LIFE11 ENV IT 000215 RESILFORMED

RESILienza al cambiamento climatico delle FOReste MEDiterranee

Project ResilForMed: defining monitoring protocols and silvicultural management models to improve the resilience of sicilian forests to climate change

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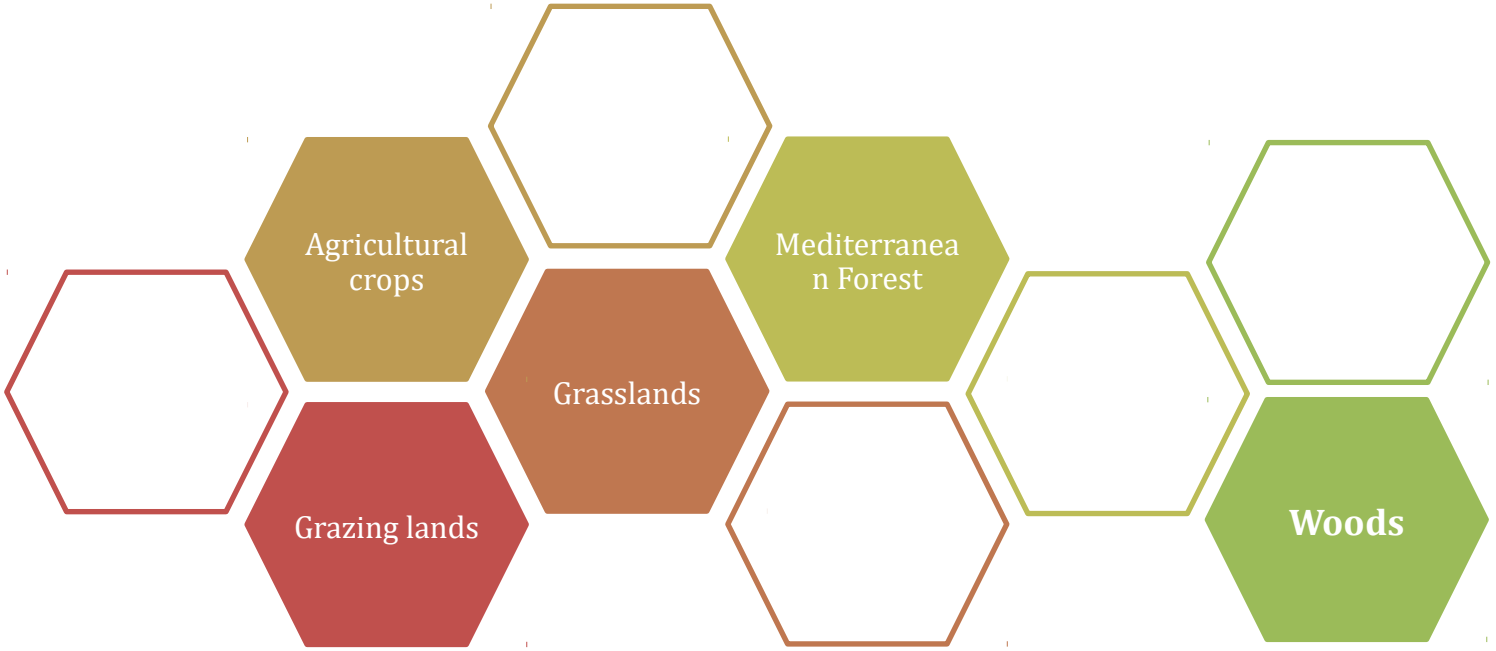
D.R.E.Am. Italia



The natural sourced woods discontinuously cover the most important mountainous relief of Sicily becoming greatly expanded corresponding to the territories included in the Regional Natural Parks of Etna, Madonie and Nebrodi , as well as the other regional protected areas.

Besides the above mentioned woods, there are large areas covered by artificial forest plantations differing by floristic composition and structure of the native formations.

Inventory category	Surface (ha)
Tall forests	258’502
Tree cultivation	4’003
Areas temporarily lacking in stand (ATPS)	11’949
Total (Woods)	**274’454**
Low forests	7’561
Scrub	851
Sparse forest	12’677
Shrub	101’161
Inaccessible forest areas	97’043
Included surfaces	18’374
Total (Other forest areas)	**237’667**

Eligible formations in view of Kyoto

It's about forestry formations which fully enter in the CO_2 stock count , on the basis of the actual international agreements.

The Other forest areas are not included within the functional formations certifying the carbon flows. However, they represent important formations in the Sicilian landscape due to their naturalistic peculiarities and to the biodiversity contribution with regard to species and habitats.

The Sicilian forests were classified in 14 Forestry Categories (9 hardwoods, 3 coniferous woods and 2 between scrub and shrub) and 58 Forestry Types .

Categoria forestale	Tipo forestale	Categoria forestale	Tipo forestale
Leccete	Lecceta pioniera rupestre	Formazioni pioniere e secondarie	Betuleto a Betula aetnensis
	Lecceta termomediterranea costiera		Pioppeto di pioppo tremulo
	Lecceta xerofila mediterranea		Boscaglia pioniera ad orniello
	Lecceta mesoxerofila		Boscaglia ad olmo campestre
Sugherete	Sughereta termomediterranea costiera		Robinieto
	Sughereta interna		Boscaglia ad ailanto
	Sughereta su vulcaniti degli iblei		Boscaglia di specie alloctone minori
Querceto di rovere e roverella	Querceto di rovere	**Pinete di pini mediterranei**	Pineta di pino d'Aleppo della Sicilia sud-orientale
	Querceto termofilo di roverella		Pineta di pino marittimo di Pantelleria
	Querceto mesoxerofilo di roverella		Pineta di pino domestico
	Querceto xerofilo di roverella dei substrati carbonatici		Pineta di pini mediterranei naturalizzata
	Querceto xerofilo di roverella dei substrati silicatici	**Pinete di pino laricio**	Pineta inferiore di pino laricio
Cerrete	Cerreta termofila a Quercus gussonei		Pineta pioniera di pino laricio
	Cerreta montana		Pineta superiore di pino laricio
Orno-ostrieti	Ostrieto pioniero	**Rimboschimenti**	Rimboschimento di eucalipti
	Ostrieto mesoxerofilo di forra		Rimboschimento di latifoglie varie
Castagneti	Castagneto termofilo		Rimboschimento mediterraneo di conifere
	Castagneto montano mesofilo		Rimboschimento montano di conifere
Faggete	Faggeta mesofila su substrati silicatici	**Macchie e arbusteti mediterranei**	Macchia dunale a ginepri e lentisco
	Faggeta su lave dell'Etna		Macchia-gariga a oleastro e euforbia arborescente
	Faggeta mesofila calcifila		Arbusteto a Calicotome infesta
	Faggeta mesoxerofila calcifila		Genisteto a ginestra di spagna
Formazioni riparie	Plataneto a platano orientale		Arbusteto a Rhus coriaria
	Pioppeto-saliceto arboreo		Macchia-gariga dei substrati carbonatici
	Saliceto ripario arbustivo		Macchia-garica dei substrati silicatici
	Formazioni a tamerici e oleandro		Gariga a palma nana
	Frassineto ripario a Fraxinus oxycarpa	Arbusteti montani e supramediterranei	Genisteto a Genista aetnensis
			Genisteto a Cytisus scoparius
			Ericeto a erica arborea dei Peloritani
			Formazioni ad agrifoglio
			Arbusteto a rosacee

Inventory (year)	Woods					
	(ha)	(%)	(ha)	(%)	(ha)	(%)
IFNI (1985)	198'000	74.3	68'400	25.7	266'400	100.0
INFC (2005)	256'303	75.8	81'868	24.2	338'171	100.0
IFRS (2009)	274'454	53.6	237'667	46.4	512'121	100.0

The increase of the forestry surface is attributable to various factors:

1. implementation of reforestation and new implants of timber species;
2. natural evolution of shrub-like and arboreal vegetation on the vacant areas abandoned by agriculture and grazing ;
3. different definition of wood which is used ;
4. for equal definition, different method of recording .


Strumenti conoscitivi per la gestione delle risorse forestali della Sicilia
SISTEMA INFORMATIVO FORESTALE REGIONALE

The numbers of ResilForMED
Date of approval by the European Commission June 14th 2012
Starting date June 1st 2012
Ending date June30th 2017
Runtime (months) 61
Overall cost 1.557.743 Euro
European contribution 778.871 Euro
% of European contribution 50%

COORDINATING BENEFICIARY - DRAFD
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Regional department Regional company of state-owned forests
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The project was born of the need to detect new procedures within the forestry sector and to enhance the existing ones, in order to foster the ecological resilience of the Sicilian forests subjected to the highest risk of desertification .

The **general objective** of the project is to preserve the forestry systems within the Mediterranean area against the risks arising from climate change, through naturalization processes , increase of biodiversity and improved reactivity , within the recovering processes, following to destabilizing events.

The **specific objective** of the project is to implement a regional forestry policy able to improve the resilience capacity of the Sicilian forests , by increasing their eco-systemic efficiency and enhancing safeguarding of biodiversity..

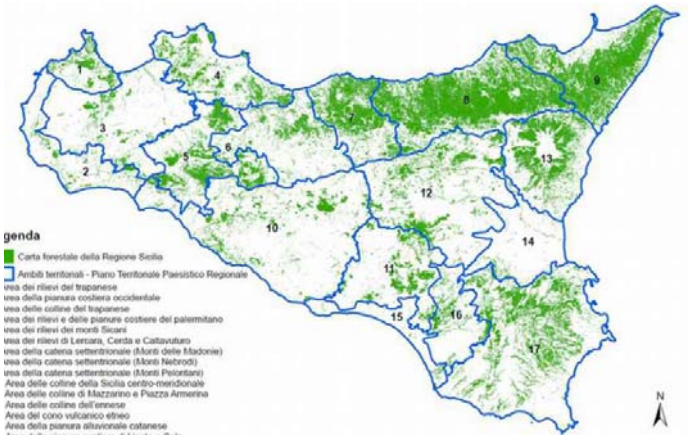
The map of vulnerability to desertification of the Sicilian forests

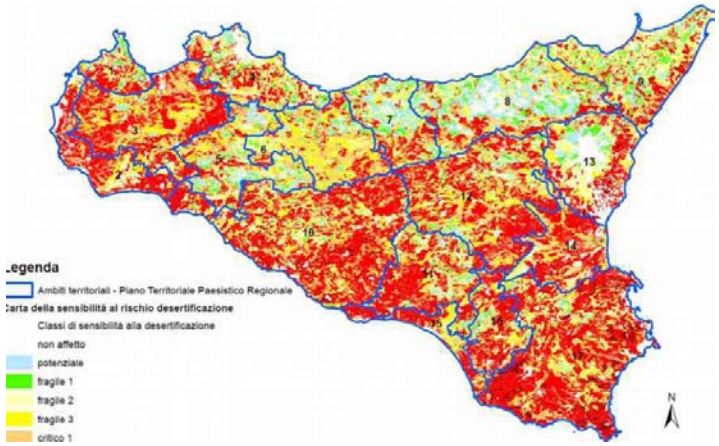
Map of desertification (methodology MEDALUS Mediterranean Desertification And Land USe, European Commission)

Identification of " di "Environmental Areas sensitive to desertification (ESAs)" consisting of a multi-factorial approach based both on local and general knowledge of the running environmental processes. This methodology defines **4 classes of indicators of desertification.**

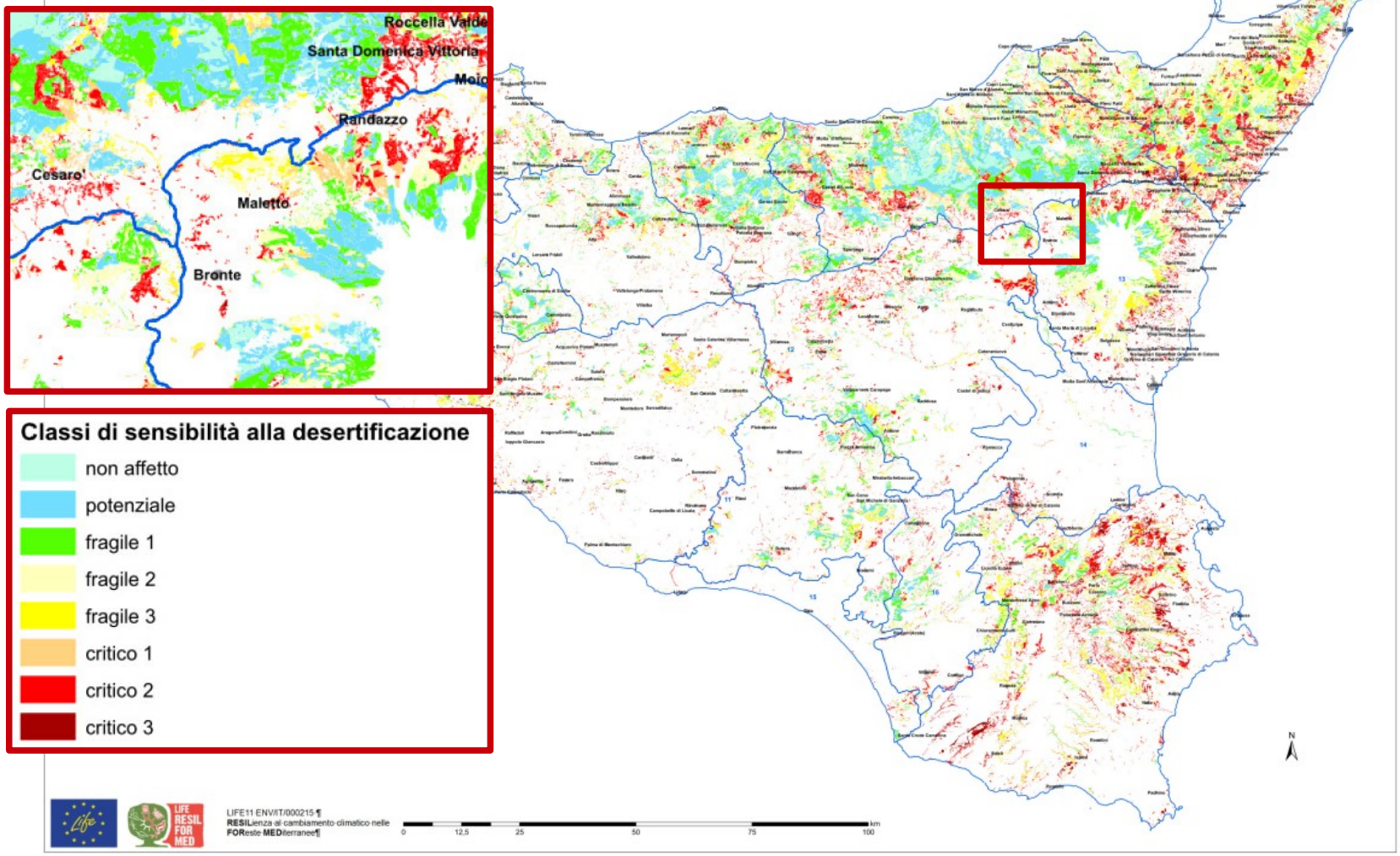
Soil **Climate** **Vegetation** **Territory management**

Forestry map





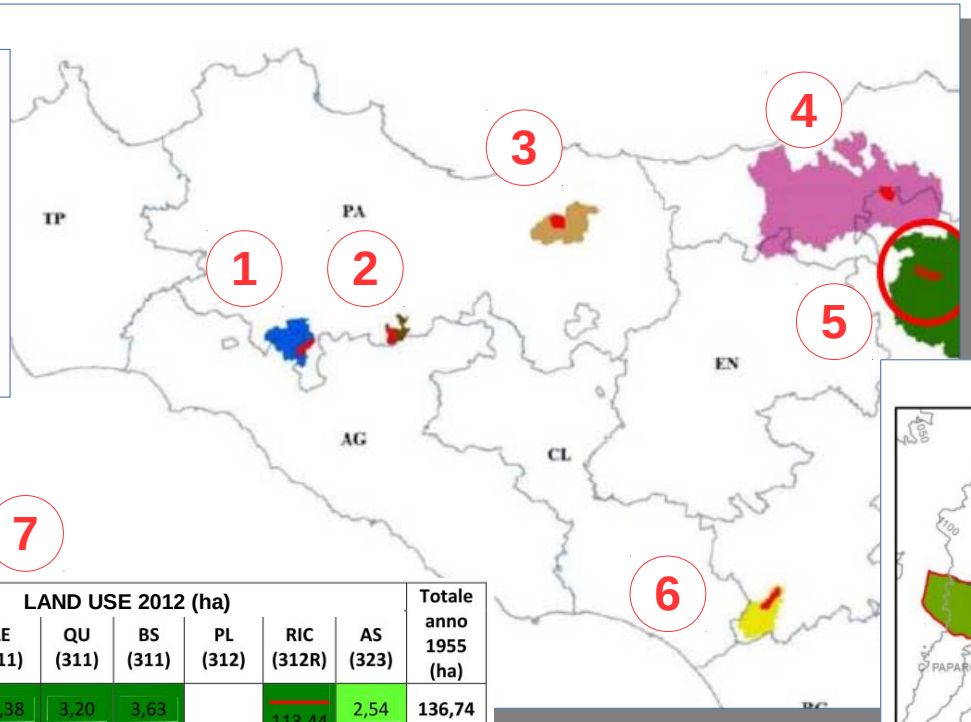
The map of vulnerability to desertification of the Sicilian forests

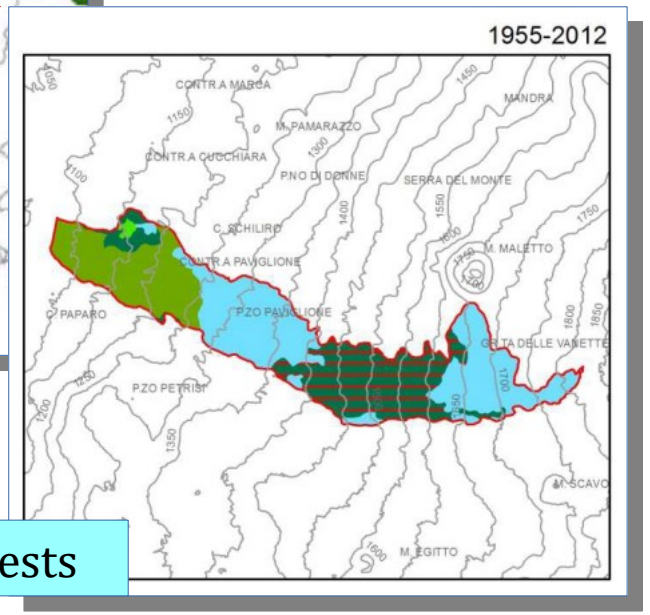


Minimum quantitative threshold to be respected within the selvicultural interventions

Over time analysis of forest cover 1955-2012

Forestry districts:
1-2 Sicani District
3 Madonie District
4 Nebrodi District
5 Etna District
6 Calatino District
7 Panetlleria District





Area di studio "Etna"		LAND USE 2012 (ha)								Totale anno 1955 (ha)
		321	FA (311)	LE (311)	QU (311)	BS (311)	PL (312)	RIC (312R)	AS (323)	
LAND USE 1955 (ha)	321	2,55		11,38	3,20	3,63		113,44	2,54	136,74
	311		8,61	41,18	35,30					85,09
	312						73,96			73,96
	312R							27,66		27,66
	323			88,44	9,80					98,24
Totale anno 2012 (ha)		2,55	8,61	141,00	48,30	3,63	73,96	141,10	2,54	421,69

Invariant forests

200 Test areas

Minimum quantitative threshold to be respected within the selvicultural interventions

Forest category	Forest type	Species	Tree density (n ha^{-1})	Basal area (m^2 ha^{-1})	D_m (cm)	H_m (m)	V (m^3 ha^{-1})
Downy oak forests	*Quercus pubescens* forest of xeric environments	*Quercus pubescens*	1241	19	14	7	98
Cork oak forests	*Quercus suber* forest of xeric environments	*Quercus suber*	573	9	14	5	29
Holm oak forests	Mountain *Quercus ilex* forest of carbonatic substrata	*Quercus ilex*	608	30	25	13	169
	Quercus ilex forest of xeric environments, variant of volcanic substrata	*Quercus ilex*	477	13	19	11	70
Turkey oak forests	*Quercus cerris* forest tipica	*Quercus cerris*	1050	28	18	14	168

Minimum quantitative threshold to be respected within the selvicultural interventions

Forest category	Forest type	Species	Tree density (n ha^{-1})	Basal area (m^2 ha^{-1})	D_m (cm)	H_m (m)	V (m^3 ha^{-1})
Beech forests	*Fagus sylvatica* forest tipica on calcareous substratum	*Fagus sylvatica*	4042	36	11	10	207
	Fagus sylvatica forest tipica on siliceous substratum	*Fagus sylvatica*	1750	36	16	10	220
Corsican pine forests	*Pinus laricio* forest tipica	***Pinus nigra ssp. laricio***	859	38	24	14	287
Mediterranean pine forests	*Pinus pinaster* forest	*Pinus pinaster*	2896	55	16	10	356

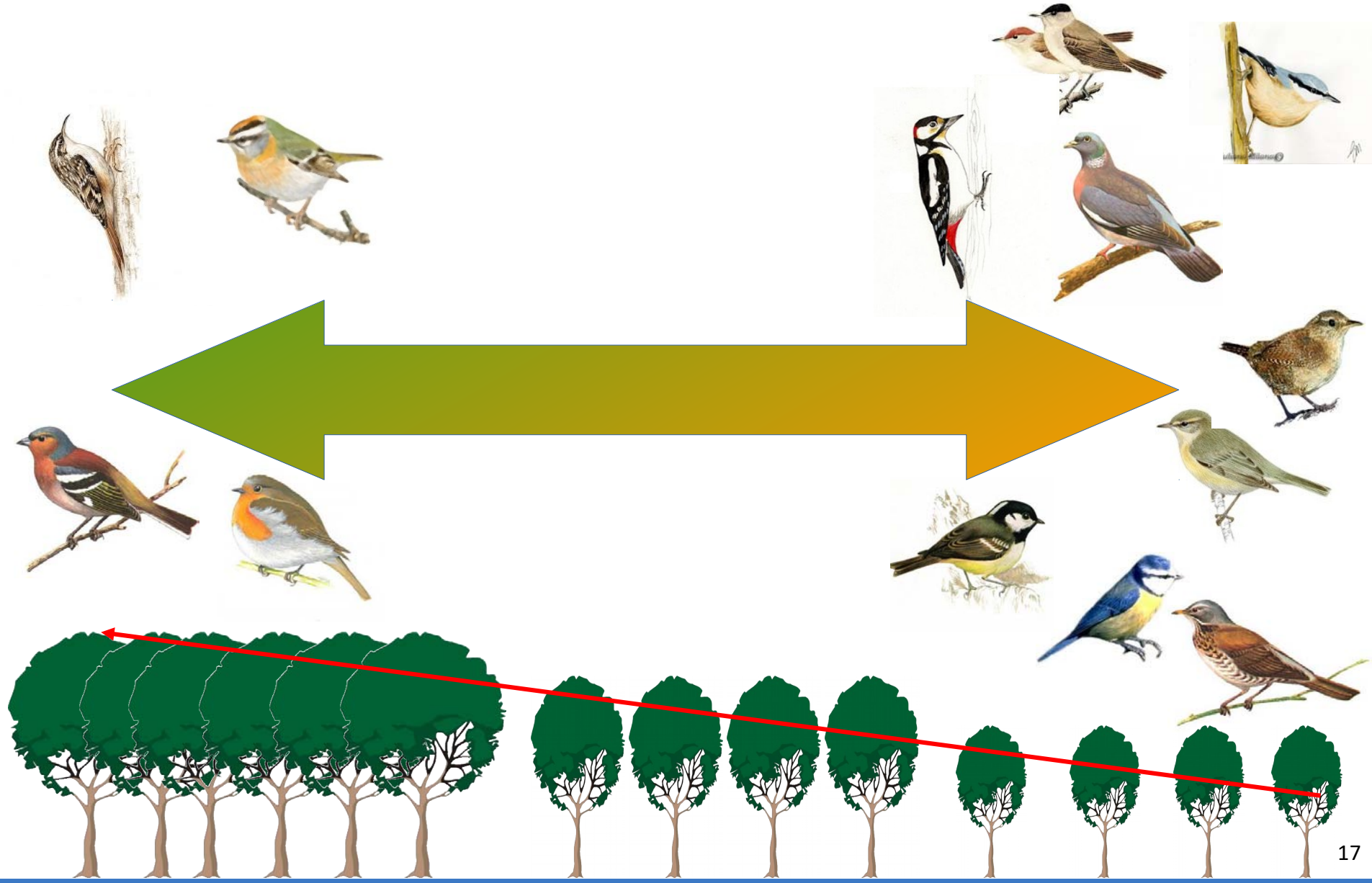
Ornithological indicators for the valuation of eco-systemic quality of the forest

Birds meet several factors which may directly concern the **climatic aspects** (with regard to both macro and micro criteria), the issues related to **structure and composition of the wood** (therefore also including those directly resulting from the management) , and aslo lastly the issues related to **landscape** (i.e. those regarding the context in which the forest is located).

Ornithological survey : 391 sampling units

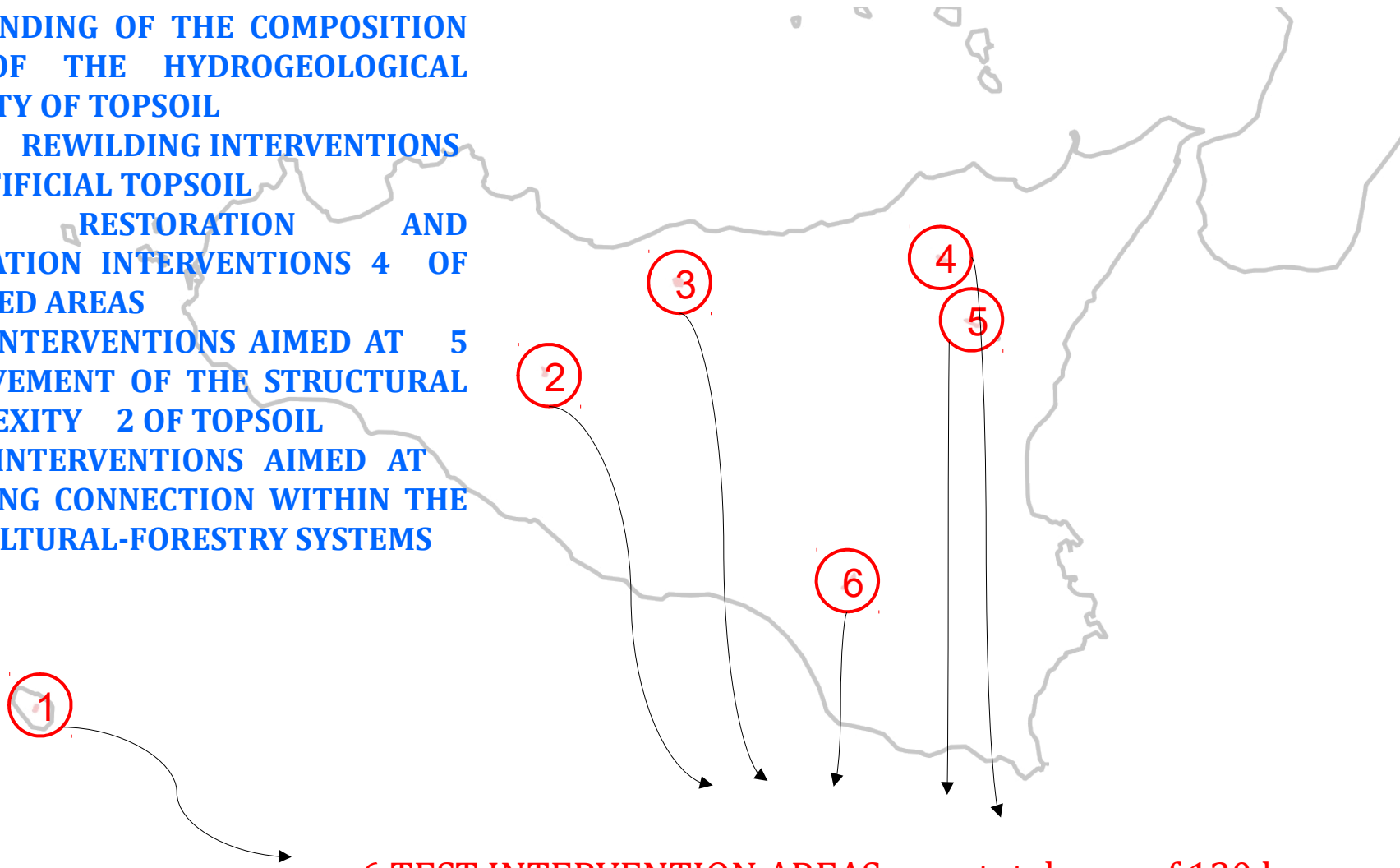
Definition of the indicators 37tested indicators, 21 efficient results of which 3 community index and 18 species

Ornithological indicators for the valuation of eco-systemic quality of the forest



Definition of 5 good management processes with 16 different types of intervention

- **BP01: INTERVENTIONS IN SUPPORT OF BLENDING OF THE COMPOSITION AND OF THE HYDROGEOLOGICAL CAPACITY OF TOPSOIL**
- **BP02: REWILDING INTERVENTIONS OF ARTIFICIAL TOPSOIL**
- **PB03: RESTORATION AND RENOVATION INTERVENTIONS 4 OF DAMAGED AREAS**
- **BP04: INTERVENTIONS AIMED AT 5 IMPROVEMENT OF THE STRUCTURAL COMPLEXITY 2 OF TOPSOIL**
- **BP05: INTERVENTIONS AIMED AT IMRPVING CONNECTION WITHIN THE AGRICULTURAL-FORESTRY SYSTEMS**

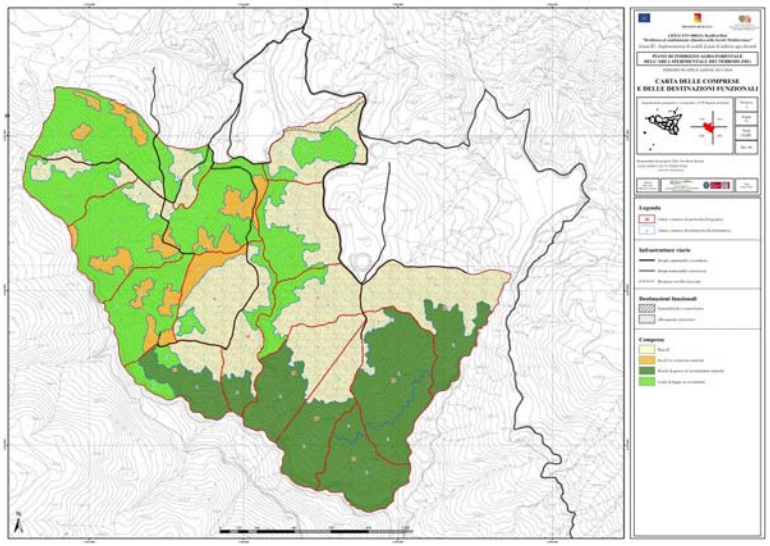


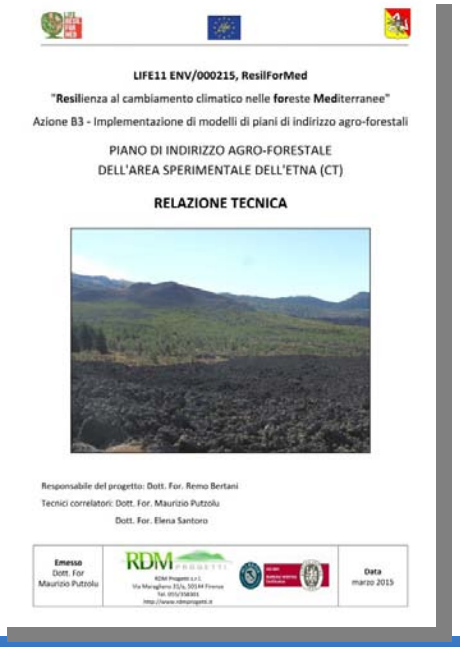
6 TEST INTERVENTION AREAS on a total area of 120 ha

Definition of 5 good management processes with 16 different types of intervention

Good Pratice	Type of populating application	Type of implemented intervention
BP01	Damaged beech forests	Surface drainage interventions and reforestation with local species
	Burnt cork-oak plantations	Surface drainage interventions
BP02	Eucalyptus plantations	Hole cutting with natural renovation and integration with sowing and planting
	Artificial reforestation of Aleppo Pine trees	Selective medium density thinning
	Exotic species (eucalyptus) added to Cork-oak plantations	Eradication of exotic species (eucalyptus)
	Mixed mountain forest deriving from artificial plantations	Selective thinning by reduction of conifers conifers
	Semi-natural plantations of Larch Pine with exotic species	Eradication of exotic species (exotic conifers)
	Semi-natural oak plantations with exotic species	Eradication of exotic species (exotic conifers)
BP03	Burnt xerophile oak plantations	Salvage felling and stumping
	Burnt artificial reforestation	Stumping of deciduous trees, surface draining and reforestation with deciduous trees
BO04	Semi natural medium full density beech plantation	Tree selvicultural intervention aimed at structural diversification
	Semi natural medium full density plantation	Tree selvicultural intervention aimed at structural diversification
	Semi natural medium full density turkey oak plant	Tree selvicultural intervention aimed at structural diversification
	Natural maritime full density pinewoods	Tree selvicultural intervention aimed at structural diversification
BP05	Artificial plantations with exotic species (Eucalyptus)	Sowing and under-plantations with local species
	Artificial plantations with exotic species (Aleppo Pine)	Sowing and under-plantations with local species

Implementation of 6 forestry pilot-plans with a participatory approach





LIFE11 ENV/000215, ResilForMed

"Resilienza al cambiamento climatico nelle foreste Mediterranee"

Azione B3 - Implementazione di modelli di piani di indirizzo agro-forestali

PIANO DI INDIRIZZO AGRO-FORESTALE
DELL'AREA SPERIMENTALE DELL'ETNA (CT)

RELAZIONE TECNICA

Responsabile del progetto: Dott. For. Remo Bertani

Tecnici correlatori: Dott. For. Maurizio Putzolu
Dott. For. Elena Santoro

Emesso
Dott. For
Maurizio Putzolu

RDM

Data
marzo 2015

Implementation of training activities for the regional staff

20 training sessions over two years involving 700 technicians and students from Forestry schools

Implementation of training activities for the regional staff

Implementation of a supportive card with regard to the decisions to be made for the informed choice of the interventions: 7 key questions which will help the forest holders to follow a logical path aimed at reaching the definition of the interventions.

ASSESSMENT CRITERIA INTERVENTION

Current forestry category and dynamic

specific composition of tree layer

Coverage of the vegetation layers

Vertical and horizontal structure of the tree stands

Horizontal structure tree stand, gaps of tree-form factors

dendrometric parameters

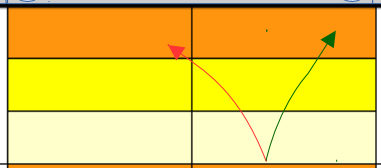
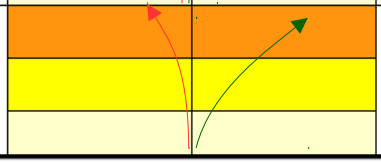
alien species

litter of the forest

renewal of forest

Elements of internal and external stability

EXAMPLE: Artificial pinewood of Aleppo Pine

PARAMETERS OF INTERVENTION VALUATION	SPECS AND DESCRIPTION OF PARAMETER	MAIN FEATURES IN THE LONG TERM	CURRENT STATE	IDEAL REQUIREMENT	STATE AND DEVELOPMENT TRENDS IN SHORT (10 YEARS) MEDIUM (20 YEARS) LONG TERM (30 YEARS) (- / +)	PROPOSED INTERVENTION
Species composition of the tree layer	Percentage of main species	Significant increase of the specific composition	80% Aleppo Pine 10 % holm oak 20% other deciduous trees	50% Aleppo Pine 30 % holm oak 20% other deciduous trees		Thinning from the top of the Aleppo pine, in order to clear next level
	Presence of Sporadic species	Enhancement for seed production	mountain ash cherry trees	assertion of the sporadic species		Forestry interventions on composition of tree
	Presence of native mother-plants	Enhancement for seed production	holm oak	fruiting of mother-plants		Selective thinning favour of native plants

Implementation of the results of the project within the new Forestry Regional Plan

Currently at an implementation stage. The team from the Sicilian Region Region and the technicians of LIFE ResilForMed are working on the drafting of the new Regional Forestry Plan. The most important issues which shall be implemented are: the introduction of monitoring systems able to valuate the health status of the forest with respect to pressure due to climate change, the intervention guidelines and the planning methods set by the project. This plan shall allow the large scale application for the next 5 years of the results of the project.

For info: www.resilformed.eu

You are all invited to

29 and 30 June 2017 in the island of Pantelleria

Final conference of the project