Teachers Retention and Recruitment in Rural Areas in Tanzania. A narrative review Based on the Chinese Experience

Abstract

A narrative review of the literature on the practices of teacher recruitment and retention in rural China, with an emphasis on identifying the tactics employed to do so, served as the basis for this qualitative study. It then showed Tanzania how similar strategies may be applied to guarantee the successful recruitment and retention of Math and Science teachers in rural areas. The study found that while China's position is not as dire as Tanzania's, especially for teachers of science and math, both countries struggle with teacher recruitment and retention in rural areas.This results from the several strategies China has implemented to ensure successful teacher recruitment and retention in both rural and urban areas. Nonetheless, the study has demonstrated that Tanzania, like other Sub-Saharan African nations, lacks a strong framework for teacher policies that connects teacher recruitment and retention. Additionally, Science and Math teachers in Tanzania are not motivated, which leads to a teacher shortage in rural and remote areas. The study, thus, recommends that Tanzania should learn from China through the following, first development of policies related to rewards and incentives and, an increase in salary and promotions for science and mathematics teachers recruited in rural areas. Secondly, creating huge investments in urbanizing rural areas to attract and retainafresh employed science and mathematics teachers. Thirdly, the development of teacher exchange and rotation policy. Fourth, encouraging more gifted form six graduates in science and mathematics to work as teachers in remote regions and providing them with free access to both online and offline higher education. In this regard Tanzania will be able to comprehend the 2030 World Education for Sustainable Development, the SDGs of the UN, the African Union objectives of 2063, and Tanzania Vision 2025.Ultimately, the study concludes that, despite Tanzania's potential to learn from China, several challenges and considerations must be taken into account. These include the need for robust data collection and monitoring systems to assess the impact of adaptive interventions, as well as the importance of engaging local communities and stakeholders in the design and implementation of relevant strategies. Additionally is essential to recognize the cultural and contextual differences between China and Tanzania, and to adapt strategies in a way that aligns with the unique needs and

realities of the Tanzanian education system. This may include considering factors such as community engagement, and local governance structures in the development of adaptive interventions. To carry out frequent orientations for recently employed science and math teachers in rural schools. To establish science and technology centers, agricultural research facilities and environmental conservation projects in rural areas that encourage teachers to engage and advance knowledge in their profession. Resources that are currently spent to train more arts teachers could instead be allocated to training more math and science teachers. Creation of an online learning environment for math and science teachers that links teachers in ruraland urban schools for knowledge sharing.

Keywords: Teacher recruitment and retention, Tanzania, China, Rural secondary schools.

1. INTRODUCTION

It has been widely acknowledged that qualified, knowledgeable, and experienced teachers greatly contribute to student learning (Wangchuk1 &Dorji, 2020). This is especially true for schools that require significant improvement. As part of the process of making education sustainable and development-oriented, it will be necessary to hire and retain highly qualified educators in both urban and rural locations by 2030. According to Goal 4 of the 2030 Sustainable Development Agenda, all girls and boys should have access to high-quality, free, and equitable primary and secondary education to enable them to make meaningful, active contributions to peaceful and sustainable societies, and to promote global responsibility (United Nations Educational, Scientific, and Cultural Organization [UNESCO], 2020). In recent years, many countries have faced difficulties in retaining teachers in rural areas as a consequence of factors such as overcrowding classrooms, poor housing, isolation from professional development, inadequate teaching and learning resources, and challenging work conditions (Tran et al., 2023;Limin Zhang, et al., 2019). It should be noted that Tanzania and China are not the only countries that are experiencing difficulties in recruiting and retaining qualified teachers in their rural communities (Yulu Du, 2019).

For example, empirical research from China shows that teachers dislike working in remote and outlying areas due to increased workloads, low pay, low social standing, a lack of emotional support, and professional isolation (An-na Liu et al., 2022). China has been taking several steps to

address this issue, including passing legislation, guaranteeing instructors preferential hiring and distribution across different regions. Due to this, there is now more high-quality education available nationwide.Similarly, several countries around the world, including Egypt, Mexico, Libya, Jamaica, Poland, Japan, and Turkey to mention a few, have been developing various measures to support effective teacher recruitment and retention in rural regions (Onyefulu et al., 2022). Likewise, a teacher policy framework that directs the procedures of initial teacher preparation, recruitment, retention, compensation, evaluation, promotion, and professional development has been made available by international organizations like the World Bank and the Organization for Economic Cooperation and Development (OECD, 2005).Additionally, to realize Education for Sustainable Development 2030, international organizations have mandated that educational planners take into account the relationship between all variables, the most crucial of which are initial teacher training, recruiting, and retention (UNESCO, 2019).

However, Tanzania's secondary school arts programs have improved more than science and math programs, which is still a problem and contributes to secondary school students' low performance in these subjects (Sijaona,&Kitula, 2022). This is especially true for subjects like history, geography and civics.Tanzania must thus take a cue from China on the effective recruitment and retention of science and math teachers in rural regions tofulfil the demands of the global community as outlined in the framework of Education and Sustainable Development 2030. This is a result of China's improved efforts to alleviate the teacher shortage in rural regions.

To determine tactics that have been employed to keep teachers in rural areas, this study reviewed the processes utilized in China's rural areas for recruiting and retaining teachers. It also attempted to determine what Tanzania can learn from China regarding the retention of science and math teachers in rural areas. The research questions in this study were: How are teachers hired and retained in Tanzania? What measures does China take to guarantee that teachers in rural areas are effectively recruited and retained? What are some Chinese strategies Tanzania may use to guarantee successful recruitment and retention of science and math teachers in remote areas?

2. LITERATURE REVIEW

Theoretical Framework

This study was underpinned by dynamic adaptation theory a concept in the field of psychology and human development that explains how individuals navigate and adapt to changes within their environment. The theory lies in Bronfenbrenner's(1979) ecological system theory, which posits that human development is shaped by the interaction between an individual and their surrounding environment. This environment consists of various interconnected systems, including the microsystem, mesosystem, exosystem, macrosystem, and chronosystem, each exerting different levels of influence on the individual(Bronfenbrenner, 1993;Bronfenbrenner, 1994;Bronfenbrenner& Morris, 1998). Dynamic adaptation theory outlines the complex and dynamic interactions between individuals and their environment, emphasizing the importance of understanding these interactions to comprehend human development more completely. One key element of dynamic adaptation theory is its recognition of the bidirectional nature of influence. Rather than perceiving individuals as passive recipients of environmental influences, the theory acknowledges that individuals also have agency and can actively shape their environments(Eisenhardt& Martin, 2000; AlZboon, 2013).This bidirectional influence underscores the dynamic nature of adaptation, highlighting that individuals are not merely molded by their environments but actively engage in reciprocal processes that lead to adaptation and development.

Application of Theoretical Framework in this Study

By using the Chinese experience as a point of reference, dynamic adaptation theory offers a useful framework for comprehending and addressing the difficulties associated with the recruitment and retention of science and math teachers in Tanzania's rural areas. The necessity of an adaptable and context-specific strategy for teacher recruitment and retention in rural areas is emphasized by the Dynamic Adaptation Framework. While acknowledging the value of tailoring tactics to Tanzania's particular sociocultural, economic, and educational context, it takes inspiration from the Chinese experience. It offers an organized framework for conducting a narrative evaluation on the recruitment and retention of math and science teachers in rural Tanzania, with a focus on the Chinese experience. The framework guides the examination of existing literature, policies, and practices in China and evaluates their potential applicability in the Tanzanian context.

Moreover, the framework guides the exploration of success stories, challenges faced, and lessons learned from China, with a focus on adapting these experiences to the unique needs of rural schools in Tanzania. By applying this dynamic framework, the narrative review aims to provide actionable

insights and recommendations for policymakers, educational institutions, and communities in Tanzania to enhance teacher retention and recruitment strategies in rural areas.

Studies on Teacher Recruitment and Retentions.

The process of locating possible pre-service teachers within the teaching education area is known as teacher recruiting. Mulkeen, (2010) reports that many nations, notably those in Africa, show less concern for finding competent candidates for teacher training programs. For instance, in Ghana, recruiting students for teacher training programs and universities occurs after the initial funding for pre-service training; the only country with a central hiring authority for teacher training positions is Ethiopia (Mulkeen, 2010; Cobbold, 2015).

Retaining teachers at their stations and lowering staff turnover are the two main objectives of teacher retention. Almost everywhere in the world, one of the drawbacks encounteredin the teaching profession is teacher retention (Wangchuk1 &Dorji, 2020). Major issues related to teacher retention have been documented by the empirical literature. These issues include teachers moving between schools, attrition, which is expectedto be caused by retirement, little pay, inadequate incentives, and purposeful acknowledgement due to the low prestige associated with teaching and the decision to seek out another job with higher status. Other problems include the social and professional isolation of rural locations, classroom overcrowding, shortage of teaching resources, lack of administrative support and poor management styles (Cobbold, 2015; Luis Miguel, 2020; Tran et al., 2023).According to the global report of 2021 on the status of teachers, therealityofteacherattritionworldwidehasindicatedthatahugeamountofnewly employedteachersandthosewiththebestquality academic backgroundhavebeenabandoningtheteachingprofessionafterbeing employedforthe first time (Thompson, 2021). For example, just one-third of attrition is accounted for by retirement, with the US having a national attrition rate of 8% while Singapore and Finland have 3% to 4% of attrition(Darling-Hammond, 2019).Comparable percentages apply to the Dutch: roughly 40% for two years, 50% for roughly six years, and roughly 60–70% in Australia, Spain, and Norway continue their careers as teachers. After five years, roughly 60% of newly hired teachers in England stay in government schools; this percentage is higher for math and physics teachers than for those in Italy, the Netherlands, or Germany, where 50% of newly hired teachers stay in the teaching profession (Siebeta, 2020). Conversely, male teachers in Norway have a higher attrition rate than

female (OECD, 2021). In Israel, public institutions had attrition rates ranging from 3.3 percent to 11.7 percent in 2016.

According to recent studies, not all types of teachers experience attrition in the case of Africa. Attrition rates for primary teachers range greatly, from 2% in Eritrea to 9% in Zambia. Additionally, the research shows that secondary school teachers experience a higher attrition rate than elementary school teachers do. For instance, in 2010 the attrition rate for elementary school teachers in Lesotho was 3%, whereas the rate for secondary school teachers was 10% (UNESCO; IICBA, 2016). Similarly, the study conducted by Nguyen et al. (2022) indicates that teachers in higher secondary schools, who teach science, technology, engineering, and mathematics subjects have low motivation which ends up in high attrition. According to the reports, attrition is significantly higher in locations with challenging living conditions such as acostly lifestyle, a tough environment, or a lack of security than in areas with favourable living conditions (Darling-Hammond and Carver, 2019;BengHuat See et al., 2020). While the globe at large has been having trouble finding and keeping teachers, especially in rural and isolated areas, different nations have been using different approaches to address these issues. One tactic is to raise teacher pay to encourage more teachers to work in remote areas (Education Endowment Foundation, 2023).Some nations, like Chile, have quadrupled their salaries, and Jamaica has increased compensation by two levels.Other nations have also begun to offer salary bonuses. For example, the study by Elacqua et al. (2022) indicates thatthe ChileanPedagogical Excellence Assignment (AEP) pays additional benefits to excellent teachers who perform highly and are ready to work in rural areas. Similarly, Mozambique has started offering 100% bonus payments; Argentina has raised base salary bonuses to 80%; Nepal has offered 100% basic salary as a bonus; the Philippines has offered up to 25% base income. Similar to this, allowances have been implemented in nations like Cambodia, Laos, Guyana, Libya, Uganda, and Egypt(Viriyasack, 2021). House allowances and loans for buying houses are offered in countries such as the United States,Senegal, Sierra Leon, and Zimbabwe just to mention a few(Gomba, 2015;Sisouphanthong et al., 2020; William et al., 2022). In the case of England, the Early Carrier Framework was implemented in 2020 as a strategy for teacher recruitment and retention. Its objectives are to lessen the workload of recently engaged teachers while also offering them excellent professional development and mentoring throughout their induction years. The workload was shown to be one of the reasons teachers in England left the teaching profession (BengHuat See et al., 2020).

3. METHODOLOGY.

A narrative literature review was used in this study. There are four primary forms of narrative literature reviews including the first, general literature review that covers the most important and pertinent aspects of what is currently known about the subject. A theoretical literature review is the second, and it looks at how theory influences or frames research. The third is a general literature review with a methodological focus that explains research design and methodology. Finally, a review of historical literature focuses on evaluating research across time before tracing its evolution within a historical framework.To create new knowledge, this study conducted a general literature review. It did this by gathering up-to-date information from various published research surveys and sources and critically analyzing the entire sources about a lesson Tanzania could pick up from China about how to successfully recruit and retain science and math teachers in remote areas (Write et al., 2007). Scholars agree that carrying out a literature review well is a suitable research methodology that can aid in the creation of new information (Snyder, 2019). Similarly,narrativeliteraturereviewasaresearchmethodology assistsinidentifyingthemes, relatedtowaysChinausesinensuringeffectiveteacherrecruitmentandretentioninruralareas. Generalnarrativeliterature reviewshaveagreatchancetogeneratefutureresearchtopicstobe conducted byempirical studies(Ward et al., 2009).In a similar vein, the narrative literature review research approach aids in the identification of themes about China's strategies for successful teacher recruitment and retention in rural areas. Reviews of general narrative literature have a strong potential to provide ideas for upcoming empirical study topics (Ward et al., 2009).

Trustworthiness and Data Collection Methods

According to Susan et al. (2002) and Cresswell, (2018), triangulating the data-gathering methods enhances the study's validity and reliability. In this study documents served as the main source of

data for this investigation. Contextually richer data sets are produced when documents are used for data collection, which also helps to ground an investigation in the various contexts surrounding the topic of study(Clarck, et al., 2021). In particular, the study used a wide range of peer-reviewed educational literature, including books, published articles, and international, regional, and local national reports, to obtain information on Tanzania's potential learning opportunities from China's successful strategies for teacher recruitment and retention in peripheral areas. Several criteria, including peer-reviewed journal papers, global, regional, and local national reports, and official written documents like education policiesfrom the Ministry of Education Science and Technology in Tanzania and China, were used to choose the documents to assure the reliability of the data sources (Bogdan&Biklen, 2003).The researchers incorporated all pertinent studies in the review to guarantee the study's credibility. This was done to make sure that research that might alter the review's conclusions was not overlooked. To ensure that neutrality and consistency are upheld, self-reflection on one's own opinions was also conducted. In a similar vein, Noble and Smith (2015) provided an open and transparent account of the research process, from the creation of methodologies to the reporting of findings.

Data Analysis

Thematic analysis was an essential tool for exploring and incorporating the findings of the general narrative literature study. According to Creswell (2012), describing and generating themes from the data entails providing comprehensive answers to the main research questions as well as a deep comprehension of the main phenomenon through thematic development and description. Thematic analysis is typically applied in qualitative research to illustrate, examine, and document the themes found in a text (Burke&Christensen, 2017).Carefully selected references from several research and document bases were needed to bolster the study's conclusions. Most of the time, plagiarism of

other people's ideas was avoided and carefully examined. Ensuring that the authors and scholars of diverse journal articles and other resources were acknowledged for their valuable contributions to the field of teacher education and the knowledge society was crucial.

4. RESULTS AND DISCUSSION

As was previously noted, the literature review was used to gather the findings that are reported in this section. As a result, the data presented and discussed here is derived from secondary sources that were categorized and distilled utilizing themes in order to impart an understanding of the subject. The three questions that formed the foundation of this inquiry are discussed in relation to the outcomes.

Teacher Recruitment and Retention in Tanzania

Tanzania's teacher attrition rate is comparable to that of other Sub-Saharan African nations. Higher teacher attrition is observed, particularly in science courses like math, physics, chemistry, and biology (Sijaona&Kitula, 2022). Teacher turnover is predicted to be 3 percent in rural places with poor working conditions when conditions are worse (HakiElimu, 2014; URT, 2010). Although the government has been assigning math and science teachers to rural areas, a higher proportion of them are leaving the sector to seek other jobs (Chediel, 2010;MoEVT, 2014).Nearly 40% of newly hired teachers who were assigned to teach in inhospitable places had not even reported to their workstations by 2008. Studies show that only 35 percent of students in rural areas receive science and math teachers, while over twice as many do so in urban ones (URT, 2010).For instance, the Tanzania Mainland Education Sector Performance Report (2018/2019) states that a teacher shortage is evident in several subjects, especially in Science, Mathematics, and Technical subjects (URT, 2019).Correspondingly,the study conducted by Sijaona and Kitula(2022) found

that some topics are not addressed at all in the early syllabus due to a lack of science and math teachers in secondary schools. In a similar vein, a lack of teachers of science and math influences how secondary school students learn, leading them to choose to major in the arts instead of science and math because they no longer have the same enthusiasm for studying these topics.Tanzania's scientific teacher shortage is mostly due to factors that are similar to those in other sub-Saharan nations.

Among the causes are unfavourable working conditions, which include any situation that could have an impact on workers' well-being or well-being at work, such as a lack of housing options (many rural areas lack decent houses to rent), a lack of recreational opportunities, or a lack of health services (many rural areas are isolated from medical facilities). For example, visiting and finishing the necessary paperwork for a doctor's appointment can take one to nine hours in an urban setting, but three days in a rural one. Because they are wasting time, most teachers who work in remote areas are affected by this problem. In addition, a shortage of libraries and laboratories, together with insufficient supplies of chemicals, lab equipment, and books, lowers morale and decreases the efficacy of instruction in rural locations (Mosha, 2016; URT, 2019). Similarly, although teaching is a common profession, there are differences in the working conditions of teachers. For example, compared to those employed in remote and rural locations, teachers in urban areas tend to love their job more because most of the schools in those areas have a favourable work environment.Due to the availability of decent working environments, teachers in urban areas successfully carry out their duties, resulting in effective learning and improved performance from students, in contrast to rural areas where the majority of students have very poor academic performance (Shikalepo, 2020). Moreover, poor pay and benefits in comparison to other professions like medicine. In comparison to certain other occupations, the teaching profession has

lower wage scales, according to the Tanzanian government, which hires a greater number of instructors for secondary education.For instance, a certificate holder in the teaching profession currently starts at TGTS B1, (419,000/=), while a certificate holder in the nursing sector starts at Tsh. 432000. In the teaching profession, a diploma holder's starting pay is Tsh 680,000, while TGTS C. 1 (530,000 Tsh) is what a diploma holder starts with. Last but not least, a bachelor's degree holder in the teaching profession begins with TGTS D. 1 (716,000 Tsh), but a bachelor's degree holder in the nursing sector begins with Tsh 980,000.All of the data point to a distinction between the nursing and teaching professions as one of the causes of the scarcity of science and math teachers in secondary schools, particularly in rural areas (Sumra&Katabaro, 2014; Mosha, 2016).

However, science and math teachers in rural areas do not have the same opportunities for extra income as their counterparts in metropolitan areas, where it is easier for them to work as part-time teachers at private schools. This becomes problematic in rural areas because the majority of residents are economically disadvantaged, which makes it difficult for them to even find teachers for their kids after school. Furthermore, these teachers cannot work as part-time teachers in rural areas because there are no private schools in those areas (Shikalepo, 2020).According to Chuwa (2014) study on the factors influencing secondary school female students' career choices in math and science in the Ilala District of Dar es Salaam Region, in Tanzania, math and science teachers in that areas charge tuition, work extra hours, and take weekends off to help their students with those subjects. In this regard, math and science teachers in metropolitan settings have an advantage over those in rural locations.

Poor transportation in isolated places is another problem that raises the high turnover rate of math and science professors. Since there isn't enough reliable transportation in remote and rural areas,

many science and math teachers are obliged to move or quit their jobs to find alternative work in cities.People frequently use rivers as a means of transportation in remote, rural areas that are off-limits to buses and other motorized vehicles. Moreover, some schools are very far from the places where instructors live, necessitating teachers to travel great distances to get to work because the majority of rural schools lack housing for professors (Shikalepo, 2020).

Another, contributing factor is an excessive workload brought on by a lack of science and math teachers in remote and rural secondary schools. More class sessions per week and larger class sizes are challenges for teachers. It is typical for one instructor to instruct classes of up to 200 students in mathematics, ranging from Form One through Form Four. Because of this, teaching biology, chemistry, or physics to the entire school becomes an extremely taxing task for one teacher, which makes most teachers question their decision to continue teaching (Mosha, 2016; Sumra and Katabaro, 2014).This explanation is further supported by the teaching profession's low status, where teachersare notrespected as similar to other professions like engineering, accounting, and lawyers (Lemomo, 2010).

Furthermore, a lack of linkage between recruitment techniques and initial teacher training programs has resulted in overtraining in Tanzania, which has prevented more graduates from finding work in the teaching industry since 2015. Additionally, despite not having received the necessary training to instruct students in basic schools, in-service art subject teachers are currently being transferred from secondary schools to primary schools. This overtraining of teachers teaching arts subjects is comparable to what occurred in China after 2005 when there was an oversupply of teachers, with roughly 936,000 graduates from various universities and teacher training programs compared to 250,000 teachers hired to teach.In rural areas, there was a teacher

deficit in courses like physical education, foreign languages, music, and art, even if there was an abundance of teachers in other subjects (Zong, 2010).

Tanzania has put policies in place to ensure that scientific teachers are hired and retained throughout the nation. Other examples include the Higher Education Students Loan Board (HESLB) providing complete loans to all enrolled students to cover all study-related expenses at colleges and universities that prepare teachers in science and mathematics(Sijaona&Kitula , 2022). Moreover, a unique curriculum for preparing science teachers for secondary schools was introduced with the introduction of the Diploma in Secondary Education. To be trained as diploma holders in science and mathematics subjects to teach in secondary schools, lower secondary school graduates who have passed starting an average of division III including science subjects like Physics, Chemistry, Biology, and Mathematics are admitted to Teacher Training Colleges (MoEST, 2019). About 1585 student-teachers were anticipated to graduate as science and mathematics teachers in 2018, with the remaining roughly 4720 predicted to graduate in 2019(URT, 2019).

TeacherRecruitment andRetention inChina

China, a country, that is expanding quickly, has been attempting to enhance and expand its knowledge economy. For this reason, studies reveal that teacher shortages are not common in China even though the country has a larger population. When compared to other occupations, teaching enjoys a high standing in China. These outstanding results are the result of several curriculum changes made at universities and teacher training institutions to produce high-calibre educators who can fulfil the nation's demand for teachers (Nagle et al., 2015; Rao, 2020;Zang et al., 2022).Furthermore, a new era of performance-based salary calculation began with the introduction of teacher salary reforms in 2009. Compared to other civil servants in the nation,

teachers in China are paid enormous salaries (OECD, 2016). It is estimated that 16.7 million people are employed as teachers in China, working at various levels of the educational system. More precisely, there are roughly 15 million instructors employed by schools and pre-primary institutions.It has been challenging to guarantee an equitable supply of qualified teachers in rural areas in China, even with a greater number of instructors (Qiong et al., 2019). This is because of teacher shortages and attrition. It has been determined that some factors, including the low pay received by professional teachers in China, contribute to teacher retention in terms of attrition (Nagle et al., 2015).

There is proof, nevertheless, that the government has taken a variety of actions to address the problem in rural areas. Ensuring the recruitment and retention of proficient teachers has long been a priority in China. For a very long time, China has experienced a teacher shortage (Guiake,2021;Limin et al., 2019). There was a notable discrepancy between the supply and demand for teachers in both rural and urban areas from 1949 until the 1990s. However, the government started enacting laws boosting teacher pay, increasing higher education, and instituting national birth control, the teacher shortage was eliminated in the 1990s. Because of this, China's reputation regarding the teacher shortage has improved (Rao, 2007). While efforts to alleviate the teacher shortage have progressed, China still has challenges in attracting and keeping teachers in rural areas. This is because the majority of teachers are not prepared to work in these areas. Consequently, the government has been implementing various measures to mitigate the situation. These measures include the following.

Township authorities and local governments were required to hire contract teachers. The majority of these teachers were inexperienced and received lower pay than professional teachers; contract teachers typically received between one-fifth and one-fourth of the professional salary

(Guiake2021). In China, there were over 2.8 million contract teachers as of 1985. The government began committing to improving teacher quality in the 1990s, and in 1993 it was decided that by the 2000s, 95% of primary school teachers should have graduated from a regular school, 80% of middle school teachers should have graduated from a regular college, and 70% of high school teachers should have graduated from a four-year normal university.According to Robinson and Yi (2008), only 705,000 contract teachers were still teaching in China in 2001. This was coupled with the introduction of stringent requirements, such as requiring teacher certification only after passing exams, and the elimination of contract teachers. After the educational changes in 2006, 448,000 contract teachers had to be fired by 2010.

The implementation of urbanization in rural areas is an excellent strategy. To attract new hires and keep existing instructors in their positions rather than forcing them to relocate to cities, as many teachers had previously done, the Chinese government has been investing more money in urbanizing rural areas. Many Chinese villages have become little cities with all the amenities of a modern city, and by 2025, it is projected that nine hundred million people will need to be served (Liu, 2011).

Alongside that, increasing funding for rural areas has been a tactic used to keep teachers in these areas. For instance, the Educational Law of 1995 mandated that the state promote the growth of education in places inhabited by minority groups, isolated or peripheral areas, and areas afflicted by poverty (Ying Peng, 2015).

Additionally, the Chinese government has been inspiring and pushing graduate teachers to work in the countrysideby giving them prestigious posts that promote their career advancement. For example, in 2005, the Compulsory Education Law was revised to compel teachers employed in urban schools to complete a requirement of working in rural schools to be eligible for

advancement (Ying Peng, 2015).As well, a lot of training initiatives were carried out nationally, especially for rural schools. For instance, the government organized volunteer labour in the Western 12 provinces through the "Go to West –College Graduates Volunteers program," which was introduced in 2003. The government must offer subsidies, insurance, and training (Ying Peng, 2015).

The Teachers in Special Post Policy, implemented by the Chinese government in 2005, established funds to offer teacher subsidies in rural regions. According to Ying Peng's (2015) analysis of the literature, starting in 2012, and teachers in Western China earned a reasonable subsidy of 27,000 Yuan a year, while those in Central China received 24,000 Yuan annually.

Similar to this, the Chinese government implemented the Free Teacher Education (FTE) policy in mainland China in 2007 to retain and inspire teachers employed in rural regions. Six regular colleges were given the authority to provide free teacher training to students who wished to teach in China's rural areas (Rao, 2020). In exchange for their tuition, housing, and other fees, students would receive free monthly stipends of roughly 600 RMB. Between 2012 and 2016, over 52,000 FTE students completed their degrees from the six regular colleges that have the authority to train these teachers.Comparably, those colleges adopted the FTE policy in 2017, and approximately 41,000 of their graduating student teachers go on to teach in rural areas (Rao, 2020). The graduate students who studied as teachers under this system were required to spend ten years working in rural areas. This initiative demonstrated more success since it gave most rural students access to extremely prestigious universities, which they would not have otherwise been able to (XuefengQiao&Mainhong Lai, 2019).

In 2008, a new policy was introduced that mandated graduates demonstrate their devotion to their country by agreeing to work as teachers in China. Recruitment of fresh graduate college students to teach in rural schools was made necessary by the "Teach for China" policy.

The 2009 saw the implementation of the New Teacher Salary Policy. The government increased teacher pay by 12,000,000,000 Yuan. The new policy placed a strong emphasis on basing teacher pay on student achievement. To guarantee improved performance from every teacher was the goal. The post salary, grade salary, performance salary, and allowance compensation are the four components that make up a teacher's pay under the new system. Teachers who work in remote areas receive subsidies from the government. Along with special allowances for particular jobs in elementary and secondary schools, there are allowances for teachers working in underdeveloped and peripheral locations (OECD, 2016).

An additional tactic was the implementation of a Rural MEd program, which drew more PhD candidates to teach in impoverished rural areas. Approximately 8801 graduate students were drawn to teach in remote areas in 2014. The Ministry of Education in China launched the Rural MEd program in 2004 intending to find highly skilled students for certain universities, havethose complete three years of online education while working as teachers in rural areas, and require them to attend offline courses during their final year on campus to earn their degree (Rao, 2020;Guiake, 2021).

To promote education in remote areas, the government of the People's Republic of China introduced the Rural Teacher Support Plan (2015-2020) (RTSP Plan) in 2015. This comprehensive and long-lasting program aims to change rural teaching practices. The initiative employs K–12 and preschool rural teachers who receive financial support from the federal government to teach in rural schools. The RTSP initiative prioritizes hiring rural teachers in underprivileged working

conditions, increasing wage subsidies, and enhancing living allowances.To guaranteeall areasdevelop teacher evaluation to achieve steadiness between remote and urban school teachers, honour systems for rural teachers will be established, retirees and senior teachers will be encouraged to teach in rural schools, and college students with a certificate of working in rural areas will enjoy tuition reimbursement (LI Jian, 2020).

Furthermore, the Action Plan for Teacher Education Revitalization (2018–2022) was introduced by the Chinese government through the Ministry of Education in March 2018 with the goal of addressing significant concerns expressed by the teaching community and determining future directions for raising the status of teachers and providing high-quality teacher education (Rao, 2020).

It goes without saying that every tactic and policy the People's Republic of China's government has put in place demonstrates how much it has done to elevate teachers' standing and respect in the nation relative to other professions. Both in rural and urban regions, this has led to successful teacher recruitment and retention. Owing to this remarkable accomplishment, the Chinese government has improved the nation's urban and rural educational systems in addition to addressing the imbalance resulting from the teacher shortage. It has also shown that it is cognizant of the need to elevate the status of teachers. Tanzania must thus devise a plan of action to tackle the deficiency of science and math courses, particularly in rural areas where a high teacher attrition rate affects science and math subjects.

Chinese Strategies Tanzania May use to Guarantee Successful Recruitment and Retention of Science and Math teachers in Remote Areas.

Although universities and teachers' colleges with jurisdiction power to train teachers conduct basic teacher training, Tanzania, like other developing nations, faces a shortage of teachers in science and mathematics, particularly in secondary schools (URT, 2019). The problem is exacerbated in remote areas (Meena, 2009). The circumstances surrounding the scarcity of scientific and math instructors raise concerns about the effectiveness of the national policies pertaining to teacher recruitment, distribution, and retention.According to World Bank research, Tanzania, like other Sub-Saharan African nations, has systems in place for projecting, planning, managing, and tracking teacher placement and retention that are typically unreliable and have little to do with the hiring practices of the colleges and universities that have the authority to provide teacher training (World Bank, 2009). Tanzanian universities and teacher training institutes do not effectively organize their student enrollment to meet the demands of the labor market.Inadequate placement planning and predictions lead to a shortage of science and math instructors in secondary schools, as well as an imbalance in the distribution of teachers between rural and urban locations. Similar to Tanzania, there isn't a specific relevant strategy that aims to close the disparity in the number of science and math teachers between urban, countryside, and distant schools. Tanzania should not lag behind in learning from other nations in order to fulfill the global educational goal for sustainable development by 2030, as Tanzania is not an island. China is a model country because, despite having a large population worldwide, more progress has been made in addressing the teacher shortage in rural areas.

Tanzania can benefit from China's experience in recruiting, assigning, and retaining science and math teachers in remote areas. First and foremost, Tanzania needs strategies and tactics that would encourage the recruitment and retention of science and math teachers in both urban and rural environments. Regardless of the nature of their employment or the challenging environmental

conditions in the area, teachers of mathematics, science, and the arts are treated similarly in urban, rural, and remote settings. Like China, the United Republic of Tanzania should create policies for the recruitment and retention of science and math teachers in remote and rural schools in order to alleviate the teacher shortage in these settings.Rewards for agreeing to work in rural areas for a number of years may come in the shape of bonuses or promotions under these schemes. To encourage more students to pursue careers in teaching, especially in the scientific and math domains, compensation should also be increased in relation to other professions.

Second, Tanzania ought to take a cue from China and adopt the urbanization of rural areas strategy. Despite Tanzania's best efforts, its science and math teachers lack the necessary skills to work in rural areas because of substandard living conditions. To keep recently hired science and math teachers where they are employed and prevent them from being lured to the metropolis, Tanzania's government, like China's, should invest more in urbanizing rural areas.

Thirdly, China implemented a program of teacher exchange and rotation with the goal of standardizing the caliber of teaching resources in all government schools. Tanzania can implement a program similar to China's in order to lessen the scarcity of math and science teachers in rural areas. The initiative has demonstrated remarkable success in reducing the difference in teacher quality across schools with high and low performance. This initiative will support high-quality science and math education in rural areas. The government should ensure that working in rural and isolated locations for several years is a mandatory requirement for teachers to be promoted to make the program more successfully implementable.

Fourthly, Tanzania like China, can hire recent Form Six science and math graduates who want to work as teachers and live in rural areas. They can then be admitted and given free training, and upon graduation, they must sign a contract to work for a set period—let's say ten years—before

they can choose to stay in the rural area or move to another area of their interest. As an alternative, Tanzania's government may, like China's, draw in more outstanding teachers to teach in undeveloped rural areas.Under circumstances that require them to teach in remote secondary schools for two years while completing their university coursework online. In their third year, they are required to attend offline courses on the university campus to graduate. They must be freely provided with a stipend and other expenditures to be motivated to participate in such a program.

5. CONCLUSION AND RECOMMENDATIONS

Many obstacles and factors need to be taken into account, even though Tanzania can gain from China's policy of teacher exchange and rotation, urbanization of rural areas, motivation of math and science teachers, and recruitment of form six graduates to teach math and science in remote areas while simultaneously receiving a free university education. These include local communities and stakeholders' involvement in the development and application of pertinent strategies, as well as the requirement for reliable data gathering and monitoring mechanisms to evaluate the effectiveness of adaptive interventions.It's also critical to acknowledge the cultural and contextual distinctions between Tanzania and China and to modify tactics to fit the particular requirements and realities of Tanzania's educational system. This can entail taking into account elements like local governance institutions and community involvement when creating and adopting treatments.The government of the United Republic of Tanzania can ponder leveraging the land in rural areas to create professional development and research opportunities. This could involve the creation of science and technology centers, agricultural research services, and environmental conservation projects that inspire teachers to engage in hands-on learning experiences and contribute to the upgrading of knowledge in their teaching profession. By providing opportunities for professional growth and innovation, the government can motivate science teachersto remain in rural schools and contribute to the

educational development of these communities. Furthermore, it is necessary to plan and carry out regular seminars and orientations for recently hired science and math teachers in these remote and rural areas.In close relation to this, the Tanzanian government ought to reallocate funds from the training of more art teachers who are unproductive in the classroom to the training of more science and mathematics teachers, whose shortage will make them highly sought after in the job market. To do this, the government should begin with primary education, which is the cornerstone of all children's education, and work its way up to secondary education by enhancing infrastructure, such as creating high-quality laboratories with adequate equipment and supplies, paying science and math teachers more and providing extra duty allowances, and ensuring that they have decent housing, health care, and other amenities.Tuition costs may be waived by the United Republic of Tanzanian government to encourage more students to pursue careers as teachers, especially in mathematics and science. In China, this tactic is more effective. Tanzania should also make sure that there is close coordination between those who guarantee teachers' continued employment in the teaching profession and those who handle teacher education management recruitment. Comparably, actions like establishing a teachers' profession board, hiring science and math teachers from secondary schools, and implementing the Alterance teaching profession methodology can also be implemented in Tanzania, as these approaches have proven to be very effective in other nations like Ghana, which has a teacher professional board. Because this study was founded on a review of the literature, the researcher suggests that future studies employ empirical techniques to ascertain what Tanzania might learn from China in terms of efficient teacher recruitment, distribution, and retention in rural areas for science and mathematics.

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