



Best Fit Practices for Reforestation in Lebanon to Enhance Climate Resilience in Remote Hilly Areas

DELIVERABLE TASK 2

DEVELOPMENT OF A DESIGN FOR WEB-BASED SEED REGISTERING AND TRACKING SYSTEM

PROFOR PROGRAM

WORLD BANK

In cooperation with FAO



WORLD BANK GROUP PROFOR



**Food and Agriculture
Organization of the
United Nations**

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DOCUMENT FOR REGISTRATION AND WEB SYSTEM OF BASIC MATERIALS AND REGISTRATION OF SEEDS IN LEBANON

In order to have a web system where you may consult existing basic material in Lebanon and to know the relationship of seeds available, it is necessary to structure and organize all the required information. Two databases are proposed for internal use; the first will contain the characteristics, location, other relevant data of the basic material, and the second will provide information about availability of seeds stored.

Based on these databases, a web system is developed allowing users to easily find the seeds sources, stands and seeds in the National Center for Forestry Seeds of Lebanon (NCFSL).

We propose to divide the web system into two sections; the first one containing the registry and catalog of basic material and the second one containing a list of forestry seeds available.

1. Databases

The content of the fields in the databases can be of two types:

- Field information as drop-down, with a finite number of elements.
- Open field to briefly describe the specific field.

The annexes specify which fields should be as drop-down and which require a brief description. For drop-down fields, some of the items that should appear are proposed, but may be modified or expanded. Field "species" is left open to avoid limiting the entry of other species of interest not covered by this point.

1.1. Database for the register of basic materials for the production of forest reproductive material

Annex 1 specifies fields and information required to enter any basic material in the Register.

1.1.1. Description of fields from the database of basic materials

- Species: drop-down with the species of interest in the country, optional scientific name and common name
- Region of provenance: drop-down with different regions of the country (01 Coastal / 02 Mount Lebanon / 03 Syncline Depression of Bekaa / 04 Anti-Lebanon Mountains).
- Code: a sequence identifies a material and distinguishes it from others.
- Coding example:
- Seed Source: FS-XX/YY/ZZ/yyyy
- Selected Stand: RS-XX/YY/ZZ/yyyy
- FS indicates that it is a seed source and RS is a selected stand.
- XX: number that identifies a particular species (previously, one should make a list of the coding species).
- YY: referring to the provenance region where the material is located (01, 02, 03, and 04).
- ZZ: specifies the geographical area (province, 01, 02....08).
- aaa: serial number of the material for that species, province, region.

- Category: drop-down with de different categories. We distinguish between source-identified and selected.
- Objective: drop-down list with the main objective of the material. It can be multifunctional, i.e. timber production, fruit production or others.
- Authenticity of the basic material: can be autochthonous, indigenous or of unknown origin.
- Location of the basic material: we consider three fields:
 - 1) Municipality: drop-down with all municipalities in the country.
 - 2) Province: drop-down with the eight provinces in the country.
 - 3) Name of the mountain or area: mountain, forest, area where the basic material is located.
- UTM coordinates: set two fields with X and Y in meters. Specify reference system used.
- Time zone: specify the time zone where the basic material is located.
- Altitude range: altitude range of the basic material, in meters, from the lowest level to the existing peak.
- Surface: surface, in hectares, occupied by the material.
- Ownership: it can be public or private
- Property details: specify the property name and contact information (phone, mail or address). Note: see regulations of data protection.
- Visit date: date when the seed source or stand was visited.
- Proposal of the material: who provided information on the material to include in the Catalogue. Specify name, position and contact.
- Authorized: check if the proposed basic material could be included in the Register or not.
- Cartography: link to the location map of the basic material.
- Photographs: link to the field that focus on photographs of the basic material.
- Remarks: Field to add other data like access, slope of the mountain...

Annex 2 shows the distribution of the fields in the database.

CATALOGUE OF BASIC MATERIALS FOR THE PRODUCTION OF FOREST REPRODUCTIVE MATERIAL					
SPECIES	PINUS PINEA	REGION OF PROVENANCE	01 Coastal	CODE	FS-XX/YY/ZZ/aaa
CATEGORY	IDENTIFIED	OBJECTIVE	FRUIT PRODUCTION	AUTHENTICITY OF BM	AUTOCHTHONOUS
MUNICIPALITY	xxxxxxxxxxx	PROVINCE	03 BEIRUT	NAME OF THE MOUNTAIN	xxxxxxxxxxx
UTM COORDINATES	xxxxxx - yyyyyyy	TIME ZONE	xx	ALTITUDE RANGE	xx - yyy
SURFACE	xx,xx	OWNERSHIP	PUBLIC	PROPERTY	xxxxxxxxxxx
DATE	xx/yy/zzzz	PROPOSAL OF BM	xxxxxxxxxxx	AUTHORIZED	YES
Link to CARTOGRAPHY	Link to PHOTOGRAPHS		REMARKS	xxxxxxxxxxx	

1.2. Database for the register of seeds

Annex 3 specifies fields and information required by all seed lots to be entered in the Register.

1.2.1. Description of the fields from the seed database

- Certificate Number: number that guarantees the origin and quality of the seeds.
- Number of the lot: set of units of a single commodity, identifiable by its homogeneity of composition and origin.
- Species: pop-up with the species of interest of the country, optional scientific name and common name.
- Nature: distinguishes between fruits and seeds.
- Region of provenance: drop-down with various distinguishable regions (01 Coastal / 02 Mount Lebanon / 03 Syncline Depression of Bekaa / 04 Anti-Lebanon Mountains).
- Category: drop down to the different categories. We distinguish between source-identified and selected.
- Objective: folding with the main objective of the material. One can distinguish between multifunctional timber production, fruit production or others.
- Authenticity of the base material: can be autochthonous, indigenous or of unknown origin.
- Year of maturity: period in which the seeds were collected.
- Analysis Date: date of the last analysis of the seeds to know the germination percentage of the lot.
- Purity: the percentage by weight of pure seeds, other seeds and inert matter of the product marketed as a seed lot.
- Germination: the germination percentage of pure seeds.
- 1,000 seed weight: the weight of 1,000 pure seeds.
- Storage: if the seeds has been kept in cold or chamber.
- Availability: the number of seeds of each lot, expressed in kilograms.
- Price: price of the seeds per kilogram.

Annex 4 shows the distribution of the fields in the database.

REGISTER OF FOREST REPRODUCTIVE MATERIAL			
CERTIFICATE NUMBER	xxxxxx	NUMBER OF THE LOT	xxxxx
		SPECIES	CEDRUS LIBANI
NATURE	SEED	REGION OF PROVENANCE	01 Coastal
		CATEGORY	SELECTED
OBJECTIVE	FRUIT PRODUCTION	AUTHENTICITY OF BM	AUTOCHTHONOUS
		YEAR OF MATURITY	xx/yy
ANALYSIS DATE	xx/yy/zzzz	PURITY (%)	xx,xx
		GERMINATION (%)	xx,xx
1.000 SEED WEIGHT (kg)	xx,xx	STORAGE	xx
AVAILABILITY	xx,xx	PRICE	xx,xx

2. Web system

The web system aims to allow users to consult the different materials available for the production of forest reproductive material in an interactive and easy way. It also may inform about the seeds available in the NCFSL (National Center for Forestry Seeds of Lebanon).

2.1. Web system for the registration of the basic materials for the production of the forest reproductive material

In the case of the web system for the registration of basic material, we propose an access through a link that redirects users to a Web application. The panels and the application functions are detailed below.

2.1.1. Introduction

The information must be presented to allow for queries by attributes and geographical location, and should allow easy access to the basic material. The application screen can be structured into three panels (**Annex 5**):

- a- Cartography
- b- Tabs for content management and queries
- c- Results screen

2.1.2. Base cartography

The cartography panel (**Annex 6**) should be composed of two maps, i.e. a main one for displaying information layers (A), and a second one to indicate the general position (B).

The main map can have different background mapping options, as orthophotos, topographic, relief or blank, as provided. One can choose to use scrolling with the different options. It is recommended to add the possibility to select as visible provinces and municipalities.

2.1.3. Basic tools

One can put buttons with basic tools that facilitate the management of the application.



Tool to return to the initial map extent Lebanon.



Tool to click on the map and get the information of the visible layers. With this tool, if one clicks on a base material information, some major fields of the material appear (we propose: code, species, grade, name of the mountain, town and province). Also two icons appear that provide more detailed information (**Annex 7**).



The first icon would bring the base material on a map and could give the path to reach it. It is proposed based on Google maps for example.



The second icon or open a tab (**Annex 8**) with the fields we want for the base material. We propose that the following appears: code name of the mountain, municipality, province, UTM coordinates, time zone, altitude range, ownership type, species, MFR category, region of provenance, authenticity of MB, objective, gradient, floor, understory, chaperones and other species. The tab with a button must be printed.



Button to send an email with comments and/or suggestions.



Help button to display the user guide.

2.1.4. Display and search

The second panel would have two tabs to configure the display of information layers and narrow the search by species and region of provenance, or search (**Annex 9**).

The first tab search by species and region of provenance would select the species of interest for display on the map. It is recommended for the names of the species to be displayed both in Latin and Arabic. The activation of a region of provenance must allow narrowing the search to the species to which corresponds the selected region.

The second search tab (**Annex 10**) should incorporate a series of drop-down items such as:

- Code MB
- Category MFR
- Region of provenance
- Province
- Ownership

Selected attributes would leave the results in the third panel to click a button on implementation of the action. It is recommended to add another button to delete a specific search, to make the following.

2.1.5. Results

Following a search (**Annex 11**), the results would display the following fields: code, species, region of provenance, MFR category, authenticity MB, name of the mountain, municipality, province, UTM coordinates, time zone, altitude range and ownership type.

- When one runs a search, the map should fit the resulting materials base extension.
- When one enters the results' table and slides the cursor over any highlighted basic material, this should be activated and displayed on the map.
- The results should be numbered and should be printable using an action button.

2.2. Web system for seed registration

In the case of the web system for the registration of seeds, we propose an access through a link that redirects users to another screen (**Annex 12**).

2.2.1. Introduction

The information must be presented so that it can display the previously selected fields from the database for internal use, sorted by species, region of provenance, category, year of maturity and price.

2.2.2. Basic tools

We can put buttons with basic tools that facilitate the management of the application.

Among them:



Button to send an email with comments and/or suggestions.



Button allowing to print the information.

2.2.3. Visualization

Example:

SPECIES	REGION OF PROVENANCE	CATEGORY	HARVEST PERIOD	PRICE (LBP/kg)
<i>Pinus pinea</i>	01 COASTAL	IDENTIFIED	2012/2013	XX.XX
	03 SYNCLINE DEPRESSION OF BEKAA	IDENTIFIED	2013/2014	XX.XX
	03 SYNCLINE DEPRESSION OF BEKAA	SELECTED	2014/2015	XX.XX
<i>Cedrus libani</i>	02 MOUNT LEBANON	IDENTIFIED	2014/2015	XX.XX
	02 MOUNT LEBANON	SELECTED	2014/2015	XX.XX

ANNEX 1. Register of basic materials for the production of forest reproductive material

FIELD NAME	CONTENT
SPECIES	<i>ABIES SILICICA</i>
	<i>ACER SP.</i>
	<i>ARBUTUS SP.</i>
	<i>CEDRUS LIBANI</i>
	<i>CRATAEGUS MONOGYNA</i>
	<i>CUPRESSUS SP.</i>
	<i>FRAXINUS SP.</i>
	<i>JUGLANS REGIA</i>
	<i>JUNIPERUS SP.</i>
	<i>PINUS BRUTIA</i>
	<i>PINUS PINEA</i>
	<i>PLATANUS SP.</i>
	<i>POPULUS SP.</i>
	<i>PRUNUS SP.</i>
	<i>PYRUS SP.</i>
	<i>QUERCUS CALLIPRINOS</i>
	<i>QUERCUS INFECTORIA</i>
	<i>ROSA CANINA</i>
	<i>SALIX SP.</i>
<i>SPARTIUM JUNCEUM</i>	
...	
REGION OF PROVENANCE	01 Coastal
	02 Mount Lebanon
	03 Syncline Depression of Bekaa
	04 Anti-Lebanon Mountains
CODE	<i>number of base material</i>
CATEGORY	IDENTIFIED
	SELECTED
OBJECTIVE	MULTIFUNCTIONAL
	WOOD PRODUCTION
	FRUIT PRODUCTION
	OTHER
AUTHENTICITY OF THE BASIC MATERIAL	AUTOCHTHONOUS
	NO AUTOCHTHONOUS
	Unknown Origin
MUNICIPALITY	<i>List of municipalities</i>
PROVINCE	01 AKKAR
	02 BAALBECK-HERMEL
	03 BEIRUT

	04 Bekaa Valley
	05 NORTHERN LEBANON
	06-SOUTH LEBANON
	07 Mount Lebanon
	08 NABATIYE
NAME OF THE MOUNTAIN	<i>Name of the mountain</i>
UTM COORDINATES	<i>X coordinate - Y coordinate</i>
TIME ZONE	<i>Time zone number</i>
ALTITUDE RANGE	<i>Minimum and maximum altitude of the base material</i>
SURFACE	<i>Surface of the base material</i>
OWNERSHIP	PUBLIC
	PRIVATE
PROPERTY	<i>Owner's name, address and contact</i>
DATE	<i>Day of the visit of the base material</i>
PROPOSAL OF THE MATERIAL	<i>Person/s who proposed the base material</i>
AUTHORIZED	YES
	NO
	PENDING VISIT
CARTOGRAPHY	<i>Plan of the basic material with its boundaries</i>
PHOTOGRAPHS	<i>Images of base materials</i>
REMARKS	<i>Access, slope, target species, undergrowth...</i>

ANNEX 2. Distribution of database fields for the register of basic materials for the production of forest reproductive material

CATALOGUE OF BASIC MATERIALS FOR THE PRODUCTION OF FOREST REPRODUCTIVE MATERIAL					
SPECIES	PINUS PINEA	REGION OF PROVIDENCE	01 Coastal	CODE	FS-XX/YY/ZZ/aaa
CATEGORY	IDENTIFIED	OBJECTIVE	FRUIT PRODUCTION	AUTHENTICITY OF BM	AUTOCHTHONOUS
MUNICIPALITY	xxxxxxxxxxx	PROVINCE	03 BEIRUT	NAME OF THE MOUNTAIN	xxxxxxxxxxx
UTM COORDINATES	xxxxxx - yyyyyyy	TIME ZONE	xx	ALTITUDE RANGE	xx - yyy
SURFACE	xx,xx	OWNERSHIP	PUBLIC	PROPERTY	xxxxxxxxxxx
DATE	xx/yy/zzzz	PROPOSAL OF BM	xxxxxxxxxxx	AUTHORIZED	YES
Link to CARTOGRAPHY	Link to PHOTOGRAPHS	REMARKS	xxxxxxxxxxx		

ANNEX 3. Register of forest reproductive material (seeds)


FIELD NAME	CONTENT
CERTIFICATE NUMBER	<i>Code that identifies the material</i>
NUMBER OF THE LOT	<i>Set of units of a single commodity, identifiable by its homogeneity of composition and origin</i>
SPECIES	<i>ABIES SILICICA</i>
	<i>ACER SP.</i>
	<i>ARBUTUS SP.</i>
	<i>CEDRUS LIBANI</i>
	<i>CRATAEGUS MONOGYNA</i>
	<i>CUPRESSUS SP.</i>
	<i>FRAXINUS SP.</i>
	<i>JUGLANS REGIA</i>
	<i>JUNIPERUS SP.</i>
	<i>PINUS BRUTIA</i>
	<i>PINUS PINEA</i>
	<i>PLATANUS SP.</i>
	<i>POPULUS SP.</i>
	<i>PRUNUS SP.</i>
	<i>PYRUS SP.</i>
	<i>QUERCUS CALLIPRINOS</i>
	<i>QUERCUS INFECTORIA</i>
<i>ROSA CANINA</i>	
<i>SALIX SP.</i>	
<i>SPARTIUM JUNCEUM</i>	

	...
NATURE	FRUIT
	SEED
REGION OF PROVENANCE	01 Coastal
	02 Mount Lebanon
	03 Syncline Depression of Bekaa
	04 Anti-Lebanon Mountains
CATEGORY	IDENTIFIED
	SELECTED
OBJECTIVE	MULTIFUNCTIONAL
	WOOD PRODUCTION
	FRUIT PRODUCTION
	OTHER
AUTHENTICITY OF THE BASIC MATERIAL	AUTOCHTHONOUS
	NON AUTOCHTHONOUS
	Unknown Origin
YEAR OF MATURITY	<i>Period when seed is collected</i>
ANALYSIS DATE	<i>Date of the last analysis of the seed lot</i>
PURITY	<i>Weight percentage of pure seed</i>
GERMINATION	<i>Germination percentage of pure seed</i>
1,000 SEED WEIGHT	<i>Weight of thousand pure seeds</i>
STORAGE	<i>If it has been kept in cold storage</i>
AVAILABILITY	<i>Amount of seeds available</i>
PRICE	<i>Amount kilogram of seed</i>





ANNEX 4. Distribution of database fields for the register of forest reproductive material (seeds)

REGISTER OF FOREST REPRODUCTIVE MATERIAL					
CERTIFICATE NUMBER	xxxxxx	NUMBER OF THE LOT	xxxxx	SPECIES	CEDRUS LIBANI
NATURE	SEED	REGION OF PROVIDENCE	01 Coastal	CATEGORY	SELECTED
OBJETIVE	FRUIT PRODUCTION	AUTHENTICITY OF BM	AUTOCHTHONOUS	YEAR OF MATURITY	xx/yy
ANALYSIS DATE	xx/yy/zzzz	PURITY (%)	xx,xx	GERMINATION (%)	xx,xx
1.000 SEED WEIGHT (kg)	xx,xx	STORAGE	xx		
AVAILABILITY	xx,xx			PRICE	xx,xx

ANNEX 5. Basic materials catalogue of Lebanon




BASIC MATERIALS CATALOGUE OF LEBANON

PROVINCE

MUNICIPALITY



a- CARTOGRAPHY

SPECIES AND REGIONS


regions
 species
 latin
 arabic

<input type="checkbox"/>	ABIES SILICICA
<input type="checkbox"/>	ACER SP.
<input type="checkbox"/>	ARBUTUS SP.
<input type="checkbox"/>	CEDRUS LIBANI
<input type="checkbox"/>	CRATAEGUS MONOGYNA
<input type="checkbox"/>	CUPRESSUS SP.
<input type="checkbox"/>	FRAXINUS SP.
<input type="checkbox"/>	JUGLANS REGIA
<input type="checkbox"/>	JUNIPERUS SP.
<input type="checkbox"/>	PINUS BRUTIA
<input type="checkbox"/>	PINUS PINEA
<input type="checkbox"/>	PLATANUS SP.
<input type="checkbox"/>	POPULUS SP.
<input type="checkbox"/>	PRUNUS SP.
<input type="checkbox"/>	PYRUS SP.
<input type="checkbox"/>	QUERCUS CALLIPRINOS
<input type="checkbox"/>	QUERCUS INFECTORIA
<input type="checkbox"/>	ROSA CANINA
<input type="checkbox"/>	SALIX SP.
<input type="checkbox"/>	SPARTIUM JUNCEUM

SEARCH

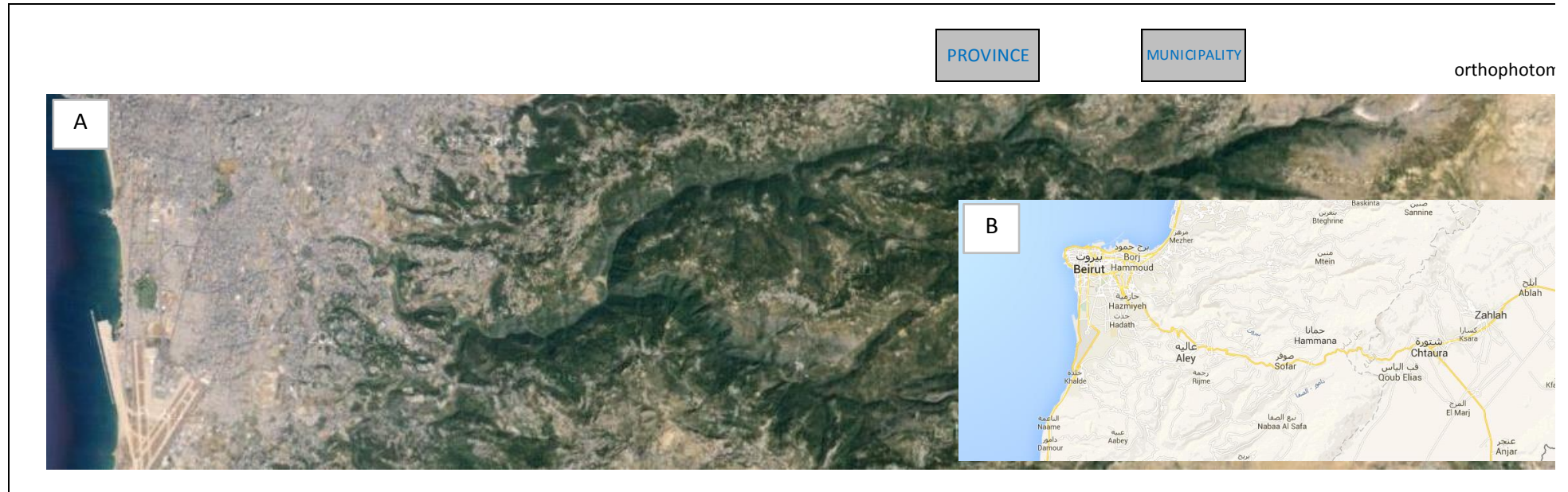
b- TABS FOR CONTENT MANAGEMENT AND CONSULTATIONS

Id	Material code	Species	Region of provenance	Category	Authenticity of the base	Location of the base	Municipality	Province	UTM Coordinates	Time zone	Range altitude	Ownership

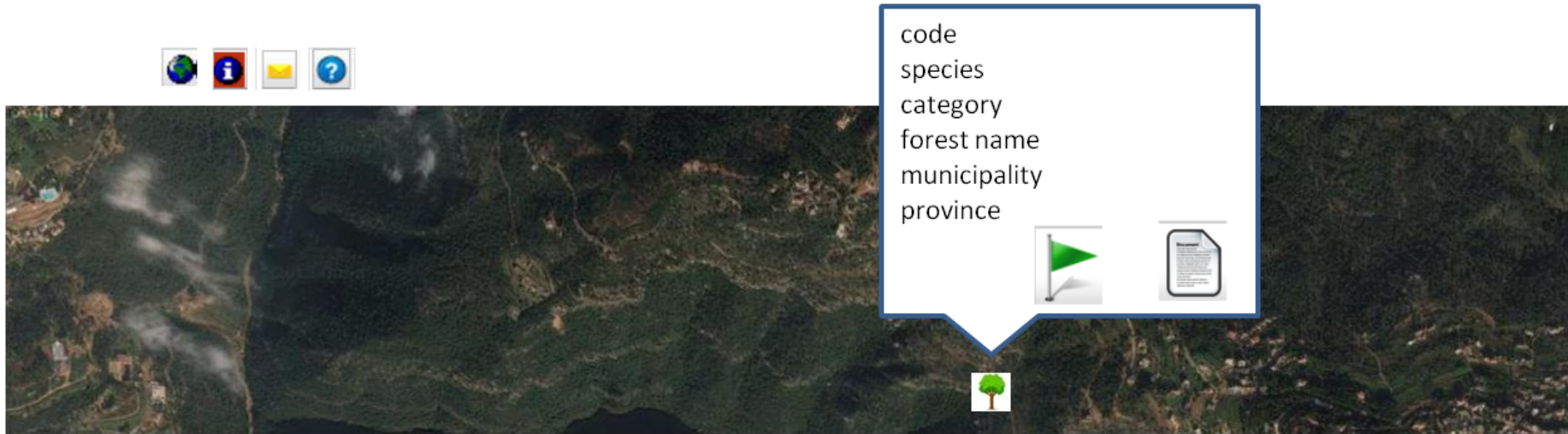


c- RESULTS

ANNEX 6. Cartography



ANNEX 7. Basic Material (BM) information tools



ANNEX 8. Tools file



BASIC MATERIAL

Material code	
Location of the base material	
Municipality	
Province	
UTM Coordinates in meters	
Time zone	
Range altitude	
Ownership	
Species	
Category	
Region of provenance	
Authenticity of the base material	
Objective	
Slope	
Pavement	
Underwood	
Companion species	
Others	

ANNEX 9. Species and regions (a)

SPECIES AND REGIONS		
<input type="checkbox"/>	Regions	<input type="checkbox"/>
<input type="checkbox"/>	Species	<input type="checkbox"/>
<input type="checkbox"/>	Latin	<input type="checkbox"/>
<input type="checkbox"/>	Arabic	<input type="checkbox"/>
<input type="checkbox"/>	<i>ABIES SILICICA</i>	
<input type="checkbox"/>	<i>ACER SP.</i>	
<input type="checkbox"/>	<i>ARBUTUS SP.</i>	
<input type="checkbox"/>	<i>CEDRUS LIBANI</i>	
<input type="checkbox"/>	<i>CRATAEGUS MONOGYNA</i>	
<input type="checkbox"/>	<i>CUPRESSUS SP.</i>	
<input type="checkbox"/>	<i>FRAXINUS SP.</i>	
<input type="checkbox"/>	<i>JUGLANS REGIA</i>	
<input type="checkbox"/>	<i>JUNIPERUS SP.</i>	
<input type="checkbox"/>	<i>PINUS BRUTIA</i>	
<input type="checkbox"/>	<i>PINUS PINEA</i>	
<input type="checkbox"/>	<i>PLATANUS SP.</i>	
<input type="checkbox"/>	<i>POPULUS SP.</i>	
<input type="checkbox"/>	<i>PRUNUS SP.</i>	
<input type="checkbox"/>	<i>PYRUS SP.</i>	
<input type="checkbox"/>	<i>QUERCUS CALLIPRINOS</i>	
<input type="checkbox"/>	<i>QUERCUS INFECTORIA</i>	
<input type="checkbox"/>	<i>ROSA CANINA</i>	
<input type="checkbox"/>	<i>SALIX SP.</i>	
<input type="checkbox"/>	<i>SPARTIUM JUNCEUM</i>	

SEARCH

ANNEX 10. Species and regions (b)

SPECIES AND REGIONS	
SEARCH	
Material code	<input type="text"/>
Category	<input type="text"/>
Region of provenance	<input type="text"/>
Province	<input type="text"/>
Ownership	<input type="text"/>
Run button	<input type="button" value="X"/>

ANNEX 11. Results

Id	Material code	Species	Region of provenance	Category	Authenticity of the base material	Location of the base material	Municipality	Province	UTM Coordinates in meters	Time zone	Range altitude	Ownership



ANNEX 12. Forest Reproductive Material (FRM) Web



FOREST REPRODUCTIVE MATERIAL CATALOGUE OF LEBANON



Species	Region of provenance	Category	Year of maturation	Price (LBP/kg)