

Status of soil information and soil management in Syria

by
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Introduction

The agricultural sector in Syria plays a key role in agricultural development and in rural area its effects are clearly reflected on the overall economic development, it is one of the most important sources for generating income and achieve food security and providing employment opportunities and providing the requirements of the manufacturing sector of food. Also, contributes to the stability of the rural population and provide a balance between the provinces

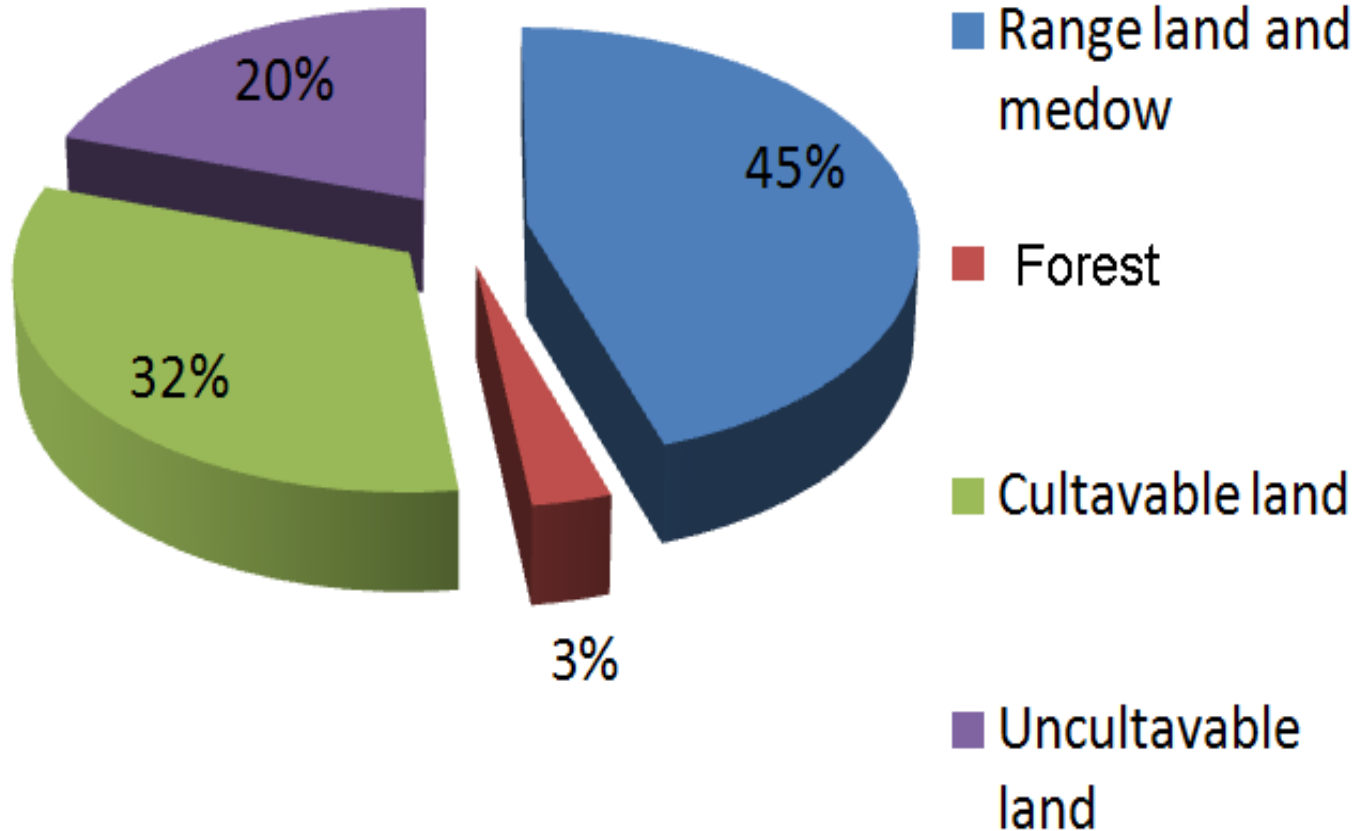
The land resources are the most important natural resources that have been depend on them for food security, thus our duty are to take care of it, and orient its use and improve its management in proper way, So to reach to those aims all the conditions regarding to it must be identified with control to the ways and means of its investment ,as well as identifying different changes of land uses, with the times and reasons, also, identifying current land uses and determine the best uses.

Syria faces number of challenges. These challenges include: drought, climate change, population growth, migration from country side to main cities, degraded water quality, decline in per capita share of fresh water, decline in fossil fuels sources of energy, depletion of natural vegetation, particularly what happened in steppe land by overgrazing and excessive depletion due to the increasing load of pastoral, and problems related to economic, social and environmental.

Encroachment on arable land at an unsustainable rate, and the potential threats of climate change

The land use balance in Syria

The land balance in Syria vary from year to year depending on the annual agricultural production plans, prevailing climatic conditions , farmers' response to government policies and market conditions.



Major ecosystems

Syria can be divided geographically into four areas:

A-The coastal region: The area bounded between the coastal mountain series and the Mediterranean sea

B-Mountainous region: The mountains and highlands stretching from north to south parallel to the shore of the Mediterranean sea and of two series mountains almost parallel to each other and between them Akkar and Ghab plains.

C- Interior region: It is located east of the series mountains, and has Aleppo ,Hassakeah, Homs and Hama plains.

D- steppe region: It includes steppe plains.

-Syria has **five settlements** zones according to annual rain fall and the relation between land and climate factors:

A-The first settlement zone:

the average rainfall is 350 to 600 mm per year not less than 300 mm in two thirds of the year ,and can ensure any observed two seasons every three years, the most important crops, wheat, legumes, summer crops.

B-The second settlement zone: The average of annual rainfall is 350-250 mm per year and not less than the figure for half the observed years, which may ensure the seasonal barley every three years, also beside the barley, wheat, legumes and summer crops can be grown.

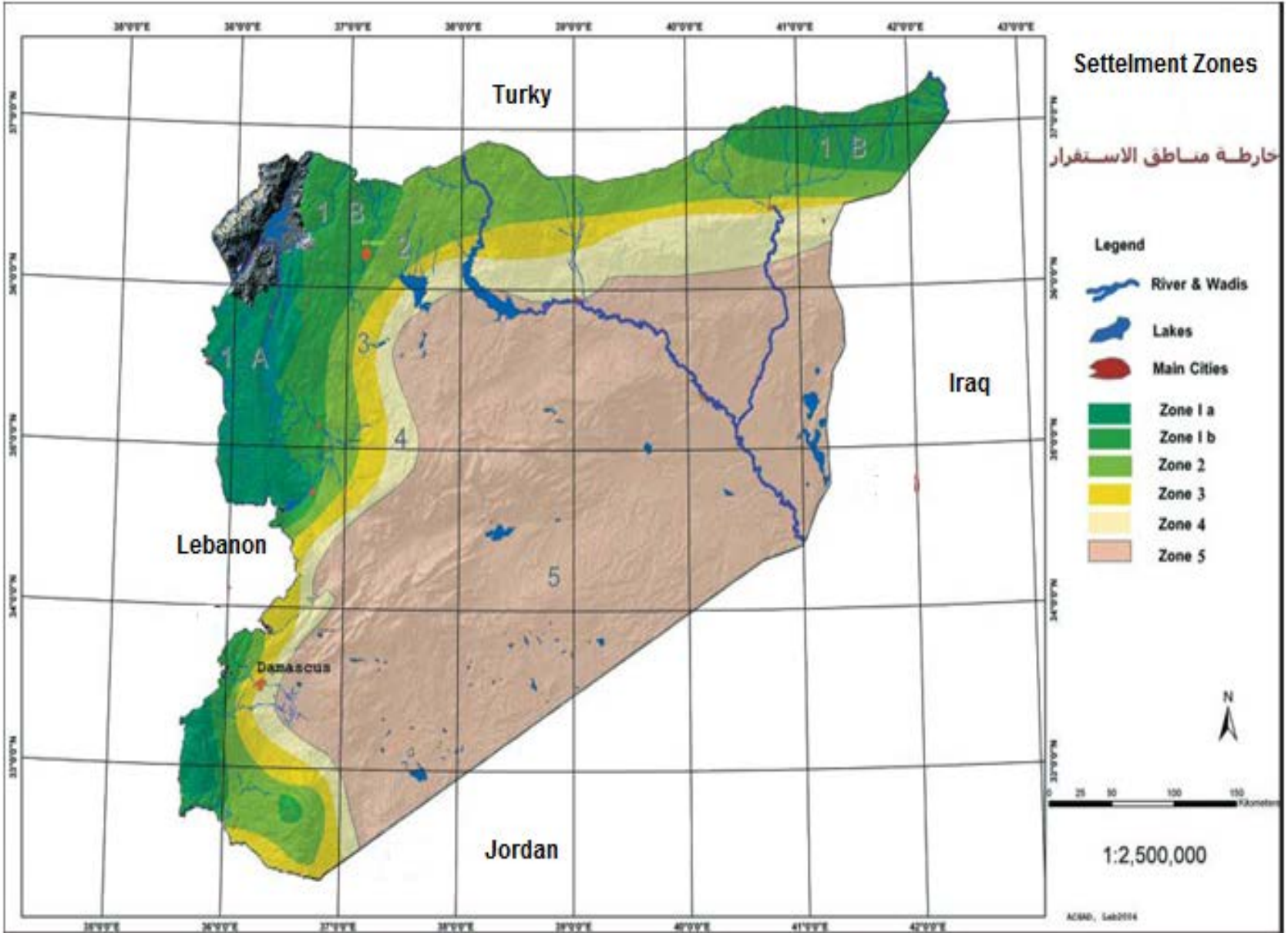
C- The third settlement zone: The average of annual rainfall over 250 mm per year and not less than the figure for half the observed years, which may ensure one to two seasons for each of three years and the main crop is barley and beans.

D- Fourth settlement zone (marginal zone): The average of annual rainfall is 200-250 mm per year and not less than 200 mm in half of the observed years, suitable only for barley or permanent pastures.

E- The fifth settlement zone (steppe land): The rest of the land area is pasture and not suitable for agriculture rain fed. The following figure shows the distribution the settlement zones of Syria.

Settlement Zones

خارطة مناطق الاستقرار



The main land resources in Syria

1. Soil resources: The soil is considered one of the most important natural resources at all, when it relates to the lives of the humanity

- As the soil maps are the basis for any agricultural development process, Syrian
The most important soils in Syria are summarized as follows:

- **Dry soils** : This soil covers 50% of Syrian land

- **Soils not well developed** :This soil covers 25% of the total area.

- **Undeveloped soil** :This soil covers 2% of the total area of the country.

- **Soil rich in organic matter** :This soil covers 2% of the total area of the country

- **Cracked clay soils** :This soil covers 5% of the total area of the country

2. Natural pastures

The total area of natural range land and meadows in Syria is about 8.23 million hectares in 2011 constituting 45% of the total area.

3. Natural forests

which covers 3% of the total area of Syrian

land use and management practices

There are different types of land in Syria, it is spreading from humid areas and half wet areas to dry and very dry areas, and the land management and land uses are great different, for example, the land management is different from gypsum soil to land management of saline soil, clay soils or dry soil etc..

-To identify the **successful (optimal) land uses and management** practices it must be collect and analyze the required information of the **soil, water, vegetation, climate, the current land uses and the current socio-economic situation**, and these data, statistics information and thematic maps are usually required extractions of all information by experts, and to take decision, development of policies and proposals that lead to the successful land use. To achieve that, it must be use the modern techniques, such as **GIS and remote sensing**, data processing and information and conduct the comparison and classification and develop different models

For example:

- **coastal area** which famous in citrus and vegetables(**good management**). In north east of Aleppo as well as in south west of Damascus, famous for fruit trees(**medium management**).

Land management issues, constrains and opportunity

The main **constrains** are

- The **fragmentation** and **dispersions** of land tenures .
- **Laws and legislation** to develop agricultural production ,land management and land use planning.
- The migration of the labor force from the countryside to the city.
- The activities of marketing, manufacturing, export and investment do not fit with the increasing in agricultural production.
- **Un rational management** of natural resources, for example random grazing, trees cutting and un conserving the forest land etc...
- Spreading the **traditional irrigation methods** in most cultivations areas in Syria, as well as the lack of laws and regulations for organizing the use of water irrigation.

The opportunity

A - Develop and apply the land use planning system in Syria (**SYLWIS**), for example adding some factors, and applying it at Syrian provinces level.

B - Important procedures for **protection ,conservation, rehabilitation and management** the natural resources

to reduce the degradation of natural resources in Syria, most of these procedures have reduced the negative impacts of different activities for example:

-The projects: The project of steppe development for **rehabilitate** and **re-vegetation**

- Natural protections areas

pastoral protection

Forest protections

water reserves

Land resources information system

In Syria the most data and information relating to land resources (physics and chemical soil analysis, maps, climate data etc...) are still in hard copies forms.

For example the Syria soils were classified at scale 1 / 25 000 for first, second and third (SZ), and all reports, soil analysis and maps still in hard forms, as well as the information and data of water, vegetation and climate are also available in hard forms.

These data and maps are needed to convert it into digital form, harmonized and processing by (GIS), and link it to land resources information and based on the successful land use can be suggested.

Syrian Land and Water Information System (SYLWIS)

The screenshot displays the SYLWIS software interface. At the top left, the title bar reads 'SYLWIS'. On the left side, there is a vertical menu with the following options: 'Run', 'Reports', 'Add Crop', 'Crop / Factors', 'Map', and 'Exit'. Above this menu is the logo of the National Agricultural Extension and Research Center for Syria, with the text 'منظمة الأعدبية والزراعة للأمم المتحدة' (National Agricultural Extension and Research Center for Syria).

The main content area is titled 'Land Resources Use and Land Suitability Assessment' with the identifier 'TCP/SYRIA/3102'. Below this title, the text 'SYLWIS V(0)' is displayed. At the bottom of the main area, there are two input fields: 'Crop_Type' and 'Crop_Name', both currently empty.

On the right side, a window titled 'Land suitability Cotton' is open, showing a map of Syria. The map is color-coded according to a legend titled 'Cotton Suitability Levels'. The legend includes the following categories:

- S1 (Very Suitable) - Light Green
- S2 (Moderately Suitable) - Medium Green
- S3 (Marginally Suitable) - Dark Green
- N2 (Not Suitable)(Improvements possible) - Light Purple
- N1 (Not Suitable) - Dark Purple

The map shows a large area of S1 and S2 suitability in the central and western parts of Syria, with N2 and N1 areas in the north and east.

*Prepared
by
Ali Abdullah
2010*

The Syria Land and Water Information system(SYLWIS) was designed through the land resources use and planning project (TCP/SYR/3102) for a **pilot area which covers 100x 40 Km, representative to Syrian soils and has five settlement zones.**

it is a kind of geodata base and attribute data base it contains tables ,inquiry and processes, which includes all spatial and descriptive of the study area, and the results of running the system.

The SYLWIS system based on the data resulting from the geographic sheets intersection of the soil, water, climate factors and crop requirement with administration sheet of the study area and comparing these data with crop requirements.

The SYLWIS gives report of land suitability for crops on the basis of administrative units, also land suitability map, climate factors and water factors for each crop can be driven by system running, So the SYLWIS is a kind of DSS to identify land suitability for agricultural planning.

Objectives of Land Suitability Evaluation

Land resources data collection

Socio-economic-cultural context

Mapping of Agro Ecological (Zones AEZ)

Selection of Land Use Types (crops, management)

Inventory of land characteristics (Factors) for each AEZ

Crop and Land Use Requirements

Matching of land characteristics with crop (land use) requirements

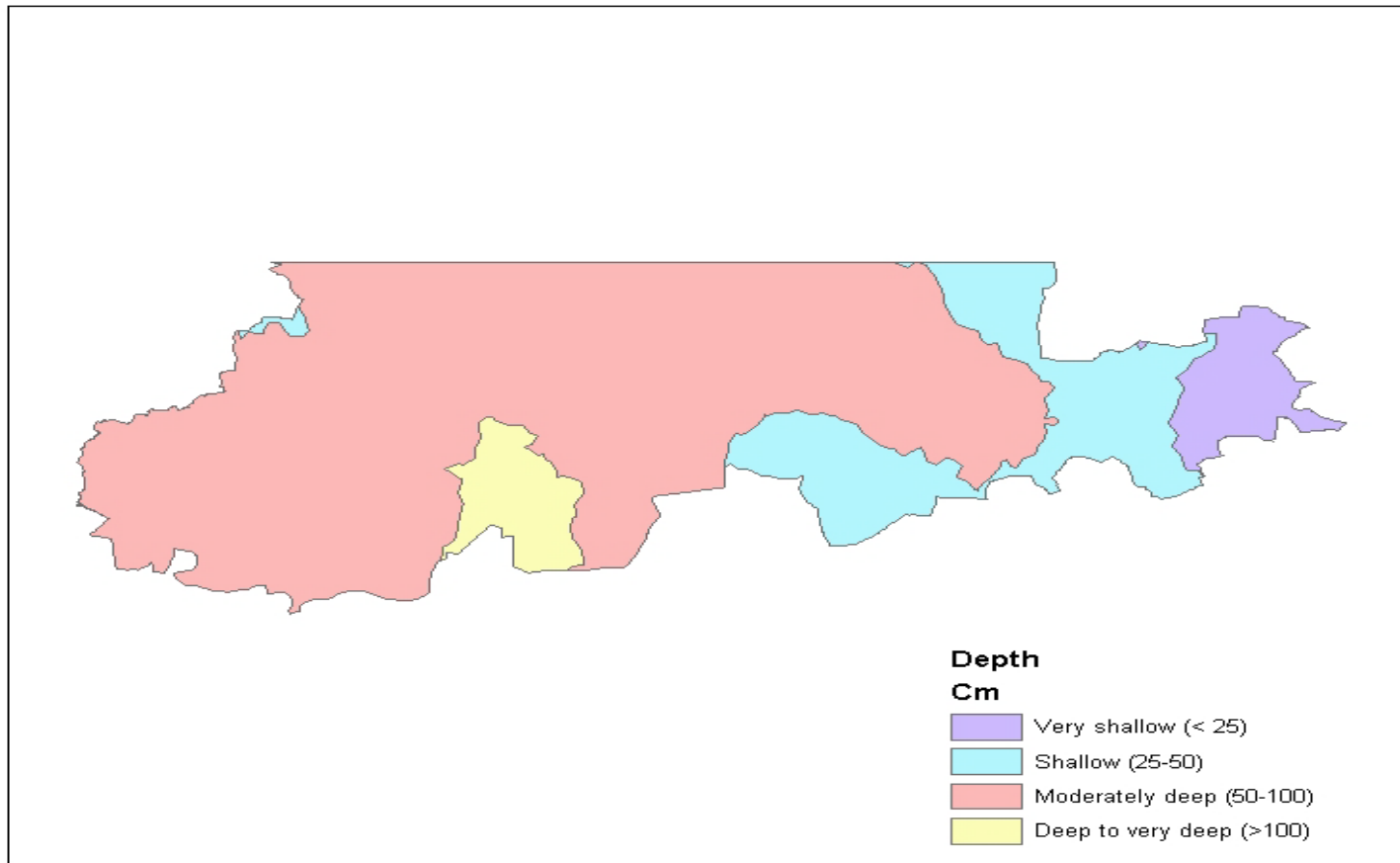
Suitability of Land for a specific LUT

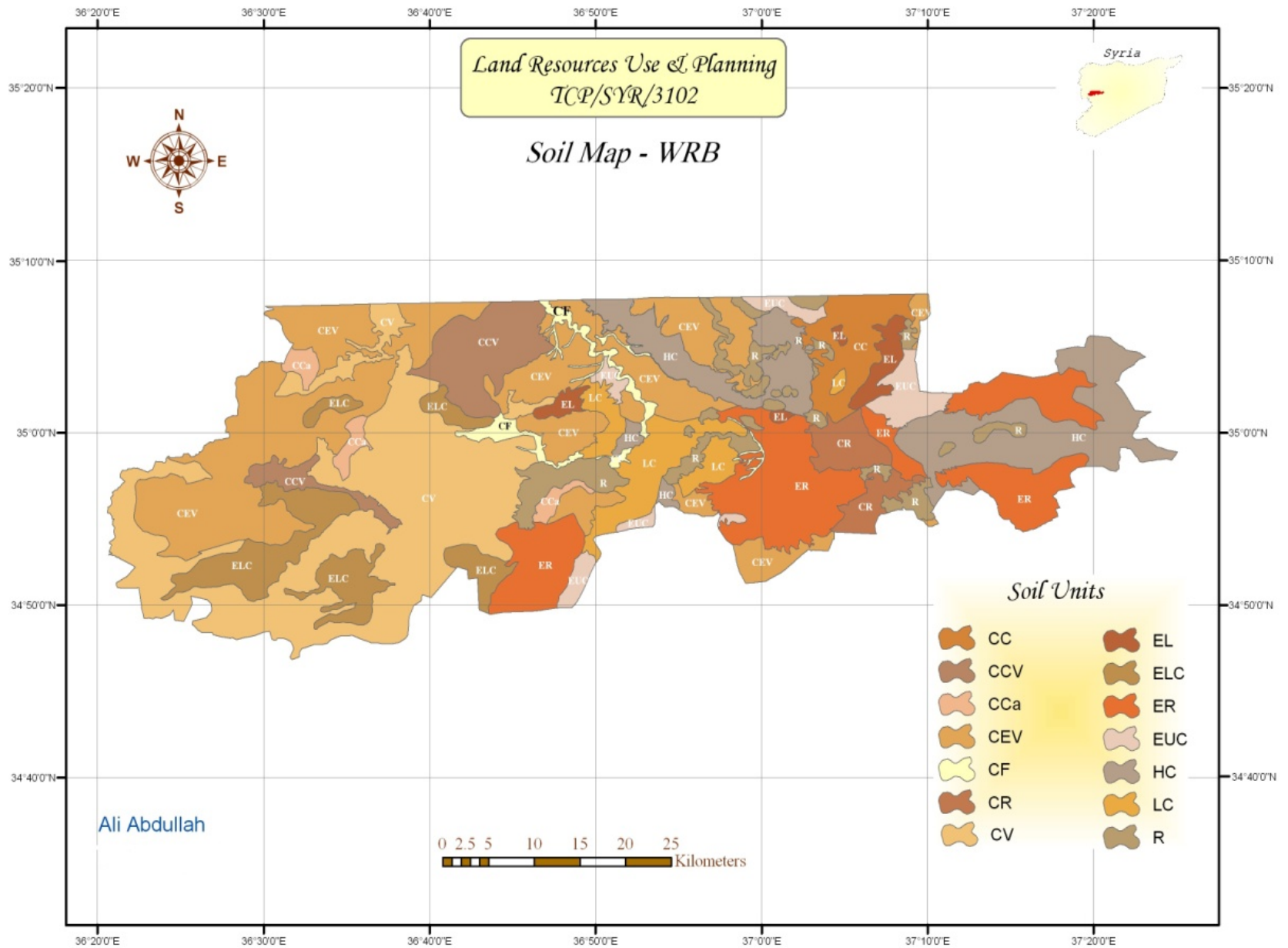
Factors

- ***Soil factors:*** soil depth, PH, drainage, stones..etc
- ***climate factors :*** frost, minimum temperature, maximum temperature...etc
- ***Slop factor: topography***
- ***water factor***
- ***crop requirements***

(d) Soil Depth

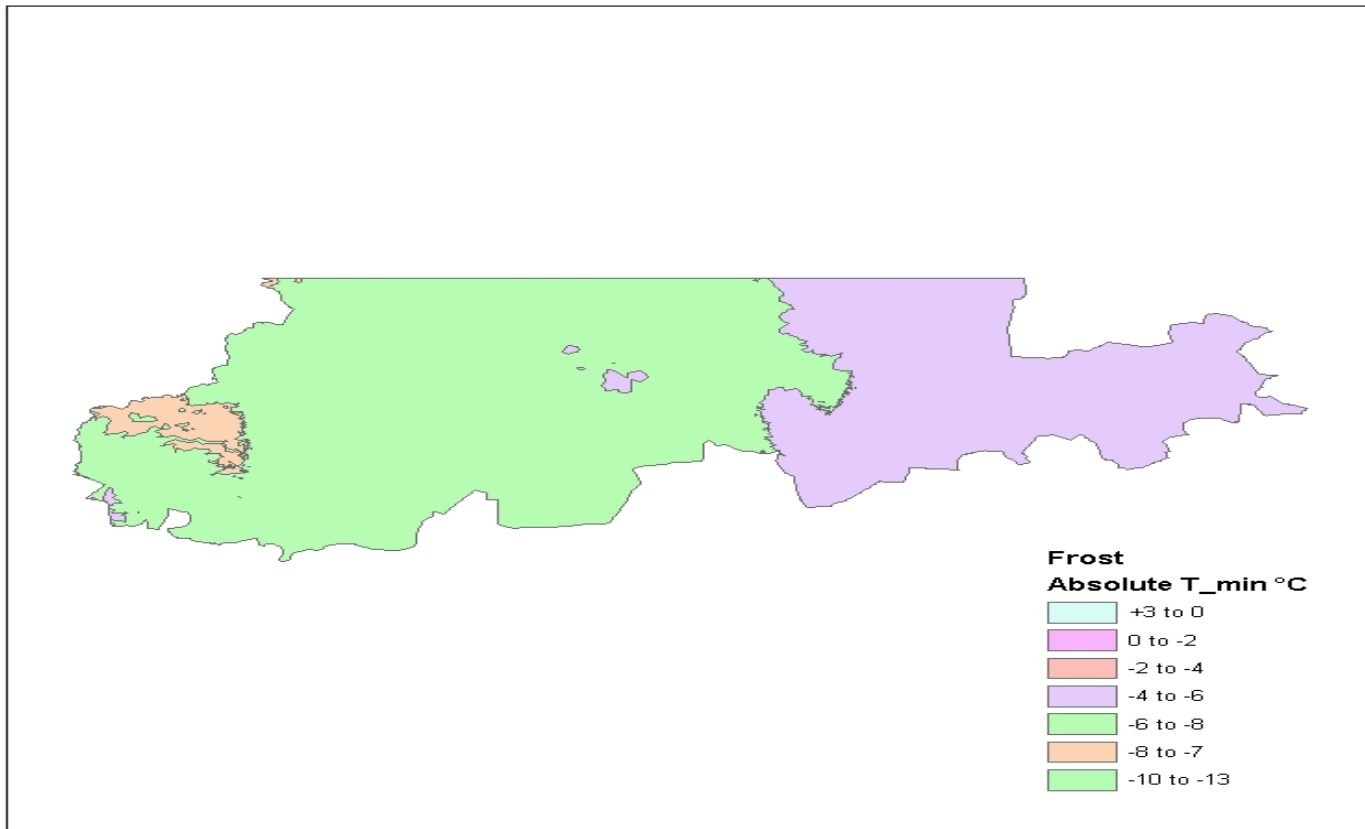
Class	Description	Depth (cm)
VS	Very shallow	< 25
SH	Shallow	25-50
MD	Moderately deep	50-100
DD	Deep to very deep	> 100





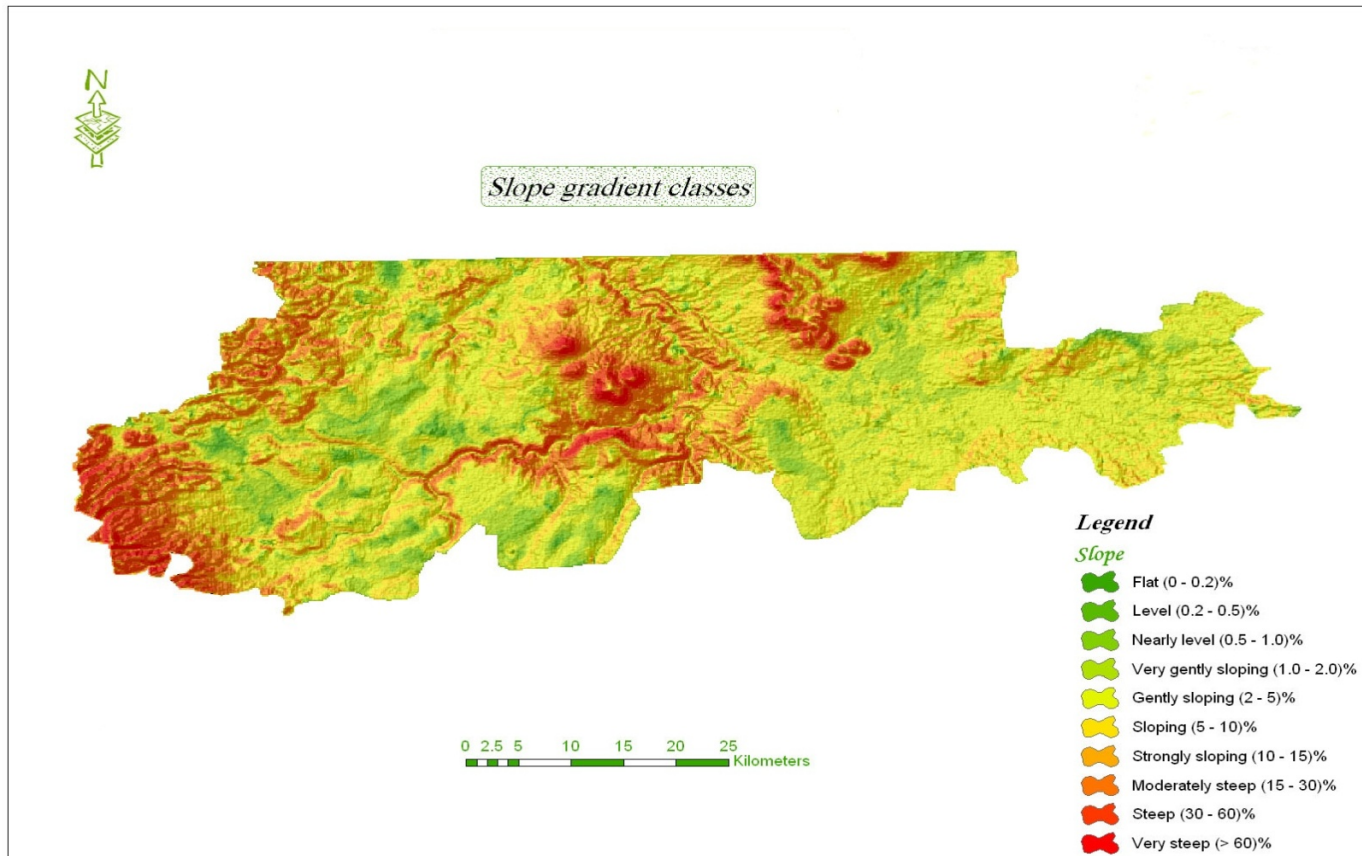
(f) (Frost)

Class	Absolute T _{min} °C	Class	Absolute T _{min} °C
A	+3 to 0	E	-6 to -8
B	0 to -2	F	-8 to -7
C	-2 to -4	G	-10 to -13
D	-4 to -6		



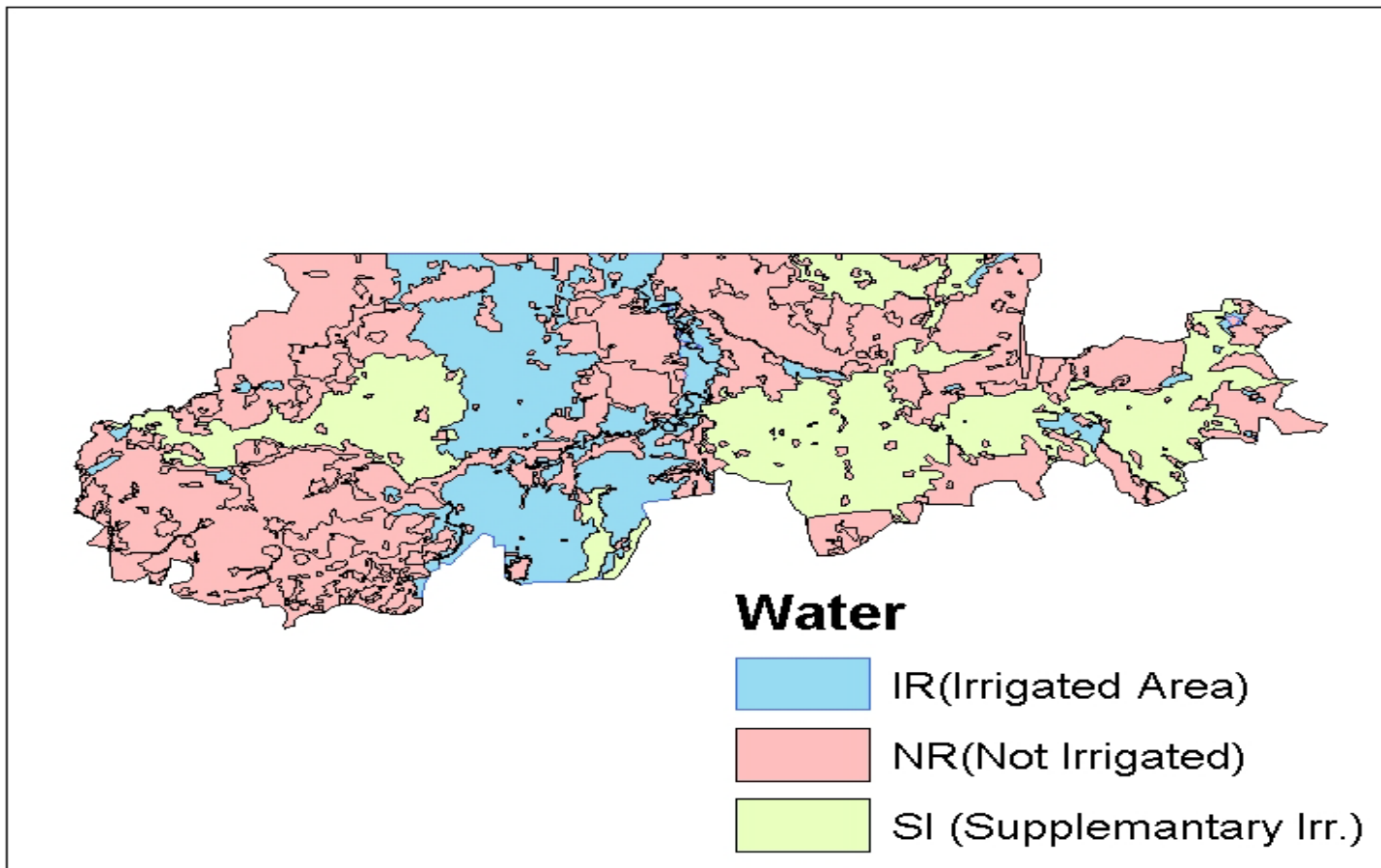
Slope

Class	Description	Gradient (%)
F	Flat – very gently sloping	< 2
G	Gently sloping	2-10
M	Moderately steep	10-30
S	Steep	30-60
V	Very steep	> 60



Irrigation

Class	Description	Note: Derived from Land Use Map: areas presently irrigated are assumed to have sufficient water for irrigation
IR	Presently irrigated	
NI	Presently not irrigated	



Crop Requirements

Crop Requirements (Climate factors)

في مقراء على طيبى باكلح شوك هي لاسجنتك لتلب
احتياجات المحاصيل للعوامل المناخية

Crop	total GP (days)	water (mm)	Drought tolerance	Mean daily temp (during GP)		frost tolerance
				optimum	range	
cotton	150-180	700-1300	H	20-30	16-35	sensitive
tobacco	90-120; from seedlings	400-600	H	20-30	15-30	sensitive
sugar beet	160-200	550-750	H	18-22	-30	tolerant
wheat (spring)	0-130	450-550	L	15-20	-25	sensitive
barley	90-120 (180- 240)	500-1000 (200- 2000)	H	15-20	2-40	seedlings sensitive
chickpea	90-120 130- 180	600-1000 (300- 1800)	H	15-25	5-30	no frost flowering / fruiting

Suitability Classes

Suitability Classes

Code

Description

N1

Not Suitable

N2

Not Suitable(Improvements possible)

S1

Very Suitable

S2

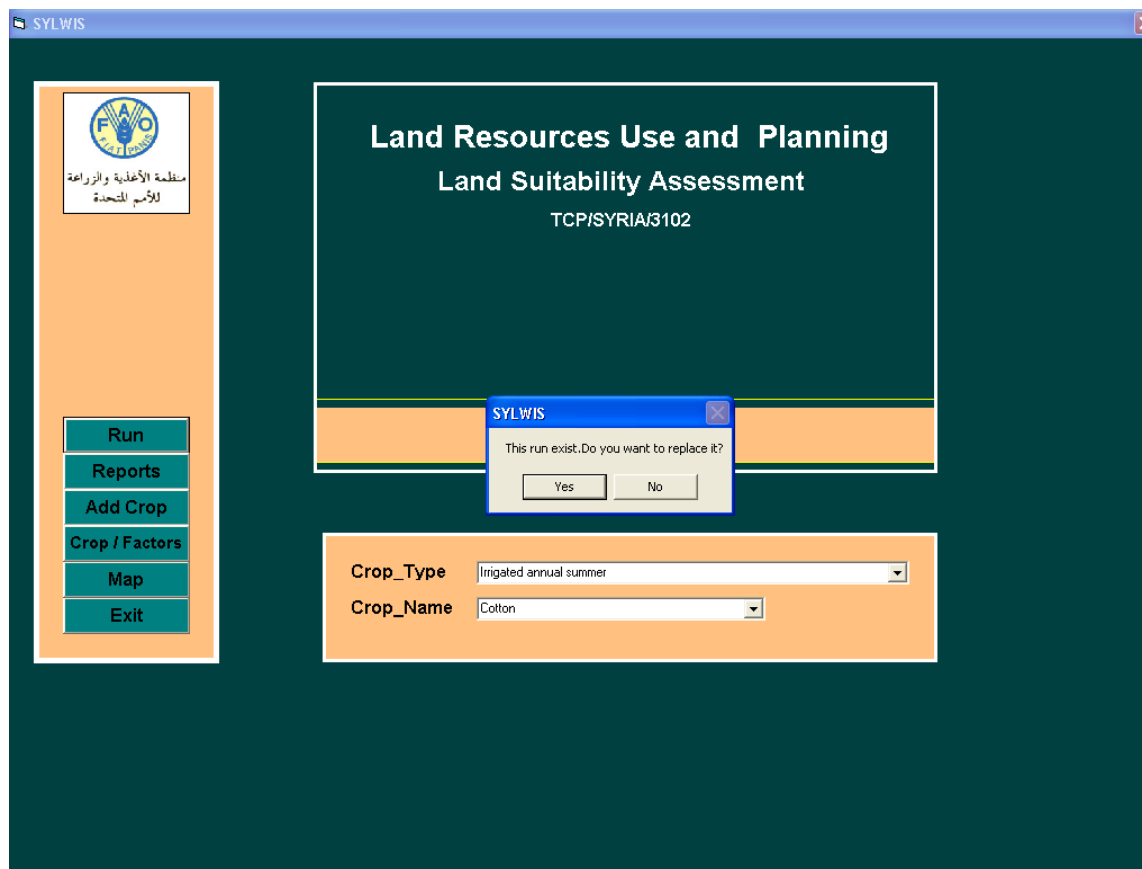
Moderately Suitable

S3

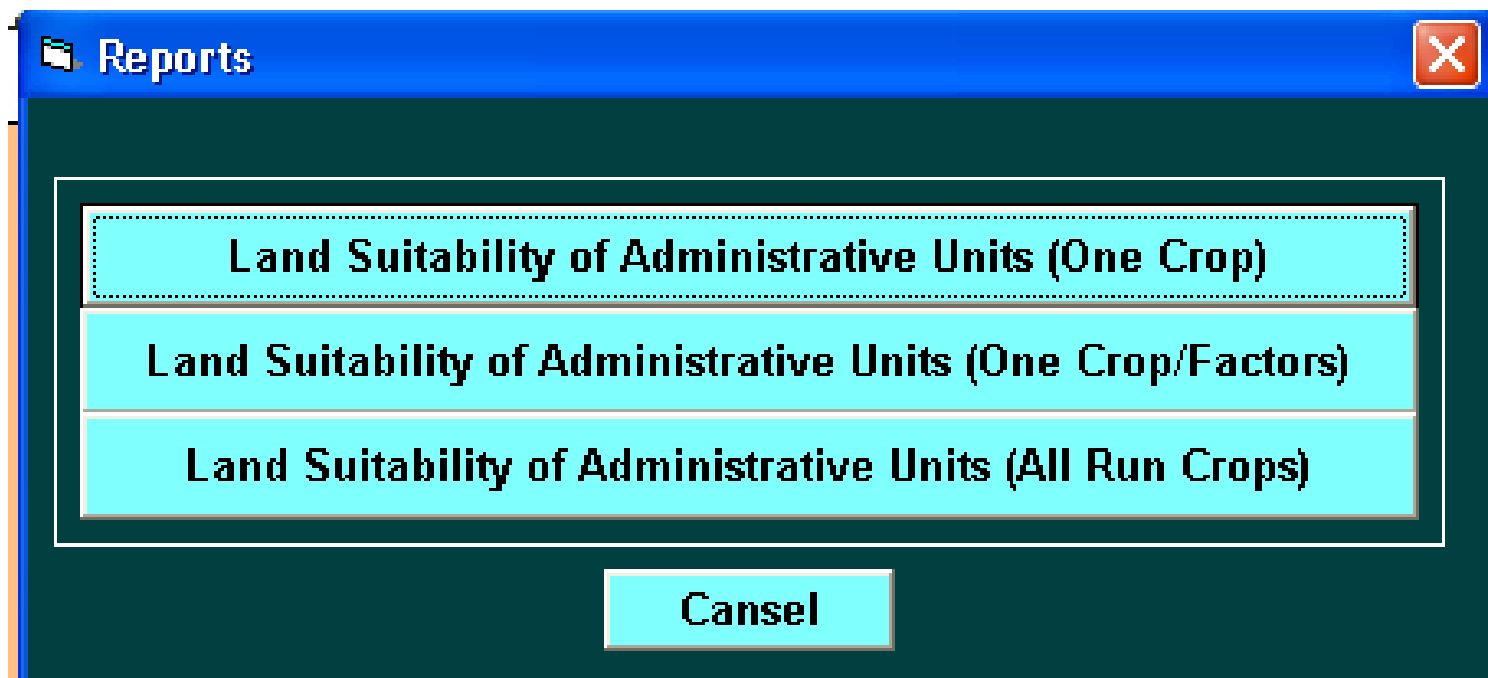
Marginally Suitable

واجهة النظام

- تحديد نوع المحصول من الصندوق Crops Type
- تحديد اسم المحصول من الصندوق Crop Name
- تشغيل النموذج بالنقر على الزر Run



Reports أنواع التقارير



Land Suitability of Administrative Units

Irrigated annual summer

Cotton قطن صيفي مروى

Site Name	Total_Area	N1	N2	S1	S2	S3
الضبي	5370.367059	1604.79	0	0	976.19	2789.39
بري شرفي	24448.649472	12407.17	0	0	243.88	11797.6
تليسة	14935.303608	1444.08	107.58	40.73	11825.6	1517.31
تلدي	20370.125307	6223.71	0	12.41	12082.81	2051.2
حر بنفسه	28223.916606	7957.89	1.59	0	18838.73	1425.7
عوج	7575.78368499999	1447.87	0	0	4741.07	1386.85
مركز منطقة الرسن	11953.333399	2109.21	150.61	0	6492.6	3200.92
مركز منطقة السلمية	56665.2434020001	7875.33	850.27	0	13412.18	34527.46
مركز منطقة حماه	49348.9280500001	17359.44	198.96	0	21133.22	10657.31
	218891.65	58429.49	1309.01	89746.28	89746.28	69353.74

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Land Suitability of Administrative Units

Irrigated annual summer

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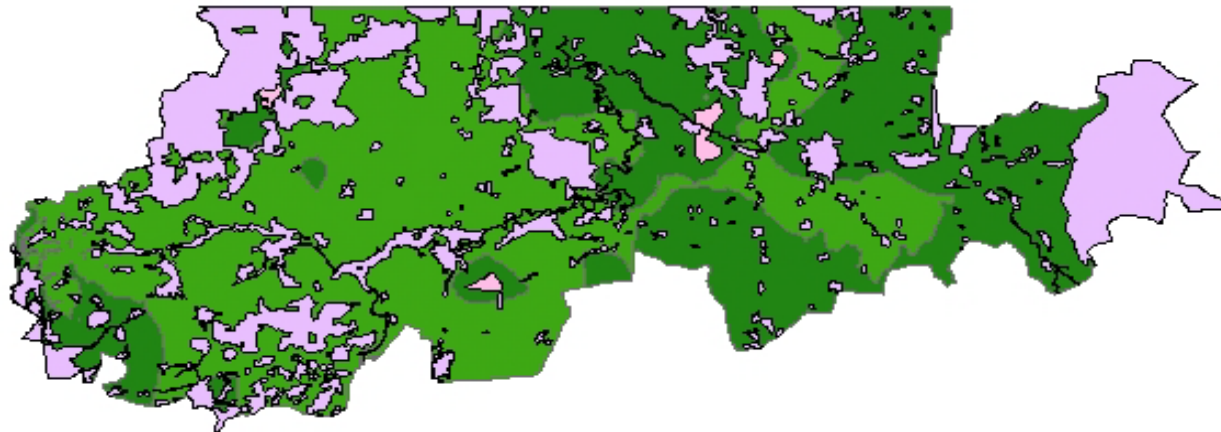
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Land Suitability of Administrative Units

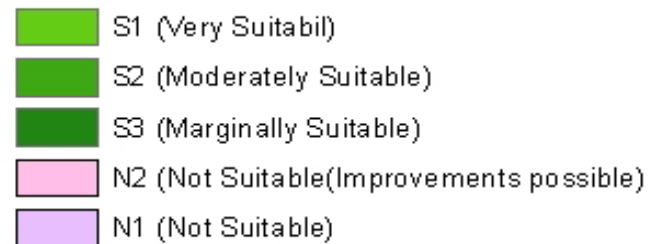
Site Name	Crop Name
القبو	
Pista chio	فستق حلبي معمر بعل
Potato	بطاطا صيفي مروى
Almond_si	لوز معمرة مروى
Almond	لوز معمرة بعل
Wheat_si	قمح شتوي مروى
Wheat	قمح شتوي بعل
Pista chio_si	فستق حلبي معمر مروى
Grape_si	عنب معمر مروى
Grape	عنب معمر بعل
Sugar beet_si	شوندر سكري شتوي مروى
Barley_si	شعير شتوي مروى
To bacco	تبغ صيفي مروى
Cotton	قطن صيفي مروى
Tomato	بندورة صيفي مروى
Barley	شعير شتوي بعل
Apple	تفاح معمر بعل
Apple_si	تفاح معمر مروى
Peach	دراق معمر بعل
Peach_si	دراق معمر مروى

Land suitability Cotton



Cotton

Suitability_Levels



Priorities

a. The priorities of actions in the field of land management

- To keep of the agricultural land and reduce its degradation by identifying erosion and degradation areas and the establish necessary projects to stop the degradation.
- Identify the hot spots areas and the promising areas for conservation and investment.
- Identify areas that its fertility has deteriorated and set up programs for rehabilitate it.
- Increase the irrigation area and rain fed by using modern techniques through the projects of land reclamation.
- Expand the arable land and increase its productivity

b-The priorities of actions in the field of management of protected areas

- Increased budget for the development of nature protected areas within the budget of investment projects.
- Training national staff for each protected area and manage it with the participation of the local people
- Update the national policy of protected areas, according to modern techniques with a full account of the role of local society.

c. The priorities of actions In the field of the management of natural pastures protection

- Expansion in the implementation of **water harvesting** techniques.
- The use of **renewable energy** sources such as wind and solar energy.
- Activation of the **sustainable management** of **rangelands** and **water** that form the backbone to keep the steppe land and its development in suitable conditions.
- Support **alternatives and rural industries and traditional handicrafts** in the steppe lands to increase employment and combat poverty and protect the environment.
- Allocation **marginal areas** adjacent to steppe land to be an area for the sheep industry and, encourage investment projects, raising sheep and dairy production.

Recommendation

- Developing data and land information system for land planning and land use .
- Establishment **agro-ecological zoning map** for Syria, and identifying the optimal areas for the production of crops and fruit trees ,which commensurate with the soil classification and land uses, according to comparative advantage and using geographic information system.
- Identify hot spot areas which exposed to erosion and pollution, and **adopt plans** and measures to stop its degradation and to implement conservation and rehabilitation.
- Establishment **maps of environmental land uses** in all provinces and apply it in order to achieve sustainable development.
- Activating and developing the necessary **legal framework** to implement and enforce **environmental land use plans** with the development of environmental laws and existing legislation and the development of mechanisms.

Thank you