The Bioeconomy in Italy

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The Italian Bioeconomy

In Italy: about 240 Billion €/y and 2 Million of jobs
In Europe: about 2 Trillion €/y and 22 Million of jobs
The Italian Bioeconomy

Turnover and employment in the EU bioeconomy (2011)

Source: SCAR – EUROSTAT 4th foresight 2015
The Italian Bioeconomy
The Italian Agriculture and Livestock

Employment

Annual Turnover

Agriculture: ~ €14.00 Billion
Terrestrial Livestock: ~ € 11.4 Billion
Aquaculture: ~ € 1.18 Billion

Agriculture, terrestrial livestock & aquaculture: ~ 600,000

After:
Indagine continua sulle forze di lavoro (fdl)
http://siqual.istat.it/SIQual/visualizza.do?id=5000098&refresh=true&language=IT
Produzione, consumi intermedi e valore aggiunto di agricoltura, silvicoltura e pesca (Nace rev.2)
http://dati.istat.it/Index.aspx?DataSetCode=DCCN_VAAGSIPET
The Italian Agriculture: main R&I needs

- Improve soil fertility and bioavailability of nutrients, via organic farming, crop rotation etc;
- Crops selection and improvement for productivity, nutritional properties, protection from infections;
- Evaluation and exploitation of local biodiversity;
- Precision farming, agro-ecological modeling;
- greenhous efficiency, etc;

- Genetic improvements for improved functional longevity and resistance to diseases of terrestrial livestock;
- Hormone/antibiotics reduction/substitution in animals;
- Sustainable management of livestock effluents/waste (with energy and fertilizers production),

- Improve productivity, tackling disease related challenges and threats of farmed aquatic animals.
The Italian food industry

Top 5 Member States in terms of food & drink industry turnover, 2015* (€ billion)

- Germany
- France
- Italy
- UK
- Spain

Italy: Turnover: 134 billion €
Export: 21%, 28.6 billion €

Over than 55,000 companies with 385,000 employees
6,845 with more than 9 employees

Source: Data processing and estimates Federalimentare 2015
Production of new foods with specific nutritional needs and/or for combating obesity and ageing;

New “typical/quality” foods (DOP, IGP, STG, etc.);

Develop Products with affordable in price / quality ratio;

Develop strategies and tools for authentication of food products and combating counterfeiting and imitations;

Improve resource efficiency/environmental sustainability in the food processing: lower raw material losses, water and energy use, and byproduct and waste production; byproducts/waste integrated valorization; biodegradable packaging, etc.

ICT and KETs (e.g. Advanced Manufacturing and Processing, Industrial Biotechnology - enzymes and microbes and bio-processing-, Advanced materials)
The Italian Forestry sector

Employment

Forestry
~ 200,000

Wood and Wood products
~ 410,000

Annual Turnover

Forestry
~ € 0.54 Billion

Wood and Wood products
~ € 28.0 Billion

After:
Indagine continua sulle forze di lavoro (fdl)
http://siqual.istat.it/SIQual/visualizza.do?id=5000098&refresh=true&language=IT

Produzione, consumi intermedi e valore aggiunto di agricoltura, silvicoltura e pesca (Nace rev.2), http://dati.istat.it/Index.aspx?DataSetCode=DCCN_VAAGSIPET

Repubblica - Affari e Finanza 18 marzo 2013
http://www.repubblica.it/economia/affari-e-finanza/2013/03/18/news/legno_e_arredo_persi_in_5_anni_14_miliardi_e_10_mila_imprese-54795147/
Forest monitoring and Management Systems (especially at farm scale);
Climate change: effect on forests, mitigation and and adaptation
Forest biodiversity conservation and protection from alien species;
Improvement of wood productivity and sustainability (i.e., low input cultural practices) of planted forest;
Short Rotation Forest (SRF) Management, phytoremediation and production of II generation biofuels;
Development of new wood products, wood-based materials and composites and identification of new opportunities in the biorefinery sector.
Italian Biobased Industry/Biorefineries

Private investments: more than €1.0 billion; 1600 people employed.

**PIEMONTE**
- R&D CENTRE BIOPLASTICS AND BIOCHEMICALS FROM RRM (NOVARA)
- R&D CENTRE CHEMISTRY FROM RENEWABLES (NOVARA)
- R&D CENTRE BIOCHEMICALS PROCESSES AND TECHNOLOGIES (RIVALTA SCRIVIA - AL)
- PILOT PLANT FATTY ALCOHOL (RIVALTA SCRIVIA - AL)
- PILOT PLANT BIOMONOMERS (NOVARA)
- DEMO PLANT GREEN GLYCOL (RIVALTA SCRIVIA - AL)
- INDUSTRIAL PLANT LIGNOCELLULOSIC BIOETHANOL (CRESCENTINO - VC)
- FLAGSHIP SUCCINIC ACID (CASSANO SPINOLA - AL)

**LOMBARDIA**
- R&D CENTRE GREEN CHEMISTRY PROCESS ENGINEERING AND BIOLUBRICANTS (MANTOVA)
- R&D CENTRE BIOLUBRICANTS (SAN DONATO MILANESE - MI)
- PILOT PLANT FOR BIOBASED BUTADIENE (SAN DONATO MILANESE - MI)

**VENETO**
- FLAGSHIP 1,4 BDO FROM RRM (ADRIA - RO)

**EMILIA ROMAGNA**
- R&D CENTRE BIOELASTOMERS (RAVENNA)

**UMBRIA**
- R&D CENTRE, PILOT AND DEMO PLANTS ON OLEAGINOUS CROPS AND BIOLUBRICANTS FROM LOCAL CROPS (TERNI)
- INDUSTRIAL PLANT BIOPLASTICS BASED ON STARCH AND POLYESTERS FROM VEGETABLE OILS (TERNI)

**PUGLIA**
- FLAGSHIP AVIATION FUEL (MODUGNO - BA)

**CAMPANIA**
- BIOTECHNOLOGICAL R&D CENTRE (PIANA DI MONTE Verna - CE)

**LAZIO**
- INDUSTRIAL PLANT BIODEGRADABLE POLYESTERS (PATRICA - FR)

**SARDEGNA**
- 1 FLAGSHIP AZELAIC ACID AND PELARGONIC ACID (PORTO TORRES - SS)
- 1 FLAGSHIP BASIS FOR BIOLUBRICANTS AND BIOADDITIVES FOR RUBBER R&D CENTRE

**LOCATION TBD**
- EXPERIMENTAL CROPS AND DEMO PLANTS FOR EXTRACTION OF NATURAL RUBBER AND OTHER VALUABLE PRODUCTS (RESINS ETC.)

(courtesy of C. Bastioli)
Biobased Industry/Biorefineries: main R&I needs and opportunities

- Developing new products/processes
- Scale up
- Small scale production
- Transformation into commercially available products

R&I: improved/new raw materials
- Non-food crops
- CO₂, Biowastes
- Marine Biomass
- Collection/treatment

R&I: process optimization
- Bio/Chem integration
- Process flexibility
- Downstream
- LCA/cost analysis

Industrial Transfer
- Spin-off/Start-up policy
- Partners Integration
  - IPR policy
- Access Pilot plants, Demonstrators

Promotion of Bio-Based Products and Processes
- policies & regulations
- consumer acceptance

Renewable resources

Bioproduct (commercially available)
The Italian Marine and Maritime sectors

Economic value: ~ € 41 Billion/y

Employees ~ 800,000

After: Il Rapporto Sull’economia Del Mare. Unioncamere, 2011
Marine renewable Energy;
Sustainable Tourism, associated with ports and marine/coastal cultural heritage;
More sustainable and productive fishery and aquaculture;
Biodiversity protection and sustainable exploitation of marine biomass, microbes, enzymes;
Deep sea ecosystems monitoring and sustainable exploitation;

Marine Pollution and remediation;
MSP- ICZM implementation;

Operational Oceanography/ Observing Systems
The Future is Bio-Based