

## Examining the weaknesses, strengths, threats and opportunities of Shulabad watershed in Lorestan Province to provide management solutions

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### ARTICLE INFO

#### Article history:

Received: 18 November 2024

Accepted: 10 February 2025

Available online: 30 June 2025

#### Keywords:

Comprehensive management

Delphi technique

Stockholders

SWOT framework

### ABSTRACT

The purpose of this research is to examine the weaknesses, strengths, threats and opportunities in the Shulabad Watershed, which will be a prelude to determining comprehensive management strategies. An examination was conducted on the key sources of income and economic status of watershed residents, and the most significant environmental challenges stemming from existing economic activities were identified. Subsequently, the SWOT framework was utilized for strategy identification. A Likert five-point spectrum questionnaire, completed by two groups comprising experts and local communities, was employed to gauge the relative weights of internal and external factors. The Delphi technique was employed to ascertain the relative weights of these factors. Considering these factors, strategies were devised for achieving management objectives by pairing each internal and external factor. The reliability of the questionnaires was calculated using Cronbach's alpha method of 0.89. The existence of lands prone to garden development and the conversion of low yielding rainfed lands to gardens with a rating of 0.253 were recognized as the most important components of strengths. Traditional animal husbandry, the imbalance between livestock and the capacity of pastures in the region, and excessive density of livestock in pastures were selected as the most important weaknesses with a rank of 0.25. The tendency of non-native people to invest was recognized as the most important component of opportunity with a rank of 0.215. Partiality and non-implementation of the land preparation program was selected as the most important threat in this watershed with a rating of 0.301. The stockholders of Shulabad Watershed have a desire to create gardens instead of rainfed cultivation with very low efficiency, so it is necessary to provide facilities and educational and promotion programs in order to expand this importance. Reverse migration can be provided by helping alternative livelihoods, especially the development of gardens and tourism.



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### Highlights

- Land suitable for orchards is a key strength for Shulabad Watershed.
- Overgrazing and livestock imbalance degrade Shulabad's environment.
- Non-native investment offers economic growth for Shulabad.
- Poor land management threatens Shulabad's sustainable development.
- Tourism potential in Shulabad is high but lacks promotion.

### 1. Introduction

The essence of management should be accompanied by comprehensiveness and integration. However, the concept of comprehensive or integrated watershed management

emerged due to the separate management of resources within watersheds (sectoral management) and the resulting environmental hazards, as well as the decline in ecosystem services due to the disruption of watershed health (Reed et

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<https://doi.org/10.22034/jelsa.2025.475987.1083>

al., 2009; Mirchi et al., 2010). Considering the natural, economic, and social conditions governing Iran's watersheds, there is a strong need to adopt and implement this model. The necessity of implementing different levels of management and planning, as well as adopting a "strategy" (which represents the highest level), in the country's watersheds requires a long-term "attitude" toward the "allocation" of resources and "scientific (Karimi Sangchini et al., 2017). Integrated watershed management has been proposed as a new paradigm for managing natural resources, emphasizing the socio-economic characteristics of the region to sustain livelihoods without vulnerability to essential resources and to enhance the well-being of the residents in these areas (Lee and Chung, 2007; McDuff et al., 2008; Ratha and Agrawal, 2015). The overarching goal of comprehensive watershed management is to develop sustainable rural livelihoods based on the integrated management of natural resources, with the active participation of all stakeholders (Promburom, 2010; Thapa et al., 2022). Integrated watershed management is presented as both a new concept and a fresh approach to planning and development concerning water, soil, and vegetation management, with special emphasis on economic, social, and environmental issues, seeking to create collaborative solutions within these domains. The foundational philosophy of watershed management advocates for a comprehensive, integrated approach to natural resource management. The purpose of this approach is to foster integration and coordination in managing the natural and social resources of watersheds through people-oriented programs (Gleick, 2003; Pahl-Wostl, 2009; Mutekanga, 2012; Yavuz and Baycan, 2014).

The application of the SWOT model is extensive, serving as a conceptual framework for system analysis. It allows for the examination of factors and the comparison of bottlenecks, threats, detrimental aspects, opportunities, demands, and conditions of the external environment while assessing the strengths and weaknesses of a strategy (Ebener and Smith, 2015; Azubuike et al., 2018; Mallick et al., 2020). Within this model, weaknesses, opportunities, and threats are categorized and discussed, leading to the formulation of strategies based on these factors (Marsall, 2006; Wheelen and Hunger, 2017; Grant, 2019; Patel et al., 2022). Specifically, SWOT is an acronym representing strengths, weaknesses, opportunities, and threats. SWOT analysis is a widely utilized tool for simultaneously analyzing internal and external environments, thereby determining a systematic approach for decision-making (Yuksel and Dagdeviren, 2007; Helms and Nixon, 2010; Shahba et al., 2017). This model aims to provide possible strategies by quantifying internal factors (weaknesses and strengths) and external factors (opportunities and threats) as well as the interaction between these factors (Nikolaou and Evangelinos, 2010; David, 2015; Sarsby, 2016). SWOT analysis systematically identifies factors that should best align with the strategy. The rationale behind this approach is that an effective strategy should maximize the system's strengths and opportunities while minimizing its weaknesses and threats. When applied correctly, this logic yields favorable outcomes for the selection and

design of an effective strategy (Yavuz and Baycan, 2013; Bakalár et al., 2021; Nasiri Khiavi et al., 2024). Effective planning for the proper management of an execution plan necessitates a comprehensive understanding of issues, problems, and challenges, on one hand, and strengths and opportunities on the other. Thus, internal and external factors, including challenges and impediments, as well as potentials and opportunities, should be investigated to determine optimal strategies. Among the various models and methods available for strategic management and planning, the SWOT matrix method is regarded as one of the most common approaches for strategy formulation (Pahl and Richter, 2009; Giusti et al., 2016; Bassi et al., 2024). One of the critical steps in implementing integrated watershed management strategies is the determination and compilation of these strategies. Various methods and models are available for this purpose, each encompassing its own concepts, insights, and specific techniques. Among them, the SWOT model, which evaluates strengths, weaknesses, opportunities, and threats of the system, has gained widespread recognition. Today, this method is employed by designers to assess strategy as a contemporary tool for performance analysis and strategy formulation (Wickramasinghe, 2009; Heshmati et al., 2022). Consequently, the SWOT model is an effective group decision-making tool designed for establishing long-term or short-term strategies and informing critical decisions regarding various issues. This model can be applied to an organization or company, or it can focus on a particular geographical area or issue that is of relevance to us. The primary objective of this model is to develop strategies that enhance efficiency or improve situations (Kurttala, 2000; Policastro, 2001; Savari et al., 2022).

Designing a comprehensive watershed management model for the Shulabad Watershed is crucial in light of climate change, water resource depletion, droughts, floods, deforestation, and the degradation of forests and pastures. This model should encompass components and elements that comprehensively address watershed management while utilizing innovative and effective tools for conserving and efficiently utilizing natural resources (Lee and Chung, 2007; Gleick, 1998; Sanchez et al., 2014). Some of the components that should be considered in the comprehensive watershed management model for the Shulabad Watershed include: Analysis of the Current Situation: A thorough assessment of the current status of the watershed, including water resources, soil, forests, pastures, economic and social conditions, and the impacts of climate change. Identification and Analysis of Problems and Challenges (Worden, 2024): Assessing the primary issues in the watershed, such as water resource depletion, deforestation, and the impacts of floods and droughts. Setting Priorities and Objectives: Determining strategic priorities and management goals, including the preservation of water and soil resources, flood and drought control, and promoting sustainable development and utilization of forests and pastures (Karimi Sangchini et al., 2022). Formulating Strategies and Operational Plans: Developing strategies and operational plans to achieve management objectives, including the adoption of

innovative technologies, promotion of sustainable agriculture, and encouragement of green economic development. The Shulabad watershed faces numerous challenges related to soil erosion and susceptibility to flooding. The steep slopes of this mountainous region, combined with extensive grazing practices, have exacerbated the problems associated with this watershed. Alongside these challenges, the area possesses significant development potential in terms of tourism, owing to its rich natural and geological features, which are conducive to ecotourism and geotourism. The presence of the Chakan Waterfall and mountain ranges with elevations exceeding 4,000 meters can create opportunities for the development of this industry. Therefore, the purpose of this research is to assess the weaknesses, strengths, threats, and opportunities in the Shulabad Watershed, which will lay the groundwork for determining comprehensive management strategies.

## 2. Materials and Methods

### 2.1. The study area

The Shulabad Watershed is located between 33° 15' to 43° 52' N and 48° 04' to 48° 46' E. This watershed constitutes in the upstream areas of the Karun River basin, originating from the Persian Gulf and the Oman Sea sub-basins. The area of the Shulabad Watershed is 5,484 square kilometers, classified as a medium-sized basin. The average elevation of the entire study area is 2,495 meters above sea level. The average slope of the Shulabad Watershed is estimated at 9.53 percent, indicating a steep terrain. The average annual precipitation, based on the correlation between precipitation and elevation, is approximately 835.2 millimeters. About 262 millimeters, or approximately 31.41 percent of the total annual precipitation, falls as snow in this watershed. Roughly, 46 percent of the study area comprises rocky terrain, while approximately 35 percent is covered by sparse forests with medium density.

### 2.2. The SWOT Framework

The SWOT framework is a strategic analysis tool used to evaluate the internal (Strengths and Weaknesses) and external (Opportunities and Threats) factors of an organization or situation. Typically employed in the strategic planning process, this tool assists managers in making informed decisions based on a comprehensive analysis of the internal and external environment of the organization (Pahl and Richter, 2009; Azubuike et al., 2018). In the context of integrated watershed management, this framework serves as a valuable tool for assessing the current and future status of watersheds and water resource management. Specifically (Kangas et al., 2001; Ebener and Smith, 2015): Strengths: These encompass the characteristics, resources, and activities existing within the watershed that have the potential to create a competitive advantage for watershed management. For instance, abundant water resources, advanced technologies in water resource management, and strong collaboration with local communities and other relevant institutions. Weaknesses: These include limitations, weaknesses, and deficiencies

present in the current watershed management. For example, declining water resources due to deforestation, challenges in water and wastewater management, and lack of coordination among stakeholders in watershed issues. Opportunities: These consist of trends, environmental changes, and opportunities available for improving the watershed situation. For instance, increasing attention to environmental conservation and sustainable development, growing international cooperation in water resource management. Threats: These encompass external factors such as competition, changes in laws and regulations, and other threats to watershed management. For example, decreasing water resources due to climate change competition for access to water resources, and conflicts in differing water use needs (Kurttila et al., 2000; Sarsby, 2016). Through the utilization of SWOT analysis, managers can develop strategies that capitalize on strengths to exploit opportunities, while also addressing weaknesses and threats to prepare plans for problem-solving and future threat mitigation (Pahl and Richter, 2009; Sarsby, 2016; Bassi et al., 2024).

### 2.3. Water quality index based on industrial uses

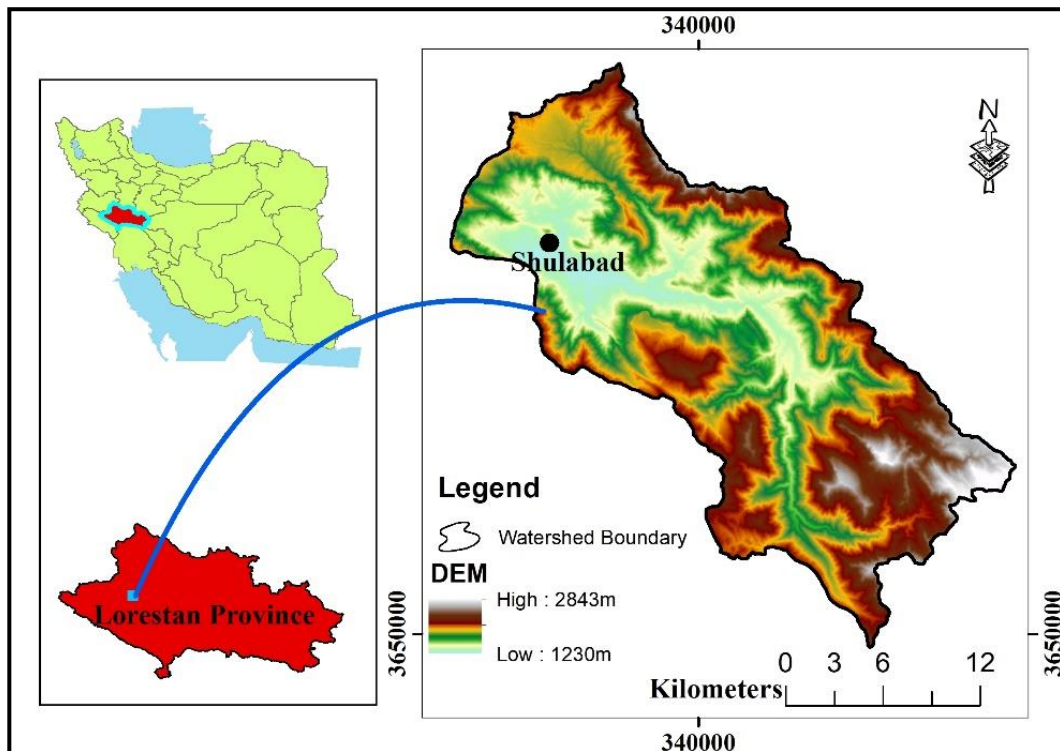
This study employed a research methodology that integrates library research, resource analysis, and interviews conducted via questionnaires to propose strategic frameworks for comprehensive watershed management in the Shulabad region. Initially, the Delphi method was utilized to identify factors influencing comprehensive watershed management. Subsequently, these factors were prioritized through questionnaires administered to a team of experts (Fabbri, 1998; Chang et al., 2010; Ruiz et al., 2012; Karimi Sangchini et al., 2022; Kibria et al., 2024). The Delphi method, originally developed for systematic prediction and interactive communication, relies on expert consensus and is predominantly employed in futures studies to uncover innovative and reliable ideas or to provide relevant information for decision-making (Wickramasinghe et al., 2009; Karimi Sangchini et al., 2017; Worden et al., 2024). The sample comprised 27 individuals, including experts and academic scholars, to determine the components of the SWOT model in the Shulabad Watershed area. Insights were gathered from university professors in Lorestan and personnel from the Research and Education Center for Agriculture and Natural Resources of Lorestan Province, alongside officials from the Agricultural Jihad and Natural Resources departments of Shulabad City, and watershed operators. In the final stage, in addition to identifying significant factors within each of the strength, weakness, opportunity, and threat criteria, requisite management strategies were defined based on the contextual specifics of Lorestan Province through SWOT analysis. SWOT analysis involves evaluating both internal factors (strengths and weaknesses) and external factors (opportunities and threats) pertinent to the subject under study. Strengths are characteristics that facilitate the achievement of organizational goals, while weaknesses are attributes that hinder goal attainment (Heshmati et al., 2022). Opportunities encompass external environmental

conditions that can positively impact goal achievement, whereas threats denote external environmental conditions that can impede goal attainment (Nasiri Khiavi et al., 2024). The strategies resulting from the SWOT analysis are presented in Table 1. To prioritize weaknesses, strengths,

opportunities, and threats, it is essential not only to consider the weights obtained during the survey process from experts but also to assess the weight of each item within each criterion in relation to other items across different criteria (Kibria et al., 2024).

**Table 1. Comparative SWOT matrix for strategy development (Policastro, 2001)**

Internal factors	External factors		
	Strength	Opportunity	Threats
	Weakness	Offensive strategy Competitive Strategy	Conservative strategy Defensive Strategy



**Figure 1. Location Shulabad Watershed in Lorestan Province and Iran**

### 3. Results and discussion

The reliability of the questionnaires, considered as the trustworthiness of the measurement tool, was calculated using the Cronbach's alpha method, resulting in a coefficient of 0.89. This indicates that the questionnaires employed in this study exhibited appropriate reliability. The results obtained from expert surveys, involving experts, specialists, and stakeholders in the Shulabad Watershed area, regarding the strengths, weaknesses, opportunities, and threats facing comprehensive watershed management, were derived from the questionnaires. For ranking purposes, each criterion was assigned a position ranging from 1 to 4 based on its respective weight within one of the categories. The criteria for effectiveness included: The impact of threats on exacerbating weaknesses and hindering opportunities. The influence of weaknesses on exacerbating threats and failing to leverage strengths and opportunities. The effect of strengths on leveraging opportunities, reducing weaknesses, and addressing threats. The effect of capitalizing on opportunities to enhance strengths, mitigate weaknesses, and address threats (Savari and Shokati Amghani, 2022).

Subsequently, the average score of each criterion (derived from expert evaluation) was divided by the total scores of the criteria for internal factors (weaknesses and strengths) to calculate the importance coefficient of each criterion relative to the total. The same methodology was applied to external factors (opportunities and threats). Multiplying the importance coefficient by the rank of each criterion yielded the final score for that criterion. This approach facilitates consensus among experts on the criteria and serves as the foundation for designing and implementing strategies for comprehensive watershed management. These strategies are formulated based on a comprehensive matrix juxtaposing internal factors (weaknesses and strengths) against external factors (opportunities and threats (Shahba et al., 2017). In the next step, the average score of each item (resulting from the experts' survey) was divided by the total scores of the internal factors (weaknesses and strengths) to obtain the importance coefficient of each item as a ratio of the total (see Table 2). The same procedure was applied to the external factors (opportunities and threats). By multiplying the importance coefficient by the impact rating of each item, the final score for that item was calculated

(see Table 3). This methodology allows for an understanding of the consensus among experts regarding the issues and establishes the cornerstone for the design and formulation of comprehensive management strategies for the Shulabad Watershed. To develop these strategies, the list of internal factors (weaknesses and strengths) was juxtaposed against the list of external factors (opportunities and threats) in a large matrix to address related issues. Table 4 displays the top items in each component. The ST

area focuses on addressing upcoming threats and transforming threats into opportunities. The WT zone represents a fallback or reduction strategy aimed at decreasing the level of debilitating activities. The SO region emphasizes developmental strategies that prioritize strengths and opportunities. Finally, the WO area suggests that, based on the identified weaknesses and available opportunities, activities should shift from weaknesses toward opportunities.

**Table 2. Results of the Internal Factors Evaluation (IFE) Matrix for Shulabad Watershed**

Row	Component Type	Criteria List	Mean Importance	Adjusted Importance	Criterion Rank	Final Importance
1	Strengths	Adequate mountainous rainfall and abundant water resources in the watershed	4.80	0.062	2	0.123
2		Potential for alternative livelihoods (medicinal and industrial plants, beekeeping, and aquaculture development)	4.53	0.058	4	0.233
3		Availability of skilled human labor	3.40	0.044	1	0.044
4		Social acceptance and feasibility of implementing natural resource rehabilitation and restoration programs	3.53	0.045	2	0.091
5		Ecotourism and geotourism attractions	4.60	0.059	4	0.236
6		Potential for renewable energy production (solar and wind)	2.87	0.037	3	0.110
7		Livestock activities, livestock products, and expansion of livestock and aquaculture	4.60	0.059	3	0.177
8		Availability of suitable land for horticultural development and conversion of low-yield rainfed lands to orchards	4.93	0.063	4	0.253
1	Weaknesses	Distance from provincial and county centers and limited infrastructure development	5.00	0.064	3	0.192
2		Proliferation of smallholder ownership in agriculture, lack of appropriate cultivation patterns, and weakness in cooperative and group participation	4.93	0.063	3	0.190
3		Poverty, unemployment, and rural migration	4.47	0.057	3	0.172

**Table 2. (Continued)**

Row	Component Type	Criteria List	Mean Importance	Adjusted Importance	Criterion Rank	Final Importance	
4		Excessive dependence of household livelihoods on natural resources	3.27	0.042	2	0.084	
5		Lack of technical knowledge among operators in the cultivation and propagation of seedlings and fruit trees, cultivation of medicinal plants, and pest control	4.33	0.056	1	0.056	
6		Deforestation, rangeland degradation, and land use change from forest and rangeland to agriculture	4.20	0.054	3	0.162	
7		Severe cold in winter and lack of adequate tourism facilities in cold months	4.27	0.055	2	0.109	
8		Traditional animal husbandry and imbalance between livestock and rangeland capacity in the area, excessive livestock density in rangelands	4.87	0.062	4	0.250	
9		Non-compliance with the timing of livestock entry and exit to rangelands	4.73	0.061	2	0.121	
10		Biophysical obstacles or environmental hazards (rough and impassable topography, avalanche risk, erosion, floods, mass and debris flows, riverbank erosion)	4.60	0.059	3	0.177	
Total Score		If the table is to span more than one page, it must have a title on every page.		77.93	1	49	2.780

**Table 3. Results of the External Factors Evaluation (EFE) Matrix for Shulabad Watershed**

Row	Component Type	Criteria List	Mean Importance	Adjusted Importance	Criterion Rank	Final Importance
1	Opportunities	Non-native individuals' inclination toward investment	3.33	0.054	4	0.215
2		Possibility of supportive reverse migration	2.40	0.039	3	0.116
3		Availability of low-interest facilities for livestock breeders and farmers	3.33	0.054	3	0.161
4		Introduction of watershed tourism attractions to attract tourists and even international tourists	2.33	0.038	3	0.113
5		Capacity for the production of herbal products, proximity to major distillation and packaging factories of flowers and medicinal plants, such as workshops in Aligudarz and Mahallat	4.40	0.071	3	0.213
6		Seizing the opportunity to utilize graduates	3.47	0.056	2	0.112
1	Threats	Climate change impact (warming, evaporation, drought, flood, and desertification), reduction of biodiversity, and species extinction	4.67	0.075	3	0.226
2		Vulnerability of sales of products produced by farmers and gardeners to imports	3.93	0.063	2	0.127
3		Lack of pricing system for agricultural and livestock products	4.80	0.077	2	0.155

**Table 3. (Continued)**

Row	Component Type	Criteria List	Mean Importance	Adjusted Importance	Criterion Rank	Final Importance
4		Fragmented vision and failure to implement land improvement programs	4.67	0.075	4	0.301
5		Currency devaluation and the impact of inflation on the price of seeds, pesticides, and agricultural and livestock inputs	4.73	0.076	3	0.229
6		Spread of human, animal, and joint human-animal diseases from outside the watershed	4.13	0.067	1	0.067
7		Possibility of pests and plant diseases spreading from outside the watershed	3.33	0.054	1	0.054
8		Removal of government support in agriculture and incomplete coverage of agricultural and livestock product damages	4.20	0.068	3	0.203
9		Attraction of surrounding city migration	3.40	0.055	4	0.219
10		Passage of nomads outside the watershed and severe rangeland degradation	4.93	0.079	3	0.238
Total Score			62.07	1	44	2.747

**Table 4. Top Indicators in Each Component of the SWOT Model for the Shulabad Watershed**

Rank	Strengths	Rank	Weaknesses
1	Existence of suitable lands for agricultural development and conversion of low-productivity rainfed lands into orchards	1	Traditional animal husbandry and imbalance between livestock and rangeland capacity in the area, excessive grazing pressure on rangelands
2	Ecotourism and geotourism attractions	2	Distance from provincial and county centers and inadequate infrastructure development
3	Potential for alternative livelihoods (medicinal and industrial plants, beekeeping, and aquaculture development)	3	Spread of small-scale ownership in the agricultural sector, lack of appropriate cultivation patterns, and weakness in cooperatives and group participation
4	Existence of livestock activities and products, and aquaculture development	4	Biophysical obstacles or environmental hazards (rough and impassable topography, risk of landslides, water erosion, floods, mass, and debris flows, and riverbank erosion)
Rank	Opportunities	Rank	Threats
1	Interest of non-native individuals in investment	1	Partial view and non-implementation of land improvement programs
2	Capacity to produce medicinal plants, proximity to important distillation and packaging factories of medicinal plants including workshops in the city of Aligudarz and districts	2	Migration of nomads outside the watershed and severe degradation of rangelands
3	Availability of low-interest facilities to livestock farmers and agriculturists	3	Decrease in the value of the national currency and the impact of inflation on the price of seeds, pesticides, and agricultural and livestock inputs
4	Possibility of reverse migration support	4	Climate change effects (warming, evaporation, drought, floods, and desertification) leading to reduced biodiversity and species extinction

The researches of Bakalár et al. (2021) and Nasiri Khiavi et al. (2024) are also in this direction and they introduced the SWOT approach in the comprehensive management of water and soil resources. They also considered it important to use the opinions of local communities, experts and policymakers to formulate strengths, weaknesses, opportunities and threats.

The distance from provincial and county centers and limited infrastructure development with a weight of 192.0 has a very high effectiveness among weakness factors in the comprehensive management of the Shulabad Watershed. This is while the lack of technical knowledge among operators in planting and cultivating seedlings, fruit trees, medicinal plants, and combating plant diseases with a weight of 0.056 has very low effectiveness among weakness factors in the comprehensive management of the Shulabad Watershed. The main problem and weakness of the Shulabad Watershed is its distance from important population centers, which can lead to more problems. The

long distance from population centers, coupled with difficult access, results in low welfare facilities. Due to the low agricultural land area and the lack of dependence on agriculture, technical knowledge in planting, maintaining, and harvesting agricultural products has received low priority.

In the research of Reed et al. (2009), Sanchez et al. (2014), Karimi Sangchini et al. (2007) and Worden et al. (2024) people's participation has been emphasized. It should also be noted that future management plans for this mountainous watershed with steep slopes should be considered. Unfortunately, skilled labor in this area has migrated due to lack of employment, limited welfare facilities, and urban attractiveness, posing challenges in this regard. However, alternative livelihood support, especially the development of orchards and tourism, can facilitate reverse migration.

Among the opportunities, the factor of non-native individuals' inclination to invest with a weight of 0.215 has

very high effectiveness, while the factors of introducing attractions of the watershed for attracting tourists, and even cross-border tourists, with a final weight of 113.0 have the lowest importance. Due to the significant tourism attractions in this area and the abundant water potential, the inclination of non-native individuals to invest in tourism, aquaculture, and agriculture sectors is high, but unfortunately, there is a weakness in introducing tourist attractions, especially to foreign tourists. One of the reasons for the low investment in these areas is the lack of welfare facilities, appropriate access roads, and the difficult access to the watershed. Partial views and failure to implement land improvement programs among the factors studied in threats with a weight of 301.0 have the highest effectiveness. Also, the possibility of the spread of plant pests and diseases from outside the watershed with a weight of 0.054 has the lowest effectiveness among the threats to the comprehensive management of the Shulabad Watershed. A major problem in many watershed areas of the country in the current conditions is partial views and failure to implement land improvement programs, which is hoped to be resolved by passing the land improvement and integrated watershed management plan, shifting from a partial approach to a holistic and systemic approach. In the researches of Thapa et al. (2022), Yavuz and Baycan, (2013), Karimi Sangchini et al. (2022) and Nasiri Khiavi et al. (2024) a comprehensive approach in watershed management is mentioned.

#### 4. Conclusion

This study has been conducted to find the weaknesses, strengths, threats and opportunities of the Shulabad watershed, with the ultimate goal of achieving a comprehensive management of this watershed. To implement this objective, co-management approach and stakeholders' opinions were used to gather strengths (S), weaknesses (W), opportunities (O) and threats (T). In this regard, semi-structured interviews with local stakeholders, technical experts and policy makers were conducted to collect and formulate strengths, weaknesses, opportunities and threats, briefly known as SWOT.

Analysis of the identified strengths factors in the comprehensive management of the Shulabad Watershed shows that the presence of land suitable for horticultural development and the conversion of low-productivity rainfed lands to orchards with a weight of 0.25 has a higher effectiveness and importance among other factors. Also, the presence of skilled human resources in Shulabad Watershed with a weight of 0.4 has very low effectiveness and importance. This indicates that the stakeholders in the Shulabad Watershed prefer to establish orchards instead of low-yield rainfed cultivation, which requires facilitation and promotion programs to expand this initiative.

The problems of the watershed in terms of forest and pasture destruction, including traditional animal husbandry and imbalance between livestock and pasture capacity, excessive livestock density in pastures, premature grazing, excessive dependence of operators on natural resources, the passage of external nomads, and severe destruction of pastures provide grounds for proposing this strategy.

Unfortunately, the lack of human resources for the protection and restoration of forests and pastures in this watershed is evident. It is recommended to prioritize the employment of human resources and engage community participation. The strategy of water and soil conservation measures and farm management can be considered as a defensive strategy (WT). This strategy, considering the biophysical obstacles or environmental hazards (including rough and impassable topography, risk of avalanches, water erosion, floods, mass movements, and riverbank erosion) in the Shulabad Watershed and the presence of steep and heavily eroded agricultural lands, is proposed. Allocating appropriate facilities for the development of mechanized agriculture and terracing steep lands is suggested.

#### Acknowledgements

This article is taken from a part of the results of a research project with the approved code 01-29-29-034-010953 in the Agricultural Research, Education and Extension Organization and from the respected officials of the SCWMRI, and Lorestan Agricultural and Natural Resources Research and Education Center.

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