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دائرة الشؤون البلدية  
بلدية مدينة أبوظبي  
ABU DHABI CITY MUNICIPALITY  
DEPARTMENT OF MUNICIPAL AFFAIRS

# Introduction of Native plants in Landscaping Projects in Abu Dhabi City



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# Introduction of Native plants in Landscaping Projects in Abu Dhabi City

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## Introduction of Native plants in Landscaping Projects in Abu Dhabi City

### RELATED TERMS

**Native plant** is a general term to describe plants **endemic** (exclusively native), **indigenous** or **naturalized** to a given area in geologic time in response to physical and biotic processes characteristic of a certain region.

**Endemic species** are those species of plants which are found **exclusively in a particular area** (native to a certain limited area). In biology and ecology, **endemic means exclusively native to the Biota of a specific place.**

**Indigenous species** are those species which are **originating and living or occurring naturally** in certain habitat or **may occur in areas other than the one under consideration**. So, an indigenous species is not necessarily endemic. Indigenous plants are native to a specific local area of the country. , **so it's a local native plant.**

**Indigenous Plant = Local Native Plant**

**Naturalized species:** An intentionally or unintentionally **introduced species** that has **adapted** and reproduce successfully in its new environment.

**So, the native plant can come from any part of Emirates, includes all its habitats: Coastal and Sabkha, desert Sand sheet and dunes, mountain.**

**Natural landscaping (native gardening)** is the use of native plants, including trees, shrubs, groundcover, and grasses which are indigenous to the geographic area of the garden.

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### PREVIOUS WORKS

The scientific studies of the UAE Flora, as vegetative habitats, commenced relatively late. They have been conducted, since 1987, at a vigorous pace by many researchers, such as Jongbloed and Western..and many others.

**We considered the most reliable and applicable reference was done by EAD (ERWDA 2004), which prepared by Gary Brown & Sapitha Sager. They confirmed the existence of (800) of higher plants species. roughly 400 species are known for AD Emirate and fixed by EAD, which represent 255 genera and 66 families.**



## CURRENT STATUS

- NPS that used in design work are **relative scarcity**.
- Some **suitable** NPS are using in design work.
- Our greenery **comprised primarily of non-native species**.
- The majority of non-NPS are **introduced** to our landscape **randomly**, which are **high-maintenance** and need substantial support systems to keep them alive.

**We can avoid all these gaps if we adopt :**

- **Estimated steps** toward discovering the **potential features of NPS**
- **proper selection of NPS** for our landscaping projects.

Alternatively, **our conventional designs have to be changed gradually too.**

**the future designs will become traditional and given  
a specific identification of national landscape.**

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### CURRENT STATUS

Recently, we found according to EAD lists that the average percentage of selected NPS in ornamental landscape projects in Abu Dhabi city is between 35 -37% .

This distinguished percentage has its promotional rank in the future of the sustainable change across our existent and new projects.



As it turns out that the sum of NPS in the PRFD lists of drought and salt tolerant plant species have the same percentage (not less than 35%).

**Also, this percentage could increase if we take into account the estimate of adaptive introduced species to the local environment conditions as well as the large group of succulent species.**

## FUTURE VISION

Adopting the cultivation of native plants will contribute in preserving the NPS and reducing costs ,energy and environment impacts.

### Benefits

- **Less water consumption** ( More water available for other usages).
- **Less time and work** ( Decreases manpower and saves energy)
- **Reserve the NPS** especially that are disappearing due to urbanization.
- **Ensure** food and shelter for birds, and other **wildlife**.
- **Retain** our own unique horticultural **identity**
- **Strengthening capacities** for drought & climate change impacts management.



**Achievement of this naturalistic approach will be one of fundamentals  
of environmental sustainability of natural resources.**

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## FUTURE VISION

Accordingly, at the mid of last year 2013, the DMA had adopted a strategy of **Introducing the native plant species in landscaping projects** and issued a guide “ **Introducing of native plants in landscape projects in Abu Dhabi Emirate** “. This guide directs the concerned stakeholders to begin [introducing of native plants in landscaping projects](#).

Municipality of Abu Dhabi city is **focusing on the importance of using native plants** in ongoing and upcoming projects and **planning to adopt best methods to introduce this strategy**.

From on-going projects , ADM has been put the final conception of a landscape project to beautify **Sheikh Zayed street** , **by introducing the native plants on large scale**. It is considered as a big initiative pilot in Urban area of AD Island .

### SHEIKH ZAYED STREET LANDSCAPE





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## FUTURE VISION

This pioneering project is **compatible with Abu Dhabi's 2030 vision to create a sustainable city** that promotes comfortable and sustainable transport routes while the soft landscape design takes advantage of the native flora , **by encouraging the use of native plant species**, to reduce water consumption and economize maintenance costs.



3D VIEW

DETAIL AREA 2 - NATIVE ARABIAN DESERT CONCEPT

**OPTION 1**

## **PROPOSED MECHANISMS**

Our current challenge is **how to insure the success of naturalizing our urban greenery ?**

This vital mission can be achieved **by introducing appropriate PS** for landscape projects .

Therefore , we are **proposing the following mechanisms:**

- 1) Prepared reliable PS lists for landscape projects.**
- 2) Establish a research station for NPS.**



# Introduction of Native plants in Landscaping Projects in Abu Dhabi City

## PROPOSED MECHANISMS

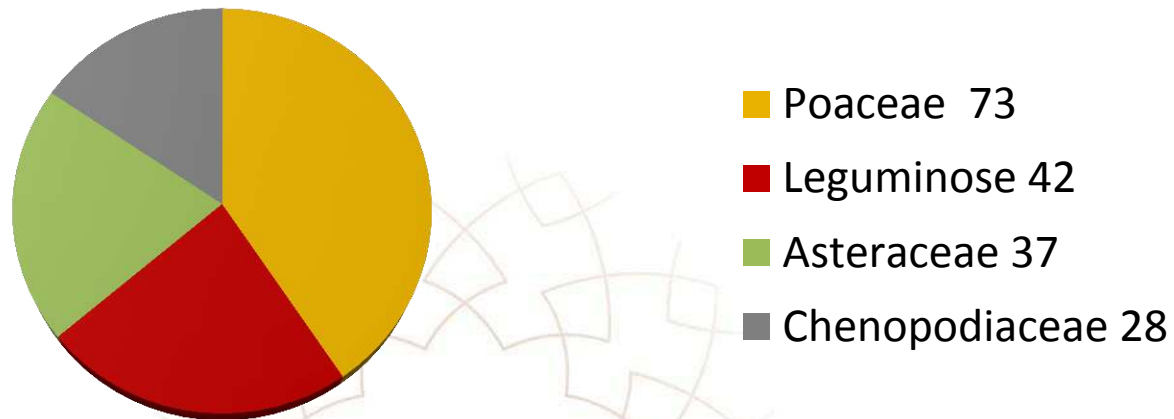
### 1) PREPARED RELIABLE PS LISTS FOR LANDSCAPE PROJECTS

#### Initiative stage

To facilitate studying of Native Plant Species characteristics , we have to rely on EAD lists and their sort according to their **families** and **habitats**.

Accordingly,we observed that the best represented families are the Poaceae (73),Leguminose ( 42) Asteraceae (37) and Chenopodiaceae (28).

#### The Major NP Families



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## PROPOSED MECHANISMS

### PREPARED RELIABLE PS LISTS FOR LANDSCAPE PROJECTS

According to **habitat** , We noticed that the best represented Habitats (as shown below).

### Numbers of NPS Different Habitats



This result was relatively agreed by Shaltout, Kamal Hussein and others (2008) in their study “Vegetation Analysis of Some Desert Rangelands in United Arab Emirates”.

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## PROPOSED MECHANISMS

### PREPARED RELIABLE PS LISTS FOR LANDSCAPE PROJECTS

#### Preparatory Execution stage

- A) Prepare the plant lists for the **most appropriate species** for landscaping projects, according to:
1. NPS **habitats**, including their **life-forms**.
  2. The Analysis of **NPS characteristics**, including ornamental, aromatic, forage, medicinal, poisonous, invasive species and other (allelopathic, thorny and toxic in some of its parts or all).
  3. All confirmed **suitable NPS species for landscape, which are subject for breeding and propagation experiments, according to the standards and controls of proper scientific research.**
  4. All **adaptive exotic species** , which are **used conventionally in landscaping projects**, can be sorted and classified according to their life-forms too.



Scientific name	Family
<b>Ornamental Plants</b>	
<p><b>Abutilon pannosum (G.Forst.) Schltidl.</b> الحمبوك</p> <p><b>Amaranthus hybridus L.</b> رعا ف</p> <p><b>Arundo donax L.</b> القصب</p> <p><b>Caralluma spp.</b> غلثى</p> <p><b>Convolvulus arvensis L.</b> العليق</p> <p><b>Dianthus spp.</b> قرنفل</p> <p><b>Leptadenia pyrotechnica (Forssk.) Decne</b> المرخ</p> <p><b>Moringa peregrina (Forssk.) Fiori</b> البان</p> <p><b>Rumex vesicarius L.</b> الحماض</p>	<p><b>Malvaceae</b></p> <p><b>Amaranthaceae</b></p> <p><b>Gramineae</b></p> <p><b>Asclepiadaceae</b></p> <p><b>Convolvulaceae</b></p> <p><b>Caryophyllaceae</b></p> <p><b>Asclepiadaceae</b></p> <p><b>Moringaceae</b></p> <p><b>Polygonaceae</b></p>
<b>Aromatic plants</b>	
<p><b>Cymbopogon commutatus (Steud.)Stapf</b> حشيشة ليمون ، حمرا</p> <p><b>Cymbopogon schoenanthus (L.)Spreng .</b> الأذخر .</p> <p><b>Ducrosia anethifolia (DC) Boiss.</b> حزا</p> <p><b>Pulicaria glutinosa Jaub.&amp; Spach</b> مهدي</p>	<p><b>Poaceae</b></p> <p><b>Poaceae</b></p> <p><b>Apiaceae</b></p> <p><b>Asteraceae</b></p>
<b>Poisonous Plants</b>	
<p><b>Calotropis procera ( Aiton) W.T.Aiton</b> الأشخر</p> <p><b>Chenopodium album L.</b> ركب الجمل</p> <p><b>Citrullus colocynthis (L.) Schrad.</b> الحنظل</p> <p><b>Cucumis prophetarum L.</b> قشعور الحمار</p> <p><b>Euphorbia granulata Forssk.</b> الخنيز</p> <p><b>Euphorbia helioscopia L.</b></p> <p><b>Euphorbia larica Boiss.</b> عسيح</p> <p><b>Euphorbia peplis L.</b> لبينه</p> <p><b>Pergularia tomentosa L.</b></p> <p><b>Rhazya stricta Decne.</b> الحرمل</p> <p><b>Ricinus communis L.</b> الخروع</p> <p><b>Solanum nigrum L.</b> عنب الثعلب</p>	<p><b>Asclepiadaceae</b></p> <p><b>Chenopodiaceae</b></p> <p><b>Cucurbitaceae</b></p> <p><b>Cucurbitaceae</b></p> <p><b>Euphorbiaceae</b></p> <p><b>Euphorbiaceae</b></p> <p><b>Euphorbiaceae</b></p> <p><b>Euphorbiaceae</b></p> <p><b>Euphorbiaceae</b></p> <p><b>Asclepiadaceae</b></p> <p><b>Apocynaceae</b></p> <p><b>Euphorbiaceae</b></p> <p><b>Solanaceae</b></p>

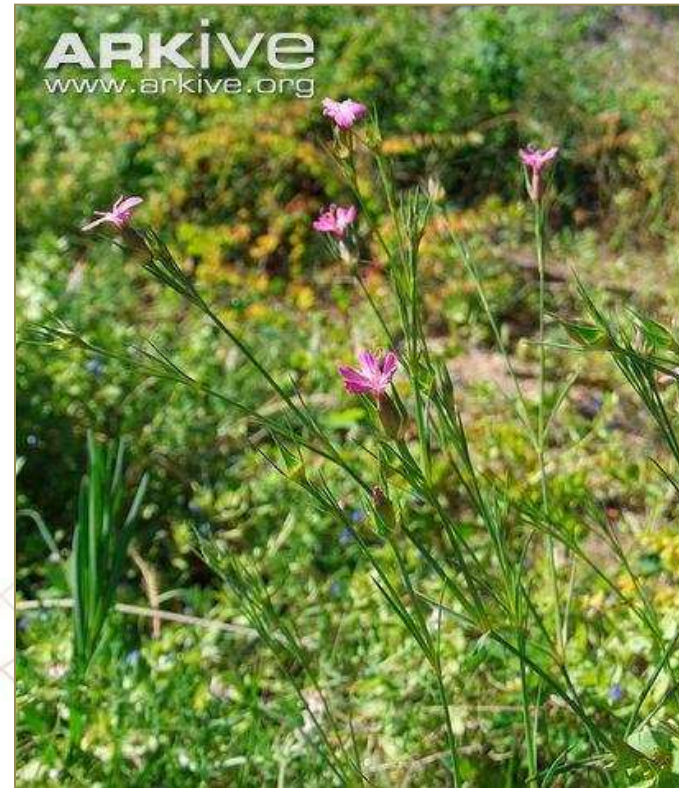


## ORNAMENTAL PLANTS (Oas)

*Abutilon pannosum* الحمبوك



*Dianthus cyri* قرنفل



## ORNAMENTAL PLANTS (Roc)

*Rumex vesicarius* الحماض



*Moringa peregrina* البان







## ORNAMENTAL PLANTS (Roc & Oas)

*Lippia nodiflora* L. michx.  
*Phyla nodiflora* (L.) Greene



## AROMATIC PLANTS

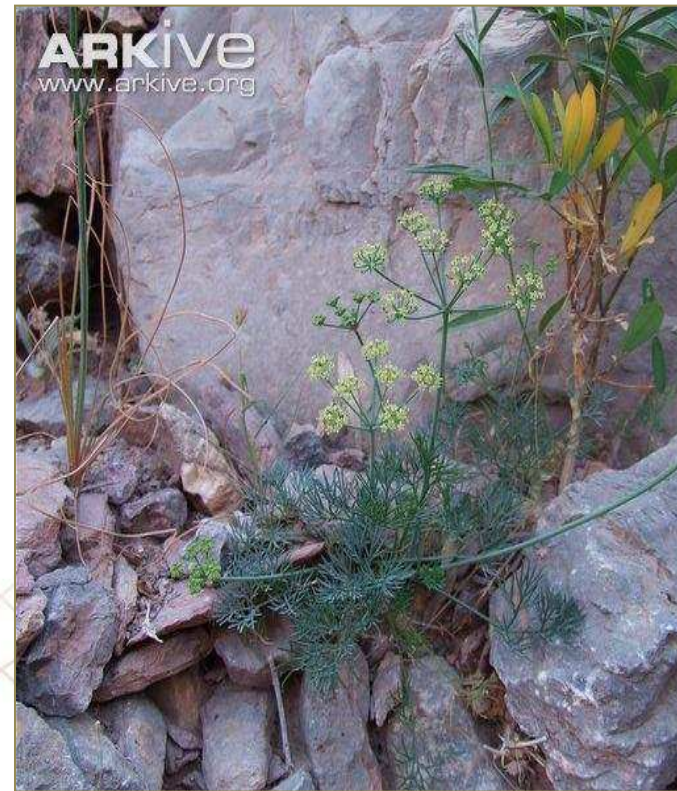
(Roc)

*Cymbopogon commutatus*



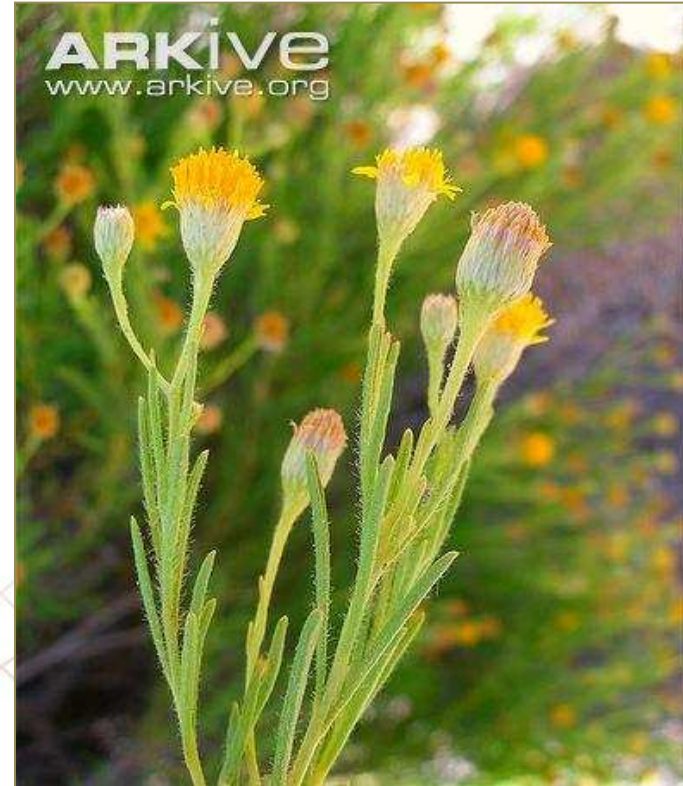
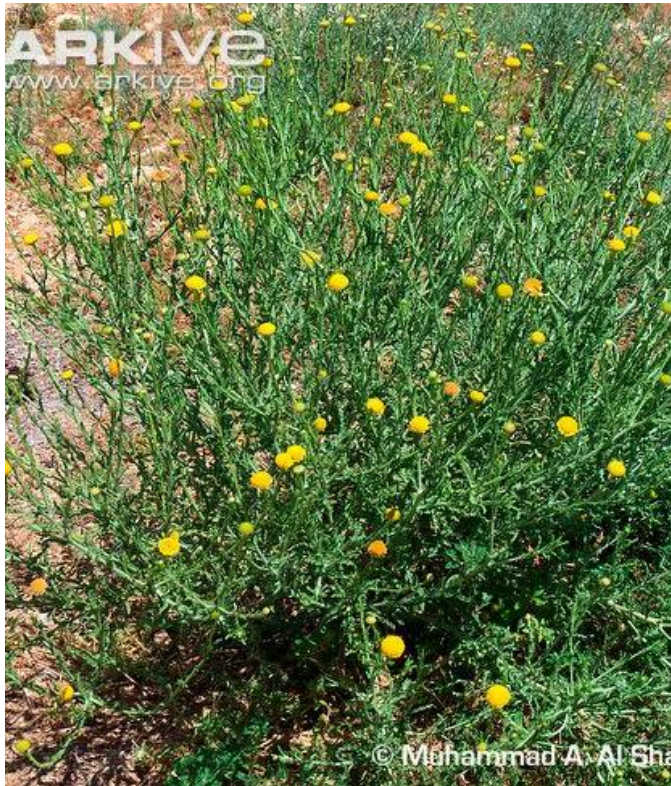
(Dun, Pl & Roc)

*Ducrosia anethifolia* حزا



## AROMATIC PLANTS (Pl & Roc)

*Pulicaria glutinosa* الغال



## POISONOUS PLANTS (Oas)

*Chenopodium album* ركب الجمل



*Solanum nigrum* عنب الثعلب





## POISONOUS PLANTS

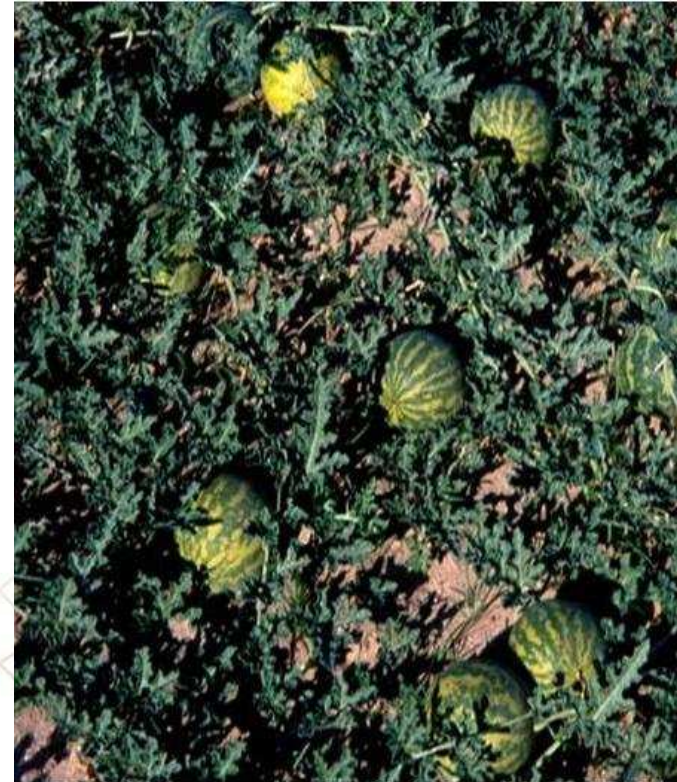
(PI & Roc)

*Cucumis prophetarum* قشعور الحمار



(Roc)

*Citrullus colocynthis* حنظل



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## PROPOSED MECHANISMS

### PREPARED RELIABLE NPS INDEXES FOR LANDSCAPE PROJECTS

- B) Combine the lists of **confirmed NPS with adaptive exotic species** in order to adopt them by related administration formally.
- C) The New lists **have to be available for developers and designers** to work on **selective** landscape projects.
- D) Circulate the new species lists to specialized native nursery station for the purpose of **testing their proper breeding and propagation**.
- E) Later, this approach can lead us to **screen and sort the suitable PS according also to the levels of drought, salt, wind tolerance ....etc.**



# Introduction of Native plants in Landscaping Projects in Abu Dhabi City

## PROPOSED MECHANISMS

### PREPARED RELIABLE PS LISTS FOR LANDSCAPE PROJECTS

#### GENERAL SUSTAINABLE NOTES :

- ❑ We have to focus an attention to select the species with well growing for example; the Ramath shrubs (*Haloxylon salicornicum*) on the sand dunes, which being most tolerant to drought and salinity and Thinda grasses (*Cyperus conglomerates*) that being the most tolerant to drought and less water need (this may takes into account as recommendation to propagate in nurseries).



- ❑ As general each plant species has to be selected on the basis of its physical appearance , growth characteristics, cultural requirement ,environmental tolerances, and its potential for design use.
- ❑ Preserve all the exist planted species ( adaptive and natural NS) in urban greenery.
- ❑ Relocate all the mature shrubs and trees that obstruct any element of general safety.

## PROPOSED MECHANISMS

### 2) ESTABLISH A NATIVE PLANT RESEARCH STATION

Current state requires establishing a research station for the NPS (Includes a seed bank, nursery and botanical garden).

Basic characteristics for the station:

- Availability of permanent **well water source** .
- Located in the **area representing the whole desert habitat**, close to the heart of the connected road network between the Emirate cities.
- Its area **not minimum than 35 hectares**.
- The level of surface area is far from the level of ground water.

This station will launch the foundation and the **nucleus that will rely upon making systematic change to the common landscape species composition.**

**It will maintain the WATER, one of most vital factors that limits the sustainable development in the whole Emirates.**



# Introduction of Native plants in Landscaping Projects in Abu Dhabi City

## PROPOSED MECHANISMS

### ESTABLISH A NATIVE PLANT RESEARCH STATION

## Some Requirements for Plant Production Planning

To enhance the Planning of Plant Production , it needs to **conduct periodic training** for workers and engineers in order to achieve multi-purposes , including;

1. **Well Identification** of NPS for ornamental purposes.
2. Identify the **seed treatments and characteristics** of each species.
3. **Understand the stages of plant growth and their requirements** ( from the seed collection or reproductive parts preparation for planting in the appropriate media passage of the follow-up to growth .. prepared for planting in the place of permanent ) .
4. How to **establish** an earlier specialized area for **native mother plants**.
5. Knowing the **specific functions of nursery** and how to **prepare lists** of its various activities and **documenting the operational data** and materials and labor requirements.
6. How to **develop and record accurate propagation protocols** for each species to maintain the success.

... And many other which leads to enhanced the success of this important trend.

## NEGATIVE IMPACTS ON WILDLIFE HABITATS

The **non- studied practices** (seed collection or removal of wild plants or parts from them) **with not knowing how to deal with wildlife habitats**, as well as the adverse effects that **can have many negative impacts** on them as a whole, including:

- ❑ Reduce their **natural numbers** , **limit their diversity** and their exchangeable effects with other associated species.
- ❑ The less diversity may **lead to decrease the plant density** to less ability to respond to environmental changes .. and may die off other plants if it is exposed to a sudden illness or insects or a sudden change in the weather.
- ❑ The **Nature stepped down to fill the gap** caused by the drilling or plant removal **by replacement a strange plants** of different species ... and often the species of **invasive** herbs.
- ❑ The **wild plants often grow poorly in the parks** , so the propagated seedlings in nurseries (from seeds or cuttings ) are the most survive after cultivation.

## CHALLENGES AND DIFFICULTIES

- The means of the safe and sustainable applications for the process of natural transformation of Abu Dhabi landscape.
- Weakness of the scientific research in related subject, in terms of the scientific staff, space and technical equipments.
- Lack of available information about the NPS characteristics and their suitability for landscape projects.
- Random introduction of plant species by individuals ,and private plant nurseries that targeting commercial purposes



## Introduction of Native plants in Landscaping Projects in Abu Dhabi City

### RECOMMENDATIONS

- **Enlightenment** about the **positive results** of the transformation process of the cultivation of NS on the environment and the sustainability of natural resources within the corridors of decision-makers.
- Adopt consultative approach with related partners to **ensure that the ornamental curve of NPS usage will harmonize** alongside the other evolving **land uses** such as; Urbanization, farms establishment, afforestation ...) **instead of competing with it.**
- All concerned partners (developers , contractors and the owners of nurseries) have to cooperate, by **following the correct and safe means**, to ensure the success of the transformation to planting of native plants..
- Need to apply **a legal restricted regulations** that ruling the trading activities of whole plant categories (Inside & Outside country) - **especially by private plant nurseries.**
- **Public awareness** about the importance of planting the NPS.
- Enhance all the means that work to **refresh and develop the wild flora** to ensure its diversity.
- Current status needs to **establish a research station for the NPS** (Includes a seed bank, central nursery and botanical garden).
- This radical change in landscape **requires extensive continuous works with scientific professionals** (Horticulturists, Taxonomists, Ecologists ,Seed Technologist , Plant Breeders...) **to discuss the future and the controls of Native plant cultivation** in urban area and their impact on the wildlife habitats.

## **CONCLUSION**

**Here we would like to emphasize on the fact that:**

**“As far as there are promising and serious indicators and attempts in introducing NPS .. we have to pay an attention to the determinants of specificity and sensitivity of their natural habitats”**

**Any unbalanced steps based only on the processes of plant production have their implications in threatening the bio-diversity of the national flora that we seek to save and sustain.**

**REMOVING NATIVE SPECIES FROM AN ECOSYSTEM  
IS LIKE TAKING RIVETS OUT OF AN AIRPLANE WING**

Sekercioglu, C. H. 2010. “Ecosystem functions and services” , Oxford University Press 2010.

## Introduction of Native plants in Landscaping Projects in Abu Dhabi City

شكراً  
Thank You



*Photo by Al-Mashtani*