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Assessing the accessibility standards of urban green spaces: A case study of Siirt

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ABSTRACT

Urban open-green spaces are important public spaces where different socio-cultural groups come together and interact. However, the accessibility of these spaces for individuals with disabilities continues to be an important problem both globally and in Turkey. A sustainable and inclusive understanding of urbanization requires that all individuals—especially children, the elderly, and the disabled—have equal access to public spaces. In this context, observing universal accessibility standards in the design and implementation processes of urban green spaces is of great importance.

In this study, the physical accessibility levels of Kızlar Tepesi Park and Siirt Millet Garden located in Siirt province were examined. In the field study, the current physical conditions of the parks in question were evaluated through elements such as ramps, pedestrian paths, stairs, and seating areas, and the findings obtained were compared with universal design principles. The findings show that there are significant deficiencies in both parks that restrict disabled individuals from being able to be in the space independently and safely. While sloping roads and inadequate seating areas stand out in Kızlar Tepesi Park, despite the contemporary design of Siirt Millet Garden, deficiencies in guidance and some physical obstacles are striking. In both parks, ramp slopes, ground textures, pedestrian paths and seating-resting areas need to be rearranged in line with universal design principles. The study offers structural improvement suggestions for local governments and designers to increase inclusiveness and accessibility in green areas and aims to support disabled individuals to benefit equally from public spaces.

Siirt kentindeki yeşil alanların erişilebilirlik standartlarına uygunluk değerlendirmesi

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ÖZET

Kentsel açık-yeşil alanlar, farklı sosyo-kültürel grupların bir araya gelerek etkileşimde bulunduğu önemli kamusal mekânlardır. Ancak bu alanların engelli bireyler açısından erişilebilirliği, hem küresel düzeyde hem de Türkiye'de önemli bir sorun olmaya devam etmektedir. Sürdürülebilir ve kapsayıcı bir kentleşme anlayışı, tüm bireylerin —özellikle çocuklar, yaşlılar ve engelliler— kamusal alanlara eşit şekilde erişebilmesini gerektirir. Bu bağlamda, kentsel yeşil alanların tasarım ve uygulama süreçlerinde evrensel erişilebilirlik standartlarının gözetilmesi büyük önem taşımaktadır.

Bu çalışmada, Siirt ilinde yer alan Kızlar Tepesi Parkı ile Siirt Millet Bahçesi'nin fiziksel erişilebilirlik düzeyleri incelenmiştir. Alan çalışmasında, söz konusu parkların mevcut fiziksel koşulları; rampalar, yaya yolları, merdivenler ve oturma alanları gibi unsurlar üzerinden değerlendirilmiş ve elde edilen bulgular evrensel tasarım ilkeleri ile karşılaştırılmıştır. Bulgular, her iki parkta da engelli bireylerin bağımsız ve güvenli biçimde mekânda bulunmalarını kısıtlayan önemli yetersizlikler olduğunu göstermektedir. Kızlar Tepesi Parkı'nda eğimli yollar ve yetersiz oturma alanları öne çıkarken, Siirt Millet Bahçesi'nin çağdaş tasarımına rağmen yönlendirme eksiklikleri ve bazı fiziksel engeller dikkat çekmektedir. Her iki parkta da rampa eğimleri, zemin dokuları, yaya yolları ve oturma-dinlenme alanlarının evrensel tasarım ilkeleri doğrultusunda yeniden düzenlenmesi gerekmektedir. Çalışma, yerel yönetimlere ve tasarımcılara yönelik olarak; yeşil alanlarda kapsayıcılığı ve erişilebilirliği artırmaya yönelik yapısal iyileştirme önerileri sunmakta ve engelli bireylerin kamusal alanlardan eşit biçimde yararlanmasını desteklemeyi amaçlamaktadır.

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1. INTRODUCTION

Urban green spaces are of critical importance as spaces that improve the physical and mental health of city dwellers and enable social interaction and social ties to be strengthened. These areas should be examined not only for their aesthetic and ecological values, but also for their potential to increase social inclusion [1-3]. In particular, accessibility is a fundamental principle to ensure that these areas are usable for everyone. The equal access of individuals with disabilities to these areas is considered a necessity in line with the principles of universal design [4-5].

Disability refers to the difficulties that individuals face in performing daily life activities not only due to physical or mental limitations but also due to environmental, social and physical obstacles [6-7]. According to the World Health Organization [8], approximately 16% of the world's population consists of individuals with disabilities, and it is recommended that universal design principles be implemented to ensure more active participation of these individuals in social life. These principles include not only the elimination of physical obstacles, but also an inclusive urban design approach that will enable equal participation of different segments of society [9-10]. Studies reveal that accessible urban green spaces play an important role in the integration of individuals with disabilities into social life [11-12]. In this context, regulations such as ramps, wide walkways, contrasting guidance systems and tactile surfaces for the visually impaired are among the main elements that directly affect the quality of urban life [13-15]. However, it is stated that these regulations are not implemented sufficiently in many urban settlements and this causes disabled individuals to be excluded from social life [16].

The accessibility of urban green spaces has positive effects on the social well-being of not only individuals with disabilities but also of entire communities. The literature states that there is a strong relationship between the accessibility of green spaces and the physical and mental health of individuals [17-18]. For example, the study by Astell-Burt and Feng, [19] revealed that individuals living close to green spaces have lower stress levels and lead more active lives. However, the fact that these benefits are not provided equally to all segments of society continues to cause spatial injustices and social exclusion [20]. Individuals with disabilities often cannot benefit sufficiently from these spaces due to design deficiencies and environmental barriers [21]. This situation causes significant problems not only at the individual level but also at the societal level.

In recent years, the COVID-19 pandemic has created new awareness about the functionality and accessibility of public spaces. During the pandemic, open spaces have played a critical role in supporting individuals' physical and mental health while maintaining social distance [22-23]. However, it has been observed that especially disabled individuals have more difficulties in accessing green spaces during this period [24]. In addition to the negatives, it is also observed that various initiatives have been launched to increase accessibility standards. For example, urban projects based on universal design principles aim to both eliminate physical barriers and promote social integration [25-26]. Despite this, it is stated that such initiatives are limited in developing countries and often fail due to difficulties encountered in implementation [27-28]. It is emphasized that accessible urban green spaces should be supported not only by physical arrangements but also by policies that aim to increase social awareness [29].

The accessibility of green spaces also contributes to the strengthening of social ties. In the literature, it is stated that the increase in social interaction opportunities in green spaces paves the way for the formation of strong social ties between individuals [30]. For individuals with disabilities, this situation is not only limited to the elimination of physical barriers, but also turns into a mechanism that encourages them to take an active role in social life [25 and 31]. Universal design principles applied in parks and other open spaces increase social equality, allowing the construction of a more inclusive society [32-33].

However, the existing literature shows that accessibility practices are not widespread enough and in most cases target only certain user groups [34]. For example, studies have indicated that many urban parks are designed only for certain age groups or physically active individuals, thus ignoring the needs of individuals with disabilities [35-36]. This situation shows that universal design principles should not remain only in theory but should also be effectively implemented in practice [37]. As a result, increasing accessibility in urban green spaces creates positive effects at both individual and societal levels. Innovative approaches should be adopted in design in order for individuals with disabilities to fully benefit from these areas. In addition, increasing social awareness and shaping policies in this direction will contribute to the construction of a more inclusive and equal urban life [38-39].

Despite the steps taken in Turkey regarding accessibility, the compliance of urban green areas with universal design standards is still not sufficient. This study aims to examine the two important green areas in Siirt province, Kızlar Tepesi Park and Siirt Millet Garden, within the framework of universal design and accessibility standards. The research aims to determine whether these areas are suitable for use by disabled individuals and to offer improvement suggestions accordingly. Such studies can guide local governments and urban planners and contribute to the creation of more inclusive and accessible cities.

2. MATERIALS AND METHODS

The main material of this study consists of two large urban green areas in the city center of Siirt, located in the Tigris Basin of the Southeastern Anatolia Region, namely Kızlar Tepesi Park and Siirt Millet Garden. The reason why these two parks are included in the study is that they are located in the city center of Siirt and have an important place among the urban green areas. These parks selected within the scope of the research were evaluated in detail within the framework of accessibility criteria (Figure 1). Other data sources used in the study consist of relevant literature review, observations and measurements carried out in the study area, and photographs taken during field studies.

The parks selected as the research area are located in the central district of Siirt province. Kızlar Tepesi Park has an area of 40 acres and includes a 3-acre ornamental pond, amphitheater, theater, walking trails, recreation, adventure park and social facilities. This park, which was opened to the service of the people of Siirt in 2021, attracts attention with both its natural landscape and recreational opportunities. 80 percent of the Siirt Millet Garden, established on a 27-acre land, has green areas. The park includes a running track, children's playgrounds, a book reading area, a prayer room, a cafeteria, pergolas, benches and various social facilities [40]. Both parks are considered important green areas designed to meet the social and physical needs of city residents.

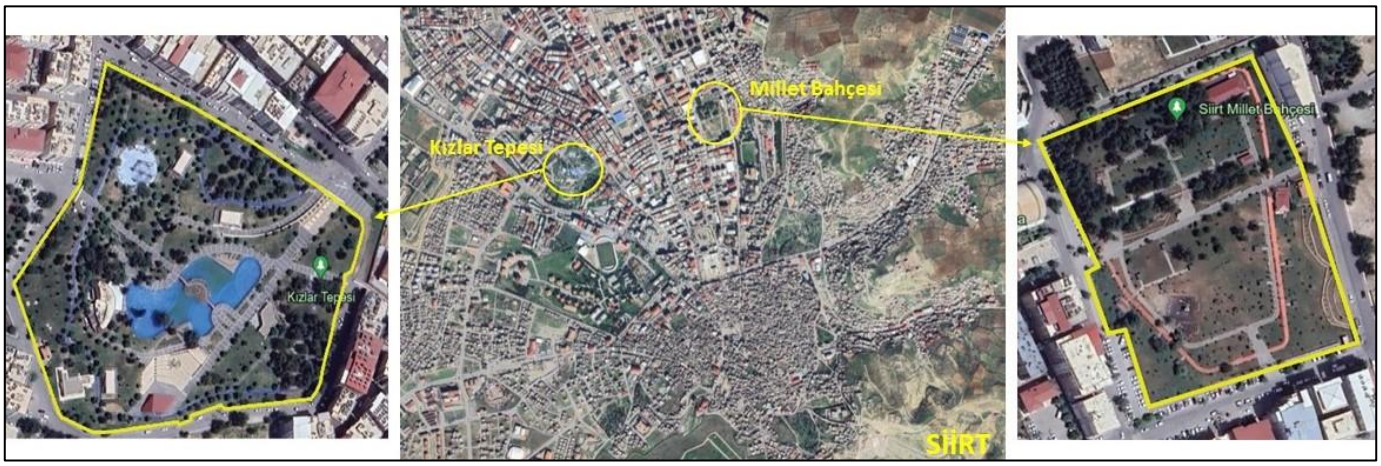

Figure 1. Work area

In the data collection process, four main data sources were used. First, national and international academic publications on the subject were examined through literature review. In addition, the accessibility status of the parks was evaluated on-site by field observations. Physical measurements were also carried out, and these measurements included accessibility para-meters such as ramp slope, road width, and sidewalk heights. Finally, visual materials were collected during field studies through photo and video documentation.

In the analysis of the data, TS 9111 (Accessibility Standard for Disabled People in Public Open Spaces) and Universal De-sign Principles were taken as basis [41-42]. In this context, the following criteria were evaluated: width and slope of pe-destrian paths, suitability of ramps, accessibility of entrance-exit points for disabled individuals, presence of direction and information signs, accessibility of seating areas and rest areas, tactile surface applications for the visually impaired, avai-lability of disabled parking lots and toilets were taken into consideration. In addition, accessible environmental standards listed in the Guide are given in Table 1. Data analysis was carried out with the descriptive analysis method, and a classifi-cation was made for each criterion as “none”, “bad”, “medium” and “good”. This classification aims to provide a compre-hensive assessment of the accessibility status of each park by supporting the findings with a table.

Table 1. Certain usage standards for open and green spaces [43]

	Standards
Some standards for the use of open and green spaces	The width of the ramps should be at least 90 cm, so that everyone can comfortably use the space.
	Roads in open areas should be non-slip, prioritizing safety and eliminating the risk of users slipping.
	Access to open/green areas and parks should be easy and barrier-free, and everyone should be able to reach these areas easily.
	The width of the main roads should be at least 120 cm and limited to not exceeding 200 cm, so that the use of the area is comfortable and orderly.
	The longitudinal slope of the main roads in the park area should be limited to 4% at most, and the transverse slope should be limited to 2%, so that the walking path becomes safe and comfortable.
	The surface of the ramps should be covered with a hard, durable, non-slip, slightly rough material, ensuring safe use in all weather conditions.
	If the length of the ramp exceeds 10 m, its slope should not exceed 6%, thus ensuring accessibility without the slope being too steep..
	The slope of the ramp should not be steeper than 8%, thus providing a safe passage for disabled individuals.
	Placing solid handrails along the stairs and having tactile surfaces at the top and bottom of the steps should increase the safety of users.
	Every 100 meters, rest benches are placed to allow walkers to relax
	The width of pedestrian pavements must be at least 150 cm and the slope of the pavement section must not exceed 2%, thus ensuring comfortable progress for pedestrians.
	Waste bins should be placed at a distance of 40 cm from the curb and at a height of between 90 and 120 cm so that access is easy and user-friendly.
	The height of the hard parts of the seating units should be 70 cm, so that both comfort is ensured and visual harmony is maintained. The height of the backs of the benches should be 70 cm and the height from the ground should be 45 cm, thus providing a comfortable sitting position for the users.

3. RESULTS AND DISCUSSION

3.1. Pedestrian Paths and Sidewalks

The walkways in the park area are generally designed to be 200 cm wide, but in some narrow areas this width decreases to 110 cm. The main reason for this narrowing is the equipment elements such as benches, garbage cans and lighting poles placed on the walkways. In areas where such elements are located, the effective walking width decreases significantly. There are various walking paths (Figure 2) on different routes in Kızlar Tepesi Park and Siirt Millet Bahçesi. These paths are generally designed to be wide enough for disabled individuals to use easily and provide a positive area in terms of physical accessibility. However, elements such as lighting poles, benches and garbage cans on these paths are not surrounded by sensible surfaces and are not supported by the necessary guidance lines for visually impaired individuals. This situation restricts the independent, safe and peaceful access of visually impaired individuals in particular to the park and constitutes a violation of the principle of equality in spatial use.

Figure 2. Accessibility of Pedestrian Paths and Sidewalks

3.2. Ramps

According to the Universal Design Standards Guide, the widths of the disabled ramps in the study area were found to be appropriate. The general use of the ramps is sufficient and the majority of the stairs are supported by ramps. The slopes of the ramps in Siirt Millet Bahçesi also comply with the standards. On the other hand, the slope rates of most of the ramps in Kızlar Tepesi Park are above universal standards. The average slope of these ramps was determined as 13% in the measu-rements (Figure 3.a, 3.c). In addition, it was determined that there was no difference in the starting and ending points of the surface textures in some ramps, and therefore, perceptible surface applications for the visually impaired were lacking. In particular, the high slope and inadequate structural features of the ramp located at one of the main entrances of the park (Figure 4.b) pose a serious problem in terms of accessibility.

Figure 3. Accessibility Compliance of Ramps: Siirt Millet Garden and Kızlar Tepesi Park

3.3. Stairs

The stairs in Kızlar Tepesi Park and Siirt Millet Bahçesi are generally compliant with accessibility standards in terms of surface coverings, use of tactile surfaces, presence of landings and step heights. However, broken and damaged stair steps, especially observed in some sections, pose potential risks that may prevent the safe movement of pedestrians (Figure 4.a). Examples of different types of stairs and structural conditions examined within the scope of the study are presented in Figure 4. This situation reveals the necessity of periodic maintenance and improvement of existing physical designs in terms of accessibility.

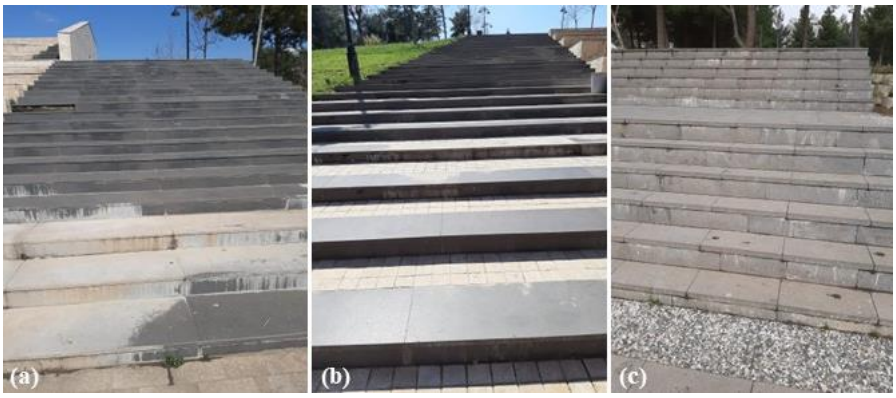

Figure 4. Examples of stairs from different points of the work area

3.4. Sitting Area

The benches in the study area are positioned at regular intervals and are sufficient in number. The height of the benches from the ground was measured as 45 cm and the back height as 70 cm, and these values comply with the relevant accessibi-lity standards and regulations (Figure 5). In addition, the 120 cm maneuvering space required for wheelchair users was provided, which was evaluated as a positive element in terms of accessibility. The preference for a single type of bench design throughout the area provided both visual integrity and a regular structure in terms of use.

On the other hand, it was observed that there were no independent pedestrian paths to provide access to some seating areas in Siirt Millet Garden, and this situation limited accessibility (Figure 5.a). It was also determined that some benches in the area were physically damaged and required maintenance. In addition, although the benches in the study area largely met the accessibility criteria, factors such as lack of maintenance and inadequate pedestrian connections partially restrict the independent and safe use of these areas, especially by disabled individuals.

Figure 5. Bench Types and Access Features of Seating Areas

3.5. Trash Cans

The waste bins in the study area are positioned on the walkways, fixed to the ground, and do not hinder user movement. A single type of waste bin was used in Kızlar Tepesi Park. The height of these bins is 93 cm and complies with the relevant standards (Figure 7.b). It was observed that two different types of waste bins were used in Siirt National Garden. The heights of these bins vary between 90 cm and 93 cm, and both types comply with the standards (Figure 7.a).

As a result of the assessments made in terms of accessibility, significant differences were determined in the levels of comp-liance with accessibility standards between the urban facilities in Kızlar Tepesi Park and Siirt Millet Bahçesi. In order to determine to what extent the existing physical arrangements in both parks comply with the standards in terms of accessibi-lity, the assessment criteria were classified as "✓ Compliant with Standards" and "X Not Compliant with Standards". Detai-led findings regarding this classification are presented in Table 2.

Figure 6. Types and Heights of Trash Cans in the Work Area

Table 2. Kızlar Tepesi and Millet Garden Accessibility Criteria Evaluation

Definition	Kızlar Tepesi	Millet Bahçesi
	Evaluation	
Ramp width (90- 180 cm)	✓	✓
Ramp slope (%8- 9)	X	✓
Sliding feature of the ramp (Rough and non-slip)	X	X
Slope of pedestrian paths (%2)	X	✓
Width of pedestrian paths (150- 200 cm)	✓	✓
Frequency of benches on walking paths	✓	✓
Height of garbage cans from the ground (90-120 cm)	✓	✓
Distance between waste bins and curbstone (40 cm)	X	X
Guide for the visually impaired	X	X
Height of hard parts (70 cm)	✓	✓

✓ Compliant with standards, **X** Not conforming with standards

According to the data presented in Table 2, the level of compliance of accessibility elements in both parks with the stan-dards varies. The ramp width was found to be compliant with the accessibility standards in both Kızlar Tepesi Park and Siirt Millet Bahçesi. However, in terms of ramp slope, only Siirt Millet Bahçesi complies with the standards, and since the slope of the ramps in Kızlar Tepesi Park is above the specified limits (8–9%), this criterion does not comply with the stan-dards.

Regarding the slip resistance of the ramps, it was determined that the surfaces in both parks were not sufficiently rough and non-slip; therefore, this feature did not comply with the standards. The slope of the pedestrian paths was arranged in ac-cordance with the 2% standard only in Siirt Millet Bahçesi, whereas the pedestrian paths in Kızlar Tepesi Park were not found to be compliant because they had a slope above the standards. In terms of pedestrian path width, both areas were measured between 150–200 cm, and this situation complies with the standards in both parks. In terms of the frequency of benches on the walking paths, both parks are equipped with a sufficient number of benches and are considered suitable in terms of accessibility in this respect.

The height of the garbage cans from the ground (90–120 cm) and the distance between the curb and the garbage cans (40 cm) meet the accessibility standards in both parks. However, it was determined that there are no guide tracks that will pro-vide guidance for visually impaired individuals in both parks and this element does not meet the standards for both areas. Finally, the height of the hard seating elements in the park areas (70 cm) meet the accessibility standards in both Kızlar Tepesi Park and Siirt Millet Bahçesi.

4. CONCLUSIONS

This study aimed to evaluate the compliance of Kızlar Tepesi Park and Siirt Millet Bahçesi, located in Siirt province, with universal design and accessibility standards. The analyses conducted show that both parks meet some basic accessibility criteria; however, there are various deficiencies, especially in areas such as the placement of physical facilities, slope and guidance elements.

- Kızlar Tepesi Park has serious limitations in terms of accessibility. In particular, the slope of the ramps is at a level of 13%, which is well above the 8–9% range specified in the standards. In addition, the surfaces of the ramps do not contain non-slip material and there are no perceptible surface applications for the visually impaired. This makes it difficult to use the park independently and reduces safety.
- Siirt Millet Bahçesi has a modern approach in terms of general design and includes many accessibility elements. The ramp width and slope are in accordance with the standards. However, the lack of surfaces that will provide guidance for visually impaired individuals shows that this park is not fully adequate in terms of universal design principles.
- Although pedestrian paths in both parks are generally 150–200 cm wide, in Kızlar Tepesi Park, due to the location of the equipment (benches, trash cans, lighting poles), this width narrows to 110 cm in some areas. These narrowings make it difficult to use, especially for individuals with limited mobility.
- The slope of the walking paths exceeds the 2% limit that should be in Kızlar Tepesi Park. This makes it difficult for wheelchair users to move safely and comfortably. In Siirt Millet Bahçesi, the slope is arranged in a more controlled manner.
- The benches in both parks are positioned at regular intervals and comply with accessibility standards in terms of seat height, back height and maneuvering areas. However, the lack of pedestrian paths providing access to some banks in Siirt Millet Bahçesi limits physical access. In addition, it has been observed that some banks in both parks require maintenance and repair.
- Although the stairs generally have appropriate step height and landing arrangement, it was determined that some stairs in Kızlar Tepesi Park were physically damaged. This situation negatively affects user safety.
- Although the height of the garbage bins in both parks (90–120 cm) from the ground is in compliance with the standards, it was determined that the distance from the pavement (40 cm) was not arranged appropriately.
- Guiding surfaces and perceptible ground textures for visually impaired individuals are not included in both parks. This deficiency prevents visually impaired individuals from navigating the parks independently and safely.
- When evaluated in general, although both parks meet certain accessibility criteria, they need structural improvements, especially in terms of physical guidance elements, ground arrangements, placement of equipment and slope control. In this context, it should be emphasized that accessibility is not limited to physical criteria only; spatial arrangements should also be addressed in line with the principles of inclusiveness.

These findings also overlap with similar studies conducted in different cities of Türkiye. For example, a study conducted in Ankara found that the vast majority of urban parks do not have guidance surfaces for the visually impaired, the slopes of the ramps do not meet the standards, and the bench placements are irregular. Similarly, a study conducted in green areas in Eskişehir and Diyarbakır (Küçük and Kırlıoğlu, 2020) revealed that accessibility in parks is limited to signs or physical entrances only; the usage areas inside are not sufficiently considered for disabled individuals. These comparisons show that the current situation in Siirt is not a local problem, but a more general and widespread one. As a result, the study provides important guidance to municipalities and urban design experts to design more inclusive, equitable, and accessible open green spaces in order to ensure that disabled individuals can benefit from parks independently and safely. It should also be remembered that accessibility should not only be considered physically; it should be addressed within a psychological, social, and spatial integrity.

AUTHOR CONTRIBUTIONS

A. Ünal: was involved in all processes of the study.

S. Alkanjo: literature review and field observation.

CONFLICT OF INTEREST

There is no conflict of interest.

ETHICS

There is no ethical issue in the publication of this article.

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