

1 **Building a climate resilient health system: Lessons from Health National Adaptation Planning**  
2 **(H-NAP) in Uganda**

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31

32 **Abstract**

33 Climate change is increasingly affecting both health and the systems required to deliver care, particularly  
34 in low-resource settings. In response, Uganda developed its Health National Adaptation Plan (H-NAP)  
35 2025–2030 to guide climate change adaptation in the health sector. However, limited analytical attention  
36 has been paid to how low-resource countries are developing and institutionalising health adaptation  
37 planning, what enables these processes, and what constraints shape early implementation. This paper  
38 examines the development and early implementation of Uganda’s H-NAP using a qualitative insider policy  
39 and process case study approach. The analysis draws on policy and planning documents generated during  
40 and around the H-NAP process, including the H-NAP itself, the national Climate Change Health  
41 Vulnerability and Adaptation Assessment (VAA), and related strategic and technical materials. Guided by  
42 a climate-resilient health systems lens, the paper explores how the H-NAP emerged, how it was  
43 developed, how it frames resilience within the health sector, and what lessons its early institutionalisation  
44 offers for low-resource settings. The findings show that Uganda’s H-NAP emerged through a sequenced  
45 process of agenda setting, evidence generation, stakeholder engagement, iterative drafting, and  
46 institutional validation. The national VAA was central in reframing climate change as a health systems  
47 issue by documenting risks to facilities, service continuity, preparedness, utilities, and vulnerable  
48 populations. The H-NAP was subsequently developed as a systems-oriented adaptation instrument  
49 addressing leadership and governance, workforce development, evidence systems, integrated risk  
50 monitoring and early warning, infrastructure and supply chains, environmental determinants of health,  
51 emergency preparedness, financing, and climate-informed programming. The Ugandan case suggests that  
52 health adaptation planning can be strengthened by country-specific evidence, strategic leadership by  
53 Ministry of Health (MOH), and broad-based multisectoral engagement through consultations, technical  
54 review, and validation; however, implementation remains constrained by financing gaps, limited  
55 institutional ownership, coordination challenges, and the difficulty of translating national policy into sub-  
56 national action. Uganda’s H-NAP therefore demonstrates that the value of H-NAPs depends on whether  
57 they move beyond paper commitments through sustained financing, institutional coordination, technical  
58 capacity, and effective sub-national implementation. Importantly, it shows that Uganda should be  
59 understood not as a model to be adopted/emulated mechanically, but as a case that offers transferable  
60 lessons for other low-resource settings.

61 **Keywords**

62 Adaptation; Climate change; Climate-resilient health systems; Health National Adaptation Plan; health  
63 systems; low-resource settings; policy process; Uganda

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## 66 1. Background

67 Climate change is increasingly recognised as a major threat to public health, with effects that are already  
68 being felt across populations and health systems worldwide (1, 2). The 2015/16 Paris Agreement seeks to  
69 hold the increase in global average temperature to well below 2°C above pre-industrial levels while  
70 pursuing efforts to limit it to 1.5°C (3, 4), yet climate-related hazards continue to intensify and place  
71 growing pressure on health systems (1, 2, 5-14). These hazards have exacerbated existing health risks and  
72 created new public health challenges, including the spread of vector-borne diseases, waterborne  
73 infections, respiratory illnesses, and nutrition-related conditions (1, 2, 5-14). The World Health  
74 Organisation (WHO) estimates that between 2030 and 2050, climate change could cause approximately  
75 250,000 additional deaths annually from undernutrition, malaria, diarrhoea, and heat stress alone (1, 2).  
76 Such growing risks have elevated climate change from purely an environmental concern to a pressing  
77 health systems issue that affects service delivery, preparedness, infrastructure, and continuity of care.  
78 These challenges are particularly acute in low- and middle-income countries, where health systems often  
79 operate with limited resources, weaker infrastructure, and lower adaptive capacity (15-17).

80 In Uganda, climate-related hazards such as droughts, floods, storms, and landslides have increasingly  
81 affected livelihoods, communities, and devastated essential services (18-22). To better understand these  
82 risks, the Ministry of Health (MOH), in collaboration with Makerere University School of Public Health  
83 (MakSPH) and the WHO Country Office Uganda, conducted a nationwide Climate-Health Vulnerability and  
84 Adaptation Assessment (VAA) across 716 health facilities in Uganda (23). The assessment documented  
85 widespread risks of exposure to climate-related hazards and identified critical gaps in emergency  
86 preparedness, workforce capacity, water, sanitation and hygiene systems, energy systems, and health-  
87 care waste management (23). It also highlighted compounded risks among vulnerable groups, including  
88 refugees, pregnant women, children, and people living with chronic conditions (23). Against this  
89 background, adaptation planning emerged as a key mechanism for organising health sector responses to  
90 climate change. Globally, these efforts are advanced through the National Adaptation Plan (NAP) process,  
91 which provides a framework for countries to identify and address medium- and long-term adaptation  
92 needs within national planning systems (24).

93 The WHO has emphasised that climate change must be integrated into national health planning and,  
94 equally, that health must be integrated into national climate planning (25). Within this process, ministries  
95 of health are encouraged to develop a standalone health-specific component, the Health National  
96 Adaptation Plan (H-NAP), while also ensuring that health is embedded in the overall NAP (25). However,  
97 recent global evidence suggests that, although health is now widely recognised within national adaptation  
98 planning, the extent to which it is institutionally embedded remains uneven. A WHO review of 59 NAPs  
99 found that while all identified health as a climate-vulnerable sector, only 78% of the NAPs with a sectoral  
100 structure included a specific health section or chapter, 29% referenced a separate H-NAP or climate  
101 change and health strategy, 59% specified an ongoing role for the health sector in NAP coordination, and  
102 only 42% identified the Ministry of Health or equivalent as the lead agency for developing the health  
103 component (25). These findings suggest that progress has been stronger in recognising health  
104 vulnerability than in fully institutionalising health leadership within adaptation planning. This uneven  
105 institutionalisation helps explain why dedicated health adaptation planning remains important. Earlier  
106 WHO guidance similarly showed that, although health was recognised in many National Adaptation  
107 Programmes of Action (NAPA), only about 4% of the Least Developed Countries Fund portfolio supporting  
108 the NAPA process targeted health adaptation (26), partly because of the limited participation of the health  
109 sector and insufficient technical guidance for proposal development (26). Dedicated health adaptation  
110 planning is therefore important for defining priorities, strengthening coordination, improving access to

111 adaptation finance, and ensuring that health is more firmly positioned within national adaptation  
112 governance (27).

113 Uganda's experience is especially relevant in this regard because it illustrates how health can move from  
114 being recognised within climate policy to being more deliberately organised through a sector-specific  
115 adaptation process. Uganda's health adaptation planning emerged within a policy context that includes  
116 the National Adaptation Program of Actions (2007) (28), the National Climate Change Policy (2015) (29),  
117 the Paris agreement (2016), the Climate Change Act (2021) (30), National Development Plan IV, and  
118 Uganda's Nationally Determined Contributions (25). Within this broader framework (27), Uganda  
119 prioritised the development of a H-NAP. Uganda committed at COP26 in Glasgow in 2021 to undertake a  
120 national climate and health VAA and to develop an H-NAP. The resulting H-NAP 2025–2030 was launched  
121 in August 2024. The plan was developed based on findings from the national assessment to guide climate  
122 change adaptation in the health sector, mobilise technical and financial resources, and support  
123 implementation at the sub-national level as part of strengthening climate resilience in the health system  
124 (25). Since its launch, Uganda has also initiated several implementation steps, including the establishment  
125 of a national climate-health coordination mechanism, the integration of climatic variables into DHIS2, the  
126 dissemination of the H-NAP in climate hotspot districts, and efforts to mobilise climate financing. These  
127 developments suggest that Uganda's H-NAP is beginning to move adaptation beyond policy recognition  
128 toward institutional and operational change within the health sector. The plan reflects a systems-oriented  
129 understanding of adaptation. It aligns with the WHO's operational framework (*Figure 1*) (31) and  
130 prioritises ten components, including climate-transformative leadership and governance, risk monitoring  
131 and early warning, a climate-smart health workforce, climate-informed programming, and resilient  
132 infrastructure, among others.

133 Although climate change and health have received growing global attention, less analytical focus has been  
134 placed on how countries in low-resource settings have institutionalised adaptation within the health  
135 sector, what enables that process, and what barriers continue to shape implementation after policy  
136 adoption. Uganda offers a timely and policy-relevant case because it has moved from vulnerability  
137 assessment to health adaptation planning and early implementation within a relatively short period. This  
138 paper examines how Uganda's Health National Adaptation Planning process contributes to building a  
139 climate-resilient health system. Examining this process can generate useful lessons not only for Uganda,  
140 but also for other countries seeking to translate climate-health commitments into operational health-  
141 system reforms.

## 142 **2. Approach, analytical lens and author positionality**

### 143 **Case study approach**

144 This paper examines the development and early implementation of H-NAP using a qualitative insider  
145 policy and process case study approach. A case study approach was appropriate because there was need to  
146 understand a contemporary policy process within its real-world institutional context, with attention to  
147 how the H-NAP emerged, how it was framed, and how it contributes to building a climate-resilient health  
148 system. The study was “insider” in nature because some of the authors were directly involved in the H-  
149 NAP development process through collaboration between Makerere University School of Public Health,  
150 the Ministry of Health, the WHO, and other relevant stakeholders, including government ministries,  
151 development partners, and Civil Society Organisations (CSOs). Uganda was selected as a policy-relevant  
152 case because it has moved from climate-health vulnerability assessment to health adaptation planning  
153 and early implementation within a relatively short period (of less than one year and a half). Following  
154 commitments made at COP26 in 2021, Uganda undertook a national climate and health VAA and  
155 subsequently developed the H-NAP 2025–2030, which was launched in August 2024.

156 **Analytical lens**

157 The analysis drew on several documentary sources generated during or directly related to the H-NAP  
158 process. These included the Uganda H-NAP 2025–2030, the national Climate Change Health VAA (2023),  
159 meeting minutes, relevant Ministry of Health climate-health materials, and WHO guidance on health  
160 adaptation planning. Additional contextual materials, process documents describing the implementation  
161 of the H-NAP, such as coordination, dissemination, risk monitoring, and resource mobilisation actions,  
162 were also reviewed. The analysis was informed by WHO guidance on health adaptation planning and the  
163 broader climate-resilient and low-carbon health systems lens. In addition to the climate-resilient health  
164 systems lens, interpretation of the H-NAP was informed by the WHO quality criteria for H-NAPs. Particular  
165 attention was paid to: 1) whether the Ministry of Health led the development process, 2) whether other  
166 health-determining sectors were engaged, 3) whether the plan identified climate-sensitive health risks  
167 and most-at-risk populations, 4) whether it articulated adaptation actions, financing, and monitoring  
168 arrangements, and 5) how these elements were positioned within the broader institutional context of  
169 implementation (25). This was especially useful for examining the extent to which Uganda’s H-NAP moved  
170 beyond recognising climate-related health risks to address questions of leadership, coordination,  
171 resourcing, and implementation.

172 The analysis combined deductive and inductive thematic approaches. Deductive coding was informed by  
173 the WHO health adaptation planning guidance and climate-resilient health systems lens, while inductive  
174 coding captured process-specific themes emerging from the Ugandan case. Themes were then organised  
175 to address three core questions: how the H-NAP emerged, how it framed resilience within the health  
176 sector, and what opportunities and constraints shaped its early implementation.



177 **Figure 1: WHO operational framework for building climate resilient health systems [Source WHO (25,**  
178 **31)].**

180 **Author positionality and reflexivity**

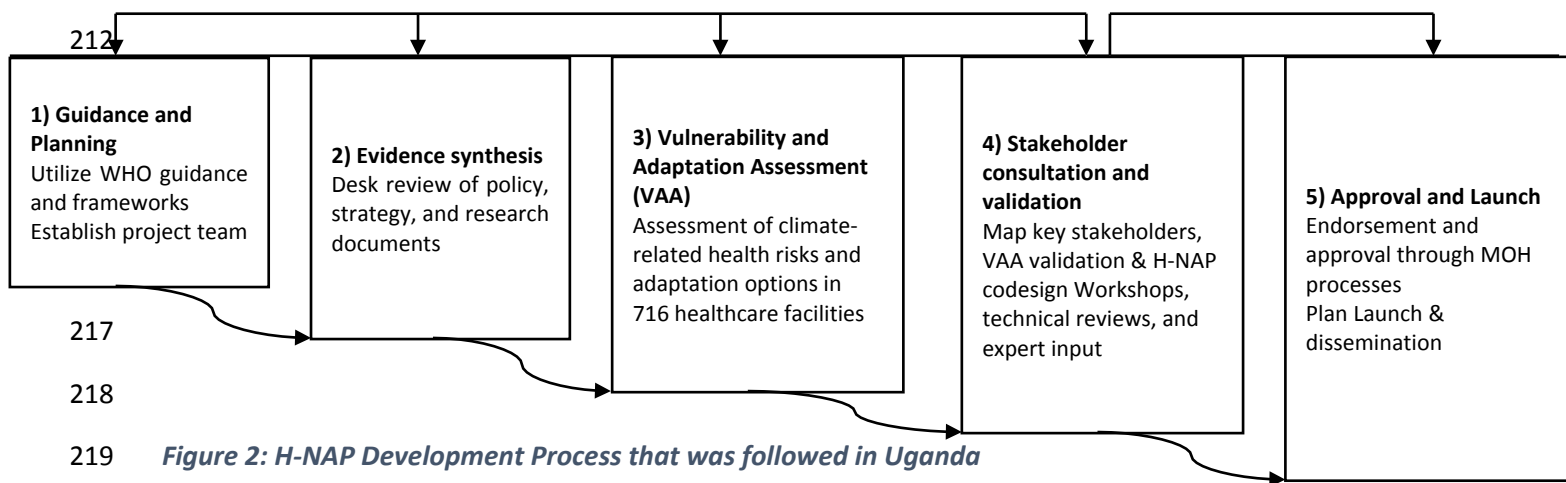
181 Some of the authors of the paper were directly involved in the development of Uganda’s H-NAP through  
182 collaboration between Makerere University School of Public Health, the Ministry of Health, WHO, and  
183 other stakeholders. This insider position provided important contextual and process knowledge, including  
184 familiarity with the sequence of planning activities, stakeholder consultations, and technical discussions  
185 that informed the H-NAP. At the same time, the authors recognised that direct involvement in the process  
186 could introduce interpretive bias. To strengthen analytical rigor, the study drew on multiple documentary  
187 sources, was informed by stakeholder consultations undertaken during the H-NAP process, and adopted  
188 a critical interpretive approach that attended to both the achievements and constraints of the H-NAP  
189 process. The intention was not to provide a celebratory account of the plan, but to generate a balanced  
190 analysis of how national health adaptation planning can contribute to climate-resilient health systems in  
191 practice.

192 **3. How the H-NAP was developed**

193 Figure 2 shows the development process of the H-NAP, which was coordinated by the MOH, Uganda and  
194 involved a systematic approach guided by several key documents. The WHO provides comprehensive  
195 guidance for developing the HNAP, outlining principles and fundamental concepts of the national health  
196 adaptation planning process, critical elements of health adaptation to climate change, and specific steps  
197 in plan development (32). This WHO HNAP guidance aligns with the technical guidelines for formulating  
198 and implementing NAPs developed by the LDC Expert Group (LEG) (33). Additionally, the WHO’s  
199 Operational Framework for Building Climate-Resilient and Low-Carbon Health Systems (*figure 1*) offered  
200 a systematic and comprehensive approach to addressing the health impacts of climate change. The H-  
201 NAP development process largely aligned with WHO guidance on health adaptation planning. This was  
202 reflected in Ministry of Health leadership, the use of a national VAA, multisectoral consultation,  
203 identification of climate-sensitive health risks and vulnerable populations, articulation of adaptation  
204 actions, and inclusion of monitoring and evaluation provisions. However, alignment was not mechanical.  
205 The process was, however, adapted to the Ugandan context by combining WHO H-NAP guidance with the  
206 LEG NAP framework and lessons from Uganda’s broader NAP process, the agricultural sector NAP, and  
207 other country H-NAPs. It was also more iterative than strictly linear, with repeated rounds of consultation,  
208 technical review, validation, and revision. These adaptations were necessary to strengthen country  
209 ownership, ensure fit with existing institutional and planning systems, and improve feasibility within a  
210 resource-constrained setting.

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219 **Figure 2: H-NAP Development Process that was followed in Uganda**

220 **Evidence generation and the role of the VAA**

221 The H-NAP was informed by a rigorous evidence-generation process aimed at ensuring that adaptation  
222 priorities were anchored in the best available scientific, policy, and contextual evidence. An extensive desk  
223 review was conducted covering global frameworks and strategies, national policies and plans, legal and  
224 regulatory documents, country commitments under relevant regional and international processes,  
225 research literature, and selected benchmarks from other NAPs and H-NAPs. In particular, lessons from  
226 Uganda’s broader NAP process (34), the Uganda Agricultural Sector NAP (35), and the Health National  
227 Adaptation Plans of Ethiopia and Tanzania (36, 37) helped shape the framing of priorities, the organisation  
228 of strategic actions, and the overall design of the plan. The desk review was used to clarify the policy  
229 context for health adaptation planning, synthesise evidence on the climate–health nexus, and guide the  
230 identification of priority areas for action.

231 The evidence base was complemented by a national VAA, which provided the empirical foundation for  
232 the H-NAP. The VAA assessed the magnitude and distribution of climate-related health risks and  
233 vulnerabilities across the health system, guided by the WHO quality criteria for H-NAPs (32). The  
234 assessment began with the establishment of a multidisciplinary project team constituted around the  
235 technical competencies required to deliver the work. Ethical approval for the VAA was obtained from  
236 Makerere University School of Public Health Research Ethics Committee and the Uganda National Council  
237 for Science and Technology. The assessment also drew on multiple sources of evidence, including  
238 literature reviews, meteorological data, climate preparedness and impact reports, District Health  
239 Information Software 2 (DHIS2) and related databases, previous strategic plans, and performance review  
240 reports. The system framing of the VAA was critical because it provided the rationale for a sector-specific  
241 adaptation plan. It also shaped the logic of the H-NAP itself, whose priorities were subsequently organised  
242 through a systems lens.

#### 243 **Agenda setting and problem recognition**

244 Agenda setting for the H-NAP was shaped by the growing visibility of climate-related health risks in  
245 Uganda and the broader momentum generated by global climate and health commitments. A major  
246 turning point came in late 2021, when Uganda committed at COP26 to undertake climate and health  
247 actions, including a climate change health VAA and the development of a Health National Adaptation Plan.  
248 In April 2022, the Ministry of Health and WHO convened a high-level advocacy meeting to mobilise  
249 development partners and other sectors around these commitments. What made this agenda-setting  
250 phase important was that it created a policy mandate for action. Rather than treating climate change and  
251 health as a diffuse or secondary concern, the COP26 commitment and subsequent advocacy activities  
252 gave the issue administrative visibility and a clearer set of next steps. These included conducting a national  
253 assessment, strengthening health sector capacity, and developing a plan that could guide adaptation and  
254 support access to climate-related financing. In this sense, agenda setting was not only about problem  
255 recognition; it was also about defining climate and health as a legitimate area of planning and institutional  
256 responsibility within the health sector.

#### 257 **Stakeholder engagements and multisectoral coordination**

258 A central feature of the H-NAP development process was collaboration. The plan was collaboratively  
259 developed by the MOH, drawing on WHO guidance, academic involvement, and co-development with  
260 state and non-state stakeholders. Prior to developing the plan, a stakeholder mapping and analysis  
261 exercise designed to identify the institutions and actors most relevant to climate and health adaptation,  
262 assess their mandates, interests, and potential roles, and determine how best to engage them across  
263 different stages of the process was conducted. These stakeholders included the Ministry of Water and  
264 Environment (Climate Change Department), Ministry of Local Government, Ministry of Finance, Planning  
265 and Economic Development, National Planning Authority, Ministry of Health, Office of the Prime Minister,  
266 Ministry of Agriculture, Animal Industry and Fisheries, Academia, Civil Society Organizations (CSOs), UN

267 Agencies (such as United Nations Development Programme (UNDP), WHO, United Nations Children’s Fund  
268 (UNICEF), researchers, Non-Governmental Organizations, and development partners, among others. The  
269 stakeholder engagements primarily took the form of workshops, technical reviews, key informant  
270 interviews, and expert consultations. These interactions focused on reviewing and validating the VAA  
271 findings, formulating the strategic direction of the H-NAP, conducting technical reviews, and validating  
272 the final plan. This collaborative approach mattered for both technical and political reasons. Technically,  
273 it enabled the VAA findings to be interpreted and translated into credible, critical priority areas within the  
274 health sector. Institutionally, it helped position the H-NAP as a Ministry of Health-led plan while ensuring  
275 alignment with the mandates, expectations, and concerns of other actors whose support would be  
276 essential for implementation. Stakeholder engagement was therefore not merely consultative; it was a  
277 core mechanism through which legitimacy, feasibility, multisectoral coordination, and institutional  
278 ownership were built into the H-NAP development process.

### 279 **Drafting, consultation, and revision**

280 The development of the H-NAP was iterative. Draft versions were presented to workshops, Technical  
281 Working Groups (TWGs), MOH senior management, the Health Policy Advisory Committee (HPAC) and  
282 top management for review, approval, and ownership. This implies that the drafting process involved  
283 more than technical compilation; it required repeated validation and revision in order to align the plan  
284 with sector priorities, strengthen institutional acceptability, and secure formal support. For instance,  
285 comments from consultations prompted reconsideration of how some priorities were framed, how  
286 responsibilities were assigned, and how the relationship between national-level strategy and sub-national  
287 action was articulated. These consultations also created space for concerns raised by relevant ministries  
288 to be discussed, negotiated, and ultimately reflected in the final plan. This iterative revision process  
289 helped move the H-NAP from a technically sound document to one that was also institutionally grounded  
290 and more likely to secure ownership across the health sector. In this respect, the H-NAP was shaped not  
291 only by evidence but also by review processes through which different levels of the health system engaged  
292 with and refined the plan.

### 293 **What the development process reveals**

294 Overall, the development of Uganda’s H-NAP reveals that national health adaptation planning in low-  
295 resource settings depends on more than policy intention. It requires a recognisable policy trigger, an  
296 evidence base that reframes climate change as a health systems issue, collaborative mechanisms that  
297 connect technical and institutional actors, and iterative review processes that build ownership across the  
298 system. Uganda’s experience also suggests that the value of an H-NAP lies not only in the final plan, but  
299 in the development process itself: a process through which climate change is repositioned from a  
300 peripheral environmental concern to a matter of health governance, service continuity, and system  
301 resilience. At the same time, the process highlights the fragility of adaptation planning when financing,  
302 competing priorities, and institutional perceptions are not fully aligned.

#### 303 **4. Uganda's H-NAP as a pathway to climate-resilient health systems**

304 In this section, we discuss the H-NAP in relation to the WHO operational components for climate-resilient  
305 and low-carbon health systems (31) and interpret it in light of the WHO quality criteria for H-NAPs (25).  
306 This helps to show what the plan prioritises and how it is positioned to support implementation and  
307 institutionalisation within the health sector. The H-NAP prioritises a range of interventions and actions  
308 aligned with the WHO Operational framework and the WHO quality criteria for H-NAPs, which ensures a  
309 standardised approach to building climate-resilient and low-carbon health systems. Its strategic  
310 interventions are intended to achieve the following specific objectives: 1) establish a national coordination  
311 framework for climate and health adaptation; 2) Mainstream and integrate climate and health in  
312 ministries, departments and agencies (MDAs) and non-state actors in their respective programs; 3)  
313 Prioritize actions to address the health impacts of climate change; 4) Advocate for resource mobilization  
314 and allocation for the implementation of context-specific climate and health adaptation measures; and  
315 5) Promote the generation and use of evidence in climate and health decision-making. Ultimately, the H-  
316 NAP aims to build a climate-resilient health system in Uganda that protects and promotes the health and  
317 well-being of the people of Uganda by addressing the impacts of climate change on health.

#### 318 **Climate-transformative leadership and governance**

319 The plan explicitly identifies climate-transformative leadership and governance as a core component and  
320 links it to three broad strategic functions: improving coordination for climate and health action,  
321 mainstreaming climate and health in planning at all levels, and strengthening advocacy and lobbying for  
322 inclusion of climate and health issues in plans and budgets. In doing so, the H-NAP signals that resilience  
323 will not be achieved through technical measures alone, but through the institutionalisation of climate and  
324 health within the structures, rules, and decision-making processes of the health sector and related  
325 systems.

326 At the institutional level, the H-NAP proposes the establishment and functionalization of a Climate and  
327 Health coordination mechanism within the Ministry of Health's Environmental Health Department, the  
328 creation of an inter-ministerial committee on health and climate change that includes civil society and  
329 private-sector actors, and the formation of Climate Change and Health Technical Working Groups to  
330 provide technical support and guidance. These actions are important because they move climate and  
331 health from a diffuse cross-cutting concern into a more clearly governed domain with identifiable  
332 structures for stewardship, oversight, and intersectoral engagement. From a health systems perspective,  
333 this matters because fragmented responsibilities and weak coordination often undermine adaptation  
334 efforts even when risks are well recognised. The governance ambitions of the H-NAP also extend beyond  
335 the Ministry of Health itself. The plan proposes the development of guidelines for mainstreaming climate  
336 and health within the health sector and other MDAs, local governments, and the private sector; the  
337 dissemination of the H-NAP at national, regional, and sub-national levels; and advocacy among  
338 stakeholders at all levels. This is significant because it treats governance as a process of horizontal and  
339 vertical integration. Horizontally, it recognises that climate-sensitive health risks are shaped by sectors  
340 such as water, environment, agriculture, local government, and finance. Vertically, it acknowledges that  
341 adaptation must be translated from national policy into regional and district planning and action. In this  
342 sense, the H-NAP frames governance not simply as administrative control, but as the means through  
343 which climate and health priorities are embedded across planning systems and across scales of  
344 implementation.

345 The plan also links governance with communication, advocacy, and constituency-building. It proposes  
346 training leaders at national and sub-national levels, training media practitioners in climate and health  
347 messaging, supporting women- and youth-inclusive community advocacy campaigns, and integrating  
348 climate and health messaging into the Ministry of Health Communications Strategy and the Uganda

349 National Climate Change Communications Strategy. These actions suggest that leadership is also  
350 understood as the capacity to shape agendas, build public and institutional support, and normalise climate  
351 and health as a legitimate area of policy concern. For a climate-resilient health system, this is crucial:  
352 without political visibility, communication capacity, and broader social uptake, even technically sound  
353 adaptation plans can remain weakly implemented.

#### 354 **Climate-smart health workforce**

355 A health system's ability to respond effectively to climate change hinges on the competency and  
356 availability of its workforce (31, 38, 39). This workforce includes not only health care providers but also  
357 administrative personnel, managers, and decision-makers. In Uganda's H-NAP, the workforce is therefore  
358 broadly defined to include not only frontline providers but also administrative personnel, managers, and  
359 other key actors whose decisions shape preparedness, response, and adaptation within the health system.  
360 The H-NAP translates this concern into a set of practical workforce interventions. These include training  
361 health workers on climate and health, integrating climate and health into pre-service and in-service  
362 curricula, developing and disseminating information, education, and communication materials, and  
363 conducting regular supervision and mentorship visits at regional and district levels. The plan also proposes  
364 incorporating Global Consortium on Climate and Health Education core concepts into health training  
365 curricula, thereby institutionalising climate competence within professional preparation rather than  
366 treating it as a one-off in-service activity. This is a significant move because it embeds adaptation capacity  
367 within the routine reproduction of the workforce itself.

368 Equally important is the H-NAP's recognition that workforce readiness requires organisational anchoring,  
369 not only knowledge transfer. For this reason, the plan proposes that districts designate climate and health  
370 focal persons to coordinate climate and health activities at the local level and support implementation  
371 and monitoring of adaptation measures. This is analytically important because it shows that the H-NAP  
372 does not treat workforce development as a generic training agenda; rather, it links capacity building to  
373 institutional roles, supervision, and accountability structures. Thus, the plan begins to address a common  
374 weakness in adaptation planning, where technical awareness is promoted without creating the personnel  
375 arrangements needed to sustain action within routine health system functions. The plan positions the  
376 workforce as an enabling foundation for adaptation across the rest of the health system. A climate-  
377 resilient health system requires workers who can interpret climate-sensitive risks, apply climate  
378 information in service delivery and planning, and support implementation at national and sub-national  
379 levels. Uganda's H-NAP frames workforce strengthening as a long-term resilience strategy rather than a  
380 short-term capacity-building activity by investing in training, curriculum reform, supportive supervision,  
381 and focal-point structures.

#### 382 **Vulnerability, Capacity, and Adaptation Assessment**

383 Conducting VAAs generates policy-relevant evidence on the scale and nature of climate-related risks to  
384 health and health systems, helps identify the populations and geographic areas most at risk, establishes  
385 baseline conditions, and assesses the potential health impacts of future climate change (31, 40, 41). On  
386 that basis, the H-NAP proposes not only to build on the national VAA already undertaken, but also to  
387 institutionalise this function through the development of gender-responsive guidelines and standardised  
388 methodologies for conducting VAAs and risk assessments at both national and sub-national levels. These  
389 guidelines will provide a consistent framework for identifying and evaluating climate-related health risks,  
390 ensuring that assessments are comprehensive and comparable across regions and sectors.

391 The plan also emphasises that district-level assessments should identify specific vulnerabilities, capacities,  
392 and adaptation needs to inform planning and implementation at the local level. In a country where  
393 climate-related risks vary considerably across ecological and administrative contexts, this sub-national

394 orientation matters because it grounds resilience-building in local evidence rather than generic national  
395 assumptions. The H-NAP further strengthens this evidence architecture by proposing the mapping of  
396 institutions involved in climate and health, as well as the development of a one-stop data repository for  
397 climate and health information. The repository is intended to serve as a centralised platform for storing,  
398 analysing, and sharing knowledge generated through VAAs and other climate and health research  
399 initiatives. This is significant because climate-resilient health systems depend on generating evidence and  
400 organising it in ways that make it accessible for planners, researchers, and implementers.

401 The plan's emphasis on standardised VAAs, district-level assessment, institutional mapping, and shared  
402 data platforms suggests an understanding that resilience requires systems capable of learning, updating  
403 priorities, and refining interventions over time. In this sense, the H-NAP uses vulnerability assessment and  
404 evidence systems to move the health sector toward a more adaptive mode of governance; one in which  
405 climate and health decisions are expected to be iterative, data-informed, and responsive to changing risk  
406 patterns.

#### 407 **Integrated risk monitoring and early warning**

408 The H-NAP aims to enhance Uganda's capacity to anticipate, monitor, and respond to climate-related  
409 health threats (31). Based on the VAA, these threats include increased incidences of vector-, water-,  
410 zoonotic, and food-borne diseases, as well as non-communicable diseases (NCDs) such as cardiovascular,  
411 malnutrition, respiratory illnesses, and mental health conditions, among others (23). In this respect, the  
412 H-NAP moves beyond a narrow emergency-response orientation and frames climate resilience as the  
413 capacity to detect emerging risks early, track them over time, and act before they escalate into wider  
414 health system disruption. The plan translates this ambition into several linked interventions. First, it  
415 proposes developing a DHIS2-based platform that integrates climate and health data for early warning,  
416 enabling real-time monitoring of climate-sensitive diseases. Second, it calls for updating surveillance  
417 systems to better monitor climate-sensitive conditions and for greater use of digital health platforms for  
418 early warning, disease surveillance, and telemedicine. Third, it emphasises interoperability across key  
419 databases, specifically the Office of the Prime Minister disaster database, the Ministry of Health's DHIS2,  
420 and the Ministry of Water and Environment's climate forecast systems. This is particularly important  
421 because climate-resilient health systems depend on more than data availability; they require systems that  
422 can convert diverse streams of information into timely intelligence for planning and action (42, 43).  
423 Through the proposed actions, the H-NAP attempts to reduce fragmentation between environmental  
424 monitoring and health surveillance. That shift matters in a setting where climate hazards and disease risks  
425 are closely intertwined but have often been monitored through separate institutional systems. In effect,  
426 the H-NAP seeks to move the health sector from reactive reporting toward a more anticipatory model of  
427 risk governance. The plan also gives notable attention to communication as part of the early warning  
428 process. It proposes periodic communication of climate and health updates to sub-national stakeholders  
429 and explicitly calls for integration of indigenous knowledge into risk analysis and communication. This  
430 broadens the idea of early warning beyond technical surveillance to include interpretation, dissemination,  
431 and local usability of information. This is significant because warning systems only contribute to resilience  
432 if information reaches decision-makers and communities in forms that support preparedness and  
433 response.

#### 434 **Climate-resilient infrastructures, technologies, and supply chains**

435 The VAA recognised that climate shocks affect the health system not only through increased disease  
436 burdens but also through damage to facilities, disruption of utilities, and breakdowns in records and  
437 logistics (23). Owing to this, the HNAP proposes several linked actions. These include revising existing  
438 health infrastructure standards to better enable facilities to withstand climate-related hazards,  
439 monitoring compliance with the revised standards through inspections and audits, and training relevant

440 stakeholders to design, construct, and maintain climate-resilient facilities. The plan also calls for advocacy  
441 around the installation of clean energy technologies, such as solar power systems, to reduce facility  
442 vulnerability to electricity disruptions. In addition, it highlights the digitisation of health records and  
443 processes at the facility level as a resilience measure to protect critical information from physical damage  
444 or service interruptions associated with climate-related events. This is significant because it broadens  
445 adaptation beyond emergency response to include the material and operational foundations of care.  
446 Revising infrastructure standards speaks to long-term structural resilience; clean energy speaks to the  
447 reliability of essential services; and digitisation strengthens the continuity of information and  
448 administrative functions during disruptions. Overall, these measures suggest that the H-NAP understands  
449 resilience not only as the ability to respond after a shock but also as the capacity to keep facilities  
450 functional, connected, and safe when shocks occur. This is especially important in low-resource settings,  
451 where even short-lived disruptions in power, records, or facility functionality can quickly cascade into  
452 service breakdowns and reduced access to care.

### 453 **Environmental determinants of health and H-NAP**

454 Uganda's H-NAP also advances climate resilience by addressing the environmental determinants of health  
455 as a distinct adaptation domain. This is a notable strength of the plan because it shifts part of the  
456 adaptation agenda upstream, beyond health service delivery alone, to the environmental conditions that  
457 shape population vulnerability. The plan explicitly focuses on proactive management of climate-related  
458 risks linked to water, sanitation, food security, nutrition, and air quality, recognising that these  
459 determinants are central pathways through which climate change affects health. In doing so, the H-NAP  
460 frames climate-resilient health systems as systems that engage with the environmental drivers of risk  
461 before they translate into avoidable disease burdens.

462 The H-NAP translates this orientation into three broad sets of actions. First, it proposes monitoring of  
463 environmental determinants through joint multi-sectoral risk management to identify and address risks  
464 associated with WASH, food and nutrition security, and air quality, alongside public awareness efforts to  
465 strengthen household resilience. Second, it calls for strengthening the regulatory framework by  
466 advocating the revision of the Environmental Impact Assessment and Audit Regulations to increase the  
467 involvement of health experts, supporting ministries, departments, agencies, and local governments in  
468 enforcing environmental regulations, and encouraging districts to review community programmes and  
469 projects for climate and health mainstreaming. Third, it proposes revising the roles and responsibilities of  
470 partners involved in the multisectoral management of environmental determinants of health. Together,  
471 these measures show that the plan treats environmental health not as a peripheral issue, but as a core  
472 arena for adaptation governance and prevention.

473 This component is important because it broadens the meaning of resilience. A climate-resilient health  
474 system cannot depend only on healthcare facilities, surveillance, and emergency response if the  
475 underlying environmental conditions that generate health risks remain unaddressed. The inclusion of  
476 environmental determinants also reinforces the multisectoral logic of the H-NAP. The plan explicitly links  
477 the management of these determinants to collaboration among government ministries, non-  
478 governmental organisations, and academic institutions, while also highlighting the integration of health,  
479 gender, youth, sexual and reproductive health, and climate change. This suggests an understanding that  
480 resilience depends not only on technical adaptation measures but also on the health sector's ability to  
481 influence and work with other sectors whose decisions shape exposure and vulnerability. In this sense,  
482 the H-NAP's approach to environmental determinants strengthens climate resilience by extending health  
483 system action into the broader social and ecological conditions that make populations more or less able  
484 to withstand climate-related threats.

### 485 **Climate-related emergency preparedness and management**

486 Effective emergency preparedness and management are essential for mitigating the health impacts of  
487 climate-related events (31). The H-NAP emphasises strengthening the health sector's capacity to prepare  
488 for, respond to and recover from weather and climate-related disasters. The plan calls for updating  
489 national disaster reduction strategies to incorporate the use of climate-related emergency preparedness  
490 and management data. This will ensure that the health sector's emergency plans and procedures are  
491 informed by the latest climate projections and risk assessments. Additionally, the H-NAP aims to improve  
492 gender-responsive, multi-sectoral collaboration in responding to climate-related emergencies at the  
493 regional and district levels. This collaborative approach will enhance the health system's ability to  
494 effectively coordinate and mobilise resources during times of crisis. Recognising the importance of  
495 community-level preparedness, the H-NAP includes interventions to increase household resilience to the  
496 impacts of climate change. This involves conducting public awareness campaigns, particularly targeting  
497 vulnerable populations such as women, girls, youth, the disabled, low-income groups, internally displaced,  
498 refugees, the elderly, and indigenous communities. Furthermore, the plan proposes integrating climate-  
499 related health emergency preparedness and response into the School Health Programme, as well as  
500 college and university curricula. This will help build the capacity of future generations to understand and  
501 respond to climate-related health emergencies.

### 502 **Sustainable climate and health financing**

503 Securing sustainable financing is critical for implementing climate adaptation measures within the health  
504 sector. Uganda's H-NAP also recognises that climate resilience in the health sector will remain largely  
505 aspirational unless it is matched by credible financing pathways. The H-NAP explicitly notes that, although  
506 several climate finance mechanisms already exist in Uganda, they are not yet sufficiently oriented toward  
507 the specific adaptation needs of the health sector. In response, the plan frames financing not simply as a  
508 question of mobilising more money, but as the broader task of aligning existing financing streams, building  
509 capacity to access external funds, and creating a more strategic resource base for implementation. The  
510 financing approach proposed in the H-NAP is notably diversified. It seeks to leverage internal mechanisms  
511 such as support from development and implementing partners already engaged in climate-related  
512 initiatives, sector-relevant national financing instruments such as the Uganda Development Bank Climate  
513 Finance Facility, and funds established under legal frameworks for environmental and natural resource  
514 management, including the National Environment Fund, Wildlife Fund, and Tree Fund. At the same time,  
515 the plan looks outward to international financing opportunities under the UNFCCC and Paris Agreement  
516 architecture, including the Global Environment Facility, Green Climate Fund, Adaptation Fund, and Loss  
517 and Damage Fund, as well as bilateral, multilateral, and philanthropic partners. It also signals openness to  
518 innovative financing mechanisms, including climate-related insurance schemes, private sector  
519 engagement through corporate social responsibility and Environmental, Social, and Governance (ESG)-  
520 linked financing, and partnerships with academic institutions for capacity building and research. This  
521 breadth is important because it reflects an understanding that no single financing source is likely to be  
522 sufficient for a cross-cutting adaptation agenda of this scale

523 Beyond identifying possible funding sources, the H-NAP proposes specific institutional measures to  
524 improve the health sector's ability to access and use climate finance. These include training stakeholders  
525 in resource mobilisation and grant writing at national and sub-national levels, increasing funding for  
526 project management operations for climate-related programmes within the Ministry of Finance, Planning  
527 and Economic Development, and advocating for increased national budget allocations for health and  
528 climate change policies and actions. The plan also proposes advocacy training to strengthen negotiation  
529 skills for climate and health financing and calls for the development of a comprehensive resource  
530 mobilisation plan specifying funding mechanisms, proposal options, timelines, and responsibilities. These  
531 actions position financing capacity itself as part of resilience. In other words, the H-NAP treats the ability

532 to identify, negotiate, secure, and manage resources as a core institutional function necessary for  
533 sustained adaptation. Without sustainable financing, the governance structures, workforce investments,  
534 surveillance systems, infrastructure improvements, and emergency preparedness measures set out in the  
535 H-NAP would be difficult to institutionalise over time.

### 536 **Health and climate research, and climate-informed health programs**

537 A final prong in which the H-NAP functions as a pathway to a climate-resilient health system is by  
538 positioning research, knowledge use, and program adaptation as ongoing system functions rather than  
539 secondary activities. The plan places strong emphasis on generating and using evidence to inform both  
540 policy and practice, and it organises this component around two linked ideas: knowledge generation and  
541 management, and knowledge translation and use. This is important because resilience depends not only  
542 on having a plan at a given point in time, but also on the health system's ability to continue learning,  
543 updating priorities, and adapting programs as climate risks evolve. In that sense, the H-NAP treats  
544 research and evidence use as part of the adaptive capacity of the system itself.

545 The research dimension of the H-NAP is notably broad. The plan proposes training stakeholders to  
546 strengthen research capacity, conducting periodic research on the interconnections between climate  
547 change and health, and supporting collaborations among government, civil society, academia, and the  
548 private sector. It specifically highlights the need for evidence on complex and cross-cutting areas,  
549 including sexual and reproductive health, mental health, gender, and nutrition in relation to climate  
550 change. To support this agenda, the H-NAP proposes the development of a shared data platform or  
551 repository that can be used by all stakeholders to store, access, and apply climate and health evidence.  
552 This is analytically significant because it frames research as both an isolated academic exercise and a  
553 collective infrastructure for innovation, policy learning, and evidence-based adaptation.

554 The plan then extends this logic into climate-informed health programming. It proposes integrating  
555 information on current and projected climatic conditions into the strategic planning of health programs  
556 for climate-sensitive diseases, mainstreaming climate change into national health policy and  
557 implementation guidelines, and incorporating climate-related health risks into regional and district plans.  
558 It also calls for developing systems that integrate climate change data into the national health database  
559 to support monitoring of climate-health linkages and adjustment of programs over time. From a health  
560 systems perspective, this matters because it moves climate information from the margins of planning into  
561 the routine design and refinement of health programs. The H-NAP, therefore, does not treat climate-  
562 informed programming as an optional add-on; it presents it as a way of making service delivery, planning,  
563 and program management more responsive to changing risk patterns.

564 This component is strengthened further by its attention to operational change. The H-NAP proposes  
565 revising standard operating procedures to integrate climate resilience into the delivery of public health  
566 programs and interventions; developing projects that mainstream climate change across health programs  
567 at different levels; and updating medium- and long-term plans with actions to prevent climate-related  
568 health outcomes. It also emphasises capacity building within the health system, civil society, and  
569 communities so that multiple actors can contribute to climate-informed programming. These actions  
570 position the H-NAP as more than a planning instrument: they suggest a pathway through which research,  
571 data systems, policy, and service delivery can be continuously connected.

## 572 **5. H-NAP implementation challenges**

573 Uganda's case also highlights tensions that arise when a broad adaptation agenda encounters the realities  
574 of implementation in a low-resource health system. While the H-NAP sets out an ambitious and  
575 appropriately wide-ranging systems framework, its realisation depends on capacities and conditions that

576 remain limited. Financing remains a central constraint, as the plan itself recognises the need for increased  
577 budget allocations, stronger resource mobilisation, and improved project management support.  
578 Institutional ownership is also likely to vary across actors and levels of the system, particularly where  
579 climate change is still seen as peripheral to core health sector mandates. Related to this are coordination  
580 challenges: the H-NAP calls for formal coordination mechanisms, inter-ministerial structures, and  
581 technical working groups precisely because multisectoral alignment cannot be assumed. The plan also  
582 relies heavily on translation into district-level action through focal persons, district assessments, and  
583 integration into local plans, yet this requires local administrative, technical, and financial capacity that  
584 may not be equally available across settings. More broadly, the Ugandan case illustrates the difficulty of  
585 balancing strategic ambition with implementation feasibility. In practice, the challenge is not only  
586 technical, such as building interoperable data systems, training the workforce, or integrating climate  
587 information into routine planning, but also political, involving prioritisation, ownership, resource  
588 allocation, and sustained commitment across institutions.

## 589 **6. Lessons for other low-resource settings**

590 Uganda's H-NAP process offers a useful lens for understanding what it takes to move from climate-health  
591 concerns to more institutionalised adaptation planning in a low-resource setting. One of the clearest  
592 lessons from Uganda's experience is that national health adaptation planning gains traction when it is  
593 grounded in context-specific evidence rather than developed primarily as a response to external policy  
594 expectations. The national VAA played a critical role in this regard by translating climate change from an  
595 abstract policy issue into a concrete set of risks affecting facilities, services, populations, and health system  
596 functions. This mattered because it gave the H-NAP a stronger empirical foundation and helped frame  
597 adaptation as a practical response to documented vulnerabilities rather than as a generic climate  
598 commitment. For other low-resource settings, this suggests that the quality and legitimacy of a health  
599 adaptation plan depend heavily on whether the process is preceded or accompanied by systematic  
600 national or sub-national assessment of climate-related health risks and capacities.

601 A second lesson is that technically sound adaptation planning is unlikely to be sustained without  
602 institutional ownership. Uganda's H-NAP benefited from a process that involved the Ministry of Health,  
603 academia, and a broad set of state and non-state actors. This appears to have strengthened the plan's  
604 technical credibility while also positioning it as a Ministry of Health-led instrument rather than an  
605 externally driven climate document. Importantly, ownership was reinforced through review, validation,  
606 and endorsement processes that helped move the H-NAP from a technical product to a plan with broader  
607 institutional legitimacy. For low-resource settings, this is important because health adaptation plans can  
608 easily be perceived as donor-facing or other-sector products unless the health sector itself leads and owns  
609 the process. The Ugandan experience also suggests that engagement matters most when it goes beyond  
610 consultation and contributes to the shaping of priorities, language, responsibilities, and implementation  
611 pathways. Adaptation planning in low-resource settings often fails when coordination is weak or when  
612 plans are developed in isolation from the institutions expected to operationalise them. Uganda's process  
613 suggests that engagement across ministries, technical actors, and implementation stakeholders can help  
614 build legitimacy, improve feasibility, and create the conditions for follow-through. Thus, multisectoral  
615 engagement should be understood not simply as a good process, but as part of the substance of resilient  
616 health governance.

617 Rather than focusing narrowly on climate-sensitive diseases, the plan addresses different components  
618 including: leadership and governance, workforce capacity, evidence systems, integrated risk monitoring,  
619 infrastructure and utilities, environmental determinants of health, emergency preparedness, financing,  
620 research, and climate-informed programming. For other low-resource settings, this implies that health  
621 adaptation planning should be framed based on WHO guidance and focus on the institutional,

622 infrastructural, and operational capacities required to absorb and respond to climate shocks. Uganda's H-  
623 NAP shows that resilience planning becomes more credible when it links climate adaptation to existing  
624 concerns such as service continuity, data systems, facility functionality, local governance, and budget  
625 processes. This systems orientation may also make adaptation more acceptable within ministries of  
626 health, because it connects climate action to core sector responsibilities rather than presenting it as an  
627 entirely new or external agenda.

628 Uganda's H-NAP process also shows that policy adoption is only the beginning of resilience-building. The  
629 early institutional steps reported after launch, including climate-health coordination structures,  
630 dissemination efforts, integration of climate variables into information systems, and attempts to mobilise  
631 financing, suggest that Uganda has already started moving beyond policy declaration toward  
632 operationalisation. This is important because many plans fail to influence practice when they are not  
633 connected to concrete institutional mechanisms. Uganda's experience, therefore, suggests that early  
634 institutionalisation matters: the period immediately following adoption is critical for establishing  
635 structures, expectations, and systems that can sustain momentum. At the same time, the Ugandan case  
636 makes clear that implementation remains the decisive challenge. Financing constraints, competing  
637 priorities, uneven capacity across levels of the health system, and the persistent tendency to frame  
638 climate change as mainly an environmental issue all threaten to limit the depth and speed of operational  
639 change. These constraints are unlikely to be unique to Uganda. Indeed, they are likely to characterise  
640 many low-resource settings where adaptation is expected to advance within already overstretched health  
641 systems. The broader lesson, therefore, is that successful H-NAP development does not eliminate  
642 implementation risk; rather, it makes those risks more visible and more urgent to address.

643 A further lesson from Uganda is that national planning will only contribute to resilience if it is translated  
644 into sub-national practice. The H-NAP explicitly recognises this by proposing district-level assessments,  
645 dissemination in hotspot districts, designation of focal persons, and local planning and implementation  
646 actions. This is a particularly important feature because climate-related risks are often unevenly  
647 distributed across districts, ecological zones, and population groups. A purely national adaptation plan  
648 may provide strategic direction, but resilience is ultimately built in the places where services are delivered,  
649 communities are exposed to hazards, and local actors must respond under conditions of constraint. In  
650 low-resource settings, this highlights the need to view national adaptation planning as a framework for  
651 differentiated implementation rather than a uniform rollout. Uganda's emphasis on district-level  
652 engagement, local assessments, and climate-informed planning suggests one possible way of bridging  
653 national strategy and local realities. However, it also points to a persistent challenge: sub-national  
654 translation requires technical support, financing, and administrative capacity that may be weak or  
655 unevenly distributed. The H-NAP therefore creates an opportunity, but whether that opportunity is  
656 realised depends on how effectively national ambition is converted into district-level capability.

657 Uganda's experience also suggests that H-NAPs should not be copied mechanically across settings. The  
658 specific institutional arrangements, stakeholder configurations, and implementation pathways that  
659 supported the Ugandan process were shaped by the country's policy environment, existing partnerships,  
660 and the availability of a national vulnerability and adaptation assessment. What appears most  
661 transferable is not the exact form of the Ugandan H-NAP but the underlying process: grounding the plan  
662 in country-specific evidence, ensuring Ministry of Health leadership, building multisectoral ownership,  
663 and linking adaptation priorities to implementation mechanisms. Equally, the Ugandan case suggests that  
664 H-NAPs are unlikely to move beyond paper commitments unless they are backed by sustained financing,  
665 coordination structures, technical capacity, data systems, and deliberate sub-national translation.

## 666 **7. Conclusion**

667 Uganda's H-NAP demonstrates how climate change can be translated from a broad policy concern into a  
668 structured health systems agenda. The plan was grounded in national VAA evidence and developed  
669 through a collaborative, Ministry of Health-led process. The plan addressed wider institutional,  
670 operational, and governance conditions that shape health system resilience. Consistent with the WHO  
671 operational components for climate-resilient health systems, it provides a pathway for embedding climate  
672 resilience across leadership and governance, workforce development, evidence systems, surveillance and  
673 early warning, infrastructure, environmental health, emergency preparedness, financing, and climate-  
674 informed programming. Uganda's experience makes clear that the value of an H-NAP lies not in its  
675 formulation alone, but in its ability to translate into sustained implementation. Financing gaps, uneven  
676 institutional ownership, coordination challenges, and the demands of sub-national translation all illustrate  
677 that the transition from policy ambition to operational change is neither automatic nor guaranteed.  
678 Uganda, therefore offers not a model to be copied mechanically, but a timely and policy-relevant case  
679 showing that health adaptation planning is most likely to contribute to climate-resilient health systems  
680 when it is grounded in country-specific evidence, led by the health sector, supported by multisectoral  
681 ownership, and backed by the institutional, financial, political, and technical conditions required for  
682 implementation.

## 683 **8. Limitations**

684 Some of the authors of this paper were directly involved in the H-NAP development process. While this  
685 insider position provided rich process knowledge and access to contextual detail, it also created the  
686 possibility of interpretive bias. To mitigate this risk, the analysis drew on multiple documentary sources,  
687 was informed by stakeholder consultations undertaken during the H-NAP process and adopted a critical  
688 interpretive approach that considered both the strengths and the constraints of the plan and its  
689 development. In addition, the paper focuses primarily on plan development and early implementation  
690 and therefore cannot assess the longer-term effectiveness of the H-NAP in strengthening health system  
691 resilience in practice. Future research will be needed to examine how the H-NAP is translated into  
692 implementation over time and what effects it has on health system resilience at national and sub-national  
693 levels.

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705 The authors declare no competing interests. Some authors were involved in the development and  
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708 interpretation of the findings presented in this manuscript.

## 709 **12. Author contributions**

710 John Bosco Isunju was responsible for leading the development of VAA & H-NAP and the composition of  
711 the manuscript. Aisha Nalugya, Bridget Nagawa Tamale, Justine N Bukenya, Doreen Nakalembe, and Jovan  
712 Galiwango made substantial contributions to the development of VAA and H-NAP, as well as to the writing  
713 of this manuscript. Solomon Wafula, Trasier Mukama, Richard Mugambe, Gerishom Gimaiyo, Suraj Man  
714 Shrestha, Didacus B. Namanya, Hebert Nabaasa and Rhoda K. Wanyenze conducted critical reviews of the  
715 VAA & H-NAP and this manuscript.

716

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