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Implementing institutional instruments for forest landscape protection in the Kilimanjaro world heritage site, Tanzania

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ABSTRACT

Various institutional instruments, including World Heritage Convention (WHC) and other strategic policies, have been deployed to protect forest landscapes as natural heritage across the globe. Despite the implementation of these instruments to protect forest landscapes in World Heritage sites (WHS), the degradation problems persist, especially in the developing world, including Africa. Using the Kilimanjaro WHS in Tanzania as a case study, we investigated the state of implementing WHC and policies as strategic institutional instruments for forest landscape protection to support the sustainability of forests as a natural heritage. We collected empirical data using surveys of experts and integrated qualitative and quantitative (descriptive) analyses to investigate the implementation level of WHC and policies on forest protection, related the implementation level to primary forest degradation, and identified key challenges confronting the implementation. Key findings showed a low-level implementation of WHC and policies for forest protection. Also, our study showed that low-level implementation is associated with 19.83% of forest degradation from 1976 to 2020. Additionally, our study identified key challenges confronting all institutional instruments deployed for forest protection, including a lack of forest protection/conservation education in local communities, a low level of law enforcement on forest degradation, inadequate resources, wildfire, a lack of political will, political interference/interests, inadequate personnel, a lack of inter-departmental coordination, and conflicts with local communities. Our findings are of great importance for decision-makers to improve the implementation level of the WHC and policies as strategic institutional instruments and to improve the sustainability of forests as a natural heritage in Africa and other parts of the world.

Key Words: *Institutional Instruments; Strategic Policies; Forest Protection; Forest Degradation; Forest Sustainability; Kilimanjaro and Africa*

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I. Introduction

The positive impact of tropical forest protection cannot be over-emphasized due to the cultural, social, economic, and environmental values attached to forests globally. For example, the forest provides several benefits, including climate change mitigation (Ellis et al., 2019), wildlife conservation (Greene et al., 2019; Mavhura and Mushure, 2019) and promotion of ecotourism in World Heritage Sites (Motlagh et al., 2020). To protect the forest as a natural heritage and sustain its values, various strategic institutional instruments, including the United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Convention (WHC) of 1972 signed by 193 nations and the United Nations Convention on Biological Diversity (CBD) of 1992 signed by 150 nations at the Rio Earth Summit have been implemented across the world (UNESCO, 2021 and CBD, 2020). Additionally, various strategic policies for forest protection have been deployed to improve the sustainability of forests as a natural heritage across the world, including the Kilimanjaro World Heritage Site (WHS), Tanzania (Lu et al., 2020; Sandström et al., 2020; Sahide et al., 2020; Allan et al., 2017; Hua, 2007; URT, 1998a; URT, 1998b; URT, 1997). In this context, the sustainability of forests as a natural heritage is a condition that allows the utilization of forest resources as natural heritage by current and future generations without compromising the healthy condition of forest ecosystems through degradation.

In the Kilimanjaro WHS, Tanzania, despite the implementation of the WHC of 1972 (UNESCO, 2021) and other strategic policies, including the National Forest Policy of 1998 (URT, 1998a), National Environmental Policy of 1997 (URT, 1997), Wildlife Policy of Tanzania 1998 (URT, 1998b), Tanzania National Park Regulation of 2003 (URT, 2003) and National Tourism Policy of 1999 (URT, 1999), forest degradation occurred over the years (Enoguanbhor et al., 2022a; Hamunyela et al., 2020; Kilungu et al., 2019; Rutten et al., 2015; Soini, 2005). The WHC of 1972 makes provisions for protecting the World Cultural and Natural Heritage Sites (UNESCO, 2020; UNESCO, 2018; Rodwell, 2012; Hua, 2007). The convention defined natural heritage as the landscape's physical form and geology, including the protected areas for habitats and endangered wildlife (Jenkins, 2018). It is also defined as "natural sites or precisely delineated natural areas of outstanding universal value from the viewpoint of science, conservation or natural beauty" (UNESCO, 2020). The primary/montane forest landscape in the Kilimanjaro WHS is, therefore, a good example of natural areas of outstanding universal value and protected areas for habitats and endangered wildlife and also serves as buffer zones of the WHS (IUCN, 2020).

Other similar studies (Blattert et al., 2022; Su Chen Ng et al., 2022; Magessa et al., 2020; Su et al. 2019; Weber, 2017; Kalonga et al., 2016; Kalaba, 2016; Brandt et al., 2016; Van Den Hoek et al., 2014; Naka et al., 2000) on implementing institutional instruments for forest protection show various implementation levels and challenges confronting implementations. For example, while investigating problems in forest policy implementation, Kalaba (2016) found poor policy implementation on forest ecosystems in Zambia, which is associated with inadequate institutional capacity, inadequate legal framework, political influences, insecure land tenure, poor funding, and lack of intersectoral coordination. While investigating forest policy implementation effectiveness, Van Den Hoek et al. (2014) report that the policy has not been able to reduce forest use pressures, contrary to policy goals in Southwest China. In Tanzania, Magessa et al. (2020) studied the participatory forest management policy with regard to achieving the objectives of its governance but found a significant gap between the policy objectives and observed outcomes, indicating the policy failure in the Kiteto district. However, Kalonga et al. (2016) investigated the forest certification policy on biodiversity conservation in Tanzania and reported that the policy implementation processes are positively associated with biodiversity conservation in the Kilwa District, Lindi Region. In the Kilimanjaro WHS, Tanzania, previous studies did not relate the analyses of experts' surveys to GIS outcomes to investigate the implementation level of all strategic institutional instruments for forest protection.

We, therefore, aim to investigate the state of implementing WHC and policies as strategic institutional instruments for forest landscape protection to support the sustainability of forests as a natural heritage. The specific objectives are to:

1. Analyze the implementation level of WHC and policies instruments on forest landscape protection;
2. Relate the implementation level of WHC and policies on forest landscape protection to primary forest degradation and;
3. Identify key challenges for WHC and policies' implementations on forest landscape protection.

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II. Materials and Methods

Study area

We chose the Kilimanjaro WHS (Kilimanjaro National Park) because of the forest degradation over the years (Enoguanbhor et al., 2022a; Hamunyela et al., 2020; Kilungu et al., 2019; Rutten et al., 2015; Soini, 2005). The WHS is located in northeast Tanzania with a total land area of 1686.72 km^2 (Figure 01). The forest landscape, particularly the primary/montane forest, is one of the outstanding universal values as a natural heritage site (UNESCO, 2021). The topographic elevation of the mountain ranges from 1277 to 5880 m above sea level at Kibo Peak (Figure 01). In addition to the Kibo Peak, Shira and Mawenzi Peaks, which are 3,952 m and 5,130 m above sea level, respectively, are important topographic features of the mountain (Figure 01).

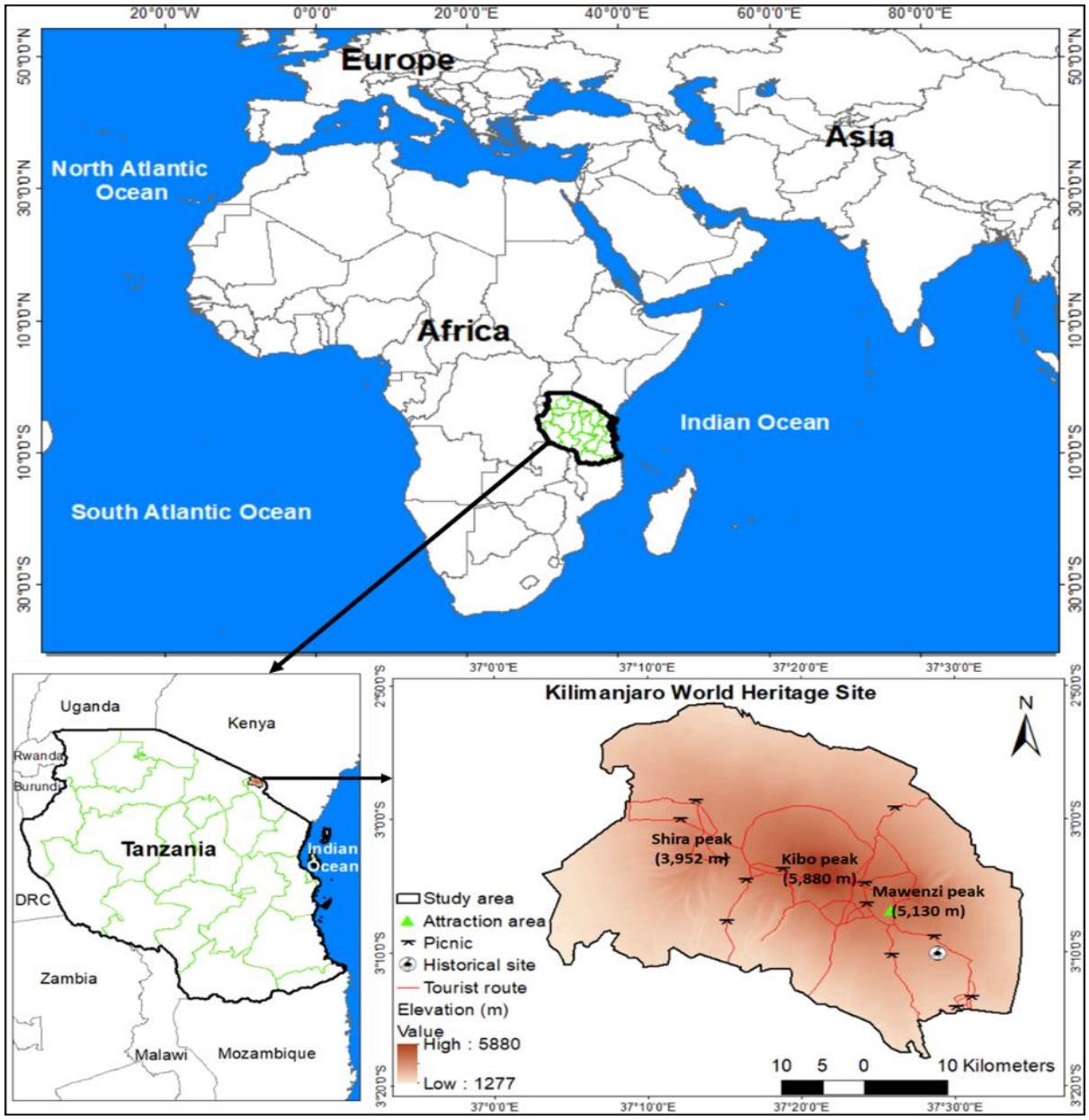

Figure 01. Locational map of Kilimanjaro WHS.
Source: Enoguanbhor et al. (2022a).

The National Park was established in 1973 and initially composed of the whole mountain and moorland vegetation above the montane forest and was inscribed as a natural WHS in 1987 under criteria vii, with the mountain as an outstanding universal value and one of the largest volcanoes in the world (UNESCO, 2021; IUCN, 2020). In 2005, the site was extended to include the montane forest, which serves as a buffer zone and habitat for wildlife. The forest is also defined as the outstanding universal value of the site (UNESCO, 2021; IUCN, 2020).

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Data collection and analysis

We collected data for this study from primary sources through questionnaires. We designed a mixed questionnaire that includes open-ended (semi-structured), closed-ended (structured), and matrix questions for experts. A matrix questionnaire is a closed-ended question of the same response categories (Babbie, 2013; Secor, 2010). The closed-ended part of the questionnaire consists of multiple-choice (fixed alternative) questions in which the respondents were expected to choose any options. The first author distributed questionnaires to experts between 21 February to 8 April 2022 using purposive sampling, which is "a type of nonprobability sampling in which the units to be observed are selected based on the researcher's judgment about which ones will be the most useful or representative" (Babbie, 2010). The questionnaires were distributed to experts from different government departments and agencies, including the Kilimanjaro National Park (KINAPA), Sokoine University of Agriculture Training Forest (SUATF), Tanzania Forest Service (TFS), and UNESCO. A total of 46 questionnaires were distributed and 26 were retrieved. Out of the 26 questionnaires that were retrieved, 61.5%, 30.8%, and 7.7% were retrieved from KINAPA, SUATF, and TFS, respectively. The only questionnaire that was administered to UNESCO due to the non-availability of staff was not retrieved because it was not responded to by the staff.

We analyzed the questionnaire data using qualitative and quantitative (descriptive) methods. We used the descriptive analysis to summarise dataset characteristics on closed-ended questions by calculating the response frequencies to identify variables on the level of implementing WHC and strategic policies for forest protection. We used qualitative analysis for open-ended questions through the process of coding, sorting, synthesizing (Bryman, 2016; Maxwell, 2013; Secor, 2010) and ranking (Enoguanbhor et al., 2021). In doing so, we coded the answers to open questions into themes based on the identified variables. Also, we sorted the identified variables, synthesized them, and grouped them into different categories. Additionally, we modified the ranking method developed by Enoguanbhor (2021) based on how many times a variable was identified by each respondent as follows: * = "Very low" for 1-2 respondents; ** = "Low" for 3-4; *** = "Moderate" for 5-6; **** = "High" for 7-8, and; *****= "Very high" for 9 and above respondents. We applied the analysis to identify, e.g., Institutional instruments used for forest protection, reasons behind the forest patterns before and after 2000, key challenges for WHC and policies, and suggestions to regenerate forests within the lost primary forest areas.

While relating the implementation level of WHC and policies on forest landscape protection to primary forest degradation, we used the findings from Enoguanbhor et al. (2022a), particularly the attribute information of land cover maps for 1976, 2000, 2012, and 2020 temporary boundaries, the transition change detection, and the degraded primary forest maps that were generated from the land cover maps. The land cover maps were produced from remotely sensed data of Landsat 7 and 2 using supervised classifications and maximum likelihood algorithm (Enoguanbhor et al. 2022b; Enoguanbhor et al., 2019; Vijayalakshmi et al., 2021; Campbell and Wynne, 2011; Lu et al., 2011) with overall accuracies from 82.67% and above (Enoguanbhor et al. 2022a).

III. Results

The results in Table 01 and Figure 02 show the list of policy and convention instruments and implementation levels for forest protection, respectively, based on experts' perceptions. Based on the number of experts that identified various instruments, the Tanzania National Forest Policy is ranked "Very-high", followed by Tanzania Wildlife Policy and Tanzania National Environmental Policy, both are ranked "High". Other identified instruments include Tanzania National Park Regulations, Tanzania National Tourism Policy, and WHC with "Moderate", "Low", and "Very low" rankings, respectively. While 42.3% of the correspondents perceived the implementations as "Low-level", 34.6% and 19.2% perceived them as "High-level" and "Very high-level", respectively. While 3.9% of correspondents did not answer the question, no correspondent perceived the implementations as "Very low-level" implementations.

Figures 03 and Figure 04 show the results from the previous study by Enoguanbhor et al (2022a) on forest degradation spatial determinants in the Kilimanjaro WHS, Tanzania. Figures 03 shows that the primary (montane) forests decreased from 76.52% in 1976 to 49.42% in 2020. Contrarily, the moorland vegetation increased from 21.35% to 26.86% in 2020. The bare land surface (alpine desert) covers about 2.13% in 1976 and 23.73% in 2020. Figure 04 (a and b) shows the transition and

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degraded primary forest, respectively, and about 19.83% of the total area is degraded between 1976 and 2000.

Table 01. Institutional instruments used for forest protection in the Kilimanjaro WHS.

	Identified instruments	Ranking
1	Tanzania National Forest Policy	*****
2	Tanzania Wildlife Policy	****
3	Tanzania National Environmental Policy	****
4	Tanzania National Park Regulations	***
5	Tanzania National Tourism Policy	**
6	UNESCO Convention (WHC)	*

Ranking: * = "Very low"; ** = "Low"; *** = "Moderate"; **** = "High", and; *****= "Very high"

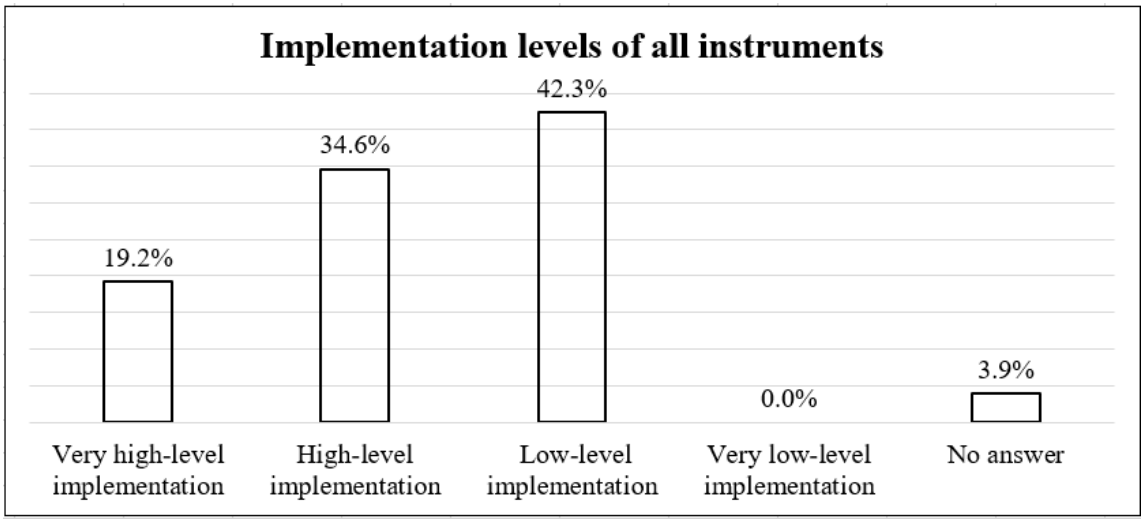

Figure 02. Implementation levels of institutional instruments for forest protection in the Kilimanjaro WHS.

Figure 03 and Figure 04 show the results from the previous study by Enoguanbhor et al. (2022a) on forest degradation spatial determinants in the Kilimanjaro WHS, Tanzania. Figure 03 shows that the primary (montane) forests decreased from 76.52% in 1976 to 49.42% in 2020. Contrarily, the moorland vegetation increased from 21.35% to 26.86% in 2020. The bare land surface (alpine desert) covers about 2.13% in 1976 and 23.73% in 2020. Figure 04 (a and b) shows the transition and degraded primary forest, respectively, and about 19.83% of the total area was degraded between 1976 and 2000.

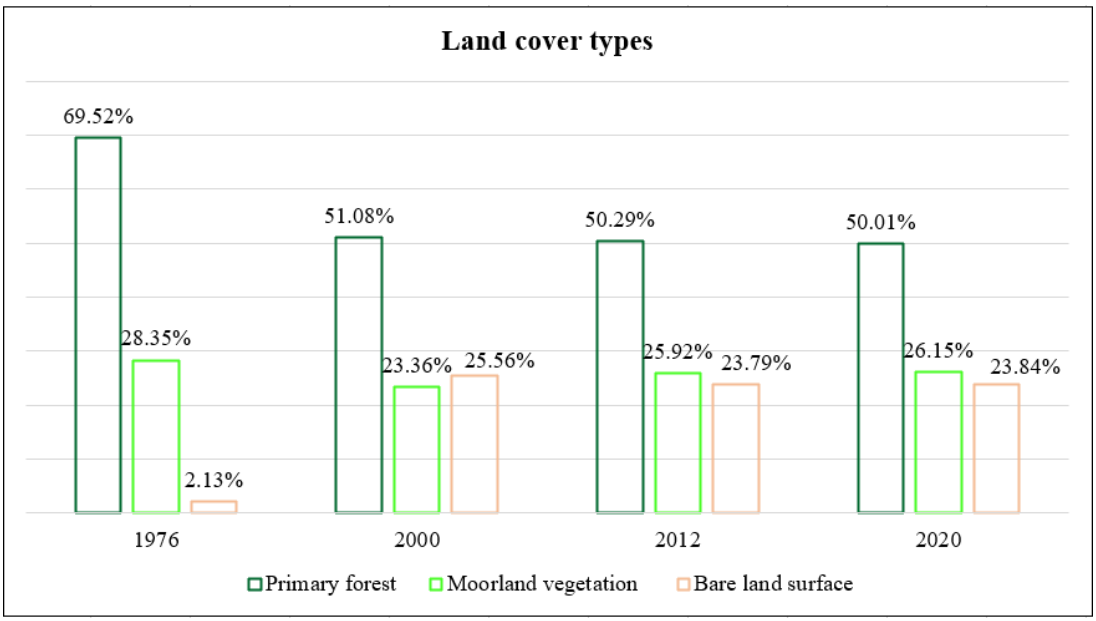

Figure 03. Calculated area of land cover types in percentage (Source: Enoguanbhor et al., 2022a)

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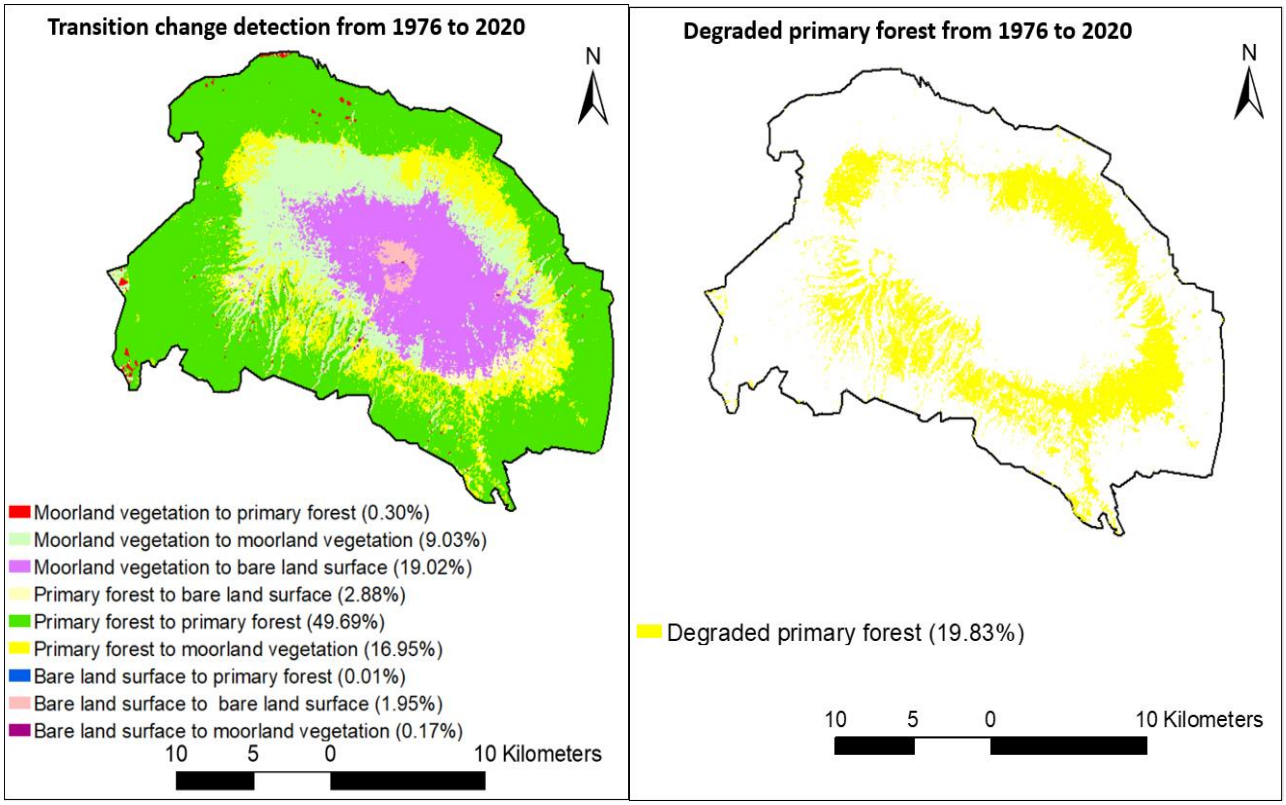

Figure 04. Spatial patterns of (a) land cover transitions and (b) the degraded primary forest.
Source: Enoguanbhor et al. (2022a).

The results in Table 02 show the reasons behind the patterns and conditions of the forest before and after the year 2000. The results show that the reasons for the high decrease in the primary forest before the year 2000 are lack of awareness, low level of law enforcement, and inadequate resources (funding) with "Low", "Low", and "Very low" rankings, respectively. However, after the year 2000, the reasons for the low decrease of the primary forest are improvement in law enforcement, improvement in creating awareness, and establishment of forest planting with "Low", "Very low", and "Very low" rankings. Other reasons include improvement in implementing policies and the inclusion of the primary forest in the WHS with "Very low" and "Very low" rankings, respectively.

Table 02. Reasons for forest spatial patterns and conditions before and after the year 2000.

Analyzed topics	Identified variables	Ranking
Reasons for forest spatial patterns and conditions (high reduction) before the year 2000	Lack of awareness	**
	Low level of law enforcement	**
	Inadequate resources (funding)	*
Reasons for forest spatial patterns and conditions after the year 2000	Improvement in law enforcement	**
	Improvement in creating awareness	*
	Establishment of forest planting projects	*
	Improvement in implementing policies	*
	Inclusion of the primary forest in the WHS	*

Ranking: * = "Very low"; ** = "Low"; *** = "Moderate"; **** = "High", and; *****= "Very high"

Table 03 shows key challenges for implementing WHC and policies on forest protection in the Kilimanjaro WHS. The major challenges include a lack of forest protection/conservation education in local communities, a low level of law enforcement on forest degradation, and poor supervision and management of forest protection at the site with "Very high", "Moderate", and "Moderate", respectively. Other identified challenges include inadequate resources (funding and provision of vehicles for park rangers, etc.), population pressure, and wildfire with "Low" rankings. Some identified challenges with "Very low" rankings include a lack of political will, political interference/interests, inadequate personnel, conflicts with local communities, a low level of community involvement, and a lack of inter-departmental coordination.

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Table 03. Key challenges for implementing WHC and policies on forest protection in the Kilimanjaro WHS.

	Identified challenges	Ranking
1	Lack of forest protection/conservation education in local communities	*****
2	Low level of law enforcement on forest degradation	***
3	Poor supervision and management of forest protection at the site	***
4	Inadequate resources (funding and vehicles for park rangers, etc.)	**
5	Population pressure	**
6	Wildfire	**
7	Lack of political will	*
8	Inadequate personnel	*
9	Conflicts with local communities	*
10	Low level of adoption of new policies	*
11	Lack of inter-departmental coordination	*
12	Illegal logging businesses	*
13	Scarcity of land resources	*
14	Political interference and interest	*
15	Livestock grazing on the site	*
16	Tourism pressure	*
17	Low level of community involvement	*

Ranking: * = "Very low"; ** = "Low"; *** = "Moderate"; **** = "High", and; *****= "Very high"

Table 04 shows suggestions for solving challenges facing forest protection, especially regenerating the lost primary forest to improve forest, environmental, and natural heritage sustainability in the Kilimanjaro WHS. The key suggestions are forest protection/conservation education for local communities and extensive planning of new trees both with "Very high" rankings. Other suggestions include introducing new laws of forest protection, improving the implementations of WHC and policies for forest protection, and improving law enforcement on forest degradation with "Moderate", "Low", and "Low" rankings, respectively. Some other suggestions with "Very low" rankings include local communities' involvement, adequate funding, introducing sources of energy other than charcoal, and educating tourists on how to utilize the site without degrading forests.

Table 04. Suggestions to regenerate forest within the lost primary forest areas to improve forest/environmental/natural heritage sustainability of the Kilimanjaro WHS.

	Suggestions	Ranking
1	Forest protection/conservation education for local communities	*****
2	Extensive planting of new trees	*****
3	Introducing new laws of forest protection	***
4	Improving the implementations of WHC and policies for forest protection	**
5	Improving law enforcement on forest degradation	**
6	Local communities' involvement	*
7	Adequate fundings	*
8	Introducing sources of energy other than charcoal	*
9	Removal of exotic species from the site	*
10	Provision of grazing routes	*
11	Controlling the number of tourists entering the site	*
12	Educating tourists on how to utilize the site without degrading forest	*

Ranking: * = "Very low"; ** = "Low"; *** = "Moderate"; **** = "High", and; *****= "Very high"

IV. Discussion

The findings on policy and convention instruments used for forest protection in the Kilimanjaro WHS based on experts' surveys (Table 01) show different policies and WHC instruments are being deployed, indicating sufficient institutional instruments to protect the forest and improve the forest, environmental, and natural heritage sustainability, especially if implemented effectively. Among the institutional instruments, Tanzania National Forest Policy has been identified as the instrument mostly used, followed by Tanzania Wildlife Policy, Tanzania National Environmental Policy, Tanzania

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National Park regulations, Tanzania Tourism Policy, and UNESCO's WHC. The findings are in line with reports on institutional instruments that made provisions for natural heritage protection, including forests (Jenkins, 2018; UNESCO, 2018; Hua, 2007). For example, various strategic actions, including the National Forest Policy of 1998 (URT, 1998a), the National Environmental Policy of 1997 (URT, 1997), WHC of 1972 (UNESCO, 2021), the Wildlife Policy of Tanzania 1998 (URT, 1998b), the Tanzania National Park Regulations of 2003 (URT, 2003), and the National Tourism Policy of 1999 (URT, 1999) have been deployed to protect the Kilimanjaro WHS from forest degradation.

The findings on implementation levels of institutional instruments for forest protection (Figure 02) show that all the institutional instruments are being implemented at a low level, as 42.3% of experts perceived this level of implementation. Despite deploying several institutional instruments, this indicates that forest protection may not be fully achieved to improve forest, environmental, and natural heritage sustainability. This result is similar to the report from Ichumbaki and Mapunda (2017), who showed that Tanzanian government policies and UNESCO's conventions have not been able to protect effectively other WHS such as the Ruins of Kilwa Kisiwani and Songo Mnara. Also, the findings are similar to that of Kalaba (2016), who found poor policy implementation on forest ecosystems in Zambia. Additionally, the findings support those of Van Den Hoek et al. (2014) who reported that the forest policy implementation has not been able to reduce forest use pressures, which is contrary to policy goals in Southwest China. Furthermore, the findings support those of Magessa et al. (2020) who show a significant gap between the forest management policy objectives and observed outcomes, indicating the policy failure in the Kiteto district of Tanzania. However, the findings contradict those of Kalonga et al. (2016), who reported that the forest certification policy implementation processes positively relate to biodiversity conservation in the Kilwa District, Lindi Region of Tanzania. However, the 34.6% and 19.2% of experts that perceived high-level and very high-level implementation, respectively, indicate that the implementations are still somewhat effective.

Relating the implementation level of all the institutional instruments (Figure 03) to the transition pattern (Figure 04a) and forest degradation (Figure 04b) showed that the low level of implementation contributes to the pattern of transition between primary forest and other land cover types and the primary forest degradation. The 19.83% of forest degradation between 1976 and 2020 indicated a large forest degradation. Also, the high decrease in the primary forest between 1976 and 2000 indicated low-level implementations of the available institutional instruments during that period (Figure 03) associated with a lack of awareness, a low level of law enforcement, and inadequate resources (funding) (Table 03). However, the little decrease in the primary forest between 2000 and 2020 (Figure 04) indicated improvements in such institutional instruments associated with the inclusion of the primary forest in the WHS, improvement in law enforcement, improvement in creating awareness, and establishment of forest planting projects (Table 03). This finding confirms the assumption from those of Enoguanbhor et al. (2022a) who reported that the little decrease could be attributed to improvements in strategic policies for forest protection during the period in the Kilimanjaro WHS.

Our findings (Table 03) on key challenges associated with the implementation of WHC and policies on forest protection in the Kilimanjaro WHS show that a lack of forest protection/conservation education in local communities is perceived as a very high challenge. This finding contradicts those of Chami and Kajiru (2020) who reported that KINAPA has been able to provide education awareness programs for stakeholders, including the surrounding rural population of the Kilimanjaro WHS. However, the finding supports those of Azman et al. (2010) who reported the need for public education in heritage conservation for Geopark communities of Geoforest Parks and Kilim Karst Geoforest Parks in Langkawi, Malaysia. Other challenges facing the implementation of WHC and policies for forest protection are the low level of law enforcement on forest degradation and poor supervision and management of forest protection at the site, which both were perceived as moderate challenges. The finding on the low level of law enforcement on forest degradation indicates that the more the law enforcement is weak, the more they attempt to harvest forest illegally. This finding is similar to those of Teucher et al. (2020) who reported forest degradation despite regulations and law enforcement to protect forests in the Taita Hills in southern Kenya. The finding on the poor supervision and management of forest protection indicates opportunities for illegal logging of forest trees to take place within the site. This finding supports those of Kimengs et al. (2022) who reviewed that the forest

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management in Sub-Saharan Africa, especially in Cameroon, is attributed to little institutional strength and a lack of transparency. Additionally, the findings show that the challenges perceived as low-level include inadequate resources (funding and vehicles for park rangers, etc.) and wildfire. The finding on inadequate resources, particularly funding supports those of Scheba and Rakotonarivo (2016), who argued that compensation should be paid to those who are or may be potentially affected by forest conservation when implementing the REDD+ projects in Lindi, Tanzania. The finding supports Lambrechts et al. (2002), who used aerial surveys to capture burnt forest in the Kilimanjaro WHS (Figure 05a). Furthermore, the findings show that the challenges perceived at a very low level include a lack of political will, inadequate personnel, conflicts with local communities, low level of adoption of new policies, lack of inter-departmental coordination, political interference/interest, low level of communities involvement, illegal forest logging businesses, scarcity of land resources, and tourism pressure at the site. The findings on inter-departmental coordination and political influence/interest, are similar to that of Kalaba (2016) who reported a lack of intersectoral coordination and political influences as barriers to poor policy implementation on forest ecosystems in Zambia. The finding on illegal forest logging businesses and scarcity of land resources supports the report from Lambrechts et al. (2002) who used aerial surveys to capture illegal forest logging (Figure 05c) and a cultivated (Taro) field within the indigenous forest area (Figure 05b) both in the Kilimanjaro WHS.

a b c

Figure 05. Aerial surveys of (a) burnt forest in the southeast Kilimanjaro WHS, (b) a cultivated (Taro) field within the indigenous forest area of Kilimanjaro WHS, and (c) illegal forest loggings in the southeast Kilimanjaro WHS. **Source:** Lambrechts et al. (2002).

The findings on the suggestions to regenerate the lost primary forest to improve forest/environmental/natural heritage sustainability of the Kilimanjaro WHS (Table 04) show that forest protection/conservation education for local communities and extensive planting of new trees are perceived as very high solutions to the problem. The finding on forest protection/conservation education for local communities as a major solution validates the finding on forest protection/conservation education in local communities as a major problem of WHC and policies' implementations for forest protection (Table 03). Also, the finding shows introducing new laws of forest protection is a solution perceived at a moderate level. Additionally, other findings include improving the implementations of WHC and policies for forest protection and improving law enforcement on forest degradation, which both were perceived at low levels. Furthermore, other findings but perceived at a very low-level include local communities' involvement, adequate funding, the introduction of sources of energy other than charcoal, removal of exotic species from the site, provision of grazing routes, controlling the number of tourists entering the site, and educating tourists on how to utilize the site without degrading forest. The findings on local communities' involvement and adequate funding are similar to those of Chami and Kajiru (2020) who recommended equal sharing of revenue/benefits from tourism to the village governments around the WHS, and the provision of employment opportunities for local communities around WHS.

Implications of the findings

The general implications of the finding for WHC and policies' implementations can be deduced from the integration of different methods (e.g., surveys of experts and GIS) to obtain new findings (e.g., the low-level of WHC and policies' implementations for forest protection and the degradation of primary forest from 1976 to 2000). Additionally, the new findings from the integrated methods indicated the reasons and conditions of the primary forest, particularly on the high and low decreases before and after the year 2000, respectively. Such new findings based on the integrated methods are crucial to informing strategic decision-makers on forest protection, especially on the relevance of awareness

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creation and deployment of different strategic actions on forest protection to improve and maintain forest, environment, and natural heritage sustainability in the Kilimanjaro WHS in particular and other natural WHS across the Global South. Other implications of the study can be deduced from the findings on key challenges for WHC and policies' implementation for forest protection and the suggestions to regenerate forests within the lost primary forest areas to improve forest/environmental/natural heritage sustainability. Awareness of key challenges such as a lack of forest protection/conservation education in local communities, a low level of law enforcement on forest degradation, and poor supervision and management of forest protection is a piece of crucial information to understand some fundamental problems associated with implementing institutional instruments. Additionally, awareness of critical suggestions such as forest protection/conservation education for local communities and extensive planting of new trees is also an additional piece of information to understand some fundamental solutions to the problems associated with forest degradation. The awareness of all challenges and suggestions identified in this study would help to improve policies and WHC implementations for the protection of forest landscapes. The positive implication of our study shows that various strategic policies and WHC implementations on forest protection have been improved for over twenty years, considering a slight reduction in the primary forest between 2000 and 2020. In 2005, the WHS was expanded from the moorland vegetation boundary to the primary (montane) forest of the mountain (UNESCO, 2021; IUCN 2020). Our study created awareness about the need to regenerate forests around the moorland vegetation lower parts for effective forest protection. Regeneration of forests in those areas would improve the sustainability of the forest landscape as a natural heritage and habitat for wildlife on the site.

By integrating methods (qualitative and quantitative) to investigate the level of implementation of WHC and policies for forest protection and by validating the findings on low-level implementation through spatial information, this study provides detailed and new insights into the state of implementing institutional instruments for the protection of forests as a natural heritage. Thus, our study contributes to Heritage Studies and Management as academic and professional domains for improving heritage sustainability.

Limitations and recommendations

Our study was limited by various issues as follows:

First, the field research was challenged by time constraints due to the Tanzanian government bureaucracy while seeking official approval for the field research. In Tanzania, before field research is allowed, approval must be sought from government departments, e.g., Tanzania Commission for Science and Technology, which permits general research, and Tanzania Wildlife Research Institute, which permits research related to wildlife. Due to unknown factors to the field researcher, one of the offices, particularly the Tanzania Commission for Science and Technology, delayed the approval, and the situation affected the remaining time left for the field research. Second, the limitation of the current study is associated with the aspect of research methods where most experts were not available for questionnaires' distribution and retrieval. For example, in UNESCO's office, only one expert was available to distribute a questionnaire and the questionnaire was not retrieved due to the unavailability of the expert during questionnaires retrieval. Also, in other offices (KINAPA, SUATF, and TFS), the number of experts available for questionnaire distribution was limited (46) and the total number of questionnaires retrieved (26) was not up to the number distributed. The perceptions from other experts that were not available, which could have been added to the findings could not be captured by the current study. However, the 26 questionnaires retrieved from experts used for the current study can be said to be sufficient, considering no inferential statistics were performed. Finally, another limitation of the current study can be associated with intentional and unintentional bias from experts' perceptions of the subject matter that could not be in this study. It is assumed that some respondents may have responded to questions in their best interests, which may have little impact on the findings. However, the inability to identify and eliminate some of these biases is not enough reason to exclude or not to mention the problem as a limitation of the study.

Based on the findings and limitations of the current study, we recommend the following:

First, regarding the critical challenges for WHC and policy implementations on forest landscape protection, forest protection/conservation education in local communities, involvement of people in local communities in processes of forest protection, and effective law enforcement on forest

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degradation should be planned and implemented. Also, adequate resources through funding and personnel willing to perform duties should be deployed to manage the site and the inter-departmental coordination among various institutions protecting the forest should be improved. Additionally, educating tourists on how to utilize the site without degrading forest, encouraging and subsidizing sources of energy other than charcoal, extensive planting of new trees, and removal of exotic species from the site should be planned and implemented. Furthermore, land resources for agricultural activities, including farming and grazing routes, should be provided to enhance livelihood in local communities. These would help improve the implementation of WHC and policies as strategic institutional instruments for forest protection and improve the sustainability of forests as a natural heritage. Second, future research should be conducted on human driving factors of forest landscape degradation by integrating surveys of residents with those of experts to provide detailed insights into exploring direct and indirect factors and other challenges hindering the implementation of WHC and policies as strategic institutional instruments for forest protection. Also, many experts from government offices should always make themselves available to respond to the questions posed by future research. Furthermore, the undetected intentional and unintentional biases from all respondents should be avoided by the respondents to support research transparency of real-world situations. Finally, the government bureaucracy for research approval should be improved to avert a waste of time as a resource and to support future field researchers to accomplish their tasks in line with their research schedule.

IV. Conclusion

We investigated the state of implementing WHC and policies as strategic institutional instruments for forest landscape protection to support the sustainability of forests as a natural heritage. Our study showed a low implementation of all institutional instruments used to protect forests in the Kilimanjaro WHS. Our study justified the low-level implementation of all institutional instruments by relating the findings to spatial information on spatial patterns of the transitions between primary forest land cover type and other land cover types, as well as the primary forest degradation between 1976 and 2020. Regarding key challenges for WHC and policies' implementations on forest protection in the Kilimanjaro WHS, our study identified a lack of forest protection/conservation education in local communities, a low level of law enforcement on forest degradation, and poor supervision and management of forest protection at the site. Other identified challenges include inadequate resources (funding and provision of vehicles for Park Rangers, etc.), population pressure, wildfire, a lack of political will, political interference/interests, inadequate personnel, conflicts with local communities, a low level of community involvement, and a lack of inter-departmental coordination.

The findings from our study are essential for decision-makers to improve the level of implementing WHC and policies as strategic institutional instruments for the protection of forests and to improve the sustainability of forest landscapes as a natural heritage in the Kilimanjaro WHS in particular and other WHS across the Global South. Future research is required on human driving factors of forest landscape degradation to provide detailed insights into exploring other challenges hindering the implementation of WHC and policies as strategic institutional instruments for forest protection.

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