

Sustainability as Key-driver for Innovation

Milano, 13th May 2015

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Bioeconomy as territorial regeneration

Transition from a product-based economy to a system-based economy

DEVELOPMENT MODEL OF INTEGRATED BIOREFINERY

Biorefinery integrated in the local area:

- primarily dedicated to the production of chemicals and high added-value products
- different local raw materials (low-input crops, scraps, etc.) – respect for local biodiversity
- use of marginal lands and re-industrialization of deindustrialized sites
- integration of a wide and rising range of low-impact technologies and plants
- Involvement of the world of agriculture, research, environment, consumers and local institutions

PRODUCTS

Innovative **bioplastics and biochemicals based on renewable resources**, which are **biodegradable and compostable** according to the most important international standards.

New bio-products as an occasion to **rethinking overall systems**.

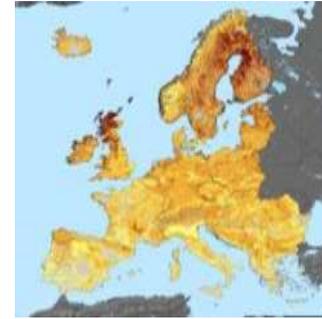
Example of product innovation to rethink a system



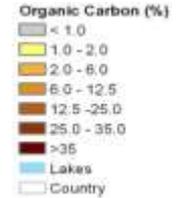
ORGANIC WASTE IN LANDFILL



DEVELOPMENT OF ORGANIC WASTE SEPARATE COLLECTION SYSTEMS THROUGH BIOPLASTICS



TOPSOIL ORGANIC CARBON CONTENT (SOURCE: JRC)

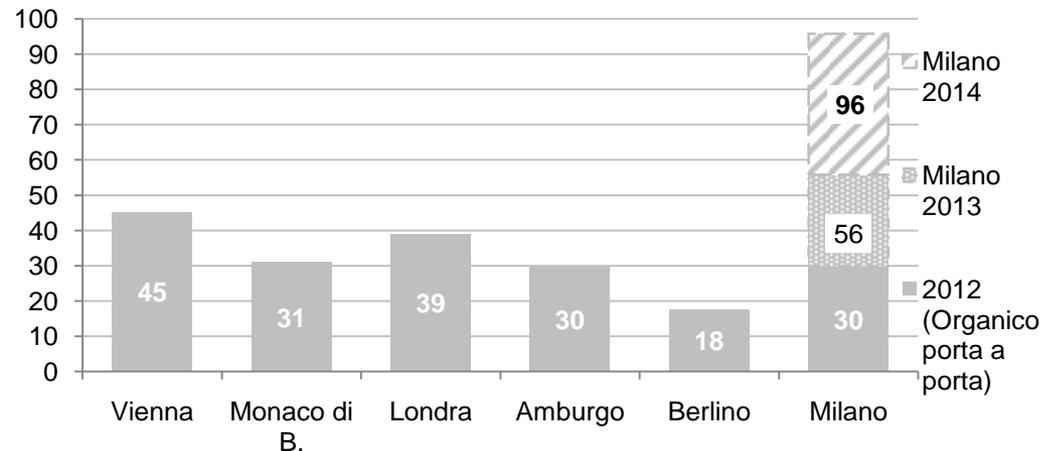


COMPOST AS DRIVER FOR SOILS FERTILITY

ORGANIC WASTE SEPARATELY COLLECTED IN ITALY (CIC data)

- 2006: 2,6 MIO TONS
- 2013: 5,2 MIO TONS
- < 4,8% IMPURITIES
- 240 COMPOSTING PLANTS
- 43 ANAEROBIC DIGESTION PLANTS

Organic Waste: the Milan case



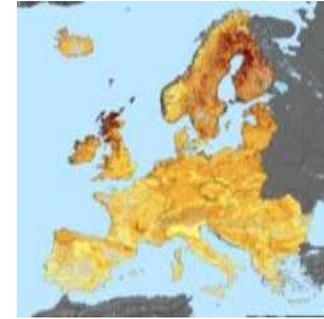
Addressing societal challenges with bioplastics



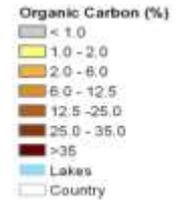
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COMPOST AS DRIVER FOR SOILS FERTILITY

Addressing the build-up of a third generation biorefinery for bioplastics and biochemicals

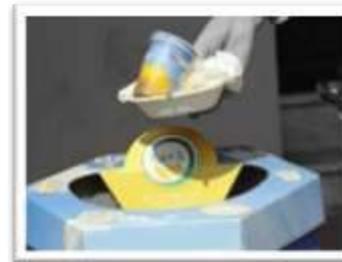


Network of sites related to the bioplastics and biochemicals value chain and based on Novamont technologies

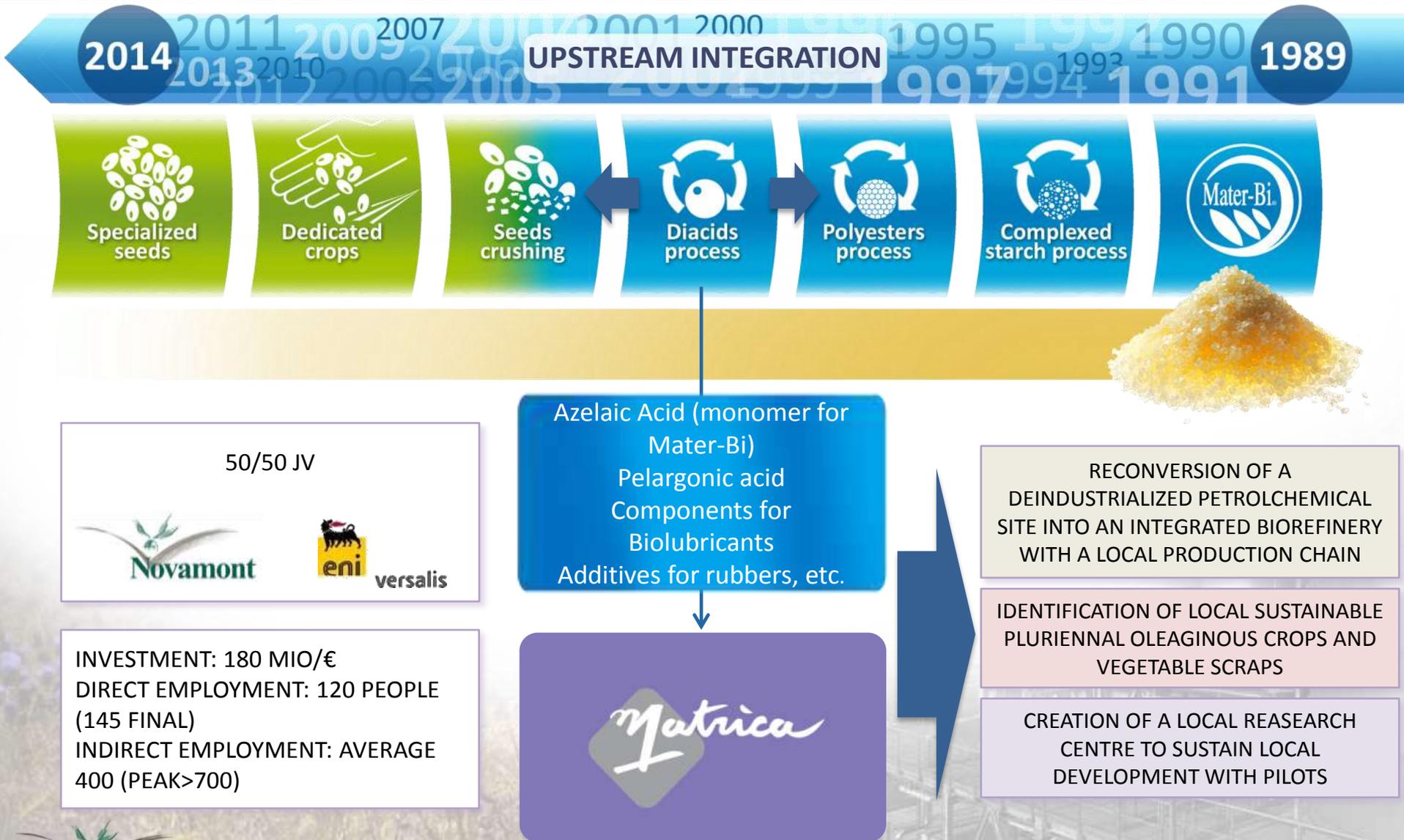


Mater-Bi[®]: applications

Tailor-made applications where biodegradability and compostability present added value



Technologies and development scheme for the upstream integration of Novamont bioplastics

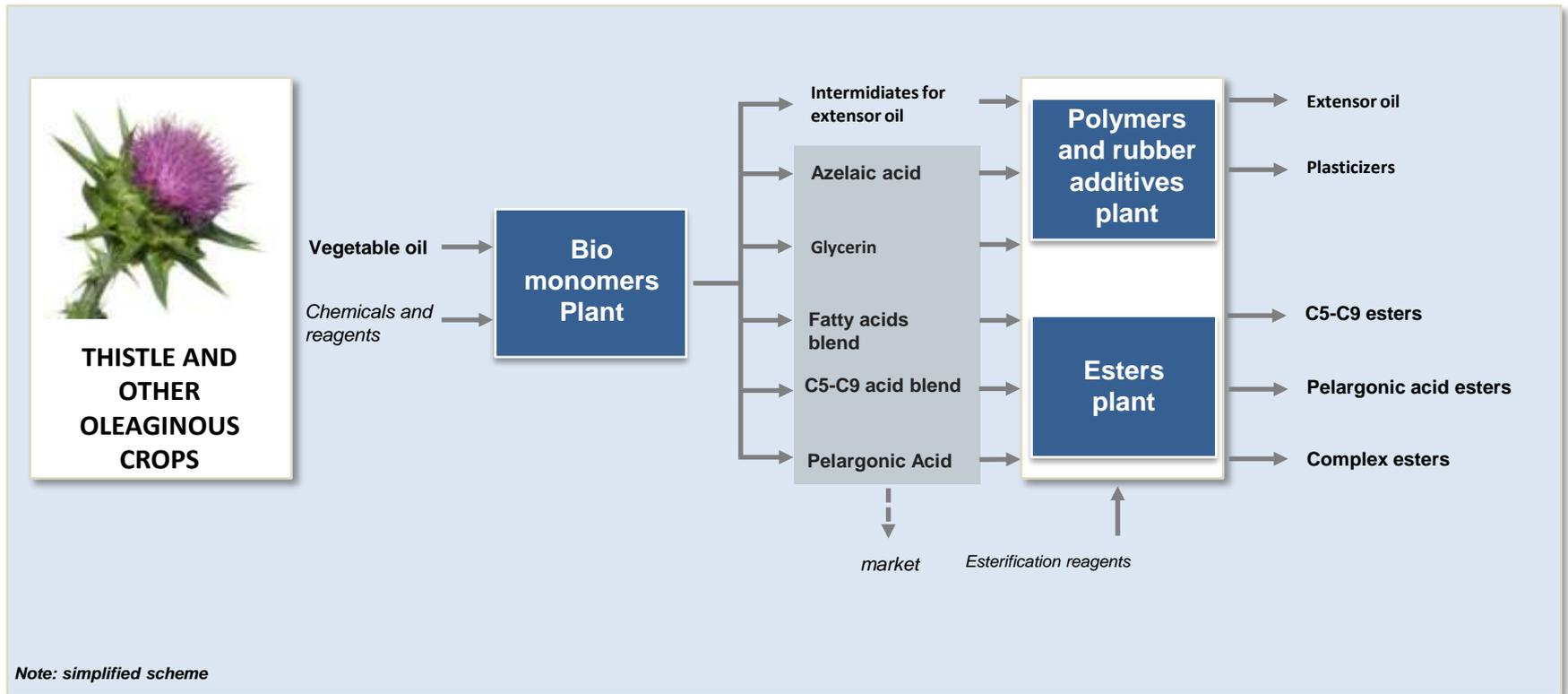


Matrìca



Matrìca production cycle

From oil to chemicals



BIOMONOMERS PLANT: VEGETABLE OIL FEEDSTOCK. PRODUCTION CAPACITY: 35'000 TON/Y

ESTERS PLANT: PRODUCTS FOR SPECIALTY APPLICATIONS: 2 INDEPENDENT AND FLEXIBLE PRODUCTION LINES

ADDIVES PLANT: ADDITIVES FOR RUBBERS AND POLYMERIC PLASTICIZERS

From azelaic acid Proprietary Mater-Bi of third generation



**Always First
among the New Generations**



**Always First
among the New Generations**

**THE "ORIGINAL"
THAT LOOKS AFTER
THE NEW GENERATIONS**

Higher proportion of renewable resources,
improved technical and environmental performance,
less raw materials of fossil origin.
For flexible and rigid films, coatings, injection moulding,
extrusion and thermoforming.



New biochemicals: sectors where Matrìca products will contribute to the quality of the environment



PLASTICIZERS FOR PVC AND OTHER POLYMERS AS REPLACEMENT OF PHTALATES

WORLDWIDE PRODUCTION OF PHTALATES: 5.5 MIO TON



BIOLUBRICANTS FOR AGRICULTURE, MARINE AND INDUSTRIAL APPLICATIONS: high lubricity, biodegradability, low flammability

**EU PRODUCTION OF LUBRICANTS: 5.2 MIO TON
HYDRAULIC FLUIDS: 0.7 MIO TON**



PALM OIL FREE COMPONENTS FOR COSMETICS



OIL EXTENDERS FOR RUBBER

EUROPEAN PRODUCTION: > 0.5MIO TON

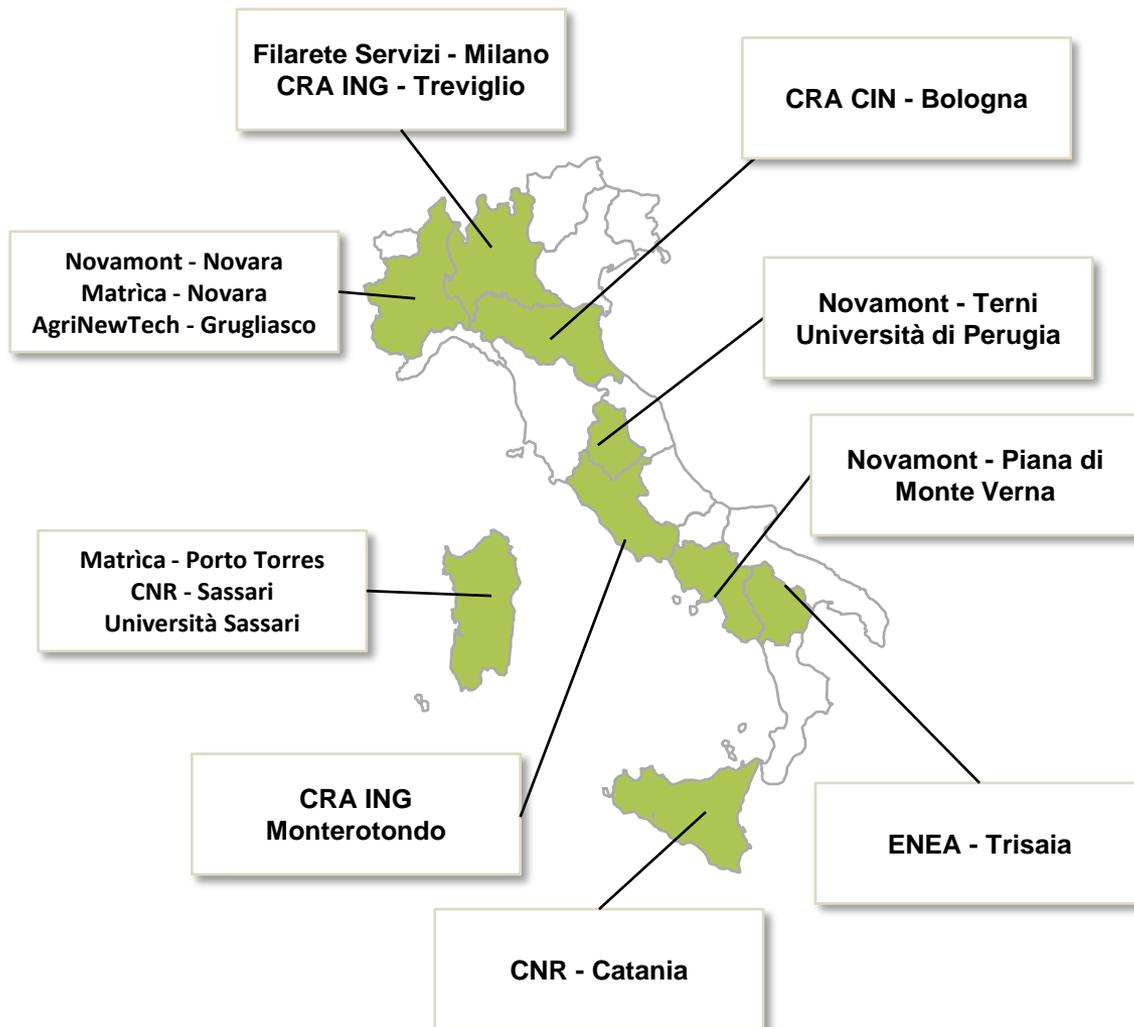


BIO-HERBICIDES FOR INTEGRATED AGRICULTURE

The agricultural value chain

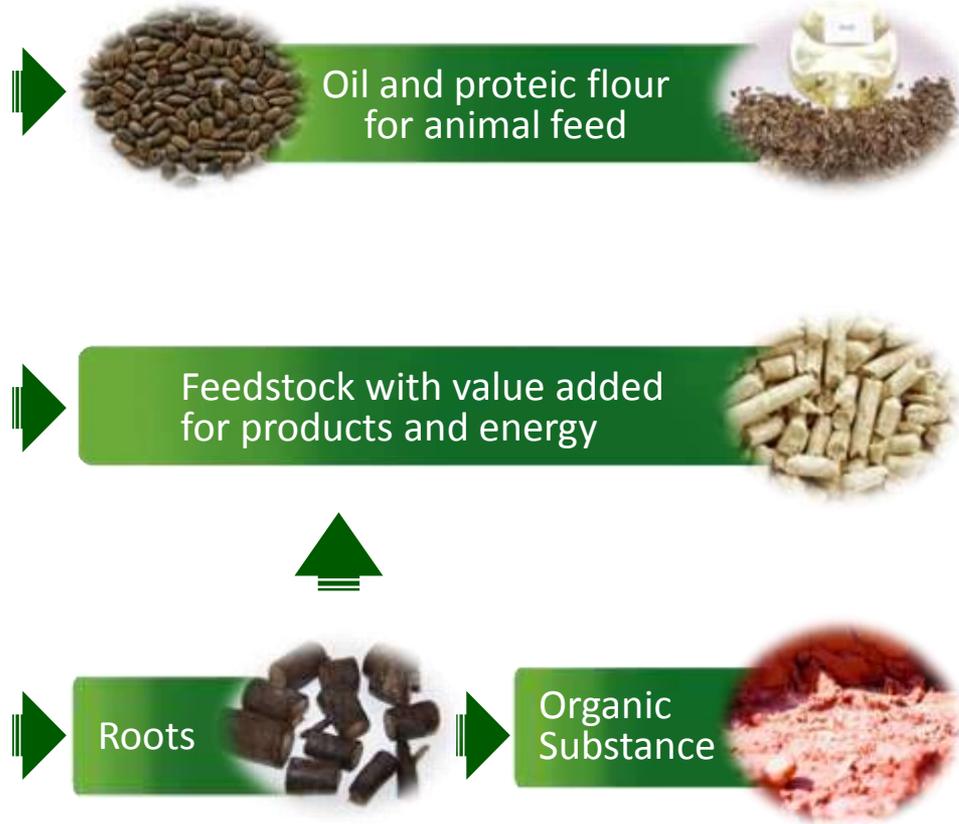


Map of research on dry crops



- Agronomic aspects
 - Soil preparation
 - Weed control
 - Fertilization
 - Entomology
- Mecanization and logistic aspects
- Agricultural valuations
- Genetic improvements
- Active molecules extraction
- Crushing/Oil production and modification
- Proteic Meal
- Sugars from biomass
- Fermentation
- Energy from biomass

The thistle: different uses and development conditions



AFTER 3 CONSECUTIVE YEARS OF EXPERIMENTATION:

- 400 HA AND MORE THAN 40 FARMERS INVOLVED
- BIOMASS PRODUCTION > 15 TON/HA (17 TON/HA IN 2014)
- SEEDS PRODUCTION ~ 1,5 TON/HA (1,74 TON/HA IN 2014)
- ENGINEERING OF SPECIFIC FARMING MACHINES SUITABLE FOR SARDINIAN STONY GROUNDS

Some images from thistle harvesting in Matrìca experimental fields (August 2014)



Potential areas for thistle production

**HARABLE LAND IN SARDINIA:
JUST IN SASSARI PROVINCE 70,000 HA OF HARABLE LAND
LOST FROM 1982 TO 2010
(SOURCE: ISTAT)**

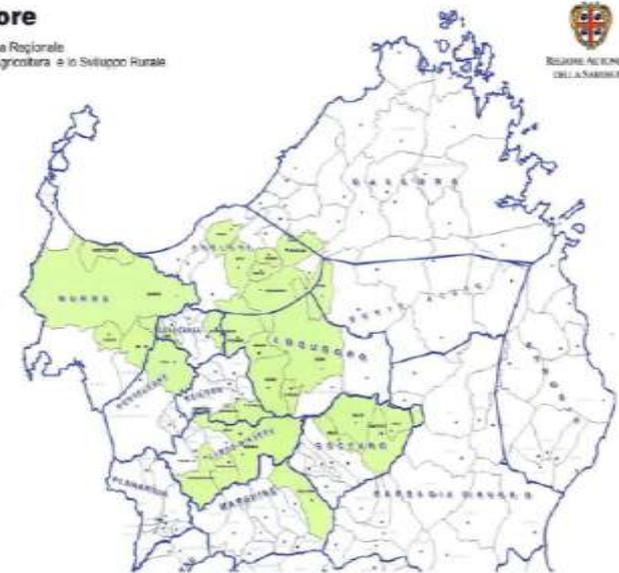
Anno	1982	1990	2000	2010
Territorio				
Italia	15.832.613	15.025.954	13.181.859	12.856.048
Sardegna	1.431.302	1.358.018	1.010.955	1.153.691
Sassari	316.160	319.816	240.027	246.822
Nuoro	255.516	259.036	191.688	229.376
Cagliari	256.398	221.943	165.958	203.047
Oristano	202.996	197.665	156.288	166.691
Ogliastra	138.723	139.980	88.552	94.707
Ogliastra	70.885	70.980	56.731	69.869
Medio Campidano	109.762	94.911	75.241	82.998
Carbonia-Iglesias	80.863	53.687	45.470	60.181

Dati estratti il 20 nov. 2012, 17h28 UTC (GMT), da censagri.Stat

La Superficie Agricola Utilizzata (SAU) ammonta a circa 1.153.691 ha, dei quali solo poco più del 34,1% è destinato a seminativo.

Laore

Agenzia Regionale
per l'Agricoltura e lo Sviluppo Rurale



SARDINIA ANNUAL IMPORT OF FEED: ABOUT 140,000 TON/Y

Fall-out in terms of territorial regeneration and new growth along the whole value chain

- **PRIVATE INDUSTRIAL INVESTMENTS** IN WORLD PREMIER PLANTS (3 FLAGSHIPS) (MORE THAN 500 MIO ALREADY INVESTED). NEW PLANTS TO BE STARTED BETWEEN 2015 AND 2016;
- **PRIVATE INVESTMENTS IN R&D** (AROUND 200 MIO EURO) TRIGGERING MULTIDISCIPLINARY PROJECTS WITH UNIVERSITIES AND PRIMARY RESEARCH CENTRES;
- START-UP OF **SPECIFIC AND LOW IMPACT AGRICULTURAL VALUE CHAINS**, NOT COMPETING WITH FOOD PRODUCTION;
- REVITALIZATION OF **DOWNSTREAM VALUE CHAINS**;
- **REINDUSTRIALIZATION** OF 6 DEINDUSTRIALIZES SITES, FOR A TOTAL OF MORE THAN 1.500 EMPLOYEES: TERNI, PIANA DI MONTE VERNA (CE), PATRICA (FR), PORTO TORRES (SS), NOVARA, ADRIA (RO);
- **NEW PROCESSES AND BIOPRODUCTS** AT EU LEVEL:
 - AZELAIC ACID
 - PELARGONIC ACID
 - THEIR DERIVATIVES
 - NEW OIL EXTENDERS FOR RUBBER AND PLASTICIZERS
 - BIOBUTANEDIOL
 - STARCH-BASED AND VEGETABLE OIL BASED BIOPLASTICS
- A VIRTUOUS **CHAIN OF HIGH QUALITY COMPOST** WITH EXTRAORDINARY CASES OF EXCELLENCE (MILAN CHAMPION IN QUANTITY AND QUALITY OF ORGANIC WASTE)

Lessons learned

- ✓ **New products and technologies** are available, as well as many **case studies** of system based economy, which can become catalysts for a faster growth.
- ✓ **Crisis** at a certain extent is a result of our inability to **change model**. If policies will not be able to leverage from what achieved today, the costs of inactivity will be dramatically high.
- ✓ A change of mindset is needed: Bioeconomy is not just dealing with renewable resources, but with **territorial regeneration** and **cultural change**, promoting the concept of **Sustainable Regions**: recovery of abandoned land for sustainable productions, soil improvement, reindustrialization of deindustrialized/polluted sites, rethinking of agricultural value chains not economically sustainable through new integrated technologies, launch of integrated agro-industrial projects along the value chain.

Thanks for your attention!

« The challenge of our millennium is in the balance between the technical means that humanity possesses and the wisdom in how we will make use of them »

Umberto Colombo

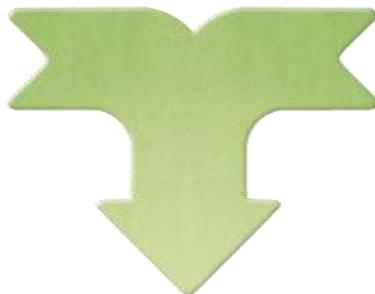
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Our roots (1989)



Montecatini
Chemical
Technologies

MONTEDISON



Eridania-Beghin Say
Agricultural
Raw Materials

FERTEC - Ferruzzi Research and Technologies

Research&Development Projects with focus on:
materials, cobuilders for cleaning, biofuels,
pulp additives, chemical intermediates from hydrocracking, etc.

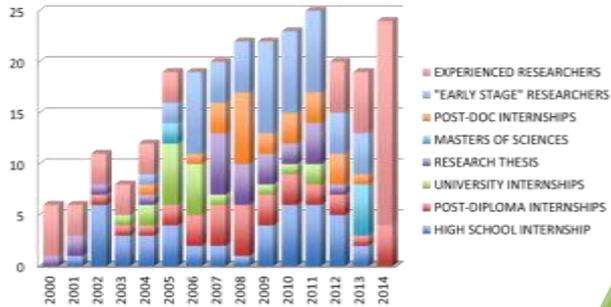
Integration of Chemistry, Agriculture and Environment

Living Chemistry for Quality of Life.

Novamont today

A knowledge-based industry

MORE THAN 250 TRAINING PROGRAMMES SINCE 2000



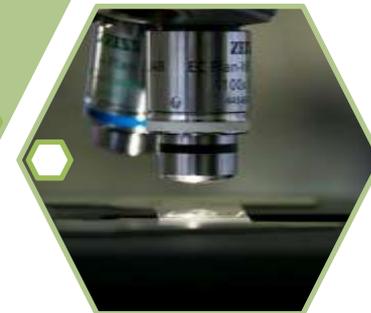
HUMAN CAPITAL

25-YEAR R&D EXPERIENCE
6.2% OF TURNOVER
20% OF EMPLOYEES
~ 1.000 PATENTS



INDUSTRY

R&D



1996 - RESEARCH CENTRE →
2014 - TURNOVER OF 145 MIO/€
257 PEOPLE DIRECTLY EMPLOYED
BY NOVAMONT(2014)
~ 500 PEOPLE EMPLOYED
INCLUDING JVs AND START-UPS)

A cultural change from a linear to a circular model

Encouraging the transition from a linear model to a **circular economy**, making a cultural leap in the direction of economic, social and environmental sustainability which must involve the whole of society, starting from the local areas and from the cooperation with all the stakeholders .

