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Chapter 4

Impact of Poverty and Lack of Education on Radio Communication for Forest Conservation in Tanzania

By

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Abstract

This paper examines how poverty and lack of education among rural-based citizens living adjacent to forests in Tanzania impact on the efforts of the radio to communicate information on forest in a bid to influence community members to be responsive to forest conservation efforts. The study was guided by three research questions: To what extent do the communities view the impacts of deforestation in Tanzania? To what extent does education hampers the efforts of radio communication for forest conservation in Tanzania? How does poverty affects the communities to put into use forest conservation education provided by the radio in Tanzania? Data collection entailed content analysis of a series of 'Urithi Wetu' (Our Heritage) programme on *TBC Radio*, questionnaires and Focus Group Discussions. Yet, the study established that, contrary to the existing findings from different researchers that the radio is the most powerful mass-medium in creating environmental awareness and the most powerful in influencing the citizens to conserve forests, factors such as poverty and low levels of education among citizens living adjacent to forests in the rural areas limited the power of radio to influence conservation behaviour in Rufiji and elsewhere in Tanzania. It was established that many of the citizens with low level of education lacked the purchasing power to buy radio sets and, hence, had no access to radio broadcasting. As a result, they lacked forest conservation education and continued harvesting of forests in an unsustainable. It was also established that the poverty level of the rural inhabitants limited their capacity to shift to modern agriculture and their power to embrace the use of improved woodfuel saving stoves and improved charcoal stoves. In consequence, the majority of continued to over-rely on firewood and charcoal energy. As such, the government and other stakeholders should endeavour to empower the citizens economically first and then educate them. The farmers must first-of-all be supported to get modern agricultural production implements such as tractors and other agricultural inputs before being informed about stopping wanton cutting down of trees.

Key words: Poverty, lack of education, radio, communication, and forest conservation

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Introduction

Experts differ on whether poverty and lack of education are important contributors to global deforestation. Some argue that lack of alternative sources of income force the poor to clear forest whereas others dispute it, arguing that the poor lack the ability to pay for the materials and labour needed to clear forest (Adeoye, Abegunde, & Adeyinka, 2012). Those who argue against the viewpoint that poverty contributes to deforestation say that indigenous inhabitants in the tropical forests are anguished to see the forest cover degraded through wanton tree felling (Stocks, Noss, Bryja, & Arce, 2012). According to Stocks *et al.* (2012), the maintenance of forests tends to be more successful when they are protected by indigenous peoples with some outside help.

Growing scientific evidence, however, has established that poverty and forest degradation are intertwined. In their study, Katerere, Minang and Vanhanen (2009) found that poverty was one of the main causes of forest loss worldwide. Other researchers have established that the poorest and most marginalised segments of the population dwell in forest frontier areas due to inadequate capital, with no viable option but to clear the virgin forest for their livelihoods (Chakravarty, Ghosh, Suresh, Dey, & Shukla, 2012). A study conducted by Palo (2000) revealed that population and income at the national level constituted one of the overriding factors behind deforestation. Even international agencies such as FAO and inter-governmental bodies have established poverty and overpopulation to be the main driving forces for deforestation (Chakravarty *et al.*, 2012).

Statement of the Problem

Despite concerted efforts on the part of the Tanzania government to communicate forest information through various channels including the use of radio in a bid to reduce the rate of deforestation in the country; these efforts seem to bear little or no tangible fruits. The UNEP (2002) report indicates that the rate of forest loss in Tanzania was between 300,000 and 400,000 hectares per annum. Another study conducted by FAO (2010) reveals almost the same findings that forest loss in Tanzania is estimated at 403,000 ha per annum, about 1.13 percent. Furthermore, a recent report by NAFORMA (2015) pegs the rate of deforestation in Tanzania at 372,816ha per annum for the 1995 - 2010 periods. According to the URT (2014) report, Tanzania has lost at least one-third of important eco-systems over the past few decades due to deforestation, hence undermining the livelihoods of many people who depend directly on them for survival.

Although the existing facts reveal that radio has been a principal medium through which environmental information is communicated, particularly in developing countries and more specifically in rural areas (Luganda 2005; Boykoff & Roberts, 2007; Harvey, 2011; Kalas & Finlay, 2009), little was known in Tanzania about how poverty and lack of education among the communities living adjacent to forest impacts on the radio's efforts to communicate forest issues for the purpose of enhancing conservation behaviour among rural inhabitants. Therefore, this study aimed to establish such baseline information.

Review of Related Literature

Despite some efforts made to reduce deforestation, over 13 million ha of the world's forests continue to be lost every year (FAO, 2010, 2006, 2005; CEC, 2008; GEF, n.d.). Statistics show that deforestation reached the rate of 9.2 million ha per annum from 1980-1990, 16 million ha per annum from 1990-2000 but decreased to 13 million ha per annum from 2000-2010 (Mohammed, 2014; Chakravarty *et al.*, 2012). Regardless of their beauty and importance, tropical forests are rapidly diminishing around the globe (Boucher *et al.*, 2011). Whereas boreal forests grow in size, tropical forests face a severe threat due to deforestation (Langner, 2009). According to Nestle (2011), forest loss, particularly in the biodiversity-rich tropical zone, has remained at the highest rate in the last 20 years.

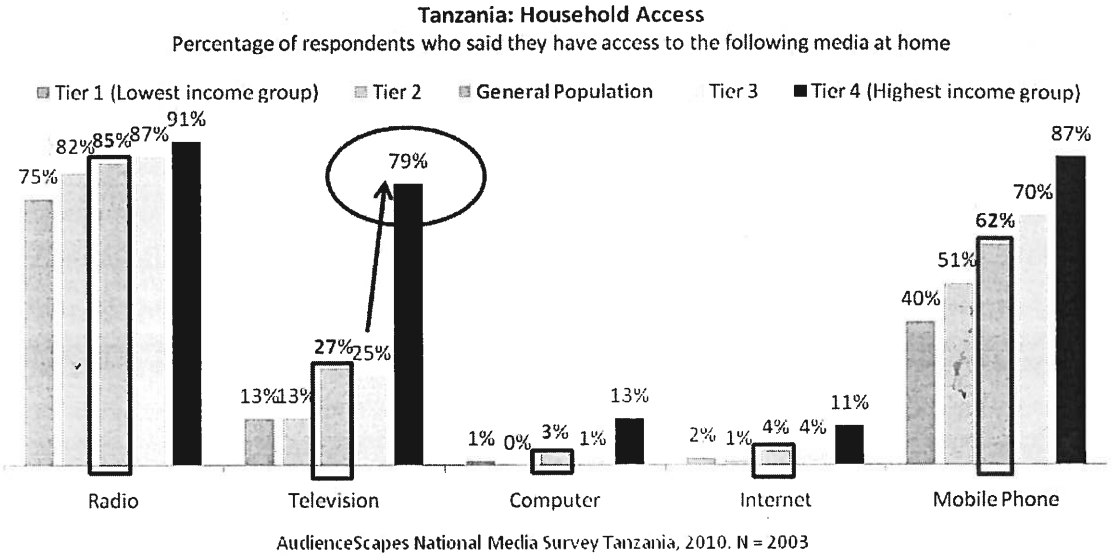
The top ten countries, which encountered the largest net forest loss per annum between 2000 and 2005, were Brazil, Indonesia, Sudan, Myanmar, Zambia, Tanzania, Nigeria, the DRC, Zimbabwe, and Venezuela, which had a combined net forest loss of 8.2 million ha per annum (CEC, 2008). However, it is important to clarify that the rate and extent of deforestation vary across continental, national, regional and local boundaries (FAO, 2005) so much such that some countries which had the highest net of forest loss in the 1990s have significantly reduced their rate of loss in the 2000s. On the other hand, some countries continued to experience a significant rate of forest loss due to different internal and external factors.

Growing scientific evidence indicates that lack of awareness resulting from information dearth contributes significantly to the deep-rooted environmental destruction in the society (Roba, 2012). In fact, there is a need to exert more efforts towards creating and raising the awareness of the citizens on environmental conservation and sustainable use of finite resources (Roba, 2012). To deal with this challenge, scholars have established that mass media can serve as an effective tool for raising awareness on environmental issues (Shayo, 2014) by bridging the harmonious link between nature and culture (Dorji, n.d.). After all, the mass media constitute the most important agency for awareness creation within civil society (Hussain, 2014).

In fact, the mass media is particularly important in providing environmental education to the growing population, which threatens the sustainability of environmental resources (Dorji, n.d.). Indeed, if effectively used, as Shayo (2014) argues, the mass media can play a huge role in raising environmental conservation awareness. Furthermore, Hussain (2014) posits that the true messages disseminated by the mass media to the citizens play a vital role in raising awareness of the conservation of the environment and biodiversity. Armed with the right information, people can take preventative measures to shield themselves from harm and also take better care of their environment (Shayo, 2014). A study conducted by Hoerisch (2002) concluded that over half (52%) of the interviewees in India attributed their awareness on environmental challenges largely to the information they had received via the mass media.

Despite the arguments from some scholars that the mass media in general have proven to be the main sources of information about environmental issues (Schmidt, Ivanova, & Schafer, 2013; Meisner & Takahashi, 2013; Boykoff, 2008; Boykoff & Roberts, 2007; Corbett & Durfee, 2004), radio remains the most dominant and powerful mass medium in Africa (Rao, 2015; Vaijanath & Chandunavar, 2013; Roba, 2012; Myers, 2008; Chapman, Blench, Kranjac-Berisavljevic, & Zakariah, 2003; Hoerisch, 2002; Niang, n.d.). Specifically, Chapman *et al.* (2003) contend that the power of the radio stems from its capacity to reach out to heterogeneous audiences and its ability to communicate relevant information using the language and the accent of its community. As an electronic audio-medium for broadcasting programmes, radio is suitable for communicating to broad-based audience of widely dispersed people and situated in rural areas (Rao, 2015; Sadaqath & Mariswamy, 2006).

In fact, radio is one of the most popular and a highly effective information dissemination media in developing countries, partly because of its accessibility and affordability (Rao, 2015; Vaijanath & Chandunavar, 2013; Niang, n.d.). A study by Murthy (2011) in Tanzania shows that, about 75 percent of the people with the lowest income and over 91 percent of those with the highest income own a radio set in their households. The study also indicates that about 85 percent and 84 percent of the urban and rural citizens, respectively, have access to a radio set in their households (Murthy, 2011) primarily because radio is much more pervasive and affordable than other forms of mass media (Servaes, 2008).



Compared to television, newspapers, or ICTs, such as the Internet, the radio has remained the most consistently available mass medium in Tanzania with the widest geographical reach and largest audiences (Murthy, 2011; Balancing Act, 2008; Myers, 2008; Panos Institute of West Africa, 2008; Niang, n.d.). According to Murthy (2011), the radio is the most widely used source of information for every age and socio-economic groups as well as both males and females in Tanzania. Arguably, radio has remained the most dominant and widely used mass medium because even people who do not own a radio set in their households can still access broadcasting through family, friends, or neighbours (Rao, 2015). Based on the findings from several scholars that mass media has the power to educate and influence communities to protect forests and the fact that in Tanzania, little has been done on the impacts of poverty and lack of education among the rural inhabitants on the radio's communication for forest conservation, this study established a necessity baseline data on the research questions at hand.

Research Questions

Three research questions guided this study to achieve its set objectives:

i) To what extent do the communities perceive the impact of deforestation in Tanzania?
ii) To what extent does education hamper radio communication efforts towards forest conservation in Tanzania?
iii) How does poverty affect the communities to apply forest conservation education acquired via radio broadcasts in Tanzania?

Research Methods

The study was conducted in the Matumbi-Rufiji landscape of Rufiji district, Coast (Pwani) region of Tanzania. Rufiji district is located at 7° 30'S to 8° 40'S and 39° 50'E to 39° 40'E on the Indian Ocean coast of Tanzania. The Matumbi landscape constitutes a large massif south of the Rufiji River that dominates the landscape in terms of Coastal Forest coverage (URT & UNDP, 2010). The landscape contains more than 26,000 ha of closed canopy Coastal Forest, grading into larger areas of coastal woodland and thicket habitats (URT & UNDP, 2010; Burgess *et al.*, 2012). Natural vegetation within the Matumbi landscape includes scrub forest, dry evergreen forest, groundwater forest, riverine forest, transition woodland/*Brachystegia* forest and coastal scrub (URT & UNDP, 2010).

A recent joint report by the URT and UNDP (2010) reveals that about 322 species of plants have been recorded in the Matumbi landscape. Of the 554 plant species endemic to the Coastal forests, over 55 have been found in the landscape. The URT and UNDP (2010) report also shows that the levels of faunal endemism within the Matumbi landscape are so high that seven Coastal Forest species endemic to the landscape and 13 broader Coastal Forest endemics have been discovered. The Matumbi area also supports coastal forest endemic species including the southern-banded snake eagle (*Circaetus fasciolatus*), plain backed sunbird (*Anthreptes reichenowi*), tiny greenbul (*Phyllastrephus debilis*), Fischer's greenbul (*Phyllastrephus fischeri*) and Livingstone's flycatcher (*Erythrocercus livingstonii*) (Burgess *et al.*, 2012).

To establish specific study areas, as it was difficult to study the whole of the Matumbi landscape, this study used Tanzania's administrative boundaries files developed by the National Bureau of Statistics (NBS) using the 2002 Census report to establish a list of villages and their respective wards generated from GIS via the 2002 Tanzania shape files as follows: Mbwara Ward (Nyamwage, Tawi, Mbwara, Yilya and Nambunju Village Land Forest Reserves); Chumbi Ward (Chumbi A, Chumbi B, and Chumbi C Village Forests); Mohoro Ward (Mohoro Forest Reserve, Nyakikae and Sunga-Pwani Village Forests); Mgomba Ward (Mpima Village Forest); and Utete Ward (Utete Forest Reserve, Ngarambe Forest Reserve, Ngarambe Village Forest, Tapika Village Forest and Katundu Forest Reserve). Three wards of Mbwara, Mohoro and Utete were systematically selected and two villages from each of the selected wards for participation in the study.

The study was carried out in two phases. Phase I entailed content analysis of the *Urithi Wetu* (Our heritage) programme aired on *TBC Taifa*. The *Urithi Wetu* programme is a nation-wide radio programme, which has existed since 2015. It is produced and aired by the Tanzania Broadcasting Corporation (TBC Radio). The *Urithi Wetu* programme is a thirty (30)-minute programme which goes on air every Tuesday from 15:00 to 15:30. It is re-aired every Saturday from 17:00 to 17:30 hours. This weekly radio programme mainly talks about the impacts of deforestation and forests conservation in Tanzania. The main objective of *Urithi Wetu* programme is to educate the citizens on the importance of protecting and conserving forests and the environment in general and expose the impact of wanton tree felling on their own lives.

The programme is divided into three segments: the first segment covers the historical information, citing the techniques which Tanzanian elders used to protect forests and the environment in general; the second segment focuses on the magnitude of forest and environmental destruction in Tanzania and their impact on human lives in terms of the shortage of water, unreliable and unpredictable rains, droughts, decrease of harvests, famine; and the third segment underscores the importance of conserving the environment by highlighting the efforts and initiatives national and international organisations made to fight against environmental and forest destruction as well as actions taken in response to the challenges occasioned by wanton tree felling and climate change challenges. In all, the study

analysed 19 programmes aired from January to December 2016. The programme featured about 124 sources of information distributed gender-wise as 93 (75%) male and 31 (25%) female sources.

Subsequently, the researcher administered 404 questionnaires with village households and in the suburbs of three afore mentioned wards and villages in Rufiji during phase II of the study. The researcher and research assistants administered the questionnaires by keying in the respondents' answers directly in relation to their respective responses for questions derived from the questionnaires. Additionally, the researcher conducted focus group discussions (FGDs) in each of the selected villages/suburbs of the three wards.

Results and Discussions

To begin with, the study established that most of the rural inhabitants had noticed the severe impacts of deforestation on their lives. During FGDs, most of them reported how fresh water was increasingly becoming scarce and how droughts and famine, all resulted from the wanton cutting trees down, had severely hampered their lives and socio-economic development. When asked about the seriousness of the impacts of their vice actions of cutting trees down, majority of the rural inhabitants (84%) said that the impacts were serious (Figure 2). In this regard, 28 percent reported the impact of deforestation to be "very serious" whereas 25 percent indicated it was "absolutely serious". Respondents who reported that the impacts of deforestation were "slightly serious" accounted for 18 percent whereas those who said it was "somewhat serious" accounted for 13 percent. Only 10 percent of the respondents dismissed the impacts of deforestation to be "not at all serious".

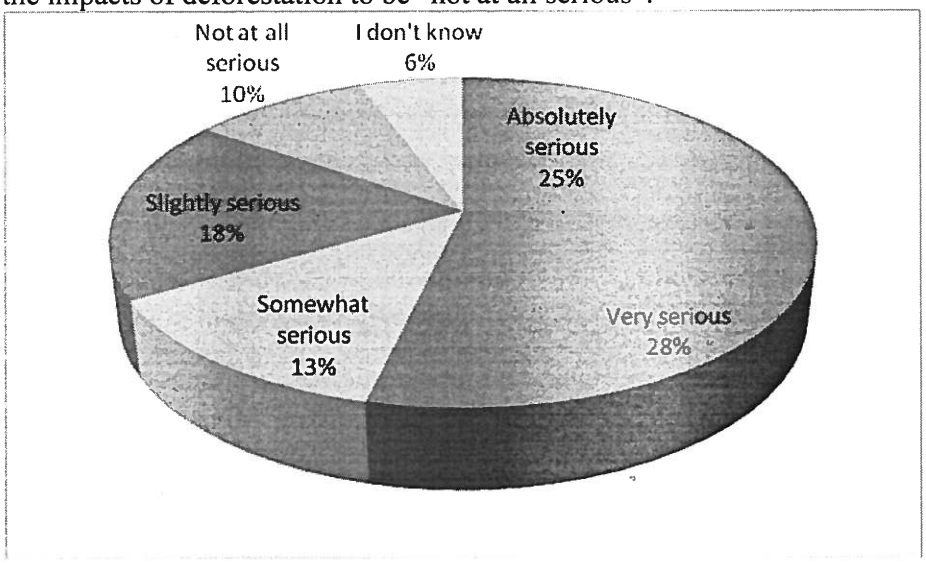


Figure 2: Respondents' views on how serious is the impacts of deforestation

The respondents complained that deforestation had resulted into severe droughts as a result they faced the scarcity of fresh water. The rural inhabitants reported during FGDs that, the shortage of water forced women to spend their nights sleepless worrying about the precious liquid, and sometimes hunted for the hardly available water in the wells. In this regard, one of the participants said:

> Whereas before the destruction of forests in our village we used to have water throughout the year, now we are forced to trek for several kilometres looking for the little available water in the wells. Currently, there is only one well, which provides water during dry season. Even neighbouring villages depend

> on this well. So, there are long queues of women lining up for water. As a result, obtaining a bucketful of water requires one to spend the whole night waiting for one's turn to fetch just one bucket (FGD Participant No.4 at Nambunju village, December 12, 2016).

In Tanzania and elsewhere in Africa, the responsibility of providing water to the households has for decades remained a chore for women who normally spend a lot of their time fetching some water away from their residences. The Population and Housing Census (PHC) of 2012 indicates an overall decline in access to water from 61 percent reported in HBS to 57 percent in 2012 (URT, 2015). Reviewing the URT (2015) report, Kessy and Mahali (2016) contend that the MKUKUTA targets of increasing access water to 95 percent and 65 percent by 2015 for urban and rural populations respectively have not been reached. According to Kessy and Mahali (2016), this dwindling access to water stem from the drying off of water sources as a result of droughts.

Overall, the reports available show that in many places, the hardly available water in wells are contaminated and tend to cause water-borne diseases. Kessy and Mahali (2016) argue that unsafe and inadequate water supply, improper sanitation, and poor hygiene are reflected in the high incidence of a number of diseases. The URT (2014b) report indicates that about 5,800 cases of cholera are reported annually in Tanzania, and 18,500 under-five children die annually from diarrhoea, with about 90 percent of these deaths attributable to poor water, poor sanitation, and poor hygienic conditions. Impact Brief (2017) also shows that a water-borne diseases such as cholera result from inadequate quantity and quality of water, as well as limited sanitation services.

Additionally, the study established that the majority of the rural populace living adjacent to forests agree that communities should get worried about the impacts brought about by deforestation. While responding to the question on whether the rural inhabitants need to be worried on the heightened wanton cutting trees down in Tanzania, the majority (57%) said definitely they should be worried (see Figure 3). More than 19 percent others said, probably, the rural inhabitants should be worried about the high spate of deforestation in Tanzania whereas 10 percent said that probably they should not. Only nine percent of the respondents reported that, definitely, the rural inhabitants living adjacent to forests should not worry about the increasing rate of deforestation in Tanzania.

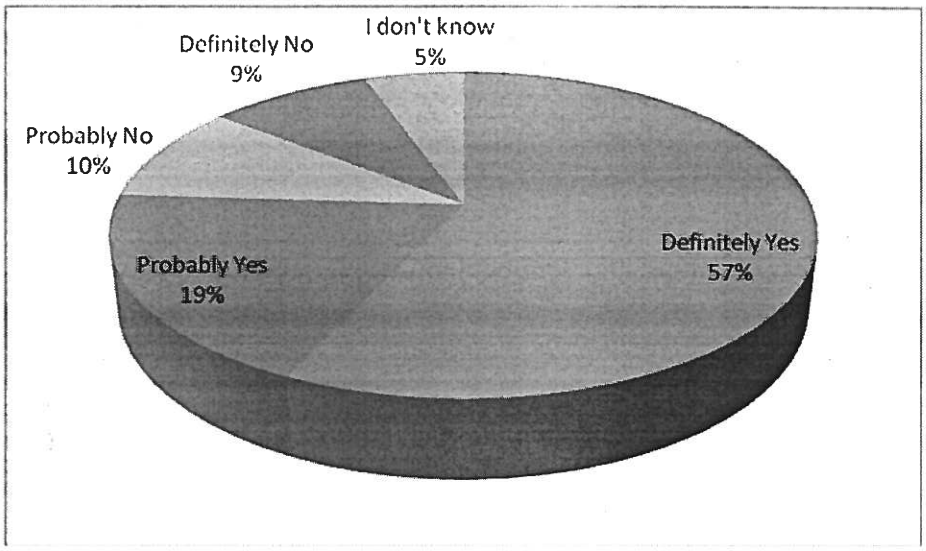


Figure 3: Respondents views on worrying about the deforestation impact

The findings obtained from the questionnaire show that the majority of the respondents reporting being worried about the impact of deforestation expressed similar sentiments with those who took part in the FGDs. The study established during FGDs that the majority of the citizens living adjacent to forests had genuine fear of their areas eventually turning into deserts in future if immediate actions were not taken to minimise the deforestation rate. In this regard, one of the participants said:

> Rufiji was endowed with valuable tree species such as *Afzelia quanzensis, Khaya anthotheca, Milicia excelsa* and *Pterocarpus angolensis* but the recent increase of wood processing factories at Ikwiriri, on the one hand, and the completion of the Mkapa Bridge on the other hand constitute the main reason behind the depletion of forests in Rufiji. We are worried that, if no substantive measures were taken to curb the increasing rate of deforestation, sooner rather than later, Rufiji will become a desert.

The findings of this study are similar to those of other researchers who have established similarities between the development of infrastructure and heightened deforestation. Growing empirical evidence reveals that infrastructural developments tend to have positive and negative effects on forests as they occasion deforestation (Rademaekers, Eichler, Berg, Obersteiner, & Havlik, 2010). The URT and UNDP (2010), for example, established that the rates of logging in Southern Tanzania have increased significantly following the opening of the road bridge over the Rufiji river in 2003 as this facilitated the transportation of wood and other natural forest products to Dar es Salaam. In their study, Shabani and Yakuti (2015) also established that the completion of the Mkapa Bridge and southern road provided more reliable all-year access to the forest of southern Tanzania, hence increasing the deforestation rate.

Through FGDs, this study also found that the majority of the rural inhabitants were worried about their future lives. They were mostly worried the threats posed by famine in the near future due to prolonged droughts in their respective areas. They reported, that due to long period of droughts, agriculture was no longer productive. In Tanzania, the majority poor Tanzanians (80%) peasants in rural areas primarily depend on agriculture and related agrarian activities (URT, 2014c). The URT (2014c) also reveals that extreme events such as droughts

and floods have led to the recurring food shortages in some areas. Mohammed (2014) contends that deforestation threatens the livelihoods and traditions of rural inhabitants who live adjacent to forests. Globally, the report by TI (2008) shows that forest degradation threatens the daily lives of 60 million indigenous people both socially and economically.

The study also established that the majority of the respondents (69%) had already been affected negatively by the effects of deforestation. In this regard, 37 percent and 32 percent of the respondents agreed and strongly agreed, respectively, that they had been negatively affected by deforestation. Those who disagreed and strongly disagreed accounted for 12 percent and 10 percent, respectively. Most of the respondents associated wanton cutting down trees with the changing of weather patterns. They reported that due to changing weather patterns, rainfall seasons were no longer predictable and reliable as they were not certain about the beginning and cessation of rainfall seasons.

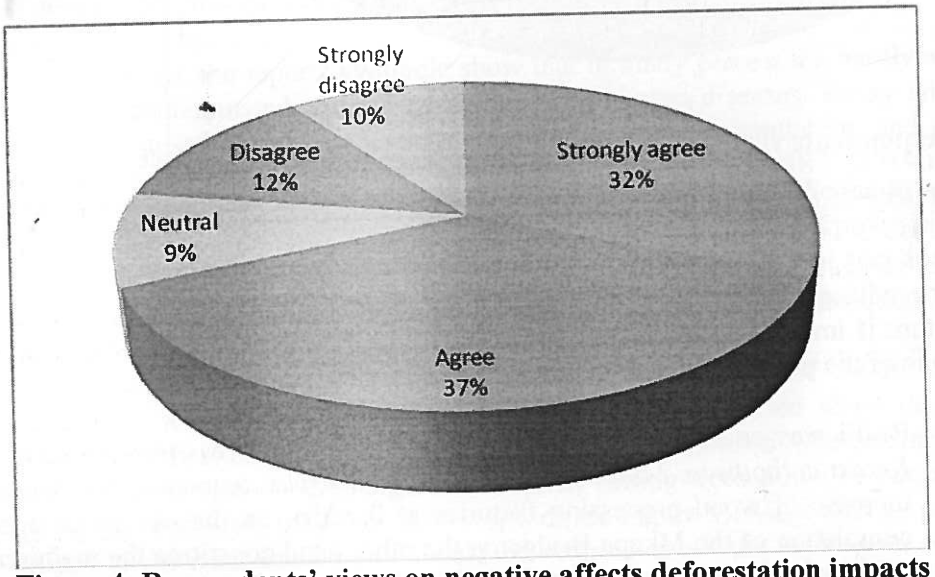


Figure 4: Respondents' views on negative affects deforestation impacts

The study conducted by Mawalagedara and Oglesby (2012) also established the correlation between deforestation and the changing weather patterns. According to Mawalagedara and Oglesby (2012), forest degradation can potentially lead to a change in the climate. These changes also alter local and regional rainfall patterns (Miller & Cotter, 2013; Spracklen, Arnold, &Taylor, 2012). In their study, Chakravarty *et al.* (2014) also established that, the impacts of deforestation disrupt normal weather patterns by producing hotter and drier weather conditions, thus increasing the prospects of drought and desertification. Inevitably, the warmer and drier weather produced produce varied devastating impacts (Lallo, 2012).

Extent to which education hampers forest conservation radio communication efforts

The results presented in Figure 5 indicate that, the majority of the respondents (60%) had attained primary education whereas a minority (12%) had no formal education. Those who had attained secondary and college education accounted for 22 percent and five percent, respectively. On the other hand, only one percent had attained university education. The educational level of the respondents was vital in establishing its impact on accessing radio broadcasts, understanding of the radio content and putting to good use the radio messages they received on the environment and environmental concerns.

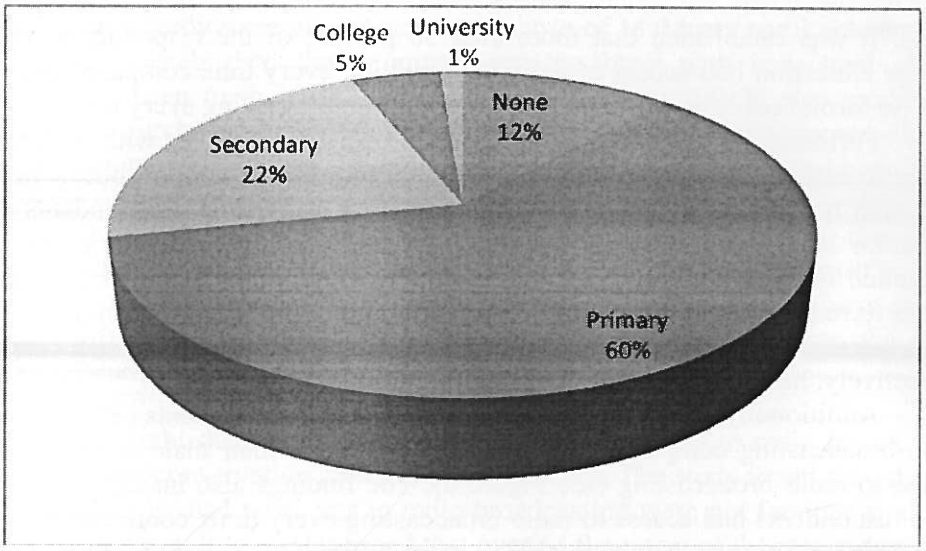


Figure 5: Respondents' educational level

The study found that there was a close affinity between educational level and access to radio broadcasting. The results presented in Table 1 established that, whereas 100 percent of the respondents who had attained university education had access to radio broadcasting in terms of rarely (80%) and occasionally/sometimes (20%), over 53.2 percent of those who had no formal education had no access to radio broadcasting. It was also observed that, whereas only five percent of those who had attained college education had no access to radio broadcasting, about 22.2 percent of the respondents with primary education had no access to radio broadcasting. This study established that most of the respondents with secondary to university education had some jobs, both formal and informal, hence were better off economically to afford the purchase of radio sets compared to those who had no formal education.

TABLE 1: ACCESS TO RADIO BROADCASTING ACCORDING TO EDUCATIONAL LEVEL

		Educational level					Total
		None	Primary	Secondary	College	University	
Access to radio broadcasting	Never	53.2%	22.2%	15.7%	5.0%		23.3%
	Rarely	25.5%	38.7%	37.1%	40.0%	80.0%	37.4%
	Occasionally/sometimes	10.6%	24.3%	16.9%	10.0%	20.0%	20.3%
	Almost every time	2.1%	7.8%	14.6%	15.0%		8.9%
	Every time	8.5%	7.0%	15.7%	30.0%		10.1%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: Field Data (2017)

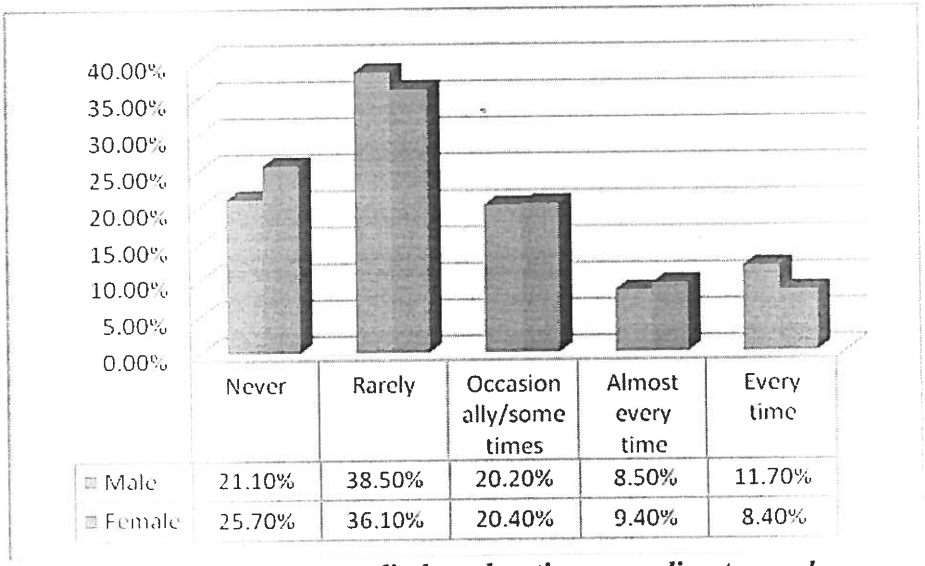
The results presented in Table 1 also indicate that respondents with higher education level had a high frequency rate of access to radio broadcasting than those with lower education

levels. It was established that more than 30 percent of the respondents who had attained college education had access to radio broadcasting every time compared to only 8.5 percent with no formal education who had access to radio broadcasting every time.

Furthermore, whereas about 15 percent of the respondents with college education had access to radio broadcasting almost every time, only 2.1 percent of those who had no formal education had access to radio broadcasting almost every time. Respondents with secondary education level, who reported that they accessed radio broadcasting almost every time, accounted for 14.6 percent compared to only 7.8 percent with primary education who had access to radio broadcasting almost every time. On top of that, the findings show that about seven percent and 15.7 percent of the respondents with primary and secondary education, respectively, had access to radio broadcasting every time.

Additionally, the study found that more female respondents (25.7%) had no access to radio broadcasting compared to about 21.1 percent of their male counterparts who had no access to radio broadcasting (see Figure 6). The findings also indicate that, 11.7 percent of male respondents had access to radio broadcasting every time, compared to only 8.4 percent of their female respondents with similar access. Similarly, survey findings, to a large extent, tally with those collected through FGDs. Gender-wise, the majority of the female respondents reported that they had no access to radio broadcasting. Some of the female respondents, with radio sets at home, also said that they did not pay attention to radio broadcasts. Some owned neither a radio nor TV set. For example, one Nambunju village respondent said during an FGD: "I do not have a radio or TV set at home. The only source of information for me is my local leaders." Another respondent revealed that neither she nor her neighbours had a radio set at home.

On the other hand, the findings obtained through FGDs established that the majority of the male respondents had access to radio broadcasting. It was established that more men than women had more purchasing power to own a radio set at home. During the FGD, it emerged that men had fewer activities at the household lever than their womenfolk. The study established that the women's daily busy schedule of taking care of all the matters related to households such as attending to healthcare needs, fetching water, gathering firewood, obtaining food, cleaning, and cooking deprived them opportunities to access information broadcast through the radio.



	Never	Rarely	Occasionally/sometimes	Almost every time	Every time
Male	21.10%	38.50%	20.20%	8.50%	11.70%
Female	25.70%	36.10%	20.40%	9.40%	8.40%

Figure 6: Access to radio broadcasting according to gender

The findings of this study were almost similar to those of McMurry and Lockhart (2013) in South Sudan who established that women were too busy with household chores and responsibilities to listen to the radio. McMurry and Lockhart (2013) also established that women had lower purchasing power than men; as a result, most of the women did not own radio sets and even when there was a radio in the household, men had control over it:

> The issue here is that men only buy radios for themselves, they don't buy radio for women. And men and women don't sit together, so it is like when you have one radio in the house, you are listening with your boys on the other side, and the wife and the girls, they are not listening from the other side (McMurry & Lockhart, 2013, p. 21).

The study further established a correlation between having access to radio broadcasting and being aware of forest conservation issues and programmes. The study found that, the majority of the respondents who had no access to radio broadcasting were not familiar at all with the *Urithi Wetu* programme. It was established that over 64.9 percent of the respondents who had no access to radio broadcasting were not at all familiar with the *Urithi Wetu* programme (Figure 6). The study further established that, although only 13.9 percent of the respondents who had access to radio broadcasting almost every time were not familiar with the *Urithi Wetu* programme, 33.8 percent of the respondents with rare access to radio broadcasting were not at all familiar with *Urithi Wetu* programme. In a nutshell, it was established that the more the respondents had access to radio broadcasting, the more familiar with the *Urithi Wetu* programme they were and vice-versa.

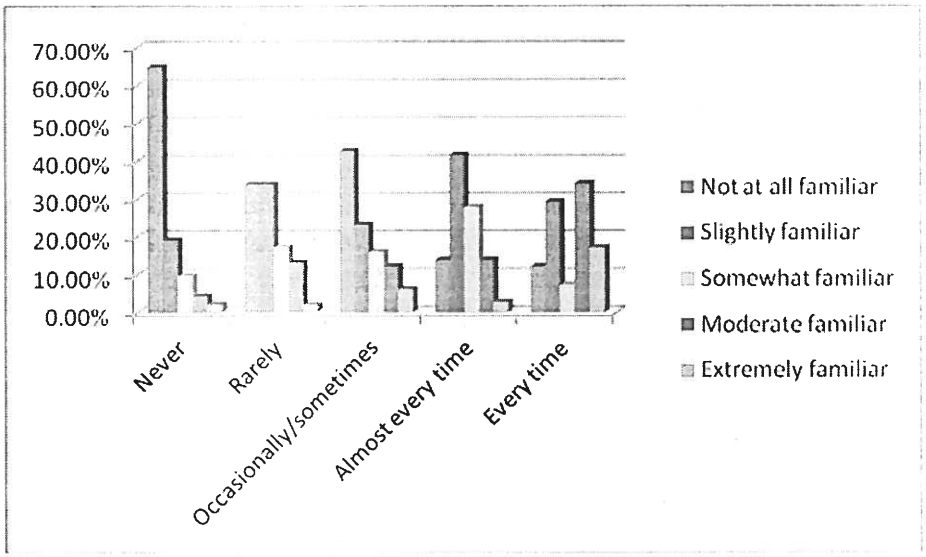


Figure 7: Respondents' familiarity with Urithi Wetu programme

Almost similar findings were established during FGDs. Indeed, those who said that they had no access to radio broadcasting also seemed to be unaware of the *Urithi Wetu* programme and many other issues compared to those who reported having a radio set at home and listening to its programmes, including TBC radio's *Urithi Wetu*. In fact, the majority of the respondents who regularly listened to radio stations indicated that they had heard of the *Urithi Wetu* programme: "I have a radio set at home and I usually get forest information through radio. They are telling us to stop voluntary harvesting of forests resources" (FGD Participant No.6 at Nambunju village, December 12, 2016). Another participant from the same village reported during FGD that most of the villagers depended on radio as their primary source of

information on various matters, including information on forest conservation. He admitted that listening to TBC *Urithi Wetu* programme made him knowledgeable on the impacts of the wanton cutting trees down: "I am also a good listener of radio stations. I have heard several times radio stations informing us that deforestation lead to droughts" (FGD Participant No.7 at Nambunju village, December 12, 2016).

In fact, low education of the rural inhabitants living adjacent to forests was one of the setbacks to efforts geared towards communicating forest information via the radio to induce community responsiveness to forest conservation in Tanzania. It was established that, whereas the respondents who had high education had good purchasing power to own radio sets in their households, most of those with low education had no access to radio broadcasting. In addition, whereas respondents with high education listened to radio broadcasting more frequently, those with low education accessed radio broadcasting rarely. As a result, respondents with low education generally lacked forest conservation education. Furthermore, it was established that lack of such education was one of the reasons that compelled citizens to harvest trees from protected areas and water sources.

On the other hand, the provision of tree plantation education to the citizens could restore the lost forest cover in the region. In this regard, stakeholders advised the government to make sure that forest conservation education was taught from the primary to the university level to prevent the eventual disappearance of the country's forests. Apart from providing tree planting education to the citizens, the government and other stakeholders were also advised to invest in projects that focus on conserving forests and water sources, boreholes drilling, solar energy uses and modern pastoralism.

How poverty affects the communities' application of forest conservation education gained

Despite efforts taken by the TBC radio through its *Urithi Wetu* programme to communicate forest information to influence community members living adjacent to forests to conserve such important natural resources, the rate of deforestation was still high in Rufiji and elsewhere in Tanzania. The study found that poverty was one of the limiting factors for the poor rural inhabitants to find alternative sources of income and refrain from indiscriminate felling of trees. In fact, the decline of agricultural production due to prolonged and the changing of rainfall patterns had further undermined the radio's efforts. It was established that since agriculture was no longer productive and lucrative, most of the youths had shifted to cutting down trees for charcoal-burning.

A study conducted by the Institute of Resource Assessment (IRA) of the University of Dar es Salaam established that extreme warm temperatures, over 35°C in Rufiji, were inhibitory at whatever stage of maize growth and yields drop rapidly (IRA, 2015). The same study revealed that climate change was expected to affect maize production in the Rufiji Basin because the warming temperatures would reduce the time to maturity and lower yield due to water deficits in some of the warmest areas (IRA, 2015). Also, a study by Funk *et al.* (2008) projected that grown-season rainfall in East Africa, would continue to decline due to the warming of the Indian Ocean, thereby threatening agricultural production in communities already vulnerable to drought. Because people rarely save, they rely on ad hoc coping strategies that are immediately available to them when harvests are insufficient or fail (Parker, 2010).

This study found that, enabling the radio to have a significant impact on the war against deforestation, the government should empower citizens to shift from traditional farming and adopt modern tillage methods in addition to educating them on engaging in other financial activities. In this regard, one of the participants in Nyamwage village said during FGD that "it was only by making agriculture more productive and profitable that the youths

would be attracted to engaging in agricultural production and stop cutting down trees." Almost the same sentiment was echoed by the Chairperson of Kitunda Suburb in Utete township who said that educating the citizens on the impact of tree felling and telling them to stop cutting down trees would never work without providing people with viable alternatives that would allow them to engage in a particular activity to earn a living:

> Luingo areas, for example, people out there earn a living through poaching and, although wildlife officials have been arresting them and, sometimes, shooting at the poachers, the villagers have continued to engage in poaching activities because they do not have any other alternative sources of earning a living. So, the same applies to forest issues. If the villagers are not informed about alternative sources of income, they will continue to cut down trees even if such action costs their lives (FGD participant No. 9 at Utete Township, December 5, 2016).

The study established that the radio's efforts towards informing the citizens about the consequences of tree felling were doomed to failure due to the poverty level of the rural inhabitants in Rufiji. The poverty and lack of alternatives had influenced most of the youths to remain heavily dependent upon forest resources. The study established that youths were even prepared for drastic measures as even police officers faced death threats if they continued to block their penetration into and invasion of the forest. In this regard, one of the participants said during FGD at Utete township that, the youths were more interested in making money for their daily life than in the future consequences of their indiscriminate cutting down of trees. In their study Chakravarty *et al.* (2012) also established that the poorest and most marginalised sections of the population continued to clear the virgin forests for their livelihoods due to lack of enough capital and viable option.

The results of this study also suggest that poverty was one of the obstacles for the rural inhabitants to applying the good information communicated to them by TBC radio's *Urithi Wetu* programme. TBC radio communicated important information aimed at influencing farmers to stop over-relying on rain-fed agriculture and adopt new eco-friendly culture of production (*Urithi Wetu* September 20, 2016), conservation agriculture (*Urithi Wetu*, November 8, 2016) and irrigation agriculture (*Urithi Wetu,* January 5, 2016). The *Urithi Wetu* programme also played a significant role in providing education to the rural inhabitants living adjacent to forests on the use of improved wood fuel saving stoves and improved charcoal stoves. The radio's education on the importance of shifting to improved woodfuel saving stoves and improved charcoal stoves was aimed to halve the amount of firewood or charcoal a family needed before.

Despite such important education provided by TBC radio through *Urithi Wetu* programme, the study established that farmers continued to over-rely on traditional farming methods and rain-fed agriculture. Most of them reported during the FGDs that they lacked the purchasing power to buy modern equipments like money-maker machine for irrigation, tractors and other agricultural inputs. Participants also reported during the FGDs that the technology of building simple trenches for harvesting and storing rainwater and building keyhole gardens was also too expensive for them to afford. Almost similar findings were established by Miya, Ball, and Nelson (2012) in Kilwa district, Tanzania. Miya *et al.* (2012) found that the majority of the farmers in Kilwa did not have access to improved farming technologies and farm inputs. As a result, they relied on the use of simple hand tools such as hand hoes and pangas (machetes) for agriculture production.

With the increasing impact of climate change, however, the study established that traditional methods of farming and dependence on rain-fed agriculture were no longer

productive; as a result, the majority of the smallholder farmers had shifted to felling trees and chopping them into pieces for charcoal-burning as their easy and fastest way of minting money and make ends meet. Participants reported that they would not stop the wanton cutting down of trees unless the weather returns to normal and the rainfall seasons become predictable and reliable so that they return into agriculture production. One of the participants said:

> If we can have predictable, reliable and enough rains, we will stop cutting down trees but short of that, we will continue with charcoal production and logging in order to make a living (FGD Participant No.5 at Nyamwage village, December 8, 2016).

Participants admitted during FGDs that poverty contributed, to a large extent, to deforestation and environmental destruction. Thus, they urged the government to empower the citizens economically first and educate them, accordingly. Participant No.3 at Nyamwage village, for example, said during an FGD that "the farmers must first-of-all be supported to get modern agricultural production implements such as tractors and other agricultural inputs before being informed about stopping wanton cutting down of trees." He said that the efforts of the government to educate the rural inhabitants through mass media without supporting small-scale farmers first to practise modern agriculture were doomed to failure:

> So, thinking of providing forest conservation education through the radio without improving agriculture and expecting the citizens to stop cutting down trees is deceiving oneself. (FGD Participant No.3 at Nyamwage village, December 8, 2016).

In fact, it was established that, the current high price for alternative sources of energy such as gas, kerosene and electricity remained an obstacle for the citizens' adoption of such alternative sources of energy for cooking which could have helped them to stop wanton cutting down trees for charcoal and firewood. Participants said during FGDs that the government should lower the prices of alternative sources of energy such as gas, kerosene and electricity to enable more people, including the poor rural inhabitants, to shift to the use of such energy and stop cutting down trees for charcoal-burning. The prices of alternative sources of energy such as electricity, gas, and kerosene in Tanzania are still too high for the poor rural citizens to afford. One of the FGD participants said that at Utete Township that, if a person cannot afford the price of gas, he/she will continue to over-rely on firewood or charcoal for cooking. This sentiment was echoed at Mohoro village by one of the participants, who said:

> If the government wants to ban charcoal-burning and reduce deforestation, it should lower the prices of gas and electricity and ensure a reliable supply of these alternative sources of energy to households throughout the country. That way, the media's education on forest conservation will be meaningful to us (FGD Participant No.2 at Mohoro village, December 15, 2016).

In Tanzania, more than 90 percent of national energy consumption depends on biomass energy such as woodfuel and charcoal (URT, 2015). According to Oladipo (2015), deforestation tends to become a reality when about 90 percent of a given population depends on wood as fuel for heating and cooking. Kissinger, Herold and De Sy (2012) posit that wood fuel collection, charcoal-burning, and, to a lesser extent, over-grazing in forests are

significant drivers of degradation in large parts of Africa. Africans are forced to over-rely on wood and charcoal for cooking due to lack of affordable alternative sources of energy (Rademaekers *et al.*, 2010). According to FAO (2009), only 7.5 percent of the rural population has access to electricity. The over-reliance on the collection of wood fuel is also said to contribute to the decline in agricultural products and income, which imply a greater over-dependence on off-farm employment, such as the wood fuel and charcoal-burning (FAO, 2009).

The study further established that there was a need for the government to build factories in rural areas to enable a good number of the youths to be employed in such factories and refrain from charcoal-burning and logging. Rufiji is one of the districts in Tanzania facing the challenges of employment opportunities due to scarcity of industries. As a result, the poverty level is high in Rufiji. According to the WWF (2005), the majority of Rufiji residents are still underdeveloped and are classified as poor for reasons such as failure to access quality primary and secondary education. A study, which was conducted by Manogerwa (2015), found poverty to be one of the factors influencing child labour in Rufiji district. Manogerwa (2015) established that, due to poverty, children in Rufiji spent long hours selling different merchandise, cooking, washing cars, begging and carrying luggage.

Conclusion

Contrary to the existing findings from different researchers, that radio is the most powerful mass medium for creating environmental awareness and the most powerful in influencing citizens to conserve forests, this study established that factors such as poverty and low level of education among the rural inhabitants living adjacent to forests hindered radio communication efforts aimed to convince villagers to take forest conservation in Rufiji and elsewhere in Tanzania. The study has established that many of the Rufiji basin dwellers with low level of education lacked the purchasing power to buy radio sets; as a result, they were unable to access radio broadcasts, and hence failed to benefit from radio programmes such as 'Urithi Wetu' and their messages seeking to encourage pro-forest conservation behaviour. Consequently, forest conservation education fell on seemingly deaf ears and the target villagers continued with unsustainable harvesting of forests unabated, the curbs in place notwithstanding. Furthermore, the poverty level of the rural inhabitants limited their capacity to shift to modern agriculture and their power to shift to the use of improved woodfuel-saving stoves and improved charcoal stoves. Hence, the majority of them continued to over-rely on firewood and charcoal energy, which does not only undermine the very objectives of airing messages on radio aimed to promote forest conservation but also exacerbated the erosion of the forest cover in Rufiji.

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