



Project funded by the
EUROPEAN UNION



**ENPI
CBCMED**
CROSS-BORDER COOPERATION
IN THE MEDITERRANEAN



**REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA**

The GRENECO Standard Project

March 27-29, 2017

6th week of water - Beirut





Project funded by the
EUROPEAN UNION



**ENPI
CBCMED**
CROSS-BORDER COOPERATION
IN THE MEDITERRANEAN



**REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA**

Green Energy for Green Companies





REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA

Green Energy for Green Companies project

GRENECO is a Standard project within the EU ENPI-CBCMED Programme under:
Priority 2: Promotion of environmental sustainability at the basin level
Measure 2.2 Promotion of renewable energy use and improvement of energy efficiency contributing to addressing, among other challenges, climate change





REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA

Beneficiary:

LOCAL ACTION GROUP (LAG) SARCIDANO - BARBAGIA DI SEULO (Sardinia - Italy)

Partners:

ITABIA (Italian Biomass Association))

The Vocational School for Agriculture and Rural Development (IPSAA)

Sardinian Forest Institute

Alexandria University

Italian - Arab chamber of commerce- Italy

Beirut Arab University

Lebanese Ministry of Agriculture





**REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA**

Duration of the project : 18-12-2013 to 30-4-2016

Budget project : 1,997,175.00 Euro

Lebanon Budget : 424,773.09 Euro





REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA

Objective :

GR.ENE.CO stems from the need to improve the energy efficiency in agriculture sector in the Mediterranean area by

- Spreading the use of renewable energy as main power source, particularly at the farm level.
- Support Local Capacity building through economic , social and environment development





REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA

Activities :

Contest Analysis : Study (Real situation of RE in Agriculture , 123 Questionnaires)





REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA

Planning of Renewable Energy in Agriculture in Lebanon

Different meetings have been done with private and public sectors in the presence of the staff of protocol in the Ministry and project coordination Unit concerning the preparation of planning of Renewable energy in Agriculture in Lebanon, the planning was divided in two parts , the technical part and the role of Ministry of Agriculture in the implementation of the planning as other part





REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA

Planning of Renewable Energy in Agriculture in Lebanon

then a launching has been done on 4 May 2015 for the planning of Renewable Energy in Lebanon under the presence of the Minister of Agriculture and a representative of ENPI CBC Med program and President of Beirut Arabic University and in the presence of donors, UNDP, ESCWA, EU Lebanon , Universities , different embassies in Lebanon , Italian cooperation office in Lebanon , private companies, Associations , and different public sectors in Lebanon and Lebanese Media.





**REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA**

Planning of Renewable Energy in Agriculture in Lebanon

First part: Technical part , stated the definition of different sources of Renewable Energy in agriculture and two tables for explanation the application of Renewable Energy in Agriculture and the advantages and constraints for each source





REGIONE AUTONOMA DE SARDIGNA
REGIONE AUTONOMA DELLA SARDEGNA

Planning of Renewable Energy in Agriculture in Lebanon

Renewable Energy Applications					
Heat		Electricity			
Solar	Biomass	Solar	Biomass	Wind	Hydro
<ul style="list-style-type: none"> • Crop drying • Greenhouse • Livestock farms • Water heating 		<ul style="list-style-type: none"> • Water Pumping: Wells, ponds, streams • Irrigation sprinklers, controls • Security and task lighting • Ventilation • Feed or product handling • Equipment • Refrigeration • Battery charging • Air condition • Compressor for fish farming • Fans for crop drying • Greenhouse heating • Electric fences • Feeder/sprayer 			





REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA

Planning of Renewable Energy in Agriculture in Lebanon

Advantages and Constraints

Type	Advantages	Common Advantages
Solar	<ul style="list-style-type: none"> • Long lasting solar cells • Easy installation • Saving eco-systems and livelihoods • Decentralization of power (each farm could has its own system) 	<ul style="list-style-type: none"> • Clean energy source • Domestic source of energy • No harmful emissions • Helps to slow/stop global warming (no greenhouse gases) • Reduce dependency on fossil fuels • Ongoing free energy • Going off the grid (no need for the government electricity) • Price volatility
Biomass	<ul style="list-style-type: none"> • Abundant and renewable • Reduce landfill (the resultant wastes will be used for recycling) • Can be used to create different products 	
Wind	<ul style="list-style-type: none"> • Sustainable • Cost effective • Wind turbines can be built on existing farms 	
Hydro	<ul style="list-style-type: none"> • Reliable and stable (not affected by the time) • Low operating cost • Power demands matching (generated electricity may serves cities) • Recreational opportunities • Safer 	





REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA

Planning of Renewable Energy in Agriculture in Lebanon

Advantages and Constraints

Type	Constraints
Solar	<ul style="list-style-type: none"> • Sustainable solar efficiency • Doesn't work at night • Storing solar is expensive • Solar panels are bulky • Expensive
Biomass	<ul style="list-style-type: none"> • Energy inefficiency • Expensive • Harmful to environment • Consume more fuel Require more land
Wind	<ul style="list-style-type: none"> • Expensive • Good wind location can be far from where electricity is needed • Turbines cause noise and aesthetic pollution • Turbine blades damage the local wildlife
Hydro	<ul style="list-style-type: none"> • Environmental damage • Expensive to build • Low water supply • Drought (use all near source of water) • Flood in low-lying areas



**REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA**

Planning of Renewable Energy in Agriculture in Lebanon

Second part: Role of MOA, private and public sectors on the
RE in Agriculture





REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA

Planning of Renewable Energy in Agriculture in Lebanon

Motivating and Agricultural Extension:

- Seeking the ratification of motivations to adopt the applications of renewable energy and energy efficiency in the agricultural sector.
- Collaborating with the Lebanese Central Bank as well as private banks in order to promote loans that are dedicated to renewable energy and energy efficiency in the agricultural sector.
- Providing the necessary funding sources for the objectives of motivating, agricultural extension and raising awareness.
- Permanent cooperation, collaboration and contact with the parliamentary agricultural commission in order to support the tendency to use renewable energy in agriculture





REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA

Planning of Renewable Energy in Agriculture in Lebanon

Motivating and Agricultural Extension:

- Collaborating with all the concerned public institutions; the private sector, civil society, NGOs, research centers and academic institutions, concerns the use of renewable energy sources and energy efficiency in the agricultural sector.
- Seeking to include the subjects of renewable energy, energy efficiency and their scientific applications in the agricultural sector in educational curricula in the faculties of agriculture, schools and technical schools.





REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA

Planning of Renewable Energy in Agriculture in Lebanon

Motivating and Agricultural Extension:

- Resorting to experts who are specialized in the fields of renewable energy and energy efficiency in agriculture in order to train the farmers.
- Starting to rehabilitate and build the capacities of the technical staff in the ministry of agriculture in order to enhance the applications of renewable energy and energy efficiency in the agricultural sector and developing it on the national level.





REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA

Planning of Renewable Energy in Agriculture in Lebanon

Motivating and Agricultural Extension:

- Issuing educational brochures that explain the importance of renewable energy and energy efficiency in agriculture and train the farmers and owners of agricultural enterprises or animal production farms about the way to use renewable energy and energy efficiency in agriculture.
- Exempt the equipment, machines and material that are used in the production of renewable energy (mentioned in the appendix) from the custom fees and VAT as well as the other taxes and fees, provided that the concerned ministry makes sure of its use in the production of renewable energy and not any other field





REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA

Planning of Renewable Energy in Agriculture in Lebanon

Motivating and Agricultural Extension:

- Working on establishing joint projects between the public and private sectors in order to produce renewable energy according to the laws and regulations in force.





REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA

Planning of Renewable Energy in Agriculture in Lebanon

Secure and Efficient Disposal of Agricultural Waste (vegetal and animal)

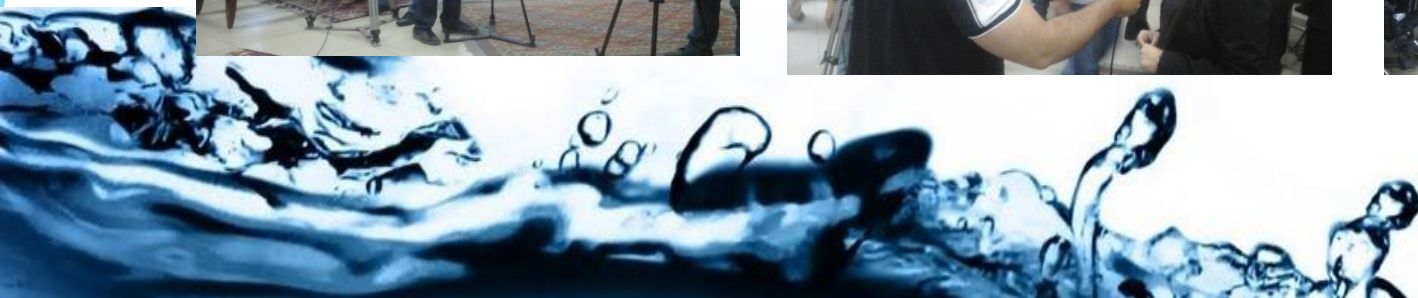
1. Cooperating and coordinating with municipalities or municipality unions in order to manage the farms and fields waste, benefit from them and alleviate their damage on the environment.
2. Affirming the integral management of the waste resulting from the farm as a main condition to authorize its establishment.





REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA

Planning of Renewable Energy in Agriculture in Lebanon





REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA

Best Green Farms

After studying the questionnaires filled by the farmers within the Contest analysis by the Project Coordination Unit, the director office of Minister of Agriculture and the Lebanese Center for Energy Conservation (LCEC) related to Ministry of Energy and water in Lebanon, the best farmers have been selected and taking in consideration different criteria, best farms on application of Renewable Energy in Agriculture and activeness of the farmers.





REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA

Best Green Farms:

Two best Green farmers in Lebanon with two engineers from project coordination unit of Ministry of Agriculture have been participated in study visits in Sardinia and Egypt, and a staff from 6 persons from Egypt with the coordinators of the project in Alexandria University visited Lebanon end of March 2016, the study visits were focused mainly on using of Renewable energy in Agriculture or using the agricultural by products in producing energy





Project funded by the
EUROPEAN UNION



**ENPI
CBCMED**
CROSS-BORDER COOPERATION
IN THE MEDITERRANEAN



**REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA**





REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA

Fund package:

Two workshops have been done as promotion for energy loan, one in Baackleen, Chouf on October 2015 in the presence of the Director Minister Office and central bank in Lebanon , Kafalat program and BLC Bank ,and more than 100 farmers were participated in this workshop and another one in Zahleh in collaboration with University of Saint Joseph in the presence of the General Director of the ministry and in cooperation of Central Bank in Lebanon and Kafalat and BLC bank , and 120 farmers were in the Meeting.





REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA

Networking action :

On 4 March 2015 , a first meeting has been done for around 34 participants , however the letter has been addressed to around 85 actors from public and private sectors , during the meeting two presentations have been done in the presence of the consultant of the Minister of Agriculture and the Project Coordination Unit and the staff of network in the ministry and the participants , the presentations were to show the GRENECO activities project and to explain how it is possible to work on Network by using GRENECO Data Exchange Portal ,through a private portal that allow them to obtain the information needed .





REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA

Networking action :

Then another meeting has been done on Friday 24 April 2015 in the presence of the consultant of the Minister of Agriculture and 11 participants from universities, associations, and institutions are followed the meeting then many bilateral meetings have been done in order to have more participants to the network and the Project Coordination Unit and the network staff are still working on it in every activity, meetings, conferences or workshops in order to arrive to the maximum numbers of beneficiaries from the network.





REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA

Networking action :

Focal Point Tasks:

- Uploading the data and files that the concerned party intends to exchange with the other parties on the data exchange portal
- Collecting the files and data to be Uploaded on the portal from the concerned party
- Verification of the data and files before Uploading them on the portal (pdf, not including illegal information, related to renewable energy as subject...)
- Sharing the available information and data provided by the other parties on the data exchange portal with the stakeholders of the concerned party.
- Taking responsibility for the user account (user account on the data exchange portal) of the concerned party.

Uploading and Downloading the pertinent information and data





REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA

GRENECO Data Exchange Portal :

Link of portal:: : <http://greneco.agriculture.gov.lb>

View All Site Content

Site Hierarchy

- Documents
- Form Templates
- Announcements
- Tasks

Announcements

Welcome to Document Center.
by System Account
Welcome to your new Document Center. Use this site to centrally manage documents in your enterprise.

Add new announcement





REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA

GRENECO Data Exchange Portal :

➤ Login in to portal

A popup window will show up asking for authentication

The screenshot shows a web browser window with the address bar containing the URL <http://greneco.agriculture.gov.lb/default.aspx>, which is circled in red. The browser displays the GRENECO portal interface, including a navigation menu with 'Home', 'View All Site Content', and 'Site Hierarchy' (Documents, Form Templates, Announcements, Tasks). The main content area features an 'Announcements' section with a 'Welcome to Document Center' message.

Overlaid on the browser is a 'Windows Security' dialog box titled 'Connecting to greneco.agriculture.gov.lb'. It contains a text input field with the text 'omsaronline\username', a 'Password' field, and a 'Domain: omsaronline' label. There is an unchecked checkbox for 'Remember my credentials'. At the bottom of the dialog are 'OK' and 'Cancel' buttons.



REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA

GRENECO Data Exchange Portal :

➤ Uploading documents on portal

The screenshot shows the Greneco Data Exchange Portal interface. At the top, it says "Greneco" and "Welcome OMSARONLINE\administrator". Below that, there's a "Home" button and a "Greneco" logo. The main content area is titled "Documents" and contains a message: "Share a document with the team by adding it to this document library." Below this message, there are buttons for "New", "Upload", "Actions", and "Settings". The "Upload" button is circled in red. A tooltip is visible over the "Upload" button, containing the text: "Upload Document" and "Upload a document from your computer to this library." Below the buttons, there's a table with columns for "Type", "Modified", and "Modified By". The table is currently empty, with the text "There are no items in this document library. To create a new item, click 'New' or 'Upload' above." visible below the table.





REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA

Pilot projects: Private and public experimental interventions by implementing green energy infrastructures and plants (10 sites in Lebanon , 3 private sectors and 7 public sectors)



Project funded by the
EUROPEAN UNION



**ENPI
CBCMED**
CROSS-BORDER COOPERATION
IN THE MEDITERRANEAN



**REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA**

Feasibility Study

SITE DESCRIPTIONS

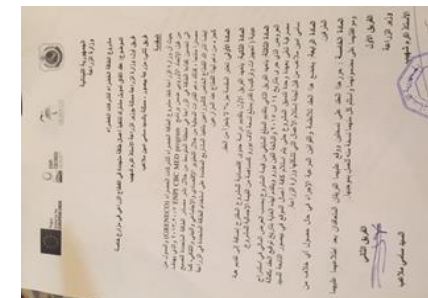
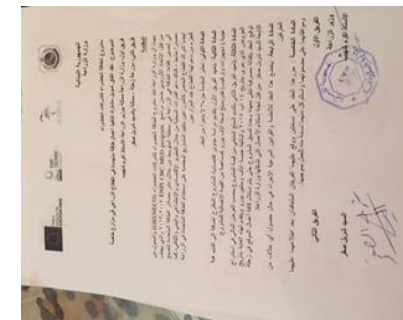
SUMMARY DESCRIPTION								
Site	01	Location	Nabatiyeh, Charkieh, Nursery of Ministry of Agriculture		Latitude	33° 37'	Longitude	35° 48'
Energy audit	After visiting the site, the best Green energy source determined was a Solar energy source, it is available to provide a fair customer needed energy, without a storage system, with life expectancy up to 25 years with efficiency levels of 91% in the first two years and 85% in the remaining years.				Site visit date	Thurs., Apr. 02, 2015		
					Contact person	Eng. Zaher Ayoub		
Environmental impact	Avoided emissions of CO ₂ is <u>0.2697 ton annually</u> equivalent to: <ul style="list-style-type: none"> • <u>35 trees</u> • <u>2.22 thousand liters of fuel</u> 				Useful & effective radiation time			
					per year (8.5 mths)	per day (7hrs 30min)		
Estimated annual solar energy ¹	50 m ² x 15.6% x 1,240 KWh/m ² .y x 0.75=		<u>725,393 KWh.y</u>		bet. Mar 20 - 15 Oct	fr. 8:15 am - 15:45 pm		
TECHNICAL SPECIFICATIONS ²								
Location power needs	<ul style="list-style-type: none"> • One PV inverter³: set for water irrigation pump: <u>4KW 3PH</u> • Two on grid inverter⁴: set (pure sine wave) <u>3KW 1PH</u> each (appliances use) • Water irrigation pump power: <u>4KW</u> 		Reducing project cost by dividing the solar panel kit into two sets		<ul style="list-style-type: none"> • 1st: energize one on grid inverter <u>3KW 1PH</u> • 2nd: energize PV inverter <u>4KW 3PH</u> or on grid inverter <u>3KW 1PH</u> 			
Total estimated power needs	7.5 KWp	Effective solar cell area	50 m ²	Solar panel specs	Refer to data sheet 3 ⁵			
Total number of solar cell modules	30 pieces	Installation needed area	70 m ²	Available Area	220 m ² (rectangular & roof location)			
DISADVANTAGE OF OTHER SOURCES								
Energy source	Main problems and constraints							
⇒ Wind	<ul style="list-style-type: none"> • unstable wind speed which necessitates using a storage system with added cost • winds are available for short times a day 							
⇒ Biomass	<ul style="list-style-type: none"> • difficult to procure raw materials continuously to serve the system • requires suitable and equipped storage space to stock the raw materials, etc... 							
¹ E=A ⁴ r ³ H ³ PR	² all instruments comply with ToR, brand origin		³ refer to data sheet 1		⁴ refer to data sheet 2		⁵ refer to data sheet 3	



REGIONE AUTÒNOMA DE SARDIGNA
REGIONE AUTONOMA DELLA SARDEGNA

Private Pilots sites Agreement :

Project provides the study and a grant with 9000 Euro for each site and the three farmers undertakes to pay the remaining sum from the value of the project implementing site according to the appel offer and the farmers shall submit on the date of the signature of the agreement , a banking guarantee that shall stay in the hands of the project coordination unit until the delivery of the site works.





**REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA**





Project funded by the
EUROPEAN UNION



**ENPI
CBCMED**
CROSS-BORDER COOPERATION
IN THE MEDITERRANEAN



**REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA**



Private Site : Zahleh

7.5 KWp

PV (VFD) inverter

Well water irrigation pump (10 HP)

Well depth <100 m





REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA



Private site Ansar :
Three hybrid PV inverter/charger
water irrigation (5 KW) pump





Project funded by the
EUROPEAN UNION



**ENPI
CBCMED**
CROSS-BORDER COOPERATION
IN THE MEDITERRANEAN



**REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA**



Private Sector : Baysour

Two Hybrid PV inverter/charger
water irrigation pump and appliances
One batteries pack 48V (200 Amph)





**REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA**



Public Sector : MOA Nursery- Charkieh

8 KWp

One PV (VFD) inverter 4 KW, 3 phases for irrigation purposes





**REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA**



Douris (Ardouna Agricultural Cooperative)

15 KWp in Total

**One PV (VFD) inverter 10 KW for well water pumping
(100m depth)**

One On Grid inverter (Green fodder production)

One On Grid inverter 5 KW 3 phases (appliances)





**ENPI
CBCMED**
CROSS-BORDER COOPERATION
IN THE MEDITERRANEAN



**REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA**

Ksarnaba (food processing women cooperative)

10 KWp in Total

One PV (VFD) inverter for well water pumping (90 m depth)

One On Grid inverter 5 KW 3 phase (food processing machinery)

More than 50 Beneficiaries





**REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA**

Dibbiyeh (Beirut Arab University)

One On Grid Inverter 3KW single phase





**ENPI
CBCMED**
CROSS-BORDER COOPERATION
IN THE MEDITERRANEAN



**REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA**

Mresti (Water Establishment – Mount Lebanon)

One PV (VFD) Inverter 20KW 3 phases; well depth 110 m
Water irrigation pump serving > 100 farmers in the area





**REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA**

Rachaya (Rachaya Gardens Coop)

Total of 6 Kw
Agro - Food processing





**ENPI
CBCMED**
CROSS-BORDER COOPERATION
IN THE MEDITERRANEAN



**REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA**

Tayr Filsay (Olive Union of cooperatives)

Hybrid PV Inverter/Chargers : total power of 24 KW

3PH set to backup the public grid

Three Batteries Packs

One on grid inverter

Photovoltaic DC Water Heaters

DC Switch Panel





REGIONE AUTÒNOMA DE SARDIGNA
REGIONE AUTONOMA DELLA SARDEGNA

Promotional material

GREEN ENERGY FOR GREEN COMPANIES

GRENE.CO offers several tools for supporting local farmers from Sardinia, Egypt and Lebanon in the adoption of RES as usual power sources and at the same time, it clearly contributes to promote and reinforce the European and Mediterranean dimension of renewable energies by facilitating cross border comparisons and cohesion so as to best work together to confront the critical challenges in the issues of energy, climate and environment protection.

The project is financed under the 2007/2013 ENPI CBC MED, a European multilateral Cross-Border Cooperation Programme.

Sources of Renewable Energy

- Solar power:** Exploitation of the energy of the sun through photovoltaic panels or solar collectors.
- Wind:** Energy obtained from the wind through wind turbines.
- Biomass Energy:** Energy obtained from the combustion of organic materials (wood, agricultural waste, etc.).
- Hydropower:** Energy obtained from the flow of water through turbines.

Source	Advantages	Disadvantages
Solar	Abundant, clean, silent, no moving parts, low maintenance, long life.	High initial cost, intermittent, requires large area.
Wind	Abundant, clean, silent, no moving parts, low maintenance, long life.	High initial cost, intermittent, requires large area.
Biomass	Renewable, clean, can be stored, low maintenance, long life.	High initial cost, intermittent, requires large area.
Hydropower	Renewable, clean, silent, no moving parts, low maintenance, long life.	High initial cost, intermittent, requires large area.

GREEN ENERGY FOR GREEN COMPANIES

Objectives: The project is financed under the 2007/2013 ENPI CBC MED, a European multilateral Cross-Border Cooperation Programme. GRENE.CO aims to improve the energy efficiency in the agricultural sector in the Mediterranean area by spreading the use of renewable energy as usual power sources for agricultural activities and to create a network of energy efficient green companies in the region.

Activities: Research & energy planning; analysis of the available local energy resources and their utilization in energy development plans to be implemented. Pilot projects: private and public supported interventions for implementing green energy solutions and plants; increasing awareness and capitalization; training activities for promoting green energy use; renewable energy and environmental topics at local level including workshops, meetings, courses and seminars.

Results: GRENE.CO wants to be a solid instrument of spreading the use of public interventions in the Mediterranean area for energy efficiency in the agricultural sector. GRENE.CO develops business skills in the field of the knowledge of renewable and energy saving for the advancement of knowledge about Renewable Energy and increasing its utilization.

الاهداف: المشروع ممول بموجب البرنامج التعاوني المتعدد الأطراف ENPI CBC MED، وهو برنامج تعاوني متعدد الأطراف بين دول البحر المتوسط. يهدف GRENE.CO إلى تحسين كفاءة الطاقة في القطاع الزراعي في منطقة البحر المتوسط من خلال نشر استخدام الطاقة المتجددة كمنابع طاقة عادية للشركات الزراعية، ولخلق شبكة من الشركات الزراعية ذات كفاءة في استخدام الطاقة في المنطقة.

النشاطات: البحث والتخطيط للطاقة وتحليل الموارد المتاحة محلياً للطاقة واستخدامها في خطط التنمية التي سيتم تنفيذها. مشاريع تجريبية: تدخلات مدعومة من القطاع الخاص والقطاع العام لتنفيذ حلول وأنظمة الطاقة الخضراء والنباتات؛ زيادة الوعي والتأهيل؛ أنشطة تدريبية لتعزيز استخدام الطاقة الخضراء في المنطقة؛ ورش عمل وندوات وندوات محلية حول مواضيع الطاقة المتجددة والبيئة.

النتائج: GRENE.CO تهدف إلى أن تكون أداة فعالة لنشر التدخلات العامة في منطقة البحر المتوسط من أجل تحسين كفاءة الطاقة في القطاع الزراعي. GRENE.CO تركز على تطوير المهارات التجارية في مجال المعرفة بالطاقة المتجددة وتوفير الطاقة لزيادة المعرفة حول الطاقة المتجددة وتعزيز استخدامها.

GREEN ENERGY FOR GREEN COMPANIES

Partners in the Project: Ministry of Agriculture - Lebanon; Local energy agency - Lebanon; Ministry of Energy - Lebanon; Ministry of Agriculture - Egypt; Ministry of Energy - Egypt; Ministry of Agriculture - Sardinia; Ministry of Energy - Sardinia; ENPI CBCMED.

The Project: The project is financed under the 2007/2013 ENPI CBC MED, a European multilateral Cross-Border Cooperation Programme. GRENE.CO aims to improve the energy efficiency in the Mediterranean area by spreading the use of renewable energy as usual power sources for agricultural activities and to create a network of energy efficient green companies in the region.

الاهداف: المشروع ممول بموجب البرنامج التعاوني المتعدد الأطراف ENPI CBC MED، وهو برنامج تعاوني متعدد الأطراف بين دول البحر المتوسط. يهدف GRENE.CO إلى تحسين كفاءة الطاقة في القطاع الزراعي في منطقة البحر المتوسط من خلال نشر استخدام الطاقة المتجددة كمنابع طاقة عادية للشركات الزراعية، ولخلق شبكة من الشركات الزراعية ذات كفاءة في استخدام الطاقة في المنطقة.

النشاطات: البحث والتخطيط للطاقة وتحليل الموارد المتاحة محلياً للطاقة واستخدامها في خطط التنمية التي سيتم تنفيذها. مشاريع تجريبية: تدخلات مدعومة من القطاع الخاص والقطاع العام لتنفيذ حلول وأنظمة الطاقة الخضراء والنباتات؛ زيادة الوعي والتأهيل؛ أنشطة تدريبية لتعزيز استخدام الطاقة الخضراء في المنطقة؛ ورش عمل وندوات وندوات محلية حول مواضيع الطاقة المتجددة والبيئة.

النتائج: GRENE.CO تهدف إلى أن تكون أداة فعالة لنشر التدخلات العامة في منطقة البحر المتوسط من أجل تحسين كفاءة الطاقة في القطاع الزراعي. GRENE.CO تركز على تطوير المهارات التجارية في مجال المعرفة بالطاقة المتجددة وتوفير الطاقة لزيادة المعرفة حول الطاقة المتجددة وتعزيز استخدامها.





REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA

The ACCBAT Strategic Project

March 27-29, 2017

6th week of water - Beirut





REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA

Adaptation to Climate Change through Improved water Demand Management in Irrigated Agriculture by Introduction of new Technologies and Best Agricultural Practices

ACCBAT is a strategic project within the EU ENPI-CBCMED Programme under:
Priority 2: Promotion of environmental sustainability at the basin level
Topic 2.1: Water Management





**REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA**

Beneficiary

ICU – Istituto per la Cooperazione Universitaria – ONLUS (Italy, Lazio)

Partnership

National Centre for Agricultural Research and Extension (NCARE, Jordan)

Lebanese Ministry of Agriculture (MoA, Lebanon)

Tunisian Ministry of Agriculture (DG GREE, MoA, Tunisia)

River Po Basin Authority (AdbPO, Italy)





**REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA**

Project duration

36 months (December 2012 – December 2015)





REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA

Project budget

The ACCBAT project is implemented under the [ENPI CBC Mediterranean Sea Basin Programme](#). Its total budget is 4,99 million Euro and it is financed, for an amount of 4,49 million Euro (90%), by the European Union through the European Neighbourhood and Partnership Instrument. The ENPI CBC Med Programme aims at reinforcing cooperation between the European Union and partner countries regions placed along the shores of the Mediterranean Sea.

Lebanon Budget: 911,588 Euro





REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA

Project's specific objectives

To improve water demand management and ensure water needs of the agricultural sector on a regional scale through:

increasing water-use efficiency;

increasing the use of treated waste water for irrigated agriculture;

reducing negative environmental impacts;

based on

technology transfer,

training in Best Agricultural Practices.





REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA

Jordan.

Ramtha Wastewater Treatment Plants (WWTP) in Irbid region, **As Salt WWPT** in Balqa region, and **Madaba WWTP** in Madaba region.

Lebanon.

WWTP of Ablah, Caza of Zahleh, in the **Bekaa Valley**.

Tunisia.

Nabeul region in particular with the **WWTP of Beni Khiar** and in **Merjada, Cap Bon**,





**REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA**

Target groups

Staff of the local partners institutions

Farmers households in the target areas

Management and extension services of the local partner institutions

Local population





REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA

Main activities of the project :

- Survey to identify and locate the exact target regions & participating final beneficiaries
- Selection of farmers for installation of demonstration plots using improved drip-irrigation system in irrigated areas with treated waste water
- Establish of water reservoir with 15.000 cubic meter as capacity
- Assessment of existing capacities and training needs of MOA technicians & farmers with regard to agricultural irrigation including the use of treated waste water, irrigation management, environmental issues and GAP





REGIONE AUTÒNOMA DE SARDIGNA
REGIONE AUTONOMA DELLA SARDEGNA

Farmer Day





**REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA**





Promotional material

السجل الحقلى للمزارع
لترتيب تصديق مخططة المزارع الزراعية المحافظة

ACCBAT

التعاون مع المزارعين من خلال تطوير برامج التدريب على الممارسات الزراعية الجيدة وأفضل الممارسات الزراعية

EU

OUR OBJECTIVE is to improve water demand management and reduce water needs of the agricultural sector at a regional scale through increases of water-use efficiency, increased use of treated WW for irrigated agriculture, and reduced negative environmental impact, based on technology transfer and training in Best Agricultural Practices, that allow for adaptation to climate change.

Target groups

- Farmers households in Jeddah, Tabuk and Yanbu who are interested in water saving technologies.
- Management and extension agents of the local authorities.
- Local population in Jeddah, Tabuk and Yanbu.

Expected results

- Enhanced regional and international cooperative networks between Jordan, Tunisia and Mediterranean countries to increase the use of treated WW and environmental issues related to agriculture through transfer of know-how through the project partners with all relevant research institutions, international agencies and agencies, NGOs and private sector companies working in rural development and agriculture.
- Enhanced public awareness with regard to water saving, reuse of treated WW in agriculture, and environmental issues in Jordan, Tunisia and Yemen. Acceptance of use of treated WW in agricultural production has increased for the public.

Adaptation to Climate Change through Improved Water Demand Management in Irrigated Agriculture by Introduction of New Technologies and Best Agricultural Practices


Composition of the partnership

- ENPI Cross-Border Cooperation (MedMediterranean 2014-2020)
- WAFU National Centre for Agricultural Research and Extension-Jordan
- King Abdullah University of Science and Technology - Jordan
- King Fahd University of Petroleum & Minerals - Saudi Arabia
- ENPI CBCMED
- ACCBAT





❖ Experimental trial



Reference: 03/ACCBAT LEBANON-MoA-05/01/2015

In the framework of the project "Adaptation to Climate Change through Improved Water Demand Management in Irrigated Agriculture by introduction of New Technologies and Best Agricultural Practices", the Ministry of Agriculture intends to assign the development of an experimental study to a service provider.

The ToR for the contract are established as follows:

- Development of a calendar for water analyses (inlet and outlet of the Waste Water Treatment Plant located in **Abjeh - Bekaa, Lebanon**)
- Development of a calendar for soil analyses of project farmers
- Establishment of a demonstration experiment on treated municipal wastewater reuse for table grapes production
- Establishment of a demonstration experiment on treated municipal wastewater reuse for vegetable production

The foreseen outcomes shall be:

- Water analyses calendar
- Soil analyses calendar
- Recommendations leading to update or confirm the adoption of proposed guidelines (wastewater reuse for irrigation as proposed by the "FAO project UTF/LEB/019/LEB (2011)")
- Recommendations on irrigation scheduling
- Recommendations on filters and drippers to be used
- The existing health risks and microbial contamination that could be encountered
- The impact of treated effluent on soil properties

Please provide us, before 5th February 2015, with:

- a technical offer including a detailed experiment description
- a financial offer including a detailed expenses breakdown

ACCBAT Project – Ministry of Agriculture

Rue des Ambassadees
Joab, Bk, Hassan Fading, Caserne Henry Obabab
LEBANON
Phone: 00961 1 660824700 - Telefax: 00961 1 850333
www.agriculture.gov.lb

- Preparation of an experiment in order to test the effect of TWW on 2 different crops (grapes and eggplants) using different water sources and different agricultural practices (i.e. irrigation timing)
- Foreseen outcomes:
 - Water analyses calendar
 - Soil analyses calendar
 - Recommendations leading to update or confirm the adoption of proposed guidelines (wastewater reuse for irrigation as proposed by the "FAO project UTF/LEB/019/LEB (2011)")
 - Recommendations on irrigation scheduling
 - Recommendations on filters and drippers to be used
 - The existing health risks and microbial contamination that could be encountered
 - The impact of treated effluent on soil properties





REGIONE AUTONOMA DE SARDIGNA
REGIONE AUTONOMA DELLA SARDEGNA

❖ Water , soil and fruit analyses – MoU with Laboratory of Lebanese University MCEMA



Memorandum of Understanding

Between

Lebanese Ministry of Agriculture hereinafter referred as MOA
مديرية الزراعة By His Excellency the Minister – His Excellency Mr. *Abbas Chbeib*

And

Lebanese Agriculture Research Institute hereinafter referred as LARI
مركز البحوث الزراعية by Mr. *Michel El-Degh*

The present Memorandum of Understanding sets out the modalities of the relations among the two parties referring to the project "Adaptation to Climate Change through improved Water Demand Management in Irrigated Agriculture and by introduction of new Technologies and Best Agricultural Practices – ACCBAT".

The project is co-funded by the European Community through the ENPI CBC Mediterranean Sea Basin Joint Operational Programme and is run by ICI in partnership with the Lebanese Ministry of Agriculture (for its component in Lebanon), the Tunisian Ministry of Agriculture (for its component in Tunisia), the National Centre for Agricultural Research and Extension (for its component in Jordan) and the Po River Basin Authority as Italian partner supporting all the activities.

The present MoU regulates the collaboration between the two parties only in regards to the project component to be executed in Lebanon.

1 Objectives

The parties agree that the Objectives of the collaboration will be the following:

- To monitor treated waste water quality for irrigation purposes;
- To monitor fresh water quality in selected irrigated plots;
- To monitor treated waste water impact on irrigated soils;

2 Duties and Responsibilities

The parties agree to act in close collaboration and with maximum transparency in any act or decision referred to the activities to be planned, implemented or undertaken.

MOA will be responsible for:

- Gathering water samples in the selected farms either irrigated with freshwater or with treated waste water;

REPUBLIC OF LEBANON Ministry of Agriculture Lebanese Agricultural Research Institute LARI Laboratories of Water Testing				Fanar Laboratory Jdeidet El Metn, Lebanon B.P: 901965 Phone: 961-1-682471 Fax: 961-1-682474 E-mail: lari@lari.gov.lb	
Water Analysis – Physico- Chemical Parameters – Test Report					
- Lab. Ref. Registration of the sample: 1202-6			Report Issue data from the Lab: 28/06/2013		
A- Request Information		Owner		Sender	
- Name:		I.C.U. Ministry of agriculture		I.C.U. Ministry of agriculture	
- Original Reference:		Boyrouth 18-06-2013			
- Place and date of issue:		18-06-2013			
- Date of receiving the sample:					
B – Specifications of the Sample	Brand name	Production date	Expiry date	Container/ Volume	Reference/ lot if applicable
Water					
C – Destination:					
D - Results					
Type of the sample					
Parameters	Norms	Results (Raw Sewage)		Results (Treated Sewage)	
pH	ISO 10523:1994	7.51		8.10	
Conductivity at 20 °C (µS/cm)	ISO7888:1985	1594		1311	
Total Dissolved Solids (mg/L)	AOAC 920.193	1020.16		839.04	
Total Suspended Solids (mg/L)	NF 190-105	146.2		8.13	
Density		1.9		0.6	
Sodium Adsorption Ratio (SAR)		10.07		8.8	
Hardness of Water (mg/L)	AOAC 973.52	137.97		137.81	
Calcium (mg Ca/L)	ISO 6058:1984	97.41		97.09	
Magnesium (mg Mg/L)	ISO 6059:1984	40.56		40.72	
Sodium (mg Na/L)	ISO 99642-1:1993	83.7		72.9	
Potassium (mg K/L)	ISO 99642-2:1993	32.5		39.3	
Chloride (mg Cl/L)	ISO 9297:1989	81.09		87.10	
Nitrates (mg NO ₃ /L)	ISO 7890-3:1988	0.83		85.2	
Total Phosphorus (mg P/L)	NF T90-023	1.88		1.59	
Boron (mg B/L)	ISO 9390:1990	0.70		0.15	





**ENPI
CBCMED**
CROSS-BORDER COOPERATION
IN THE MEDITERRANEAN



**REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA**

❖ Experimental plot





REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA

❖ Training at institutional level : Technicians (Ministry of Agriculture)

- 3 topics on using of treated waste water in irrigated Agriculture
- *15 training sessions*
 - Waste water treated reuse in Irrigated agriculture
 - Waste water reuse guidelines and standards
 - Case study of Ablah WWTP



*60 Technicians with
900 as total
participants*





**REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA**

Training at institutional level : Technicians (Ministry of Agriculture) - 15 training sessions

• 5 topics on irrigation system

- Design & install of irrigation system.
- Crop Wat program
- Operational & maintenance of Drip irrigation system
- Water Harvest
- Extraction of water from air





REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA

Training at institutional level : Technicians (Ministry of Agriculture) - 15 training sessions

- 3 topics on Renewable Energy (RE) in Agriculture
 - Impact of climate change & RE on Environment
 - Source of RE in Agriculture
 - Case study of feasibility study of using of diesel or RE for pumping water





REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA

Training at institutional level : Technicians (Ministry of Agriculture) - 15 training sessions

- 1 topic on Fertilizers & Fertigation





REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA

Training at institutional level : Technicians (Ministry of Agriculture) - 15 training sessions

- 1 topic on Using of communication tools and spread excel for data analysis in experimental plots





REGIONE AUTONOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA

Training at institutional level : Ministry of Agriculture Technicians - *15 training sessions*

- 1 topic on integrated pest management on grapes
- 1 topic on integrated pest management on vegetables





REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA

Training at farm level: farmers in Ablah area and the villages around - 15 training sessions :

Two workshops in three different topics have been done in 21 November 2015 in two different places one in Central Bekaa & another one in North Bekaa and 98 farmers are benefit from the two workshops





**REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA**

One workshop in four different topics has been done in 27 November 2015 in Forzel in Central Bekaa and 39 farmers are benefit from the workshop





Promotional material

ACCBBAT

«Adaptation to climate change trough improved water demand management in irrigated agriculture by introduction of new technologies and best agricultural practices – ACCBBAT»

Leader of the project:
ICU - Institute for University Cooperation - Onlus (Italy)

Partners in the project:

1. NCARE: National Centre for Agricultural Research and Extension (Jordan)
2. Ministry of Agriculture (Lebanon)
3. Tunisian Ministry of Agriculture / General Direction of Rural Engineering and Water Exploitation - DG GREE (Tunisia)
4. ADBPO: River Po Basin Authority (Italy)

Budget:
Budget total:
€ 4,998,952.50 (90% financed by EU through ENPI CBC Med)

OBJECTIVES of the Project:

- To improve water demand management through good irrigation practices adoption
- To encourage wastewater treatment and re-use in irrigated agriculture
- To reduce negative environmental impact, based on technology transfer and training in best agricultural practices

EXPECTED RESULTS:

1. Increased water use-efficiency and increased availability of conventional water resources through use of treated wastewater in irrigated agriculture
2. Enhanced institutional capacity within the partner institutions with regard to use of an integrated approach in irrigated agriculture
3. Enhanced farmers technical know-how with regard to integrated agricultural resources management and best agricultural practices
4. Enhanced regional and international cooperation between project partners on irrigation, use of treated wastewater and environmental issues related to agriculture
5. Enhanced public awareness with regard to water saving, re-use of treated wastewater in agriculture and environmental issues

Website: <http://accbbat.eu>

Treated waste water in irrigated agriculture

مياه الصرف الصحي المعالجة في الري الزراعي

Water quantity, quality and its reuse in agriculture: the ACCBBAT project

ACCBBAT

Water quantity, quality and its reuse in agriculture: the ACCBBAT project





**REGIONE AUTÒNOMA
DE SARDIGNA
REGIONE AUTONOMA
DELLA SARDEGNA**

Thank you for your attention

