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Environmental Assessment of Coastal Resorts: Recreational Spaces as a Case Study

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Abstract. Tourism is one of the most important resources of national income in Egypt. Tourism as a vital role in bringing economic benefits to local communities, helping with conservation efforts or placing value on aspects of cultural heritage. Egypt is one of the world's most attractive countries in terms of its natural and historical characteristics, which makes it eligible to play an important role in the international tourism market. The vision of Egypt 2030 urges all sectors of the state to adhere to the axes of sustainability. Thus, the tourism sector is studying the current situation in the hotel industry and exploring the possibility of applying sustainability to hotels and resorts. This paper studies some of the sustainable practices in outdoor recreational spaces (especially in landscape) affects positively on conservation and the reduction of operation cost. The research method applies the seven principals of Xeriscape, which is considered as one of the sustainable benchmarks to evaluate landscape practices. The research aiming at assessing the coastal resorts in the Red Sea, Egypt from an environmental standpoint, analysing the operation practices in the recreational landscape which affects positively resources, conservation and the reduction of operation cost.

Keywords: Environmental Assessment, Recreational Spaces, Sustainability, Tourism Development.

1-Introduction

According to definition, Recreational areas would include land that is designed, constructed, designated, or used for recreational activities. Examples are national, state, county, or city parks, other outdoor recreational areas such as golf courses or swimming pools and bodies of waters (coastal areas) when used by the public for swimming, diving or boating. Public and private areas that are predictably used for hunting, fishing, bird watching, bike riding, hiking,



or camping or other recreational use also would be considered recreational areas. Most of the tourist activities in Egypt, particularly in Red Sea clustering in coastal areas. The coastal zone has gained a solid reputation as a place vacated for recreational activities and this is generally related to the presence of the sea. A resort is a full-service lodging facility that provides access to or offers a range of amenities and recreation facilities to emphasize a leisure experience. Resorts based on two sectors. The first is income-generating sector such as hotel rooms, conferences halls, outdoor restaurants and retail shops. The second is income-expensing such as swimming pools, gardens, sports yards and kids playing area. Resorts work as a primary provider of the guests' experience, often provide services for business or meetings, and are characteristically located in vacation-oriented settings. According to Brey [1] the minimum qualifications of a resort, related to recreation amenities, should provide one signature amenity or anchor attribute, provide five secondary recreation/leisure/entertainment experiences and emphasize a leisure or retreat-environment experience. According to Egyptian Tourism Development Authority (ETDA) resort can be defined as an integrated tourist development project with an approximately total plot area of 500,000 sqm or more, that includes many hotels and tourist facilities, secured and surrounded by fences and managed by investor (developer or development company) who provides all project infrastructure and facilities of water and energy. Resort recreation offerings have grown over the years. Early resorts could focus on one amenity and be prosperous. Ski resorts didn't seem to need more than an alpine ski area and beach resorts could rely on the beach alone for visitors. But as the resort industry grew, multiple amenity offerings became the norm and consumers became conditioned to expect certain amenities as part of the resort experience [2]. Recreation participation changes, vacationer demand, and industry influence have swayed resort development over the years, so much so, that for each decade, a new seemingly "essential" recreation amenity appeared to emerge. A swimming pool was one of the earliest expected resort facilities, followed by tennis in the 70s, fitness in the 80s, golf in the 90s, and spa in the 2000s. Amenity facilities and related services can make or break the success of a recreation amenity department and is a way for resorts to stay competitive in the market [3]. According to recent studies, 40% of hospitality managers indicated they were ready to make 'recreation area' structural improvements, with twenty percent (20%) also specifying spa improvements [4]. Because today's travelers expect much from their recreation dollar and are offered more ways to spend that dollar, resorts must anticipate changing consumer preferences and cater to those needs [5]. During economic crises, vacationers are more discriminating when choosing a resort destination. Amenities often define a resort [6]. When making a vacation decision, tourism experts will cite resort offerings and amenities as one of the key deciding factors; that are 'any extra product or service found in the hotel [7]. This paper studies one of the new tourist developments in Red Sea region, Egypt. The purpose is to provide a comprehensive sight on the sustainable practices in coastal resorts from an environmental standpoint, particularly on resort recreational facilities and service offerings. The paper aiming at providing an environmental assessment to these facilities to establish a benchmark to enable appropriate solutions to be chosen at the early stages of a design to achieve more sustainable developments in tourism sector.

2- Literature review

A considerable amount of literature has been published on tourism sustainable development. In recent years, increasing attention has been paid to research regarding the evaluation of open spaces -including green areas- and their components as well as their effect on the environment. In Red Sea governorate, no such analytical research or evaluation relating to the effects of sustainability on open spaces and operating cost values has been made so far. This lack has been to the detriment of the development in all resorts in red sea governorate. However, the open spaces have increasingly greater roles in the sustainable city development processes because of the expansion of the tourist projects and also of the growing of the tourists' number. Globally, a large and growing body of literature has investigated environment friendly practices and cost reduction from many different standpoints. The United States Environmental Protection Agency (USEPA) provided the apply water-efficient landscaping principles using Xeriscaping method in landscape [8]. So State enacts rules put for landscapers including Group

plants according to their water needs, use native and low-water-use plants, limit turf areas to those needed for practical uses, use efficient irrigation systems, schedule irrigation wisely, make sure soil is healthy, remember to mulch and provide regular maintenance. Robert F Baldwin and others [9] studied practices in research (The Future of Landscape Conservation) and provide a wide vision for conservation in landscape and put points for Success of the landscape conservation cooperatives. A recent research provided a framework to include cultural resources in spatial conservation planning that acknowledges the different scales of importance and management of sites [10]. Eric W. Sanderson and others [11] outlined a conceptual methodology for landscape conservation being tested by the Wildlife Conservation Society at three sites in Latin America and Africa. Based on the biological requirements of an ecologically functioning population of a landscape species, the “biological” landscape is defined. This landscape is compared to the landscape of human activities through the use of Geographic Information Systems (GIS). Focal landscapes sufficient to meet species requirements are defined and threats from human activity evaluated with respect to biological requirements. A suite of landscape species may be selected depending on resources, leading to multiple, often overlapping, focal landscapes. A hypothetical example is presented [12]. Several different methods are used in the industry to classify resorts. One common technique is to identify the resort’s signature amenity [13]. According to Brey [14] resort types should be including many elements and facilities such as beach or lakeside hotel, golf course, tennis playground, fishing and hunting facilities, marina, theme park, spa and health facilities, ski and mountain hiking, waterpark and aquatic resort and casino.

3- Case study

3.1 Soma Bay Resort

Soma Bay resort was selected as the location for the case study for several reasons. Rea Sea is considered as one of the world’s most attractive destination for tourism, the resort located about 42 km from Hurghada International Airport. It spreads over an area of about 10 square kilometers as shown in Figure 1. The resort consists of two major zones; the first zone comprises 324 units owned for landlord and dedicated for investment. These units are distributed in clusters all over five main projects in the area, ranging from villas, chalets and housing units, with a maximum height of three stories. The second zone comprises five (5 stars) hotels, including some recreational outdoor spaces, central business, entertainment district and marina center.

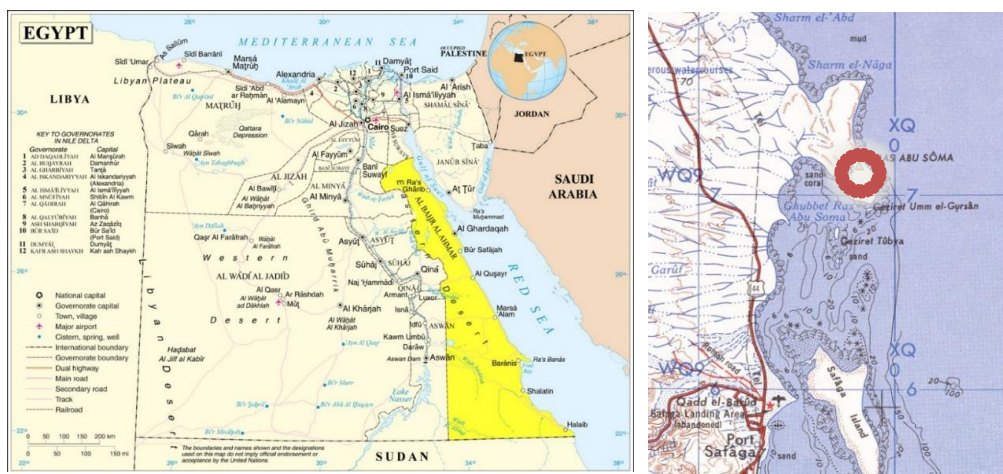


Figure 1: Rea Sea region location (in yellow) relative to Egypt and the location of selected case study (in red).

As shown in Figure 2 and 3, all hotels guests have the ability to join sky-surfing, diving courses, marina activities, golfers globally and are home to a world-class spa and facility. Hotels are surrounded by charming coastal landscapes, entertainment and recreational zones offer luxurious gardens with a view of either the sea, pool, golf course, or a panoramic view of all. The resort serves an array of unique recreational activities creations to please every palate.



Figure 2: The master plan of Soma Bay resort located in Red Sea, Egypt.

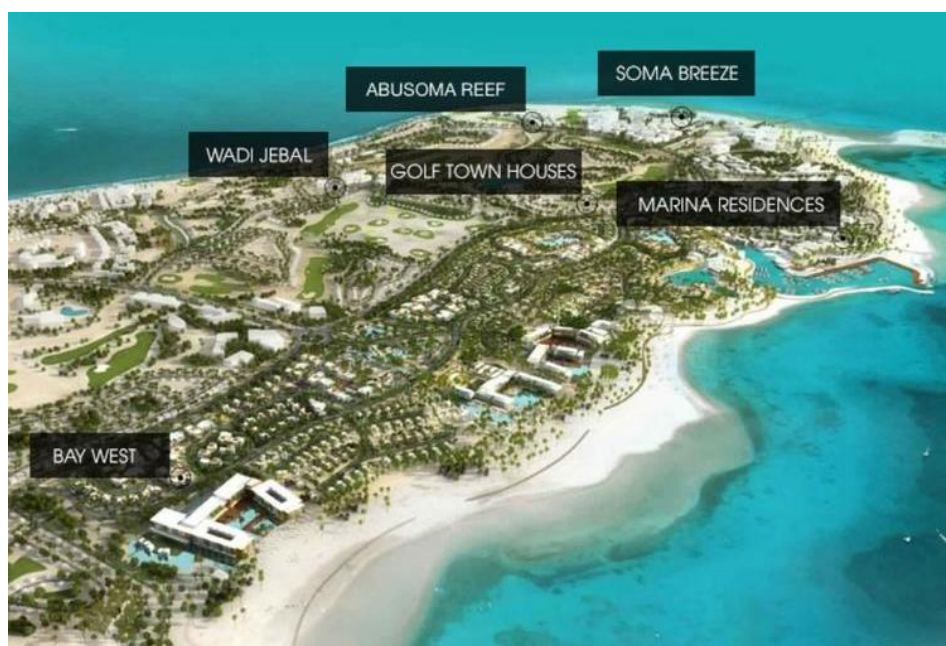


Figure 3: An aerial view Soma Bay resort. (as planned)

3.2 Recreational Open Spaces

Recreation open spaces are the heart of resort attractions. The recreation and entertainment can be considered as the main aims of visiting the resort. Beach, gardens, golf, swimming pools, lakes, water-park facilities, outdoor activity center, kids' area and sports courts are dominant recreation open spaces in coastal resorts. They are huge areas and consume a lot of money during construction phase that is covered by the investor. The presence of recreational spaces (specially golf course and gardens) at coastal resorts is frequent and costly. For example, in some cases the amount of freshwater required to maintain them is very high. A study of several tourist facilities' water use in Zanzibar [15] showed that hotels with extensive gardens require an average of up to 50% of the total freshwater consumption. Different landscape design strategies aim to reduce the need for garden irrigation, which can greatly contribute to reducing the whole water demand of resorts. Therefore, one of the main aims of this study is to find sustainable solutions to reduce the cost of operation and overcome the side effect of the presence of recreational area.

3.3 Sustainable practices

Many practices can be implemented to improve recreational spaces sustainability and reduce the cost of operation process on different scales and capacities. These practices can be outlined in the following scales.

3.3.1 On Beach

- Conservation of marine life, stop over-fishing, protect the rare organisms and protect coral reefs.
- Improve waste separation through the use of color-coded bins for different kinds of waste: recycling, organic waste, composting
- No plastic waste.
- Fit water taps with flow controllers such as aerators, restrictors or percussion. Fit showers with flow restrictors or special low-flow shower heads.
- Put in place a towel and bed linen re-usage program with an incentive for guests
- Reduce waste by limiting disposable items such as small packages for food such as jam, butter where bulk dispensers could be used instead.
- Use refillable bottles and containers for items such as shampoo and soap.
- Place glass reusable water bottles in guest bedrooms rather than plastic ones.
- Offer a Sustainable Tourism Kit during the booking process filled with products such as a bamboo toothbrush, an ocean safe sunscreen, a water bottle or a reusable cotton swab.
- Offer a carbon footprint offset option like the one used by KLM Royal Dutch Airlines.
- Provide staff training on best environmental practices to reduce waste and create awareness around protecting local biodiversity
- Showcase recommendations for environment friendly behavior in orientation booklets available in each cabin, as well as through the company TV channel in cabins.
- Apply for a free sustainability certification by the Oceanic Global.

3.3.2 In Gardens, Sports Courts and Golf

- Develop clear understanding of species, habitats, hydrology and geomorphology.
- Ensure golf course and landscape design typology is clearly compatible with site and surroundings.
- Protect the most valuable landscape and ecological features
- Use native or locally important species in landscaping designs, and drought-tolerant varieties if applicable.

- Minimize pollution from maintenance facility.
- Plan an ecologically-rich landscape.
- Naturalize any water features as far as possible.
- Minimize the extent of intensively managed grass areas.
- Consider the visual impact of buildings.
- Maximize irrigation water efficiency.
- Use local materials.
- Select best-adapted turf species and cultivars for the local environmental conditions and to minimize resource requirements.
- Reduce fuel use in maintenance.
- Maximize the energy efficiency.
- Use recycled materials and materials with recycled content.
- Apply conservation methods in landscape (like xeriscape).

3.3.3 *Swimming Pools, Lakes and Waterpark Facilities*

- Harvesting rain water is as easy as putting a rain barrel under downspouts and using the water for interactive water play or site irrigation.
- Grey water harvested from sinks, showers and swimming pools can be recycled or used for site irrigation.
- Solar driven water pumps, water fountains and water features, like water curtains, can offer new dimensions in eco-friendly play.
- Alternative water playground designs allow children to pump water from collected rainwater and self-direct play opportunities in a low cost, environmentally friendly way.

4- Research Methodology

The context of this study concerns recreational spaces of tourist projects. The concept of sustainable touristic buildings includes the process of landscaping and gardening that reduces or eliminates the need for supplemental water from irrigation [16]. In some areas, terms as water-conserving landscapes, drought-tolerant landscaping, and smart landscaping are used instead. Plants whose natural requirements are appropriate to the local climate are emphasized and care is taken to avoid losing water to evaporation and run-off. The specific plants used in xeriscaping depend upon the climate. Xeriscaping approach is different from natural landscaping, because the emphasis in xeriscaping is on selection of plants for water conservation, not necessarily selecting native plants. Public perception of xeriscaping has frequently been negative as many assume that these types of landscapes are ugly expanses of cactus and gravel. However, studies have shown that education in water conservation practices in the landscape can greatly improve the public's perception of Xeriscaping [17].

In order to analyze and evaluate the impact of landscaping and gardening upon recreational spaces of tourist projects in Rea Sea region, the Xeriscaping approach was selected as a method in this paper. This approach was originally conceived by Denver Water, the seven design principles of xeriscaping have since expanded into simple and applicable concepts to creating landscapes that use less water. The principles are appropriate for multiple regions and can serve as a guide to creating a water conserving landscape that is regionally appropriate and since they were conceived for homeowners they are easy to implement [18]. Through the field visit and the meeting of officials, all operation details were recognized. The measurement ruler (Seven Principles of Xeriscape) was applied and the availability of this procedure was measured at the site. Every element will take a percentage score. Finally, research will provide the result to get accurate evaluation for existing situation in conservation field to be able to make a correct future plan to optimum environment-friendly and lowest operation cost.

4.1 Seven Principles of Xeriscape

4.1.1 Plan and Design

Create a diagram, drawn to scale, that shows the major elements of the landscape, including house, driveway, sidewalk, deck or patio, existing trees and other elements. Once a base plan of an existing site has been determined, the creation of a conceptual plan (bubble diagram) that shows the areas for turf, perennial beds, views, screens, slopes, etc. is undertaken. Once finished, the development of a planting plan that reinforces the areas in the appropriate scale is done.

4.1.2 Soil Amendment

Most plants will benefit from the use of compost, which will help the soil retain water. Some desert plants prefer gravel soils instead of well-amended soils. Plants should either fit the soil or soil should be amended to fit the plants.

4.1.3 Efficient Irrigation

Xeriscape can be irrigated efficiently by hand or with an automatic sprinkler system. Zone turf areas separately from other plants and use the irrigation method that waters the plants in each area most efficiently. For grass, use gear-driven rotors or rotary spray nozzles that have larger droplets and low angles to avoid wind drift. Spray, drip line or bubbler emitters are most efficient for watering trees, shrubs, flowers and groundcovers. If watering by hand, avoid oscillating sprinklers and other sprinklers that throw water high in the air or release a fine mist. The most efficient sprinklers release big drops close to the ground. Water deeply and infrequently to develop deep roots. To reduce water lost to evaporation, never water during the day. With the use of automatic sprinkling systems, adjust the controller monthly to accommodate weather conditions. Also, install a rain sensor to shut off the device when it rains.

4.1.4 Appropriate plant and zone selection

Different areas in a yard receive different amounts of light, wind and moisture. To minimize water waste, group together plants with similar light and water requirements and place them in an area that matches these requirements. Put moderate-water-use plants in low-lying drainage areas, near downspouts, or in the shade of other plants. Turf typically requires the most water and shrub/perennial beds will require approximately half the amount of water. Dry, sunny areas support low-water-use plants that grow well in the specific climate. Planting a variety of plants with different heights, color and textures creates interest and beauty.

4.1.5 Mulch

Mulch keeps plant roots cool, prevents soil from crusting, minimizes evaporation and reduces weed growth. Organic mulches, such as bark chips, pole peelings or wood grindings, should be applied 2 to 4 inches deep. Fiber mulches create a web that is more resistant to wind and rain washout. Inorganic mulches, such as rocks and gravel, should be applied 2 to 3 inches deep. Surrounding plants with rock makes the area hotter; limit this practice.

4.1.6 Limited turf areas

Native grasses (warm-season) that have been cultivated for turf lawns, such as buffalo grass and blue grama, can survive with a quarter of the water that bluegrass varieties need. Warm-season grasses are greenest in June through September and may go dormant during colder months. Native grasses (cool season) such as bluegrass and tall fescue, are greenest in the spring and fall and go dormant in the high heat of the summer. New cultivars of bluegrass,

Numbers Before and after applying Xeriscape to insure landscape sustainability.

5. Results

The land use of hotels was analysed to provide an accurate vision of hospitality capacity and open spaces. As shown in Table 2, Four hotels are sea front and one hotel is golf hotel. Findings show that according to the rooms (keys) capacity, the biggest hotel is Robinson (348 keys – 24% Resort keys). According to the hotel's plot area, the largest hotel's land is La Residence Des Cascades–golf (2020367 m²). And the largest area of used open space is Sheraton (190181.5 m²).

Table 1: Types of hotels and total plot area of Soma Bay resort.

Hotel Name	Hotel Type	keys	Plot Area (m ²)	Building Area (m ²)		Open Spaces (m ²)	
KEMPINSKI HOTEL	Beach	325	156153	20927.6	13%	135225.4	86.6%
ROBINSON CLUB	Beach	348	190807	25166.1	13%	165640.9	86.8%
SHERATON SOMA (+Island)	Beach	326	209499	19317.5	9%	190181.5	90.8%
THE BREAKERS	Beach (Diving)	173	82681	6811.4	8%	75869.6	91.8%
LA RESIDENCE DES CASCADES	Golf	249	2020366.6	19020	1%	2001347	99.1%

Table 2: Recreational spaces of all analyzed hotels (5 Hotels).

Hotel name	Kempinski hotel	Robinson club	Sheraton soma	The breakers	La residence des cascades
Beach	19843	39564	27893	3805	0
	14.7%	23.9%	14.7%	5.0%	0.0%
Gardens, Golf	4674	19950	8481	456	1368708
	3.5%	12.0%	4.5%	0.6%	68.4%
Pedestrians and Streets	1796	3032	3966	1837	9534
	1.3%	1.8%	2.1%	2.4%	0.5%
S. Pools, Lakes and Waterpark Facilities	13946	4153	3829	287	32088
	10.3%	2.5%	2.0%	0.4%	1.6%
Outdoor Children's Activity Centre	243	811	211	0	185
	0.18%	0.49%	0.11%	0.0%	0.01%
Sports Courts	2408	5432	2661	0	3641
	1.8%	3.3%	1.4%	0.0%	0.2%
Others (Un-used Areas)	92315.4	92698.9	143140.5	69484.6	587190.6
	68.3%	56.0%	75.3%	91.6%	29.3%
Total Open Spaces (m ²)	135225.4	165640.9	190181.5	75869.6	2001347

In this study recreation space have been analyzed, the percentage of its area were compared with other recreation spaces of all hotels. provide this analysis with the seven kinds of recreation open spaces and the total area of open spaces in each hotel. Research achieves that Robinson has the largest Beach area, Garden also, Kempinski has the largest Swimming Pools but Cascades has the largest Lakes and Golf areas. Resort has a lot of recreation kinds (See Table 3). Recreation open spaces shown in Figure 5 contain: Beach, Gardens, Golf Yards, Swimming Pools, Lakes, Waterpark facilities, Sports Courts and Outdoor Activities Center (Adults – kids areas). Every hotel has a special character in activities and recreation open spaces.

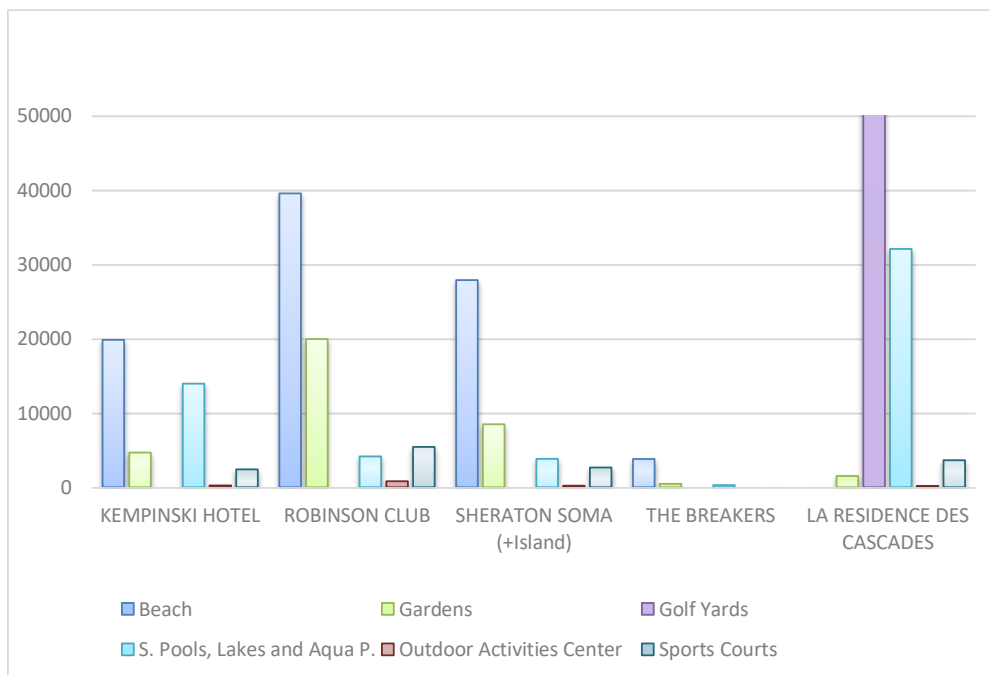


Figure 5: Comparison of the area of recreational spaces of 5 hotels in Soma Bay

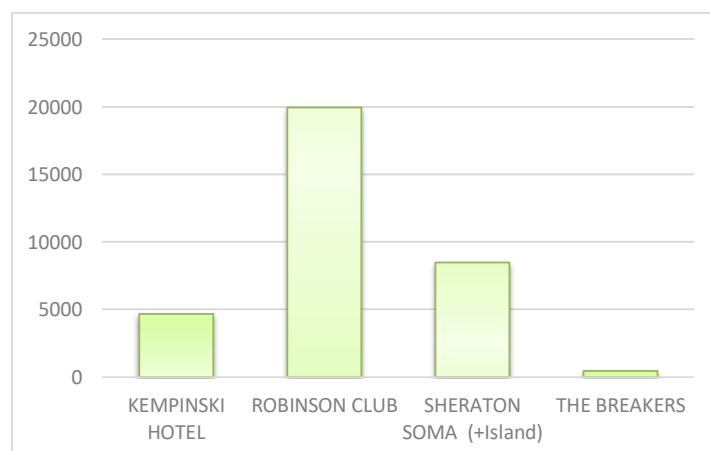


Figure 6: Comparison of the garden area (greenery places)

As shown in Figure 6, the papers also highlighted the Gardens areas in each hotel to be able to understand the operating cost of landscape (in following study). this paper made an assess for Soma Bay landscape existing situation (38561sqm). And measured the xeriscape principles as criteria shown in Figure 7. Some of landscape operating practices ware matching with the Xeriscape Principles:

- landscape was designed in the project design phase.it considers the climate, views, functions and the watering needs. But recently there are many modifications done for view reasons without any planning.
- Lawn is Limited with functions except rarely spaces.
- Some plants are native but most of plants are not water efficient.
- Irrigation systems are efficient at all resort gardens except stuff residence gardens. And most of gardens irrigated with Grey water and sea-water desalination.
- Soil of gardens (up to 75%) was prepared before cultivation.
- Mulches are not used at all.
- landscape maintenance is taken care regularly according to timelines and careful follow-up.

Findings show that landscape is Xeriscape up to 62%. that is meaning that Landscape is already conserving water and materials (and saving 37.2% of traditional gardens cost).

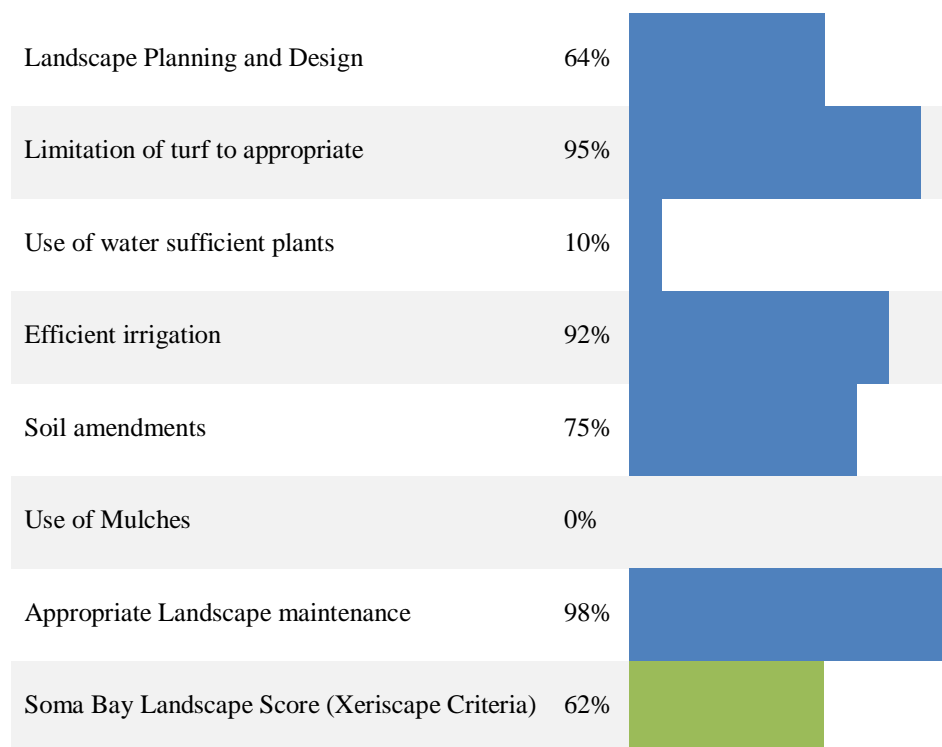
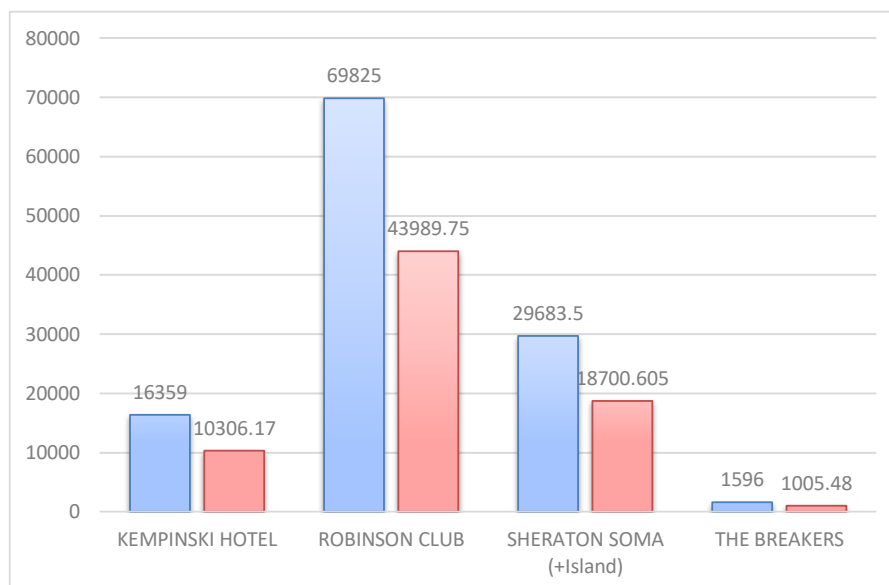


Figure 7: Results of applying Xeriscape evaluation approach.

Findings also revealed the amount of irrigation water used in resort gardens (grey and treatment water) as shown in Table 3 and the amount of irrigation water reduced by applying Xeriscaping illustrated in Figure 8. Sea-water desalination and gray water treatment stations provide 1000 m³/day of water covers all hotels, gardens and golf yard's needs. By using Xeriscape as a method makes a huge reduction in water consumption in gardens. So by extension cost, waste and manpower reduced.

Table 3: Daly Water Consumption in Garden (liters) per meter² (average).

Hotel Name	Gardens Area (m ²)	Existing Irrigation Water(L)	Xeriscaping Reduction rate	Irrigation Water after using xeriscape (L)
KEMPINSKI HOTEL	4674	16359	37%	10306.17
ROBINSON CLUB	19950	69825	37%	43989.75
SHERATON SOMA (+Island)	8481	29683.5	37%	18700.61
THE BREAKERS	456	1596	37%	1005.48
Other Spaces (streets and Parking areas)	4956	17346	37%	10927.98
Total	38517	134810	37%	84929.99

**Figure 8:** Xeriscaping reduces the amount of irrigation water

6. Conclusion

Some coastal resorts in Egypt are already applying some sustainable practices to reduce the running cost of landscape (20%-35%). But they need to apply more practices to achieve the optimum situation (Xeriscape = 60% saving). By using the aforementioned proposal system generated by the aim of the research, there are many Sustainable practices could reduce the cost of recreation open spaces. as well as serve the principles of sustainable development and contribute to the creation of more pleasant settlements. The proposal system connected to property and recreation open spaces developments could consist of the following three sections: A) Local Government Module.

B). Developer/Investor Module.

C). Public Space Developmental Contribution Module.

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