Case Study
JOURNAL OF UNIVERSITY OF BABYLON
For Pure and Applied Sciences (JUBPAS)
Vol.33 ; No. 4 | 2025

Integrating Remote Sensing and Field Surveying Techniques for Assessing Social Sustainability: A Case Study of South Eastern Missan

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دمج تقنيات الاستشعار عن بعد والمسح الميداني لتقييم الاستدامة الاجتماعية: دراسة حالة جنوب شرق ميسان

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Accepted: 12/11/2025 Published: 31/12/2025

ABSTRACT:

Social sustainability plays a significant role in the entire sustainable framework. It can be described in a variety of ways, such as: The capacity of a city to continue to serve as a long-term viable environment for social interaction, communication, and cultural development. At the same time, it is an aspect of sustainability that is often overlooked. Where the focus is only on the economic and environmental aspects

Materials and Methods:

This study deals with social sustainability estimation using remote sensing and surveying techniques. The study focuses on Sheikh Fars area, which is in eastern Missan, because of the economic significant of the area. The research hypothesis assumes that Sheikh Fars city is a good social sustainability according to its significance.

Results:

The results of the questionnaire survey (direct process) were analyzed used collected data (face to face interview) for residents using Likert scale approach. The results indicated that the study area is classified a poorly social sustainable area. as well as its neighboring areas, as they have the same characteristics as the region.

Conclusion:

In conclusion, this study weakens the first hypothesis, indicating that the Sheikh Fars area is socially unsustainable regardless of its economic significance. The findings show a significant gap between economic and social performance. This emphasizes the importance of incorporating direct social assessments into sustainable development plans.

Key words:

Remote sensing, Social sustainability, Sheikh Fars, Surveying techniques, Cultural life, Questionnaire.

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INTRODUCTION

The concept of sustainability became well-known after the Brundtland report was released in 1987[1],[2]. Sustainability and sustainable development are being discussed in a wide range of areas, from the social sciences to the natural sciences, from politics to economics, and from urban planning to architecture. Sustainability originates from environmental, economic, and social dimensions [3]. A crucial component of the wider "sustainable frame," social sustainability emerged as a major concern in urban planning in the 1990s as people's awareness of everyday living increased [4]. Social sustainability plays an essential role in achieving overall sustainability, especially in urban design and development. The term generally refers to a city's capacity to sustain an environment conducive to human interaction, cultural growth, and social unity over time [3]. Numerous researchers highlight its importance in fostering equity, cultural diversity, and the quality of life for current and future generations. On the other hand, land use issues have an impact on sustainable development. The United Nations World Conference held in Rio in 1992 produced Agenda 21, which raised awareness of land use, urban expansion, agriculture, and forestry challenges and fueled discussion for the following three decades [5],[6]. Essential elements involve addressing fundamental human needs, promoting personal and collective responsibility, guaranteeing access to vital services like healthcare, education, and housing, and building trust, collaboration, and active community engagement [7]. Remote sensing-derived land use maps are critical for analyzing and supporting social sustainability by ensuring reasonable access to resources, healthy living conditions, and sustainable urban growth.

Fig. 1 Procedure of social sustainability detection [9]

These maps use satellite images, drones, or aerial pictures to categorize land (e.g., residential, industrial, agricultural, and green spaces) and illustrate spatial patterns that affect populations [8]. Fig.1 illustrates the procedure for measuring social sustainability, impact monitoring and analysis. The framework for the present study Fig.1) is based on the chosen scope and criteria (feeling of safety, observed impact on decision-making, transportation, and access to and use of sports health services).

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This covers study aims, indicators, data gathering methodologies, and analytic procedures designed for social sustainability. The research hypothesis assumes that Sheikh Fars city, Eastern Missan, is a good social sustainability according to its significance. The questionnaire was a powerful tool used to test that hypothesis. A questionnaire is a powerful research tool called "SAQ", Self-Administered. A questionnaire, which comprises many questions dealing with a specific subject, is used to collect the answers [10]. The Sheikh Faris area was chosen to evaluate social sustainability because of the economic significance. It has the largest agricultural area and the existence of the Dewerige Dam reservoir, in addition to petroleum activity (the Al-Feqa oil field).

RESEARCH PURPOSE

- focusing on the economic significance of Sheikh Fars city.
- This study analyses the definition of social sustainability in the city, which requires its development by specialists.

STUDY AREA

The present study focuses on Sheikh Fars city in Missan Governorate, Iraq. It is situated near the Iraq-Iran border at coordinates (E746239.862, N3551456.909), according to WGS-84 coordinate system Fig.2.

IMPORTANCE OF STUDY AREA

1. Hydrogeology and Hydrology Aspect

Hydrological properties of the study area have been derived from the records of water well sections. Mukdadya and Bai Hassan Formations contain the main upper aquifer in the area near the Iranian border, whereas Quaternary deposits represent the upper aquifer in the rest area. The surface layers of quaternary deposits characterized by impermeable strata reach to 10m. Therefore, the geological aquifers are usually found under this depth [11]. The dark yellow shade in Fig2 explain groundwater aquifers in the area.

Sheikh Fars city has been identified by the presence of a submerged dam known as the Dewerige dam. It's a gravity small dam with total storage capacity / 1,870,000m^3 [12]

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Fig.2 Site of study area

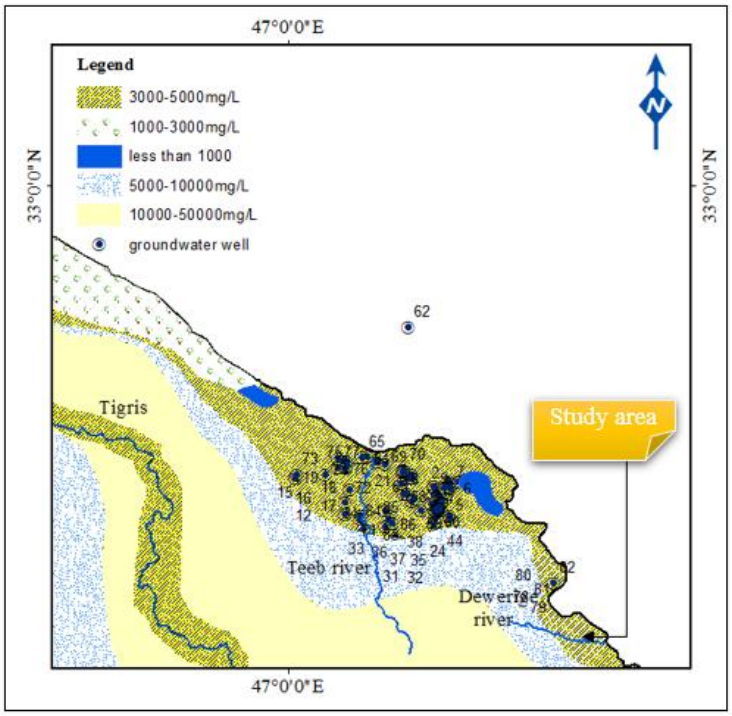

Fig.3 Hydrogeology of the study area

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2. Agricultural Aspect

Agriculture plays a vital role in local economy of the area, but on another side, its influence by social conditions [13]. Fig.3 has been derived from the agriculture map of Missan in 2022. This agricultural activity was irrigated by drilling a well. The annual rainfall average is various extremely between high altitude region (Hamrin Hill) and the low region. It ranges from (150mm-more 200mm). The study area characterized by a high rate of rainfall about 200mm or more [14].

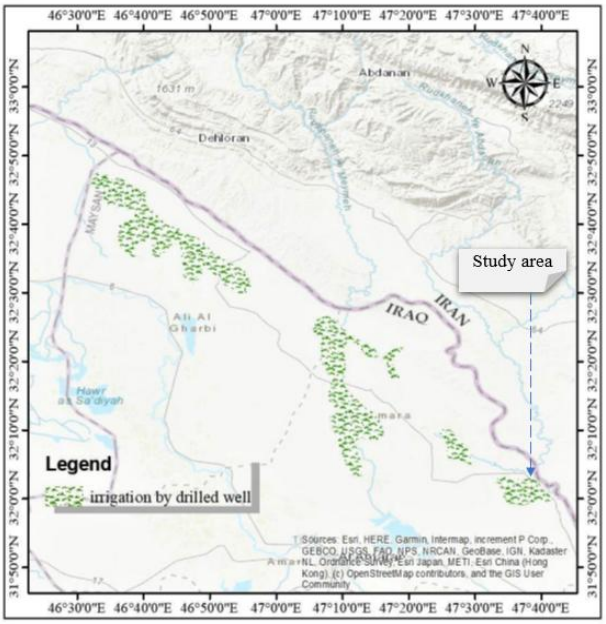

Fig.4 Agriculture land use map in the area at 2022

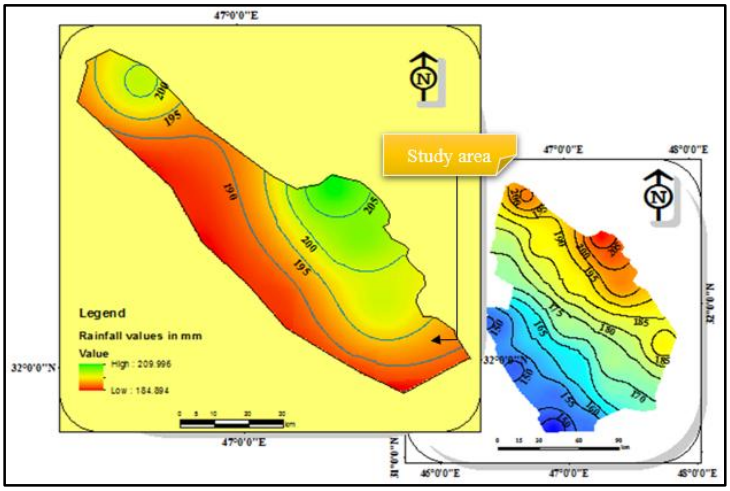

Fig.5 Distribution of Rainfall Values in Misan [15]

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METHODOLOGY

This study has been achieved according to analysis of the quantitative data. According to the general procedure of social sustainability detection Fig.6. The results of questionnaire survey (direct process) were analyzed using Likert scale approach.

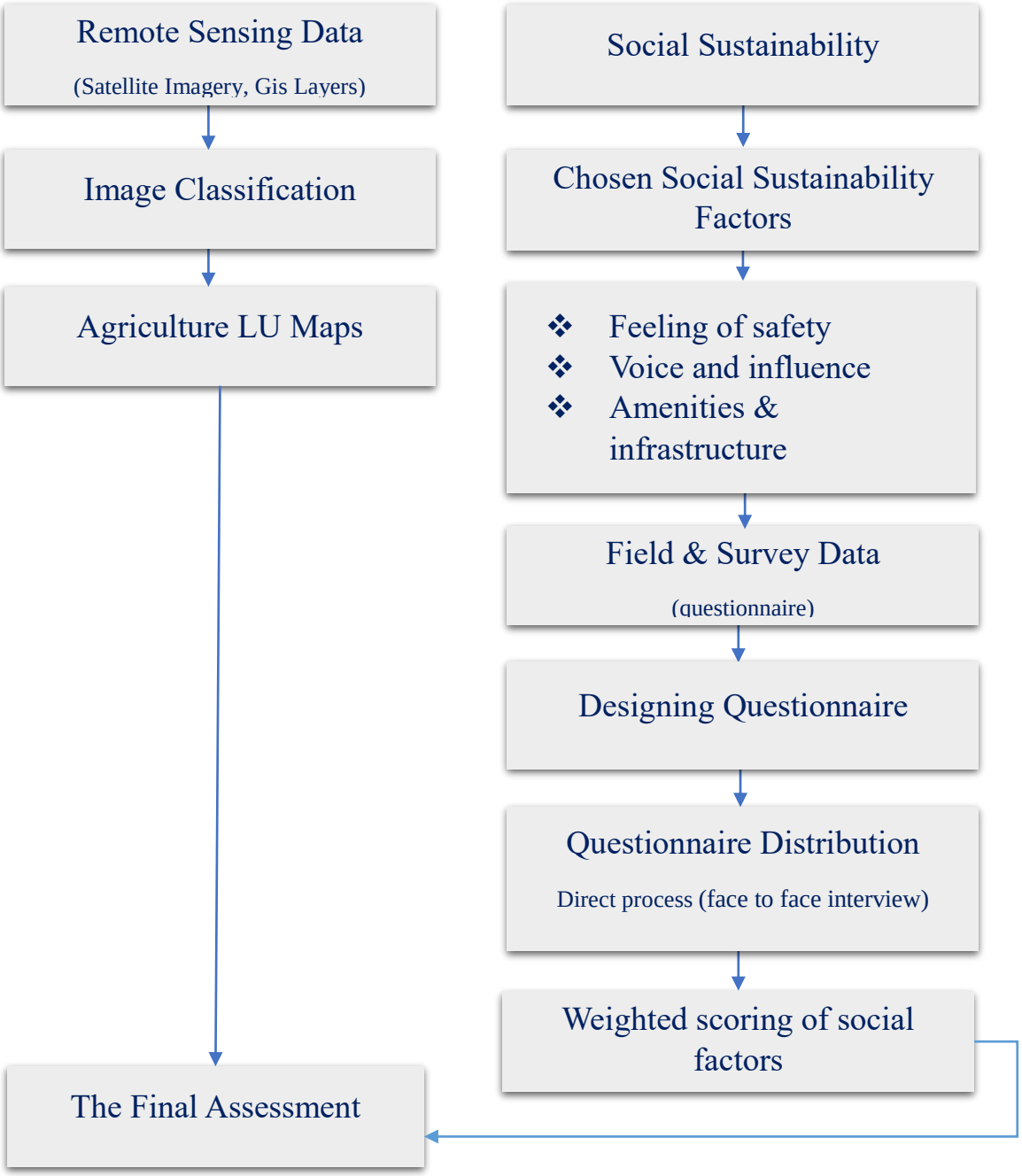

Fig.6 Methodology

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RESULTS

As previously mentioned, the main topics used in the questionnaire were derived from the general procedure of social sustainability detection chart. Therefore, the results of the study were summarized according to these topics as follows:

I. Social and culture life:

Feeling of safety: includes what is related to the feeling of safety for local residents, whether daily events or natural phenomena. It has been addressed as follows:

- **Flooding Risk**/ The area is exposed to frequent flash floods. That caused catastrophic losses to the residents Fig.6, especially after the failure of the Dewerige submersible dam.
- **Conflicts related to water scarcity/** Due to climate changes, the region, like other regions of Iraq, suffers from prolonged periods of drought [5]. The area depends mainly on rainwater, in addition to the seasonal Dewerige River [16]. Local residents confirmed that conflicts and problems frequently occur due to water scarcity, for irrigation and livestock. Fig.7.

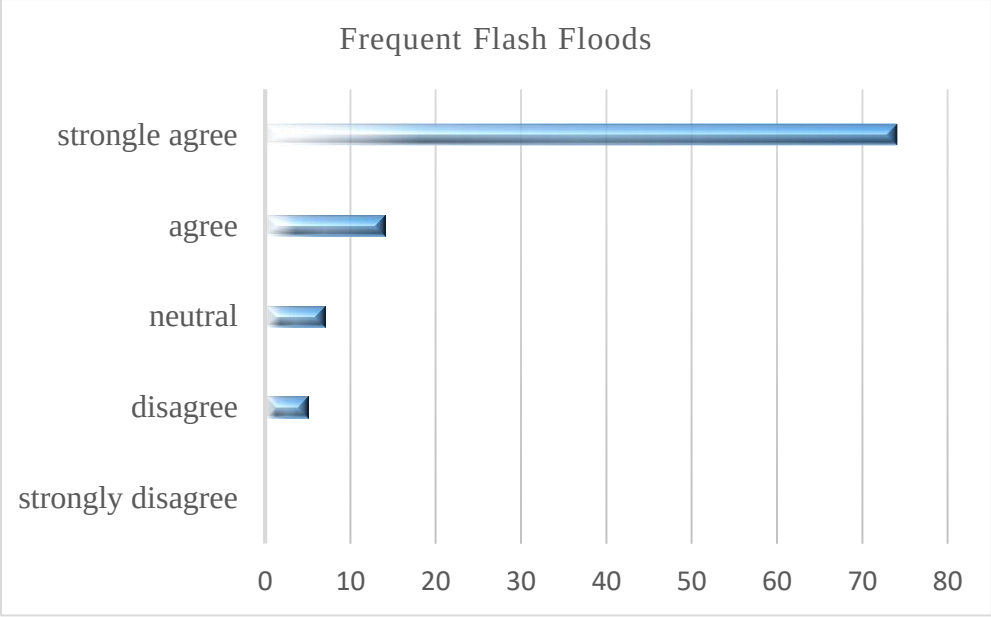

Fig. 6 Estimation of flooding risk

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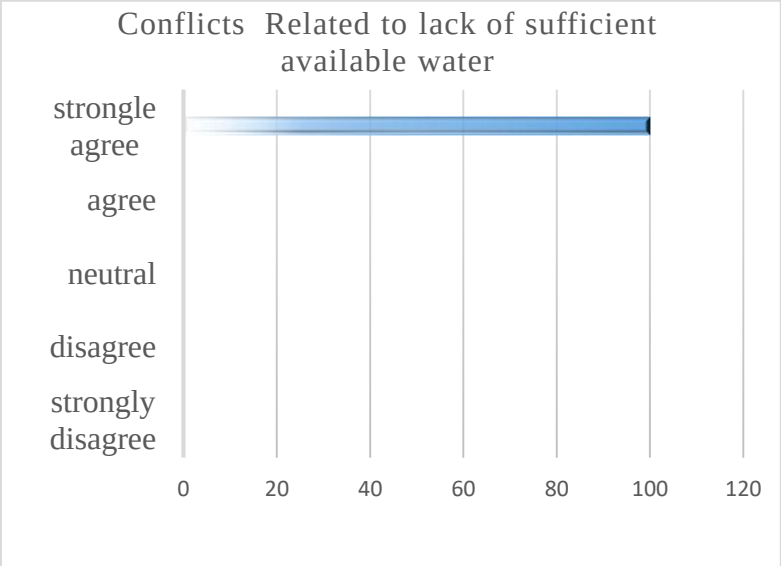

Fig. 7 Estimation of conflicts

II.Voice and influence

Decision making: Residents have expressed their willingness to contribute to any project that activates the agriculture in the area. The local authorities did not meet with residents to seriously discuss the water crisis, offer solutions, or listen to proposals Fig.8.

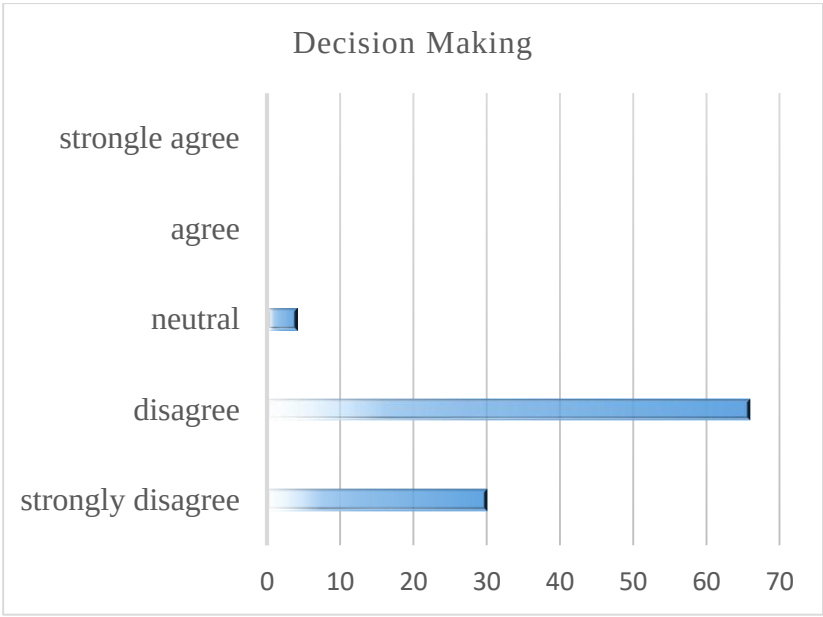

Fig. 8 Evaluation of Decision making

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III. Amenities & infrastructure

A. Transportation: The Feedback on the road network and available public transportation Fig.9.

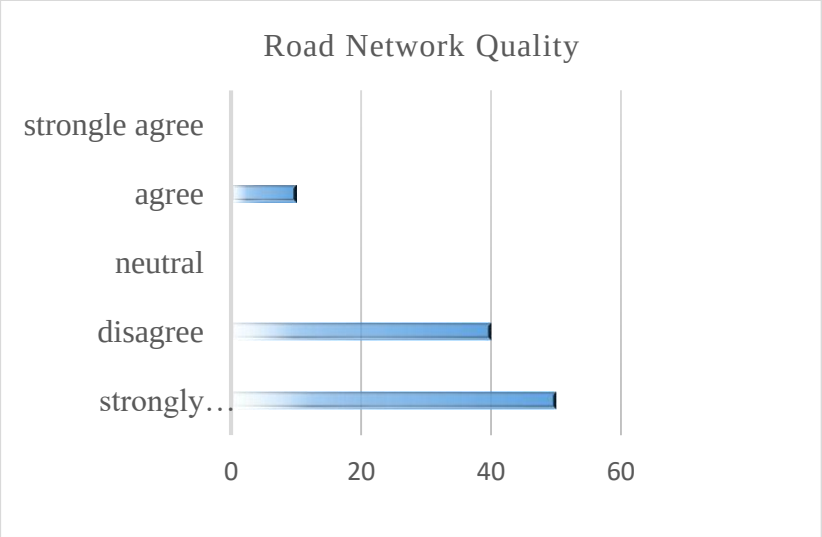

Fig. 9 Transportation

B. Use the sport and health service: Health and youth centres are important components of cities [17]. The area suffers from insufficient and low-quality health care. Also, there are not any sport center or youth activities. The resident's opinion on this point is explained in Fig.10.

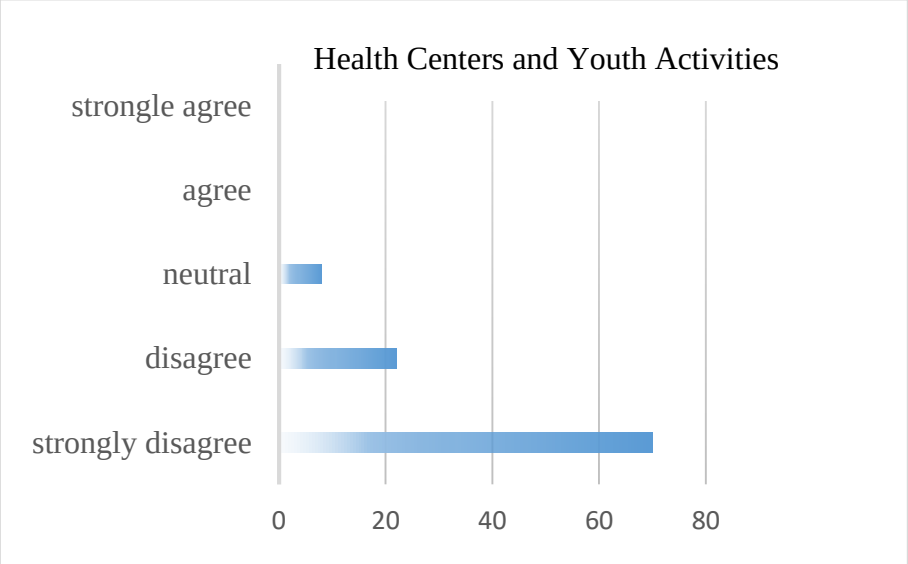

Fig. 10 Availability of health centres and youth activities

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DISCUSSION

The study based on the three major components of social sustainability such as "social and cultural life, voice and influence, amenities and infrastructure [18]. These components which are used to create the questionnaire (direct process) as following:

- Feeling of safety parameter in the Social and cultural life component, is threatened by flooding risk (Dewerige River) [19]. Ther residents pointed to the annual damages that their agricultural lands are exposed to due to floodings coming from Iran. In the same way, the conflicts that are related to water scarcity is constantly threatening their security.
- Voice and influence are necessary when considering social sustainability, which also affects governance. Also, social sustainability can be influenced by the community due to its participation in democratic issues [20]. The responses to the questionnaire in this aspect were ensure on the complete exclusion of the role of residents.

The questions of amenities and infrastructure focused on transportation, health services and sports. The transportation described as low quality of the road network, and there are no public transportation services in the area. The residents highlight poorly health services and contaminated water as well as a lack of designated centers to manage

Conflict of interests

Authors declare that they don't have any conflict of interests.

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الخلاصة

المقدمة:

تلعب الاستدامة الاجتماعية دورًا مهمًا في الإطار المستدام بأكمله. ويمكن وصفها بعدة طرق، مثل: قدرة المدينة على الاستمرار في العمل كبيئة قابلة للتطبيق على المدى الطويل للتفاعل الاجتماعي والتواصل والتنمية الثقافية. وفي الوقت نفسه، فهي جانب من جوانب الاستدامة غالبًا ما يتم تجاهله. حيث ينصب التركيز فقط على الجوانب الاقتصادية والبيئية.

طرق العمل:

تتناول هذه الدراسة تقدير الاستدامة الاجتماعية باستخدام تقنيات الاستشعار عن بعد والمسح. تركز الدراسة على منطقة الشيخ فارس، التي تقع في شرق ميسان، نظرًا لأهميتها الاقتصادية. تفترض فرضية البحث أن مدينة الشيخ فارس تتمتع باستدامة اجتماعية جيدة وفقًا لأهميتها.

النتائج:

تم تحليل نتائج مسح الاستبيان (العملية المباشرة) للبيانات التي تم جمعها (مقابلة وجهاً لوجه) للسكان باستخدام نهج مقياس ليكرت. أشارت النتائج إلى أن منطقة الدراسة تصنف على أنها منطقة ذات استدامة اجتماعية ضعيف. وكذلك المناطق المجاورة لها، حيث أنها تتمتع بنفس خصائص المنطقة.

الإستنتاجات:

في الختام، تُضعف هذه الدراسة الفرضية الأولى، مُشيرةً إلى أن منطقة الشيخ فارس غير مُستدامة اجتماعيًا، بغض النظر عن أهميتها الاقتصادية. وتُظهر النتائج فجوةً كبيرةً بين الأداء الاقتصادي والاجتماعي، مما يُؤكد أهمية دمج التقييمات الاجتماعية المباشرة في خطط التنمية المستدامة.

الكلمات المفتاحية:

الاستشعار عن بعد، الاستدامة الاجتماعية، الشيخ فارس، تقنيات المسح، الحياة الثقافية، الاستبيان.