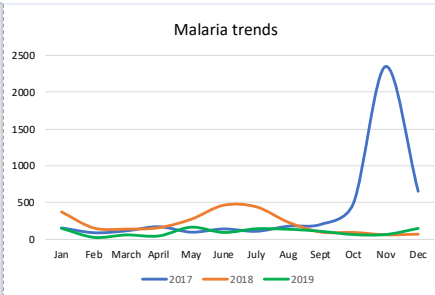
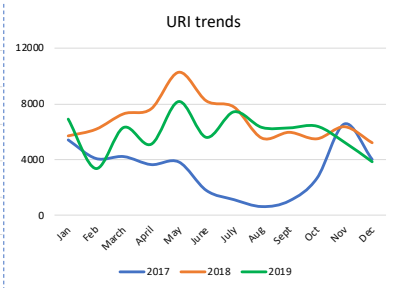
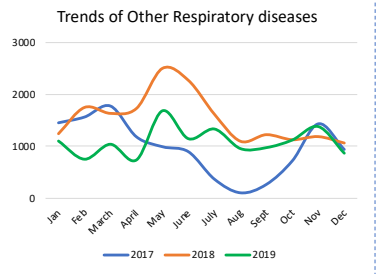
Annex A Morbidity admissions for Marsabit, Turkana, and Wajir

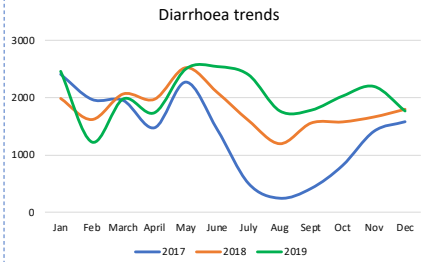
Marsabit county

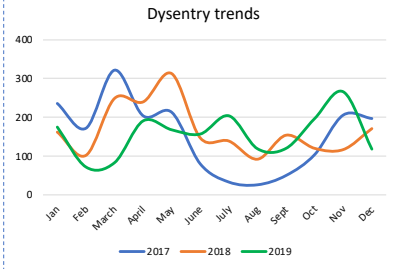
Morbidity trends for above 5-year olds, by Year | 2017-2019





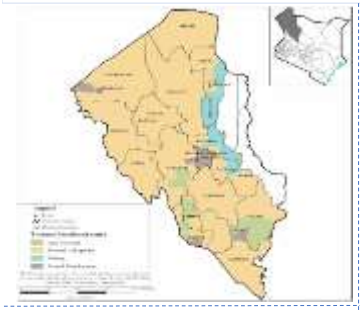


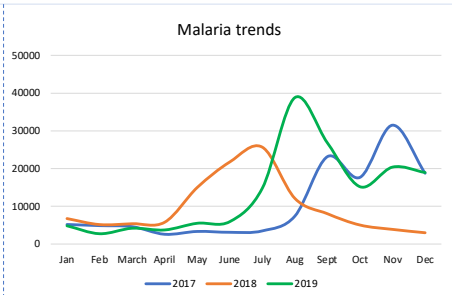


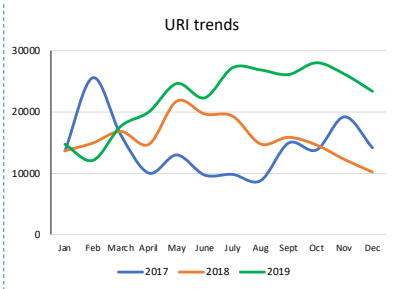


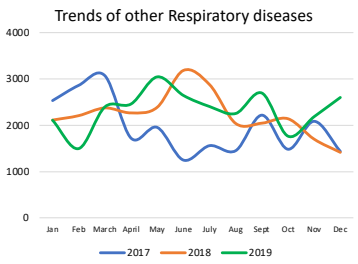
Turkana county

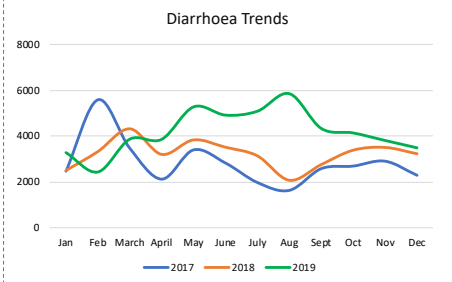
Morbidity trends for above 5-year olds, by Year | 2017-2019

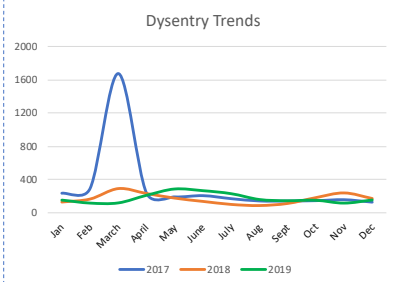


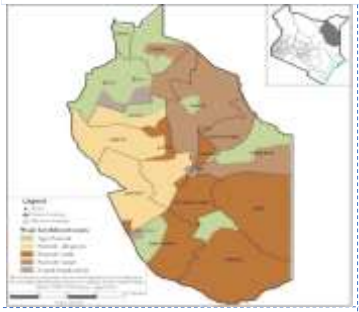
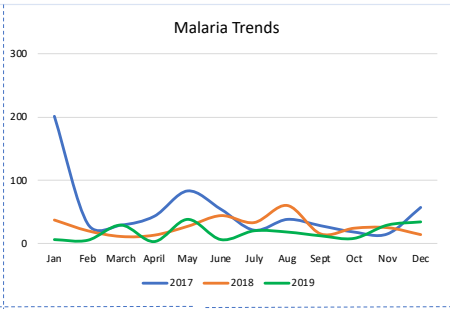
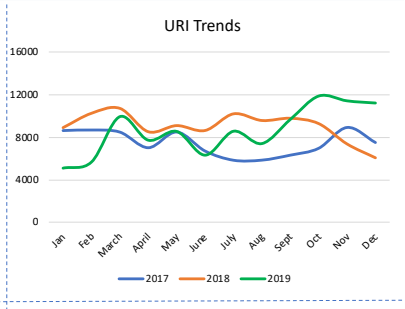
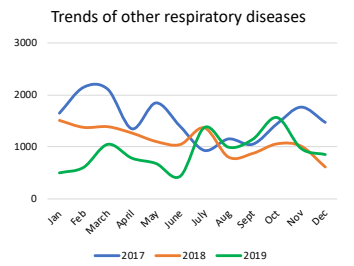
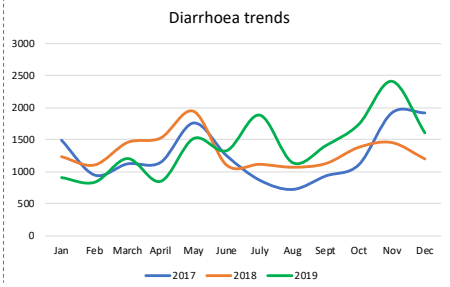
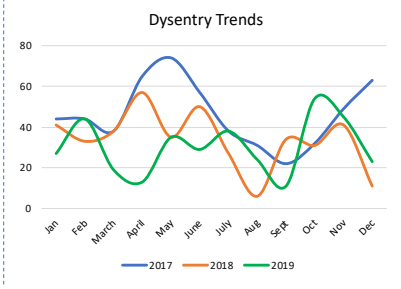










Wajir county

Morbidity trends for above 5-year olds, by Year | 2017-2019