Transition Management for Improving the Sustainability of WASH Services in Informal Settlements in Sub-Saharan Africa—An Exploration

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Abstract: This paper explores how transition management processes can be designed to address the unsustainability of water, sanitation, and hygiene (WASH) services in informal settlements in cities in Sub-Saharan Africa. The unsustainability of services related to WASH in informal settlements in Sub-Saharan Africa is deeply embedded in current societal and governance structures, cultures, and practices; it is context-dependent and involves numerous actors with different interests. Based on a literature review and empirical work in Arusha (Tanzania), Dodowa (Ghana), and Kampala (Uganda), we identify five context dimensions that account for the unsustainability of WASH services: (a) multiplicity of WASH practices, structures, and arrangements; (b) governance capacities for WASH services and maintenance; (c) landownership for sustainable access to WASH; (d) public participation in decision-making related to WASH; and (e) socio-economic inequalities governing access to WASH. These dimensions pose numerous conceptual and application challenges for transition management. Based on these challenges, recommendations are formulated for the design of a contextualized, participatory transition management process that is not only functional, but also emancipatory.

Keywords: Sub-Saharan Africa; transition management; WASH; informal settlements; sustainability transitions

1. Introduction

Ensuring the availability and sustainable management of water and sanitation for all is one of the Sustainable Development Goals adopted by the United Nations in 2015 [1]. Despite this, the majority of the population of Sub-Saharan Africa (hereafter: SSA) lacks (access to) safe sanitation and clean water, and many ecosystems are heavily burdened [2]. Various factors play a role, including broader trends such as population growth, migration from rural to urban areas, and climate change [3,4]; governance issues, such as poor resources management, corruption, bureaucratic inertia, inadequate planning, and low citizen engagement [5,6]; and social and cultural factors like local power structures, cultures, and religious and political attachments [3].

There have been many attempts to address the lack of (access to) WASH services in SSA—including those provided by governments, international donors, (local) NGOs, and other organisations. However, these interventions, in many cases, are not sustained over time and/or have failed to meet expected outcomes [7–10]. The UNDP/UNICEF 2015 [11] reports that, worldwide, between 30 to 50% of WASH interventions failed after two to five years of their implementation. The Rural Water Supply Network (RWSN) states that in SSA, between 30% and 40% of installed hand pumps are not functioning [12]. Causes, consequences, and causal links of the unsustainability of WASH services are not easily identified and there are no straightforward solutions. Rather, the unsustainability of these services is deeply embedded in current societal and governance structures, cultures, and practices, and involves numerous actors with different interests and values. Such kinds of problems have been characterized as wicked or persistent and cannot be solved by business-as-usual, or by optimization strategies [13,14]. Achieving more sustainable WASH services requires systemic ways to understand the complexity of the problems at hand and to propose innovative governance approaches.

Sustainability transitions research addresses such persistent and large-scale societal challenges [15]. Transitions are considered as complex, long-term, and multi-actor societal processes fundamentally changing cultures, structures, and practices [16]. Since transitions can neither be commanded nor controlled, transition governance approaches allow for a fundamental ambivalence of goals and uncertainty of knowledge. One of these is transition management, which seeks to support sustainability transitions through fostering alternative ideas, practices, and social relations [17,18]. Transition management is a conceptual framework that can be used as a heuristic for analysing governance interventions in the context of sustainability transitions and offers operational guidance for organizing multi-actor learning and experimentation processes [19]. This governance approach views sustainability in all its facets—environmental, social, and economic. Transition management was developed in an interplay between policy and science in Europe and has been applied to diverse sustainability issues, including water management [20,21], at different geographical scales. To date, only a few studies have taken up transition management in non-European settings [21–25].

In this paper, we aim to harness the potential of transition management to address the unsustainability of WASH services in informal settlements in SSA contexts. Based on the identification of the challenges this context harbours for transition management, we formulate recommendations for designing contextualized multi-actor learning and experimentation processes that support a transition towards sustainable WASH in informal settlements in SSA contexts.

This introduction is followed by an outline of our methodology and our empirical setting: informal settlements in Arusha (Tanzania), Dodowa (Ghana), and Kampala (Uganda) (Section 2). This is followed by a more detailed introduction of transition management (Section 3). From there, we outline a number of context dimensions and the conceptual and application challenges they pose for transition management (Section 4). We recommend adaptations to transition management process methodologies (Section 5) before we conclude the paper (Section 6).

2. Materials and Methods

2.1. Case Studies

In SSA, the low quality of and poor access to WASH services have profound consequences for health and life expectancy [26,27]. Diarrhoea is a prime example [28,29], as is increased maternal mortality [30,31], the transmission of a range of tropical diseases [32,33], and respiratory infections [34]. To establish an empirically informed understanding of WASH services in informal settlements in SSA, we focus on the cities of Arusha (Tanzania), Dodowa (Greater Accra Region, Ghana), and Kampala (Uganda). These cities are diverse, specifically in terms of WASH governance, which allowed us to cater for the fact that SSA is a rather large and heterogeneous region.

Dodowa is a small district town with 12,070 inhabitants (2010) located in a peri-urban area of Ghana [35]. More than half of the residents rely on piped water, and others use multiple groundwater abstraction points or buy sachet water. Water is highly contaminated, especially by *E. coli* [36]. Kampala is the capital city of Uganda, with 1,507,000 inhabitants [37]. Over 60% of Kampala's population lives in informal settlements [38], where access to safe drinkable water is one of the big challenges: only 45% to 70% of the population have access to clean water [39]. The remainder of the population obtain water from polluted sources, such as protected and unprotected water springs. Arusha is a fast-growing city of about 400,000 inhabitants located within the Pangani River basin in Northeast Tanzania. The population depends on multiple sources of water (protected and unprotected springs, kiosks, piped water, sachet water, etc.) [40].

Our research is part of the T-GroUP project (2015–2020), an interdisciplinary and transdisciplinary research project aimed at: (a) better understanding the relationships (over time and within a defined area) between above-ground and below-ground water systems and (b) exploring the applicability of transition management to informal settlements areas in SSA. The partnering research institutes are based in Tanzania, Ghana, Uganda, The Netherlands, and Sweden. All research underlies strict ethical procedures agreed upon between and validated by the partnering institutes.

2.2. Research Approach

To increase the robustness of our understanding of WASH services in the three cities, we triangulated knowledge from different sources and research activities carried out as part of the T-GroUP project. Firstly, we conducted a systematic literature review of WASH in SSA, with a special emphasis on Arusha (Tanzania), Dodowa (Ghana), and Kampala (Uganda). We searched articles on SCOPUS using different combinations of the following key words: [WASH] or (water) or (sanitation) and (Accra) and (Ghana) and (Kampala) and (Uganda) and (Arusha) and (Tanzania). The resulting articles were supplemented by relevant grey literature, including reports by international institutions and/or donors such as the World Bank and UN, among others. Secondly, we relied on empirical material collected between 2015 and 2018 by T-GroUP. This includes 57 interview summaries, four master theses, and eight fieldwork reports. Thirdly, we analysed project-internal communication, most prominently reports and field-notes from two inter- and transdisciplinary workshops (in 2016 and 2017) which aimed at translating transition management to the three urban areas in question and featured all T-GroUP research institutes.

This data was used to identify five context dimensions and describe them in more detail. Based on these context dimensions, and a thorough review of transition management literature, we discuss conceptual and application challenges these dimensions pose for transition management. To formulate meaningful recommendations on how to address these challenges, we conducted targeted literature searches with regard to specific methods and topics.

3. Transition Management

Transition management is a reflexive governance mode which aspires to influence societal dynamics by stimulating multi-actor experimenting, searching, and learning processes towards sustainable futures [17,41–43]. In their overview chapter about transition management in the urban context, Wittmayer and Loorbach [18] distinguish between four elements of transition management (see Figure 1).
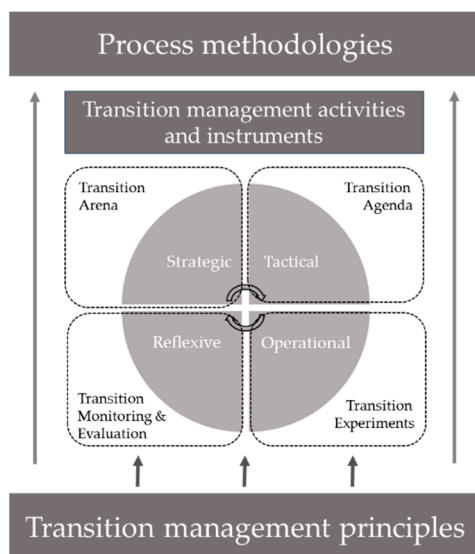
Figure 1. Translation from transition management principles to process methodologies (adapted from 18).

First, there is a set of principles for transition governance which forms the conceptual backbone of transition management and that is based on complex system thinking, sociological insights, and governance theories [17]. These principles include: (a) content and process are inseparable; (b) long-term thinking guides short-term policy; (c) objectives should be flexible and adjustable at the systems level; (d) timing is crucial, using system disequilibria as well as equilibria; (e) creating protected spaces for change agents to build up alternative regimes; (f) steering from outside a societal system is not effective; (g) focus on (social) learning; (h) participation from and interaction between stakeholders is necessary (cf. [17]). *When identifying the conceptual challenges (Section 4.6) that the unsustainability of WASH in informal settlements in SSA cities poses to transition management, we refer back to these principles.*

Second, these principles have been translated into a transition management framework (or cycle) [17] which distinguishes between operational, tactical, strategic, and reflexive governance activities. Strategic activities are related to the 'culture' of a societal (sub-) system (i.e., debates on norms and values, identity, ethics, sustainability). Among these activities, processes of vision development, strategic discussions, and long-term goal formulation are crucial for transition management [17]. Tactical activities are steering activities that are interest driven and relate to the dominant structures (regime) of a societal system, therefore including rules and regulations, organizations and networks, institutions, infrastructures, and routines. Operational activities are actions and experiments with a short-term horizon often carried out in the context of innovation projects and programs. Reflexive activities relate to the monitoring, assessment, and evaluation of transition interventions, but also of societal dynamics. Such reflexive activities are necessary to prevent lock-ins, and re-adjust and enable the exploration of new ideas and trajectories. From a transition management perspective, enhancing reflexivity is an integral part of governance processes [17]. *When identifying the application challenges for transition management (Section 4.6), we refer back to these different levels of governance activities.*

Third, these principles and governance activities have been operationalised into different transition instruments. These often not only entail technological, but also social, organizational, and business, innovations. A prominent instrument is the 'transition arena', a participatory learning process that allows change agents from different societal spheres to structure and (re)frame the societal problem and develop a shared vision for a sustainable future [44]. A more practical instrument is the 'transition experiment', where actors experiment with a specific solution with the aim of learning about its suitability and effectiveness to address societal problems [45].

Fourth, the different governance activities and associated instruments have been integrated in process methodologies for policy makers or intermediaries [46,47], but also for researchers, using action-oriented or transdisciplinary research approaches [48,49] (see Figure 2). Expanding the idea of a transition arena, it roughly covers the following steps [46,47]: (1) setting the stage and exploring local dynamics; (2) framing the transition challenge; (3) envisioning a shared future, exploring pathways, and building an agenda; (4) engaging and anchoring; (5) getting into action; and (6) reflexivity, monitoring, and evaluation. *When formulating recommendations for the design of transition management process methodologies to address the unsustainability of WASH in SSA cities (Section 5), we focus on the transition arena and use the different process phases as a structuring element.*
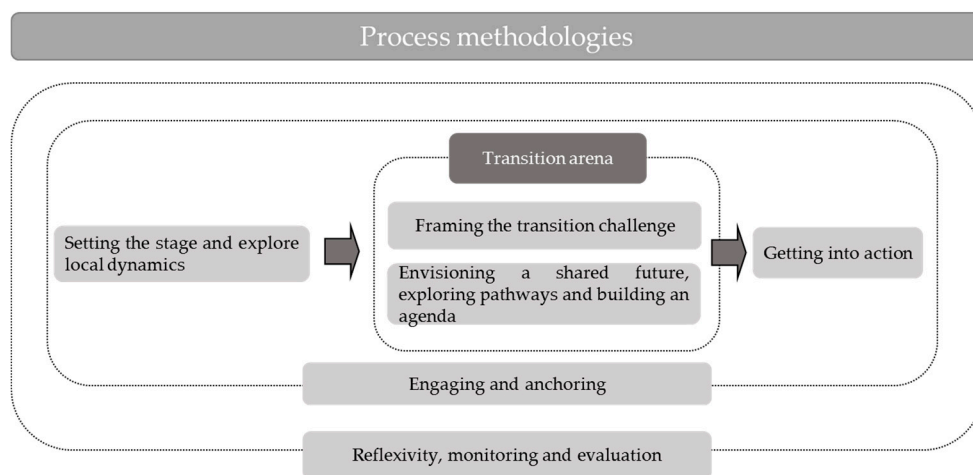
Figure 2. Different steps of the process methodologies.

Over the years, these transition management process methodologies have been contextualized and used to address sustainability challenges in a variety of cities (e.g., [19,21,50–52]). Since it seeks to create space for alternative ideas, practices, and social relationships [18,53], transition management does not replace, but rather co-exists with, other governance activities. According to Roorda et al. [46], transition management process methodologies have the potential to provide: (1) a sense of direction: since they allow for framings and ideas to be confronted while acknowledging the complexity of societal problems and the uncertainty of knowledge, alternative narratives about the underlying problems, the future directions, and possible strategies towards these can be developed; (2) an impulse for local change: alternative practices addressing or mitigating the immanent challenges can be developed or existing initiatives enriched; and (3) collective empowerment: actors from different backgrounds explore the past and the future together and explore alternative roles and role constellations, which enables them to address challenges and seize opportunities.

However, transition management has also been controversially discussed for its apparent neglect of power relations and the political nature of transition governance [19,54–58]. Several authors point to implementation challenges of transition management, stressing that it is not "a silver bullet solution for actually realizing ambitious sustainability objectives" [59] or an 'ideal type' that is barely attained in practice [60]. Implementation challenges include: finding a fit with ongoing dynamics and developments, specifically with policy making; holding on to the need for fundamental change; providing space and time for learning and reflexivity, while attending to the political character of change processes; and contextualising the approach (e.g., societal challenge, place, time, meaning of sustainability) [18]. The broader sustainability transitions thinking falls short when it comes to addressing the challenges and politics of just transitions and understanding the socio-political regime in the Global South [61]. These discussions regarding the politics of transition management and the implementation challenges have strongly influenced our exploration of a transition management design for addressing the unsustainability of WASH in SSA cities.

4. Conceptual and Application Challenges for Transition Management in Sub-Saharan Africa

In this section, we detail the unsustainability of WASH in informal settings in SSA cities along five dimensions. These context dimensions are neither exclusive to, nor by any means exhaustively accounting for, the unsustainability of WASH in the SSA context. Rather, we consider them as exemplars also pointing to the main differences between the European and the SSA context, and thereby revealing challenges to a euro-centric governance approach. For each context dimension, we introduce the main challenges it poses for transition management. To this end, we distinguish between challenges of a conceptual nature that question underlying assumptions, concepts, and principles of transition management, and application challenges related to the transition management framework and its distinction between governance activities at different levels.

4.1. Multiplicity of WASH Practices, Structures and Arrangements

The first context dimension refers to the informality and multiplicity that characterize the practices, (infra) structures, and arrangements of WASH in informal settlements [62–65].

Rather than (only) relying on the services supplied by the state or private companies, as is the case in the majority of European countries, the access to water and sanitation in informal settlements is a question of a mosaic of formal and informal practices, including a variety of actors, such as the state, private actors, NGOs, civil society, and international donors [66]. For example, in Kampala, community residents collect water from protected and/or unprotected springs, standpipes, self-supply mechanisms such as dug wells and manually drilled wells, and boreholes. In Arusha, water is supplied especially via kiosks (booths for the sale of tap water) and springs [40]. Sanitation structures in cities in SSA are also diverse, including improved facilities (such as flush toilets, ventilated improved pit latrines, pit and composting toilets) and unimproved facilities (such as bucket latrines, hanging toilets or hanging latrines) [67]. Additionally, open defecation continues to play a role [68].

On top of relying on a multitude of practices, many local residents engage in highly informal arrangements. They may prefer such familiar informal arrangements over formal ones that may be more costly or unknown [69–72]. While informal arrangements are a symptom of underlying inequalities in basic service delivery, they are not by definition worse in terms of hygiene and quality than formal arrangements.

This context dimension underlines the need to formulate flexible and adjustable objectives for transition management processes. However, it challenges the underlying implicit assumption of transition management and of sustainability transitions studies more broadly that there is one dominant way that a societal function is fulfilled; i.e., that the regime is a coherent entity with dominant practices, values, and structures [73]. This dimension also poses an application challenge in selecting transition experiments and the possible role of these experiments with regards to enabling change of the regime. Transition experiments could combine the advantages of decentral and multiple practices with the need to make these more equal, sustainable, and long-lasting, possibly through formalisation.

4.2. Governance Capacities for WASH Services and Maintenance

The second context dimension is the lack of governance capacities across actors to provide and secure WASH services and maintenance [6].

Firstly, the responsibility for public services in cities in SSA falls under mixed and fragmented organisational and governance structures, resulting in unclear roles and responsibilities, and suffers from a lack of accountability mechanisms [74,75]. In Dodowa and Kampala, decentralization policies have led to a transfer of responsibilities and resources for the provision of key services to sub-national authorities. This transfer was ineffective since it resulted in overlapping mandates and contributed to a replication of efforts and a waste of resources. In addition, local governments, such as district assemblies in Ghana, responsible for the maintenance and management of the facilities, do not have the capacity to manage WASH facilities effectively [74,76]. Besides state and private actors, international

and local NGOs, often funded by international donors, play an important role in providing WASH services (e.g., building wells and shared toilets). Due to the low local and national governance capacity, as well as low community involvement and government support, it proves to be difficult to maintain facilities over time. In Kampala, for example, active members of a community water committee stated that the local government does not provide funding, capacity building, or organizational support for maintaining a water well built by the Kampala Capital City Authority (KCCA).

Secondly, the low level of collaboration and trust between actors affects service delivery and hampers local engagement in water management [74]. The relationship between multiple governance levels is often defined by party political tensions. The relation between governments and societal actors is characterized by a lack of trust due to the fact that information is withheld and local actors are excluded from (often non-transparent) decision-making processes. In a focus group, the chairmen and the community leaders of the Kawaala community in Kampala described how the KCCA excluded community members from the decision-making process regarding drainage systems in their informal settlement. Other interviewees shared how water committees and Community-Based Organisations (CBOs) were not transparent about their funding. Organisations are also bureaucratic and hierarchical, which leads to representatives (e.g., of governmental institutes, private companies, or other local organisations) having to ask permission for joining participatory processes and only being able to speak on behalf of the organisation and not on personal title.

These governance issues reinforce the need for a systematic analysis of actors and their (power) relations, as well as of governance structures, at the beginning of a process. Roles and responsibilities of actors and institutions and their (power) relations are not always obvious. A shared understanding identifying undesirable power dynamics, practices, and expectations (e.g., clientelism) based on multiple forms of knowledge is needed. These governance dynamics challenge the principle of open and equal collaboration in a protected space, since this presupposes that spaces that show at least a certain degree of trust, mutual respect, and social equality can actually be created. Application challenges thus relate to building both trust and collaborations, as well as to the identification, selection, and capacity building of actors (cf. [73]) from different backgrounds, with one of the goals being to maintain experiments over time.

4.3. Landownership for Sustainable Access to WASH

The third context dimension relates to questions of landownership, planning, and the linked legal (un)certainty. Land ownership and/or access to land is generally important in relation to accessing, controlling, and maintaining water sources [77]. In many countries in SSA, indigenous, community-based property regimes have been subject to change into either centralized state-owned forms of tenure or individualized freehold private property [78,79]. Also, landownership is unequal and skewed [80] and residents lack security of tenure for the land or dwellings they inhabit, which are often rented out informally [81].

Such inequality often mirrors the socio-economic and political positions of different groups and is exacerbated by the fact that many informal settlements in SSA have been left out of formal planning for basic service provision and housing [82].

Furthermore, in Dodowa, Kampala, and Arusha, landownership is a sensitive issue. In Dodowa, for example, water prices reflect the power relations between tenants and landlords, with the former often paying more for water than the latter [83]. In Kampala, many water and sanitation projects failed in their ambition to provide services for a larger group due to land conflicts among community members. Landowners would be compensated for 'donating' their land for setting up WASH facilities. After some years, the landowners would take back ownership of the land, including the facility, and deny access if others would not pay for the usage. Thus, landownership issues can negatively impact access to water and sanitation facilities, as well as their sustainability.

Transition management is based on the conceptual assumption that it is possible to create a protected space to incubate and nurture innovations. However, existential insecurity (e.g., when

facing eviction, legal uncertainty, or unclear landownership) poses severe limitations to this principle. Ownership structures and associated power dynamics (e.g., between landowners and tenants) should be addressed, for example, throughout the process, including systems and actor analysis, and the envisioning and development of actions. The associated legal uncertainty could also be addressed by designing suitable transition experiments.

4.4. Public Participation in Decision-Making Related to WASH

The fourth context dimension relates to public participation in decision-making processes in general and in relation to WASH services particularly. Public participation refers to the goal of achieving better and more acceptable decisions by involving those affected [84].

On the one hand, most local governments in SSA do not offer opportunities for citizens to participate in decision making [85,86]. Additionally, even when local governments make the shift towards more inclusive forms of participatory decision making, as is the case in Ghana, they focus on elite populations [87]. Residents of informal settlements in particular lack a 'voice' related to service delivery at the local government level, as we have seen in Kampala and Dodowa. In turn, at the level of the informal settlement in Kampala, for example, decisions are made by a consensus among the most influential community actors (e.g., landowners, chairmen, local leaders, etc.), excluding more vulnerable community members like tenants.

On the other hand, residents also lack the financial resources, know-how, and 'right' network to take responsibility for the provision of water and the maintenance of facilities. Therefore, they tend to leave this to other actors, such as the state or municipal authorities, the private sector, or NGOs. When drilling for water samples, for example, T-GroUP researchers in all case studies (i.e., Arusha, Dodowa and Kampala) experienced strong expectations from residents towards the building of water infrastructures. In general, the awareness of residents and institutional actors regarding sustainable water use, as well as the provision and maintenance of water and sanitation facilities, is low, which, along with low governance capacities (see Section 4.1), aggravates the contamination of water sources and the environment.

This context dimension challenges the implicit assumption that transition management is designed to work against the backdrop of a well-functioning democracy (and bureaucracy) that ensures the respect of certain basic human rights for every citizen and provides space for and allows deviant and alternative ideas, practices, and social relations to develop and co-exist. Related application challenges are (a) to design a process that provides room for multiple forms of interaction and participation, explicitly including the most vulnerable; (b) to clearly define what is being decided on, by whom, and with which impact (expectation management related to the transition management process); and (c) to support the building of capacity (e.g., related to how to engage in participatory processes, to mobilise others, to take up the role as change makers) and democratic consciousness, possibly through popular education in the Freirean sense [88]. A shared monitoring and evaluation of the process can provide a mechanism for assessing the needs related to capacity building or education activities.

4.5. Socio-Economic Inequalities Governing Access to WASH

The fifth context dimension is related to the persistent and high level of poverty and social inequalities [89,90]. Residents of informal settlements have low access to basic services, such as education, health care, housing, water and sanitation, and city infrastructures like accessible roads within their settlements [82,91].

Unequal access to WASH is problematic in all three cities: Arusha, Dodowa, and Kampala. The water price, for example, varies between community members and is based on social status. This often results in those with the lowest social status (e.g., tenants) having to pay the most to secure access to safe water. As a result, they find themselves forced to use alternative (often contaminated) water sources. In Kampala, tenants explained that caretakers raised the price for piped water, causing

them to use unprotected water sources (i.e., water springs) instead. Additionally, social status, power, and low trust influence the opportunity for people to engage in active groups or local organisations (e.g., CBOs, water, sanitation or other issues committees, local active groups) [75] or in consensus decision making (see Section 4.4). Women are disproportionally disadvantaged—since it is expected that women ensure the water supply for the households while they are restricted in their right to own property or participate in decision-making processes ([92] cf. Sections 4.3 and 4.4]). These gender inequalities were identified in all three cities. In Zongo, a community in Dodowa, women were initially not allowed to participate in meetings organized by T-GroUP researchers without their husbands' consent.

Thus, social and communal ties play a key role in SSA contexts. If in some cases they reinforce certain norms and values and the accompanying inequalities, at the same time they contribute to create a sense of amity and security among the community members. At the base of SSA culture is the believe that the individual can ever hope to realize his social aspirations in life by mutually interacting with other community members and not only by living as an isolated being.

Low access to education seems to play a crucial role in reproducing social inequalities and in maintaining unsustainable sanitation and water practices. Many community members are not aware of the causes of water contamination, the health effects of using contaminated water, or the effects of open defecation or littering. Education, in fact, has been identified as a key factor in economic and social development, and the equitable access to good quality education has become a key objective of development policies [93]. Countries with high educational inequality consistently score low on innovation and show a tendency to transmit poverty across generations [94]. However, access to education is also dependent on one's sex, location, and asset index (for Kampala, see [95]). Many interviewees in Kampala explained the unfeasibility of paying school enrolment fees.

Like the governance issues, this context dimension challenges the principle of open and equal collaboration in a democratic space, since it presupposes a culture and socio-economic structure that at least allows this to a certain degree. It also challenges the focus of transition management on capable individuals that should participate based on personal title. On the one hand, this ignores that, in the SSA context, specific actions and experimentation might only be meaningful if combined with capacity building. On the other hand, it ignores cultural predispositions, such as being rooted in collectivism rather than individuals, and structures where participation in such processes is set aside for socially advantaged members (since these will be acting as representatives) (cf. 83). Application challenges include designing transition experiments, as well as a broader transition process, that challenge and address these hegemonic cultures and practices to provide more equal access to resources; or, more concretely, to make 'equal access' a prominent indicator for the monitoring and evaluation.

4.6. Conceptual and Application Challenges

Each of these context dimensions poses conceptual and application challenges for transition management aimed at addressing the unsustainability of WASH in SSA (see Table 1 for an overview).

The recommendations in the next section focus on ways to address the application challenges. With regards the conceptual challenges, some of these are in line with the questioning of concepts that has started with the recent uptake of transition thinking in 'developing' countries [73,89,90]. The main principle of transition management that is being questioned is the creation of a protected space where change agents can create alternatives to the status quo. The idea of a protected space, in fact, presupposes a well-functioning democracy that welcomes deviant and alternatives to emerge; as well as certain degrees of legal certainty, societal trust, mutual respect, and social equality; and the cultural belief that capable individuals are the most important organizing principle of social life.

Table 1. Overview of conceptual and application challenges for designing and applying transition management in SSA.

Context Dimensions	Conceptual Challenges (Relating to the Principles)	Application Challenges (Relating to Governance Activities)
Multiplicity of WASH practices, structures and arrangements	Open up the understanding of the 'regime' as coherent entity by paying attention to formal and informal practices, structures and arrangement as well as to their multiplicity	*Strategic:* Take stock of informal and formal practices, structures and arrangements as well as their multiplicity in the system analysis *Operational*: -Design the process taking specific local challenges and needs as well as strengths into account. -Design and select context-sensitive transition experiments that combine the advantages of decentral and multiple practices with the need to making these more equal, sustainable and long-lasting.
Governance capacities for WASH services and maintenance	Consider the limitations of open and equal collaboration in a protected space, since this presupposes at least a certain degree of trust, mutual respect and social equality	*Strategic:* Take account of multiple knowledges in identifying current roles, responsibilities and (power) relations (system analysis) *Tactical:* Enhance trust building and political awareness among actors from different societal domains as part of the process *Operational:* Strengthen governance capacities to maintain and sustain transition experiments over time *Reflexive*: Build capacities, address uneven power relations and enhance collaboration through shared monitoring and evaluation of process and outcomes
Landownership for sustainable access to WASH	Reconsider the contours and duration of a protected space that enables nurturing of innovations in the face of existential insecurity and legal uncertainty	*Strategic:* Take account of landownership in systems analysis *Strategic/tactical:* Include solutions for landownership issues in visions and pathways *Operational:* Design and/or select transition experiments that address legal uncertainty as well as existential insecurity, and thereby enhance equal access to water
Public participation in decision-making related to WASH	Address the issue of limited space for deviant and alternative ideas, practices, and social relations	*Strategic/operational:* Design processes that use different forms of interaction and participation to engage various actors with clear expectation management *Operational:* Set up transition experiments related to capacity building, democratic consciousness and popular education *Reflexive*: Use a shared monitoring and evaluation of process and outcomes to identify needs related to democratic principles
Socio-economic inequalities governing access to WASH	Consider the limitations for creating protected spaces and rethink selective participation of capable individuals	*Strategic:* -Design open and inclusive processes by considering alternative ways to select and engage actors -Consider approaches that give a voice to the most vulnerable and less powerful actors and create a safe environment -Integrate capacity building and skills development in the transition management process *Operational:* Design experiments that address and alter social inequalities and poverty related to access to basic services *Reflexive*: Make 'equal access' a prominent indicator for the monitoring and evaluation activities

5. Recommendations for the Design of Transition Management Processes

In this section, we translate the application challenges into recommendations focusing on the strategic instrument of the transition arena and its step-wise implementation (adapted from [18,46,47]) (see Figure 3).
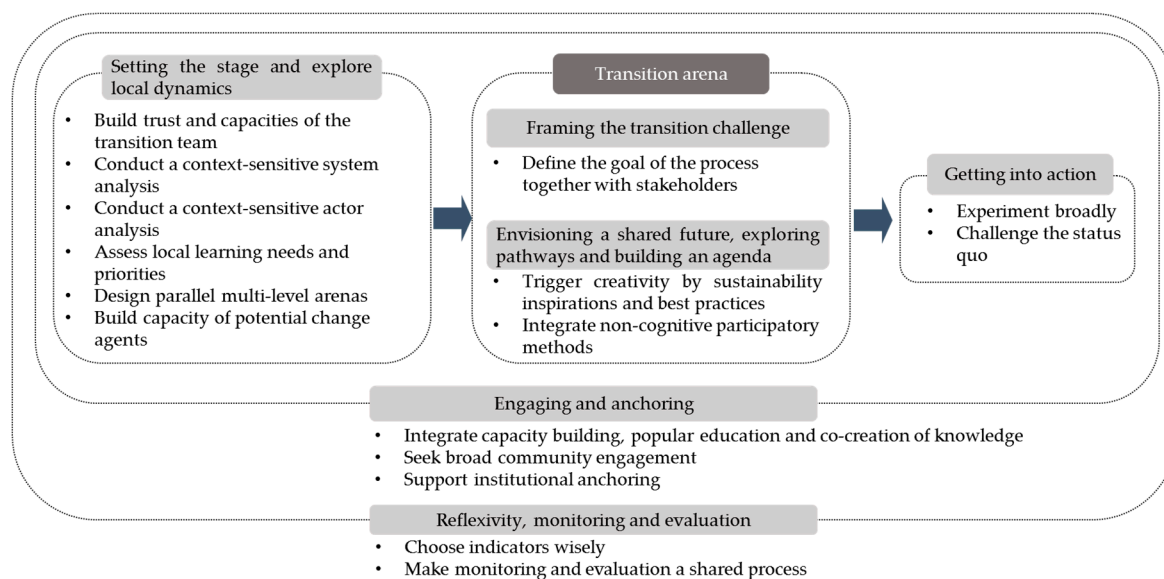
Figure 3. Recommendations for the design of transition management process methodologies.

5.1. Setting the Stage and Explore Local Dynamics

● **Build trust and capacities of the transition team.** The members of the transition team that guide the transition arena process should be trusted by and well-connected within the community and should include actors with analytical skills. To address ineffective WASH governance (Section 4.2) and deal with social inequalities (Section 4.5), it is vital to strengthen the capacity of the transition team to connect with the local stakeholders early in the process, e.g., communication skills and expectation management.

● **Conduct a context-sensitive system analysis.** To avoid the reproduction of persistent problems and social inequalities, it is important to take into account the multiplicity of WASH practices (Section 4.1), the (land) ownership structures related to service provision (Section 4.3), and the different levels and traditions of decision-making and participation (Section 4.4). Mapping governance capacities helps to identify gaps and possible opportunities for new collaborations across societal domains that can be crucial in anchoring the (outcomes of the) transition arena process in a later stage.

● **Conduct a context-sensitive actor analysis.** Since the social relations and inequalities between participants affect the process, a contextualized understanding of actor roles and relations should inform actor selection (Sections 4.2 and 4.5). This means understanding how conflicts of interest, power dynamics, and political tensions are interpreted and whether particular interests are prioritized [96]. At the community level, this means thinking about who is constituted as 'the community', how the community is socially organised, and how power is distributed [97]. Think of the allocation of resources (e.g., accessibility and affordability of water and possibly other services such as education) in relation to language, gender, religion, and political affiliation of the community members.

● **Assess local learning needs and priorities**. The identification of learning needs and priorities of local stakeholders allows the inclusion of targeted capacity building activities that, for example, strengthen governance and organizational capacities to support the sustainability of WASH services (Section 4.2). This could be done by, for example, integrating principles and tools from the community development literature [98], like a needs assessment [99] or co-created learning processes with engaged stakeholders [100–102].

● **Design parallel multi-level arenas.** To deal with the challenges of bringing together participants from different societal domains and levels of hierarchy in the context of low levels of trust (Sections 4.2 and 4.5), a multi-level process could be designed that organizes different and parallel transition arenas for each group of actors (e.g., community, state, organizational actors). These parallel processes can be connected through a separate platform where the different groups can progressively

meet, interact, and share their experiences. It is key to identify the suitable moment to integrate the processes based on relevant (power) dynamics, social customs, and the advances in capacity and trust building. The multi-level transition arena process needs to be designed based on a system, actor, and learning needs assessment.

● **Build capacity of potential change agents.** Not only is sustainability a new issue in informal settlements in SSA with low awareness about it, but residents also cannot access many resources (such as education, networks, facilities) that would be important for developing and maintaining WASH facilities in a sustainable way. The selection of participants should therefore also consider the *potential* of actors in engaging in future actions and experiments, and the process should provide them with opportunities to learn, build capacities, and access resources.

5.2. Framing the Transition Challenge

● **Define the goal of the process with stakeholders.** Based on an initial assessment of the system, actors, and local learning needs, the transition challenge, and therewith the goal of the process, is formulated. Framing the challenge in a way that relates to the daily experience and priorities of the broader public is crucial in enhancing a sense of ownership in a later phase. Notwithstanding, it should also unleash transformative ambitions regarding the status quo to ensure that the unsustainability of the current WASH system will be addressed.

5.3. Envisioning a Shared Future, Exploring Pathways and Building an Agenda

● **Trigger creativity by sustainability inspirations and best practices.** To address a lack of awareness on unsustainability problems related to WASH services (Section 4.4), the transition team could raise awareness of sustainability practices and behaviours (e.g., through field visits, learning exchange activities among communities, videos, etc.), encourage a sense of place and belonging, and share experiences of related (sustainability) initiatives. Speakers from relevant local initiatives, projects, or programs (e.g., representatives of community organisations or NGOs also from elsewhere) could be engaged in the process to share best practices and innovative actions that could inspire and motivate participants to identify local opportunities and to start new collaborations.

● **Integrate non-cognitive participatory methods.** The range of participatory methods of transition management (back-casting, envisioning, etc.) could be expanded to support the (emotional) expression of institutionalised inequalities or power dynamics between actors as well to increase human rights awareness. Integrating tools such as 'photo voice' [103,104], forum or community theatre [105–107], or community-led total sanitation approaches [108,109] could allow the expression of issues difficult to express with words.

5.4. Engaging and Anchoring

● **Integrate capacity building, popular education, and co-creation of knowledge.** Unequal access to education and other social services is one of the challenges of the SSA context. To enhance the uptake and impact of transition arena outcomes over time, it seems important to build knowledge, skills, and capacity in a practice-oriented way. Activities rooted in a popular education paradigm or participatory development, or related to capacity building and co-creation of knowledge, bear the promise to address many of the challenges mentioned in Section 4 [110–112]. They can contribute to making the engagement of more vulnerable members and disadvantaged groups possible, encourage learning exchanges across communities, and contribute to the development of new networks. In addition, they can support active citizenship and social inclusivity, and foster governance capacities [113–115].

● **Seek broad community engagement.** To ensure a positive impact of the transition arena process on the wider community, insights and capacity building should be shared and accessible. A selective transition arena process focusing on creating a new WASH narrative and designing experiments could be combined with a more inclusive and participatory process. Selected actors, ideally the (potentially)

most intrinsically motivated and active community members, could be involved to inform, engage, and mobilise the overall community. These actors could be prepared and trained over time to become community mobilisers (including lessons on how to engage stakeholders, how to facilitate and monitor meetings, how to advocate and lobby for certain changes of policies and regulations, and what tools and methods to use). These activities would also enhance transparency within the community and foster unity among the community members towards a common goal.

- **Support institutional anchoring.** To ensure that developed solutions and actions are taken note of by existing institutions, the transition team could encourage the dissemination of the transition management process to a broader audience, the plugging of its outputs in institutional agendas, and linking it with institutional actors through experiments. This concerns governmental institutions operating at the city, regional, national, and international level, as well as international donors and NGOs. When taking part in the process, representatives of institutions should be supported in transferring knowledge and lessons learnt back to their institutions and thereby contribute to organisational learning.

5.5. Getting into Action

- **Experiment broadly.** In this phase, the interests of engaged actors are centre stage, since they will set up and drive the different experiments. The transition team can support these actors depending on the resources it has available. At a minimum, the transition team could help design experiments that address either of the context dimensions, including formal and informal alternative practices and structures or equal access to basic services. Experiments could be more general and focus on raising sustainability awareness, or more specific (e.g., build Multiple Use water supply Systems (MUS) [116]). However, they should also be considered as institutional innovation in that they could provide space to experiment with new ways of service delivery and maintenance by institutions. When setting up experiments, it is important to think about ownership and sustainability over time, which can be supported through building (governance) capacities, knowledge, and trust.

- **Challenge the status quo.** The set of experiments that results from a transition arena process should be ambitious and include novel and radical ideas and solutions that challenge and/or alter, and in the long-term also replace, the status quo. They could be understood as a tool for popular education with the goal to give a voice and build capacity through aiming to transform dominant structures.

5.6. Reflexivity, Monitoring, and Evaluation

- **Choose indicators wisely.** Indicators for monitoring and evaluation should be chosen so as to address those factors that create the unsustainability of WASH, for example, the unequal access to water (Section 4.5) or landownership issues (Section 4.3), doing so ensures that data and evidence are collected on the issues that matter and puts these issues on policy agendas.

- **Make monitoring and evaluation a shared process.** By not outsourcing monitoring and evaluation to a third party but making it an integral part of the follow-up activities, it could act as a capacity building activity and enhance collaboration between different actors (Section 4.2). These insights would be useful for guiding future actions and or interventions.

6. Conclusions

This paper explores how transition management processes can be designed to address the unsustainability of WASH services in informal settlements in cities in SSA. Based on a literature review and empirical work in Arusha, Dodowa, and Kampala, we identify five context dimensions that account for the unsustainability of WASH services. These dimensions pose numerous conceptual and application challenges for transition management. Based on these challenges, we formulated recommendations for the design of transition management processes based on the transition arena as a strategic instrument.

Until recently, transition management and more generally sustainability transition studies have been focusing on contexts situated in the Global North, characterized by liberal representative democracies with well-functioning markets and strong institutions. The analytical models and approaches therefore need to be critically scrutinized before being applied in other contexts. This paper underlines that context matters; we have shown that the governance, legal, political, social, and cultural context of informal settlements in cities in SSA, as well as the way WASH services have been organized and managed in the past, necessitate approaches which start from critical assessments of structural and cultural inequalities and combine them with trust- and capacity-building based on local needs and priorities. A creative diversification of instruments and methods, combining analytical with process-oriented and capacity building ones, is needed in the different process phases and across different parallel-running processes.

At the very least, our design recommendations for transition management processes in the SSA context emphasize that it is not only about a sense of direction, impulses for action, and collective empowerment. Critically, transition management should be about enlarging and strengthening democratic space by building capacity for participation in knowledge and society-shaping processes and by addressing hegemonic power imbalances. Therefore, transition management needs to be not only functional, but also emancipatory, in its design.

At the core, this analysis of the unsustainability of WASH in informal settlements in SSA cities challenges not only methods and instruments, but core assumptions and principles, of transition management. This analysis also reveals that neither methods nor principles are neutral or universal, but inherently culturally shaped. Think of the imperative of taking part on account of 'personal title' in a 'protected space'. Our analysis asks for cultural sensitivity and ideally a co-construction of process principles in a translocal collaboration. We emphasize translocal here, since neo-colonialization is not reserved for interactions between European governance approaches and African contexts, but crucially can also take place within Europe. Therefore, we recommend that transition scholars 'unfamiliarise' themselves with the contexts they are working in to arrive at more critical and emancipatory insights and designs.

References

1. United Nations. *Report of the Secretary-General, Progress towards the Sustainable Development Goals*; United Nations: New York, NY, USA, 2017; Volume 66.
2. Hutton, G.; Chase, C. The Knowledge Base for Achieving the Sustainable Development Goal Targets on Water Supply, Sanitation and Hygiene. *Int. J. Environ. Res. Public Health* **2016**, *13*, 536. [CrossRef] [PubMed]
3. Akpabio, E.M.; Takara, K. Understanding and confronting cultural complexities characterizing water, sanitation and hygiene in Sub-Saharan Africa. *Water Int.* **2014**, *39*, 921–932. [CrossRef]
4. Cobbinah, B.P.; Erdiaw-Kwasie, M.O.; Amoateng, P. Africa's urbanisation: Implications for sustainable development. *Cities* **2015**, *47*, 62–72. [CrossRef]
5. J-PAL. *J-PAL Urban Services Review Paper*; Abdul Latif Jameel Poverty Action Lab: Cambridge, MA, USA, 2012.
6. Rogers, P.; Hall, A.W. *Effective Water Governance*; Technical Committee Background Papers No. 7; Global Water Partnership (GWP): Stockholm, Sweden, 2003.

7. Brikke, F.; Bredero, M. *Linking Technology Choice with Operation and Maintenance in the Context of Community Water Supply and Sanitation*; World Health Organization and IRC Water and Sanitation Centre: Geneva, Switzerland, 2003.

8. Lockwood, H.; Smits, S. *Supporting Rural Water Supply: Moving Towards a Service Delivery Approach*; Practical Action Publishing: Rugby, UK, 2011.

9. Ademiluyi, I.A.; Odugbesan, J.A. Sustainability and impact of community water supply and sanitation programmes in Nigeria: An overview. *Afr. J. Agric. Res.* **2008**, *3*, 811–817.

10. Tsinda, A.; Abbott, P.; Pedley, S.; Charles, K.; Adogo, J.; Okurut, K.; Chenoweth, J. Challenges to Achieving Sustainable Sanitation in Informal Settlements of Kigali, Rwanda. *Int. J. Environ. Res. Public Health* **2013**, *10*, 6939–6954. [CrossRef] [PubMed]

11. UNDP/UUNDP Water Governance Facility/UNICEF. *WASH and Accountability: Explaining the Concept" Accountability for Sustainability Partnership: UNDP Water Governance Facility at SIWI and UNICEF*; UNDP/UUNDP: Stockholm, Sweden; New York, NY, USA, 2015. Available online: http://www.watergovernance.org/ (accessed on 17 October 2017).

12. RWSN Handpump Data 2009. In *Selected Countries in Sub-Saharan Africa*; Rural Water Supply Network (RWSN): St Gallen, Switzerland, 2009.

13. Hisschemöller, M.; Hoppe, R. Coping with Intractable Controversies: The Case for Problem Structuring in Policy Design and Analysis. In *Knowledge, Power, and Participation in Environmental Policy Analysis*; Hisschemöller, M., Hoppe, R., Dunn, W.N., Ravetz, J.R., Eds.; Transaction Publishers: New Brunswick, NJ, USA; London, UK, 2001; pp. 47–72.

14. Rotmans, J. *Societal Innovation: Between Dream and Reality Lies Complexity*; Rotterdam Erasmus Research Institute of Management: Rotterdam, The Netherlands, 2005.

15. Loorbach, D.; Frantzeskaki, N.; Avelino, F. Sustainability Transitions Research: Transforming Science and Practice for Societal Change. *Annu. Rev. Environ. Resour.* **2017**, *42*, 599–626. [CrossRef]

16. Frantzeskaki, N.; de Haan, J. Transitions: Two steps from theory to policy. *Futures* **2009**, *41*, 593–606. [CrossRef]

17. Loorbach, D. Transition management for sustainable development: A prescriptive, complexity-based governance framework. *Governance* **2010**, *23*, 161–183. [CrossRef]

18. Wittmayer, J.; Loorbach, D. Governing Transitions in Cities: Fostering Alternative Ideas, Practices, and Social Relations through Transition Management. In *Governance of Urban Sustainability Transitions, Theory and Practice of Urban Sustainability Transitions*; Loorbach, D., Wittmayer, J.M., Shiroyama, H., Fujino, J., Mizuguchi, S.D., Eds.; Springer: Berlin, Germany, 2016; pp. 1–195.

19. Frantzeskaki, N.; Hölscher, K.; Wittmayer, J.M.; Avelino, F.; Bach, M. Transition Management in and for Cities: Introducing a New Governance Approach to Address Urban Challenges. In *Co-Creating Sustainable Urban Futures, Future City 11*; Frantzeskaki, N., Hölscher, K., Bach, M., Avelino, F., Eds.; Springer: Berlin, Germany, 2018; pp. 1–425.

20. Van der Brugge, R.; van Raak, R. Facing the adaptive management challenge: Insights from transition management. *Ecol. Soc.* **2007**, *12*, 1–33. [CrossRef]

21. Frantzeskaki, N.; Ferguson, B.C.; Skinner, R.; Brown, R.R. *Guidance Manual: Key Steps for Implementing a Strategic Planning Process for Transformative Change*; Dutch Research Institute for Transitions, Erasmus University Rotterdam: Rotterdam, The Netherlands; Monash Water for Liveability, Monash University: Melbourne, Australia, 2012.

22. Frantzeskaki, N.; Shiroyama, H. Sketching future research directions for transition management applications in cities. In *Governance of Urban Sustainability Transitions. European and Asian Experiences*; Loorbach, D., Wittmayer, J.M., Shiroyama, H., Fujino, J., Mizuguchi, S., Eds.; Springer: Tokyo, Japan; Heidelberg, Germany; New York, NY, USA; Dordrecht, The Netherlands; London, UK, 2016; pp. 183–189.

23. Pant, L.P.; Adhikari, B.; Bhattarai, K.K. Adaptive transition for transformations to sustainability in developing countries. *Environ. Sustain.* **2015**, *14*, 206–212. [CrossRef]

24. Silvestri, G.; Frantzeskaki, N. A transition management approach for local sustainability. A case study from La Botija protected area, San Marcos de Colon. In *Co-Creating Sustainable Urban Futures: A Primer on Applying Transition Management in Cities*; Frantzeskaki, N., Hölscher, K., Bach, M., Avelino, F., Eds.; Part of the Future City Book Series, FUCI; Springer: Berlin, Germany, 2015; Volume 11, p. 425.

25. Poustie, M.S.; Frantzeskaki, N.; Brown, R.R. A transition scenario for leapfrogging to a sustainable urban water future in Port Vila, Vanuatu. *Technol. Forecast. Soc. Chang.* **2016**, *105*, 129–139. [CrossRef]

26. Roche, R.; Bain, R.; Cumming, O. A long way to go–Estimates of combined water, sanitation and hygiene coverage for 25 sub-Saharan African countries. *PLoS ONE* **2017**, *12*, e0171783.

27. United Nations Children's Fund. UNICEF Annual Results Report: Water, Sanitation and Hygiene. 2014. Available online: www.unicef.org/publicpartnerships/files/2014_Annual_Results_Report_WASH.pdf (accessed on 23 November 2017).

28. Schmidt, W.-P. The elusive effect of water and sanitation on the global burden of disease. *Trop. Med. Int. Health* **2014**, *19*, 522–527. [CrossRef] [PubMed]

29. Wolf, J.; Prüss-Ustün, A.; Cumming, O.; Bartram, J.; Bonjour, S.; Cairncross, S.; Clasen, T.; Colford, J.M., Jr.; Curtis, V.; De France, J.; et al. Assessing the impact of drinking-water and sanitation on diarrhoeal disease in low- and middle-income settings: A systematic review and meta-regression. *Trop. Med. Int. Health* **2014**, *19*, 928–942. [CrossRef] [PubMed]

30. Benova, L.; Cumming, O.; Campbell, O.M. Systematic review and meta-analysis: Association between water and sanitation environment and maternal mortality. *Trop. Med. Int. Health* **2014**, *19*, 368–387. [CrossRef] [PubMed]

31. Songa, J.; Machine, M.; Rakuom, C. Maternal child health through water, sanitation and hygiene. *Sky J. Med. Med. Sci.* **2015**, *3*, 94–104. Available online: http://www.skyjournals.org/SJMMS (accessed on 8 September 2017).

32. Strunz, E.C.; Addiss, D.G.; Stocks, M.E.; Ogden, S.; Utzinger, J.; Freeman, M.C. Water, sanitation, hygiene, and soil-transmitted helminth infection: A systematic review and meta-analysis. *PLoS Med.* **2014**, *11*, e1001620. [CrossRef] [PubMed]

33. Freeman, M.C.; Garna, J.V.; Sclar, G.D.; Boisson, S.; Medlicott, K.; Alexander, K.T.; Penakalapati, G.; Anderson, D.; Mahtani, A.G.; Grimes, J.E.T.; et al. The impact of sanitation on infectious disease and nutritional status: A systematic review and meta-analysis. *Int. J. Hyg. Environ. Health* **2017**, *220*, 928–949. [CrossRef] [PubMed]

34. Rabie, T.; Curtis, V. Handwashing and risk of respiratory infections: A quantitative systematic review. *Trop. Med. Int. Health* **2006**, *11*, 258–267. [CrossRef] [PubMed]

35. Ghana Statistical Service (GSS). *Ghana Poverty Mapping Report*; Government of Ghana: Accra, Ghana, 2015.

36. Grönwall, J.; Oduro-Kwarteng, S. Groundwater as a strategic resource for improved resilience: A case study from peri-urban Accra. *Environ. Earth Sci.* **2018**, *77*, 6. [CrossRef]

37. Uganda Bureau of Statistics. *The National Population and Housing Census 2014—Area Specific Profile Series*; Uganda Bureau of Statistics: Kampala, Uganda, 2017.

38. UN-HABITAT. *Situation Analysis of Informal Settlements in Kampala*; UN-HABITAT: Nairobi, Kenya, 2007.

39. LWF/DRT/ACT, Baseline Survey. *Kampala Slum Settlements: Where Access to Safe Water and Sanitation is Still a Challenge*; Fact Sheet 002; Kansanga: Kampala, Uganda, 2014.

40. Aponte Rivero, C.E. A Socio-Spatial Analysis of Access to Groundwater in Low-Income Communities in Arusha, Tanzania. Master's Thesis, UNESCO-IHE, Institute for Water Education, Delft, The Netherlands, 2016; pp. 1–110.

41. Grin, J.; Rotmans, J.; Schot, J.; Geels, F.; Loorbach, D. *Transitions to Sustainable Development—Part 1. New Directions in the Study of Long Term Transformative Change*; Routledge: New York, NY, USA, 2010.

42. Voß, J.; Bornemann, B. The politics of reflexive governance: Challenges for designing adaptive management and transition management. *Ecol. Soc.* **2011**, *16*, 9. [CrossRef]

43. Voß, J.; Bauknecht, D.; Kemp, R. *Reflexive Governance for Sustainable Development*; Edward Elgar: Cheltenham, UK, 2006.

44. Van Buuren, M.W.; Loorbach, D. Policy innovation in isolation? Conditions for policy renewal by transition arenas and pilot projects. *Public Manag. Rev.* **2009**, *11*, 375–392. [CrossRef]

45. Van de Bosch, S. *Transition Experiments: Exploring Societal Changes towards Sustainability*; Erasmus University Rotterdam: Rotterdam, The Netherlands, 2010.

46. Roorda, C.; Wittmayer, J.; Henneman, P.; van Steenbergen, F.; Frantzeskaki, N.; Loorbach, D. *Transition Management in the Urban Context: Guidance Manual*; DRIFT, Erasmus University Rotterdam: Rotterdam, The Netherlands, 2014.

47. Nevens, F.; Frantzeskaki, N.; Gorissen, L.; Loorbach, D. Urban Transition Labs: Co-creating transformative action for sustainable cities. *J. Clean. Product.* **2013**, *50*, 111–122. [CrossRef]

48. Wittmayer, J.M.; Schäpke, N.; van Steenbergen, F.; Omann, I. Making sense of sustainability transitions locally: How action research contributes to addressing societal challenges. *Crit. Policy Stud.* **2014**, *8*, 465–485. [CrossRef]

49. Wittmayer, J.M.; Schäpke, N. Action, research and participation: Roles of researchers in sustainability transitions. *Sustain. Sci.* **2014**, *9*, 483–496. [CrossRef]

50. Loorbach, D.; Wittmayer, J.M.; Shiroyama, H.; Fujino, J.; Mizuguchi, S.D. (Eds.) *Governance of Urban Sustainability Transitions, Theory and Practice of Urban Sustainability Transitions*; Springer: Berlin, Germany, 2016; pp. 1–195.

51. Hölscher, K.; Wittmayer, J.M.; Avelino, F.; Giezen, M. Opening up the transition arena: An analysis of (dis)empowerment of civil society actors in transition management in cities. *Technol. Forecast. Soc. Chang.* **2017**, in press. [CrossRef]

52. Frantzeskaki, N.; Hölscher, K.; Bach, M.; Avelino, F. (Eds.) *Co-Creating Sustainable Urban Futures: A Primer on Applying Transition Management in Cities*; Part of the Future City Book Series, FUCI; Springer: Berlin, Germany, 2015.

53. Wittmayer, J.M.; Roorda, C.; van Steenbergen, F. *Governing Urban Sustainability Transitions: Inspiring Examples*; DRIFT: Rotterdam, The Netherlands, 2014.

54. Shove, E.; Walker, G. CAUTION! Transitions ahead: Politics, practice, and sustainable transition management. *Environ. Plan. Econ. Space* **2007**, *39*, 763–770. [CrossRef]

55. Hendriks, C. Policy design without democracy? Making democratic sense of TM. *Policy Sci.* **2009**, *42*, 341–368. [CrossRef]

56. Meadowcroft, J. What about the politics? Sustainable development, transition management, and long term energy transitions. *Policy Sci.* **2009**, *42*, 323–340. [CrossRef]

57. Jhagroe, S.; Loorbach, D. See no evil, hear no evil: The democratic potential of transition management. *Environ. Innov. Soc. Trans.* **2014**, *15*, 65–83. [CrossRef]

58. Avelino, F.; Grin, J.; Jhagroe, S.; Pel, B. The Politics of Sustainability Transitions. *Environ. Policy Plan.* **2016**, *18*, 557–567. [CrossRef]

59. Nevens, F.; Roorda, C. A climate of change: A transition approach for climate neutrality in the city of Ghent (Belgium). *Sustain. Cities Soc.* **2014**, *10*, 112–121. [CrossRef]

60. Hölscher, K.; Wittmayer, J.M. A German experience: The challenges of mediating 'ideal-type' Transition Management in Ludwigsburg. In *Co-Creating Sustainable Urban Futures. A Primer on Applying Transition Management in Cities*; Frantzeskaki, N., Hölscher, K., Bach, M., Avelino, F., Eds.; Springer: Dordrecht, The Netherlands, 2018; pp. 205–224.

61. Hansen, U.E.; Nygaard, I.; Romijn, H.; Wieczorek, A.; Kamp, L.M.; Klerkx, L. Sustainability transitions in developing countries: Stocktaking, new contributions and a research agenda. *Environ. Sci. Policy.* **2018**, *84*, 198–203. [CrossRef]

62. Kooy, M.; Bakker, K. Splintered networks: The colonial and contemporary waters of Jakarta. *Geoforum* **2008**, *39*, 1843–1858. [CrossRef]

63. McFarlane, C.; Rutherford, J. Political Infrastructures: Governing and Experiencing the Fabric of the City. *Int. J. Urban Reg. Res.* **2008**, *32*, 363–374. [CrossRef]

64. Ranganathan, M. Paying for Pipes, Claiming Citizenship: Political Agency and Water Reforms at the Urban Periphery. *Int. J. Urban Reg. Res.* **2014**, *38*, 590–608. [CrossRef]

65. Rutherford, J.; Coutard, O. Urban Energy Transitions: Places, Processes and Politics of Socio-technical Change. *Urban Stud.* **2014**, *51*, 1353–1377. [CrossRef]

66. Kasala, S.E.; Burra, M.M.; Mwankenja, T.S. Access to Improved Sanitation in Informal Settlements: The Case of Dar es Salaam City, Tanzania. *Curr. Urban Stud.* **2016**, *4*, 23–35. [CrossRef]

67. World Health Organisation (WHO); The United Nations Children's Fund (UNICEF). *Progress on Drinking Water, Sanitation and Hygiene: 2017 Update and SDG Baselines*; Licence: CC BY-NC-SA 3.0 IGO; World Health Organization (WHO): Geneva, Switzerland; United Nations Children's Fund (UNICEF): Geneva, Switzerland, 2017.

68. Galan, D.I.; Kim, S.; Graham, J.P. Exploring changes in open defecation prevalence in sub-Saharan Africa based on national level indices. *BMC Public Health* **2013**, *13*, 527. [CrossRef] [PubMed]

69. Koster, M. Fear and intimacy: Citizenship in a Recife Slum, Brazil. *Ethnos* **2014**, *79*, 215–237. [CrossRef]

70. Waldorff, P. 'The law is not for the poor': Land, law and eviction in Luanda. *Singap. J. Trop. Geogr.* **2016**, *37*, 363–377. [CrossRef]

71. Wilhelm-Solomon, M. Decoding dispossession: Eviction and urban regeneration in Johannesburg's dark buildings. *Singap. J. Trop. Geogr.* **2016**, *37*, 378–395. [CrossRef]

72. Koster, M.; Nuijten, M. Coproducing urban space: Rethinking the formal/informal dichotomy. *Singap. J. Trop. Geogr.* **2016**, *37*, 282–294. [CrossRef]

73. Wieczorek, A. Sustainability transitions in developing countries: Major insights and their implications for research and policy. *Environ. Sci. Policy* **2018**, *84*, 204–216. [CrossRef]

74. Grönwall, J. Self-supply and accountability: To govern or not to govern groundwater for the (peri-)urban poor in Accra, Ghana. *Environ. Earth Sci.* **2016**, *75*, 1–16. [CrossRef]

75. Jenkins, S. Come Together, Right Now, Over What? An Analysis of the Processes of Democratization and Participatory Governance of Water and Sanitation Services in Dodowa, Ghana. Master's Thesis, LUCSUS, Lund University Centre for Sustainability Studies, Lund, Sweden, 2016; pp. 1–67.

76. Holm, R.H.; Kamangira, A.; Tembo, M.; Kasulo, V.; Kandaya, H.; Gijs Van Enk, P.; Velzeboer, A. Sanitation service delivery in smaller urban areas (Mzuzu and Karonga, Malawi). *Environ. Urban.* **2018**. [CrossRef]

77. Sjöstedt, M. The impact of secure land tenure on water access levels in sub-Saharan Africa: The case of Botswana and Zambia. *Habitat Int.* **2011**, *35*, 133–140. [CrossRef]

78. Bruce, J.W.; Freudenberger, M.S. *Institutional Opportunities and Constraints in African Land Tenure: Shifting from a 'Replacement' to an 'Adaptation' Paradigm*; Land Tenure Center: Madison, Mimeo, 1992.

79. Farvacque, C.; McAuslan, P. *Reforming Urban Land Policies and Institutions in Developing Countries*; World Bank: Washington, DC, USA, 1992.

80. Isaksson, A.-S. Unequal Property Rights: A Study of Land Right Inequalities in Rwanda. *Oxf. Dev. Stud.* **2015**, *43*, 60–83. [CrossRef]

81. Brown, A.M. Uganda's new urban policy: Participation, poverty, and sustainability. In Proceedings of the Sustainable Futures: Architecture and Urbanism in the Global South, Kampala, Uganda, 27–30 June 2012.

82. UN-Habitat. *Informal Settlements*; Habitat III, 22; UN-Habitat: Nairobi, Kenya, 2015.

83. Nastar, M.; Abbas, S.; Aponte Rivero, C.; Jenkins, S.; Kooy, M. The emancipatory promise of participatory water governance for the urban poor: Reflections on the transition management approach in the cities of Dodowa, Ghana and Arusha, Tanzania. *Afr. Stud.* **2018**, *77*, 504–525. [CrossRef]

84. Creighton, J. Part one: Overview of public participation. In *The Public Participation Handbook: Making Better Decisions through Citizen Involvement*; Jossey-Bass: Hoboken, NJ, USA, 2005; pp. 7–10.

85. Devas, N.; Grant, U. Local Government Decision-Making—Citizen Participation and Local Accountability: Some Evidence from Kenya and Uganda. *Public Adm. Dev.* **2003**, *23*, 307–316. [CrossRef]

86. Narayan, D. *Voices of the Poor: Can Anyone Hear Us*; Oxford University Press: Oxford, UK, 2000.

87. Mohammed, A.K. Ghana's Policy Making: From Elitism and Exclusion to participation and inclusion? *Int. Public Manag. Rev.* **2015**, *16*, 43–66.

88. Freire, P. *Education for Critical Consciousness New York*; Seabury Press: New York, NY, USA, 1973.

89. Van Welie, M.; Romijn, H.A. NGOs fostering transitions towards sustainable urban sanitation in low-income countries: Insights from Transition Management and Development Studies. *Environ. Sci. Policy* **2018**, *84*, 250–260. [CrossRef]

90. Ramos-Mejía, M.; Franco-Garcia, M.-L.; Jauregui-Becker, J.M. Sustainability transitions in the developing world: Challenges of sociotechnical transformations unfolding in contexts of poverty. *Environ. Sci. Policy* **2018**, *84*, 217–223. [CrossRef]

91. Foster, P. Education and Social Inequality in Sub-Saharan Africa. *J. Mod. Afr. Stud.* **1980**, *18*, 201–236. [CrossRef]

92. Amenga-Etego, R. *Water Privatization in Ghana: Women's Rights under Siege*; Paper presented at the Africa water conference on the right to water, Ghana; Integrated Social Development Centre (ISODEC): Accra, Ghana, 2003.

93. Rutaremwa, G.; Bemanzi, J. Inequality in School Enrolment in Uganda among Children of Ages 6–17 Years: The Experience after Introduction of Universal Primary Education—UPE. *Sci. J. Educ.* **2013**, *1*, 43–50.

94. World Bank. *World Development Report 2006: Equity and Development*; World Bank: Washington, DC, USA, 2005.

95. Mugendawala, H. Inequity in Educational Attainment in Uganda: Implications for Government Policy. *IJGE Int. J. Glob. Educ.* **2012**, *1*, 93–101.

96. Laverack, G. An identification and interpretation pf the organisational aspects of community empowerment. *Oxf. Univ. Press Community Dev. J.* **2001**, *36*, 134–145. [CrossRef]

97. Fraser, H. Four different approaches to community participation. *Oxf. Univ. Press Community Dev. J.* **2005**, *40*, 286–300. [CrossRef]

98. United Nations; Economic and Social Council; Social Commission. Concepts and Principles of Community Development and Recommendations on further Practical Measures to be taken by International Organisations. *Ekistics* **1957**, *4*, 92–96.

99. Altschuld, J.W.; Kumar, D.D. *Needs Assessment: An Overview*; Sage: Thousand Oaks, CA, USA, 2010.

100. Voorberg, W.H.; Bekkers, V.J.J.M.; Tummers, L.G. A Systematic Review of Co-Creation and Co-Production: Embarking on the social innovation journey. *Public Manag. Rev.* **2014**, *17*, 1333–1357. [CrossRef]

101. Frantzeskaki, N.; Kabisch, N. Designing a knowledge co-production operating space for urban environmental governance—Lessons from Rotterdam, Netherlands and Berlin, Germany. *Environ. Sci. Policy* **2016**, *62*, 90–98. [CrossRef]

102. Banana, E.; Chitekwe-Biti, B. Co-producing inclusive city-wide sanitation strategies: Lessons from Chinhoyi, Zimbabwe. Copyright International Institute for Environment and Development (IIED). *Environ. Urban.* **2015**, *27*, 35–54. [CrossRef]

103. Bisung, E.; Elliott, S.J.; Abudho, B.; Schuster-Wallace, C.J.; Karanja, D.M. Dreaming of toilets: Using photovoice to explore knowledge, attitudes and practices around water–health linkages in rural Kenya. *Health Place* **2015**, *31*, 208–215. [CrossRef] [PubMed]

104. Berrang-Ford, L.; Dingle, K.; Ford, J.D.; Lee, C.; Lwasa, S.; Namanya, D.B.; Henderson, J.; Llanos, A.; Carcamo, C.; Edge, V. Vulnerability of indigenous health to climate change: A case study of Uganda's Batwa Pygmies. *Soc. Sci. Med.* **2012**, *75*, 1067–1077. [CrossRef] [PubMed]

105. Clammer, J. *Art, Culture and International Development. Humanizing Social Transformation*; Routledge: London, UK, 2014.

106. Epskamp, K. *Theatre for Development. An Introduction to Context, Applications and Trainings*; University of Chicago Press: Chicago, IL, USA, 2006; pp. 1–192.

107. Morrison, J.F. Forum Theater in West Africa: An Alternative Medium of Information Exchange. *Res. Afr. Lit.* **1991**, *22*, 29–40.

108. Kar, K.; Chambers, R. *Handbook on Community-Led Total Sanitation*; Plan UK: London, UK; Institute of Development Studies: Brighton, UK, 2008.

109. Sah, S.; Negussie, A. Community led total sanitation (CLTS): Addressing the challenges of scale and sustainability in rural Africa. *Desalination* **2009**, *248*, 666–672. [CrossRef]

110. Mohan, G. *Participatory Development. The Companion to Development Studies*; Hodder Education: London, UK, 2008.

111. Greig, A.; Hulme, D.; Turner, M. *Challenging Global Inequality. Development Theory and Practice in the 21st Century*; Palgrave Macmilan: New York, NY, USA, 2007.

112. Eade, D. *Capacity-Building: An Approach to People-Centered Development*; Oxfam (UK and Ireland), Oxfam House, John Smith Drive: Oxford, UK, 1997.

113. Sastre Merino, S.; de los Ríos Carmenado, I. Capacity building in development projects. *Procedia Soc. Behav. Sci.* **2012**, *46*, 960–967. [CrossRef]

114. Chaskin, R.J. Building Community Capacity: A Definitional Framework and Case Studies from a Comprehensive Community Initiative. *Urban Aff. Rev.* **2001**, *36*, 291–323. [CrossRef]

115. Uphoff, N. Fitting projects to people. In *Putting People First: Sociological Variables in Rural. Process Approaches to Development*; Chernea, M., Ed.; Oxford University: Oxford, UK, 1985; p. 1357.

116. Van Koppen, B.; Smits, S.; Moriarty, P.; Penning de Vries, F.; Mikhail, M.; Boelee, E. *Climbing the Water Ladder: Multiple-Use Water Services for Poverty Reduction*; TP Series No. 52; IRC International Water and Sanitation Centre and International Water Management Institute: The Hague, The Netherlands, 2009.