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THÈME

**CONTRIBUTION TO THE STUDY OF THE
INTEGRATION OF SHARED GARDENS IN THE
URBAN ENVIRONMENT OF EL-KALA
NATIONAL PARK.**

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DEDICATION

I would like to introduce this memo to my Parents for their gratitude and tiredness on me.

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To all the friends I had in college.

Finally to Sushi, my beloved cat.

ABSTRACT

This study was conducted at the level of El-Kala National Park in the first half of 2024. This park undergoes a lot of approvals throughout the year. A forest fire can sometimes lead to the passage of one of its richest ecosystems from the highest point to the bare ground. In order to propose an urban development method that would be beneficial for the restoration of the park's habitats, we evaluated the capacity of park inhabitants to integrate shared gardens. This concept is well known and recognized for its diverse interests.

To begin an internship of mastery of techniques of management of the green fools was carried out in the nursery of the National Park, in parallel, a digital questionnaire was shared via social networks to study the opinions of residents of the park on the idea of integrating shared gardens in urban zone. Our results show that park residents support the idea and even actively encourage it.

المخلص

أجريت هذه الدراسة على مستوى الحديقة الوطنية للقالبة في النصف الأول من عام 2024. تخضع هذه الحديقة للكثير من المخاطر على مدار العام.. حيث يمكن أن يؤدي حريق الغابات أحيانًا إلى مرور أحد أغنى أنظمتها البيئية من ذروة التوازن البيئي إلى أرض جرداء عارية. من أجل اقتراح طريقة تنمية حضرية من شأنها أن تكون مفيدة لاستعادة توازن الحديقة، قمنا بتقييم رأي سكان الحديقة في تقبل فكرة انشاء حدائق مشتركة. وهذا المفهوم معروف جيدًا عالميًا ومعترف بإيجابياته المتنوعة. ابتدأت هذه الدراسة بتدريب على إتقان تقنيات إدارة الحقول الخضراء على مستوى مشتل الحديقة الوطنية، بالتوازي، تمت مشاركة استبيان رقمي عبر الشبكات الاجتماعية لدراسة آراء سكان الحديقة حول فكرة دمج الحدائق المشتركة. اظهرت نتائجنا أن سكان الحديقة يدعمون الفكرة بل ويشجعونها.

RESUME

La présente étude a été menée au niveau du parc national d'El-Kala durant le premier semestre de l'année 2024. Ce parc subit de multiples perturbations tout au long de l'année. Un feu de forêt peut parfois conduire au passage d'un de ses écosystèmes les plus riches du stade climax au stade sol nu. Afin de proposer une méthode d'aménagement urbain qui serait bénéfique pour la restauration des habitats du parc, nous avons évalué l'aptitude des habitants du parc à intégrer des jardins partagés. Ce concept est bien connu et reconnu pour ses intérêts divers.

Pour commencer un stage de maîtrise des techniques de gestion des espaces verts a été effectué dans la pépinière du Parc National, En parallèle, un questionnaire numérique a été partagé via les réseaux sociaux pour étudier les opinions des habitants du parc vis-à-vis l'idée d'intégrer les jardins partagés en zone urbaine. Nos résultats montrent que les résidents du parc appuient l'idée et l'encouragent même activement.

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INTRODUCTION

A protected area is a classified geographical area. The International Union for Conservation of Nature (IUCN) defines a protected area as: "a clearly defined geographical area, recognized, dedicated and managed by any effective means, legal or otherwise, to ensure long-term nature conservation and services ecosystem and associated cultural values". Article 2 of Law n 11-02 of 17 February 2011 (n1-appendix) defines a protected area as: "the territory of all or part of one or more municipalities as well as areas within the maritime public domain subject to special regimes for the protection of fauna, flora and terrestrial ecosystems, lake, coastal and/or marine concerned". Given the richness of its biological diversity, Algeria was concerned with Protect and preserve its fragile and extremely rare natural environments that can serve as vital support to human populations. And with the establishment of a real network of spaces monitored and protected by the government, the area of protected areas has increased since the creation of the concept of biosphere reserve by UNESCO in 1971. In recent decades, Algeria has implemented a policy to protect these protected areas, leading to their classification under international conventions (Ramsar and Biodiversity). It uses its satellite technology to better monitor protected areas. There are dozens of protected areas in Algeria that are divided between national parks, nature reserves and wetlands [1].

The protection of nature, which became a global leitmotif in the 1970s, impose on the Algerian authorities who do not want to remain on the sidelines of this movement. The first law on the environment, was promulgated in February 1983, to enshrines the principle of the creation of protected areas of Algeria. It was followed a few months later by the statutes of the national parks which lay down the framework, the missions and the prerogatives of these public establishments for the nature conservation. In order to preserve natural resources and curb their degradation, the Algerian public authorities have developed areas to meet conservation objectives of fauna and flora. These protected areas include eleven national parks, four nature reserves, four hunting reserves and tree hunting centres. These areas cover an area of approximately 53,000,000 hectares. The parks of Djurdjura, El Kala and Tassili have been classified Biosphere Reserves by UNESCO [2].

The eleven national parks are: eight parks in the north of the country with a total area of 165,362 ha, which fall under forest Administration: ‘Theniet El Had (1983, 3,426ha), Belezma (1984, 7,600Ha), El Kala (1990, 80,000 ha), Tlemcen (1993, 8,225 ha), Djurdjura (1997, 18500Ha), Chr ea (2003, 26,000 ha), Gouraya and Taza (2004, 1,000 ha). One parc in steppic area: Djebel A issa National Park with an area of 24,500 Ha, in the wilaya of N ama classified in 2003 by the Ministry of Territory and the environment; tow parks in the far south: Tassili (1982, 100,000 ha), and Ahaggar (1987, 380,000 ha) [2].

Early nursery history tells that in 1883 Frederick Hinsdale Horsford and Cyrus G Pringle went into the nursery business together. As botanists they had travelled throughout North America collecting plants. In 1893 Horsford bought out Pringle and created F. H. Horsford Nursery in Charlotte, Vermont. The nursery is still in existence on the same acreage. Horsford was an avid hybridizer and was known as an international pioneer in the hybridizing of lilies. Horsford offered nearly 60 varieties for sale in 1895. The nursery business grew, so the selection of plants had included trees, shrubs, perennials, vines, evergreens, and roses. They were all grown from seeds, divisions or rooted cuttings, started in a glass greenhouse, and then neatly aligned in the perfectly maintained fields. The plants were dug at the right time, in bare soil, packed in crates, and loaded onto a wagon. Crew often carted plants to the Essex, NY ferry and shipped them to gardens all over the world. By 1928 the state of Vermont listed nearly 40 nurseries doing business in the state with F.H. Horsford being the oldest and largest. The next 80 years brought on many changes in the nursery business. Horse and wagons were replaced with gas-powered trucks, plants were dug and held in pots and sold over the course of the spring, summer, and autumn. Slowly, mail order stopped and all business was done at the nursery. By the late 1970s much of the plant material sold was bought in rather than grown on site. The once informative catalog was discontinued [3] Recent Nursery HistoryI in 1985 with the idea of returning the business to its glory days, Charlie Proutt and Eileen Schilling purchased the nursery. Hard work, long hours, and great help from like-minded nurserymen and women enabled them to realize that vision. The nursery once again grows 90% of the plants they sell either from cuttings, seeds, or root division. Two glass greenhouses are used for annual growing in the spring. Field-grown trees, shrubs, and evergreens are sold at the nursery to local gardeners and landscapers. Extensive display gardens have been added, as has a garden gift shop. Neighboring land was purchased in the mid 1990s, bringing the total acreage up to nearly 50. Horsford's has worked hard to implement new-age, sustainable practices when it comes to water conservation, pest

management, weed control, and use of cover crops at the nursery. The nursery employs many local team members who have degrees and valuable experience in horticulture. While many things have changed over the nursery's more than 125 years, some things remain the same. A trip to Horsford Gardens and Nursery is a memorable experience, one worth repeating often [3].

Cultivation methods vary from place to place, especially with the development of today's world. Agriculture is the most important source of human nutrition and as used in various journals such as livestock feed, but before farming must create nutrient-rich soil, weed and insect's disposal, and choose suitable seeds to give a good product.

Integrating shared gardens into the management strategy for El Kala National Park. This study presents the integration of community gardens as a promising solution to address ecological degradation and biodiversity loss. By engaging communities, providing economic opportunities, and promoting environmental education, shared gardens can play a pivotal role in the sustainable development and restoration of the park.

1.1. EL-KALA NATIONAL PARK PRESENTATION.

El-Kala National Park is the largest national park in the north of Algeria, stretching over an area of 76,438 ha, which represents 26% of El-Tarf Wilaya. Its highly varied ecosystems classify it among the world's protected sites. The park benefits from an internationally renowned wetland complex. It contains endemic and endangered species. It is home to the striped yenne and serves as one of the last refuges for the Barbary deer. El-Kala National Park is highly forested, covering more than 69% of its surface area. It extends over a coastal strip of 40 km rich in coral and fish and a navy fringe along the Tunisian border for 98 km. The park's geographical boundaries include nine municipalities, six of which are entirely located within this natural space. Classified as a biosphere reserve in 1990 and renowned for its Ramsar sites, El-Kala National Park encompasses a mosaic of natural, marine, dune, and lake environments, all taking socio-economic constraints into account [5].

The institution's name is El-Kala National Park,

Guardianship: Ministry of Agriculture and Rural Development,

Status: Protected Area.

Creation Decree: NOT°83-462 relating to environmental protection.

The number of residents in the area is 134,000, and there are nine new municipalities. The municipalities fully include Elkala, Om-Teboul, El-Aioun, Ramel Souk, Ain El-Assel, and Bougous. The municipalities partially include:El-Tarf, Boutheldja, and Berrihane.

Administrative situation: El-Tarf Wilaya. Geographic location: Far North-East Algeria. Geographic coordinates: 36°55-36°90N, 8°43 E Altitudes: 30–1202 m Bioclimatic stage: hot sub-humid Sectors: Brabtia sector: 28,000 ha; Oum teboul sector: 26,438 ha; Bougous sector: 22,000 ha Important rankings: Biosphere Reserve (December 17, 1990) UNISCO: Ranking of six sites on the RAMSAR list, Figure 1. El-Kala National Park location (ref.).

El-Kala National Park, under the guardianship of the Ministry of Agriculture and Rural Development, holds the status of a protected area as established by Decree No. 83-462 relating to environmental protection. The park is home to 134,000 residents and encompasses nine municipalities, which include El-Kala, Om-Teboul, El-Aioun, Ramel Souk, Ain El-

Assel, and Bougous in their entirety, and El-Tarf, Boutheldja, and Berrihane partially. Located in the Far North-East of Algeria, the park spans coordinate 36°55'-36°90'N and 8°43'E, with altitudes ranging from 30 to 1,202 meters. The park experiences a hot sub-humid bioclimatic stage.

El-Kala National Park is divided into distinct sectors: Brabtia sector (28,000 ha), Oum Teboul sector (26,438 ha), and Bougous sector (22,000 ha). The park has earned notable environmental accolades, being designated as a UNESCO Biosphere Reserve on December 17, 1990, and having six sites listed on the RAMSAR list. Additionally, the park boasts diverse ecosystems, including 5,836 hectares of RAMSAR sites, 43,000 hectares of cork groves, and 9,292 hectares of strictly protected reserves. Its rich ecological variety is further highlighted by 12 types of natural terrestrial environments and 10 types of remarkable natural marine environments [4].

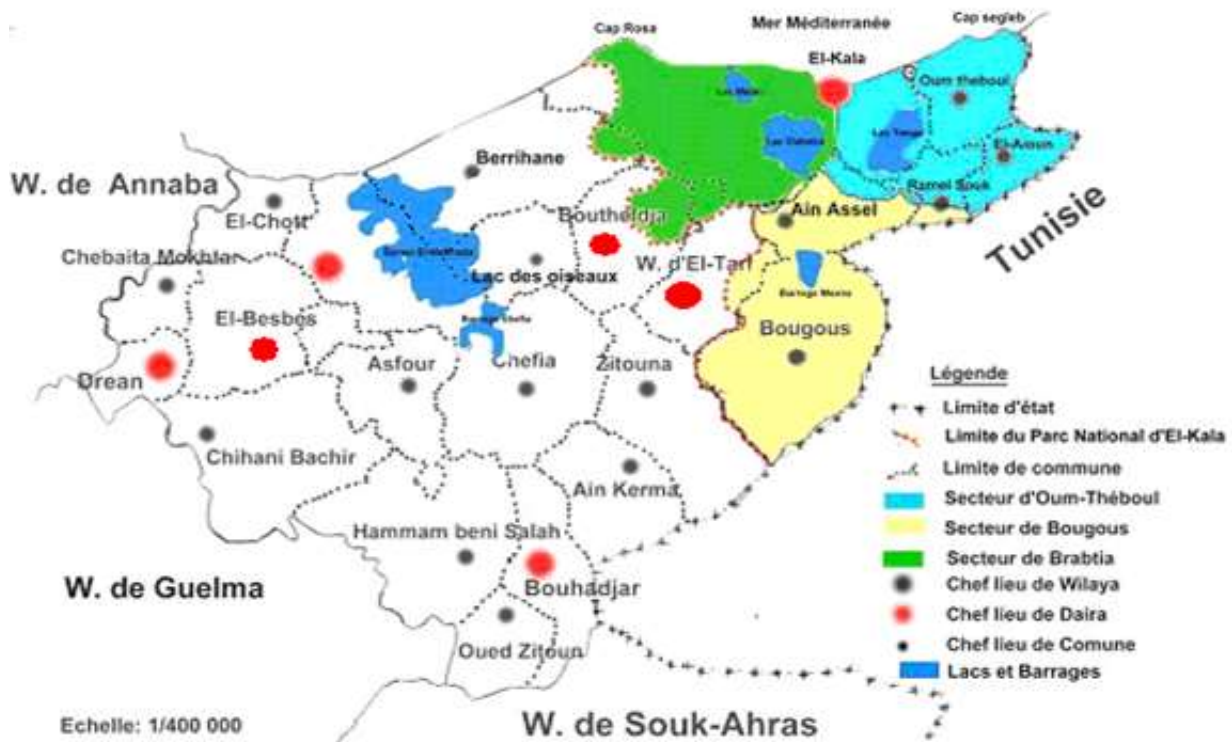


Figure 01. El-Kala National Park location [5].

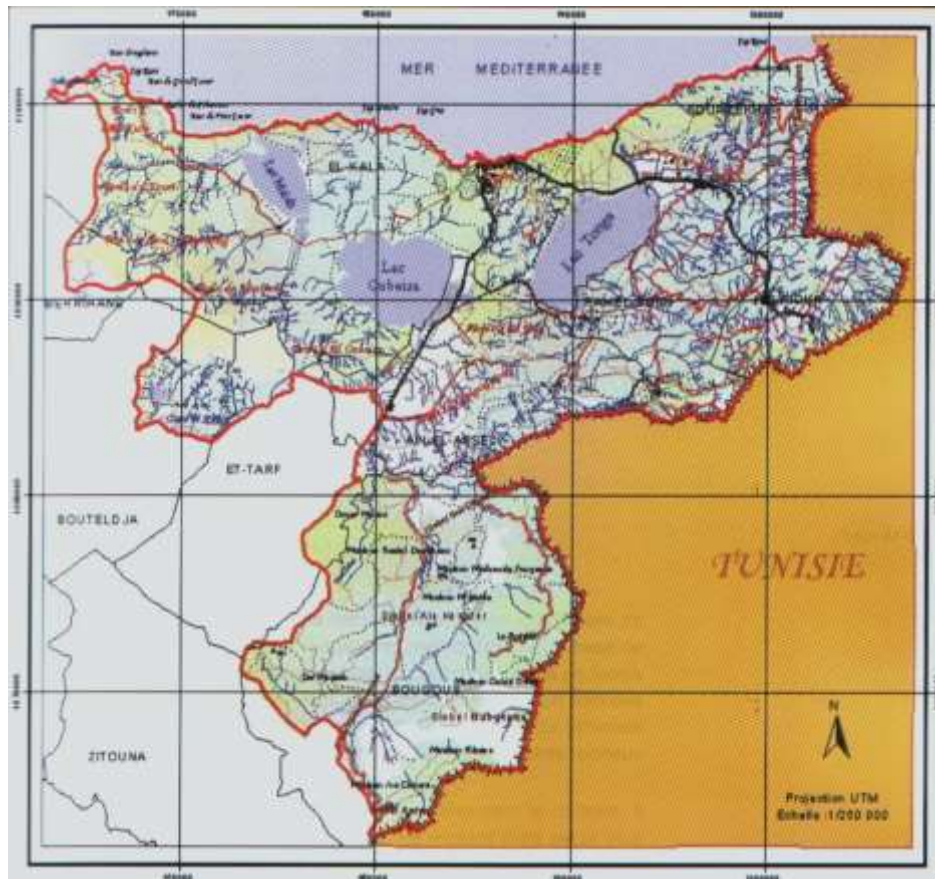


Figure 02. El-Kala national park zone boundary map [4].

1.1.1. The park's ecosystems

Natural wealth, results in a mosaic of interdependent ecosystems: going from the sea towards the interior we observe the following succession of ecosystems [5]:

- **Coastal ecosystem**: extends from east to west over a length of 40 km from Segleb Cap to Rosa Cap, limited in the interior by a very diversified supra-littoral barrier.
- **Dune ecosystem**: extends from east to west over a length of 40 km, and an average width of 04km plunges towards the south to the foot of Segleb mountain, this cord is colonized by denser vegetation of Kermes oak and Melia and Retiame and Maritime Pine.

- **Lake ecosystem:** represented for large inter-hill depressions, where the main lakes are located: Tonga, Oubeïra, Mellah, Bleu, Noir
- **Forest ecosystem:** is characterized by the area of cork oak in association with Zene oak, Maritime and maquis pine and the lawn with a total area of 54,000ha.

1.1.2. PNEK Zoning

Currently five different classes of protection are defined in the park [5].

Table 01. PNEK's areas [5].

Areas	Area (HA)	Features	Area of wilaya (%)
Full reserve	9292	Wetlands and significant population	3.21
Wild reserve	9222	Sensitive dune environments	3.18
Low growth	29859	Forest ecosystem production	10.32
Buffer	26274	Periphery of integral zones	9.08
Peripheral	1791	Relaxation and leisure area	0.61
Total		76438	26.40

Full reserve: these areas contain resources of a unique or particular nature. The zones and sub-zones of this class are entirely exempt from any intervention with the exception of investigations of a scientific nature. Any interventions are subject to authorization from the Minister responsible for the environment.

Primitive or wild: these areas are made up of specific natural environments which must be maintained in their state as a control sample to be compared to natural environments that are degraded or in the process of being degraded. Interventions in this class must not modify the natural atmosphere. They are subject to authorization from the Minister responsible for the environment.

Low growth: these areas contain natural environments in development or with a particular aesthetic to be preserved. They can be places for cultural, scientific, sporting, tourist, leisure and relaxation activities linked to nature as well as areas for the development of agricultural and artisanal resources.

Buffer: these areas separate rigorously protected areas from areas open to use related to nature such as agriculture and forestry. In this class any intervention is subject to authorization from the Wali after advice from the Director of the National Park.

Strong growth or peripheral: This category contains the towns included in the National Park, where socio-economic structures and infrastructures are concentrated. These must comply with the provisions of environmental law regarding nuisance. Any intervention outside the master urban planning plan of the municipal capitals must be subject to authorization from the Wali.

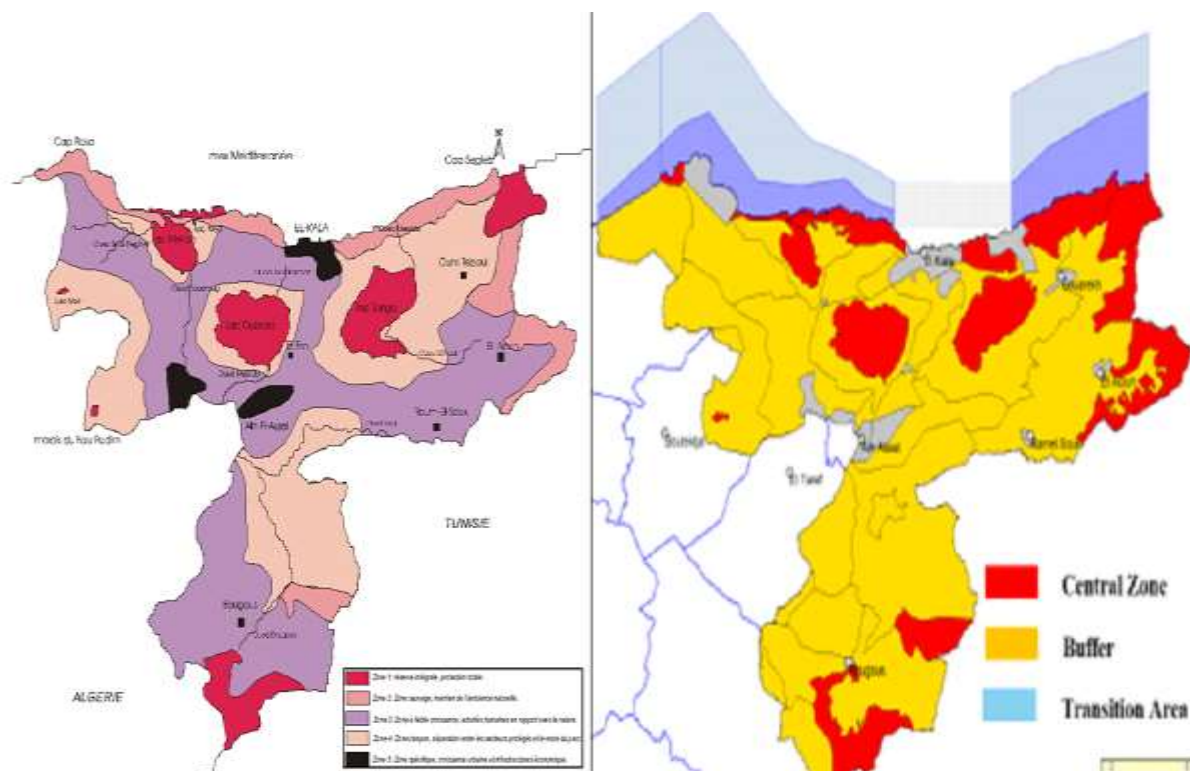


Figure 03. The park zoning (Left: before law 11.02, right after this law) [5].

1.1.2.1. El-Kala National Park Richness

The region is distinguished by its vast natural expanses, including 54,000 hectares of lush forests, 5,851 hectares of vital wetlands for biodiversity, and 40 Km of picturesque coastline. Additionally, 40 Km of dunes shape the coastal landscape, providing a unique ecosystem and natural protection against erosion. These natural elements are essential for preserving biodiversity and maintaining local ecological balances [5].

1.1.2.2. Classed natural areas

the region is further characterized by 5,836 hectares of Ramsar sites, which are recognized for their importance to global biodiversity. Additionally, there are 43,000 hectares of cork groves, contributing to both the local economy and the environment. The area also includes 9,292 hectares of sites classified as strict reserves, ensuring the highest level of protection for these crucial habitats. The diversity of the region is highlighted by the presence of 12 types of natural terrestrial environments and 10 types of remarkable natural marine environments, underscoring the rich ecological variety found here [5].

Table 02. Main lakes and swamp areas [5].

Lakes And Swampy	Depth	Area (Ha)	PNEK (%)	Ranking year	GPS
Lake Tonga	1-1.5m	2600	3.40%	1982	N 36°52'55" S 8°30'40" E 36°49'35" W 8°28'15"
Lake Oubiera	0-04m	2200	2.87%	1982	N 36°51'55" S 8°25'10", E 36°49'40" W 8°21'20"
Lake Mellah	0-06m	860	1.12%	2004	N 36°55'00" S 8°20'50" E 36°52'30" W 8°18'20"
Black Lake	-	05	0.006%	2002	N 36°51'10" E 8°12'10"
Bourdim Marshes	-	11	0.014%	2009	/
Blue Lake	-	04	0.005%	2004	N 36°55'00" S 8°20'50" E 36°52'30" W 8°18'20"
Nechat Ain Khia	-	170	0.22%	2002	/

1.1.2.3. PNEK's biodiversity

Faune: the fauna of El-Kala National Park is equally diverse. It includes 39 species of mammals, 16 of which are protected, and 195 species of birds, 71 of which are protected, representing 66.35% of protected avifauna in Algeria. Among the birds, there are 98 forest species (18 protected), 64 water species (26 protected), 9 seabird species (2 protected), and 25 raptor species, all protected. The park also hosts 17 species of reptiles, divided into 7 families with 3 protected species. These reptiles include 4 species of chelonians (turtles), 8 species of saurians (lizards), and 5 species of ophidians (snakes). Amphibians are represented by 7 species, divided into urodeles (2 species) and anurans (5 species, dominated by the green frog). The park's fish population includes 14 species of freshwater fish and at least 33 species of marine fish. Invertebrates are represented by 223 species of insects, including 76 species of diptera, 60 species of beetles (3 protected), 42 species of odonates (12 protected), and 45 species of lepidoptera (2 protected). This rich biodiversity underscores the ecological importance of El-Kala National Park [5].

The terrestrial area of the park is home to several key animal species. Among the mammals are the Barbary deer (*Cervus elaphus*), otter (*Lutra lutra*), striped hyena (*Hyaena hyaena*), genette (*Genetta genetta*), and monk seal (*Monachus monachus*). Bird species include the white-headed duck (*Oxyura leucocephala*) and greylag goose (*Anser anser*). This rich biodiversity underscores the ecological importance of El-Kala National Park [5].

Flora: at the marine zone level, the flora is diverse, with marine phanerogams such as *Posidonia oceanica* and various algae species (66 in total) including lichens, rhodophytes, chromophytes, and chlorophytes. The main plant species in the marine area include Rhodophyta-Rhodophyceae like *Lithophyllum lichenoides*, such as *Cystoseira spp.*, and like *Posidonia oceanica* [5].

In the terrestrial areas, the flora includes a variety of trees, shrubs, and herbaceous plants. Notable tree species are the cork oak (*Quercus suber*), zen oak (*Quercus faginea*), and glutinous alder (*Alnus glutinosa*). The shrub layer features species such as the arbutus (*Arbutus unedo*), myrtle (*Myrtus communis*), mastic (*Pistacia lentiscus*), azerolier (*Crataegus monogyna*), and bay leaf (*Laurus nobilis*). Herbaceous plants include the yellow water lily (*Nymphaea lutea*), white water lily (*Nymphaea alba*), and water adornment (*Marsilea diffusa*).

The diverse plant life supports a rich array of wildlife, highlighting the ecological importance of El-Kala National Park [5].

The map below represents the newly defined central, buffer, and transition zones based on an integration of previous classifications. The new central zones now encompass what were formerly known as the integral, primitive, and wild zones. The buffer zones have been expanded to include areas previously designated as low-growth and buffer zones. Lastly, the new transition zones have been redefined to incorporate what were once considered peripheral zones [5].

Table 3. Park’s area and demarcated zones [5].

Areas		Area (ha)
Central zone (terrestrial)		17,380
Buffer zone (terrestrial)		61,382
Transition zone (terrestrial)	Urban zones, ZET and peripheral classes old zoning	4,284
Total		83,046
Marine Zone		29,555

1.2. SHARED GARDENS OR COMMUNITY GARDENS

Community gardens have a rich and diverse history that dates back several centuries, but their modern popularity is often associated with social and environmental movements of the 20th century. Originating from 19th-century allotment gardens in Europe, where spaces were allocated to workers to grow vegetables, community gardens gained momentum during the industrial revolution as a response to urban poverty and food scarcity. They saw a resurgence in the 1960s and 1970s as part of environmental movements, fostering urban revitalization and ecological awareness. Today, community gardens are recognized for their multifaceted benefits including local food security, ecological sustainability, and community cohesion, serving as important spaces for social interaction and health improvement. Their evolution continues to reflect changing urban and rural needs worldwide, while remaining rooted in traditions of sustainability and community connection (adapted from "History of Community Gardens," Sustainable Communities Online).

A community garden is simply a plot of land gardened by a group of people. Utilizing either a public or private space, these gardens grow fruits, vegetables, flowers and/or other plants and trees. They can be one garden maintained by many or broken up into plots for individuals to use. They can also charge dues or ‘rent’ for the plots, or they could be sponsored and offer free land for the community to garden. The only real requirement to be a community garden is that the members of the community garden and tend the land [6 - 7].

Community gardens provide various economic, ecological, and social benefits for urban dwellers with the potential to lead to more sustainable cities. Community gardens provide access to social networks that fulfil various social functions, like social interaction, community cohesion, or education and learning [8].

1.2.1. Creation of the community garden

1.2.1.1. The creation steps:

To create a community garden there are steps to follow:

Find available land: before to build a garden, you must find the good location. Look around your community and find land that is available, near water, and with decent soil or enough ground to build containers. Vacant lots are often a great option, as long as you can get permission to build the garden there for the growing season. You might need to rent the space; in which case you’d need to charge for plots in the garden. Also, check the zoning laws to ensure building a community garden won’t violate any local regulations [9].

Find The Garden Coordinator: he is responsible for ensuring the upkeep of the overall garden. In addition, this person is the point of contact for individuals who rent a plot within the garden [10].

Involve neighbours & friends: it takes dedication and hard work to start a new community garden. Begin with a group of dedicated people to make the gardening program successful. Five interested families or a comparable group are a baseline minimum to create and sustain a garden project. Survey the residents of your neighborhood, community, or building to see if others are interested and willing to participate. Once the group (committee) is formed, hold monthly community meetings, establish a social network on social media with other interested

families or individuals to share ideas for your gardening group name and function, and initiate plans and delegate responsibilities. Make sure stakeholders are involved in the planning process and keep everyone updated on the garden's progress. Other key stakeholders to be involved are local elected officials that can connect the gardening group to vital city and/or county resources that are available to support public projects [11].

Maintenance and care: the individuals and families participating in the community garden will need to recognize that gardening is not a once and done endeavor. From planting to harvest, some level of regular ongoing involvement will be necessary. At a minimum, the garden will require a few hours of care on a weekly basis. From weeding and watering to inspecting the garden for harmful in-sects and diseases, the level of maintenance will vary from week to week [12].

1.2.1.2. The benefits of community gardens

Community gardens have a significant impact on the community in different sectors and mention the death of [13 - 17]:

Help the Environment: community gardens:

- Help improve air and soil quality,
- Increase plant biodiversity and livestock,
- Improve water filtration,
- Reduce neighborhood waste and food trucking miles.

These positive changes to the local environment collectively contribute to reducing overall air pollution. In addition to these changes.

The social and ecological: improves aspects of our environment:

- Restoration of vacant land and ecosystems by repurposing them,
- Production and upgrading of water infiltration and other ecosystem services,
- Promotion of biodiversity by planting native plants,
- Educating the community about gardening.

The urban agriculture: and their benefits:

- Reduction of food transport lessening air pollution,
- Promotion of sustainable agriculture practices,
- Fostering social inclusion.

The above environmental benefits show the overall importance of community gardens and their contribution to providing habitat for organisms and food to the locals, eliminating food insecurity.

Health benefits: the most prevalent theme was the ability of community gardens to provide health benefits. These benefits include physical activity, improved diet and mental health. Community gardens were identified as a way for governments to promote sustainability, encourage walking through the use of open, outdoor spaces, and provide settings for rehabilitation for individuals with mental illnesses or learning disabilities.

Reduce pollution: community members can consume vegetables and, in some cases, fruits grown in a community garden, increasing fresh produce intake. This is particularly true for communities in which individuals tend to not have a healthy or nutritious diet. Growing food in the community can reduce greenhouse gas emissions and waste from the total life cycle of food production. This is because it does not contribute to polluting food production practices, and the food does not have to travel across the city, state, region, or world to reach consumers. Compared with commercial farms, it is easy for community gardens to avoid pesticide use, creating a more sustainable and environmentally friendly food source. Community gardens also often practice composting, which can help to reduce pollution.

Reduce crimes: neighbors engaged in community gardening become better at looking out for one another. As their feelings of empowerment increase, their attitudes and perceptions of the neighborhood improve, as do their crime watch activities. Cutting overgrown grass, cleaning up broken glass, and removing illegal trash dumping may help curb crime. According to research by the University of Michigan, communities that repurpose vacant spaces for activities such as gardening experience higher reductions in neighborhood violence and crime than neighborhoods that do not clean and repurpose vacant lots.

Strengthening communities: working in the garden together also provides opportunities for positive social interaction between members of the community. Often in a busy society,

neighbors are strangers each other. Involvement in a community garden opens to meeting and working alongside neighbors, may not have had a chance to meet. These gardens will be shown to improve surrounding property values by eliminating vacant lots and illegal dumping, common in empty buildings and lots, are reduced in neighborhoods that replace empty lots with farms, creating a safer and more connected community. Community gardens also provide participants greater economic opportunities through skills training or by selling produce at farmer's markets. Participants can learn skills in planning, food production, and business and apply them to their careers or pursuits for greater personal growth.

1.2.1.3. Community gardens around the world

In recent years, the idea of community gardens has become popular in the world due to its many benefits and among the most important gardens in the world, we mention [18 - 21]:

In Russia: collective gardens appeared at the end of the 1930s in parallel with the boom a collective urban and rural housing. The plots are then intended for workers and in the 1950s and 1970s, in the face of growing demand for population and a failure of the planned system of production and distribution of goods in the USSR, an extension of the collective garden system was decided. Since the 1990s, collective gardens are expanding. As elsewhere, they were closely correlated with economic and agricultural crises. The ownership of these gardens was primarily linked to a strategy of food production and diversification but also to other aspects include: social connection, network development and strengthening (exchanges, barter, ...etc., source of social prestige, space for leisure and relaxation.

The Gardens du Ruisseau in Paris: The pioneers of parisian shared gardens were those of the 1998s. The inhabitants of the porte de Clignancourt neighbourhood were tired of seeing garbage piling up on the quays below the former little belt. To replace the open landfill, they decided to form an association to rehabilitate this abandoned wasteland. The Jardins du Ruisseau, named after the street over the railway above, was officially created in 2004. 1.5 ha of SNCF network property, leased by the City of Paris which ensures and finances of the development, via an exclusive management agreement, signed with the association. Pretty well-maintained plots, and composting areas managed by local residents. Over the years, this long oasis, squatting the old quay facing south, grows, clings to the steep slopes, covering

here and there the graffiti. An apiary is born, then a henhouse, a vineyard. But in reality, only a third of the members were gardeners, the remaining two-thirds just taking advantage of the spot to relax, read, picnic (tables and chairs available!) ...etc. To note also, beyond the open doors (provided three half-days a week, from 14h to 19h), the association also organizes several major festive events every year.

City Farmer – Vancouver, British Columbia: as the first organization to provide resources on the internet on urban farming, City Farmer is a resource site that provides all city dwellers with accessible information on how to contribute to environmental stewardship by maintaining eco-friendly households in an urban setting. In addition to providing tips and tricks like collecting rainwater and making compost for an urban garden, this 39-year-old organization also runs their own demonstration garden that shows community members how to build a green roof or grow organic vegetables among many other valuable lessons. If you're ever in the Vancouver area, the City Farmer team is open to visitors stopping by to visit and learn.

In India: In much of the world, urban gardens provide not only public green space, but critical sources of food security and nutrition for impoverished urban residents. According to the World watch Institute, "urban agriculture, credited with producing 15 to 20 percent of the world's food in 2011, can be a driving force of urban nutrition and community development." India has about 93 million slum dwellers, and as much as 50 percent of New Delhi's population and 60 percent of Mumbai's are estimated to live in these informal settlements. Residents in the dense slum of Ambedkar Nagar in Mumbai recently converted a dumpsite into a community garden. Formerly, the waste had become as high as a two-story building, propagating diseases and threatening the nearby Mithi River and residential water pipeline. With help from local organizations, the community mobilized to clean the area and raise awareness of waste management and composting. In addition to greatly improving public health and containing waste, the site is now covered in greenery and attracts butterflies rather than flies. When event halls are too costly, families have even turned to the garden as a wedding venue.

1.2.1.4. Types of community gardens

Due to the benefits of common parks, they have been classified in several types of them [22 - 24]:

Allotment gardens: personalized plots: allotment gardens allocate individual plots to community members, providing them with a designated space to cultivate as they see fit. These personalized plots empower individuals to manage their own piece of greenery within the larger community garden framework.

Youth gardens: students need to learn how to grow vegetables in healthy soil and how to care for them. These skills can be used to transfer knowledge from the classroom or from college. Students can sell vegetables in their local food markets to get exposure to new products and flavors in their food. The proceeds from the sale will pay for the produce and encourage others to grow organic vegetables. From the profits the students can purchase products they like from the market and then buy other produce they are interested in and not in their garden. Students will save money by not having to buy fresh produce all the time. Students interested in producing more than vegetables might consider other types of community gardens, such as fruit gardens. And might also consider being creative especially if the plot of land does not allow for an outdoor vegetable plot. And can also grow greens in potted containers in the space they have for example on a balcony or window.

Entrepreneurial / job training market gardens: are typically established by nonprofit organizations or other agencies to teach business or job skills to youth or other groups. They grow and sell the produce they raise. Proceeds from the sale of garden products are used to pay the participants for their work. Programs typically rely on outside sources of funding to offset costs.

Therapeutic Gardens: these types of gardens tend to be found in places such as hospitals, nursing homes / assisted living facilities, botanical gardens, and outpatient treatment centers. These might be gardens that offer a peaceful respite and are designed for people with physical or other limitations.

1.2.2. Plant nurseries

Plant nurseries come in various types, each catering to specific needs. Wholesale nurseries grow plants in large quantities for sale to retailers, landscapers, and other businesses, typically having extensive land and greenhouse space. Retail nurseries sell directly to the public, often through a store or garden center where customers can browse and purchase plants. Specialty nurseries focus on specific types of plants or niches, such as orchids, bonsais, succulents, or native plants, often providing expert advice and care instructions. Finally, online nurseries sell plants through online platforms and deliver them to customers, using websites or e-commerce platforms to reach a wider audience, with logistics tailored for safe plant shipping. Each type of nursery serves different markets and needs, providing a variety of plants for hobbyists, homeowners, and commercial buyers alike. In agriculture, forestry, arboriculture or horticulture, a nursery is a field or plot of land reserved for the multiplication of woody plants mainly (trees, shrubs) but also perennial plants, and for their cultivation until they reach the stage where they can be transplanted or marketed. The term can also be applied to plots in which annual plants (including vegetables and flowering plants) are sown and raised to the stage where they are suitable for being “transplanted” into their final location [24].

The construction of a healthy nursery: respecting this critical include several essential elements. First, a waterproof roof, it is crucial to protect the nursery from rain. Covering the soil is necessary to prevent the growth of weeds and contamination by diseases present in the soil. The walls should protect against pests, such as birds, and the wind, while still allowing air to pass through for ventilation and to limit extreme heat. Multiplication tables should be 1.2 meters from the ground to limit the action of pests and contamination by soil diseases, as well as to facilitate work by providing better ergonomics. Additionally, there should be a high work surface for carrying out cultivation operations such as sowing and cuttings. An irrigation system is also essential, preferably one that uses fine droplet sprinklers with a programmer to ensure precise and consistent watering [25].

Types of nurseries: the term of a nursery varies according to several considerations (the duration of existence of the nursery, the humidity level of the soil at the location, the production and the type of equipment, etc.) [26]. In the world, there are two types of nurseries [27]:

- **The permanent nursery:** its installation is definitive, complete and solid in order to respond to a continuous planting program, it is a real plant production

factory. It requires significant investments to guarantee a regular production rate, and it is expected to cover the seedling needs of a vast region [28]. It is characterized by sophisticated and adapted equipment, an area greater than or equal to 1ha, a specialized and permanent workforce, a production of more than 10,000 plants and a duration of more than five years, ...etc., [29].



Figure 04. Permanent nursery in Madagascar [30].

- **The temporary or Volante nursery:** it is a temporary nursery established near the land to be planted. It is small in area, and has the advantage of not requiring large investments. The plants are produced in ecological conditions similar to those of the planting area, which reduces transport costs. It is characterized by minimal equipment, an area of less than $\frac{1}{2}$ ha, production rarely reaches 5,000 plants, occasional and trained labour on the job and lasts more or less tow years [30].

The soil of the nursery: nurseries can be classified according to soil moisture as a follow-up:

- **Dry nursery:** the nursery is qualified as a dry nursey when all soil preparation is carried out in a dry manner. Sowing is also carried out on dry soil with dry seeds [30].



Figure 05. nursery in dry land [31].

- **Wet nursery:** the wet nursery is a nursery where the work takes place in water or on wet soil. Sowing is done with pre-germinated seeds [31].



Figure 06. nursery in flooded/humid land [30].

Nursery production: nurseries can be also classified according to its production [31]:

- **Forest nurseries:** they mainly target the production of forest species (hardwood and softwood) or semi-forest.

- **Fruit nurseries:** they are intended to produce fruit plants.
- **Mixed nurseries:** they simultaneously produce forest, fruit and ornamental plants, as well as herbaceous and semi-woody plants.
- **Ornamental nurseries:** they produce plants for apartments and green spaces.

Functions and services of the nursery: the nursery plays a crucial environmental and educational role by promoting awareness about environmental conservation and sustainable development. It provides educational programs for schools and community groups, teaching about plant care, ecology, and the importance of green spaces. In terms of production and supply, the nursery cultivates a wide variety of plants, including ornamental plants, shrubs, and trees, and supplies these plants for landscaping projects, public parks, and private gardens. Moreover, the nursery contributes to the conservation of biodiversity by working on the preservation of native plant species and the restoration of natural habitats. It implements programs for the protection and propagation of endangered plant species. Economically, the nursery plays a significant role by providing jobs and supporting the horticulture industry, generating revenue through the sale of plants and horticultural services [33].

1.2.3. Eating bio / eating organic

Today eating organic is not a phenomenon of nutritionist mode, but a vital requirement for our health threatened by the consumption of food produced by an industrial agriculture abusing chemical fertilizers of intended to increase yield, and pesticides used for control of elements harmful to crops, plants and harmful evils at the expense of natural means guaranteeing of natural balance [30]. Organic food is produced in compliance with organic farming standards that regulate the way agricultural products are grown and processed. While the regulations vary from country to country, in the United Stat organic crops must be grown without the use of synthetic herbicides, pesticides, and fertilizers, or bioengineered genes (GMOs) [31].

1.2.3.1. Organic agriculture

In 1999, the Codex Alimentarius commission stated: Organic agriculture is a logistic production management system which promotes and enhances agro-ecosystem health, including biodiversity, biological cycles, and soil biological activity. it emphasizes the use of management practices in preference to the use of off-farm inputs, which takes into account that regional conditions require locally adapted systems. This is accomplished by using, where possible, agronomic, biological, and mechanical methods, as opposed to using synthetic materials, to fulfil any specific. Function within the system; after about eight years, a concise definition of organic agriculture was released in Vignola, Italy as follows: “Organic agriculture is a production system that sustains the health of soils, ecosystems and people; it relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects; organic agriculture combines tradition, innovation and science to benefit the shared environment and promote fair relationships and a good quality of life for all involved” [34].

Organic agriculture is the best type of agriculture because of the benefits it offers to society and the environment and therefore we must follow the principles of organic agriculture. Organic agriculture should sustain and enhance the health of soil, plant, animal, human and planet as one and indivisible. The principle of health in organic agriculture refers to the health of eco-systems, as well as the health of people and communities. Healthy soil produces healthy crops, and in turn, healthy produce leads to healthy animals and humans. Good health is imperative to our mental and physical wellbeing; it also increases our immunity and allows our body to regenerate. Organic agriculture aims to provide healthy food that is nutritious and superior quality. By not using fertilisers, pesticides and additives, organic food plays an extra part in aiding good health [34].

1.3. WORKING METHODOLOGY

This study was carried out over two parallel phases. the first step was to analyze the opinion of park residents with the intention of establishing shared gardens. For this we created a

digital questionnaire of which we shared the link in the most visited sites of the wilaya of El-Tarf. At the end we studied statically the results obtained (the opinions expressed).

The second represents a six-month internship at the nursery of the El-Kala National Park in order to master effective methods of green space management.

2.1. MANAGING GREEN SPACES

2.1.1. Soil preparation

To plant or cultivate and achieve a good yield of vegetables or beautiful plants, you must have a well-suited, rich, and loose soil. Before embarking on the creation of a beautiful garden or vegetable patch, whether following permaculture principles or opting for pesticide-free gardens, you need soil that is nutrient-rich, light, aerated, well-drained, which is often not the case (*Fig. 7*):

- Uprooting harmful weeds and cleaning the soil of impurities is the first step in preparing the soil for planting,
- Digging above the ground is necessary to facilitate the transplanting process and allow the plant to take advantage of the soil,
- Make sure that plants have enough space to grow and feed without any conflicts,
- Cover the plant's base with soil,
- The final step is to water the soil to ensure that the plant absorbs water and mineral salts.



Figure 07. Soil preparation.

- However, if the plant is planted inside a pot, the soil must be filtered well and then placed in the pot.



Figure 08. Soil preparation.

- Then, make a hole in the soil to place the plant in the pot and cover it with soil (A & B), In the last step, water the plant (C).



Figure 09. Potting.

2.1.1.1. Rich soil

The production of biomass and specific diversity are both enhanced by soils that are rich in nutrients (36). There is rich soil in the national park, light in texture, fertile, easy to work and gives good results in agriculture (loamy soil) (37). Silt ($\text{Ø}=50$ to $2\ \mu\text{m}$) consists of particles of variable chemical nature. They are unstable and play a very important role in soil fertility. Silts can be broken down into finer fragments or they can evolve through agglomeration or aggregation (38).

2.1.1.2. Poor soil

The poor soils limit plant growth and are less diverse at least in the vegetation (Sandy soil) [36].

The national park contains a dune ecosystem with dry soil that retains little water and mineral salts. Sand ($\varnothing=2000$ to 50 microns) is a type of soil that contains chemically stable rock fragments that are abundant in the coarse part of the soil, but their role is predominantly physical as they maintain the morphological organization of the soil [36].

2.1.2 Planting

Cultivation comes in many forms, but it's crucial to ensure the quality of the soil. To ensure a good product and suitable consistency for crops if the soil is poor, various types of soil can be mixed.

2.1.2.1. Planting the seed

In order to plant seeds, it is necessary to select a suitable soil type, filter it, place it in a container, place the seeds, and then apply sand and water to it.



Figure 10. Planting seeds.

2.1.2.2. Plant seedlings

Preparing a suitable place for planting plants is necessary to ensure they are exposed to the sun and have good soil, then cover them with soil and water.



Figure 11. Plant seedlings.

2.1.2.3. Transplantation

During the transplant process, the plant was transferred from El kala National Park (Wilaya of El-Tarf) to the wilaya of Annaba, to find out how the plant would adapt to the new micro-climate. The plant was removed from the pot, transferred to new soil, then the roots were covered with soil and watered.



Figure 12. Transplantation.

There are also different planting techniques; among them are the following technologies [37]:

Growing from cuttings: small segments of stem or leaf sections can be removed from one plant to generate a completely new one that is genetically identical to its parent. Fleshy-stemmed plants like begonias, nasturtiums, and pelargoniums can be grown easily from cuttings. Remove a new shoot, cutting just below the third set of leaves from the tip. Trim off the lowest set of leaves and make a fresh cut at the base of the stem. Insert the cutting into a pot of potting soil. Cover the plant with a plastic bag or the top half of a plastic bottle to conserve moisture, keep it in a light airy place until a root system develops. The plants can then be transplanted to a large pot and gradually moved outside.

In mild climates, cuttings can be taken at almost any time of year, although rose cuttings are usually taken in very early spring. Cuttings taken from shrubs can be placed straight into fine soil and kept outside in a sheltered spot. Several cuttings can be packed tightly into one pot; the survivors could be potted when there are signs of good root and leaf growth. Cuttings, seedlings, and small plants grow best in even temperatures and in light, but not in bright sun. Keep moisture levels fairly constant and provide shelter. Some air circulation is essential.

Bare roots: planting takes place during the dormancy period, from April to mid-May or from late September to late October. Cloudy conditions are preferable for this type of planting.

1. Remove damaged, weak or diseased roots, then remove one-third of the healthy roots,
2. Prune diseased, weak branches as well as those that cross each other, then cut down a third of the healthy branches,
3. Soak the roots in a container containing muddy water and soluble transplant fertilizer (be sure to read the manufacturer's instructions),
4. Dig a hole or trench large enough to spread the roots easily and deep enough to add 15 cm (6 in) of mixed potting soil,
5. Ensure proper drainage for the selected variety,
6. Fill the bottom of the hole with potting soil and incorporate bone powder.
7. Water,
8. Place the plant so that its beautiful side is highlighted,
9. Do not bury the crown (base of the plant where all branches leave) or graft varieties,
10. Fill half the hole, taking care not to leave air pockets,
11. Water again,
12. Fill the hole with a bowl around the plant,

Hydroseeding: the hydroseeding method combines a specialized mixture called a “slurry” and then applies it to an intended surface using high pressure. The slurry usually consists of seeds, fiber mulch, fertilizer, soil amendments, and water. A hydroseeder tank stores and transports the slurry and then sprays it over the prepared ground under high pressure.

Advantages [38]:

- It is quicker and safer than manual planting.
- The plants retain their moisture.
- It is cost effective
- It saves time.
- It minimizes the risk of soil erosion
- Hydroseeding allows you to cover vast or hard-to-reach areas.
- It can be used in industries and applications other than agriculture, such as lawn care, landfills, and erosion cont.

Disadvantages:

- It is not ideal for do-it-yourself farming.
- It requires a lot of water.
- It requires precision.
- Hydroseeding during the dry season can waste time and effort without irrigation.
- It is cost-effective only when used in larger areas.
- It is not accessible in remote areas.
- It can raise environmental concerns (such as harming existing flora).

Intensive agriculture: dense agriculture originates in places where the population is crowded and the value of agricultural land rises as in the main river basins. This diversification of agriculture relieves land stress and allows it to regenerate its fertility, a productive agricultural system with the following characteristics [39].

- Intensive use of agricultural inputs to maximize production and optimize exploitation of production factors
- Intensive use of fertilizer and chemical pesticides
- Great reliance on advanced irrigation systems
- Intensive use of sophisticated techniques allowing for maximizing resources and reducing the size of cultivated too.

Extensive farming: this type of agriculture is found in areas with large areas of agricultural land. But do not use the best due to the lack of population, or the lack of availability of agricultural production factors and the possibilities available both human and material cultivates the portion of these large areas. This type of agriculture is characterized by the use of modern scientific methods and agricultural mechanization, due to the abundance of the land element and the element of capital and technical expertise needed to achieve the highest productivity rates [40].

2.1.3. Bioremediation

Remediation means to get rid of an issue and if it is associated with taking care of an ecological issue like soil and groundwater contamination is called bio-remediation. Bioremediation is a mechanism which utilizes the living microorganisms to reduce natural contaminations or to anticipate contamination [9]. It is an evolution towards elimination of toxins from the climate in this way reestablishing the first characteristic environmental factors and forestalling further contamination. Bioremediation also can be a permanent in situ solution for contamination instead of simply translocating the problem. Remediation of heavy metals, metalloids, or other inorganic pollutants from soil or water can be done by this technique [10]. It is a cost-effective, efficient, novel, eco-friendly, and solar-driven technology with good public acceptance as compared with other engineering techniques [41].

2.2. OPINIONS ON THE CREATION OF SHARED GARDENS

The questionnaire was sent to 58 individuals from eight communes in the El-Tarf Wilaya:

- Ain Assel,
- El Tarf,
- Benmhidi,
- Bouhadjar,
- El kala,
- Oum theboul,
- Zitouna.

2.2.1. Are the residents interested in eating healthy, organic food

More than 95% of those who answered the questionnaire believe that eating organic food is necessary.

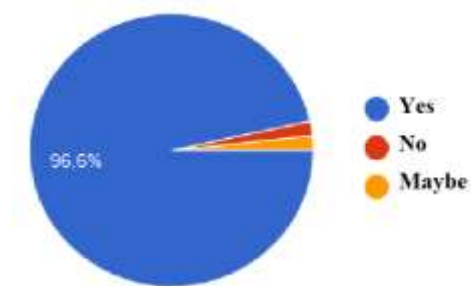


Figure 13 . What do residents think about eating organically.

The rates of cancer and diabetes have been rising significantly worldwide, posing major public health challenges. Over the past three decades, there has been a substantial increase in cancer cases, especially among individuals under 50 years old. From 1990 to 2019, new cancer cases in this age group increased by 79%. The most common cancers affecting younger adults are breast, windpipe, lung, bowel, and stomach cancers. Factors contributing to this rise include genetic predisposition, lifestyle changes such as diets high in red meat and salt, and increased alcohol and tobacco use [42].

2.2.2. Why eating organic

The results illustrate the various motivations behind individuals' decision to engage in gardening:

Heath Care: the overwhelming majority of respondents garden to take care of their health. This highlights the recognition of gardening as a beneficial activity for physical and mental well-being. Gardening can be a form of exercise, helps reduce stress, and provides access to fresh, home-grown produce which can lead to a healthier diet.

Pleasure: gardening for personal enjoyment is another significant motivation. This includes the aesthetic pleasure of maintaining a beautiful garden, the satisfaction of growing plants, and the therapeutic effects of interacting with nature.

Education for youngsters: some individuals think that garden help them to educate their children. This can be an effective way to teach them about nature, responsibility, and where food comes from. It also provides a hands-on learning experience that can foster a lifelong appreciation for the environment.

Fashionable: for a smaller segment of the parc residents, garden is considered fashionable. This might be influenced by social trends, the desire to follow a popular hobby, or to create visually appealing spaces that are in vogue.

Economic reasons: gardening for economic reasons is another consideration. It can be a cost-effective way to provide food for a family, reduce grocery bills, and make use of available land efficiently.

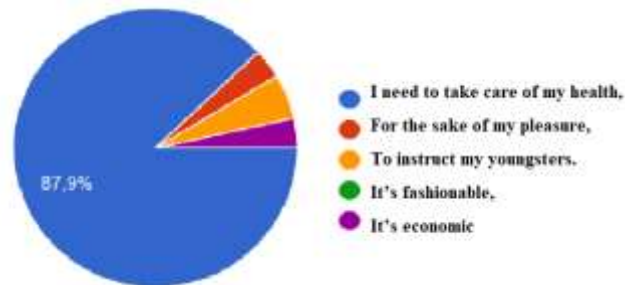


Figure 14. Answers to the question 'why eating organic'.

2.2.3. Doctors recommend consuming organic foods

More than 70% of those questioned acknowledge that their doctors have already recommended that they eat organic food.

Doctors often recommend that their patients consume organic foods to reduce exposure to harmful chemicals, as organic foods are grown without synthetic pesticides, which have been linked to health issues such as cancer, hormonal disruptions, and neurological problems.

Additionally, organic foods may have higher levels of certain nutrients, including antioxidants, vitamins, and minerals, enhancing their nutritional value. Organic farming practices are more sustainable, preserving soil quality and reducing water pollution, while also promoting animal welfare by providing more humane conditions for livestock. Consuming organic foods has also been associated with a reduced risk of chronic diseases such as cancer. These combined benefits make organic foods a healthier choice for individuals and the environment [43].

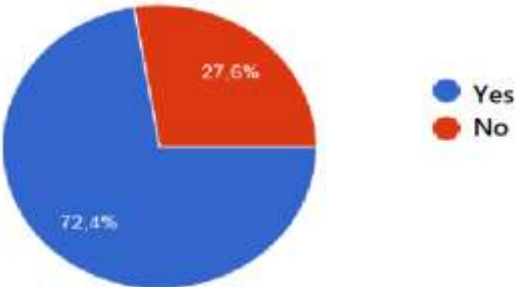


Figure 15. Answers to the question ' Have you ever been instructed by your doctor to consume organic food'.

2.2.4. The aim of having a garden plot that is shared

This indicates that a significant majority of respondents are keen on planting their vegetables, while a smaller portion shows interest in making honey, and an even smaller group finds neither activity worthwhile.



Figure 16. Answers to the question ' Are you interested in getting a plot?.

The community garden is a source of healthy products that are helpful for human health, society, and the environment, while also having positive effects on living organisms. The primary products in the common garden area are:

➤ **Vegetables and Fruits:** are one of the most important products of the community garden because they are the fundamental factor of human life as well as due to their high prices in the markets and the most important products that exist [44]

1. **Onions:** are an easy, low-maintenance vegetable to grow. Due to their modest growth rate, plant onions in moist, sandy soil in the spring. Once planted, onions only require a little attention aside from full sunlight, weeding, and watering the plants once a week.
2. **Garlic :** an Allium, when you plant one clove, it will develop into a whole bulb and is very easy to grow once you follow the planting guide. Garlic stores well, plant autumn/winter or early spring. Harvest late summer.
3. **Strawberries :** are a popular fruit for community gardens. They are low maintenance and can be grown in containers or directly in the ground. Strawberries require full sun and well-drained soil. They are also great for small spaces, such as raised beds or hanging baskets. There are many varieties of strawberries to choose from, including June-bearing and everbearing.
4. **Melons:** watermelon and cantaloupe are two common spring plants that become summer staples at picnics and get togethers. Melons need full sun and loose, well-drained soil to flourish.

➤ **Herbs:** Herbs and medicinal plants can be planted in the community garden [45]:

1. **Rosemary :** is an attractive and superbly fragrant perennial shrub-like herb that is easy to grow in garden beds or pots. rosemary can grow up to 1.5 m tall, but there are prostrate or low-growing forms too, that only reach 20-30cm high. There are also varieties with different flower colours, including various shades of blue, lilac, pink and white. Native to the Mediterranean region, Rosemary grows well in hot and dry climates and is incredibly drought-tolerant, once established. Rosemary is ideal for adding flavour to roasts and casseroles, as well as pasta, bread and pizza. Most Rosemary varieties have their peak flowering season in late spring or summer, although they can flower sporadically throughout the year. Rosemary's flowers are a great attractor of bees and other beneficial insects.
2. **Chamomile:** is a versatile herb known for its calming properties. Beyond aiding in relaxation, chamomile also offers benefits for anxiety, eye health, digestion, and more. Learn more about chamomile in this blog post, and definitely consider adding this easy-to-grow herb to your garden for its myriad of uses.

1. **Flower:** flowers are used in many magazines as well as a successful commercial project to present them on occasions or use them for decoration [45].
 2. **Sunflowers :** Sunflowers (*Helianthus annuus*) are hardy annuals that can reach heights of up to 400cm. A sunflower known as 'Shot-O-Lat' has large flower heads and many branches. Golden tips highlight the deep, dark brown color of the blooms, like a chocolate bar. A gold halo circles each center disk, too. All flowers are pollen-free and have varying colors, making them suitable for vases.
 3. **Roses :** they grow almost all over the world. The plants grow in the form of shrubs or vines. The stems usually have sharp thorns. The flowers vary in color and size. They come in shades of pink, red, orange, yellow, and white. They may be from 1.3 cm to 18 cm across. Wild roses usually have five petals. The most cultivated roses often have many sets of petals. The petals grow out from a fleshy, fruitlike structure known as a hip. Roses make beautiful decorations. But roses have other uses besides being pretty. People use the fragrant oil from rose blossoms in perfumes. They also use rose hips to make jams and herbal teas. Rose hips are a rich source of vitamin C.
- **Apiculture:** bees provide a critical link in the maintenance of ecosystems, that is pollination. They play a major role in maintaining biodiversity, ensuring the survival of many plants, enhancing forest regeneration, providing sustainability and adaptation to climate change and improving the quality and quantity of agricultural production systems. In fact, close to 75% of the world's crops that produce fruits and seeds for human consumption depend, at least in part, on pollinators for sustained production, yield and quality. Also, because of bee husbandry, a large profit will be earned, which is due to the trade in honey produced by the bees [46].

3.2.5. Knowledge of techniques for utilizing green spaces

The majority of respondents say they do not need assistance to operate a shared garden plot.

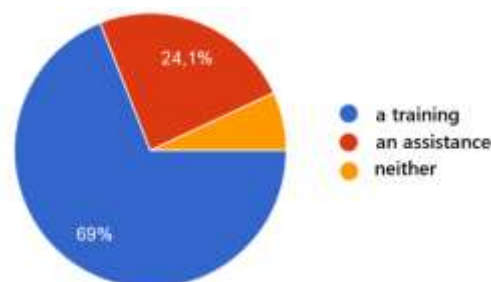


Figure 17. Answers to the question ' If we give you a parcel, would you need? '.

To assist beneficiaries of shared garden plots effectively, a structured and community-focused approach is essential. Firstly, organizing practical workshops and theoretical courses on topics such as gardening, organic agriculture, and crop rotation will provide valuable education. Providing resources like basic gardening tools, compost, and access to water is also crucial. Personalized advice and discussion groups can offer technical support, while social events and plant exchanges can foster a sense of community. Logistical support, such as waste management systems and maintenance of common facilities, ensures smooth operations. Encouraging the use of gardening journals and regular evaluations can help in tracking progress and identifying areas for improvement. Lastly, assisting beneficiaries in accessing grants or financial aid and setting up community-funded projects can provide the necessary financial resources. These steps will equip beneficiaries to succeed in their gardening efforts, creating a more productive and harmonious community environment [47].

3.2.6. The prospect of renting plots for symbolic amounts

The park's residents expressed their interest in renting plots of a shared garden for symbolic prices.

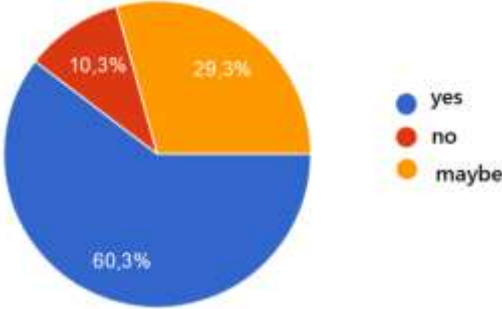


Figure 18. Answers to the prospect of renting plots for symbolic amounts.

Renting shared garden plots at a symbolic price is an effective solution to promote community gardening and sustainable living. This approach ensures inclusivity by making gardening accessible to everyone, regardless of their financial situation, fostering a diverse and engaged community. It encourages sustainable practices by supporting local food production and organic gardening, benefiting the environment. Additionally, gardening enhances mental and physical health, providing a space for stress relief and physical activity. Shared gardens also

strengthen community bonds through social interaction and collaboration, and they offer educational opportunities about horticulture and ecology. By identifying suitable land, establishing a management structure, setting affordable prices, and promoting the initiative, communities can create vibrant, sustainable spaces that improve the quality of life for all participants [48].

3.2.7. The residents' perspective on buying a local organic product

Once again, the residents of the park express with majority their desire to consume organic.

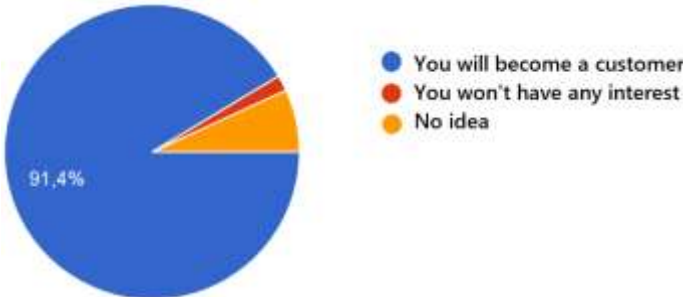


Figure 19. The residents' perspective on buying a local organic product.

3.2.8. The Integration of shared gardens in new cities

The people questioned are in favour of integrating shared gardens into new cities.

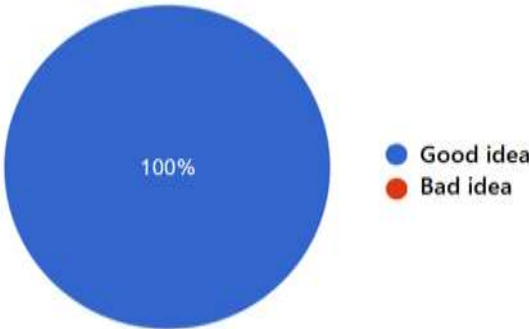


Figure 20. The opinion of the residents regarding the creation of shared plots in the new cities.

The survey results show strong support for integrating shared gardens into new city developments, highlighting the recognized benefits of such spaces. Shared gardens enhance urban green spaces, improving air quality and aesthetics while providing habitats for wildlife. They foster community building by offering a place for residents to interact and collaborate, which strengthens community bonds. Additionally, these gardens promote health and well-being by encouraging physical activity and providing mental health benefits. They also enhance food security by offering fresh, locally grown produce and serve as educational spaces for teaching sustainable practices. To implement this, urban planners should strategically plan garden locations, involve the community in the design process, allocate necessary resources, and support the initiative with appropriate policies. Integrating shared gardens into urban planning can create vibrant, sustainable communities with numerous social, environmental, and health advantages [48].

3.2.9. The interests of the shared gardens

Shared gardens offer significant benefits across social, economic, educational, and ecological dimensions. Socially, they promote interactions and cohesion among community members, creating spaces for sharing and collaboration. Economically, they allow individuals to produce their own food, reducing household expenses and contributing to local food security. Educationally, these gardens serve as outdoor classrooms where children and adults can learn about horticulture, ecology, and sustainable agricultural practices. Ecologically, shared gardens enhance urban biodiversity, enrich soils, and reduce carbon footprints by decreasing reliance on food transported over long distances. In summary, shared gardens are valuable assets for sustainable development and collective well-being [49]

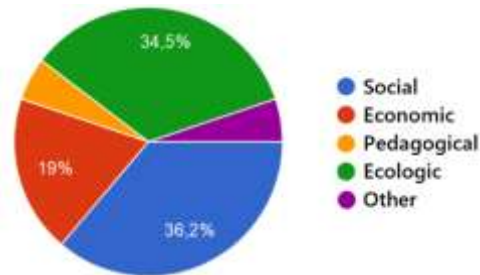


Figure 21. The interests of the shared gardens.

CONCLUSION

Soil is the thinnest layer of the Earth's surface and its fertility is due to the action of the atmosphere, water and the microorganisms that live there. This superficial layer is the one that concentrates all the agronomic interest, since its richness in organic matter allows the farmer to develop crops. Knowing its behaviours will promote biomass production through balanced fertilization.

Today, it is essential to emphasize the vital importance of sustainable agriculture for obvious reasons. Our societies depend heavily on agriculture for their food and feed supply for livestock. As the world's population continues to grow, the demand for these resources continues to grow, creating the very real risk of a resource shortage.

Sustainable agriculture is characterized by a commitment to the responsible management of non-renewable resources, taking into account the needs of nature and future generations. This approach to sustainable agriculture includes a shift to renewable energy sources, wise land use and the eradication of environmental pollution. Farmers are actively seeking effective solutions to promote the sustainable development of agriculture. Remote sensing technology is emerging as a source of exceptionally accurate and reliable data to support this sustainable agriculture initiative.

The common garden is a structure that is widely known worldwide, but it is not widely known in Algeria because of its relatively new concept. This new concept was highly acclaimed by the residents of El-Kala National Park. Natural products that are free of fertilizers and pesticides are beneficial for human health and lower the risk of serious diseases like cancer. In harmony, man and his environment will coexist.

Eat organic, natural, healthy foods that preserve health! This is possible thanks to organic farming that exploits and protects the laws governing nature such as the balance of the natural chain, allowing to improve agricultural yield without risk to the environment and the health of consumers. Bioremediation is a real revolution in organic farming.

The integration of shared gardens near the national park, supported by the active participation of residents, promises significant social, economic, and environmental benefits. By fostering

community engagement, creating economic opportunities, and promoting health and well-being, these gardens can serve as a model for sustainable development and environmental restoration.

The integration of shared gardens with organic agricultural practices offers a comprehensive solution to the degradation observed in El Kala National Park. By addressing both ecological and social dimensions, these initiatives can restore degraded lands, support local communities, and promote sustainable land management practices.

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