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# *IUC programme application – Concept note South – Call 2022*

## GENERAL INFORMATION

| **Programme Data**<br>Country and Region of the Programme | |
|---|---|
| **Kenya**<br>Five case study areas across Kenya including; one oceanic area (the Lamu Archipelago), two trans-territorial drainage basins (the Lake Victoria and Lake Turkana basins), one inland water basin (Lake Naivasha), and an urban area (Nairobi Metropolitan Region) | |
| Programme title (linked to strategic/thematic focus area) | |
| ***MAJI NI UHAI:* BUILDING EXCELLENCE ON WATER GOVERNANCE FOR BETTER LIVELIHOODS AND CLIMATE CHANGE ADAPTATION IN KENYA** | |
| Programme Summary (Focus of proposed strategic area(s) and institutional strengthening activity) | |
| TU-K is a young HEI making the transition from a Polytechnic to a University. The IUC programme is therefore timely as it will assists in consolidating an ongoing effort to strengthen capacity-deficit domains necessary to complete this transformation. Some of the key areas include; academic staff capacity enhancement, upgrading TU-K's research infrastructure, enhancing collaboration between faculties and schools, and transforming existing gender and generational relations. The IUC will also help to forge engagements with local and international partners in inter and transdisciplinary settings, thereby improving its embeddedness in society and enhancing its international image. The IUC's objectives will be met by developing a pilot research agenda focused on water governance, livelihoods and climate change adaptation, in which TU-K is developing leading expertise. The IUC seeks to address the lack of a coordinated approach towards water-sector challenges, and contribute to the search for solutions to Kenya's water shortage problems, governance gaps and gendered challenges emanating from unequal access to water, and further exacerbated by climate change. The IUC supported research agenda will be pursued along 4 interrelated research tracks explored in the context of 5 selected case study areas further elaborated in the programme strategy. | |
| Applying local university (institution and proposed local coordinator) | |
| Full name of the institution (+ abbreviation) | The Technical University of Kenya (TU-K) |
| Address | Haile Selassie Avenue, P.O. Box 52428-00200, Nairobi, Kenya. |
| Website | www.TU-Kenya.ac.ke |
| Name of proposed local coordinator (details in annex 3) | Dr. Ir. Lawrence Esho |
| Name of the authority of the local university (Vice-Chancellor) | Prof. Dr. Ing. Francis W. O. Aduol |
| Statute of the institute (private or public) | Public Institution |
| Signature of the authority of the local university (Vice-Chancellor) | |
| PROF. DR.-ING. F.W.O. ADUOL<br>VICE-CHANCELLOR<br>TECHNICAL UNIVERSITY OF KENYA | |
| Signature of the proposed local coordinator | |

# *MAJI NI UHAI:* BUILDING EXCELLENCE ON WATER GOVERNANCE FOR BETTER LIVELIHOODS AND CLIMATE CHANGE ADAPTATION IN KENYA

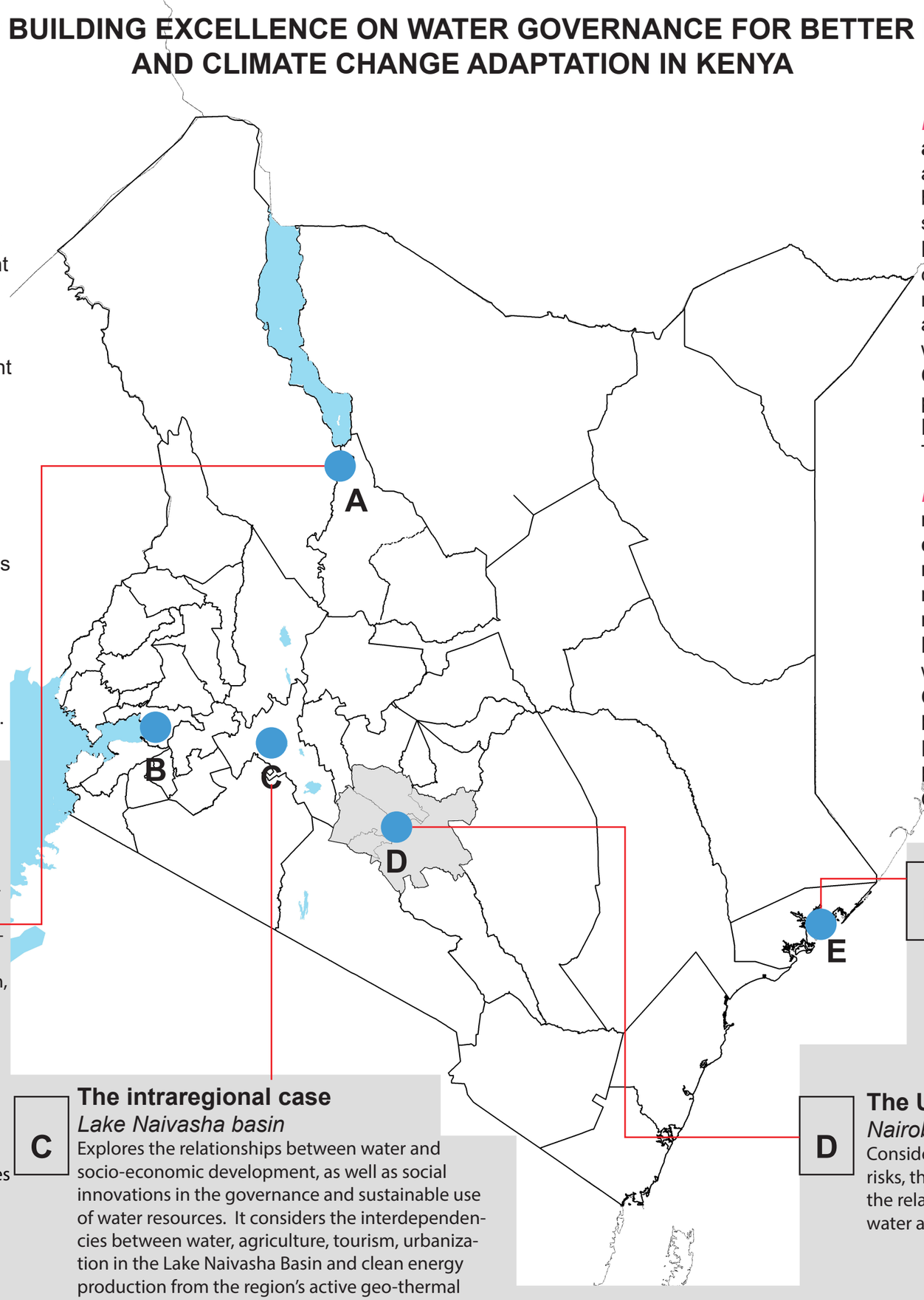
## Research Tracks

***Research track 1*** explores the relationships between **water and socio-economic development,** as well as social innovations in the governance and sustainable use of water resources.
**Main research question:** How do existing water resource governance frameworks and management systems influence livelihoods of communities around water catchments and basin areas?
**Case studies:** Lake Naivasha Basin
**Lead partners:** School of Social and Development Studies and Department of Spatial Planning and Design

***Research track 2*** considers **technological innovations** in the exploration, extraction and utilization of water resources.
**Main research question:** How appropriate are water extraction and use technologies and practices in the conservation and sustainable use of scarce water resources?
**Case studies:** Lake Turkana Basin, Lake Naivasha Basin.
**Lead partners:** School of Infrastructure and Resource Engineering and School of Public Health.

***Research track 3*** considers **climate change and water induced disaster risks,** the reduction and adaptation thereof, as well as the relationship between and innovations relating to water and sanitation.
**Main research question:** What is the impact of climate change on water availability and what mechanisms are in place to foster climate change adaptation and reduction and management of water-associated risks and disasters?
**Case studies:** Lamu Archipelago, Nairobi Metropolitan Region.
**Lead partners:** School of Physical Sciences and Technology and School of Computer Science,

***Research track 4*** considers the role of water resources in **territorial development and the delicate geo-politics of cross-border water resources** with a view to informing the overdue review of international treaties on shared water resources and fostering peacebuilding initiatives.
**Main research question:** What is the role of water resources in territorial development?
**Case studies:** Lake Victoria Basin, Lake Turkana Basin, Lamu Archipelago.
**Lead Partners:** School of Architecture and Spatial Planning and Department of Geography and Earth Observation.




## Case Studies

**A** **Arid and Semi-Arid Lands case**
*Lake Turkana basin*
Considers technological innovations in the exploration, extraction and utilization of water re-sources. The arid and semi-arid lands around the Lake Turkana Basin considers fossil fuel exploration and clean energy development initiatives in a marginal region, the growth of which is historically stagnated by conflict over land-based resources.

Research track 2 & 4

**B** **Interregional case**
*Lake Victoria basin*
The case considers peacebuilding inniatiaves in a regional conext of contestations over water resources and fisheries amongst Kenya, Uganda and Tanzania, which is also the source of the Nile which traverses South Sudan, Sudan and Egypt. Any changes in the supplying catchment zones will almost certainly trigger conflict within the region.

Research track 4

**C** **The intraregional case**
*Lake Naivasha basin*
Explores the relationships between water and socio-economic development, as well as social innovations in the governance and sustainable use of water resources. It considers the interdependencies between water, agriculture, tourism, urbanization in the Lake Naivasha Basin and clean energy production from the region's active geo-thermal field.

Research track 1 & 2

**D** **The Urban case**
*Nairobi metropolitan region*
Considers climate change and water induced disaster risks, the reduction and adaptation thereof, as well as the relationship between and innovations relating to water and sanitation in a water-scarce urban context.

Research track 3

**E** **Oceanic Case**
*Lamu Archipelago*
The oceanic case, considers the ongoing development of blue economy practices against a backdrop of a fragile marine ecosystems collocated with historical settlements, both of which are potentially threatened by adverse effects of impending modernisation and industrialization.

Research track 3 & 4

# PROGRAMME DESCRIPTION

## 1. Strategy of the Institution

Briefly describe the overall institutional strategy. Highlight the institution's vision on its role as university and as a driver of change in society. Refer to other relevant internal policy documents, if relevant.

Since its founding as a polytechnic in 1961 and its upgrading to a University College in 2007 and to a fully-fledged University in 2013, TU-K has endeavoured to become **a regional centre of excellence in the areas of education, research, technology and innovation.** TU-K increasingly **plays a major role in the advancement of society** through the production of high skilled and industry-ready graduates in technical and vocational fields and by undertaking research in industry-support and technological innovation. It is therefore no coincidence that the bulk of its training programmes are geared towards the production of technicians, technologists and professionals in a variety of engineering branches, built environment domains and vocations; this includes the fields of architecture, building technologies, geo-spatial surveys, spatial planning, and real estate management, for which TU-K has established itself as the premier training institution in Kenya and East and Central Africa. These fields are further supported by contextualizing programmes in the applied and social sciences, such as mathematics, physical sciences, the arts, business and management sciences, and social sciences. Currently, the University has a combined total of 12,566 students enrolled in a variety of programmes (see Annex 2).

To achieve its societal-advancement agenda, TU-K's strategic plan 2015-2020 focuses its research and development activities towards supporting the government's efforts in a number of priorities that are in line with existing development blueprints – namely, **Vision 2030** and the more recent **Big Four Agenda.** To this end, the University is proactively **expanding its research portfolio by launching numerous postgraduate programmes (Masters and PhD).** Since 2013, postgraduate students and staff have published more than 200 publications. A major initiative to **furnish its laboratories and workshops with state-of-the-art equipment** complements the research effort by translating research outputs into technological innovations relevant and necessary to support local industries and spur economic growth.

Training at the post-graduate level not only aims at meeting the labour market needs for highly specialized professionals, but also supports TU-K's **capacity development goals through the training and recruitment of highly knowledgeable and skilled academic staff.** The University has a total of 1545 staff, 725 of which are academics including 63 PhD and 388 Masters holders. TU-K is an equal opportunity employer with a 2:1 male to female ratio, both in overall staff numbers and in its academic staff establishment.

To **enhance its standing as a national, regional and global academic centre of excellence,** and in tandem with its ambition to become a leading university in Kenya and beyond, TU-K has increased its engagement with local and global partners. Several directorates have been established in the area of research and knowledge exchange, industry and community outreach. The University has forged partnerships and is engaged in mutually beneficial research endeavors with international and local institutional collaborators in the educational and developmental sectors.

Elaborate on the capacity of the university to network with external actors: Governments, private sector, communities, civil society organisations, external funders, etc.

TU-K develops and expands its global and community outreach activities through networking and forging effective partnerships. A number of **international academic and research partnerships** are currently operational. Among other collaborations, TU-K has established partnerships with: Politecnico di Milano in Italy; Dar-es-Salaam Institute of Technology in Tanzania; Katholieke Universiteit Leuven in Belgium; Netherlands Initiative for Capacity Development in Higher Education (NICHE); Vaal University of Technology (South Africa); Government of France vs TU-K in the areas of education, training and research. The University has maintained its membership in the Commonwealth Association of Polytechnics in Africa (CAPA) and continues to host its secretariat. It is a full member of the Association of Commonwealth Universities, the Inter University Council of East Africa and the Global Energy Technology Network. TU-K hosted four international conferences between 2015 and 2018 with a view to disseminate findings from research related to ongoing initiatives.

Aside from these academic collaborations, TU-K engages with local actors such as the national and county governments, private sector and industry and non-governmental organizations in a variety of **local corporate social responsibility initiatives and direct consultancy services**. Notable amongst these are the collaborations between TU-K and the county governments of Kilifi, Tharaka Nithi and Kirinyaga, where TU-K deployed its expertise and technology in spatial planning and GIS to assist these counties in mapping their resources and preparing their county development plans. In the City of Nairobi, TU-K is positioning itself as a key partner in the redevelopment of the Nairobi Central Railway Station areas. Individual departments have entered into numerous partnerships with relevant sector players and community groups on a number of mutually beneficial ventures.

# 2. Context analysis

Provide a local context analysis, highlighting key development problems, their context, importance and underlying causes. Take into account the transversal themes gender and environment in this analysis.

**Poverty, pressure on land and water resources and climate change in Kenya –** Upon gaining independence in 1963, Kenya committed to eradicating three societal ills, namely ignorance, poverty and disease. Six decades later, the country confronts difficulties in the provision of basic education, housing and shelter, food security, and primary healthcare. The country also faces significant challenges in the preservation, management and utilization of natural resources, including land, water, minerals, forests and so on, against a backdrop of global warming, climate change and attendant consequences of incessant droughts and famine, and of erratic rainfall patterns and flooding, etc. This poses a serious threat to Kenya's economic and social development (Hirji, 2000).

*Figure 1: The multidimensional challenges of poverty, destruction of resources and climate change (Source: Technical University of Kenya, 2019)*

**Water and sustainable development -** In this context, water is critical for human survival, economic development, and for the sustainability of ecological systems. Few other resources affect so many areas of the economy or human and environmental health. Though Goal 6 of the Sustainable Development Goals (SDGs) focuses on clean water and sanitation, calling for universal safe and affordable clean water and sanitation, all the other 16 SDGs have a direct and strong interrelationship with access to water and its impacts (UNDP, 2018). The attainment of these goals is, however, inhibited by serious challenges in the development, governance, management and distribution of water resources.

**Scarcity in the midst of plenty -** Kenya's development blueprint, Vision 2030, recognizes the abundance and diversity of **water resources** and the potential of harnessing these to deal with present and future societal challenges. Water is a major input in the development of the key sectors of agriculture, forestry, human settlements and industry. This notwithstanding, the Vision also acknowledges that Kenya is confronted with serious water challenges, including among others, scarcity, pollution, unequal access, conflicts, and wastage. According to Moraa et. al (2012), over 50% of Kenya's households do not have access to safe drinking water. As such, Kenya is considered a water-scarce country, with renewable fresh water per capita at 647m$^3$ against the United Nations recommended minimum of 1,000m$^3$. This also compares unfavorably with the neighbouring countries of Uganda and Tanzania, which have per capita levels of 2,940m$^3$ and 2,696m$^3$ respectively. Kenya's fresh water per capita has, in fact, been declining and is projected to reach 235 m$^3$ by 2025 unless effective measures to address the challenges are implemented (GOK, 2008). Based on current water demand and future national development plans, it is estimated that Kenya could face a 31 per cent gap between water demand and its practically available water supply by 2030 (2030 Water Resources Group, 2015). Experts believe that only by properly harnessing Kenya's gross precipitation and the stock of underground and surface water sources will the country be able to surpass the recommended per capita levels.

**Poor and unequal access to water -** In addition to scarcity, access to water is highly unequal in the country. 80% of Kenya is comprised of Arid and Semi-Arid Lands (ASALs), the larger parts of which receive an annual rainfall below 600mm. These lands are occupied by less than 36% of the population, living in absolute water scarce conditions. 74% of the country's population inhabits the remaining 20% of the land, which incidentally has the most arable land and hosts the country's main water towers (MODA, 2019). Access to water is also skewed in terms of socio-economic standing, disadvantaging the poor rural folk and urban dwellers in the informal residential and low-income settlements. There are also gender disparities in water access, with women and children being most affected. The scarcity of water, coupled with its unequal distribution, has often become the source of tension and conflict between different communities and social groups.

**Destruction of water catchment areas and overexploitation of water resources** – The collocation of settlements and production activities with water catchment areas and drainage basins spells doom for Kenya's future water scenario. Overexploitation and over-abstraction of surface and underground water resources, settlement upon water towers and forest clearance for settlement and agricultural activities has resulted in the destruction of catchments, basins, courses and sources, and led to further acute shortages in some areas. The situation is

even direr in urban areas where existing water sources are rendered inaccessible or unpalatable for human consumption due to the encroachment and pollution of watercourses.

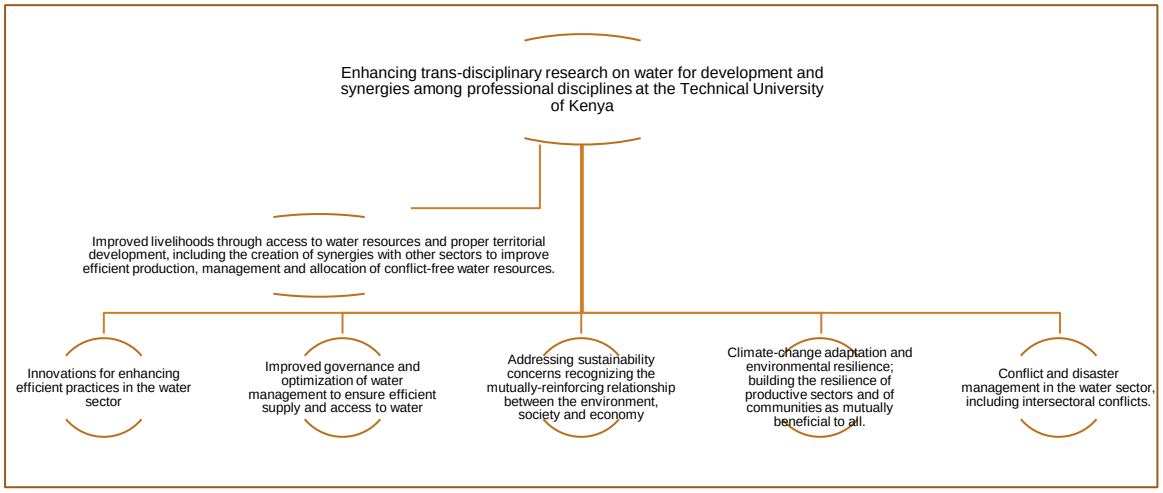
**Gaps in the governance of water resources -** Efforts to improve access to water resources in Kenya seemingly downplay the cross-sectorial dimension and the need for greater coordination thereof. Vision 2030 recognizes challenges in the governance of water resources, as seen in the poor planning, allocation and management of land and water resources. These governance shortfalls have resulted in perennial shortages in the availability of water for consumption and for agricultural and industrial production, as well as unpreparedness and unresponsiveness to climate change and associated disaster risks. The Government envisions that key sectors under Kenya's Vision 2030, including tourism, agriculture and industry will increase their water consumption, as will the social sector (through measures envisioned for education, health, urban development and housing) (GOK 2007). All these sectors are competing for scarce water resources. The ability to meet expected demands is inhibited by poor management and allocation of available water resources by the various sector agencies, and a lack of a coordinated approach involving communities, governments and industry. Competing and overlapping mandates, and fragmented institutional efforts around water, have complicated efforts towards ameliorating water-sector challenges. The lack of coordination is also reflected in the purely state-centric development of irrigation, hydropower, water diversion or flood control projects, in contrast to subsidiarity frameworks that devolve mandates across territorial scales and institutional domains. Cooperation among institutions has been identified as critical in solving conflicts and enhancing the access to adequate fresh water (Swain, 2015); as such, solving water challenges requires increased levels of cooperation, more robust governance systems and technical and social innovations, which have the potential to multiply productivity and improve water management within spatial systems in a more sustainable way.

**Absence of a comprehensive territorial development strategy –** The embeddedness of water access challenges in wider territorial development and governance systems is often ignored. Systems integrating watersheds and drainage basins often have a trans-territorial spatiality and their management framework does not necessarily fall within the remit of one state. For example, Kenya shares the Lake Turkana basin with Ethiopia, and the Lake Victoria basin with Uganda and Tanzania. However, the influence and impact of these two basins transcend the scope of the countries across which their boundaries lie. Lake Turkana is partially fed from the south by the River Turkwel (sourced by Mt. Elgon that lies across the Kenya/Uganda border), and partially fed from the north by the Omo River (which emanates from Ethiopia's Shewan Hills). The Nile River, which serves South Sudan, Sudan and Egypt, emanates from the Lake Victoria basin. Riverine resources such as the Mara River, whose primary source is the Mau water tower, present a crucial lifeline to the Mara-Serengeti Ecosystem that is shared between Kenya and Tanzania. Likewise, Kenya shares its oceanic and marine resources with its northern and southern neighbours, Somalia and Tanzania, respectively. The shared territoriality brings into sharp focus the potential for trans-boundary conflicts around the use of these resources, and the devastating consequences of such conflict upon the lives of the millions of people that depend on them for their survival. With proper structures and improved governance, allocation, conservation and innovation in the water sector, these conflicts might be controlled. The imperativeness of a collaborative governance framework between basin and riparian countries cannot be overemphasized, to guarantee their optimal and sustainable use for the benefit of the people that rely on them.

**Lack of a gendered perspective on water challenges -** Water shortage, inadequate allocation, and other challenges associated with poor management and governance of water resources manifest themselves in gendered frameworks of inequality. In many Kenyan households, water provision is seen as a woman's responsibility. The scarcity of water resources and depletion of exiting sources thus results in women walking long distances, spending many hours, in both urban and rural areas, to access water, often putting their lives in danger when threatened by wildlife. Vision 2030 acknowledges that women and girls who spend a large portion of their day fetching water are denied the opportunity to engage in other economic activities and schooling (GOK 2005). Furthermore, when water crises strike, it is women who are most impacted. On average, women, primary caregivers of children and the aged, spend longer hours in hospital when water-borne diseases occur. When the family shelter is destroyed by heavy rains and floods, it is women and children that are often directly affected, and repairs are done by women. Water-related challenges also affect men. Pastoralist men walk long distances in search for water and pastures sometimes staying away from their families for weeks on end. This exposes them to conflict related risks and infectious diseases.

Kenya's Vision 2030 aims for universal access to water and improved sanitation by the year 2030. The Swahili saying "*Maji ni uhai"* (translated *"water is life/health"*), captures the significance of water in guaranteeing life and health for all humans and other living organisms. It is a rallying call for people to protect water and its resources. The IUC programme aims at finding solutions for each of the above challenges by presenting **innovating frameworks and measures towards better governance of water resources**, with the goal of enhancing livelihoods and climate change adaptation in Kenya (see Figure 2).

*Figure 2: Towards a transformative framework for water-sector challenges (Source: The Technical University of Kenya, 2019)*




Provide an institutional context analysis, highlighting strengths and capacity constraints/needs of the institution. Take into account the transversal themes gender and environment in this analysis. Describe the position of your university in the national higher education landscape.

**Training programmes and student enrollment -** Since becoming a University, TU-K has built upon the trajectory of its predecessor, the Kenya Polytechnic, in becoming a centre of excellence in the production of market and industry-ready graduates, especially in the fields of science and technology. Currently, TU-K offers 66 undergraduate programmes, 72 diploma programmes, and 73 certificate programmes. The institution has over 12,500 students, the bulk of whom are enrolled in engineering and built environment programmes. As is expected, enrollment in these programmes is heavily skewed towards male students, although the numbers are increasingly evening out, thanks to outreach initiatives to promote these programmes in girls' secondary schools.

**Financial resources, facilities and equipment -** TU-K's popularity, coupled with its large student body, has contributed to straining its resources over the years. Capitation remittances from the government of Kenya (not exceeding Euro 30 million annually) and proceeds from fees have not kept pace with the rise in numbers. Income goes towards meeting staff emoluments, leaving little for research, innovation and human resource development. The expansion of facilities is constrained by the lack of funds and land availability, as the University only has a total of 35 acres (well below the legal benchmark of 50 acres). TU-K has an opportunity to expand its facilities by adopting a vertical approach to developing its existing land and by outsourcing facilities for student accommodation and staff offices. To plug its funding deficit, TU-K has come up with a proactive strategy to mobilize resources such as by engaging in consultancy and applying for donations from internal and external partners. Such is the case of the recent donation by the Chinese government of equipment for engineering labs and workshops.

**Staff establishment -** One of the areas of focus in capacity development is the recruitment of younger, more dynamic scholars to fill faculty positions. TU-K currently has a staff establishment of 725 academic staff, 388 with a master's qualification, and 63 with a PhD. Females comprise 42 per cent of the total academic staff, although the number of staff with PhD qualifications is heavily skewed towards males who make up 70 per cent of the total. This also translates in the low number of women among the university's professorial and senior leadership positions. The inability of the university to meet the funding requirements for its research and innovation programmes however, remains a major drawback, especially in terms of funding research initiatives of its own staff. Overall, the number of staff is still too low and significantly not proportionate to student numbers. Other challenges include the risk of brain-drain due to the low salaries paid to staff, and the lack of staff mobility and international competitiveness amongst its faculty.

**TU-K's position in Kenya's higher education landscape –** TU-K has so far effectively managed its transition from a Polytechnic to a University College to a fully-fledged and Chartered University. The University is one of the three Technical Universities declared and chartered under the University's Act 2016. Many conditions are now adequately met to anchor and direct its anticipated rapid advancement, including among others a robust organizational structure that includes management, academic and support components, the existence of functional academic structures divided into faculties, schools, departments and institutes, and the number of staff with PhD and masters qualifications. The results are evident in the high rate of absorption of graduates in industry. The IUC programme offers a great watershed for the consolidation of such gains and in assisting TU-K to make its giant leap forward.

# 3. Proposed Programme Strategy

**Long term desired change(s):** Explain how the proposed IUC programme will contribute to the strategy of the institution. How does this fit with the objectives of institutional university cooperation? What are the ambition(s)/dream(s) of the proposed IUC programme?

TU-K has made a significant internal **transition, moving from a vocational school to becoming a leading university of science and technology**. At the heart of TU-K's vision is the two-pronged mission:

1. To establish itself as **a regional and global centre of excellence** in the areas of education, research, technology and innovation, and;
2. **To be a critical player in the advancement of society** through the provision of *quality technological education and training* and the support of *research solutions and innovations for the real world* through the production of highly skilled and industry-ready graduates in the technical and vocational fields and the advancement of industry-support research and technology innovations.

Drawing on this mission, TU-K sees IUC as an opportunity to **address the lack of a coordinated approach towards water-sector challenges in Kenya and beyond,** and to contribute to the **search for solutions to Kenya's water shortage problems, the gendered challenges emanating from unequal access to water and governance gaps**, all in light of climate change. Solving water challenges requires increased levels of cooperation, more robust governance approaches, and comprehensive territorial development strategies as well as technical and social innovations, which have the potential to multiply productivity of water within existing spatial systems, and improve its management in a more sustainable way. This requires a collaborative venture between TU-K and its 3 faculties, 6 schools and semi-autonomous institutes on the one hand, and water resource agencies at different spatial scales and policy levels on the other, to **formulate policies, strategies and plans for the management of Kenya's major watersheds and drainage basins.**

To fulfill this ambition for Kenya, TU-K needs to embark on a concomitant trajectory of long-term change, for which the IUC programme will be instrumental.

1. TU-K will be able to complete its internal **transition in moving from a vocational school to a leading university of science and technology**. The IUC programme would provide a strong footing to consolidate TU-K's emerging expertise regarding various aspects of water resource planning and management, including technology enhancement, knowledge of spatial and geodetic systems, water and land management expertise, urban systems planning, and climate change elements.
2. IUC will assist TU-K to complete an **upgrade of its research infrastructure** by equipping the newly established *Institute of Spatial Analysis and Regional Studies (ISARD),* the *University Library* and *ICT Directorate*. This in turn, will enable connectivity to local, regional and global audiences, a critical element in enhancing TU-K's research outputs and dissemination through a variety of methods, including publications in academic journals, and in print and electronic media. It is estimated that 80 publications in areas focusing on natural resource use, planning and management, water resource conservation, urban infrastructure and service supply systems, irrigation and food security, spatial data infrastructure, and other thematic theoretical studies in human settlements and regional development planning will be published in International Refereed Journals level and six applied referred books.
3. The IUC Programme is expected to **affect the position of TU-K in the university landscape** in Nairobi, Kenya and Africa. The hosting of **a regional resource centre for water-related spatial data and information** within the University's newly established *Institute of Spatial Analysis and Regional Development (ISARD),* will establish TU-K as an authority in the field of water resources and territorial development in light of climate change. This, coupled with the interfacing, throughout the duration of the programme, of TU-K scholars with those from the global north, will further **enhance TU-K's visibility and international image**.
4. The TU-K IUC programme *"MAJI NI UHAI – Building Excellence in Water Governance for Betterment of Livelihoods and Climate Change Adaptation"* will assist in **focusing TU-K's research and development (R&D) agenda towards supporting the government's efforts in a number of development sectors**, and in line with existing development blueprints aforementioned (Vision 2030 and the Big Four Agenda). In so doing, it will provide insights and solutions that reflect and are responsive to existing societal realities and challenges. The IUC programme will enhance ongoing partnerships developed through community outreach activities, industry relations and local CSR initiatives targeting a number of governmental agencies and community-based organizations, and further **improve TU-K's embeddedness in society**.
5. The IUC programme will endeavor to involve multiple segments of the University population and demographic. The selection process for beneficiaries of PhD funding will take into consideration age and gender factors, thereby assisting TU-K in **transforming existing gender and generational relations.** In addition, each of the adopted research tracks will explicitly prioritize gender, age and ethnicity related research questions, frames and methodologies, thereby informing national policies that contribute to the vision of a socially-just Kenya.

**Domains of change:** What are the key challenges (cf. context/institutional analysis and strategy) the programme wants to tackle (can be both internal and external to the institution)? How to translate them into desired changes (i.e. "domains of change")? How does this contribute to the long term objective(s)?

In the Kenyan context of poverty, pressure on land and water resources and climate change, the IUC programme will focus on **enhancing collaborative governance of water resources** in their territorial dynamics. IUC will

contribute to solving Kenya's water shortage problems, the overexploitation of water resources, gendered challenges emanating from unequal access to water and water governance gaps, all in light of climate change. It will trigger improved governance of water resources in Kenya, more collaboration between water related sectors, improved and more equal access to water resources, and a decreased vulnerability of women, youth and elderly regarding water shortages. Within the broad field of water resource planning and management, IUC will address the following main challenges: tensions between water resources and socio-economic development; the need for technological innovations for water resource management; water induced disaster risks; challenges of water related territorial development and the geo-politics of cross-border water resources.

Besides addressing these key developmental challenges in Kenyan society, the IUC programme will tackle the following key institutional challenges.

1. **Staff consolidation and training.** TU-K lacks staff with PhDs to fill in the numerous job positions that it offers given the rise in student intake and the need for establishing masters and doctoral programmes. Staff consolidation and training will facilitate the increase in research skills, knowledge, competencies and attitudes that will improve the quality of teaching and learning experiences. **The programme will enable the institution to maintain and upgrade its staff and thus promote positive growth and development within the three faculties** of Applied Sciences and Technology, Engineering Sciences and Technology, and Social Sciences and Technology. The programme will also enhance TU-K's research agenda that will aid in scientific publications.
2. **Upgrading research (supporting) infrastructure**. The programme will develop two research infrastructure projects, to support developing research tracks. In particular, it will support the creation of TU-K's own doctoral training system and the development of connections between experts on spatial information from various schools. This will be achieved through the establishment of an *Institute for Spatial Analysis and Regional Development (ISARD)*, fed among others by the School of Surveying and Geospatial Sciences, the School of Computing and Information Sciences, the University Library, the School of Architecture and Spatial Planning and the Department of Geography. This institute serves as a transversal project generating data sets to be used by the four thematic-based research tracks, explained below. The programme will also enhance effective internet connection within the university to enable good communication and promote well researched collaborative projects over the ten years. The institute will be equipped with research materials and equipment that will benefit the institution and country at large.
3. **Developing inter- and trans-disciplinarity** by enhancing collaboration between faculties and schools and enhancing TU-K's embeddedness in society. TU-K's impact within the institution and on society at large will be deepened through the training and improved skill-set of its staff through the IUC programm. The programme **"***MAJI NI UHAI - Building Excellence on Water Governance for Better Livelihoods and Climate Change Adaptation In Kenya"* involves transversal thematic research areas that will bring together six schools drawn from the University's faculties. Moreover, stakeholders will be given strong positions in the elaboration of IUC projects, further stimulating TU-K's embeddedness in society.
4. **Transformation of the existing gender and generational relations**. The IUC programme will see the upgrading and implementation of gender, integrity and an upgraded research accreditation policy in TU-K to enhance innovative and all-inclusive research agendas in Kenya. This will facilitate equal opportunities for women and men on a 50/50 share in the university. Developing interrelated research tracks will enhance the participation of more women than before in conducting research with an outcome of 14 female PhD holders and 3 female professors by the end of 10 years. In this programme, it is women who occupy the centre-stage of conceptualization, capacity development of institutions and project implementation. In this regard, safety nets are provided for mainstreaming gender issues, which will ensure gender equity.

**Programme strategy:** Describe how the programme will approach these different challenges or 'domains of change'. What will be the key strategies of the programme? What will be the priorities of the programme in terms of capacity development? What are the key institutional strengthening domains to be addressed? Are there specific links with the transversal themes gender and environment foreseen?

The **overall strategy** for this IUC is to develop a **multi-layered but integrated pilot research agenda** focused on the specific thematic field of water, livelihoods and governance in the context of climate change, thereby touching many of the fields in which TU-K is rapidly developing leading expertise and enabling the placement of environment and gender at its core. This includes some of the resources/research infrastructure needed to properly implement this. **Five specific strategies** include:

**1. Developing a research programme comprising 4 interrelated research tracks** within the field of water, livelihoods and governance, enabling building staff, organizing collaboration, increasing expertise and enhancing research infrastructure. This will further the transition within TU-K doctoral schools that will lead to upgrading curriculums in the university. The research tracks will be coordinated by the School of Architecture and Spatial Planning, and bring together departments from six schools drawn from the University's three faculties of Applied Sciences and Technology, Engineering Sciences and Technology, and Social Sciences and Technology, whose academic focus is relevant to the subject theme. Project implementation further includes developing a meta-theoretical socio-ecological and gender-sensitive framework, enabling the dialogue between the schools involved. Given the focus of TU-K's research agenda on urban, rural and regional development in education, as well as its embeddedness in wide professional and policy networks in Nairobi and the country at large, supporting TU-K will have a considerable impact on urban and regional development practices and policies in Oceanic areas

(Lamu), Interregional (Lake Victoria basin), Intraregional (Lake Naivasha), Semi-arid and arid lands (Lake Turkana) and Nairobi Metropolitan region.

This research agenda is inspired by and aims to contribute to finding **solutions for Kenya's water shortage problems, (gendered) unequal access to water, and especially the lack of a coordinated approach towards water-sector challenges, all exacerbated by climate change**. Solving water challenges requires increased levels of cooperation, more robust governance systems and technical and social innovations, which have the potential to multiply the productivity and management of water within spatial systems in a more sustainable way. The IUC programme seeks answers to the following overall questions.

- How do existing water resource governance frameworks and management systems influence livelihoods of communities around water catchments and basin areas?
- How appropriate are water extraction and use technologies and practices in the conservation and sustainable use of scarce water resources?
- What is the impact of climate change on water availability and what mechanisms are in place to foster climate change adaptation and reduction and management of water-associated risks and disasters?
- What is the role of water resources in territorial development?

Answers to these questions will be pursued through **four (4) interrelated research tracks** that are linked to these overall research questions as explored in the context of **five (5) illustrative case study areas,** including one oceanic area (the Lamu Archipelago), two trans-territorial drainage basins (Lake Victoria and Lake Turkana), one inland water basin (Lake Naivasha), and an urban area (Nairobi Metropolitan Region)**.**

- Research track 1, led by the School of Social and Development Studies, in partnership with the Department of Spatial Planning and Design, will explore the relationships between **water and socio-economic development**, as well as social innovations in the governance and sustainable use of water resources. The *intraregional case of the Lake Naivasha basin* will serve as a case study in this regard. It considers the interdependencies between water, agriculture, tourism, and urbanization in the Lake Naivasha basin and clean energy production from the region's active geo-thermal field. This track will include at least 2 PhD projects.
- Research track 2, led by the School of Infrastructure and Resource Engineering, partnering with the School of Public Health, will consider **technological innovations in the exploration, extraction and utilization of water resources**. The *arid and semi-arid lands around the Lake Turkana basin*, as well as the *geothermal fields south of the Lake Naivasha basin* will serve as case studies. The case of the Lake Turkana basin additionally considers fossil fuel exploration and clean energy development initiatives in a marginal region, the growth of which is historically stagnated by conflict over land-based resources. This track will include at least 1 PhD and 2 Master projects.
- Research track 3, led by the School of Physical Sciences and Technology and partnering with the School of Computer Science, considers **climate change and water induced disaster risks**, the reduction and adaptation thereof, as well as the relationship between and innovations relating to water and sanitation. The *oceaning cases of the Lamu Archipelago at the North Coast* and the *urban case of the Nairobi Metropolitan Region* serve as case studies. The oceanic case considers the ongoing development of blue economy practices against a backdrop of fragile marine ecosystems collocated with historical settlements, both of which are potentially threatened by adverse effects of impending modernisation and industrialization. The urban case considers climate change and water induced disaster risks and innovations relating to water and sanitation in a water-scarce urban context. This track will include at least 1 PhD and 2 Master's projects.
- Research track 4, led by the School of Architecture and the Spatial Planning and partnering with the Department of Geography and Earth Observation, considers **the role of water resources in territorial development**. The *interregional cases of Lake Victoria and Lake Turkana basins*, *and the Lamu Archipelago* will serve as illustrative case studies. The cases will consider the delicate **geo-politics of cross-border water resources** with a view to informing the overdue review of international treaties on shared water resources and foster peacebuilding initiatives. This track will include at least 3 PhD projects.

**2. Developing two research infrastructure projects**, supporting the 4 research tracks. A first project includes creating TU-K's own **doctoral training system** under the coordination of TU-K's directorate of Knowledge and Research Exchange. Given the existing collaborations between TU-K and KU Leuven, this can culminate into the creation of a spin-off of the KU Leuven coordinated predoc programme 'International Module on Spatial Development Planning (IMSDP)' for Africa. The second project connects spatial information expertise from various schools through the newly established **Institute for Spatial Analysis and Regional Development (ISARD)**, among others fed by the School of Surveying and Geospatial Sciences, the School of Computing and Information Sciences, the University Library, the School of Architecture and Spatial Planning and the Department of Geography. This serves as a transversal project generating data sets to be used by the four thematic-based research tracks. As such, the IUC programme will provide a strong footing on the side of technology enhancement in spatial and geodetic systems coverage which are critical for resource mapping, planning and management, informing improved land management practices, the quest for functional and healthy human settlements, improved environmental management and responses to climate change impacts.

**3. Linking these 4 interrelated research tracks with broader stakeholders' interests** is in line with TU-K's ambition to educate for the real world, and will increase the IUC's impact and guarantee social uptake of its

results. The proposed research tracks will be imbued in societal reality by closely collaborating with governmental, civil society and private sector stakeholders, including parastatals, county governments, NGOs, private companies thereby increasing the research programme's societal impact. The programme will facilitate a collaborative research agenda that is in line with the overall Kenya Government Strategy, Vision 2030, which highlights climate change concerns, water and infrastructure, and support to science and technology. More specifically, the IUC research agenda will target the main actors in the field of water planning and governance in Kenya. This includes:

- national and county water management agencies (Water Resources Management Agency, National Water Conservation and Pipeline Company, County Waters Services Boards)
- food production agencies (e.g. National Irrigation Board)
- conservation agencies (Kenya Water Towers Agency, Forest Service, Kenya Wildlife Service)
- government ministries (espc. Water, Agriculture, Mining and Petroleum, Tourism)
- energy generating agencies (KenGen, Kenya Power, Geothermal Development Cooperation).

At the beginning of the IUC's implementation, a Stakeholder Advisory Committee will be installed, which will meet once a year to discuss the programme's progress. For the research tracks or its projects, more specific transdisciplinary working groups will be developed, in which researchers and case study stakeholders will co-create problem statements, research questions, research findings, policy proposals, project events etc.

**4. Stimulating TU-K's academic and societal dissemination activities** will support its regional, national and international ambitions to become a leading university in technology and innovation. This includes making academic publications, organizing international workshops, seminars and conferences, as well as translating research results into policy briefs, magazine articles and social media communications. The programme will enable the organization of conferences and outreach to society. This will create forums for exposure of research work conducted to enhance practicality and knowhow for to society at large. In the process, TU-K's current biannual magazine *TUNews* will be instrumental.

**5. Developing gender strategies** will stimulate the upgrading and implementation of gender policies in TU-K to enhance innovative and all-inclusive research agendas in Kenya. This will facilitate equal opportunities for women and men on a 50/50 share in the university. The four interrelated research tracks mentioned above will enhance the participation of more women in conducting research than before as will the outcome of 14 female PhD holders and 3 female professors by the end of the 10 years. Each research track will explicitly prioritize gender related research questions, frames and methodologies.

**Cross-cutting themes and transversal activities –** At the societal level, each of the five strategies will explicitly prioritize **gender, age and ethnicity** related research questions, frames and methodologies, with a view to highlighting gendered challenges emanating from scarcity and unequal access to water, and subsequently evolve a gendered perspective in the solution thereof. Questions of **environment and sustainability** will also pervade the research methodology of each strategy, with issues of environmental impacts of extractive land use practices, climate change adaptation and long-term sustainability of resource systems being at the core of the investigation. The research programme also has, as an explicit intention, the **generation of digital spatial data** for ease of future reference and research. The schools of Surveying and Geospatial Sciences and Computing and Information Sciences will jointly generate spatial information and process it into digital format. The data, in addition to feeding into the four thematic-based research tracks, will be consolidated into a comprehensive data-base to aid future research ventures.

How will the university ensure an appropriate institutional embeddedness of the programme?

**Institute of Spatial Analysis and Development (ISARD) –** Institutional embeddedness of the IUC programme within TU-K will be assured in the hosting of the programme in the newly established **Institute of Spatial Analysis and Regional Development (ISARD).** ISARD was established at TU-K to foster interdisciplinary research in the areas of *Spatial and Regional Economics, Rural and Regional Development, Environment and Sustainable Development,* and *Spatial Analytics and GIS*. ISARD will work closely with the equally newly-established **Centre for Integrated Water Resources Management (CIWRM),** which was established to foster *training, advocacy and research in the sustainable development and management of water and related resources.*

**Inter/intra-disciplinary collaboration** – the IUC programme will be further embedded in the institution through collaboration within 6 schools across the 3 faculties of *Applied Sciences and Technology, Engineering Sciences and Technology,* and *Social Sciences and Technology*, where research coproduction will stimulate interdisciplinary approaches. The schools include:

- School of Architecture and the Spatial Planning
- School of Surveying and Geo-spatial Sciences
- School of Infrastructure and Resource Engineering
- School of Internet and Communication Sciences
- School of Physical Sciences and Technology
- School of Social and Development Studies

Each school will undertake research supervision, data collection, collation, analysis and publications.

**Networking with external collaborators -** The programme will further reinforce embeddedness through networking and collaborating with external stakeholders in government, non-governmental organizations and communities, where TU-K will play a vital role in putting together various stakeholder networks. Through the IUC programme, TU-K endeavours to use the newly established Institute of Spatial and Regional Development, which, in collaboration with the library services and ICT, will consolidate and disseminate publications within and outside the institution.

**Monitoring and Evaluation** –TU-K understands the elements of project risk management that underlie such programmes. As such, mechanisms relating to project organization and management will have to adapt to IUC's operation guide. Communication on project reporting, risk assessment and progress will be streamlined to ensure effectiveness on project delivery by the local steering committee. Monitoring and Evaluation will be conducted in agreed timing on how the IUC Programme should be run from the beginning to the end of the ten years. All stakeholders will be involved to ensure inclusive participation and efficient output delivery. In addition to this, training will be conducted to the staff for skills and knowledge impartation where necessary, such as in the operation of digital spatial information systems and the Institute for Spatial Analysis and Regional Development (ISARD) and in the overall research process. For up-to-date information and operation of the programme, regular stakeholder meetings will be conducted to promote transparency and to keep every stakeholder at bar with the happenings and progress of the programme.

Explain how the proposed programme links to national/regional policies, strategies and/or priorities, and the VLIR-UOS country strategy (priorities and themes developed in the VLIR-UOS country strategy).

For some countries, the VLIR-UOS country strategy includes a list of potential partners. In case your university *is not on this list,* please motivate why an IUC programme with your university should be considered.

The programme ***"MAJI NI UHAI". Building Excellence on Water Governance for Better Livelihoods and Climate Change Adaptation in Kenya*** aligns with the institutional growth and transformation agenda as communicated in TU-K's strategic plan 2015-2020. The plan also aligns with Kenya's Government Strategy **to spearhead the attainment of *Vision 2030***. In this regard, TU-K has encouraged its academic units to initiate research that is well targeted to inform and assist through innovation, the national strategy as embodied in **the *Big Four Agenda* 2017-2022,** and targeting the expansion of **manufacturing, food security, affordable housing and affordable healthcare**. The IUC programme specifically aligns to the following national long-term development foci.

- **Science and technology support for development -** The programme will aid Vision 2030's goals by illustrating how the intensification of the application of science, technology and innovation can raise productivity and efficiency levels across social, economic and political pillars.
- **Social justice -** Vision 2030 advocates for a just, cohesive and equitable society where everyone enjoys equitable social development in a clean and secure environment. The IUC programme mainstreams gender and environment in the governance of natural (water) resources in the interest of sustainable development in Kenya.
- **Climate change adaptation –** The programme feeds into environmental management goals of Vision 2030, particularly by providing insights necessary for the effective conservation and sustainable exploitation of the country's natural resources, ensuring climate change adaptation and improving Kenya's disaster preparedness and mitigation.
- **Water and infrastructure -** The programme will assist in informing policies and strategic options and social and technological innovations towards Vision 2030's water and sanitation goal of ensuring effective water resource monitoring, sustainable catchment management, reducing water scarcity, upgrading water supply infrastructure, both for human consumption and irrigation, and improving water management.

The IUC programme also aligns with the VLIR-UOS Kenya Country Strategy and the central thematic areas of natural resources management and development, including:

- **Water resources –** The IUC programme is explicitly water-themed, with water resources at the centre of the research endeavour.
- **Biodiversity –** Water towers and basins double up as biodiversity areas and hence some of the research will be centered on the link between water and natural (terrestrial and marine) ecosystems.
- **Textile –** The use of water for irrigation is a key component of the government's strategy to expand both food and cash crop production, especially the revival of the textile sector. The IUC programme will explore possibilities for activating the potential for arid and semi-arid zones to support production of textile raw materials.
- **Oil and gas exploitation and conservation –** Co-location of water and oil and gas resources makes it imperative to undertake research on sustainable exploration and exploitation of these resources. The Lamu, Naivasha and Turkana cases are instructive in this regard.
- **ICT, Data and Biostatistics –** The IUC programme's transversal project is geared towards addressing cross-cutting themes of the VLIR-UOS strategy by targeting the production and uptake of datasets on a wide scope of research areas and development and testing of ICT resources infrastructures.

# 4. Stakeholder Analysis

| In order for a programme to have impact, a thorough understanding of the key stakeholders is essential. Describe and analyse these **key** stakeholders These may include both internal and external (outside HEI) stakeholders, as well as direct and indirect beneficiaries. | | |
|---|---|---|
| **Stakeholder** | **Analysis** | **Engagement strategy** |
| **Technical University of Kenya**<br>Institute of Spatial Analysis and Regional Development (ISARD),<br>School of Architecture and Spatial Planning,<br>School of Infrastructure and Resource Engineering,<br>School of Surveying and Geospatial Sciences,<br>School of Social and Development Studies,<br>School of Physics Sciences and Technology<br>University Library<br>ICT Centre | The programme will be domiciled and coordinated within the Institute of Spatial Analysis and Regional Development (ISARD).<br>The local coordinator will provide leadership and oversee the execution of the project from beginning to end. He will make strategic decisions in consultation with partner institutions to oversee the quality of the process and outputs.<br>The staff and students will participate in the research programme of the project at individual levels and will contribute in the coproduction of knowledge and innovations. They are directly responsible for the delivery of the project.<br>They will also play a proactive role in the dissemination of research knowledge generated from the project. | Each school will provide a project leader for the 4 research tracks. There will be a programme manager to oversee day-to-day running of the project. The project leaders and programme manager will work under the local coordinator who together will constitute a local steering committee. The local steering committee will work with the Flemish steering committee to oversee overall project delivery. |
| **Parastatals**<br>Water Resource Management Authority (WARMA)<br>Kenya Water Towers Agency<br>National Water Conservation and Pipeline Company,<br>County Waters Services Boards<br>Kenya Marine and Fisheries Research Institute (KMFRI)<br>Kenya Wildlife Service (KWS)<br>Kenya Forest Service (KFS)<br>National Irrigation Board (NIB)<br>Kenya Agricultural & Livestock Research Organization (KALRO)<br>Kenya Industrial Estate (KIE)<br>Kenya Electricity Generating Company<br>Geo-thermal Development Company | The programme will initiate collaboration and partnership with parastatal agencies. Research on land resources will work closely with KALRO, KFS, KWS & KIE, while research on water resources will work with WARMA.<br>Some of these partners will be co-opted into the teams while others will be involved through consultation when the need arises.<br>Their tasks will primarily be to provide data and guide the research on specialised niches whose expertise is focused on specific areas of research. They will also have input into the policy briefs.<br>They will also play a critical role in quality assurance purposed in production of research knowledge and innovation. Further, they will play a central role in the dissemination and uptake of research knowledge and innovation into the market. | Members from these institutions will be enjoined into the core team of researchers where they will be engaged on a continuous basis in the research programme. Some will be involved at specific stages of research for their input into the process as key stakeholders. |
| **Line Ministries**<br>Water and Irrigation<br>Agriculture<br>Mining and Petroleum<br>Tourism and Wildlife<br>Lands and Physical Planning<br>Infrastructure, Housing and Urban Development | The line ministries may not have a direct role in the implementation of the project but as key stakeholders, the project team will liaise with them in policy formulation and implementation.<br>They will also play a pivotal role in uptake and mainstreaming of produced knowledge and innovations in the market. | They will mostly be secondary stakeholders in the project. They will be consulted and engaged when the need arises to participate in workshops and project meetings. |
| **County Governments** | Some research will focus on community-based resources that are managed collectively by committees and boards on behalf of | They will form part of the research team specifically during data collection and data |

| | | |
|---|---|---|
| County Governments of Nairobi, Lamu, Turkana, Nakuru, Kisumu, Migori, Siaya | the communities. Others involve resources managed directly by county governments. Representatives of the communities will be engaged either directly or indirectly in the research project, through committees, boards or county governments.<br>As custodians of these resources, they will participate during data collection and analysis. They will also play an important function in the dissemination of knowledge and in implementation. | dissemination. Depending on their roles, they will be engaged either on a continuous basis or at intermittent/need basis. |
| **Non-governmental Organizations/ Community Based Organizations**<br>Community Trust Land Boards | NGOs whose activities and mandate fit into the focus areas of research will be enjoined as important stakeholders.<br>Their primary role will be to augment research coproduction and dissemination.<br>The research will tap into their community networks especially in data collection phases. | They will be engaged as secondary stakeholders whose contribution will be determined on an occasional-basis. |
| **Private Sector** | The role of the private sector will be primarily to upscale the uptake of research knowledge and innovation. It will play a critical role in mainstreaming research output/products into the market.<br>Private sector actors will bring industry needs into research to facilitate customised production of knowledge and innovations. | Private sector actors are secondary stakeholders in the process whose engagement will be occasional. |
| **General Public** | The general public includes the ultimate consumers of generated knowledge and innovations. As such, they will be engaged in different stages of the programme implementation.<br>The general public will be involved in data collection and as custodians of primary data. | They will be engaged in primary/field data collection and other engagement forums such as workshops and dissemination activities. |

# 5. Assumptions, Preconditions & Sustainability

Describe in detail the preconditions and external factors that can influence the realisation of the objectives of the programme (feasibility).

**Assumptions -** The success of the IUC programme is premised on a number of assumptions:

- there exists sufficient interest amongst collaborating entities to pursue the proposed research agenda as expressed in the number of staff that will be availed to undertake research under the various research tracks
- collaborating entities have sufficient senior academic expertise to facilitate proper and adequate guidance for researchers in their respective domains of involvement
- there is sufficient capacity at TU-K to provide efficient and effective administrative services and ensure programme success
- there will be willingness on the part of the Flemish HEI to provide leadership to the programme and make available its senior academic staff for purposes of research guidance and the enrollment of Masters and PhD candidates in their institution.

**Internal challenges and externalities** - In spite of its inherent potential for success, a number of internal and external factors may impinge on certain aspects of the programme. In addition, in spite of immense benefits of the IUC programme to individual TU-K collaborators, certain situations may exist or develop in the course of the implementation of the IUC programme that shift the equilibrium and participation of the participating faculties, schools or departments.

- There may be a lack of numbers to fill vacancies from all the departments that will be involved in the IUC programme in TU-K. It is envisioned that in the first phase alone, more than eight PhD positions are expected to be created and trained to completion. Although unlikely given the current staff's eagerness to obtain a PhD, there is always a possibility that this target may fail to be met.
- Owing to the fact that TU-K is still a new university, some of the participating schools and departments may not have sufficient internal capacity to offer requisite and effective supervision for the PhD training component.
- Considering that salaries in the academic sector in Kenya are generally low, staff mobility and turnover of staff and researchers to more lucrative positions, change of vocations or destination, is anticipated, which in turn may involve some scholars quitting the programme mid-way through, or altogether abandoning the PhD research before its completion.
- There is fear that due to the high quality of research that is anticipated to come out of this programme, the high quality PhDs produced will enhance the marketability of programme alumni, thereby exposing them to poaching aggression from other local and international Universities.
- Weak organizational and administrative capacity might prove to be the programme's stumbling block and therefore needs to be guaranteed.
- In terms of gender, there may be a difficulty in attracting an adequate number of female researchers, especially given that the interest in technology subjects is still very low amongst Kenyan women. There are also adequate lucrative opportunities in industry, for women who possess master's qualifications, thereby making PhD studies unattractive. This may make it difficult to raise the required numbers to obtain the gender balance that is envisioned in the programme.

Describe the opportunities and challenges for the sustainability of benefits (capacity retention, continuation of research activities, outreach services, policy development, etc) after VLIR-UOS funding. This may include reflections on possible strategies to retain trained staff members, sustaining the enhanced research culture, continue the research activities, strengthen networking, making external international cooperation possible, etc).

To ensure the sustainability of programme benefits, the following must be guaranteed.

- To ensure the programme's attractiveness and future replicability, fellowship programmes as well as co-supervision, sandwich programmes and double degrees with universities outside Kenya may be explored.
- To ensure the timely and successful completion of the programme, TU-K shall guarantee an environment of optimal productivity by incentivizing the research and researchers during the entire duration of the programme, and especially during field work and when the writing is most intense.
- To plug the gender deficit in the PhD programme, sandwich arrangements may be explored especially for female candidates.
- TU-K shall make the programme attractive for other non-collaborating units to formulate similar programs and replicate the same milestones, especially with a view to ensure staff and institutional capacity enhancement.
- To guarantee that the programme outputs influence policy, TU-K must intensify dissemination of information and promote uptake through targeted institutional outreach.
- The phase-out years of the programme will be used to monitor and evaluate sustainability of the benefits of the programme beyond the programme timeline, with a possibility for integrating a review and redesign of future programmes.

# 6. Background of the proposal

Please explain how this concept note was developed (process, who was involved?).

The inception and development of the concept note is a consequence of a long-standing collaboration and partnership between TU-K and the Flemish Higher Education Institution KU Leuven. The idea for a broad-based collaboration was mooted in August 2016 when our Flemish partner was in the country for a non-official trip. He was invited and graciously agreed to join a PhD seminar at the Department of Spatial Planning and Design (DSPD), where he gave his thoughts on candidates' PhD concepts. As a young department, most of the staff at the DSPD were on a staff development track and needed funding to pursue their Masters and PhDs. The University did not have adequate funding to expend towards this and consequently, academic departments were asked to explore external mechanisms targeting funding for staff development such as through scholarships for PhD research. The possibility of applying for an IUC programme was discussed, which would give sufficient funding possibilities in a framework of knowledge exchange between the Kenyan and Flemish academics and researchers.

The idea was revisited again in August 2018, when the partners agreed to jointly submit a proposal for the next IUC programme cycle. The intention was registered in Leuven by the Flemish partner. In June 2019, a meeting was held in Belgium where a concept development discussion ensued and a concept was agreed upon. This began a process in which the TU-K partner comprising a number of schools worked on the proposal, with inputs from the Flemish counterpart.

During the 1st week of September 2019, there was a writing workshop week in Nairobi where the TU-K team worked with the Flemish partner. The concept was further redeveloped and redesigned under the guidance of our Flemish counterpart. The concept was discussed with collaborating TU-K schools and a meeting held with the University top administration, including the Vice Chancellor and senior academics. This paved the way for a much more refined concept to be realized. The process culminated in a final proposal that was submitted to VLIR-UOS.

Please explain earlier or current links with Flemish Higher Education Institutions (if any):

- earlier collaborations with Flemish Higher Education Institutes (HEIs)
- specific links with Flemish HEIs and/or individuals?
- their role in the development of this concept note?
- how do you see their involvement in the proposed programme?

TU-K has a well-established relationship with KU Leuven, based on the following.

- A significant number of TU-K staff of the School of Architecture and Spatial Planning (SASP) are KU Leuven alumni. In essence, KU Leuven is the single most HEI contributor to SASP's staff development efforts. KU Leuven is the alma mater for at least 9 staff who have undertaken their postgraduate studies at different levels. The chair of Spatial Planning, and one other senior staff member, are both a MaHS and PhD alumnus under the VLIR-UOS and IRO programmes. One other member of staff is commencing her PhD studies under the Global Minds framework.
- TU-K and KU Leuven have been collaborating in a staff development and knowledge exchange initiative under the short-term International Training Programmes (ITP). A total of 5 TU-K (SASP) staff have participated in the 3 month International Module for Spatial Development Planning (IMSDP), thanks to funding secured by the Flemish partner. Senior academics at TU-K have been involved as tutors for the programme.
- KU Leuven Alumni at TU-K have been involved in supervising undergraduate and postgraduate research projects, whenever these have been undertaken in Nairobi.
- TU-K (DSPD) academic staff are occasionally involved in studio assessment for KU Leuven's MaHS programme (Dept of Architecture). A joint studio is planned in Nairobi for the Spring of 2020 that will involve DSPD Urban and Regional Planning and KU Leuven MaHS students in a joint fieldwork exercise, leading to each institution finalizing their studio outputs in the framework of their own curricula.

The role of KU Leuven in the development of the IUC proposal was central from the beginning, particularly in regards to capacity building on concept writing. KU Leuven staff has also offered guidance, assistance and most importantly, its time to work in partnership throughout the development of the concept. Their future involvement will entail contributing to the overall strategic leadership of the programme. They will provide a critical link between the local team and VLIR-UOS. Their expertise and knowledge will be relied upon for capacity building and training of participants in adopted research tracks, and with a view to ensure quality assurance of the products/outputs of the project. Masters and PhD researchers will be enrolled in the Flemish HEI and jointly promoted by KU Leuven and TU-K professors.

In case your university has applied for IUC funding earlier, please summarize the main reasons for non-selection by VLIR-UOS at that time, and what measures you have taken to remedy since then.

NA