



Community Strategies in agricultural heritage in desert-prone Area

الاستراتيجيات المجتمعية في التراث الزراعي في المناطق المعرضة للصحراء

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Abstract

This study explores the integration of heritage-based economic activities and political institutions within the agricultural heritage system of desert areas, with the aim of preserving cultural identity and sustainable agricultural practices. By examining the role of both formal and informal institutions, this research elucidates the ways in which cultural values, cash economics, and governance contribute to sustainable development and resilience. The focus of this investigation is on the livelihoods of desert heritage farmers and their engagement with institutions in Siwa Oasis villages situated in the Western Desert of Egypt.

The findings reveal that Siwan communities encounter various challenges, including uncertain access to land tenure, limited availability of services, and strong social support networks. Involvement with formal institutions, such as state departments, non-governmental organizations, and market-based entities, is relatively limited, with men predominantly occupying formal employment positions in the private and government sectors. Owing to the remote location of Siwa, access to formal institutions and markets is restricted, leading to a higher reliance on informal institutions. Among these, women's groups have emerged as crucial informal institutions that provide social support and engage in minor economic activities.

Key livelihood assets, including customary land tenure, agricultural heritage systems, and perennial gardens, have been identified as fundamental to the well-being of Siwan communities. This research underscores the significance of informal community

and culturally-based social protection systems in successful development activities within the agricultural heritage system. This study contributes to the literature by shedding light on the complex interplay between heritage-based economic activities and formal institutions in desert areas and the need for a comprehensive approach that recognizes the importance of integrating formal and informal institutions to enhance the resilience of heritage farmers. The findings offer valuable insights for policymakers and researchers working towards the preservation of cultural heritage, sustainable agricultural practices in similar contexts.

Keywords: heritage-based economic activities, political institutions, sustainable development, cultural identity, desert-prone areas.

المستخلص:

تبحث هذه الدراسة في دمج الأنشطة الاقتصادية التراثية والمؤسسات السياسية ضمن منظومة التراث الزراعي للمناطق الصحراوية، بهدف الحفاظ على الهوية الثقافية والممارسات الزراعية المستدامة. ومن خلال دراسة دور المؤسسات الرسمية وغير الرسمية، يوضح هذا البحث الطرق التي تساهم بها القيم الثقافية والاقتصاد النقدي والحوكمة في التنمية المستدامة والقدرة على الصمود. يركز هذا البحث على سبل عيش مزارعي التراث الصحراوي وتفاعلهم مع المؤسسات في قرى واحة سيوة الواقعة في الصحراء الغربية في مصر.

تكشف النتائج أن مجتمعات سيوان تواجه تحديات مختلفة، بما في ذلك عدم اليقين في الوصول إلى حيازة الأراضي، ومحدودية توافر الخدمات، وشبكات الدعم الاجتماعي القوية. إن المشاركة في المؤسسات الرسمية، مثل إدارات الدولة والمنظمات غير الحكومية والكيانات القائمة على السوق، محدودة نسبيًا، حيث يشغل الرجال في الغالب مناصب وظيفية رسمية في القطاعين الخاص والحكومي. ونظرًا لموقع سيوة النائي، فإن الوصول إلى المؤسسات والأسواق الرسمية مقيد، مما يؤدي إلى زيادة الاعتماد على المؤسسات غير الرسمية. ومن بين هذه المجموعات، برزت المجموعات النسائية كمؤسسات غير رسمية بالغة الأهمية توفر الدعم الاجتماعي وتشارك في أنشطة اقتصادية صغيرة.

تم تحديد أصول سبل العيش الرئيسية، بما في ذلك حيازة الأراضي العرفية، وأنظمة التراث الزراعي، والحدائق المعمرة، باعتبارها أساسية لرفاهية مجتمعات سيوان. يؤكد هذا البحث على أهمية المجتمع غير الرسمي وأنظمة الحماية الاجتماعية القائمة على الثقافة في أنشطة التنمية الناجحة ضمن نظام التراث الزراعي. تساهم هذه الدراسة في الأدبيات من خلال تسليط الضوء على التفاعل المعقد بين الأنشطة الاقتصادية القائمة على التراث والمؤسسات الرسمية في المناطق الصحراوية والحاجة إلى نهج شامل يدرك أهمية دمج المؤسسات الرسمية وغير الرسمية لتعزيز مرونة مزارعي

التراث. تقدم النتائج رؤى قيمة لصانعي السياسات والباحثين الذين يعملون من أجل الحفاظ على التراث الثقافي والممارسات الزراعية المستدامة في سياقات مماثلة.

الكلمات المفتاحية: الأنشطة الاقتصادية المرتكزة على التراث، المؤسسات السياسية، التنمية المستدامة، الهوية الثقافية، المناطق المعرضة للتصحر.

1. Introduction

Development policies in desert communities of Egypt have prioritized improving livelihoods and economic accessibility (Alary et al., 2014; Shalaby et al., 2011). However, agriculture and cash cropping remain central to the livelihoods of desert communities, particularly in the Siwa Oasis region of the Western Desert (Alary et al., 2014). Siwa Oasis is characterized by agricultural heritage systems that blend traditional practices with sustainable land-use methods (García et al., 2020; Santoro et al., 2020). Nevertheless, the dynamic environment, including factors like population growth, limited land availability, and the pursuit of additional income, influences the livelihood activities and land management decisions of heritage farmers, raising concerns about the potential loss of traditional knowledge and the impact of globalization on agricultural heritage systems (Koohafkan & Altieri, 2016).

To address these challenges, this study focuses on exploring the livelihood strategies employed by heritage farmers in Siwa Oasis. Specifically, it examines the institutions in which farmers are engaged and the local institutional arrangements that either facilitate or hinder their capacity to respond and adapt to vulnerabilities in agricultural heritage sites. By understanding the factors that shape farming practices and livelihood strategies, this study aims to promote sustainable agriculture, conserve cultural heritage, and improve the well-being of the local community.

Siwan heritage gardens have historically utilized intercropping techniques and perennial multipurpose date trees to ensure food production (Nabhan, 2013). However, the changing context of Siwa Oasis, marked by population growth, limited land

availability, and the need for additional income, influences the farming practices and livelihood strategies of heritage farmers (Singh et al., 2016). The potential loss of traditional knowledge and the impact of globalization on agricultural heritage systems further highlight the need for research and understanding in this area (Koochafkan & Altieri, 2016).

In response to these challenges, this study seeks to explore the specific institutions in which heritage farmers are engaged and the local institutional arrangements that shape their capacity to respond and adapt to vulnerabilities within agricultural heritage sites. The findings will shed light on the distinct challenges and opportunities faced by heritage farmers in Siwa Oasis, with a focus on factors such as land tenure systems, cash income accessibility, and engagement with formal institutions and governance systems. Understanding these dynamics is crucial for promoting sustainable agriculture, conserving cultural heritage, and enhancing the well-being of the local community.

Examining vulnerability and resilience is vital in understanding the dynamics of desert oasis communities. Vulnerability refers to the uncertainty and susceptibility of communities in maintaining well-being amidst environmental changes (Scoones, 2015), while resilience represents the ability to effectively manage and reduce vulnerability by utilizing available assets to generate income, acquire food, and meet basic needs (Moser, 1998).

Siwan communities have demonstrated economic resilience by adapting to their surroundings and utilizing local resources and alternative strategies to sustain their livelihoods (Alary et al., 2014). Key to this resilience is the presence of customary land tenure systems, which provide vital resources and opportunities, including food security, housing, employment, social safety nets, and the preservation of cultural heritage (Keovilignavong & Suhardiman, 2020; Nara et al., 2021; Smith, 2011).

In the realm of desert communities, the most successful endeavors often build upon existing organizational and traditional structures, rather than introducing entirely new frameworks (Seelos et al., 2011). Extensive research has examined the impact of these structures on desert communities in heritage sites (Albaqawy et al., 2023; Camp et al., 2005; Pianka, 2017). However, there remains a gap in effectively integrating the agricultural-heritage-based economy and institutions within the existing community systems and structures. Balancing neoliberal approaches and the value of customary land tenure and traditional economy is essential for sustainable development (Kuruk, 2007; Murata et al., 2022; Omar et al., 2009; Unruh, 2008).

To comprehensively understand the complexities of integrating cultural structures into community frameworks and their impact on desert agricultural heritage, further exploration and analysis are warranted. This study aims to delve into these dynamics, shedding light on community strategies and their effectiveness within the unique context of Siwa Oasis. By examining the interplay between traditional practices, economic development, and communal structures, the research contributes to the discourse surrounding sustainable development in desert regions.

Understanding the role of formal and informal institutions is vital in assessing the influence of cultural values on governance frameworks and economic activities, supporting resilience in desert-prone areas. This study specifically focuses on the traditional agricultural heritage system and aims to evaluate the role of both formal and informal institutional processes and organizational structures in smallholders' response and adaptation to agricultural heritage sites. Examining how institutions shape farmers' access and utilization of their assets within heritage-based agricultural systems provides insights into the factors that impact the functioning and viability of these agricultural systems rooted in cultural heritage.

In Siwa Oasis, the socio-economic fabric is woven together by a combination of formal organizational institutions and informal traditional structures. Formal organizational institutions encompass established entities such as government bodies, cooperatives, and non-governmental organizations operating within the oasis. These institutions adhere to regulatory frameworks, hierarchies, and administrative procedures that are commonly recognized in a formal setting.

On the other hand, findings suggested that the oasis community also relies heavily on informal traditional structures. These structures are deeply rooted in Siwan culture, traditions, and historical practices. They often revolve around Qabila systems (13 tribal systems), barter arrangements, special interest groups (e.g., women's groups, handicraft associations), and customary land tenure systems often rooted in local customs and norms. Informal traditional structures function outside formal legal frameworks and provide a foundation for social cohesion and the preservation of Siwan heritage.

The research contributes to the livelihood strategies and institutional dynamics within the agricultural heritage system of Siwa Oasis in Egypt. By exploring the engagement of heritage farmers with formal and informal institutions, the study sheds light on the challenges and opportunities they face in responding to and adapting to vulnerabilities in agricultural heritage sites. The findings emphasize the significance of customary land tenure systems, traditional agricultural heritage practices, and existing organizational and cultural structures in fostering resilience and sustainable development in desert communities. The study adds to the discourse on sustainable development in desert regions by providing insights into the interplay between traditional practices, economic development, and communal structures for promoting sustainable agriculture and preserving cultural heritage based on local contexts.

2. Methodology

2.1. Study area

The study employed a qualitative research method to explore the livelihood strategies of heritage farmers in Siwa Oasis, aiming to identify the formal and informal institutions that farmers interact with and evaluate the role of local institutional arrangements in supporting or hindering the development of agricultural heritage systems based on traditional practices (Taylor et al., 2015)

The research was conducted in the Siwa Oasis region, which has recently gained attention for its development. Siwa Oasis is situated in the Matrouh Governorate and encompasses the city of Siwa along with five villages: Al-Marqah, Aghormi, Bahy Al-Din, Abu Shuruf, and Umm Al-Sughayr (El-Qara oasis). The population of Siwa Oasis is approximately 33,491 individuals, consisting of 16,816 males and 16,675 females (Information and Decision Support Centre, 2020). The majority of the population belongs to the Amazigh (Berber) ethnic group, which has developed a unique desert culture and a distinct language called Siwi, separate from other languages spoken in Egypt. Additionally, the Siwan community is fluent in the Egyptian dialect (Hagan, 2001; Harris, 2017).

Geographically, Siwa Oasis is the largest part of one of the depressions in the Western Desert. It is located between the Qattara Depression and the Great Sand Sea, covering an area of approximately 1,088 square kilometers (Gobashy et al., 2021; Gouda, 1994). The geographical location of Siwa has significant spatial relations and is influenced by various environmental factors. Due to its remote location within the desert, Siwa Oasis is considered the furthest economic and administrative center within the Matrouh Governorate. It is situated 306 km southwest of Marsa Matrouh, the governorate's capital, and 307 km from Sallum. Additionally, Siwa is located 130 km from the Jaghbub Oasis in Libyan territory and 350 km from the coastal oases. Furthermore, Siwa is approximately 593 km away from Alexandria and 752 km away from Cairo (Mahsoub, 1992) (Fig. 1).

This information highlights the unique cultural and geographical characteristics of Siwa Oasis, providing important contextual details for understanding the livelihood strategies of heritage farmers in the region.

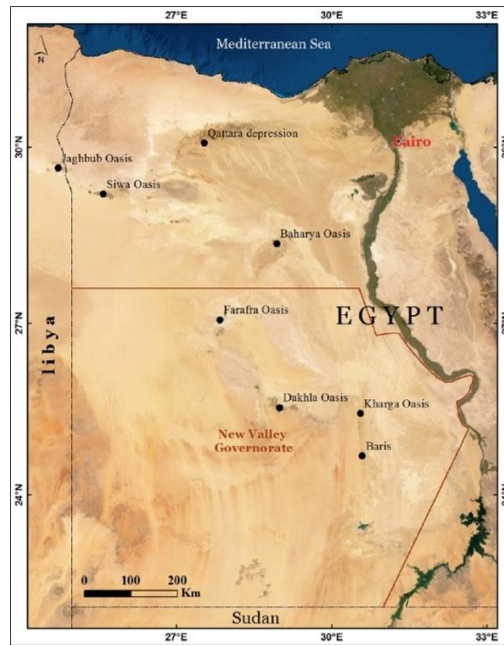


Figure 1 Geographical Location of Siwa

In 2002, Siwa Oasis was designated as a natural reserve encompassing a total area of 7,800 square kilometers. Renowned for its rich cultural heritage, the oasis is divided into three sectors: the eastern sector spanning approximately 6,000 square kilometers, the western sector covering around 1,700 square kilometers, and the southern central sector encompassing approximately 100 square kilometers (Gouda, 1994). In recognition of its unique agricultural practices shaped by the local environment and cultural traditions, Siwa Oasis declared a Global Agricultural Heritage System (GIHAS) in 2016 (FAO, 2016). The oasis relies primarily on underground water sources, including natural springs and wells, and is distinguished by its extensive date palm groves, which serve as the cornerstone of the local economy and food production (Eldomeriy, 2005).

The agricultural heritage system in Siwa is characterized by traditional irrigation techniques that utilize an intricate network of underground channels to distribute water to

agricultural fields (Fakhry, 1937). Moreover, the integration of salt-tolerant crops and halophytes demonstrates the system's adaptability to the naturally high salinity of the soil (King, 2011). Farmers in Siwa engage in cultivating a diverse range of crops, including barley, olives, figs, and date palms, thereby ensuring both food security and diversified sources of income (Nabhan, 2013).

2.2. Integrating Agricultural Heritage and Sustainable Livelihoods

In this study, a comprehensive approach is employed to develop desert agricultural heritage by utilizing the Agricultural Heritage System and Sustainable Livelihoods Framework (SLF) (Hutton et al., 2015). Rather than solely focusing on identifying needs, the study places emphasis on recognizing and leveraging existing assets. During the data collection process, particular attention is given to the participation of heritage farmers, taking into account their unique cultural heritage and livelihood resources. The SLF underscores the importance of adapting research activities, methods, and findings to align with the specific local circumstances, ensuring that the study remains relevant and meaningful to the community under investigation.

2.3. Data collection

The data collection process for this study took place from March to October 2021 and employed participatory research methods to ensure the active involvement and perspectives of desert farmers and the community (Aldridge, 2016). In March 2021, the author established collaborative partnerships with key local agencies, institutions, and community members in Siwa Oasis. This initial engagement aimed to build trust, gather local knowledge, and ensure the research process was contextually appropriate. Contacts were made with various stakeholders, including community leaders, local farmers, governmental representatives from the City Council, the Ministry of Tourism and Antiquities (MoTA), the Egyptian Environmental Affairs Agency (EEAA), the Desert

Research Center (DRC), the Ministry of Agriculture and Land Reclamation (MALR), the Agriculture Directorate, and the Faculty of Desert and Environmental Agriculture of Marsa Matrouh.

To obtain in-depth insights into the agricultural heritage system and livelihood strategies, participatory research methods such as focus groups and in-depth interviews were employed (Jason et al., 2005). Focus Discussion Groups (FDGs) were conducted, involving participants of various ages, ranging from 18 to 85, with a balanced representation of both genders. However, the participation of women was comparatively limited due to cultural factors. The number of participants in each focus group varied but typically consisted of approximately seven participants. The focus groups provided a platform for discussing livelihood strategies and the significance of the agricultural heritage system. Additionally, unstructured conversations were encouraged to allow for spontaneous and nuanced insights.

In-depth interviews were conducted with representatives from governmental agencies, including the City Council, MoTA, EEAA, DRC, Agriculture Directorate, and the Faculty of Desert and Environmental Agriculture of Marsa Matrouh. These interviews offered an opportunity to gather insights into the policy framework, institutional arrangements, and perspectives of key stakeholders involved in agricultural heritage and sustainable livelihood development. These methods facilitated the engagement of community members, local officials, and relevant stakeholders, providing a comprehensive understanding of the study area and its context.

2.4. Data Analysis

Thematic analysis, a subcategory of content analysis, was employed to analyze the collected data in this study. The researcher identified several overarching themes that emerged from the data, including the existing livelihood strategies of heritage farmers, the local institutional structures, the broader policy framework, factors influencing enterprise development, and the outcomes in terms of livelihood improvement. Through the use of

participatory research methods and in-depth interviews, the methodology aimed to capture the perspectives of heritage farmers, local authorities, and institutions involved in the agricultural heritage system of Siwa Oasis. The thematic analysis provided a systematic framework for examining the data, allowing for the identification of patterns and relationships among different elements of agricultural heritage and sustainable livelihoods in the area.

3. Results

This research presents the results of a comprehensive analysis exploring the diverse livelihood activities in Siwa Oasis. Utilizing thematic analysis, this study investigated various themes to provide insights into the unique dynamics of livelihood strategies in this desert community. The main themes examined include exploring the diverse livelihood activities of Siwa Oasis, women's livelihood engagement, geographical remoteness shaping livelihood accessibility, access to cash income through an informal system, challenges of land legalization and customary practices, community participation in economic activities, and governance challenges for development. The findings provide insights into the economic dynamics, challenges, and opportunities in this unique desert community.

Table 1: Demographic characteristics of the study participants

(N = 67)	Frequency
Interview type	
In-depth interview	28
FDG group (8 Focus group for each 6 individuals)	72
Gender	
Male	73
Female	27
Age	
18-25yrs	23
26-30yrs	29
31-45yrs	24
46-60yrs	16

Above 60yrs	14
Marital Status	
Single	18
Married	67
Window	9
Divorced	6
Level of education	
No degree	6
Primary education	46
Secondary (high) Education	36
University Education	8
Post-graduate education	4
Job Status	
Permanent	22
Intermittent	27
Temporary	21
Seasonal	31
Source of income	
Government employee	11
Agriculture	41
Tourism employee	16
Industrial employee	21
Self-employed (Business, trade, handicraft)	12

3.1. Exploring the Diverse Livelihood Activities of Siwa Oasis

Farmers' group expressed their diverse range of livelihood activities, which include agriculture, tourism-related enterprises, handicraft production, and other income-generating initiatives. The farmers emphasized the importance of diversifying their sources of income to reduce dependence solely on the agricultural heritage system (FDG 1).

According to the participants, livelihood activities are deeply connected to the agricultural heritage system and cultural traditions of the community. Agriculture, especially date palm cultivation, is considered their main livelihood (FDG 1). In addition, A community leader has expressed that Siwan farmers cultivate a variety of crops, including date palms, olives, figs, and barley (Interview 12, community leader). However, the participants specifically highlighted the significance of date palm cultivation of

various types. Farmers also mentioned olive cultivation and producing olive oil as an important source of their income and their house needs (FDG 2).

Additionally, an official expressed that the tourism sector has gained prominence in Siwa Oasis, attracting both domestic and international visitors (Interview 3, government representative). Consequently, participants emphasized the role of handicrafts and traditional industries in their livelihood activities; Siwan local artisans engage in weaving, pottery, embroidery, and traditional medicine production (FDG 3). An NGO officer expressed that these activities not only provide economic opportunities but also contribute to the preservation of cultural heritage and the unique identity of Siwa Oasis (Interview 6, NGO representative).

3.2. Women's Livelihood Engagement

Perspectives from the Siwan women's group shed light on their active involvement in a diverse array of livelihood activities, encompassing handicraft production, tourism-related businesses, and small-scale entrepreneurship (FDG 4). These women take pride in their exceptional skills in traditional handicrafts, manifesting in the creation of exquisite products like embroidery, weaving, and pottery. Furthermore, women highlighted their contribution to the development of domestic environmentally-based industries, such as basketry utilizing palm fronds, and their participation in salt-based sectors, including salt artifacts (FDG 4).

Additionally, an official attested to the local and international recognition garnered by these handicrafts, which significantly contribute to the economic advancement of the community (Interview 4, government representative). Additionally, an NGO officer emphasized the significance of Siwan women's participation in date factories, particularly young unmarried women who work in segregated areas, showcasing their vital role in the packing process. These collective voices emphasize the diverse roles and contributions of

Siwan women in various sectors, underscoring their integral presence within the community (Interview 7, NGO representative).

An official acknowledged the significant contributions of various organizations and NGOs in creating opportunities for women to showcase their talents and effectively market their products. However, traditional gender roles, limited access to resources, societal norms, and cultural constraints can hinder women's complete engagement and progress in the economic domain (Interview 5, government representative).

Equally, an NGO pointed out the implementation of multiple initiatives aimed at supporting and empowering women in Siwa Oasis. These initiatives encompass skill development programs and entrepreneurship training. NGO associations in the Siwa region recognize the pivotal role played by Siwan women in economic development. They actively support women artisans through mentorship programs and facilitate market linkages.

NGOs offer training in Siwan-style embroidery, known as "Siwan-Motiva." External trainers visit Siwan houses to teach the art of crafting high-quality products, enabling women to showcase their talents and earn a fair income (Interview 7, NGO representative).

During the interview, an official pointed out that women played a crucial role in agricultural-based industries and informal institutions. Specifically, in Umm Al-Sughayr (El-Qara oasis) (Interview 8, government representative). Furthermore, a community leader highlighted that women are extensively involved in various manual labor activities within the local markets (Interview 13, Community Leader). While their engagement in informal institutions and the traditional economy provided livelihood benefits, it was observed that women still had relatively less prominent roles in effectively participating in economic activities. This finding highlights the need for further exploration and support of women's economic empowerment.

Through group discussions, the social structure was examined as a means of fostering resilience through income-generating activities. However, in remote villages like

El-Qara, which is situated within a Protected Area, the community encountered challenges in meeting their partial needs. This was primarily due to the absence of male workers who had migrated to Libya, leaving a significant gap in the local workforce. Moreover, the region's political instability further exacerbated the scarcity of available employment opportunities. As a result, women expressed concerns about their limited financial resources, making it difficult for them to afford imported food from nearby villages or main markets in other regions. These findings shed light on the complex socio-economic dynamics and the specific challenges faced by communities in remote areas (FDG5).

3.4. Geographical Remoteness Hinders Livelihood Accessibility

During a group discussion, participants emphasized the weak access to various services, including healthcare, nutrition, education, infrastructure, and social support networks, as vital assets for their livelihoods. Farmers expressed their desire for improved services to support their traditional farming practices and to safeguard their cultural heritage and identity. However, limited access to these services and formal markets was acknowledged as a challenging factor, mainly due to the remote location of Siwa Oasis.

A participant emphasized that the remote location of Siwa Oasis contributes to the scarcity of educational institutions and healthcare facilities. Another participant showed that the absence of limited academic institutes in the area hinders educational opportunities and impedes the development of a skilled workforce. The official representative pointed out that limited awareness and training opportunities pose also risks to the loss of traditional skills, handicrafts, and cultural rituals that contribute to Siwan identity, for example, access to cultural assets (such as village museums or cultural platforms) is key to the preservation of their cultural heritage.

However, some participants' concerns about the limited cultural education and awareness programs cause the erosion of traditional knowledge and practices especially among the younger generation (FDG 4). The Siwa Oasis has disadvantages in terms of

access to education due to few academic institutes with no universities in the area (Interview 6, NGO). Additionally, without proper training and support, it becomes challenging to pass down our ancestral knowledge and preserve our unique agricultural heritage, especially since our younger generations are losing touch with our customs, folklore, and traditional skills due to the lack of awareness programs (Interview 14, Community leader)

Another community leader shared that the presence of only one hospital (Siwa Central Hospital), with a lack of health personnel leads to low health conditions of the Siwan people consequently, it does affect the local farmers' productivity. Some women shared that the shortage of medical professionals and equipment translated to poor delivery of healthcare services to their children (FDG 7). Participants expressed that often relied on self-treatment and traditional herbal remedies. They had to travel long distances to seek specialized medical care, and described the process as exhausting, both in terms of time and financial resources, particularly for elderly individuals (FDG 5).

Sometimes, we resort to using herbal treatments as we have no other options, especially for our children (FDG 7)

If my symptoms are severe, I have to go to hospitals in Matrouh or Alexandria, which are far from Siwa and require a significant investment of time and money, especially for the elderly (FDG 5)

According to nutrition and food accessibility, participants shared that limited access to diverse agricultural products and nutritious food options impacts nutritional status and contributes to health challenges such as malnutrition (FDG 8). Officials exposed that despite the fact that dates, a readily available source of nutrition, surround them, some families have grown to overlook their significance in their culinary choice, instead, they've ventured into the world of alternative food options, unintentionally creating an imbalance in their overall nutritional intake—and hemoglobinopathy deficiency prevailing in the community (Interview 2, government representative). Another participant has expressed a significant issue arises from the fact that women in Siwa tend to not engage in shopping,

while men who do the shopping often prioritize factors other than nutritional value. This calls for a shift in mindset to address the problem effectively (Interview 10, educational institution representative).

Additionally, Participants particularly highlighted the importance of having access to cash as a crucial element for their well-being. They expressed that their engagement in cash-based activities was constrained by geographical isolation. However, they highlighted the strength of their social networks and their active involvement in community-led initiatives as a means to overcome the limited access to formal markets.

3.4.1. Access to Cash Income Through an Informal System

Heritage farmers expressed that access to cash is a crucial factor in managing financial needs (FDG 1). A group discussion explained that while there is motivation to engage in cash-generating activities to meet our livelihood needs, we often find ourselves compelled to sell our dates at lower prices to traders before the harvesting period, in order to obtain cash during the summer months (FDG 2). A community leader explained that small-scale farmers sell their crops, especially dates, to the trader before harvesting at meager prices. This helps farmers meet a portion of their financial needs. However, farmers must deliver the agreed-upon number of crops to the traders during the harvest season, who then sell the products at much higher prices (Interview 14, Community Leader). Additionally, An NGO officer mentioned the access to income issues of farmers and greedy traders as the traders obligate the farmers to deliver the agreed quantity of crops. Subsequently, the traders capitalize on the higher demand and sell the products at elevated prices, maximizing their profits (Interview 7, NGO representative)

Furthermore, a group discussion expressed that the reluctance to rely on formal loans from banks stems from their religious and cultural beliefs, which prohibit engaging in usury (Raba) (That is, the legal action or practice of lending money at high rates of interest) (FDG 2). Despite this challenge, adopted other strategies to meet their financial

needs (e.g., providing loans without any interest). However, the participants shared that this practice is also difficult to implement according to banking regulations.

A community leader explained that with determination and ingenuity, the governor implemented a solution that would alleviate the burdens weighing upon the farmers' shoulders; the governor provided funding to farmers without interest, offering them specific guarantees. This approach eased the burden on heritage farmers and curtailed the exploitative practices of traders (Interview 15, Community Leader). Nevertheless, this situation did not continue as the new government assumed office, one farmer stated that as time passed and a new region governor assumed office, the continuation of this strategy became uncertain. Regrettably, the subsequent governor chose not to uphold the previous approach, leaving the farmers once again vulnerable to the challenges imposed by market forces (Interview 16, Local farmer).

Consequently, in the absence of access to formal credit and financial institutions, the participants expressed that they heavily rely on informal loans within their social networks. They have developed strong bonds and connections within their community, enabling them to support each other financially. These informal loans serve as an alternative source of funding, allowing individuals to meet their financial needs (FDG 5).

Participants also emphasized that access to the local heritage-based economic activities posed challenges to the financial well-being of the Siwan community, while also being crucial for preserving traditional cultural practices and ensuring customary land accessibility. They highlighted that these traditional economic activities played a fundamental role in generating income, recovering from economic shocks, and mitigating natural risks (FDG 4).

Furthermore, farmers expressed that access to land was a fundamental asset that contributed to their overall prosperity and well-being, including their financial stability and physical well-being, as well as the preservation of their cultural heritage. The participants collectively emphasized the issue of insecure land tenure, recognizing the

vital role that agricultural land plays in sustaining the resilience, income, and cultural identity of smallholders (FDG 6).

3.5. Challenges of Land Legalization and Customary Practices

Many participants, including heritage farmers, emphasized the significance of traditional and cultural practices in supporting customary land access systems (FDG 6). They highlighted the importance of having secure access to gardens, which they considered essential assets for their economic, cultural identity, and food security. However, A community leader expressed dissatisfaction with the recent mechanism for registering customary land, as described in law No. 144 of 2017 (Interview 15, Community Leader). There were overlapping tenures between customary and statutory systems, leading to disputes between the two (Interview 2, government representative). Local farmers and officials strongly voiced their disagreement with the mentioned law, leading to a significant concern about land tenure insecurity among the participants

Heritage farmers questioned the court's concept of "Reconciliation," which aims to legalize the appropriation of agricultural land and grant a "certificate of possession" to ensure ownership rights (FDG 6). However, the farmers suppose that this particular approach does not suit their unique situation and expresses their clear disagreement with it. Participants voiced their disagreement with the current legislation, particularly regarding the high costs associated with land legalization. This resulted in most farmers refusing to register their land as expressed by an NGO representative:

Although the state is technically trying to legalize farmland, the authorities have set a high price for legalization that local farmers could not afford. Hence, most local farmers refused to register their land (Interview 7, NGO representative).

According to a state official, a significant portion of the lands in Siwa Oasis are held under customary practices and have not been officially legalized. Although the government has initiated the process of legalization, the associated costs imposed are beyond the financial means of local farmers (Interview 3, government representative).

Another official added that land ownership typically varies from half an acre to an acre. It was hoped that the state would consider reducing the financial requirements for Siwan farmers (Interview 4, government representative).

Another official explained that the prices of lands in Siwa Oasis, being a desert area, are significantly different from those in the Nile Valley and the Delta. For instance, the cost of an acre in Siwa ranges from 5,000 to 10,000 Egyptian pounds, whereas in the Nile Valley, it can reach as high as 125,000 Egyptian pounds. Furthermore, the legislation fails to consider the specific characteristics of desert areas, and the regulations that are applicable to such environments do not necessarily apply to the lands in the Nile Valley and the Delta in terms of land prices and water salinity (Interview 5, government representative).

The current legislation was criticized for not adequately recognizing the rights of the Berber ethnic group in the desert to own and control land based on their cultural and social values (Interview 6, NGO representative)

The community leader revealed that the prevailing land system in Siwa Oasis is based on customary practices, represented by a "blue contract". When the authorities introduced the option of legalization, local farmers were reluctant to participate, feeling that the process disproportionately favored investors rather than prioritizing the interests of the Siwan community (interview 15, community leader). While an official has expressed problems arise from the conflict of ownership and the absence of clear possession rights stating that

Selling lands to multiple individuals, particularly newcomers from outside Siwa, has become a source of contention. Hence, a number of land disputes with most cases still waiting to be resolved in the high courts (Interview 9, government representative).

The participants shared that their land was inherited from their ancestors and essential for their livelihoods, but the current legal framework did not adequately reflect their perspective (FDG 6). An official has mentioned that if we think of 'customary law' as giving local people the freedom to practice their own cultural traditions, we should also

recognize that it is limited and controlled within the framework of established traditions. This means that when customary law is put into practice, it operates within the boundaries of existing traditions. Different legal systems in Berber Siwan communities are seen as “cultural systems” and sets of rules and ways of life (Interview 10, government representative).

3.6. Community Participation in Economic Activities

The heritage farmers provided insights into the diverse approaches they employ to maintain their livelihoods. These approaches primarily involve working together with their families on their garden plots or enlisting the help of additional farmers for larger-scale cultivation (FDG 7). In these endeavors, men typically take on responsibilities such as planting and harvesting date palm trees, while women focus their efforts on producing various handicraft items (FDG 4). While women generally do not participate directly in agriculture-related tasks, they do contribute by assisting with harvesting when needed and supporting their husbands' agricultural activities.

Moreover, male farmers shared that they prefer operating as independent entrepreneurs, assuming full responsibility for their agricultural pursuits. When the need arises, they employ members of the local community, fostering a sense of cohesion and mutual support. Participants also revealed that the transportation of goods, a crucial aspect of their trade, primarily relies on the infrastructure owned by community members. By leveraging these resources, farmers effectively overcome logistical challenges and ensure the efficient movement of their products to market destinations (FDG 7).

While customary practices hold significant cultural and social value in Siwa Oasis, economic activity within the community revolves around the concept of reciprocity. Participants emphasized the central role of customary practices and Islamic traditions in shaping the local economy. They expressed that adherence to these practices fosters a sense of identity and community cohesion, facilitating mutually beneficial relationships (FDG 6). Consequently, community leaders emphasized that a higher level of reciprocity

exists within the Siwan community, where individuals engage in economic activities based on principles of mutual exchange and support (Interview 16, Community Leader).

Small Business initiatives and the development of viable enterprises emerged as pivotal factors contributing to the livelihoods of Siwan farmers. Participants highlighted the growing importance of these aspects as drivers of economic progress (FDG 7). An official emphasized that while cultural practices remain significant, they do not hinder the improvement of livelihoods. Instead, the ability of farmers to diversify their income streams is more influenced by declines in social support networks within the community. This suggests that strengthening these networks is vital for empowering farmers to explore alternative livelihood options and improve their economic circumstances (Interview 5, government representative).

In the context of promoting farmers' interests and facilitating market export nationally and internationally, the Siwan Community Development and Environmental Protection Association (SDREC) plays a significant role (established in 2002 the number board of members is 13 members representing the thirteen tribes of Berbers in Siwa). Participants expressed their involvement and highlighted the association's support in qualifying their products to meet global market standards (FDG 7). SDREC assists factories in obtaining internationally recognized certifications, such as ISO and Halal certificates, which enhance the export potential of Siwa dates and other agricultural products. The association also facilitates the registration of over 200 farms, ensuring compliance with international quality standards (Interview 6, NGO representative).

Furthermore, participants emphasized the significance of SDREC's collaboration with national and international development organizations (FDG 2). Notably, an official stated that the establishment of the local Handicraft Center in 2004 with the Ministry of International Cooperation stands as a testament to their efforts. This center spread across six acres, serves as a hub for various handicrafts related to Siwa's agricultural heritage. It houses facilities such as date factories, refrigeration units capable of preserving up to 1600

tons of dates, and workshops dedicated to woodwork, palm frond crafts, silverwork, and embroidery (Interview 9, government representative). Participants shared that the local Handicraft Center does not work for the community benefits as desired (FDG 1). Female participants particularly highlighted the center's role in providing training and fostering the development of high-quality handicrafts and embroidery products that meet national and international standards (FDG 4).

3.7. Governance Challenges for Development

Participants revealed a nuanced understanding of the challenges and opportunities associated with governance practices in the region. Participants highlighted the limited provision of stable policy settings and formal protection schemes by institutional governments (FDG 8). Participants expressed their dissatisfaction with the lack of consistent support for development initiatives, including crucial areas such as education, healthcare, pensions, and sanitation (FDG 2). In response, the participants emphasized their reliance heavily on informal customary governance systems to fulfill these roles (FDG 8). A community leader pointed out that these systems played a vital role in providing social support networks, resolving land disputes, and maintaining law and order (Interview 17, Community Leader). The participants emphasized the importance of these informal structures in filling the gaps left by formal institutions.

The geographical remoteness of certain villages within Siwa Oasis posed unique challenges, with participants highlighting the limited external support received from various state institutions. An NGO officer revealed that while the government and international aid donors showed interest in development initiatives, sustainable support was often lacking (Interview 7, NGO representative). The disconnection from major economic and political hubs further exacerbated this issue, resulting in limited engagement with formal institutions (Interview 10, educational institution representative).

Consequently, the Siwan community had to navigate development efforts with minimal direct or indirect support from these institutions.

Additionally, participants noted a weak relationship between increased engagement with formal institutions and the state. They identified the provincial administration and city council as the key actor responsible for disseminating information and extending support from higher levels down to farmers. However, shortcomings in this regard, such as inadequate information dissemination and a lack of support, hindered effective governance and institutional linkages (FDG 8). Insufficiently trained and compensated management positions further exacerbated these challenges, leaving a gap in the overall governance structure (Interview 11, educational institution representative)

Despite these hurdles, the Siwan showcased resilience and entrepreneurial spirit. Participants expressed their desire to establish commercial centers that would serve as hubs for goods exchange among neighboring villages and potentially facilitate exports to nearby countries (FDG 8). These centers were seen as effective platforms for individual farmers to engage in entrepreneurship while operating within the informal community and culturally-based social protection systems. By allowing individuals and commercial entities to come together in a central location, such as a market hub, these centers would promote flexible and independent distribution of goods (Interview 6, NGO). The Siwan community actively collaborated with the Desert Research Center (DRC) and the Department of Agriculture to strengthen market access and explore opportunities for resource aggregation, aiming to achieve economies of scale (Interview 10, educational institution representative)

4. Discussion

This research involves the local community using a participatory research approach to create an inclusive environment that was tailored to the specific local cultural conditions. This research adopted Sustainable Livelihoods Framework (SLF) to recognize the significance of analyzing communal institutions as a whole (Scoones, 2009). This

holistic approach allowed for a comprehensive understanding of livelihoods (including economic, social, and cultural aspects) within the community.

The primary objective of this research is to investigate how the aspirations and values of heritage farmers are expressed through their livelihood activities, which can aid in identifying potential development opportunities. The findings provided an opportunity to determine the agricultural heritage multifunctionality (Filipe & de Mascarenhas, 2011; Lu & Qingwen, 2013) which is made up of multi-faceted aspects of livelihoods of both on-farm and off-farm activities considering its social, economic, and environmental dimensions.

4.1. Land Tenure Uncertainty

The Uncertainty of land tenure title was highlighted as the most vulnerable aspect of the Siwan livelihood and the inability of the Siwan community in exercising their right to accessibility and preserving their cultural identity and food security. The findings affirmed that in Siwa Oasis like other sub-Saharan Africa significant portion of the land is governed by a customary system. However, it has been found that existing legislation does not adequately recognize customary group rights. This Finding is consistent with Ahmed ElKholei (2012) that found land policy regulations should be reformed and rooted in local cultural and social values (ElKholei, 2012). Fakhry (1973) described that Siwa Oasis has a long history of land tenure, dating back to even ancient Egyptian times. The right to access gardens and water in Siwa is intertwined which has been prevalent in the oasis and other desert Egyptian oases for centuries (Fakhry, 1937). Dakhla Stela bears a long text in which a land register of the king Psusennes II during the Libyan Period (22nd Dynasty) dates back to 490 B.C, its inscription contains the word "oasis" (WHAT), The stela is now in the Ashmolean Museum, Oxford (Gardiner, 1930; Kaper, 2015).

Even though, the history of Berber customary law, including the Siwan people, traces back to the Arab Maghreb (Hoffman & Miller, 2010). During the French colonial era, indigenous court systems were influenced by Islamic law (fiqh), customary law, or a

combination of both (Hoffman, 2010). The French colonial administration emphasized the distinction between "law" and "custom" but considered both to be immutable (Hoffman & Miller, 2010). Islamic law recognizes and protects property rights, which the state should adopt (ElKholei, 2012). Many studies in other regions in Africa have stated that the security of land rights in these communities relies on cultural and social norms rather than formal documentation of ownership (Blocher, 2006; Murtazashvili & Murtazashvili, 2016; Musembi, 2007; Zevenbergen et al., 2013). Addressing insecure land tenure in the Siwa Oasis requires efforts to establish clear and enforceable land rights for communities. This can be achieved through legal reforms (ElKholei, 2012). By providing secure land tenure, individuals in the Siwa Oasis can have the confidence to preserve their land, access credit, and improve their livelihoods sustainably.

4.2. Accessing Cash Income

Furthermore, the findings identified difficulties in accessing cash income and credit. The traditional economic practices are based on customary rules that prohibit the community from obtaining loans from formal institutions such as banks. Thus, most individuals heavily rely on informal loans by exchanging dates with the money-lending agreement of deliverable crop yield during harvest time. Heritage farmers adopted this strategy to cope with the economic shock.

Therefore, Siwan farmers viewed accessing heritage-based economic activities as a vital strategy. However, it has been recognized that solely prioritizing economic growth without considering other cultural and social contexts, well-being, equity, and sustainability could undermine the overall achievement of those development goals. While there is a need to enhance access to income in remote arid desert areas like Siwa, a balanced approach that incorporates broader development objectives is essential. The findings revealed that the traditional economic practices embedded in the heritage areas play a fundamental role in enhancing the resilience of communities, enabling them to

maintain their incomes and recover from economic shocks and droughts, or natural disasters which are supported by (Daskon, 2010; MacGillivray, 2018). However, the exact level of resilience offered by the heritage-based economic activities in the Siwa Oasis remains relatively unknown due to limited available information.

4.3. Geographical Location and Informal Institution

Evidently, the geographical location of the Siwa Oasis and the surrounding villages influence engagement in formal and informal institutions. The findings demonstrated that a community's location and its terms of access to land directly impact the ability to generate income and the strength of social support networks within the community. The geographical remoteness desert area of Siwa Oasis presents difficulties in coping with natural disasters, shocks, or health issues. Within this study, participants extensively discussed the obstacle of geographical remoteness and its impact on their access to essential services. Participants define the lack of healthcare professionals as a vulnerability where a shortage of healthcare professionals and providers that creates a state of increased susceptibility to health risks and limited access to necessary medical care.

The absence of an adequate healthcare workforce can leave individuals and communities vulnerable to inadequate healthcare services, delays in diagnosis and treatment, reduced quality of care, and overall compromised health outcomes (Scheffler et al., 2015). The findings of this study align with previous research, confirming the inadequate healthcare services in Siwa that fail to meet the population's needs, instead, the Siwan commonly relies on the use of medicinal plants to promote general well-being (Eriksson et al., 2008; Tohamy & Hussein, 2018). Besides, the findings revealed that Siwan is suffering from malnutrition and sickle cell hemoglobinopathy (Hb S). A study conducted in 2015 by Moez & Younan (2016) emphasizes the economic burden of providing healthcare services for sickle cell disease and highlights the importance of

implementing prevention programs in Siwa to reduce the prevalence of the condition (Moez & Younan, 2016)

In such circumstances, the support of the community becomes irreplaceable. However, the development of local economic activities has encountered obstacles such as management challenges or insufficient clarity in governance. Nonetheless, the result acknowledged the pivotal role of the community in assisting individuals and families in establishing small businesses. These findings are supported by (Souryai, 2011) who describes the Siwan community as a coherent social and economic exchange network with a patronage system and reciprocity. Our findings, however, contradict other studies in other regions (Fukuyama. F., 2008; Hughes, 2004) that found there are certain social and cultural factors that can limit small businesses.

However, the findings suggest that the cultural context of Siwa Oasis doesn't necessarily discourage small businesses outright, but it does influence the characteristics and behaviors of individuals in the community as small businesses in Siwa Oasis. Nevertheless, Siwan cultural context may differ in certain aspects from their Western counterparts in terms of their approaches to business and their motivations (Abdelghany, 2020; Raufflet et al., 2008; Youssef & Abdelghafar, 2013).

In the vast majority of developing nations, poverty is predominately a desert-prone area issue and geographically isolated communities (Blank, 2005; Lichter et al., 2012; Sachs et al., 2011). However, our findings uncovered a paradoxical situation in which the communities that seemed to have the most favorable conditions, such as desert landscapes in character, traditional access to land, and opportunities to earn income from agriculture and tourism. These findings were supported by other studies in Asia that found the incidence of poverty was highest in urban communities than in rural areas (Agarwal et al., 2007; Sridhar, 2015).

4.4. Women in Economic Activity

Additionally, the results of the research highlighted the significance of women's involvement in the traditional economy. The findings demonstrate that women have a crucial role in traditional economic systems, which have proven vital in reducing vulnerability, promoting resilience, and supporting livelihoods (Ashour & Rania NS, 2019; Shafiek, 2022). Our findings show the importance of supporting women to take on these critical roles in these informal institutions. Women were involved in informal cash-generating activities, such as agro-industries handicrafts or date packing (Akl et al., 2011). Although men dominate formal institutions in the market and industries and are responsible for their families, women were satisfied in their informal roles. Most women participants stressed keeping their cultural values intact by preserving and maintaining a household family (Abdel Aziz et al., 2021) which contradicts Western views.

Thus, it is vital for development in these societies to balance supporting women in their roles while keeping their social and cultural aspects intact. This is supported by (Barket, 2011) who highlighted that SDREC support for women's economic empowerment has focused more on informal cash-generating activities, such as selling food and handicrafts, at markets rather than supporting access to formal, male-dominated areas of livelihood generation such as employment in both private and government sectors that predominately generate higher incomes. The findings showed that SDREC supports heritage farmers in exporting dates process and supporting financial assets.

4.4. Governance and Sustainability

Furthermore, the findings revealed that formal institutions, such as government departments and regulations, have a relatively minor role in shaping the governance and development of Siw Oasis. On the other hand, informal institutions play a significant role in maintaining the cultural identity and autonomy of the tribe. The tribal government has its own structure, which comprises traditional mechanisms, customs, and leadership roles specific to the Siwan community. The participant emphasized that many decision-making

processes and dispute resolution are typically handled by community members through customary practices and traditional leadership. A little study in this area, a study by Souryai (2011) has confirmed the issue of the role of tribal community in governance, social control, and conflict resolution (Souryai, 2011)

The participants hoped that Siw Oasis would be able to achieve economic progress without compromising its unique cultural identity. This idea was validated by a study by Zhang et al., (2018) in Asian regions, using China as an example, that demonstrated successful strategies for balancing social and economic progress while preserving agricultural heritage sites. The authors suggested integrating industrial development with agricultural heritage (Zhang et al., 2018). Siwn heritage farmers hoped to maintain their traditional practices, values, and way of life while also benefiting from economic opportunities. Ultimately, the Siwan community aimed to ensure that the unique characteristics and heritage of Siw Oasis would be preserved and passed down to future generations.

5. Conclusion

This research highlights the livelihood strategies of Siwan heritage farmers and the challenges they face in engaging in economic activities. The study reveals that farmers predominantly prefer individual and family-level economic engagements, while community-level involvement is more focused on social support networks and maintaining customary norms. The findings emphasize the importance of improving the governance and effectiveness of local institutions and organizations. Collaborative efforts with the provincial government and local associations are crucial for supporting successful agricultural heritage-based enterprise development and market access in the Siwa Oasis region.

Contrary to pessimistic literature, this study presents a more positive approach to desert communities' development, recognizing the potential of customary economies in

enhancing people's well-being. It cautions against overemphasizing cash engagement at the expense of participation in the agricultural-heritage-based economy, which is fundamental to the region's livelihood assets and well-being. The research underscores the significance of supporting farmers in their agricultural heritage enterprise development activities within informal communities and culturally based social protection systems. Strategies that promote economic development, empower women, and complement traditional social support networks are essential. These strategies should consider the absence of formal safety nets and the potential vulnerability of women to macroeconomic shocks.

This study contributes valuable insights for policymakers and practitioners working towards sustainable development in desert heritage communities. It emphasizes the significance of preserving agricultural heritage and supporting traditional livelihoods, and local communities. The results have important implications for policymakers and researchers working towards the preservation of cultural heritage, sustainable livelihoods, and community development in similar contexts.

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