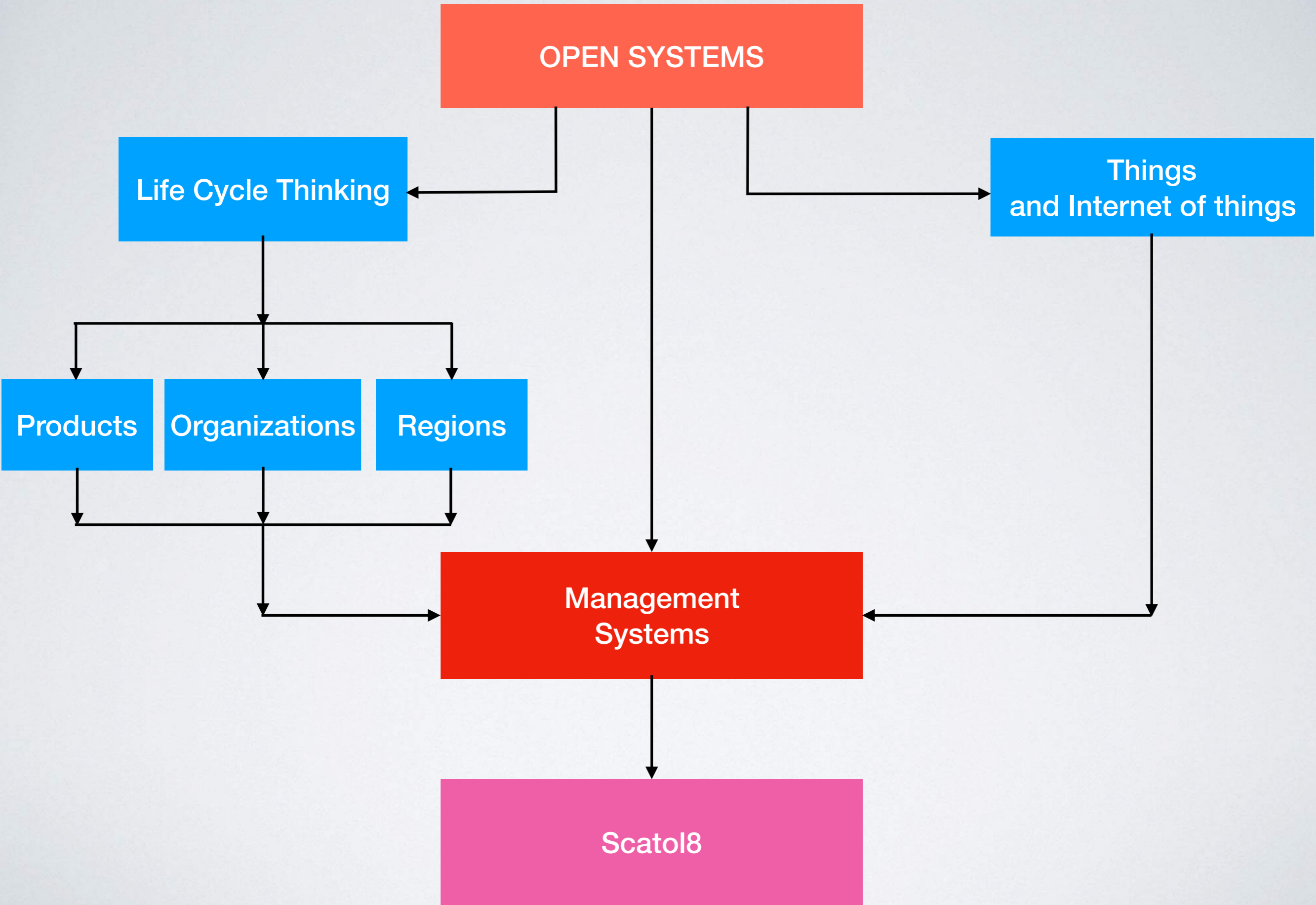# Small and medium enterprises promoting mountain products

Prof. Riccardo Beltramo
University of Torino
Department of Management - Area of Commodity Science
Research Centre on Natural Risks in Mountain and Hilly Environments

Planning
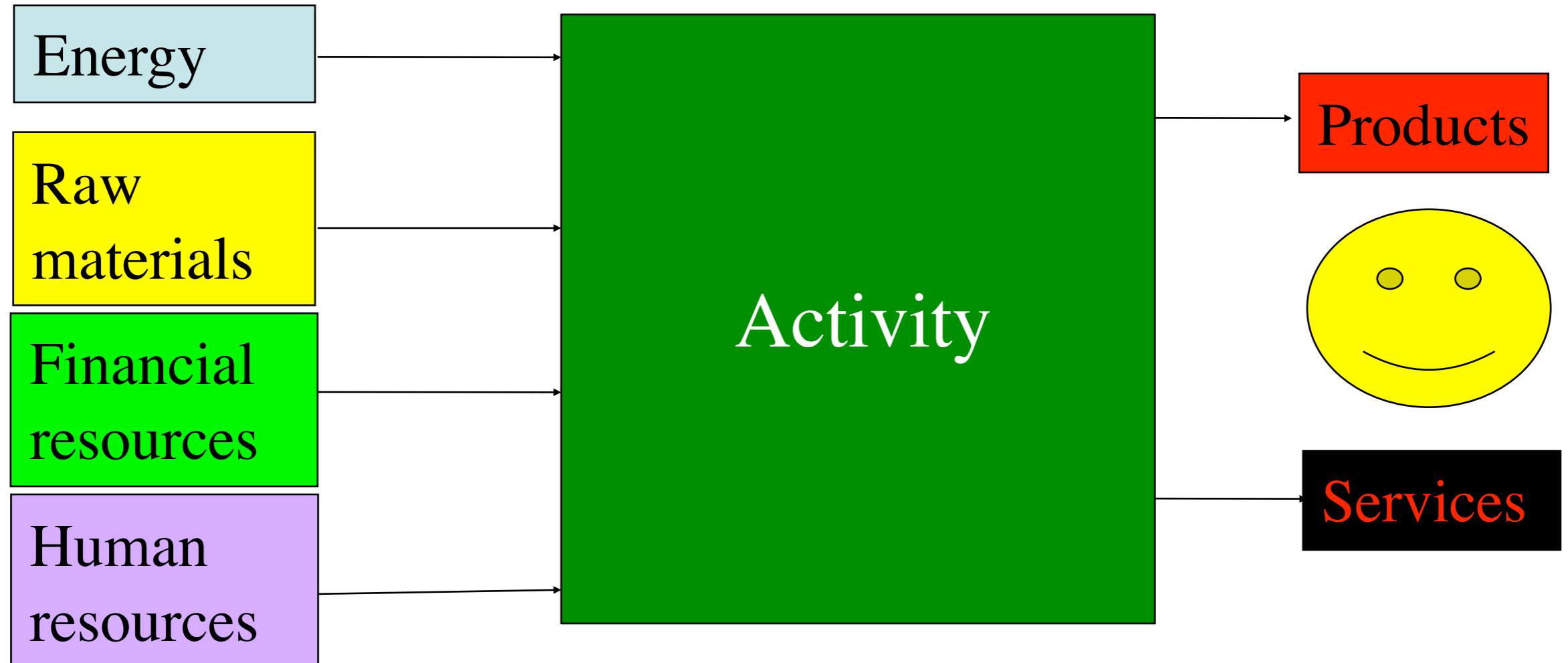
A transformation process
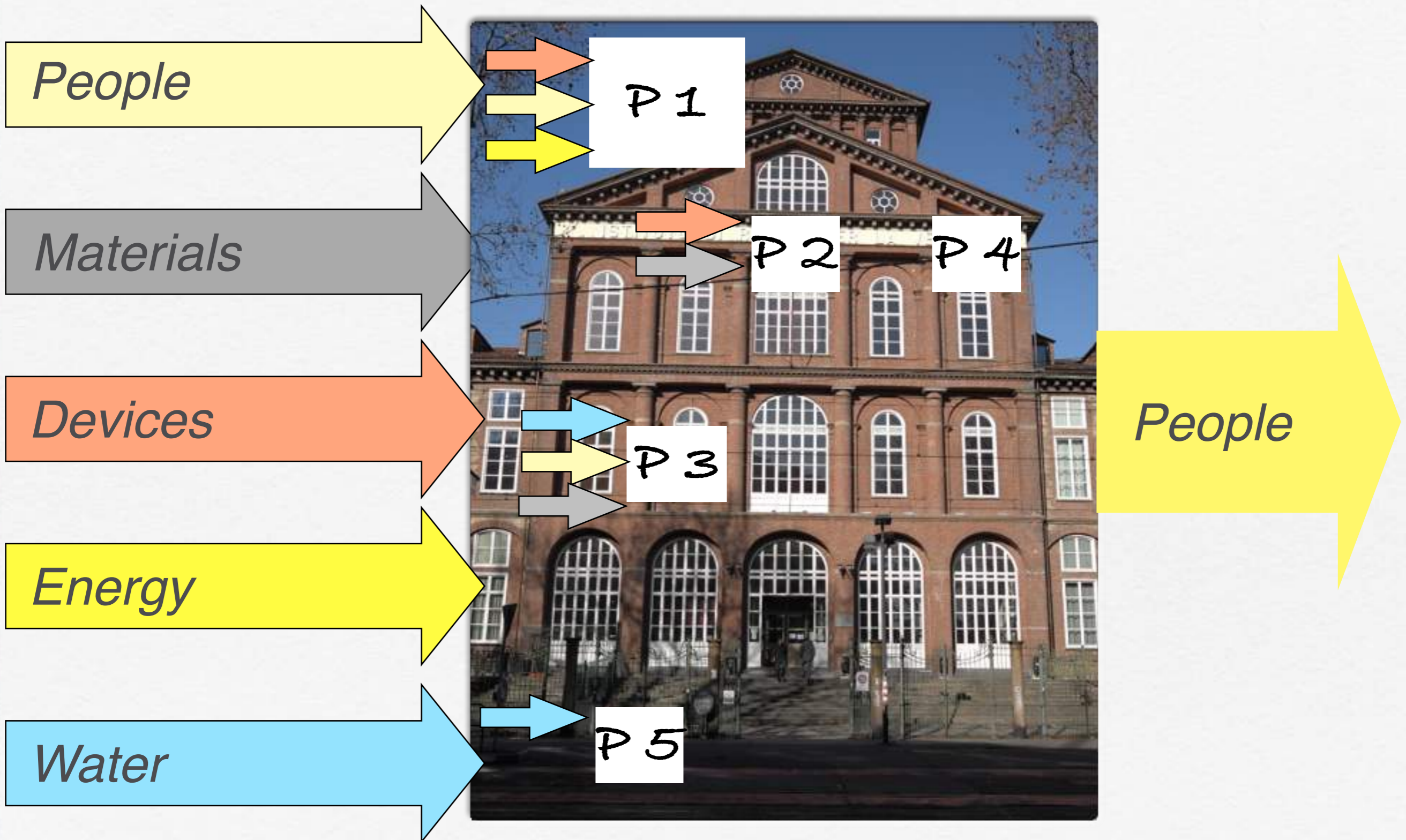
Transformations…

made through processes and operations

Agriculture

Land →

Human Resources →

Machinery →

Seeds →

Livestock →

Feed →

Water →

Energy →

Fertilizers →

Pesticides →

Other products →

Food →
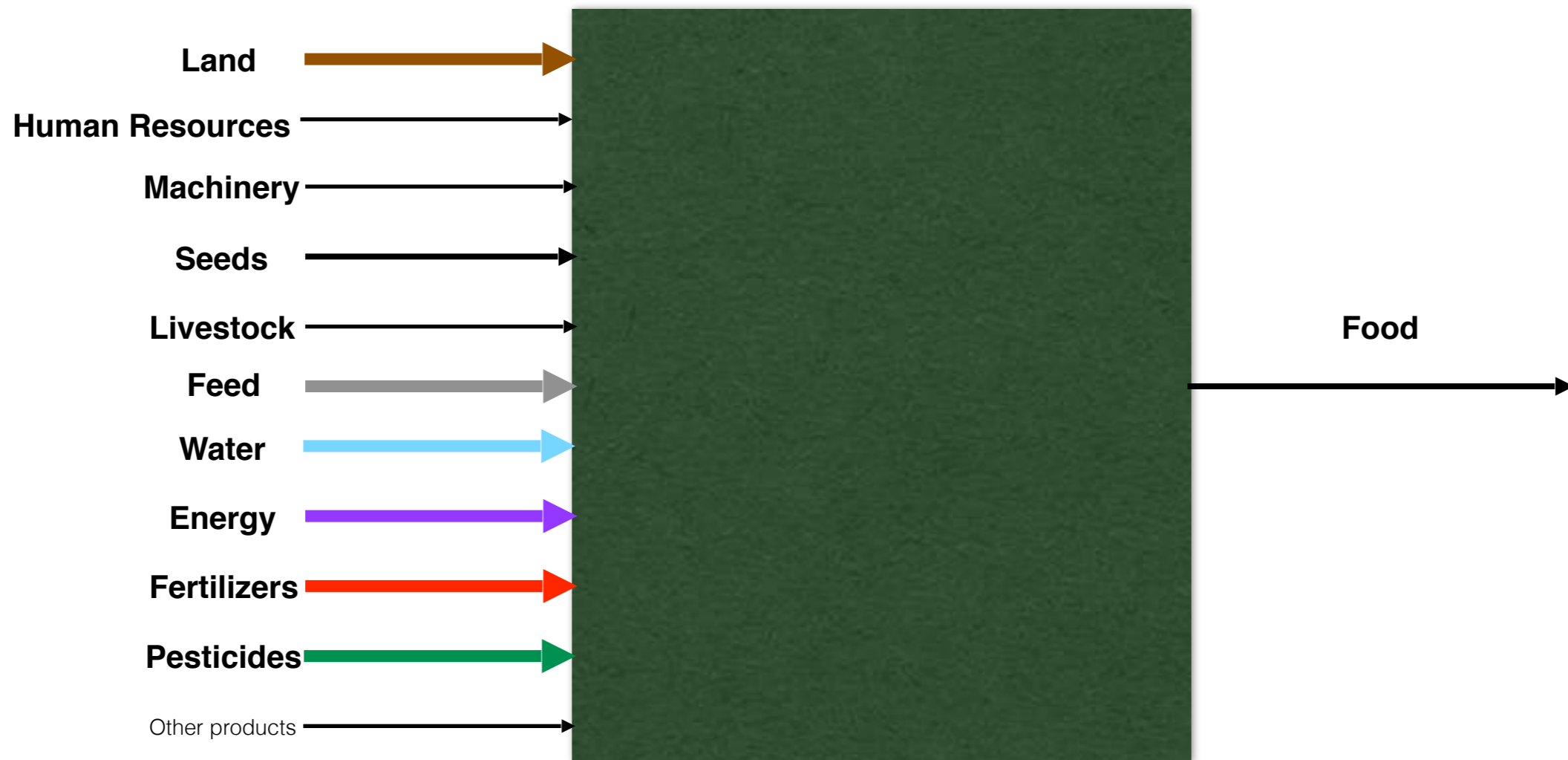
Cheddar Cheese Making Process

pasteurized milk

↓

Setting the milk

↓

Cutting the curd

↓

Cooking the curd

↓

Draining the whey

↓

Milling and salting

↓

Pressing

↓

Ripening
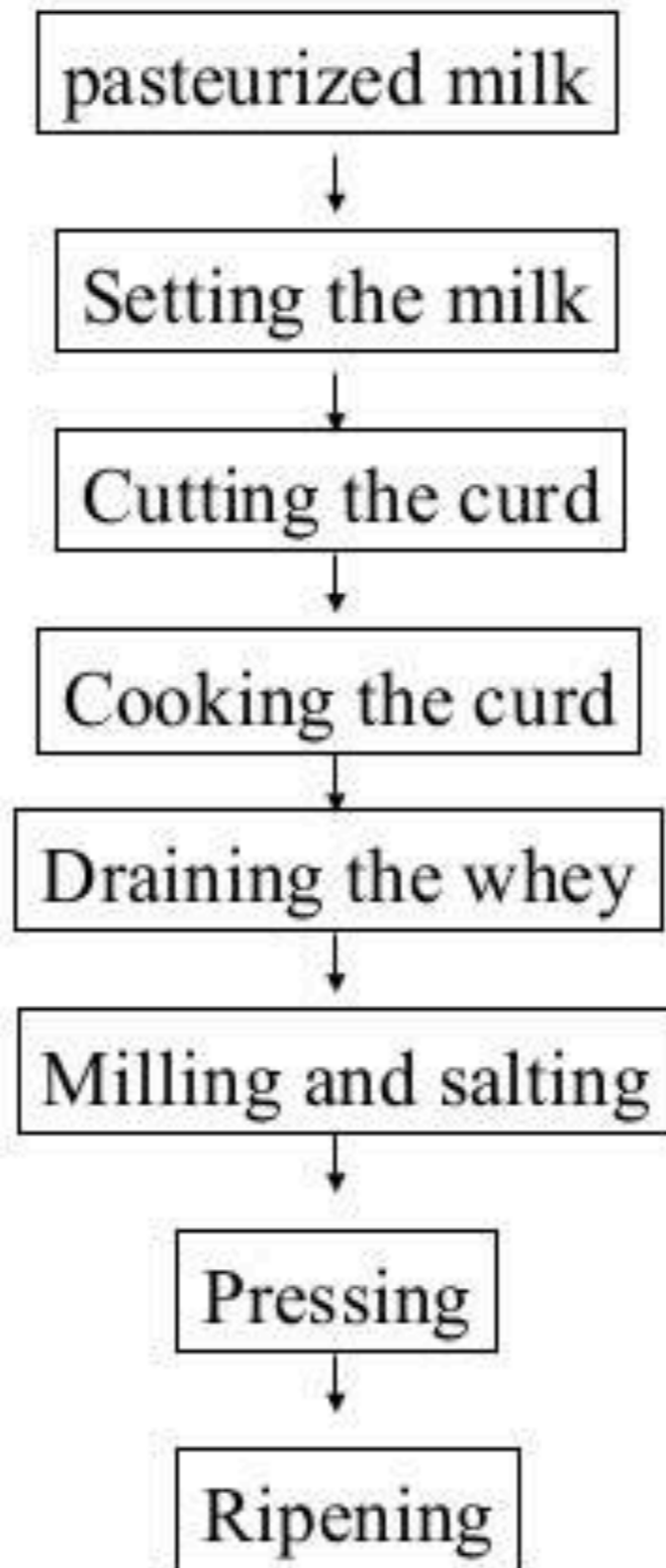
The Entropy Law and the
Economic Process

Nicholas Georgescu-Roegen

⊞
Harvard University Press

Biophysical Model of the Economic System
(Flows of matter and energy)

3 – The economy as an open system inside the ecosystem (*ecological*
of the *economy*).

OPEN SYSTEMS

A transformation process…

Energy

Raw materials

Financial resources

Human resources

Activity
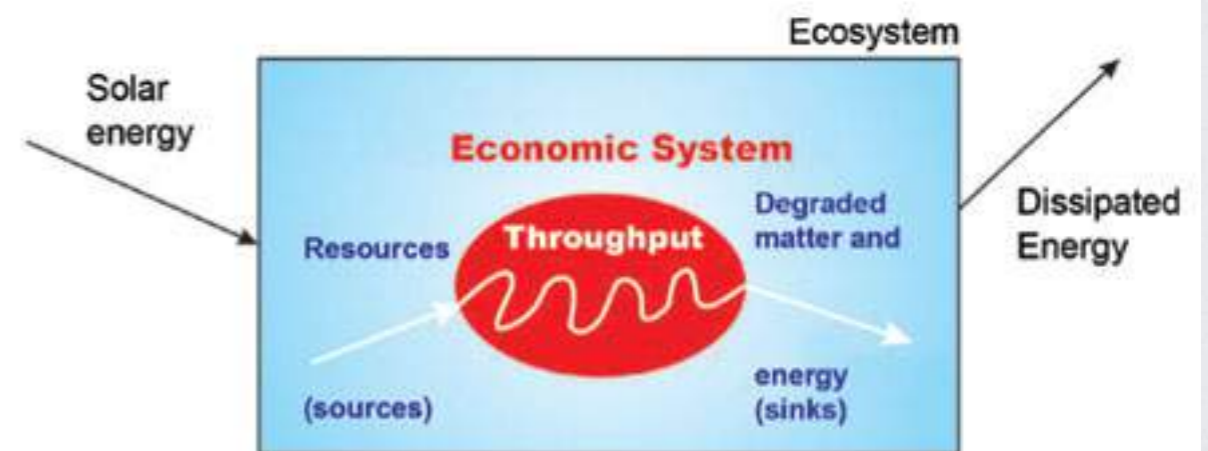
Products

Services

Solid waste

Liquid waste

Air emissions

Energy losses
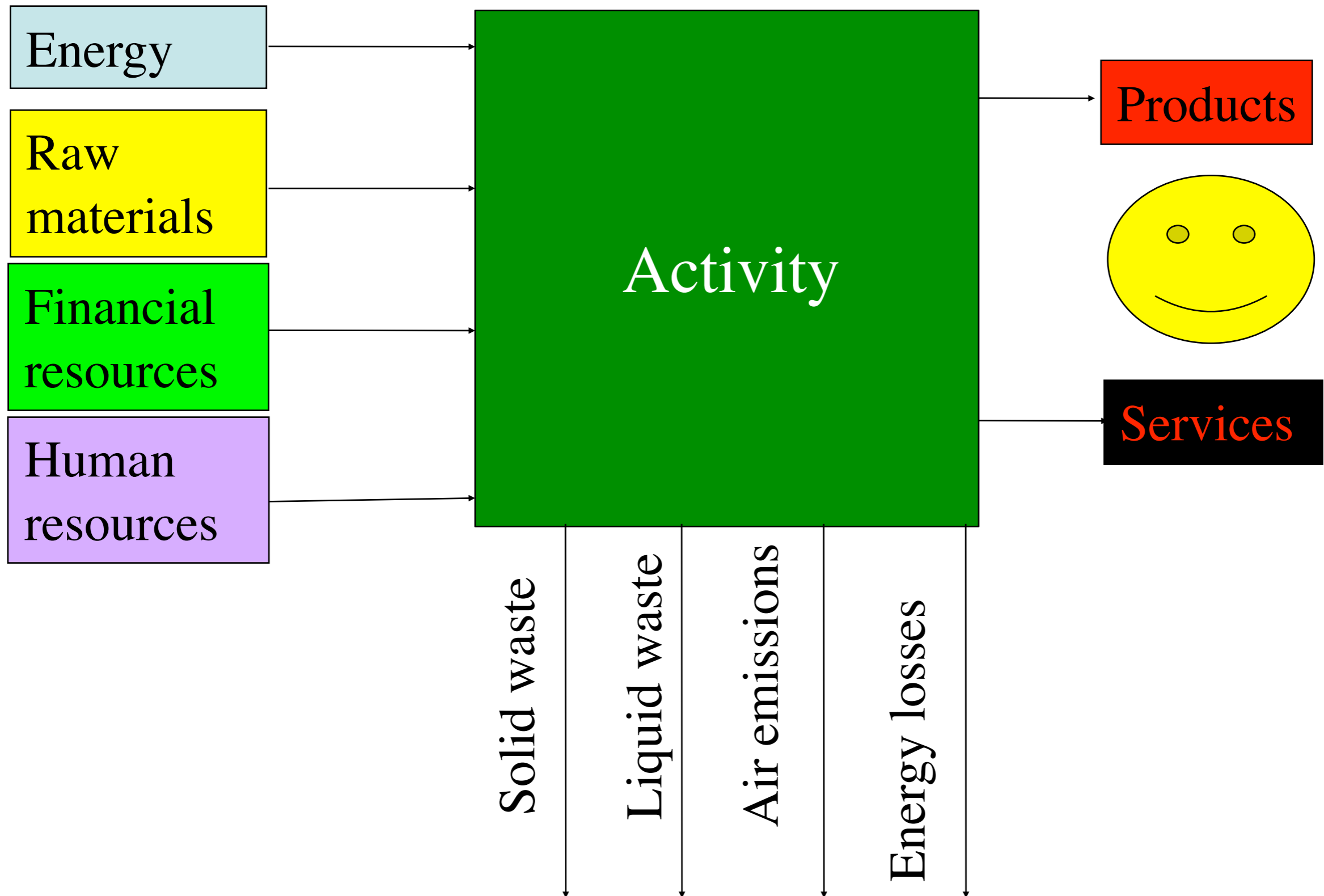
…not for free

A transformation process

Laws

Energy

Raw materials

Financial resources

Human resources

Activity

Products

Services

Solid waste

Liquid waste

Air emissions

Energy losses

within an economic and social framework

Wastewater

Milk

Receiving

Storage tanks

Clarification

Pasteurization

- Milk: homogenization
- Cheese manufacture
- Butter: churning
- milkpowder: drying
- Condensate: condensing

Packaging

Storage

Shipping

Effluent to drain

Cleaning and sanitation solutions
Wash water

Steam
Cooling Water

Steam
Cooling Water

Product

Milk
Cheese/Whey
Butter
Milkpowder
Condensate

Drivers

- Climate change

- Environmental quality: Land degradation, Soil contamination, Water use, Air emission.

- Energy: Paradigm shift

- Nutrition: Diet shift

- Conscious consumption

Agriculture & Environment

Land

Human Resources

Machinery

Seeds

Livestock

Feed

Water

Energy

Fertilizers

Pesticides

Other products

Food

Land use

Soil contamination

Air emission

Waste water

Solid waste

Energy dispersion
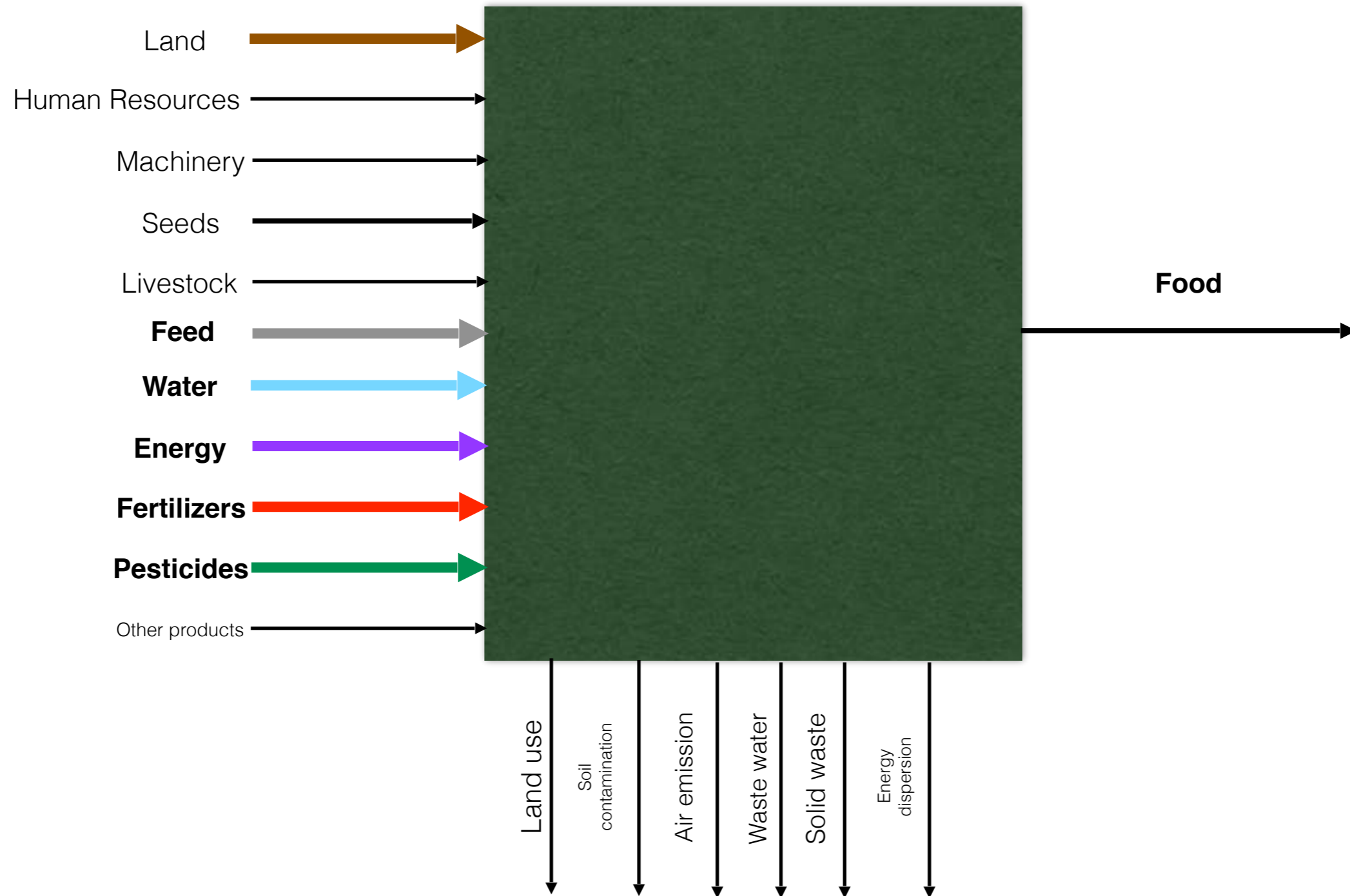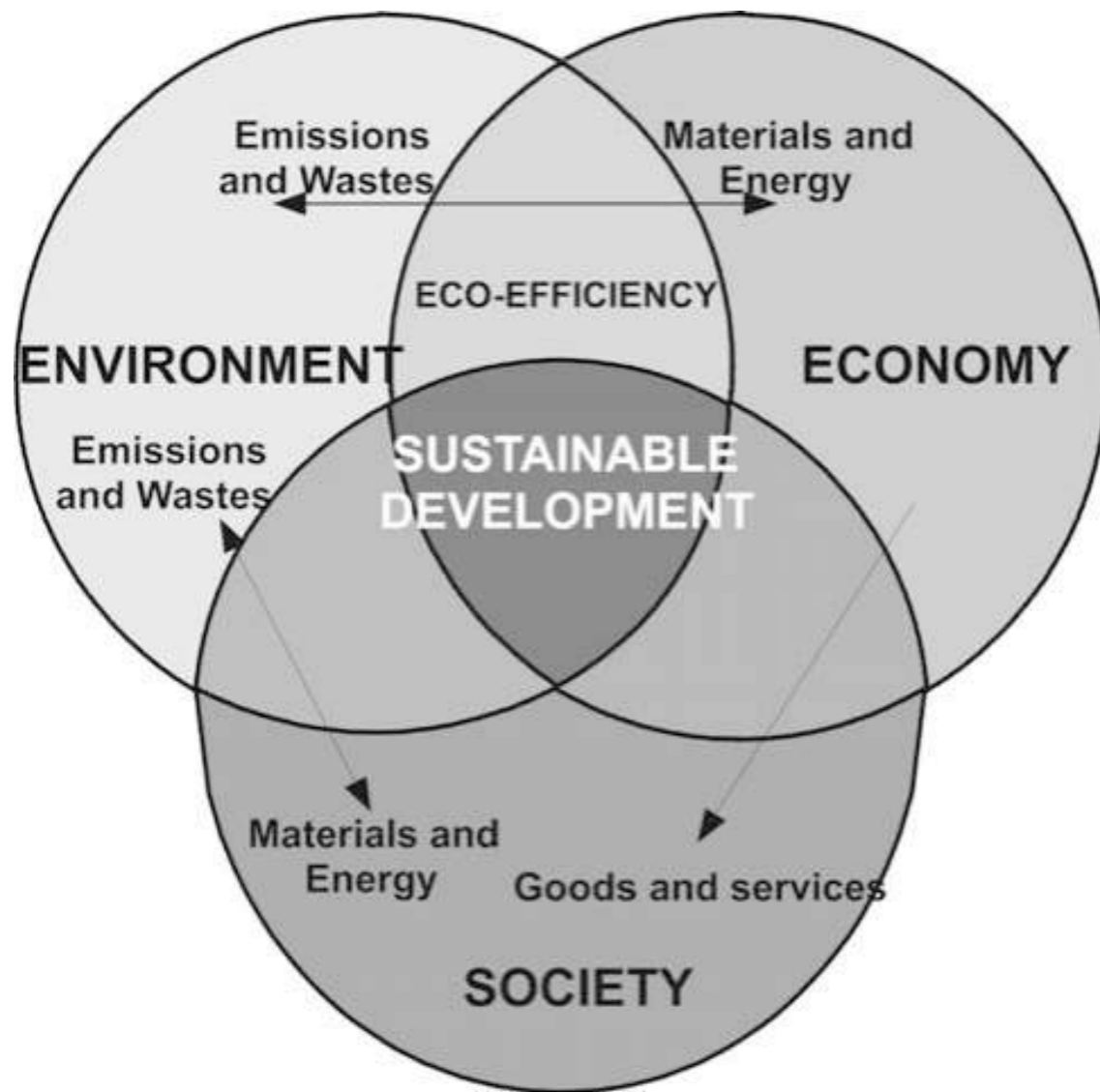
A model of sustainable development

Krajinc D., Glavič P., 2003, Indicators of sustainable production, Clean Technology Environmental Policy, 5, 279-288

1997 - 2003

**C.RE.STA Project:
Capanna REgina margherita Sistema di
gesTione Ambientale**
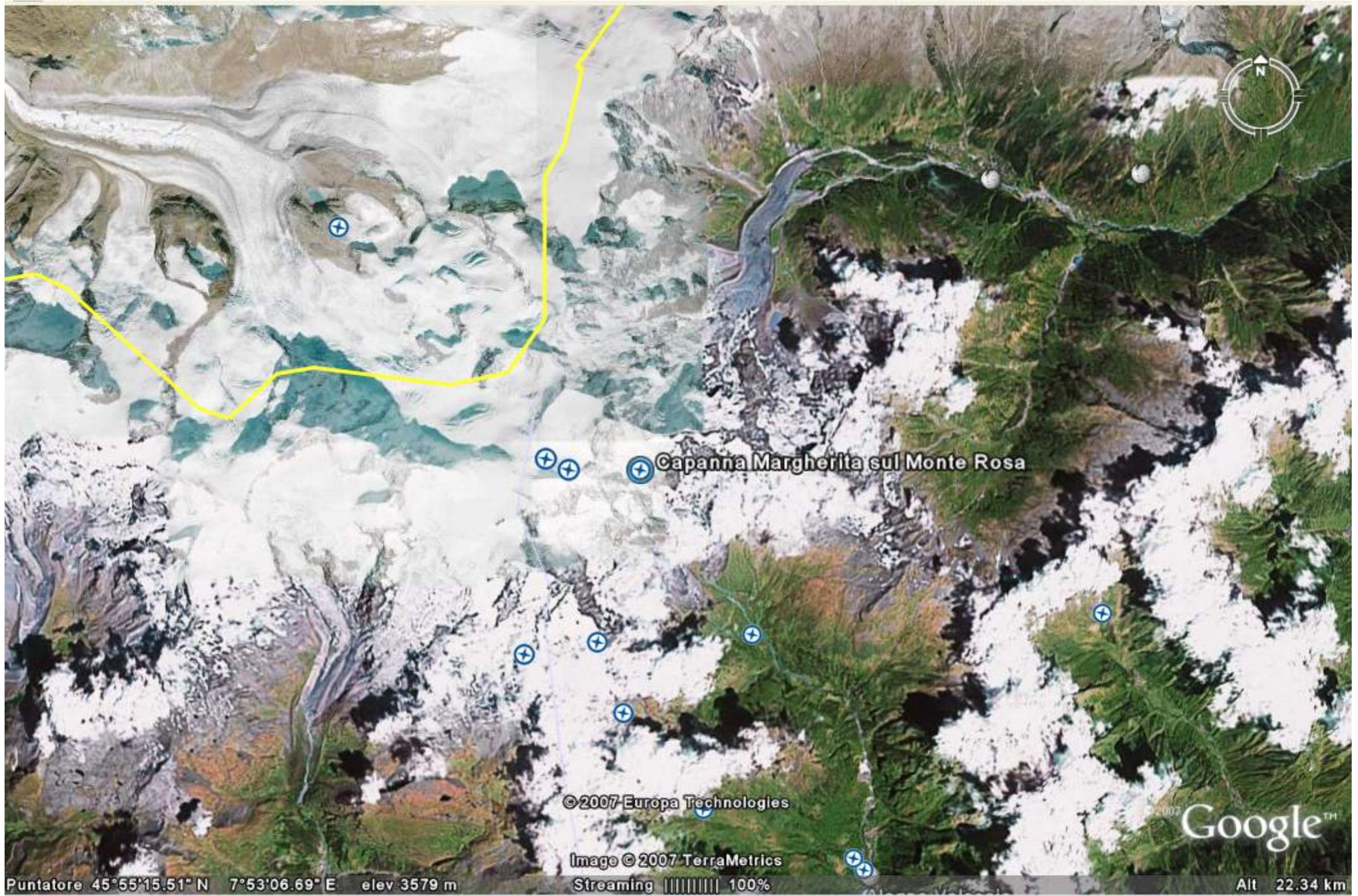
Capanna Regina Margherita

2001 - 2004

Mountain Huts
Valle d'Aosta

Research - Intervention for the realization of the Environmental management systems in mountain huts

Management models for the qualification of mountain huts managers towards sustainable tourism

Valorisation and promotion of mountain tourism through environmental qualification of a network of mountain huts

Benvenuti nei Rifugi Alpini della Valle d'Aosta

Wilkommen in den valdostaner Berghütten

Welcome to the Aosta Valley mountain shelters

Bienvenus dans les refuges alpins de la Vallée d'Aoste

ASSOCIAZIONE GESTORI RIFUGI · VALLE D'AOSTA · ASSOCIATION GARDIENS REFUGES ·

FRANCIA

SVIZZERA
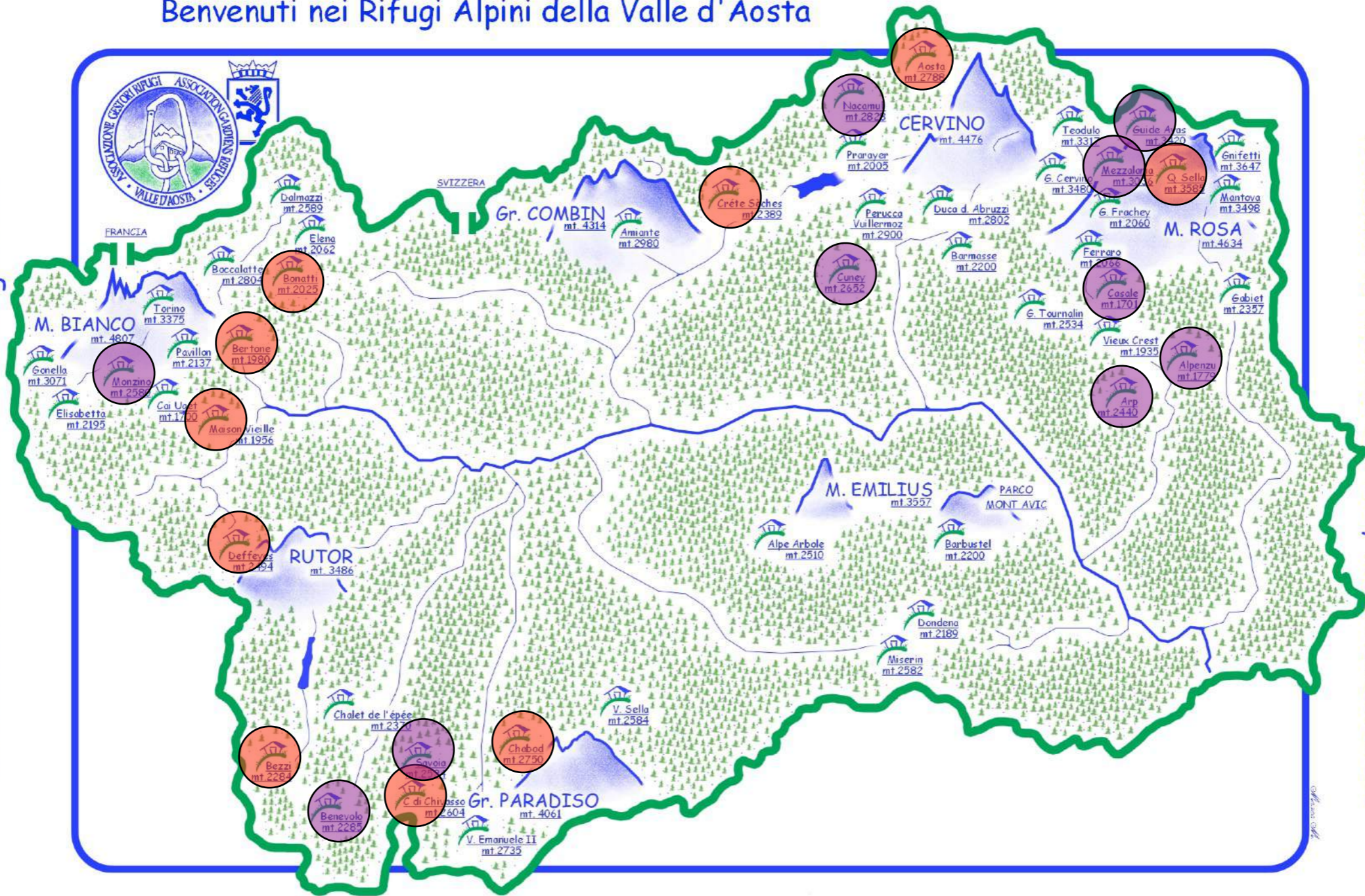
Aosta mt.2788

Nacamuli mt.2818

CERVINO mt.4476

Teodulo mt.3317

Guide Ayas mt.3420

Gnifetti mt.3647

Prarayer mt.2005

G. Cervino mt.3480

Mezzalama mt.3036

Q. Sella mt.3585

Mantova mt.3498

Créte Séches mt.2389

Perucca Vuillermoz mt.2900

Duca d. Abruzzi mt.2802

G. Frachey mt.2060

M. ROSA mt.4634

Gr. COMBIN mt.4314

Amiante mt.2980

Barmasse mt.2200

Ferraro mt.2066

Cuney mt.2652

G. Tournalin mt.2534

Casale mt.1701

Gabiet mt.2357

Dolmazzi mt.2589

Elena mt.2062

Baccalatte mt.2804

Bonatti mt.2025

Vieux Crest mt.1935

Alpenzu mt.1779

M. BIANCO mt.4807

Torino mt.3375

Pavillon mt.2137

Bertone mt.1980

Arp mt.2440

Gonella mt.3071

Monzino mt.2580

Cai Uget mt.1760

Maison Vieille mt.1956

Elisabetta mt.2195

M. EMILIUS mt.3557

PARCO MONT AVIC

Deffeyes mt.2494

RUTOR mt.3486

Alpe Arbole mt.2510

Barbustel mt.2200

Dondena mt.2189

Miserin mt.2582

Chalet de l'épée mt.2321

V. Sella mt.2584

Bezzi mt.2284

Savoia mt.2....

Chabod mt.2750

Benevolo mt.2285

C. di Chivasso mt.2604

Gr. PARADISO mt.4061

V. Emanuele II mt.2735

Benvenuti nei Rifugi Alpini della Valle d'Aosta

ASSOCIAZIONE GESTORI RIFUGI · VALLE D'AOSTA · GARDIENS REFUGES

FRANCIA

SVIZZERA

Aosta mt.2788

Nacamuli mt.2828

CERVINO mt.4476

Prarayer mt.2005

Teodulo mt.3317

Guide Aya mt.34..

Gnifetti mt.3647

Créte Séche mt.23..

G. Cervino mt.3480

Mezzalama mt.3036

Q. Sella mt.3585

Mantova mt.3498

Gr. COMBIN mt.4314

Amiante mt.2980

Perucca Vuillermoz mt.2900

Duca d. Abruzzi mt.2802

G. Frachey mt.2060

M. ROSA mt.4634

Dalmazzi mt.2589

Elena mt.2062

Boccalatte mt.280..

Bonatti mt.2025

Cuney mt.2652

Barmasse mt.2200

Ferraro mt.2066

Casale mt.1701

Gabiet mt.2357

M. BIANCO mt.4807

Torino mt.3375

Pavillon mt.2137

Bertone mt.1980

G. Tournalin mt.2534

Vieux Crest mt.1935

Alpenzu mt.1779

Gonella mt.3071

Monzino mt.2590

Cai Uget mt.1760

Maison Vieille mt.195..

Arp mt.2440

Elisabetta mt.2195

M. EMILIUS mt.3557

PARCO MONT AVIC

Deffeyes mt.2494

RUTOR mt.3486

Alpe Arbole mt.2510

Barbustel mt.2200

Dondena mt.2189

Miserin mt.2582

Cholet de l'épée mt.23..

V. Sella mt.2584

Chabod mt.2750

Bezzi mt.2284

Savoia mt.25..

C. di Chivasso mt.2604

Gr. PARADISO mt.4061

Benevolo mt.2285

V. Emanuele II mt.2735

R. Beltramo B. Cuzzolin

**Manuale-tipo
per la realizzazione
di un Sistema di gestione ambientale
dei Rifugi di montagna**

Manuel type pour la réalisation
d'un Système de management environnemental
des Refuges de montagne

Manual for the implementation
of an environmental management system
for Mountain Refuges

Editions L'Eubage

ASSOCIAZIONE GESTORI RIFUGI · VALLE D'AOSTA

DIPARTIMENTO DI SCIENZE MERCEOLOGICHE

GRIVEL MONT BLANC

2002 Anno Internazionale delle MONTAGNE COMITATO ITALIANO

Regione Autonoma Valle d'Aosta
Région Autonome Vallée d'Aoste
Presidenza della Regione
Présidence de la Région
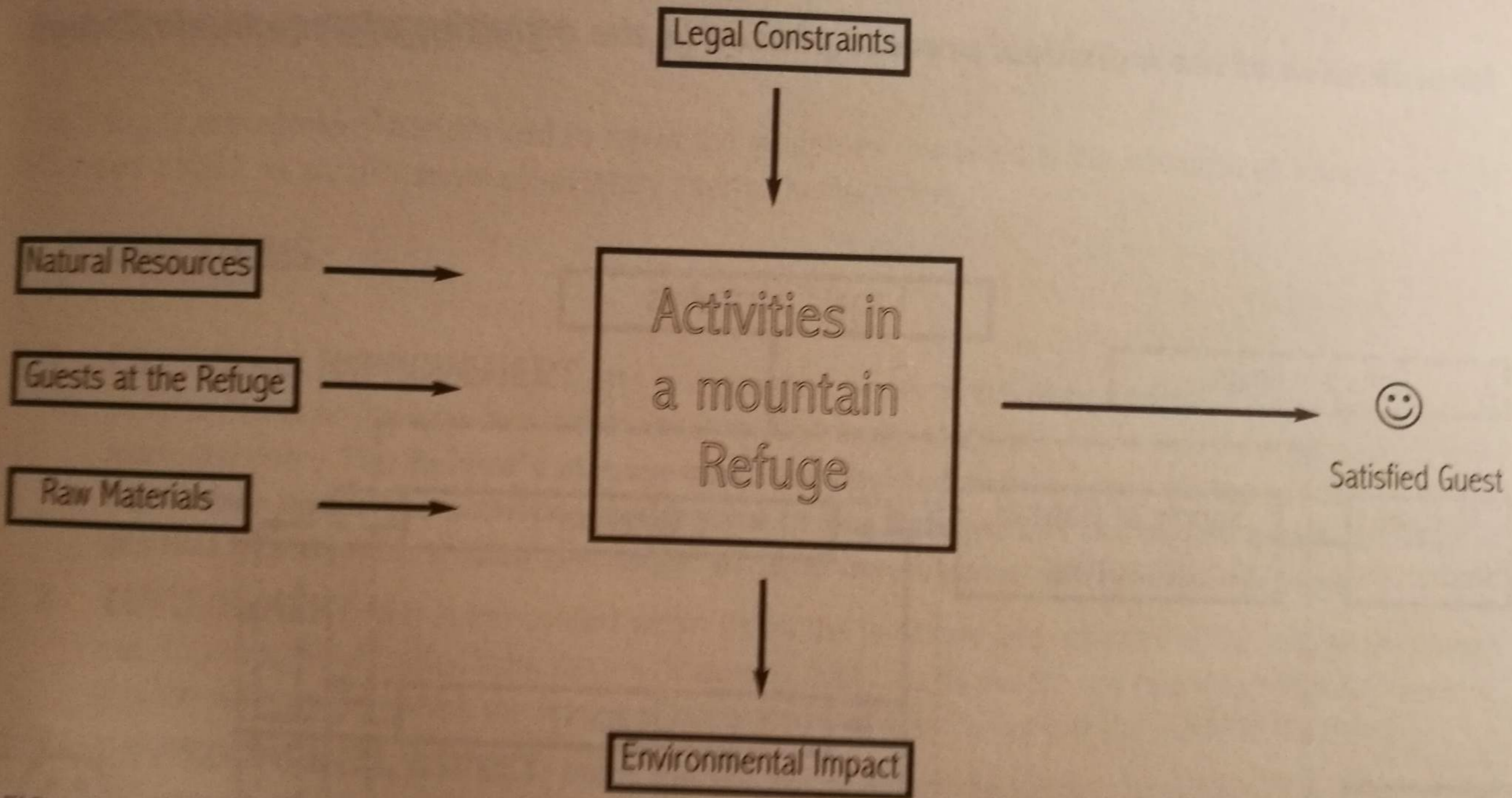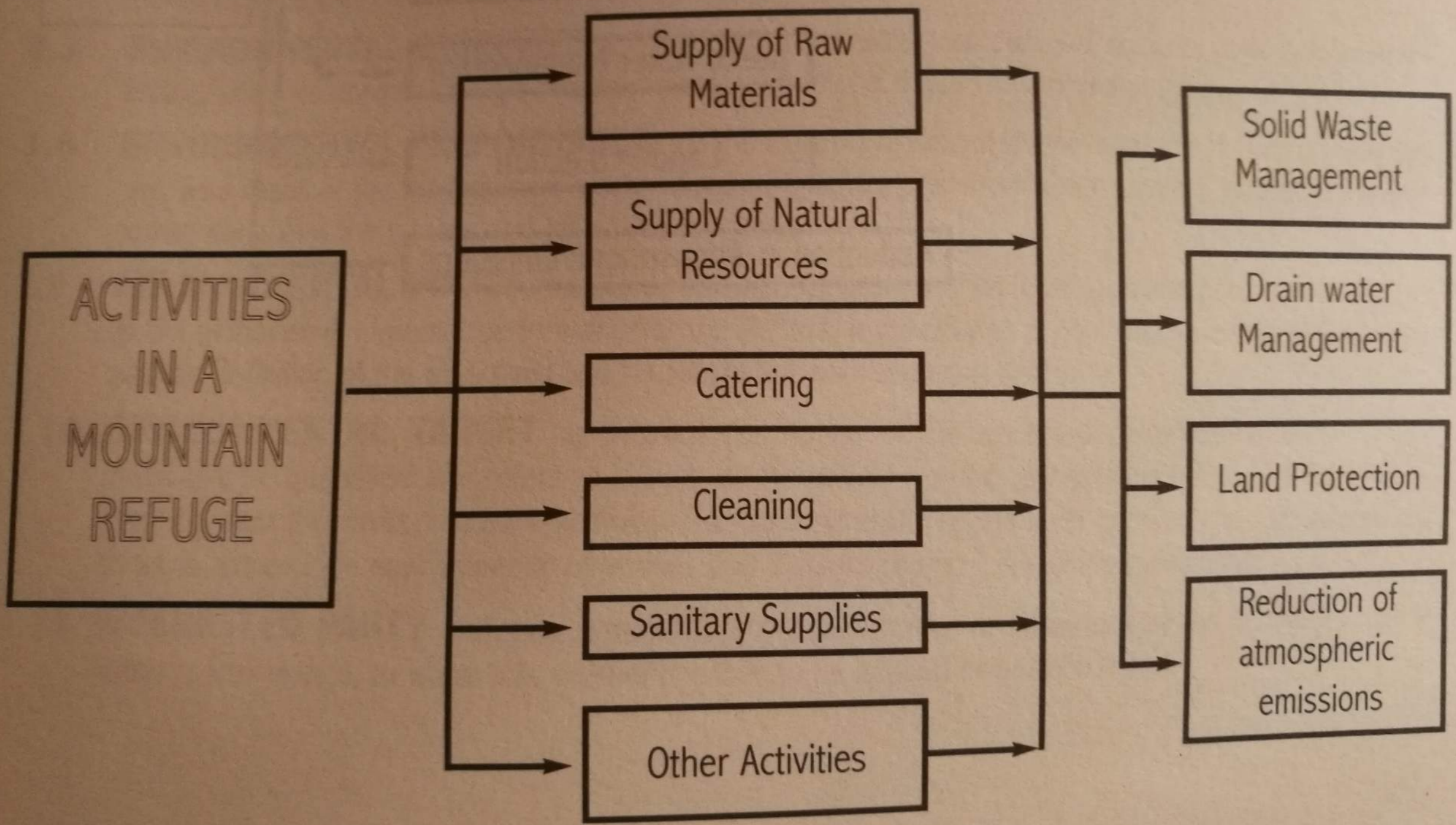
Legal Constraints

Natural Resources →
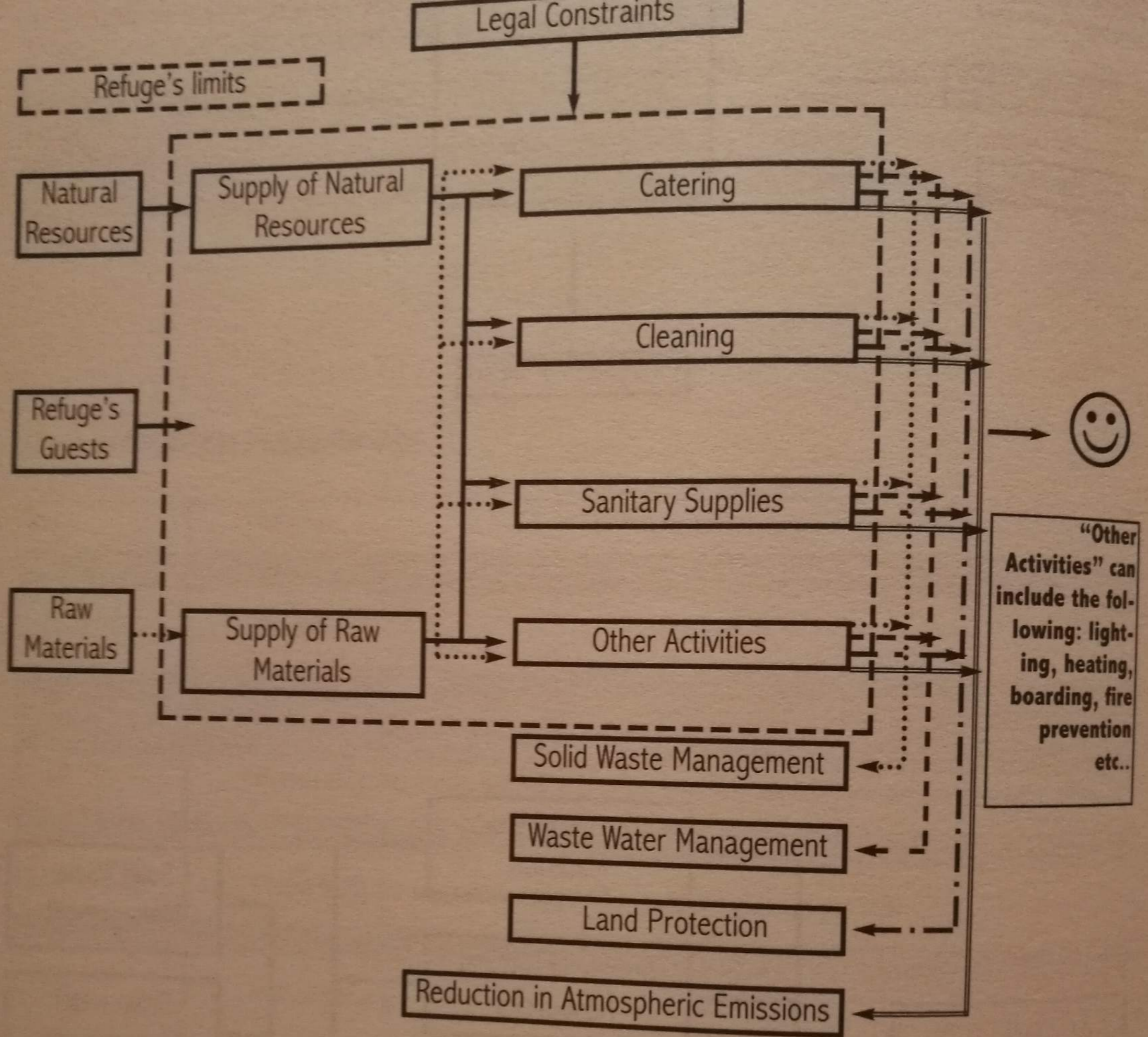
Guests at the Refuge →

Raw Materials →

Activities in a mountain Refuge

→ ☺ Satisfied Guest

Environmental Impact

FIG. 1.2

ACTIVITIES IN A MOUNTAIN REFUGE
- Supply of Raw Materials
- Supply of Natural Resources
- Catering
- Cleaning
- Sanitary Supplies
- Other Activities

- Solid Waste Management
- Drain water Management
- Land Protection
- Reduction of atmospheric emissions

FIG. 1.3

Legal Constraints

Refuge's limits

Natural Resources → Supply of Natural Resources → Catering

Cleaning

Refuge's Guests

Sanitary Supplies

Raw Materials → Supply of Raw Materials → Other Activities

Solid Waste Management

Waste Water Management

Land Protection

Reduction in Atmospheric Emissions

"Other Activities" can include the following: lighting, heating, boarding, fire prevention etc..

UNION EUROPÉENNE

alcotra

Qualification de l'offre des refuges de montagne
pour un tourisme durable
en Vallée d'Aoste et Pays de Savoie

Programme Interreg IIIa ALCOTRA *Projet Refuges N°192*

GUIDE TECHNIQUE

ÉNERGIE
EN SITE ISOLÉ D'ALTITUDE

Sous la direction de Gérard NICOUD

P. Boldo / G. Nicoud

R. Beltramo / S. Duglio

UNION EUROPÉENNE

alcotra

Qualification de l'offre des refuges de montagne
pour un tourisme durable
en Vallée d'Aoste et Pays de Savoie

Programme Interreg III ALCOTRA *Projet Refuges N°192*

GUIDE TECHNIQUE

ASSAINISSEMENT
EN SITE ISOLÉ D'ALTITUDE

Sous la direction de Gérard NICOUD

P. Boldo / G. Nicoud

R. Beltramo / S. Duglio

UNION EUROPÉENNE

alcotra

Qualification de l'offre des refuges de montagne
pour un tourisme durable
en Vallée d'Aoste et Pays de Savoie

Programme Interreg III ALCOTRA *Projet Refuges N°192*

GUIDE TECHNIQUE

ALIMENTATION EN EAU
EN SITE ISOLÉ D'ALTITUDE

Sous la direction de Gérard NICOUD

P. Boldo / G. Nicoud

R. Beltramo / S. Duglio

2003

Sagarmatha National Park

Nepal

Let's write a list of five
enterprises (and products)
which operates in mountain areas
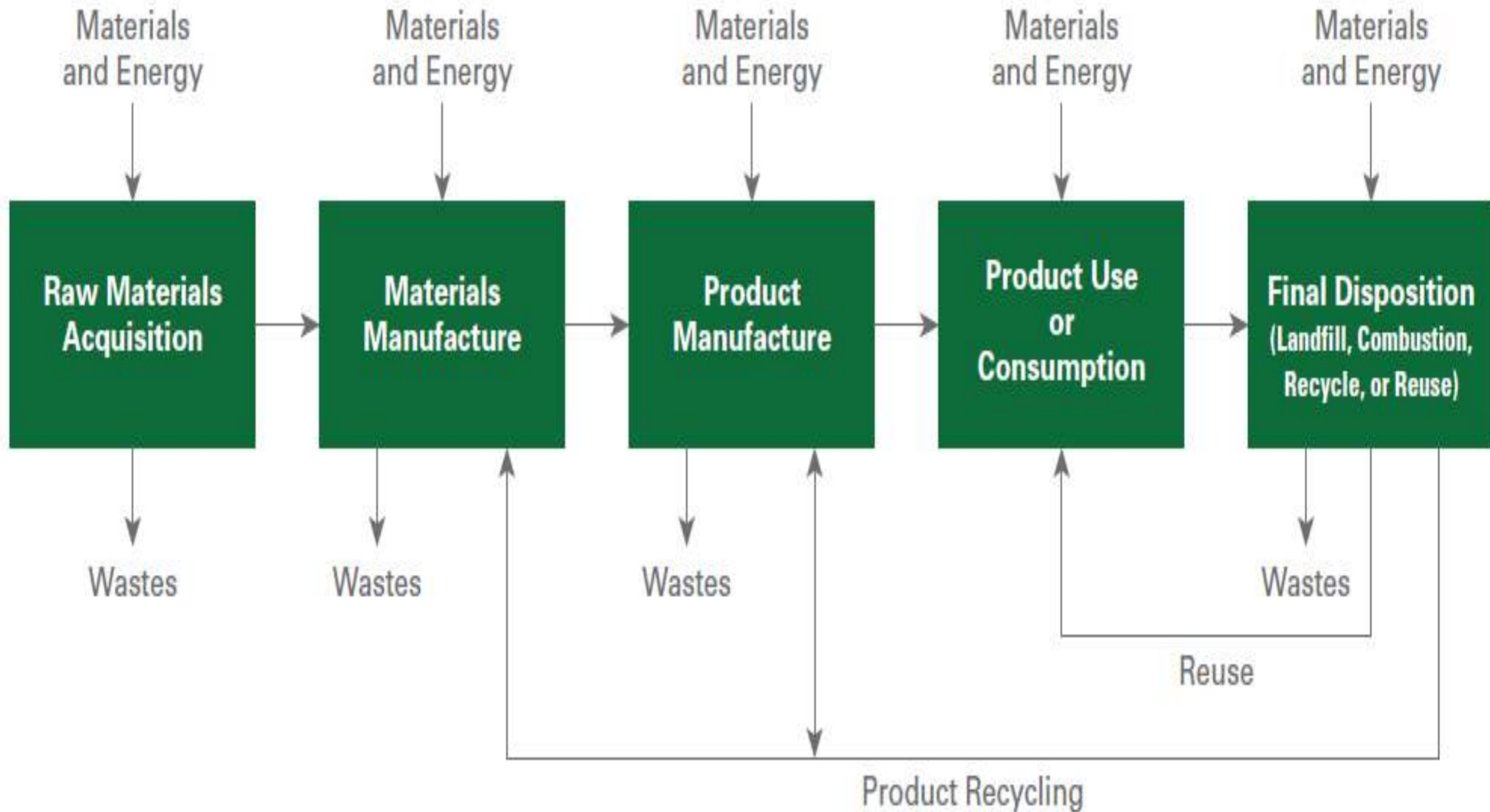
**Itinerari turistici
alla scoperta delle Eccellenze d'impresa**

Let's choose a productive cycle and draw processes, with inputs, outputs and byproducts

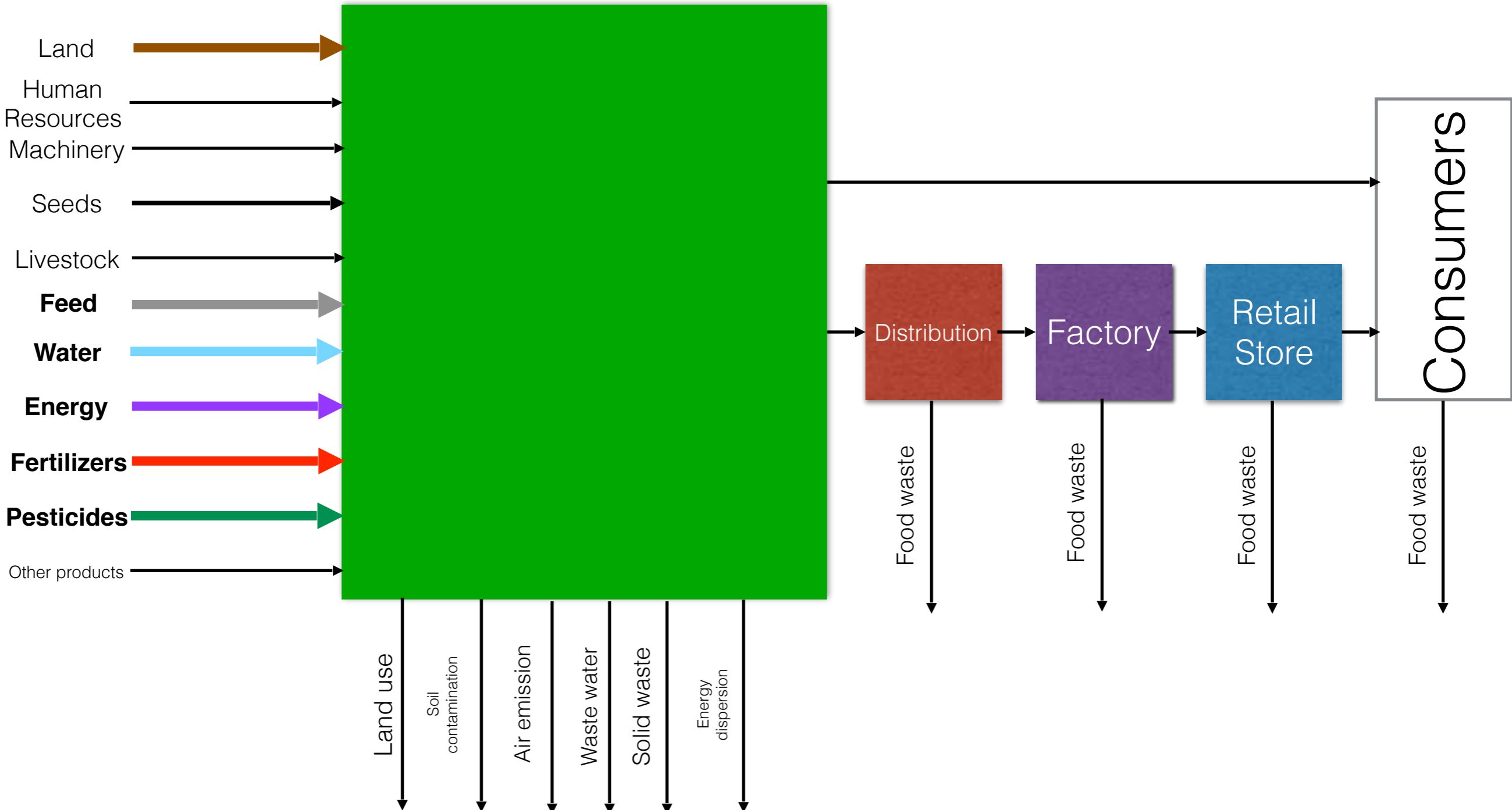# The product life cycle

Some analytical tools based on LC

- Ecological footprint
- Environmental extended Input-output analysis
- Material flow accounting
- Environmental Risk Assessment
- Life cycle costing
- Life cycle Assessment (S-LCA, O-LCA, LCSA)
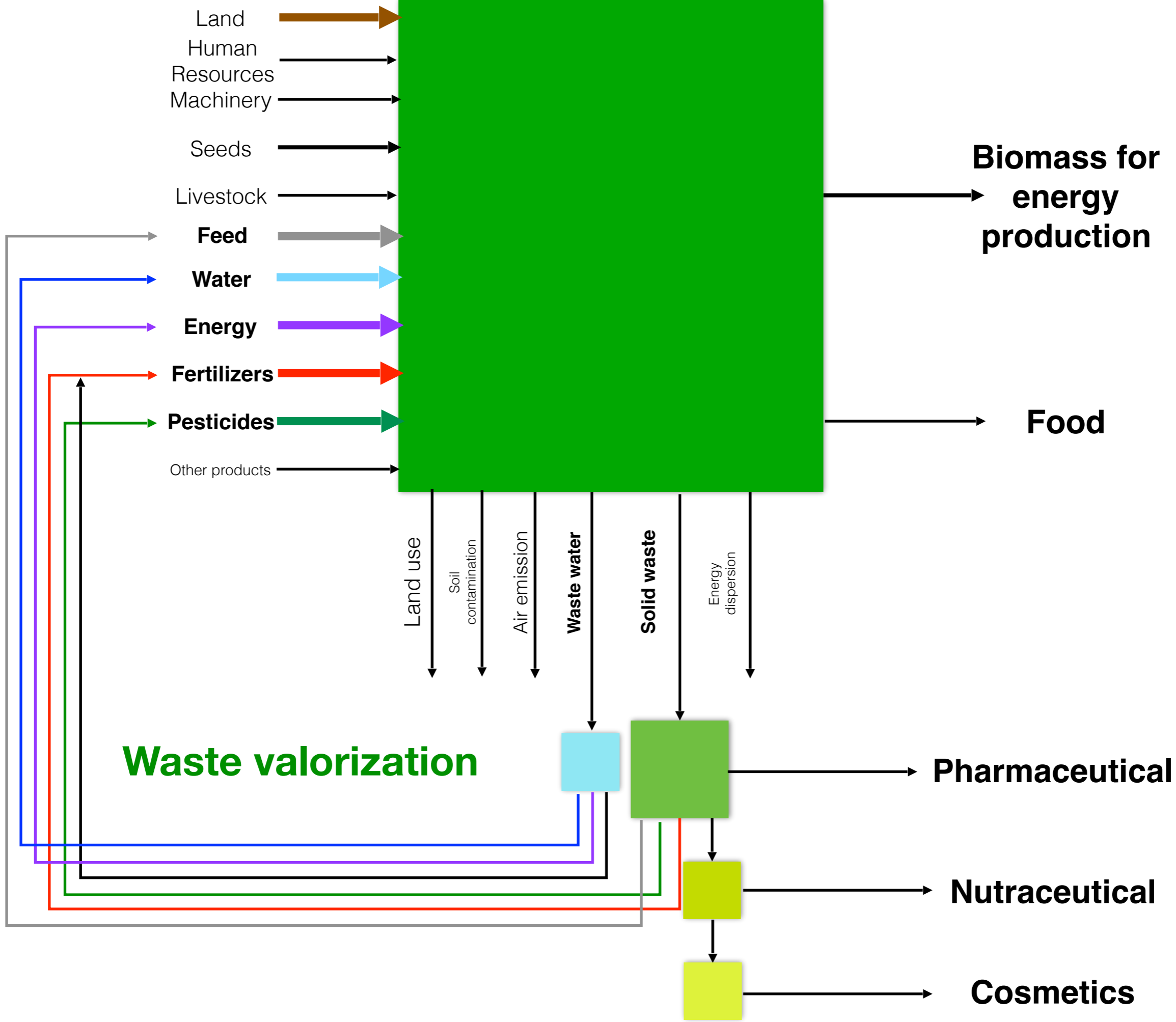- Carbon footprint
- Water footprint
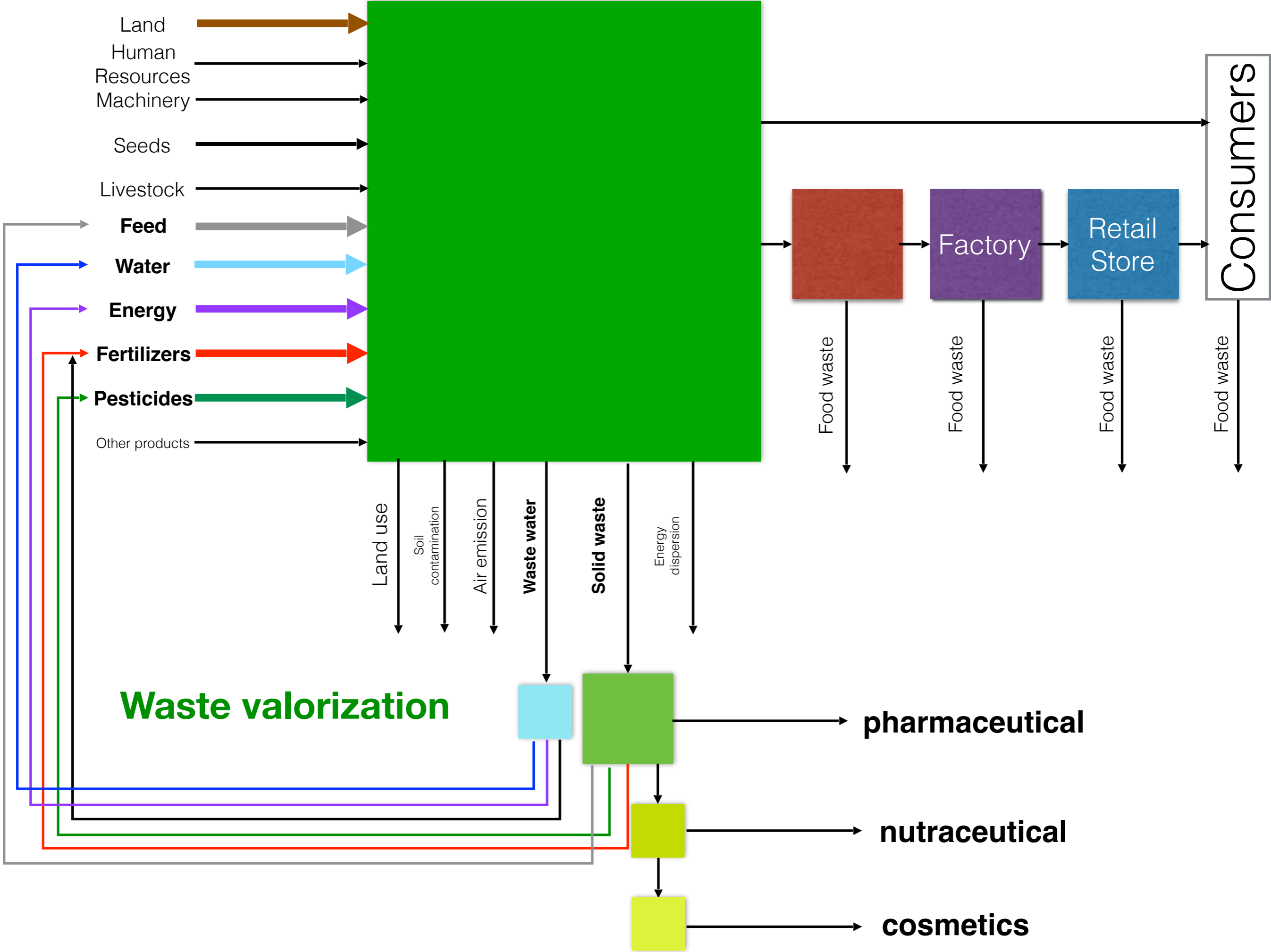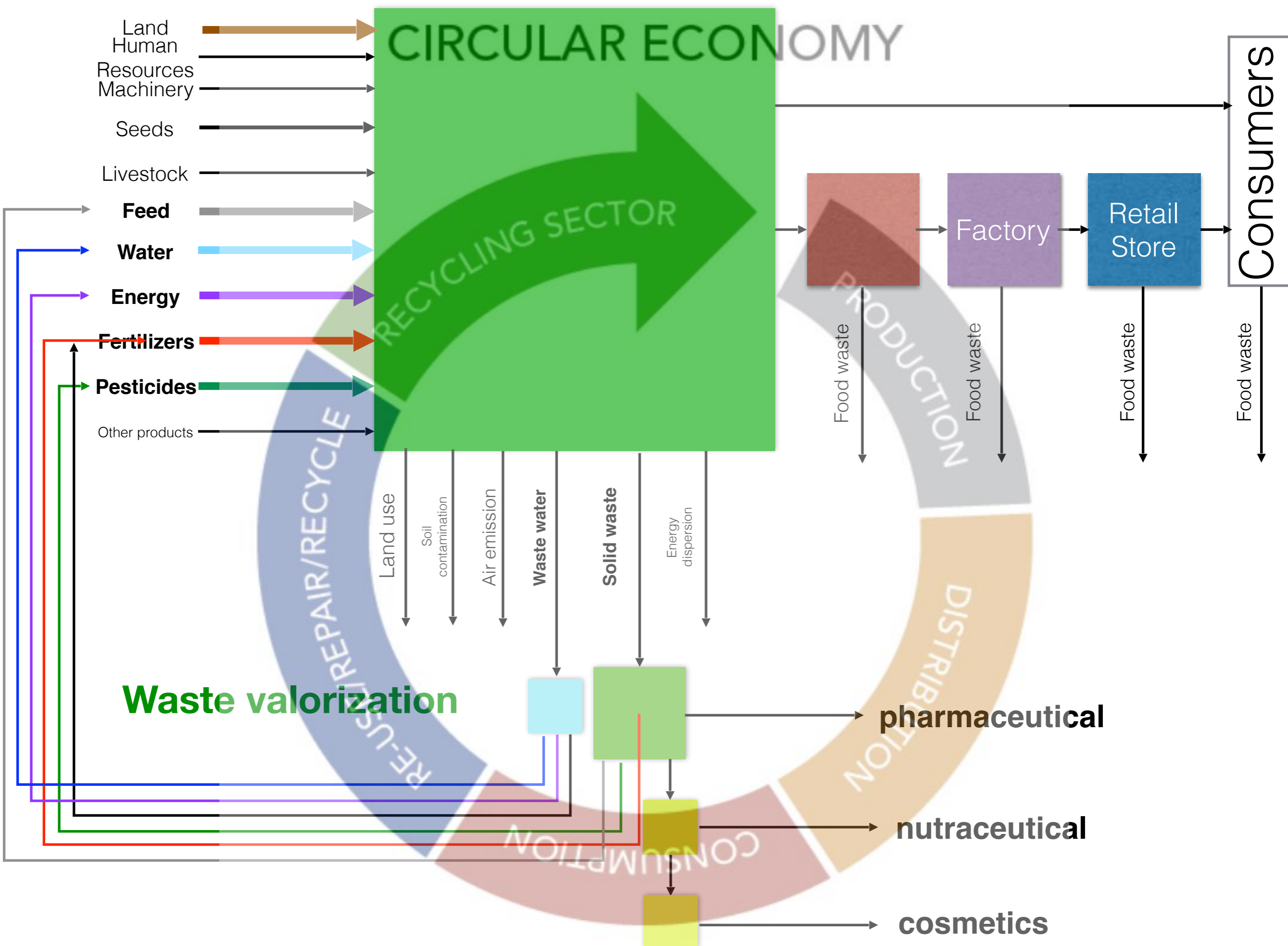
Communication tools: ecolabels

LINEAR ECONOMY

RESOURCE EXTRACTION · PRODUCTION · DISTRIBUTION · CONSUMPTION · WASTE

Land

Human Resources

Machinery

Seeds

Livestock

Feed

Water

Energy

Fertilizers

Pesticides

Other products

Distribution

Factory

Retail Store

Consumers

Food waste

Food waste

Food waste

Food waste

Land use

Soil contamination

Air emission

Waste water

Solid waste

Energy dispersion

global food loss and waste

Inputs (left side): Land, Human Resources, Machinery, Seeds, Livestock, **Feed**, **Water**, **Energy**, **Fertilizers**, **Pesticides**, Other products

Outputs (bottom): Land use, Soil contamination, Air emission, Waste water, **Solid waste**, Energy dispersion

Supply chain: Distribution → Factory → Retail Store → Consumers

Food waste (at each stage)

100 kilograms per person per year

Current estimates put **global food loss and waste** between **one-third and one-half** of all food produced. **Loss and wastage occurs at all stages of the food supply chain or value chain.** In **low-income countries**, most loss occurs during **production**, while in **developed countries** much food – about 100 kilograms per person per year – is wasted at the **consumption stage**.

http://www.fao.org/food-loss-and-food-waste/en/, http://www.huffingtonpost.co.uk/2013/01/10/food-waste-half-of-all-fo_n_2445022.html, http://large.stanford.edu/courses/2012/ph240/briggs1/docs/mb060e00.pdf
https://en.wikipedia.org/wiki/Food_waste

Land

Human
Resources

Machinery

Seeds

Livestock

Feed

Water

Energy

Fertilizers

Pesticides

Other products

Land use

Soil contamination

Air emission

Waste water

Solid waste

Energy dispersion

Waste valorization

Consumers

Factory

Retail Store

Food waste

Food waste

Food waste

Food waste

pharmaceutical

nutraceutical

cosmetics

2005 - 2008

Mountain Huts
Valle d'Aosta

Interreg III A Alcotra n. 192:
Qualification of the high mountain huts offer for sustainable tourism
in Valle d'Aosta and the two Savoie

Saveurs du
VAL D'AOSTE
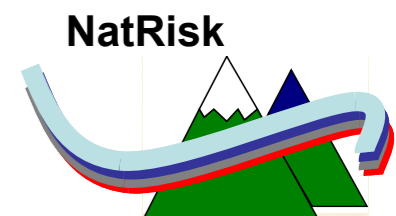
V.E.T.T.A. – *Valorization of Experiences and Transfrontier Tourism products at medium and high Altitude* – is a strategic Project for cross-border cooperation between Italy and Switzerland

Riccardo Beltramo, Stefano Duglio

- **Partners**

Italy

Switzerland

Regione Piemonte - Lead Partner

Regione Lombardia

ERSAF

Provincia di Bolzano

Italian Alpine Club

Canton Grigioni

Canton Ticino

Polo di Poschiavo

Riccardo Beltramo, Stefano Duglio
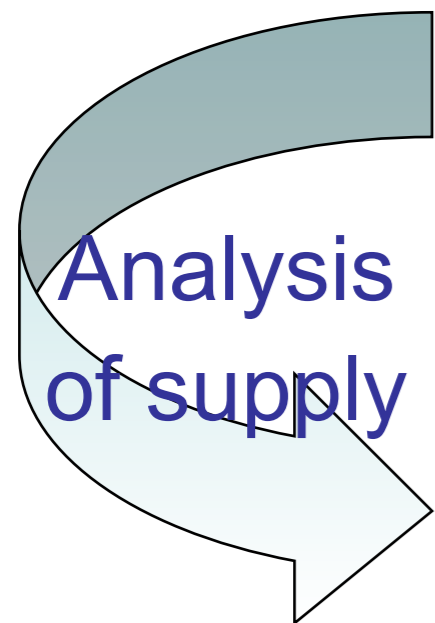
General aim

The general objectives of the V.E.T.T.A. Project partners include improvement, promotion and valorisation of tourist services of mountain valleys within the pilot area, in order to assure practices of sustainable mountain tourism.

Riccardo Beltramo, Stefano Duglio

Area (Verbano-Cusio-Ossola)

Riccardo Beltramo, Stefano Duglio

"The three bottom lines"

UNIVERSITÀ DEGLI STUDI DI TORINO
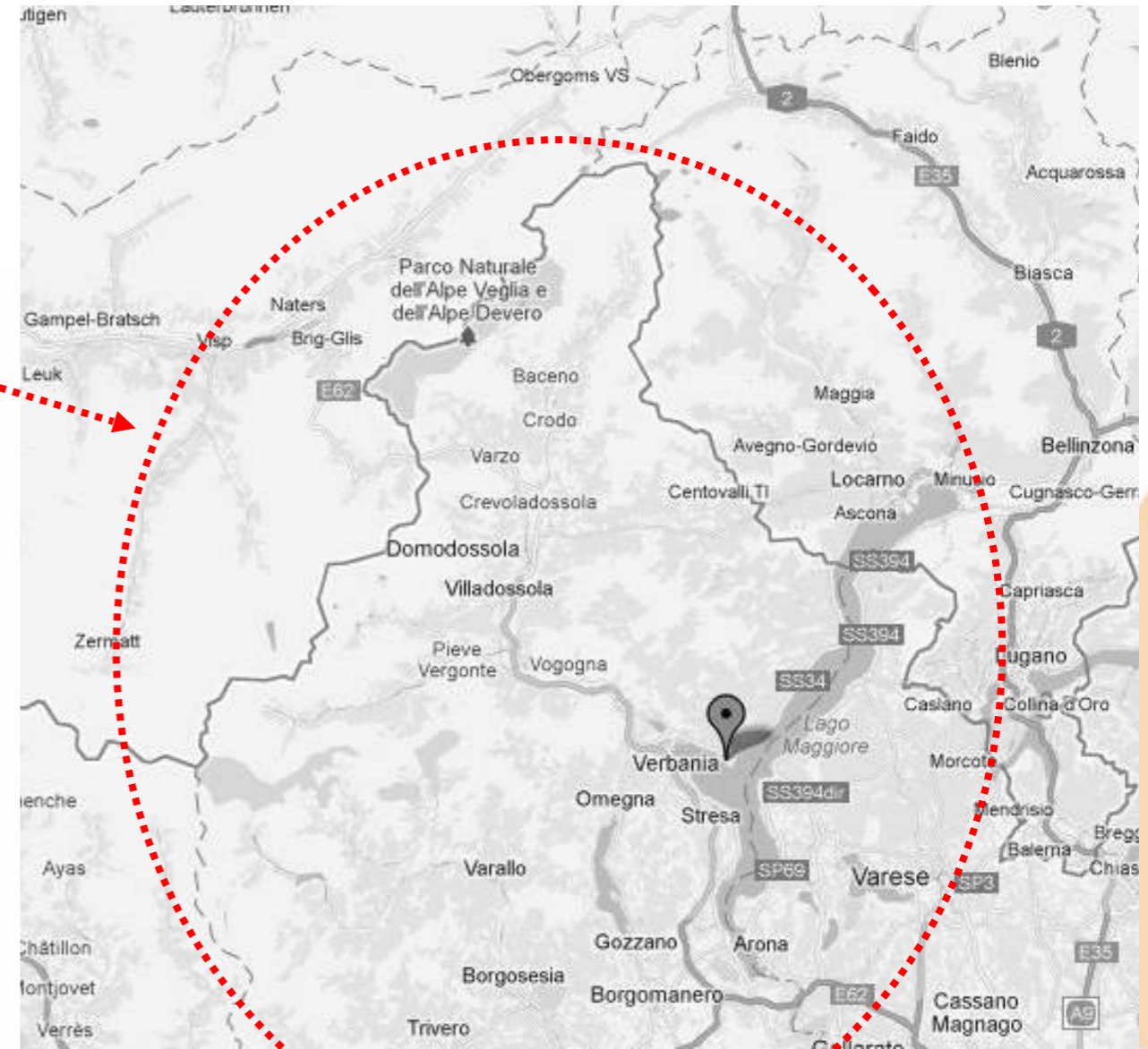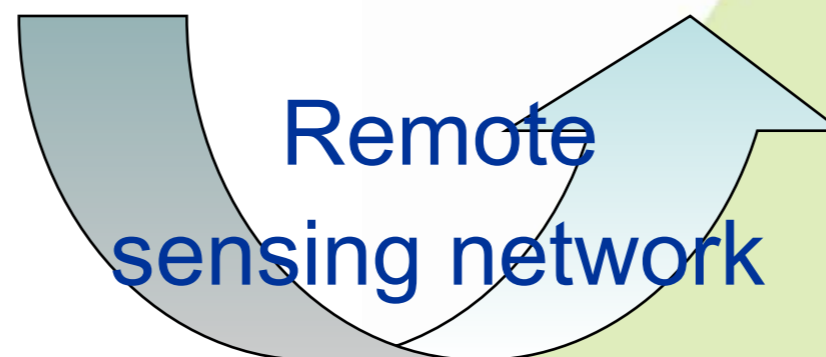
Analysis
of supply

Quality
Charter

Remote
sensing network

Riccardo Beltramo, Stefano Duglio

1.a. Analysis of supply

- 110 references (books and reports)
- 1.200 interviews
  - 381 interviews (summer 2010)
  - 433 interviews (summer 2011)
  - 400 interviews (summer 2012)
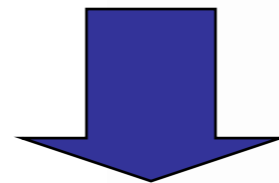
In order to understand the perception of the quality of service as expressed by mountain huts in the target area.

Riccardo Beltramo, Stefano Duglio
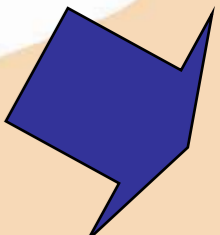
Methodology for the characterisation of the mountain huts and for the collecting, updating and communication of the information on their management

Structural and technological equipment

Interconnections between

Management of mountain hut

Riccardo Beltramo, Stefano Duglio

The inspection checklist and its structure

General

    General features

    Accessibility and environmental conditions

Technological facilities

    Management of water cycle

    Production of electricity and heat

    Equipment

Building type

    Description

    Impact on the landscape

Management of environmental variables

    Transportation of materials

    Waste management

Supply of tourist activities

Riccardo Beltramo, Stefano Duglio

Riccardo Beltramo, Stefano Duglio

ANALYSIS of the MOUNTAIN HUTS
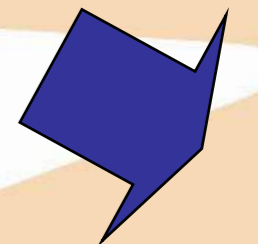
Mountain hut	Place	Altitude (m)	Accessibility	Manager	Beds
3A	Formazza Valley	2,910	On foot	Yes	80
Al Cedo	Vigezzo Valley	1,560	On foot	No	22
Alpe la Colma	Antrona Valley	1,570	On foot	Yes	12
Alpe Laghetto	Bognanco Valley	2,039	On foot	Yes	24
Andolla	Antrona Valley	2,061	On foot	Yes	59
Baita Omegna	Mottarone	1,350	By car	Yes	18
Bim-se "Al lago"	Formazza Valley	1,800	By car	Yes	21
Blitz	Vigezzo Valley	1,250	On foot	Yes	4
Bonasson	Vigezzo Valley	1,925	On foot	No	16
Brusa-Perona	Ornavasso	1,535	On foot	Yes	20
Cà Bianca del Minatore	Pieve Vergonte	780	On foot	No	20
CAI Saronno	Anzasca Valley	1,827	By cableway and on foot	No	24
Castiglioni	Devero Valley	1,640	On foot	Yes	24
Città di Arona	Divedro Valley	1,750	On foot	Yes	68
Città di Busto	Formazza Valley	2,480	On foot	Yes	50
Città di Novara	Antrona Valley	1,474	By car	Yes	24
Claudio e Bruno	Formazza Valley	2,713	On foot	Yes	60
Crosta	Divedro Valley	1,751	On foot	Yes	24
Fantoli	Grande Valley	1,000	On foot	Yes	12
Gattascosa	Bognanco Valley	1,993	On foot	Yes	25
Greppi	Vigezzo Valley	1,915	By cableway and on foot	No	6
Il Dosso	Bognanco Valley	1,740	On foot	Yes	24
La Stria Rusa dal Blitz	Vigezzo Valley	1,270	On foot	Yes	8
Margaroli	Formazza Valley	2,194	By cableway and on foot	Yes	46
Maria Luisa	Formazza Valley	2,157	On foot	Yes	70
Mores	Formazza Valley	2515	On foot	Yes	25
Monte Vecchio	Cannobina Valley	1094	On foot	No	30
Myriam	Formazza Valley	2,050	By cableway and on foot	Yes	50
Nigritella	Vigezzo Valley	1,491	On foot	Yes	6
Oberto-Maroli	Anzasca Valley	2,796	By cableway	Yes	24
Parpinasca	Vigezzo Valley	1,210	On foot	Yes	22
Pian Cavallone	Grande Valley	1,530	On foot	Yes	25
Regi Forno	Vigezzo Valley	1,888	On foot	No	13
San Bernardo	Bognanco Valley	1,630	By car	Yes	16
Sesto Calende	Devero Valley	1,630	By car	No	20
Somma Lombardo	Formazza Valley	2,561	On foot	Yes	26
Wengwald Hutte	Anzasca Valley	1,827	By cableway	Yes	12
Zamboni-Zappa	Anzasca Valley	2,070	On foot	Yes	36
Zeus	Antigorio Valley	781	By car	Yes	35
Zum Gora	Antigorio Valley	1,509	On foot	Yes	10

1,111 beds
Average: 28

Average Altitude:
1,780 m

Riccardo Beltramo, Stefano Duglio

Technological facilities

Riccardo Beltramo, Stefano Duglio

Building type

C. Technological system   keyw
[…]
2. Closing ◊
[…]

2.3 Roof

2.3.1 Roof types ◊

2.3.1 ... Rarity, singularity, representativeness

2.3.1 ...

2.3.1 ... conv...

2.3.1 ... circu...

2.3.1.5 Translucid/sunroof elements◊

2.3.1.5.1 Dormer ◊
2.3.1.5.2 Skylight ◊
2.3.1.5.3 Hatch ◊
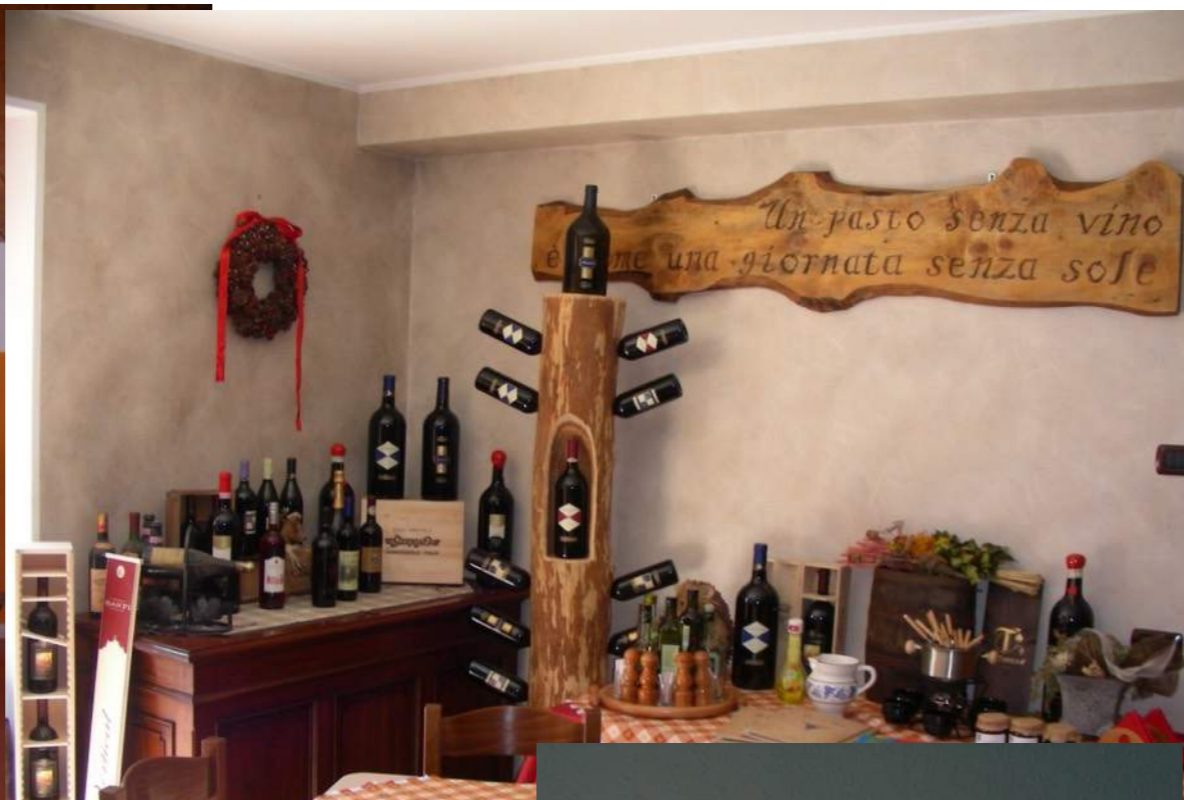
Visual quality assessment of the landscape unit

Visua

Landform features

Symbolic role

Vegetation

Water features

Rarity, singularity, representativeness

Impact of a territorial scale, panoramic character

Color, variety, contrast

Signs of territorial organization

Built environment

Transformations and deformations

ckness. [cm]:
ckness [cm]:5
ckness. [cm]:

■ **Highest value**
■ **Hut Andolla**

1.4.1.1.1 Concrete/brick
1.4.1.1.2 Stone
1.4.1.1.3 Metal/Aluminum
1.4.2.1.1 Concrete/brick
1.4.2.1.2 Stone
2.3.1.4.2.1.3 Metal/Aluminum

Riccardo Beltramo, Stefano Duglio

Riccardo Beltramo, Stefano Duglio

2. The Quality Charter

The structure

First section
Legal requirements

+

Second section
The service

+

Third section
Environmental compatibility

=

Quality Charter

National Label

Riccardo Beltramo, Stefano Duglio
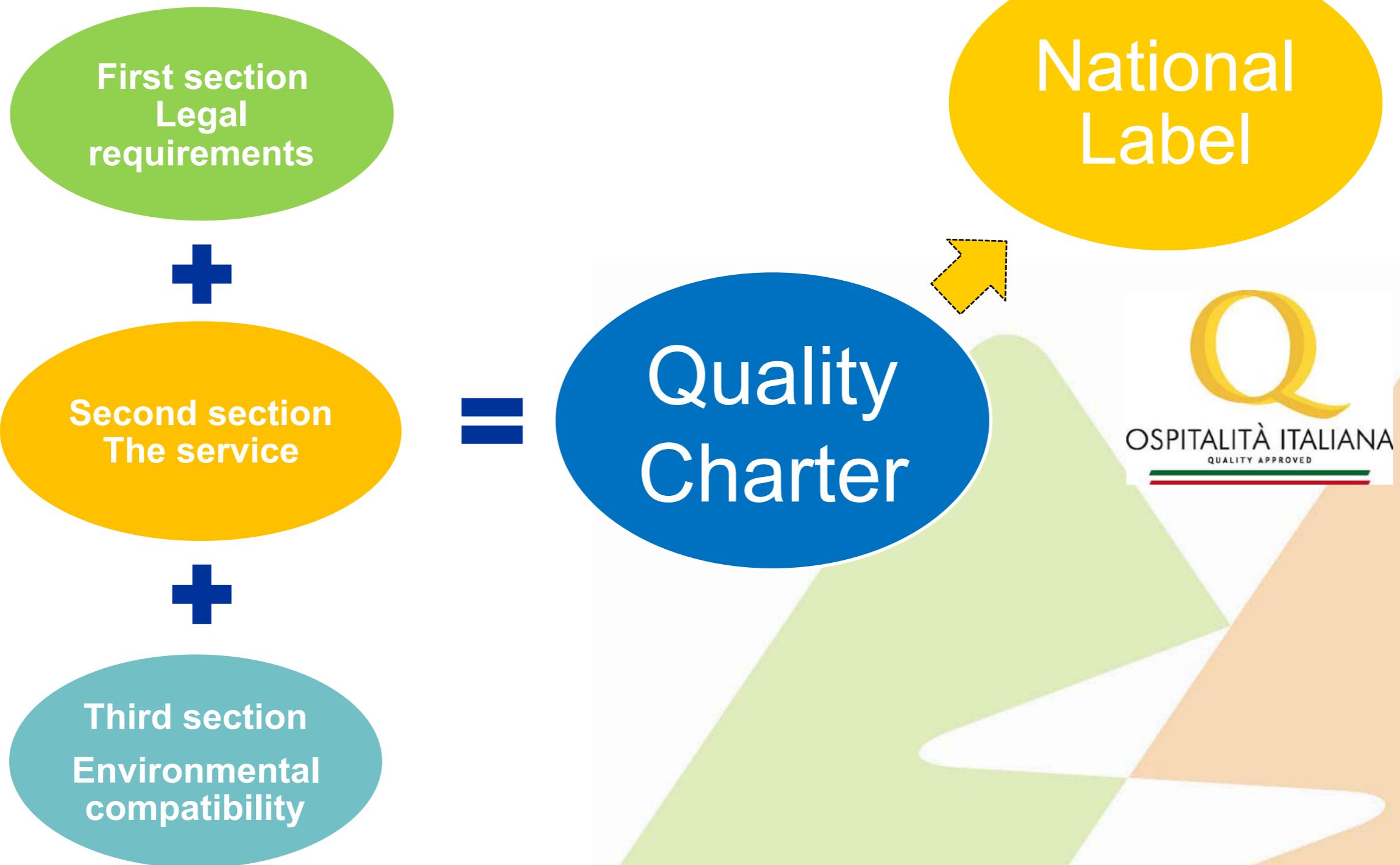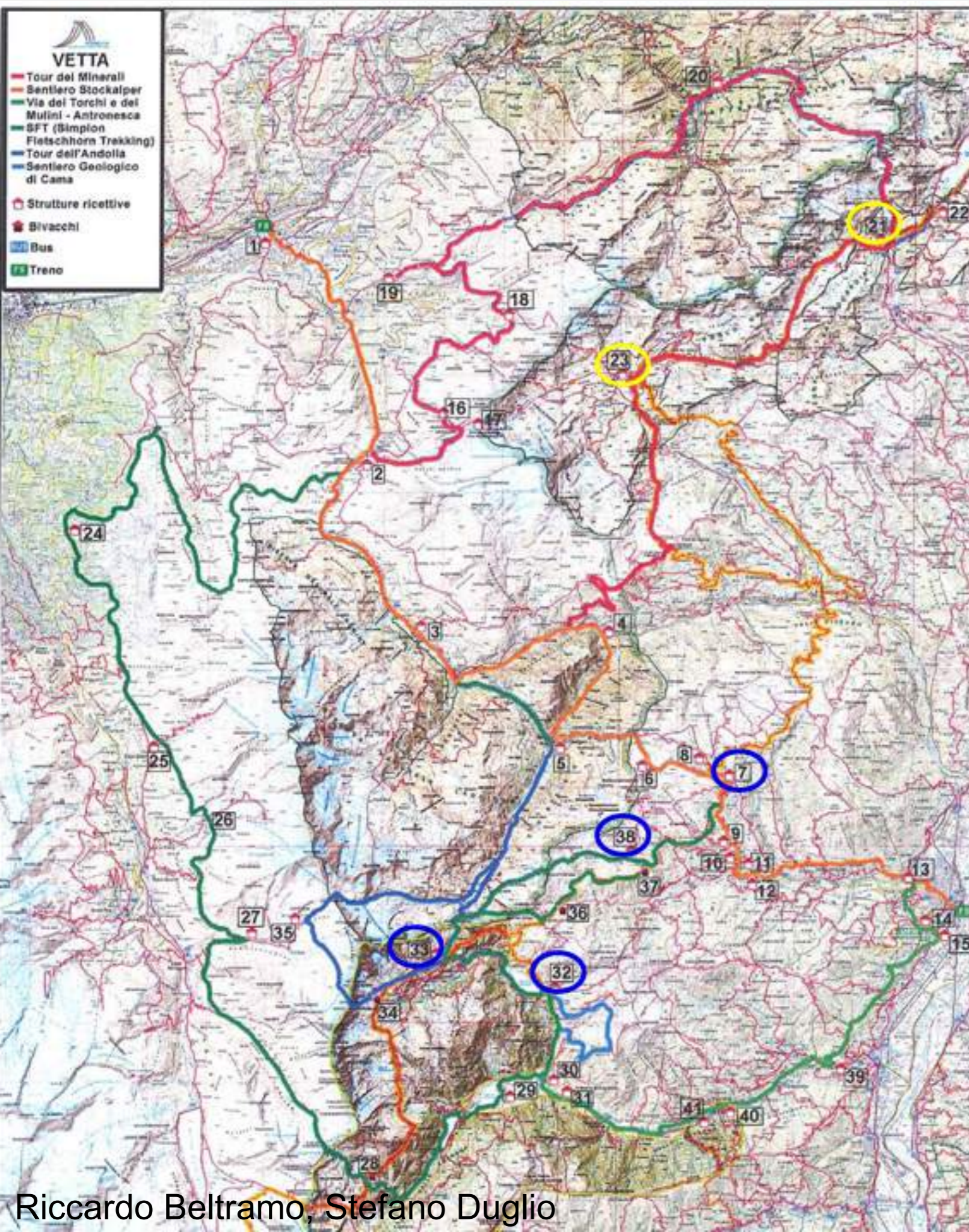
In 2010 The
Quality Charter
was tested in 6
mountain huts:

21. Castiglioni

23. Città di Arona

7. San Bernardo

38. Alpe il laghetto

32. Città di Novara

33. Andolla

On historical mountain path
between Italy and Switzerland

Riccardo Beltramo, Stefano Duglio

UNIVERSITÀ DEGLI STUDI DI TORINO

UNIVERSITÀ DEGLI STUDI DI TORINO

The Italian mountain huts with the Q label in VCO

OSPITALITÀ ITALIANA
QUALITY APPROVED

Città di Novara

Andolla

Castiglioni

Alpe il Laghetto

San Bernardo

Stria Rusa dal Blitz

Bim-se

Città di Busto

Zamboni-Zappa

Riccardo Beltramo, Stefano Duglio

Optional Quality Term «Mountain Product»: A pathway to success?

Regulation EU n. 1151/2012

The latest European Regulation on quality schemes i.e. "quality package" for agricultural products and foodstuffs, **underlines** the importance of **consolidated voluntary certification schemes** on Origin and Geographical Indications and Traditional Specialities i.e.:

- Protected *Designation* of *Origin (PDO),*

- *Protected Geographical* Indication (PGI),

- *Traditional Speciality Guaranteed* (TSG)

and **confirms the importance of origin specifically for rural areas.**

Moreover, The European Parliament drew attention to the need for the enhancement of mountain and insular areas and established the "Optional quality terms"

Optional Quality Term
"Mountain Product"

The **OQT "Mountain Product"** has been introduced by European Legislation with the aim of the valorization of the foodstuffs produced in mountain areas.

This term was coined to provide an instrument that mountain workers may apply to the agrifood market.

The EU definition of "Mountain" is contained in the Regulation EC n. 1257/1999 (Article 18).

Delegated Regulation EU n. 665/2014

The Delegated Regulation EU n. 665/2014 detailed the "quality package" instructions and defined the conditions of use of the Optional Quality Term MP.

It took into consideration France, Switzerland and Italy's experience in this field.

According to the current orientation, this optional term provides for a **labelling scheme that allows the term MP to be used by agrifood operators to promote their qualified production.**

Life in mountain: Milk and cheese are supplied from animals reared for at least the last two thirds of their life in those mountain areas, if the products are processed in such areas; or, by way of derogation, products made from transhumant animals that have been reared for at least one quarter of their life in transhumance pastures in mountain areas.

Fodder: With regard to ruminants, the Regulation also states that feedstuffs for farm animals can be considered to come essentially from mountain areas if *"the proportion of the annual animal diet that cannot be produced in mountain areas, expressed as a percentage of dry matter, (…) does not exceed 40%"*.

Production process: the processing of milk and milk products may also be performed outside of mountain areas, provided that the distance from the mountain area in question does not exceed 30 kilometres. It is left to individual Member States to decide whether to implement all or part of this derogation.

RESEARCH QUESTIONS

1: *what perception do cheese producers have of the term OQT "Mountain product"?*

2: *could the adoption of the term OQT "Mountain product" be useful for mountain producers to improve their business*?

Sample. The sample identified for the survey was chosen on the basis of three main factors:

- firstly, the breeding supply chain for cheese is more complex than other if the term OQT Mountain Product is to be applied, in agreement with the initial research on OQT;

- secondly, OQT is a labeling scheme and its nature requires particular attention if it is to meet the requirements;

- thirdly, a model area was defined and the Alpine Arch of North-West of Italy was chosen, as it is a territory with a strong, long-standing cheese tradition, supported by the *Summa Lacticinorum* and several recent studies have been dedicated to traditional cheese production.

METHODOLOGY: defining the sample

Sample.

Six traditional cheeses was identified i.e. *Bettelmat* or *Bettelmatt*, *Maccagno* or *Macagn*, *Toma Del Lait Brusc* or *Bianca Alpina*, *Plaisentif*, i.e. a particular kind of Toma d'Alpeggio, *Nostrale d'Alpe* and *Toumin Dal Mel*, all of which are indicated in the Italian National List (Italian Ministerial Decree - DM 350/99)

All the producers of these cheeses were selected. The sample was composed by **sixty-eight farmers**: 8 out of 68 *Bettelmat* producers, 12 out of 68 *Maccagno*, 5 out of 68 *Toumin Dal Mel*, 12 out of 68*Plaisentif*, 14 out of68 *Toma Del Lait Brusc* and 17 out of 68 were producers of *Nostrale d'Alpe*.

PERIMETRO REGIONE PIEMONTE

MACCAGNO

PLAISENTIF

TOMA D'L LAIT BRUSC

NOSTRALE D'ALPE

BETTELMATT

TOUMIN D'L MEL

Verbano-Cusio-Ossola

Como

Varese

Aosta

Biella

Monza e della B

Vercell

Novara

Milano

Torino

Pavia

Asti

Alessandria

Cuneo

Genova

Savona

Imperia
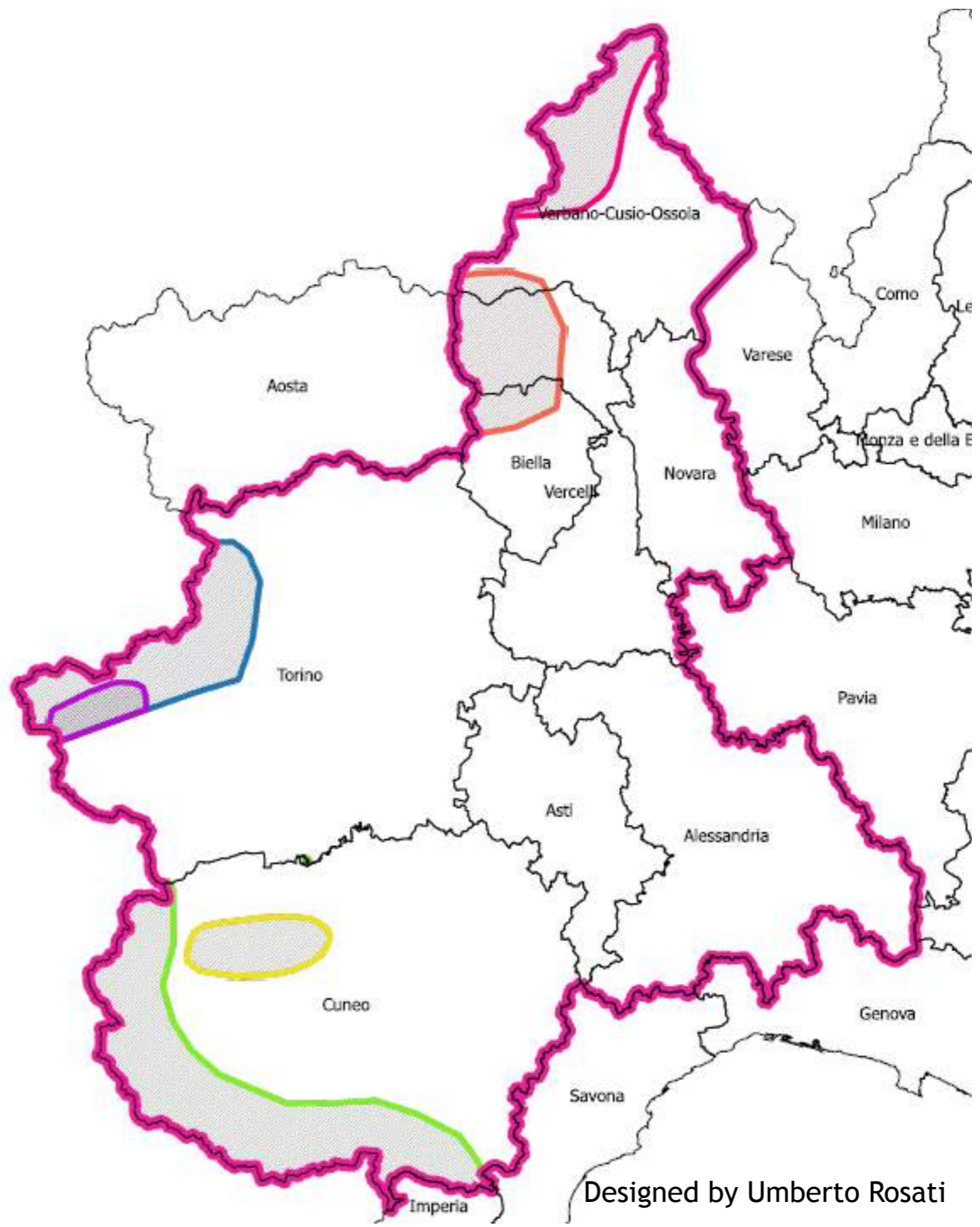
Designed by Umberto Rosati

Bettelmat is a pasture cheese, produced in the Antigorio and Formazza Valleys. It is made in the following mountain pastures: Forno and Sangiatto (the Commune of Baceno), Poiala (the Commune of Premia), Toggia, Kastel, Morasco and Vannino (the Commune of Formazza). It is a fat cheese, with semi-cooked paste obtained from whole fat milk obtained in a single milking. It is a cylindrical cheese, 8 cm high, 25-35 cm in diameter and is 4-6 kg in weight. The yellow paste, is soft and compact with the holes to the eye of partridge and the crust is smooth. The seasoning must be at least 60 days [32,33].

MACCAGNO

Maccagno is a dry-salted cheese, made from whole fat milk obtained in one or two milking, coagulated with calf rennet at 35°-37°C [34]. It's made in some Communes of the Vercelli and Novara Provinces. This cheese has a cylindrical shape with flat faces, a diameter of 18-25 cm, height of 5-8 cm whilst and a weight of 1,8-2,5 kg. *Maccagno* rind is smooth, regular and elastic, yellow or reddish in colour. The paste is firm with small eyes and the colour ranges from white to pale yellow. The aroma is very sweet and pleasant and the cheese has a very intense flavour, without any pungent or spicy sensations [35].

TOMA DEL LAIT BRUSC

http://www.prodottidelpaniere.it/bianca-alpina-toma-del-lait-brusc/

http://www.cittametropolitana.torino.it/cms/agri-mont/prodotti-del-paniere/prodotti-tipici/formaggi/toma-lait-brusc

Toma Del Lait Brusc (known also as *Bianca Alpina*) is a dairy product from the Susa, Sangone and the Lanzo Alpine Valleys. Toma is a raw, semi fat cow's-milk cheese with middle-long ageing. It is cylindric with flat faces and a straight height. This Toma has an average weight of 3-6 kg, a height of 10-20 cm and is 20-25 cm in diameter. The rind is smooth, or slightly irregular. The colour ranges from grey to slightly orange and tends to become more intense with longer ageing. It must age for no less than 70 days, which is necessary to allow this cheese to express its typical aromatic characteristics [30,34].

PLAISENTIF

Plaisentif is a cheese obtained from whole raw milk in pasture obtained at a minimum altitude of 1,800 meters from the Alta Chisone Valley, in the Communes of Fenestrelle, Usseaux, Pragelato, Roure and Perosa Argentina or from the High Susa Valley, in the Communes of Cesana Torinese, Exilles, Oulx, Salbertrand, Sauze di Cesana, Sauze d'Oulx or Sestriere. The transformation of milk into cheese must be carried out in the municipalities indicated at a height of no less than 1,400 meters. According to the information provided by the data sheet, a whole *Plaisentif* must be a cylindrical in shape, with a straight height of 6-8 cm, with slightly rounded edges, whilst the faces must be almost flat. The average *Plaisentif* has a diameter of 20-22 cm and a weight of 1.8-2.3 kg. This cheese has a smooth rind and is grey-ocher in colour, which becomes more intense with increased ageing. The paste is consistent and soft yellow. The taste is sapid, balanced with a slightly consistent structure [34-36].

TOUMIN DAL MEL

Toumin Dal Mel is a cheese produced not only in the Communes of Melle, Frassino and Valmola, but also in the neighboring municipalities of Brossasco, Isasca, Piasco, Rossana, Sampeyre and Venasca. *Toumin Dal Mel* is a cheese obtained from whole milk from Piedmontese bred cows fed mainly on local fodder. Small quantities of goat's milk may be added, but it must not exceed 10%. It is cylindrical in shape, with a tapered disk and has a diameter of 10-12 cm, with a very convex top of 1-2 cm. The weight ranges from 150 to 250 grams. The rind is almost nonexistent when the cheese is fresh, whilst if it is aged it becomes porcelain white, with a thin layer of white mold which is edible. The paste is ivory white, with a fine texture, sparse eyes and sometimes presents proteolysis phenomena, towards the outside when the cheese has been aged for longer. The taste is sweet and reminiscent of fresh milk, slightly salty fresh shapes, while the more mature specimens are more intense, caused by the formation of mold and the flavor becomes more fragrant [34].

NOSTRALE D'ALPE

Nostrale d'Alpe is a cow's milk cheese, produced in the mountainous area of the province of Cuneo. The milk is from pasture animals, bred at a height of no less than 1,500 meters. Either raw milk, whole milk or slightly skimmed milk is used, to make a raw and pressed paste. This paste is cylindrical in shape with flat faces and a straight or slightly convex height of 5-8 cm. It has a diameter of 25-35 cm and a weigh of 3-7 kg. The rind is smooth with a dark-grey to straw colour. The paste is golden yellow, with a consistent structure. The smell is intense and persistent, with slight hints of lipolysis and butter. Also the flavour is intense, sapid, balanced, but never bitter [37].

METHODOLOGY: survey

Survey

- A semi-structured telephone survey was implemented, so that both the questions and their order could be changed, according to the individual interviewed, in line with other authors.

- Each interview lasted around 20 minutes.

- The questions covered were: the distribution channels used to sell the cheese production, the perception of OQT "mountain product", related to utility for potential stakeholders (farmers, large distribution operators, agro-industry operators).

- All interviews were done from November, 2015, to February, 2016.

- The interview results were analyzed singularly by one of the authors, so as to avoid their being influenced in the evaluation phase. Lastly, the results obtained by each single author were pooled, compared and the fundamental issues pertinent to the aim of this paper, were extrapolated.

MAIN FINDINGS

- **36 out of 51** respondents **sell at least 90% of their production directly to the consumer without commercial intermediaries**, of which **17 sell all their production on the farm** and **2 producers in outdoor markets**.

- **The added value of the direct relationship between the farm and the consumer**, that in terms of guarantee can be considered the most effective tool, **is evident here**.

- The last part of the interview brought to light the fact that **the term "mountain product" was considered of no use for the farms that made direct sales, which, in itself, is a guarantee of quality**.

MAIN FINDINGS

- The average value assigned to the usefulness of this term shows some linearity of judgment of the term, with a higher average score (5.544 out of 7) for farms, a intermediate score for food industries (3.794 out of 7) and a lower one (3.412 out of 7) for large retail organizations.

- However, the assigned individual assessments do show a higher level of inhomogeneity in assessing the issue for food industries (σ_1=2.134009) against farms (σ_2=1.66109) and large retailers (σ_3=1.789149).

MAIN FINDINGS

- The survey emphasized the critical issues emerged in the past, such as the possibility to make the processing activities within 30 kilometers from the mountainous border area and the self-declaration limit and its control system.
- The labelling system has mainly been set-up by the food industry for well-known consumer brands such as Parmigiano Reggiano.
- The lack of regulation for the symbols and the terms i.e. "Mountain", "Alpine" or the like, which are used to promote foods do not necessarily conform to the EU Regulation 665/2014.
- The producers report a lack of information and communication as to the term OQT Mountain product

CONCLUSIONS

- The mountain foodstuff enhancement is a priority which involves all stakeholder networks, including the public and territorial organizations.
- The EU labeling scheme is the demonstration of how this question is of institutional interest at a European level
- This tool is to be considered an enhancement of a set of territorial marketing tools

Moreover ...

- The small mountain farmers are characterized by direct sale
- The main user of OQT is Parmigiano Reggiano Consortium

THINGS

A beginners guide to Internet of Things: Common Questions that were never answered! http://www.codeproject.com/Articles/832492/Stage-Introduction-to-the-Internet-of-Things-Wha#2.1 Embedded System, Grasshopper.iics, 26 Oct 2014
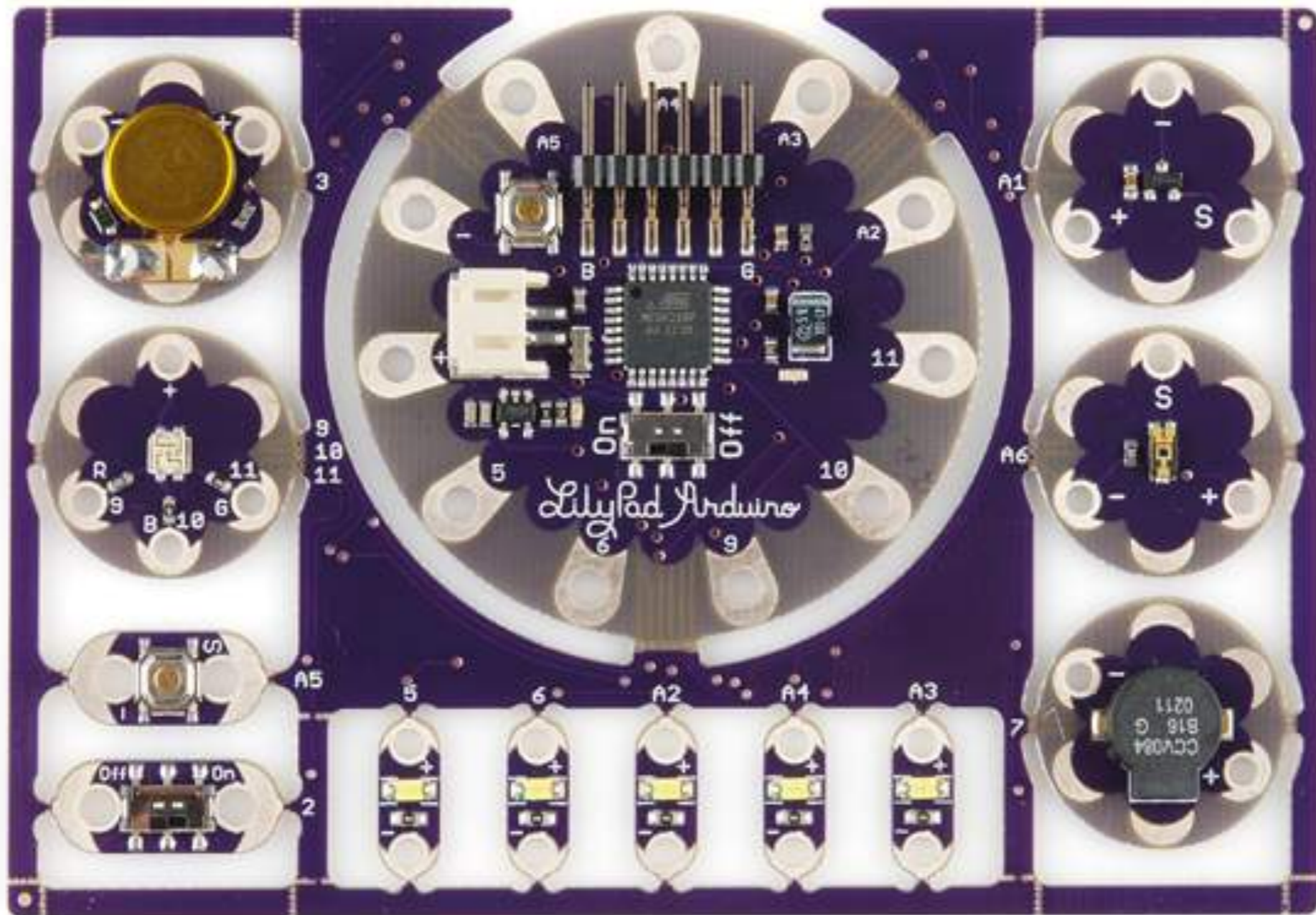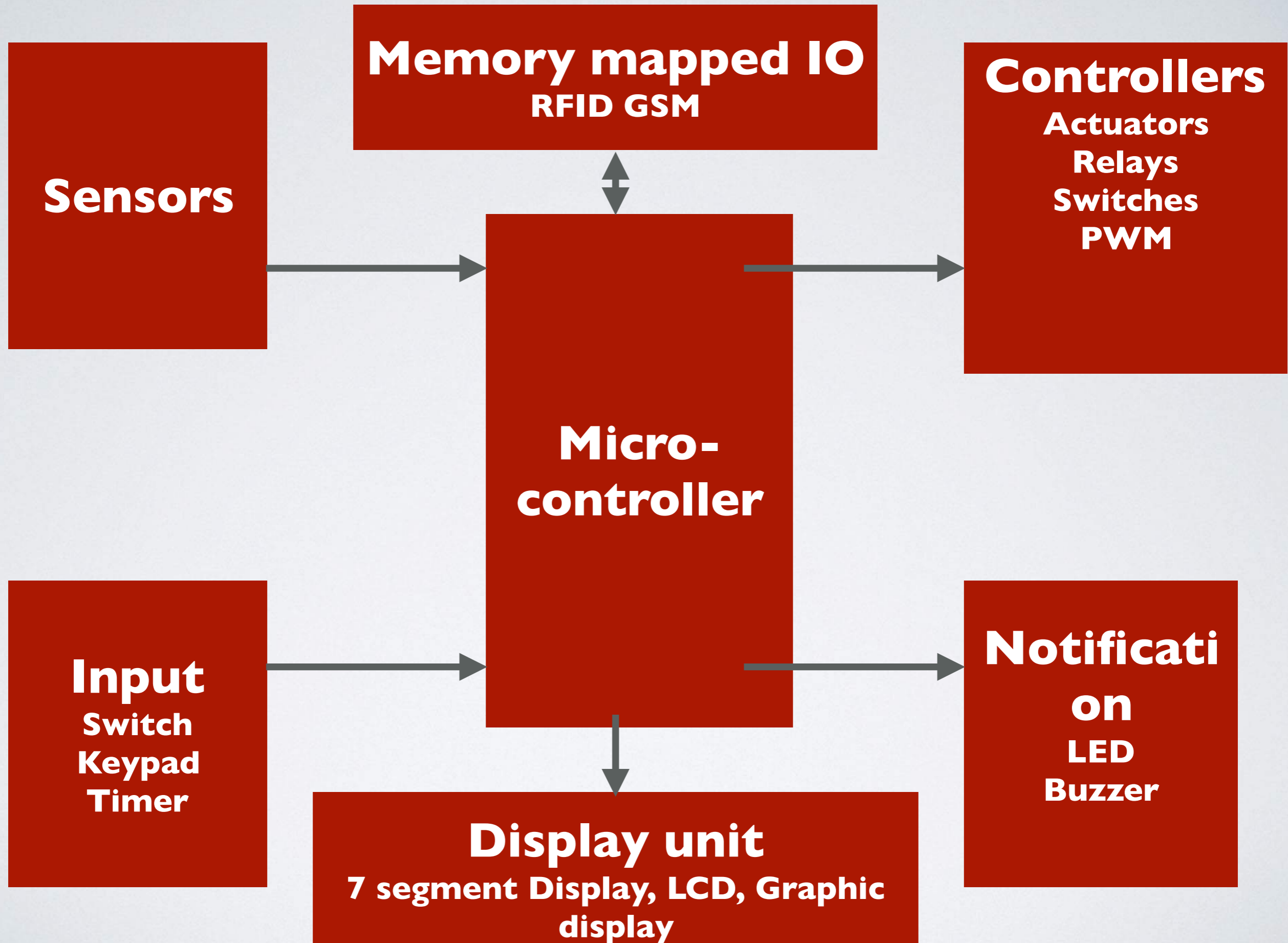
Sense	Sensor	Actuator
Sight	Light, camera, color, IR	LEDs, displays, lights
Touch	Buttons, pressure, rotation, temperature, bend	Stepper motors, servo motors, DC motors
Hearing	Microphone, ultrasound	Speakers
Smell	Gas sensors, artificial noses	Fragrance emitters
Taste	Artificial tongues	Flavor emitters
Also...	RFID, GPS, accelerometers, compass	Wireless communication

Actuators

SO, WHY SUCH EMBEDDED SYSTEMS ARE ATTRACTIVE?

1) **Autonomous**: You can build a system specific to a particular application. For instance some standard peripherals and a specialized program can turn a micro-controller unit into washing machine controller or an oven controller; an embedded system may not mandatorily need a display unit.

2) **Low Cost:** The cost of the micro controller unit is magnitude scale lower than a full computer.

3) **Low Space**: An embedded system takes away very little space when you compare it with even the smallest of laptops; you can put such a system in your hardware system quite efficiently.

4) **Low power**: Most of the common micro-controllers out there which are popular choices for embedded systems operate at 5V and often need 5v regulated power supply which can be provided through a simple 9v standard battery with voltage regulator or directly from main by using a voltage rectifier with filter circuit.

A beginners guide to Internet of Things: Common Questions that were never answered!http://www.codeproject.com/Articles/832492/Stage-Introduction-to-the-Internet-of-Things-Wha#2.1 Embedded System, Grasshopper.iics, 26 Oct 2014
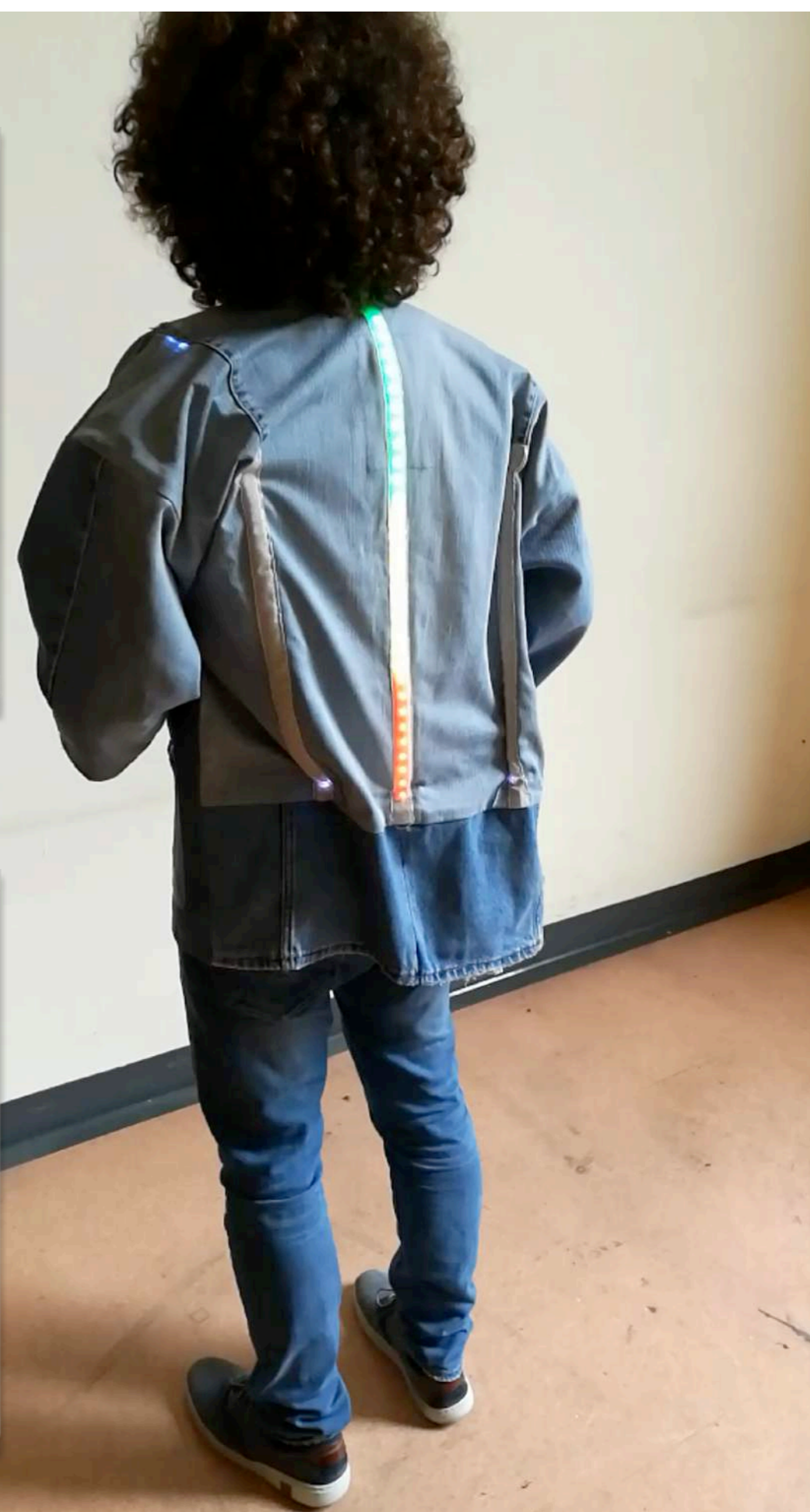
Denim

Denim + Hemps
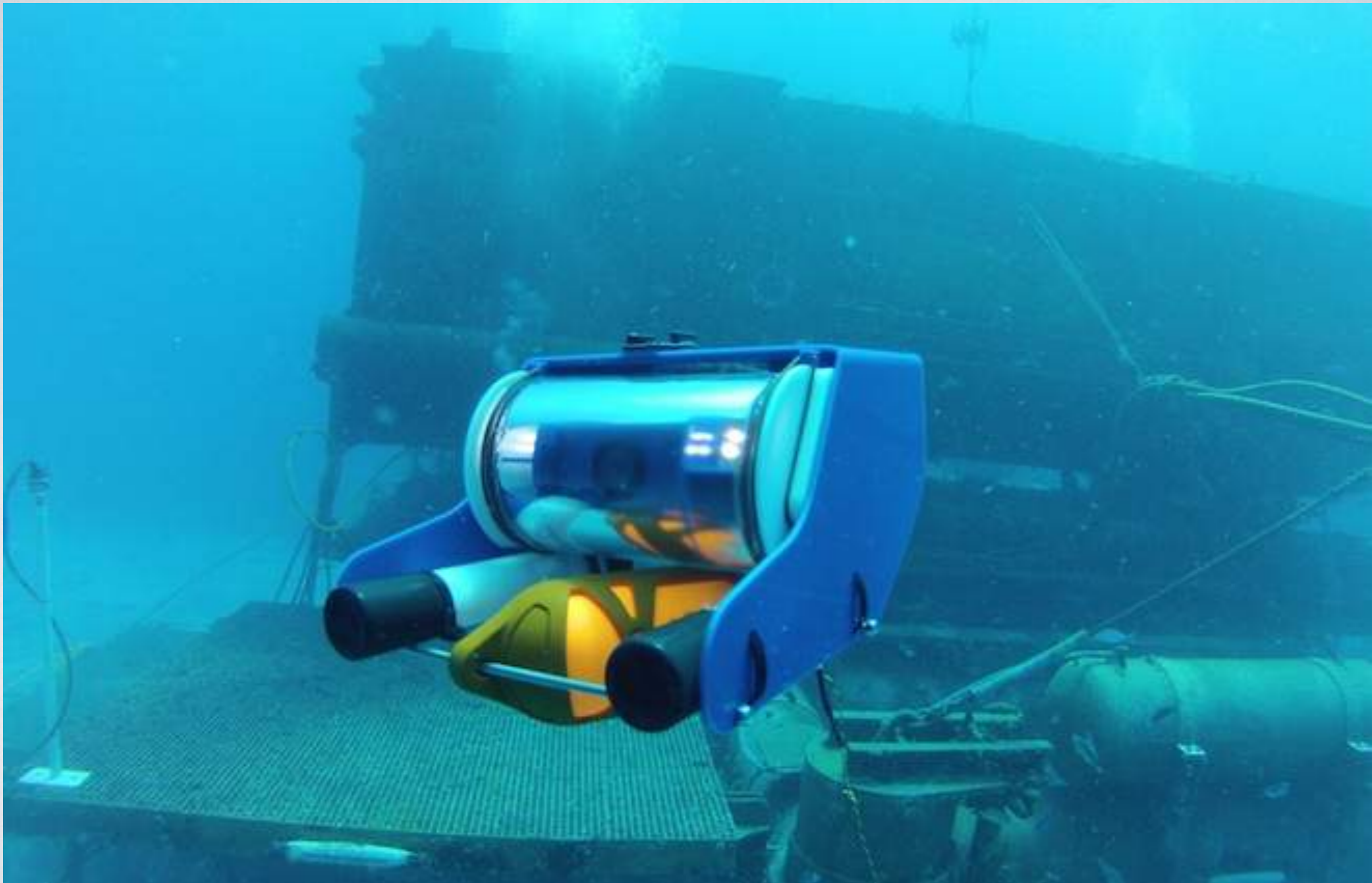
"The Internet of Things (IoT) is the network of physical objects or "things" embedded with electronics, software, sensors, and **network connectivity,** which enables these objects **to collect and exchange data**"

"Internet of Things Global Standards Initiative". ITU. Retrieved 26 June 2015.".
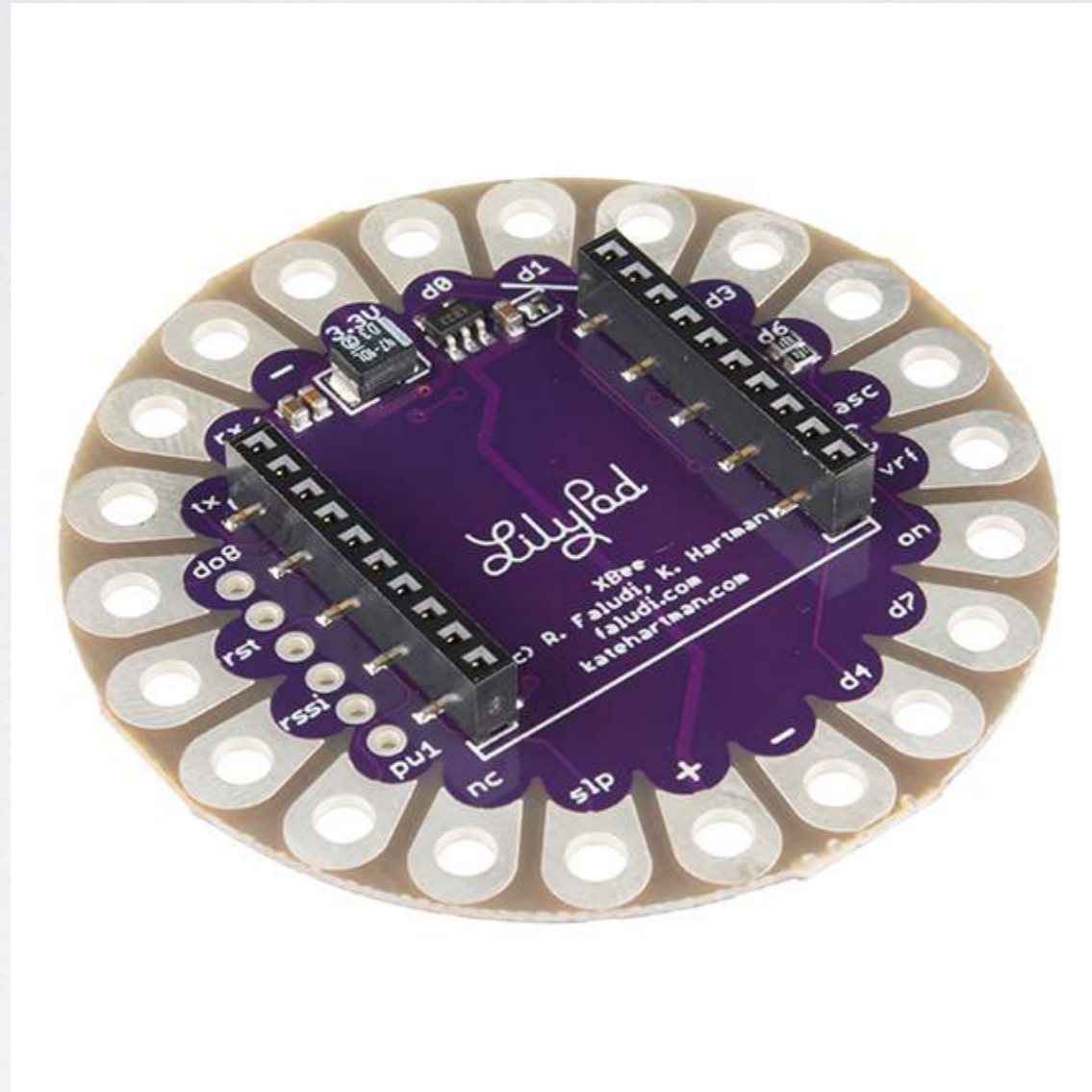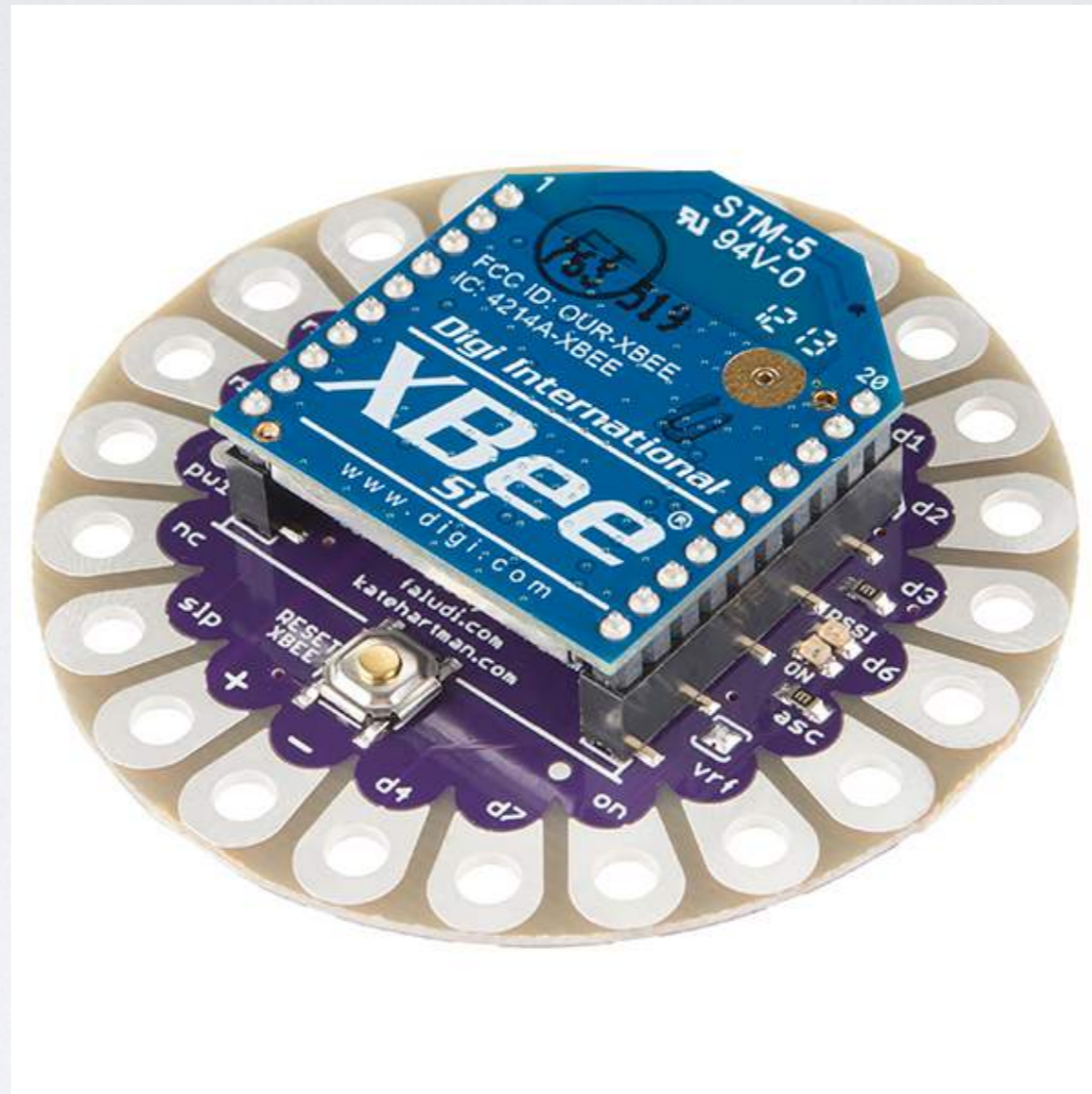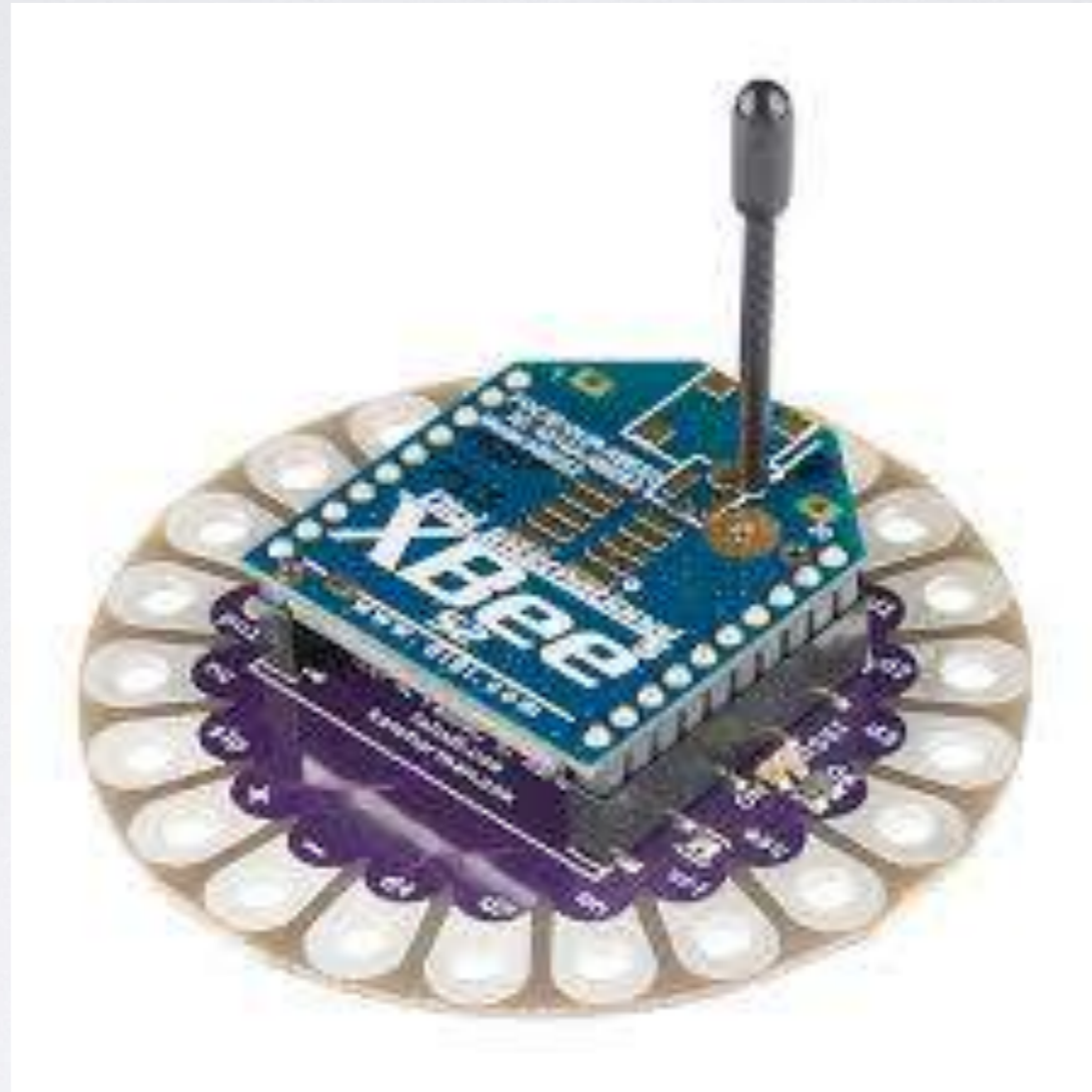
Internet of Things

Peripheral hardware
Sensor
Actuators
Drives

Embedded system

Wifi
Bluetooth
Ethernet
ZigBee

IPV6 Address

Connection services

Local connectivity

Local Network
LAN, WAN, WSN

Web API

Other devices

Internet

"Internet of Things (IoT) is a **concept** and a **paradigm** that considers **pervasive presence** in the environment of a **variety of things/objects** that through wireless and wired connections and unique addressing schemes are able to interact with each other and cooperate with other things/objects to create new applications/services and reach common goals."

Internet of Things beyond the Hype: Research, Innovation and Deployment

Ovidiu Vermesan1, Peter Friess2, Patrick Guillemin3, Raffaele Giaffreda4, Hanne Grindvoll1, Markus Eisenhauer5, Martin Serrano6, Klaus Moessner7, Maurizio Spirito8, Lars-Cyril Blystad1 and Elias Z. Tragos9

THE INTERNET OF THINGS

AN EXPLOSION OF CONNECTED POSSIBILITY

BILLIONS OF DEVICES

2020
50.1 BILLION
Taking population predictions into account, there will be about 6.6 devices per human on the planet.

2019
42.1 BILLION

2018
34.8 BILLION

2017
28.4 BILLION

2016
22.9 BILLION
Sensors that are already emerging will become more prevalent — traffic light cameras, parking spot sensors, entertainment facilities and smart utility meters are all chatting to other machines via broadband.

2015
18.2 BILLION

2014
14.4 BILLION
Today, there are twice as many things connected to the Internet as human beings on the planet.

2013
11.2 BILLION
According to forecasts from Machina Research, global machine-to-machine connections will swell to 18 billion by 2022, thanks in large part to consumer electronics and intelligent buildings.

2012
8.7 BILLION
Just three years old and the U.S. National Intelligence Council has recognized IoT on their list of the six most "disruptive" technologies — with impacts that will last through 2025.

2009
IoT INCEPTION
CISCO estimates the IoT was born sometime in 2008-2009.

1992
1,000,000
About the equivalent of the population of San Jose.

2003
0.5 BILLION
A 49,900% increase in connected devices in just 11 years.

YEAR

Research funding

- **The European Union has sponsored several projects on the topic during the Seventh Framework Programme and, now, during Horizon 2020.** The currently running EU-PLF project for instance, is designed to look at the feasibility of bringing proven and cost-effective Precision Livestock Farming tools from the lab to the farm.

- Several private companies are also starting to be active in this field, such as Anemon (Switzerland), eCow (UK), Connected Cow (Medria Technologies and Deutsche Telekom). Smart fishing is at initial stage with some projects in Europe, South Korea, North America and Japan.

Smart Farming

1. Fleet management – tracking of farm vehicles.

2. Arable farming, large and small field farming. Meteorological Station Network: Study of weather conditions in fields to forecast ice formation, rain, drought, snow or wind changes.

3. Livestock monitoring. Location and identification of animals grazing in open pastures or location in big stables. Offspring Care: Control of growing conditions of the offspring in animal farms to ensure its survival and health. Toxic Gas Levels: Study of ventilation and air quality in farms and detection of harmful gases from excrements.

4. Indoor farming – greenhouses and stables: Control micro-climate conditions to maximize the production of fruits and vegetables and its quality. Compost: Control of humidity and temperature levels in alfalfa, hay, straw, etc. to prevent fungus and other microbial contaminants.

5. Wine Quality Enhancing. Monitoring soil moisture and trunk diameter in vineyards to control the amount of sugar in grapes and grapevine health.

6. Fish farming

7. Forestry

8. Storage monitoring–water tanks, fuel tanks

- **Precision agriculture** aims to **optimise the yield per unit** of farming land by using the most modern means in a continuously sustainable way, to achieve best in terms of quality, quantity and financial return.

- **Precision agriculture makes use of a range of technologies that include GPS services, sensors and big data to optimise crop yields**. Rather than replace farmer expertise and gut feeling, ICT- based decision support systems, backed up by real time data, can additionally provide information concerning all aspects of farming at a level of granularity not previously possible. This enables better decisions to be made, resulting in less waste and maximum efficiency in operations.

"Internet of Things (IoT) is a **concept** and a **paradigm** that considers **pervasive presence** in the environment of a **variety of things/objects** that through wireless and wired connections and unique addressing schemes are able to interact with each other and cooperate with other things/objects to create new applications/services and reach common goals."

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- By **International Telecommunication Union**, the **network architecture** of IoT consists of the **sensing layer**, the **access layer**, the **network layer**, the **middleware layer** and **application layers**.

- **Sensing layer**: the main features of this layer are to **capture** the interest information large-scaly by various types of sensors, identify intelligently, **and share the captured information in the related units in the network**.

- **Access layer**: this layer's main function is to **transfer** information from the sensing layer to the network layer through existing mobile networks, wireless networks, wireless LANs, satellite networks and other infrastructure.

- **Network layer**: this layer's main function is to **integrate** the information resources of the network into a large intelligence network with the Internet platform, and establish an efficient and reliable infrastructure platform for upper-class service management and large-scale industry applications.

- **Middleware layer**: this layer's main function is to **management** and control network information real-time, as well as providing a good user interface for upper layer application. It includes various business support platform, management platform, information processing platform, and intelligent computing platform.

- **Application layer**: this layer's main function is to **integrate the function** of the bottom system, and **build** the practical application of various industries, such as smart grids, smart logistics, intelligent transportation, precision agriculture, disaster monitoring and distance medical care.

Examples

Proprietary

John Deere is using the IoT **to connect each of its vehicles to a mobile online platform called JDLink**, which **gives farmers and their dealers remote access to see location, utilization and diagnostic data for each machine**.

Its John Deere Operations Center offers comprehensive IoT solutions for farmers, including wireless data streaming of production data, mobile monitoring, and weather and crop reporting in real time.

Networked sensors and both historical and real-time data on weather, soil conditions and crop status help farmers enhance the value of their operations by ensuring equipment is operating reliably. They optimize each job by ensuring that crops are planted and harvested when and how they will produce the best yields, and achieving what John Deere calls "agronomic optimization" by engaging the trusted partners of the farmer to analyze data and recommend changes for future crop years.

John Deere Field Connect

New environmental sensors help you get the most crop from every drop

JOHN DEERE

Independent research* suggests using John Deere Field Connect to measure and record moisture levels can result in significant costs savings and yield increases ... as much as 2 inches per acre in reduced water plus reduced energy costs, and a 5.5-bu/acre jump in corn yield!

And now, the John Deere Field Connect advantage is even stronger, with new environmental sensors!

*Fonatanelle Hybrids, 2010

John Deere Operations Center

A set of online tools that provides information about your farm when you need it, where you need it
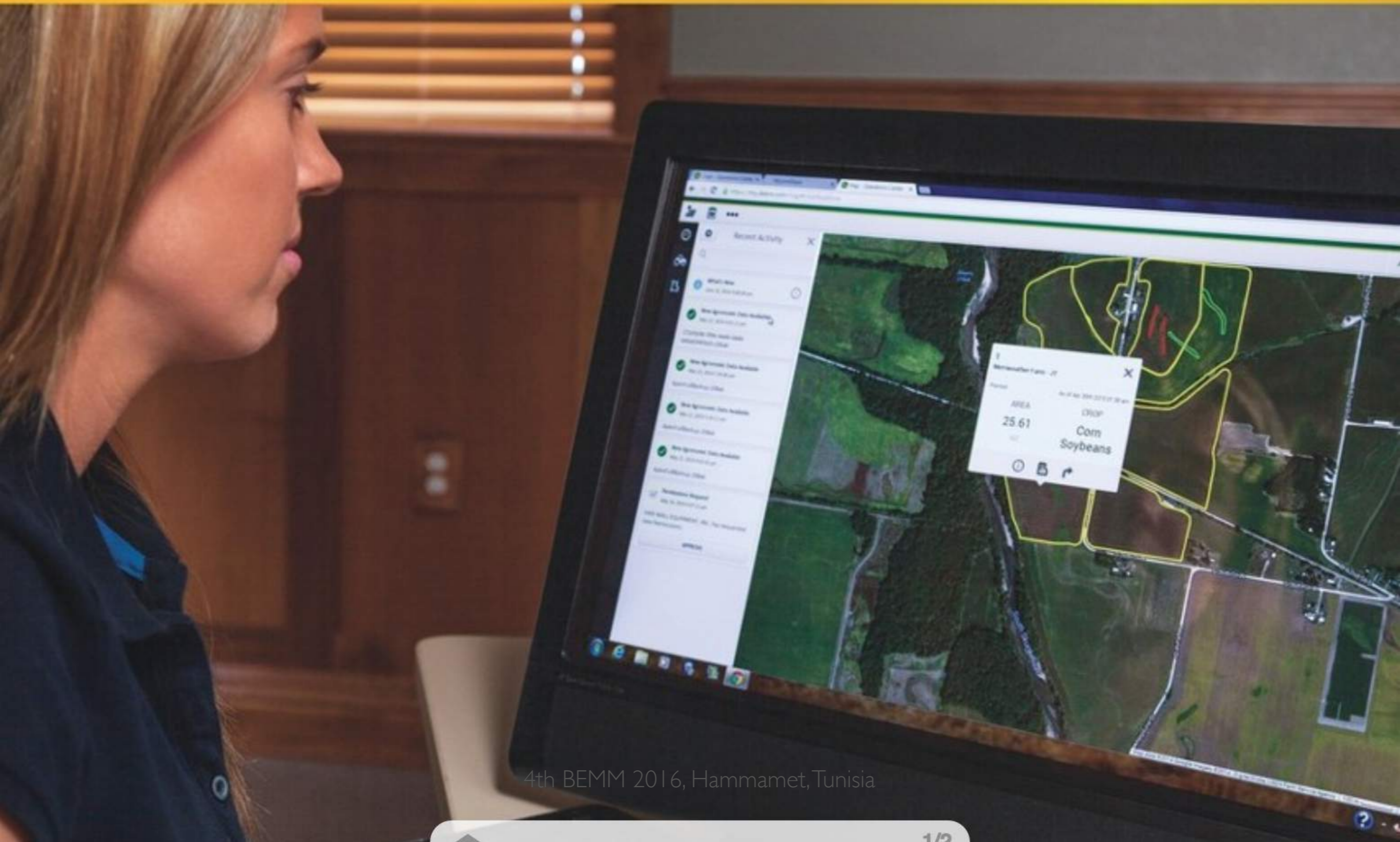
JOHN DEERE

**critical and timely information
ut your machines, online.**

e **Location History** to see where your machines
e and what ground they've covered. Get a clear
se of progress so you can easily plan next steps.

alyze your **Machine Performance** in order to plan
 future jobs. By tracking measures such as fuel
e, ground speed, and idle time, you can identify
 portunities for improved performance.

MOVE data to and from your
machines — easily, securely,
and wirelessly.

– Let **Wireless Data Transfer** save you time and hassle
by automatically and securely moving production
data into the John Deere Operations Center. Easily
send setup files and prescriptions to your machines
in advance or as plans change.

SUPPORT your machines and pe
to keep your operation running.

– Use **Remote Display Access** to check on work i
progress or help an operator in need.

– Identify issues promptly with **Machine Alerts** f
and your dealer.

– Let your dealer connect with your machine thro
Service ADVISOR Remote, to diagnose what's
needed to keep you running.

JohnDeere.com/Preci

New machines from John Deere can not only **plow, sow and reap**, **they can also collect a Farmer's Almanac worth of data, including air and soil temperatures, moisture, wind speed, humidity, solar radiation and rainfall**.

Smart watering systems sprinkle just enough water on the fields, in just the right places, and **can detect leaks in water pipes**—vital in dry and drought-affected regions like California.

THE FUTURE IS SMART, Alec Scott, 8 ways the Internet of things will change the way we live and work, http://www.theglobeandmail.com/report-on-business/rob-magazine/the-future-is-smart/article24586994/

OnFarm Grower DashboardTM
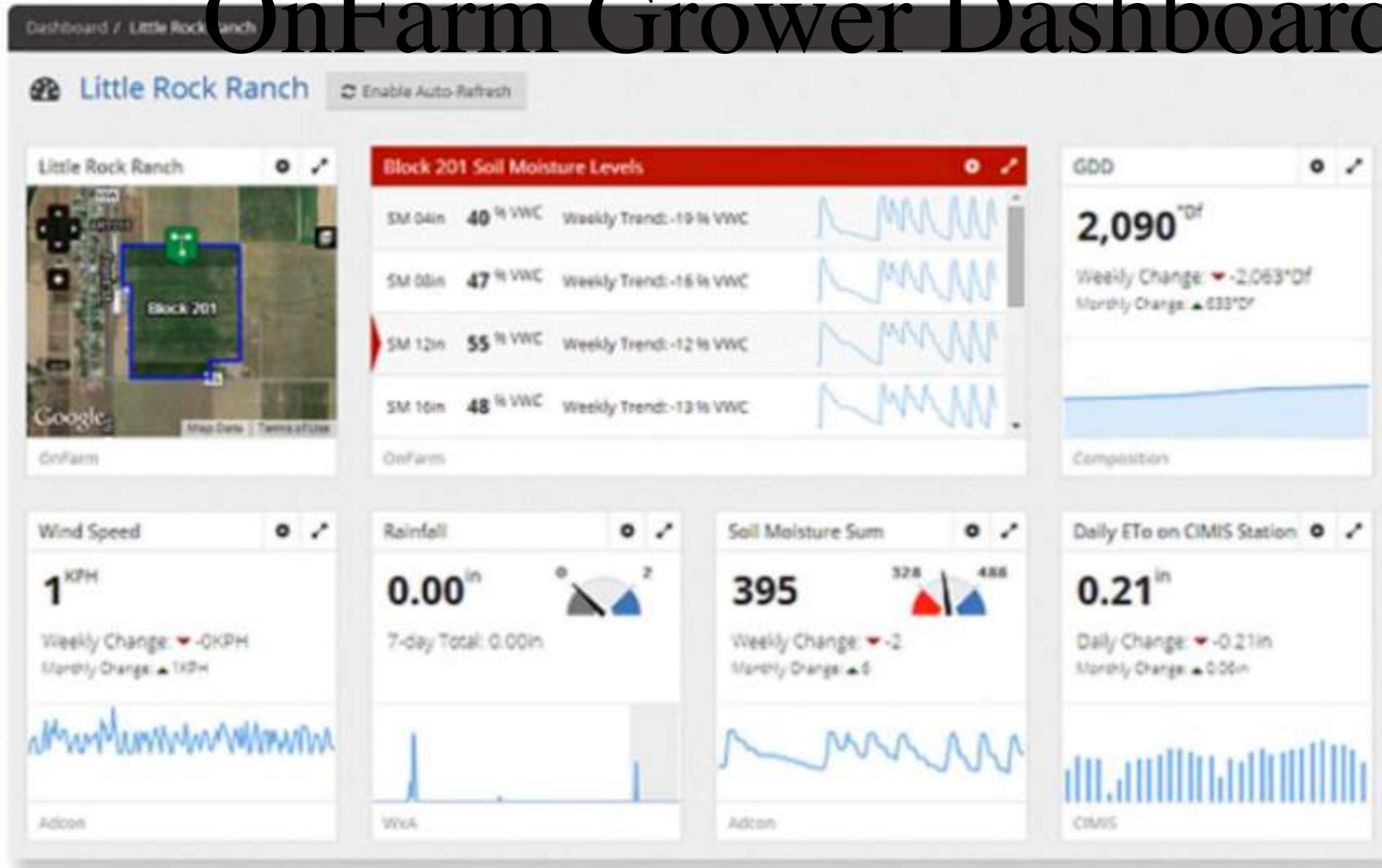
Source: OnFarm, February 2015

Precision Livestock Farming (PLF)
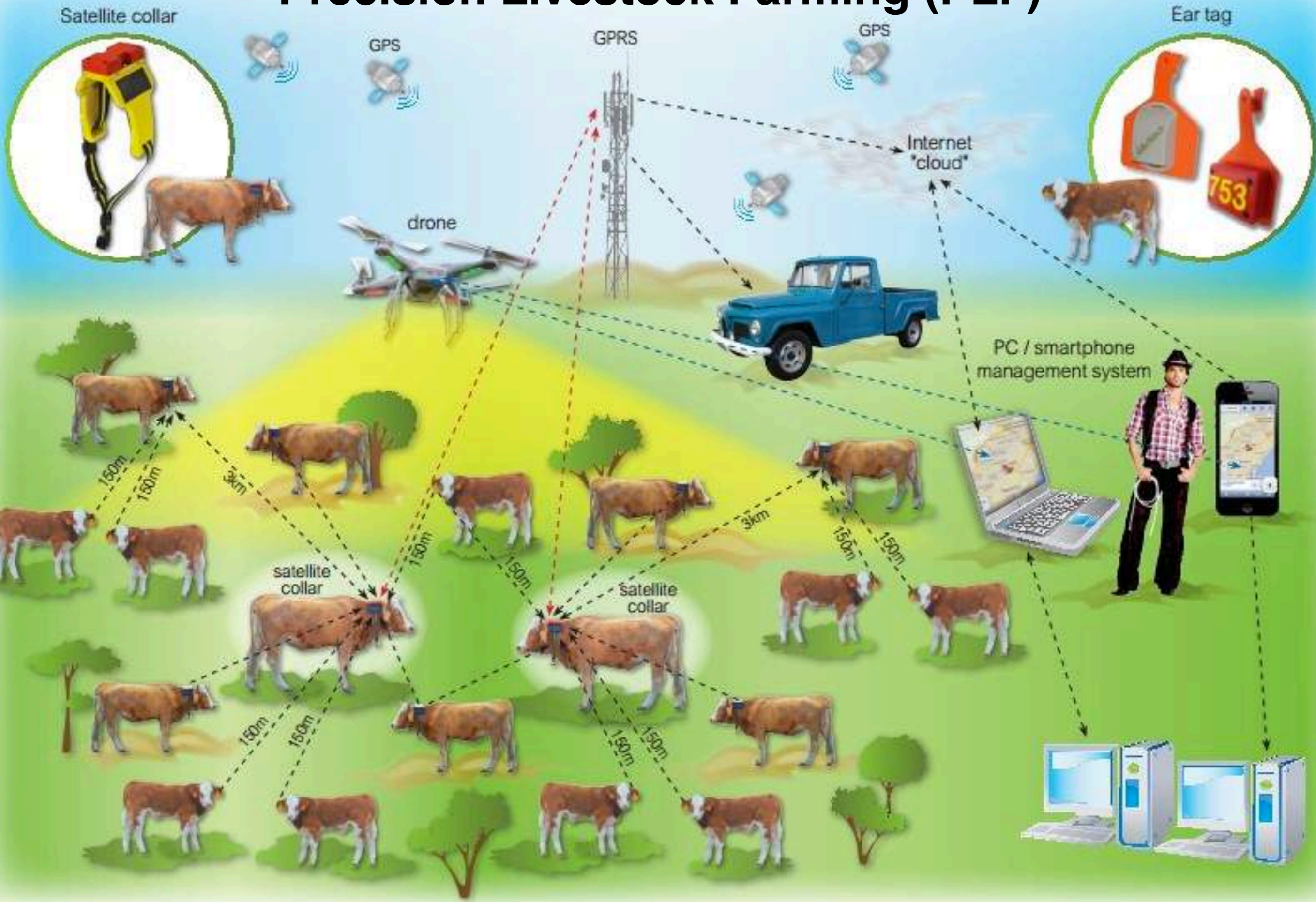
- **Precision Livestock Farming** is a subset of smart farming. Sensors are used for monitoring and early detection of reproduction events and health disorders in animals.

- Typical monitored data are the **body temperature**, the **animal activity**, **tissues resistivity**, **pulse** and **GPS position**.

- **SMS alerts** can be sent to the breeder based on predefined events.

Development of specialized **RFID tags** that can be embedded into trees, manually or by machine. Some of these tags are made of biodegradable materials, so they can be ground with wood products to make pulp and paper.

"RFID can bring value by tracking timber through the whole logging operation, through shipment, monitoring for deliveries and such."

In pilots and deployments worldwide, governments, research institutes, forestry and sawmill companies, and wood products manufacturers are employing **RFID to optimize forest production and improve the quality of wood products, as well as to minimize environmental damage and enable companies to comply with U.S. and European rules barring import of illegal or endangered timber products**.

But before RFID-tagging becomes common practice in the forestry industry, tag prices must come down and more solid business cases must be demonstrated. Meanwhile, RFID shows promise as a tool to help control wildfires.

SK Telecom's connected eel farm

The first pilot of the IoT **aquaculture management system** is being tested on an **eel farm** in Gochang, South Korea. A set of sensors in dozens of 20-foot-wide eel tanks wirelessly transmit data on **water temperature**, **pH** and **dissolved oxygen levels** to a sensor hub, which in turn connects to SK Telecom's LTE network using a machine-to-machine radio.

https://gigaom.com/2014/09/01/meet-the-slimiest-thing-on-the-internet-of-things-sk-telecoms-connected-eel-farm/

OnFarm

In 2011, Lance Donny, the CEO and founder of OnFarm, identified a unique opportunity to leverage his extensive personal agricultural knowledge with connected applications to create and deliver a transformational suite of Internet of Things-based **agricultural management services**. These services would be delivered as easy-to-use, smart, connected product applications that would provide OnFarm's customers with the ability to have a real-time big picture of the large and varying data points necessary for them to create optimal agricultural working and growing conditions.

Expensive

Big farms can afford them
but
the average farm in Europe is…

186

50.7

14.7   22.2

1.06   1.3

Asia   Sub-
        Saharan
        Africa

Europe   Central   South   North
          America & America America
          Caribbean
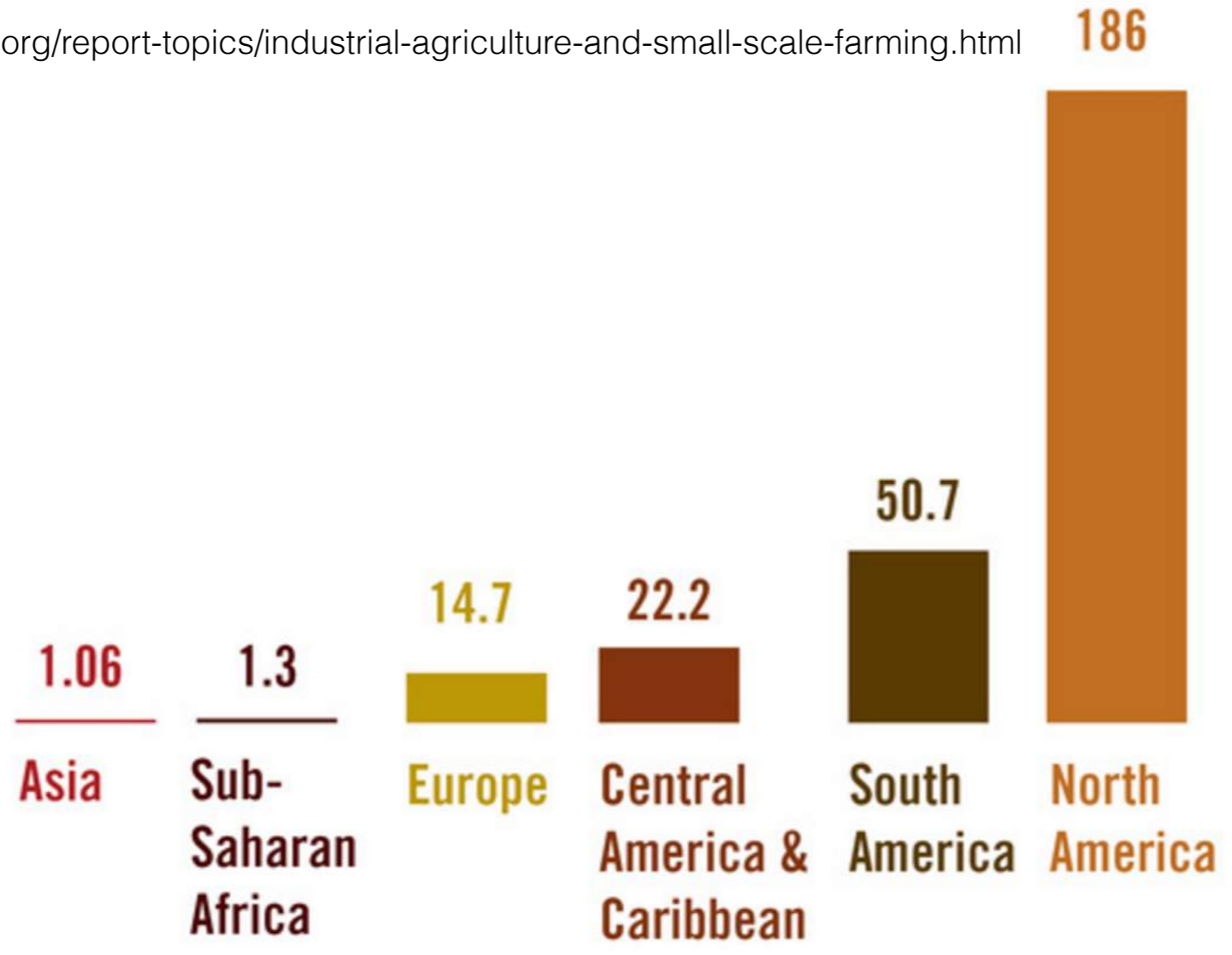
Source: IFAD (2010)

Average farm size in hectares. The size of agricultural enterprises in Europe and North America is increasing, whilst their numbers are drastically decreasing. In Latin America, the average numbers disguise the extremely sharp contrast between a few huge operations that are engaged in one of the most industrialised forms of agriculture worldwide, and a large number of small-scale farmers with less than two hectares of land. In Argentina, for example, the average farm size is 582 hectares. In North America and Europe, these calculations also disguise small farms whose owners can no longer make a living from agriculture.
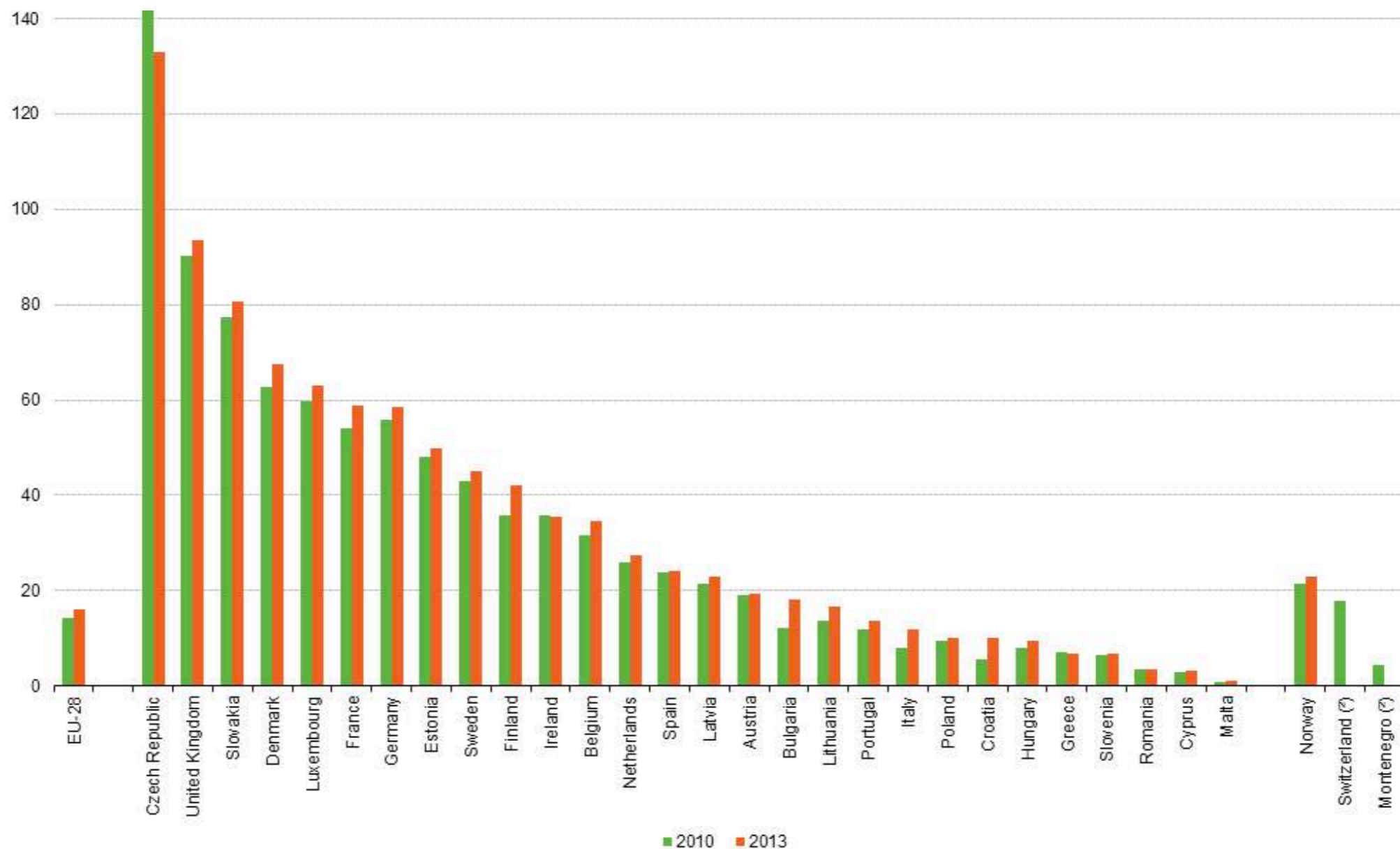
Average utilised agricultural area per holding, 2010 and 2013 (hectares)
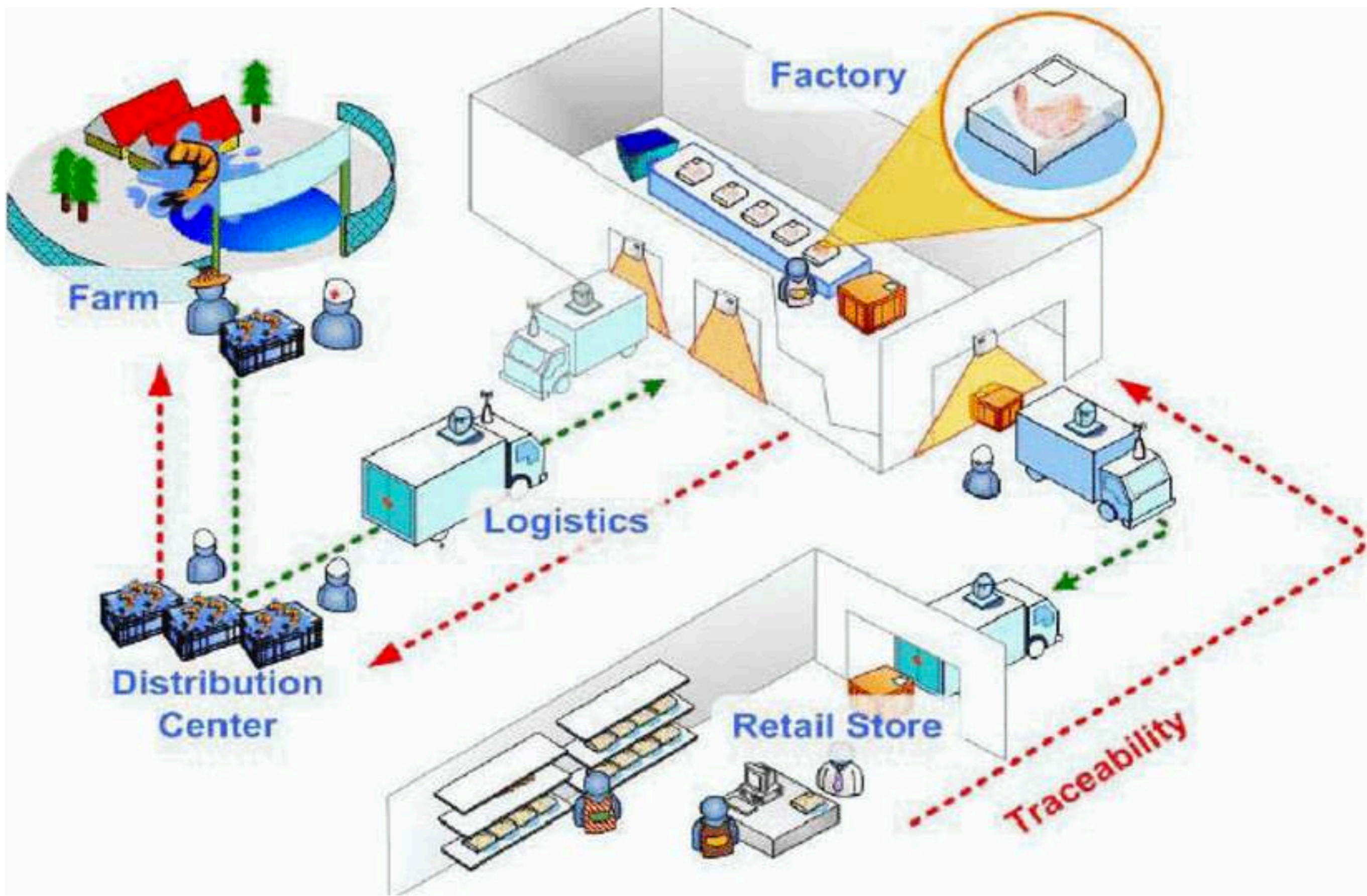
http://ec.europa.eu/eurostat/web/agriculture/farm-structure

Farm

Factory

Logistics

Distribution
Center

Retail Store

Traceability

ENTRY LEVEL

ARDUINO/GENUINO UNO **ARDUINO PRO** **ARDUINO PRO MINI** **ARDUINO/GENUINO MICRO**

ARDUINO NANO **ARDUINO/GENUINO STARTER KIT** **ARDUINO BASIC KIT** **ARDUINO MOTOR SHIELD**

ENHANCED FEATURES

ARDUINO/GENUINO MEGA **ARDUINO ZERO** **ARDUINO DUE** **ARDUINO PROTO SHIELD**

INTERNET OF THINGS

ARDUINO YÚN **ARDUINO ETHERNET SHIELD** **ARDUINO GSM SHIELD** **ARDUINO WIFI SHIELD 101**

WEARABLE

ARDUINO GEMMA **LILYPAD ARDUINO USB** **LILYPAD ARDUINO MAIN BOARD**

LILYPAD ARDUINO SIMPLE **LILYPAD ARDUINO SIMPLE SNAP**

3D PRINTING

MATERIA 101

BOARDS **MODULES** **SHIELDS** **KITS** **ACCESSORIES** **COMING NEXT**
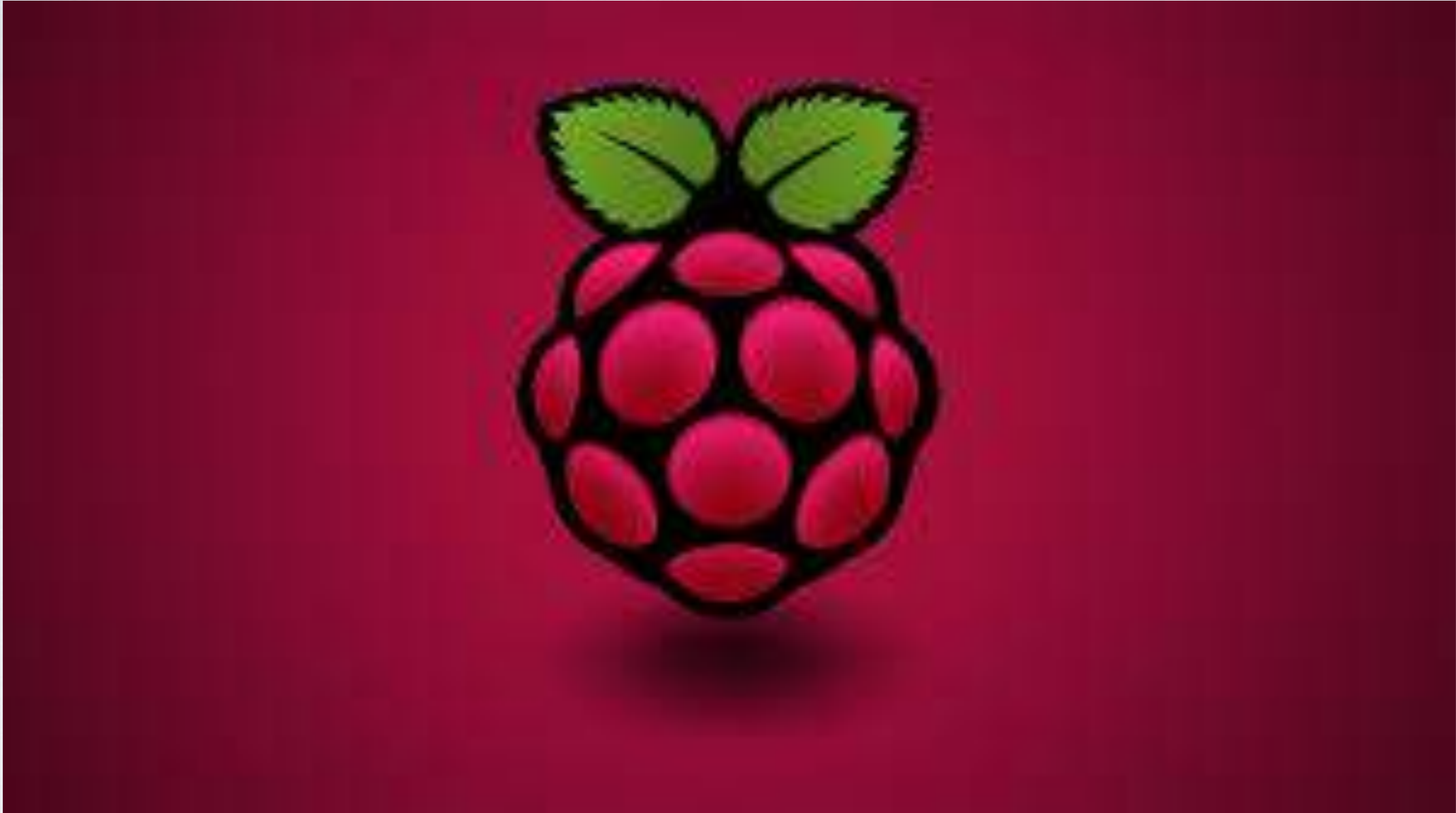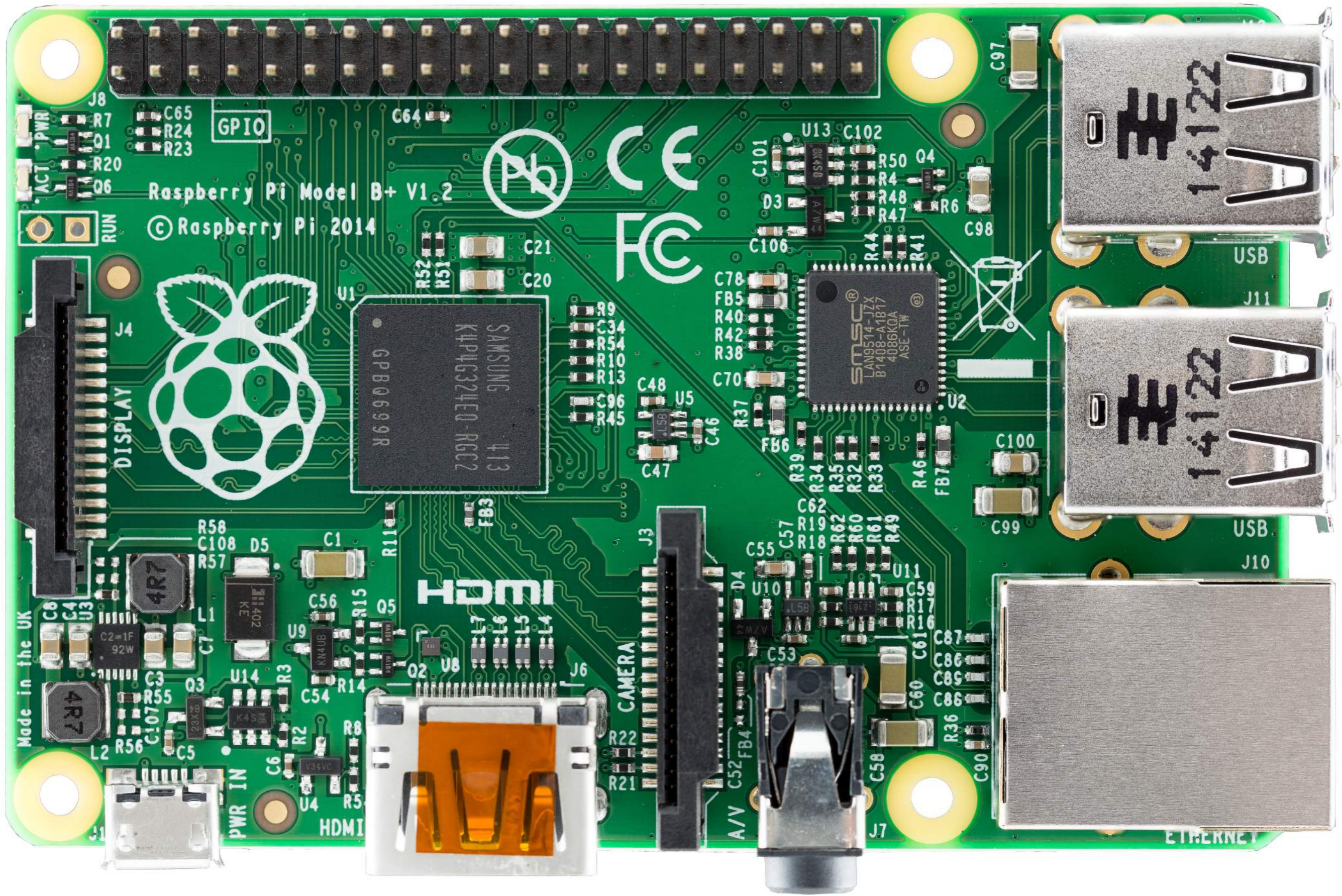
RASPBERRY PI PRODUCTS
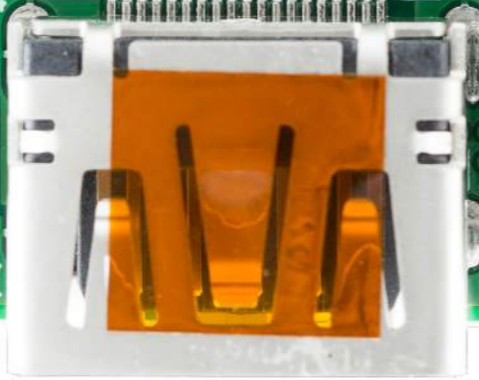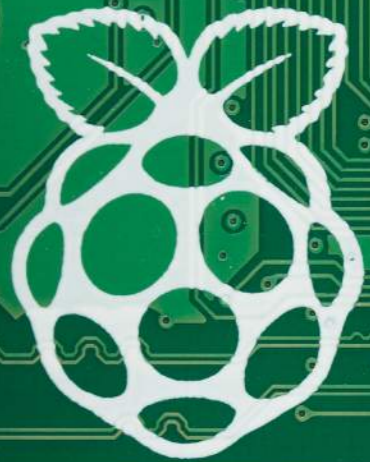
BUY RASPBERRY PI

LATEST PRODUCT NEWS

305

THE EAGERLY AWAITED RASPBERRY PI DISPLAY

The official Raspberry Pi touch display is available now

RASPBERRY PI PRODUCTS...

RASPBERRY PI 2 MODEL B

RASPBERRY PI 1 MODEL B+

RASPBERRY PI 1 MODEL A+
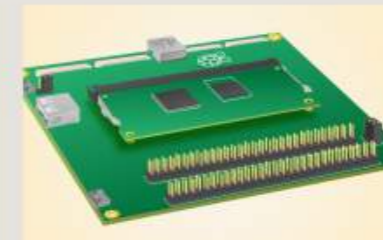
COMPUTE MODULE DEVELOPMENT KIT
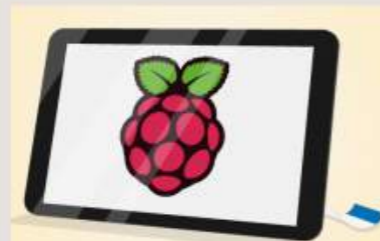
RASPBERRY PI TOUCH DISPLAY

RASPBERRY PI CASE

USB WIFI DONGLE

SENSE HAT

Libelium Smart World

Air Pollution
Control of CO$_2$ emissions of factories, pollution emitted by cars and toxic gases generated in farms.

Forest Fire Detection
Monitoring of combustion gases and preemptive fire conditions to define alert zones.

Wine Quality Enhancing
Monitoring soil moisture and trunk diameter in vineyards to control the amount of sugar in grapes and grapevine health.

Offspring Care
Control of growing conditions of the offspring in animal farms to ensure its survival and health.

Sportsmen Care
Vital signs monitoring in high performance centers and fields.

Structural Health
Monitoring of vibrations and material conditions in buildings, bridges and historical monuments.

Quality of Shipment Conditions
Monitoring of vibrations, strokes, container openings or cold chain maintenance for insurance purposes.

Smartphones Detection
Detect iPhone and Android devices and in general any device which works with Wifi or Bluetooth interfaces.

Perimeter Access Control
Access control to restricted areas and detection of people in non-authorized areas.

Radiation Levels
Distributed measurement of radiation levels in nuclear power stations surroundings to generate leakage alerts.

Electromagnetic Levels
Measurement of the energy radiated by cell stations and WiFi routers.

Traffic Congestion
Monitoring of vehicles and pedestrian affluence to optimize driving and walking routes.

Water Quality
Study of water suitability in rivers and the sea for fauna and eligibility for drinkable use.

Waste Management
Detection of rubbish levels in containers to optimize the trash collection routes.

Smart Parking
Monitoring of parking spaces availability in the city.
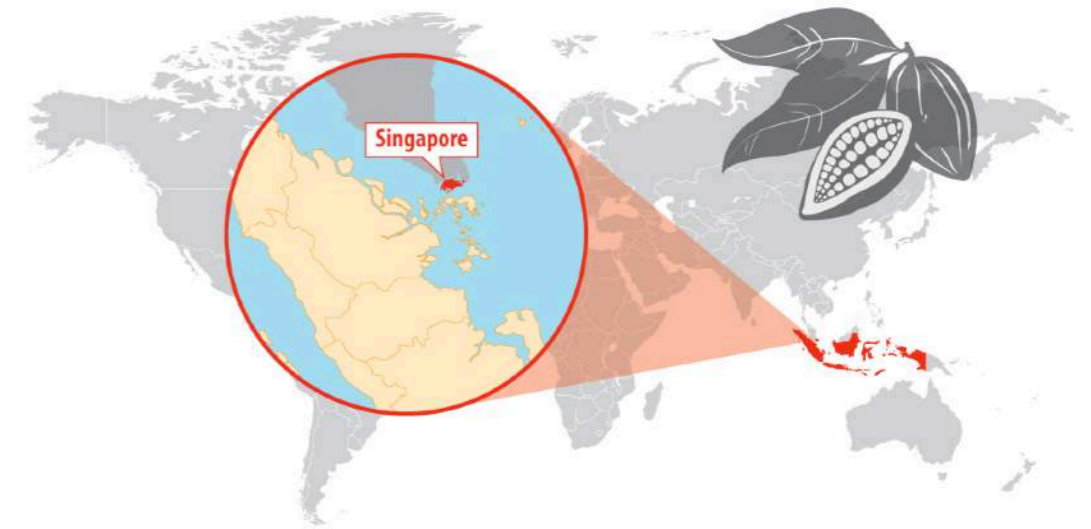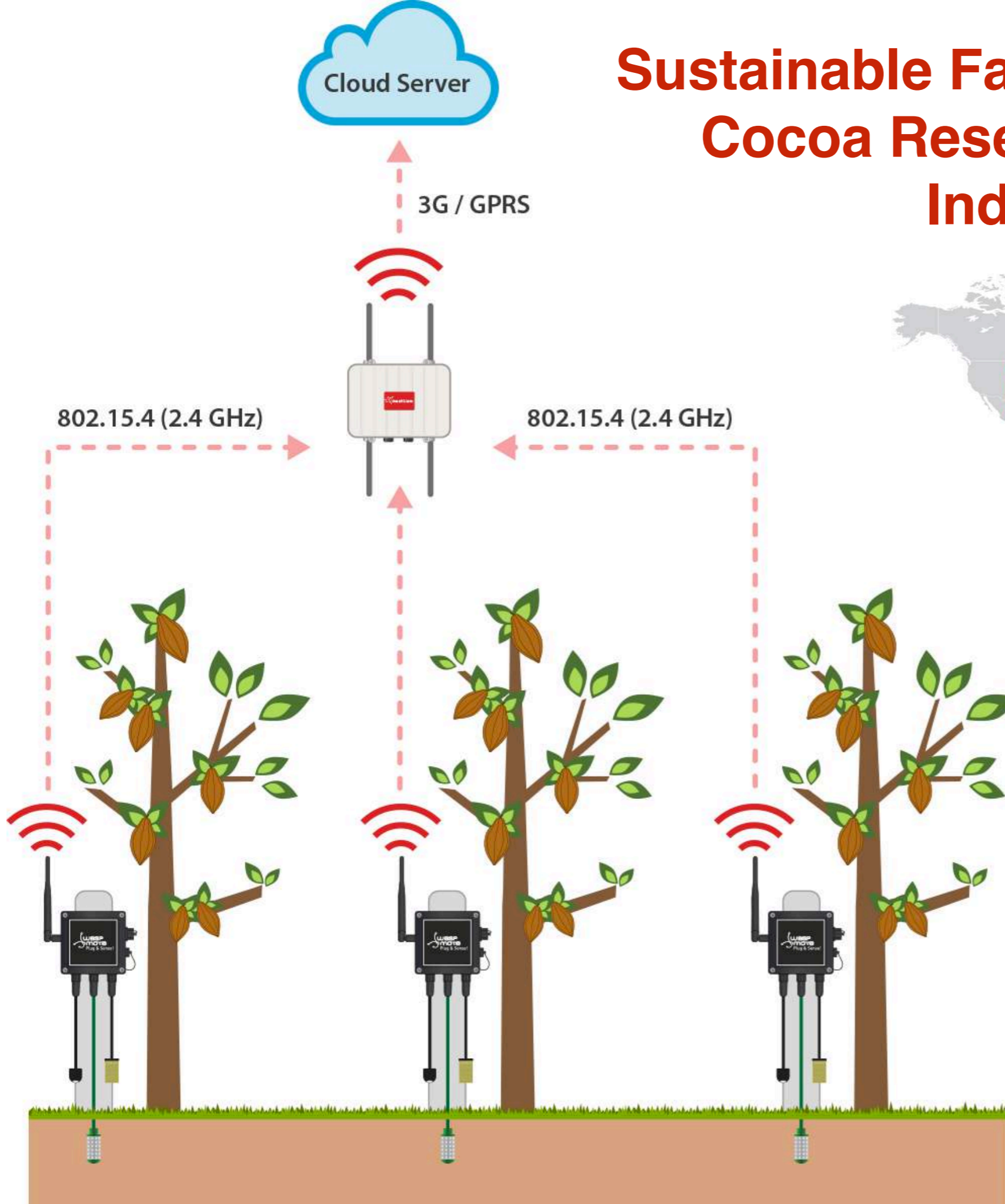
Golf Courses
Selective irrigation in dry zones to reduce the water resources required in the green.

Smart Roads
Warning messages and diversions according to climate conditions and unexpected events like accidents or traffic jams.

Smart Lighting
Intelligent and weather adaptive lighting in street lights.

Intelligent Shopping
Getting advices in the point of sale according to customer habits, preferences, presence of allergic components for them or expiring dates.

Noise Urban Maps
Sound monitoring in bar areas and centric zones in real time.

Water Leakages
Detection of liquid presence outside tanks and pressure variations along pipes.

Vehicle Auto-diagnosis
Information collection from CanBus to send real time alarms to emergencies or provide advice to drivers.

Item Location
Search of individual items in big surfaces like warehouses or harbours.

OPEN SOURCE

Sustainable Farming and the IoT: Cocoa Research Station in Indonesia

Cloud Server

3G / GPRS

802.15.4 (2.4 GHz)

802.15.4 (2.4 GHz)

Singapore

Parameters measured include:

- Temperature
- Humidity
- Photo-synthetically active radiation (PAR)
- Soil water potential

http://www.libelium.com/sustainable-farming-and-the-iot-cocoa-research-station-in-indonesia/#!prettyPhoto-img%5B20343%5D/1/

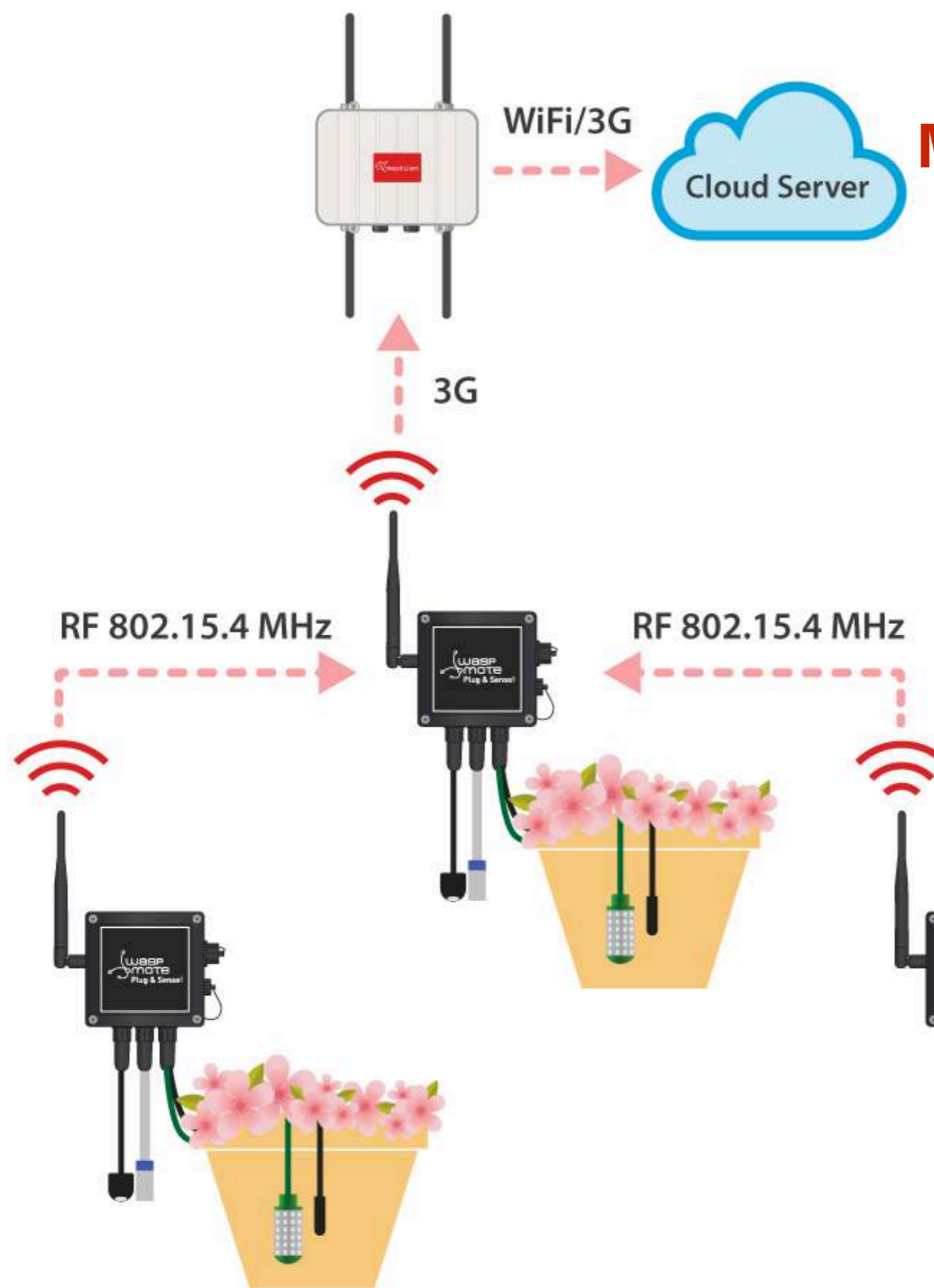**Smart Strawberries Crop Increases the Quality and Reduces the Time from Farm to Market**

Cloud Server

3G / GPRS

3G

3G

Emilia Romagna Region

Parameters measured include:

• Air Temperature
• Soil water potential

Smart Agriculture: Monitoring greenhouse conditions to develop new products in the food industry

WiFi/3G

Cloud Server

3G

RF 802.15.4 MHz

RF 802.15.4 MHz

Flores en la mesa is an Aragonese company that grows and sells fresh edible flowers and crystallized flowers

Parameters measured:

Temperature – Ground + Ambient
Humidity – Ground + Ambient
Ultraviolet

Smart Farming: Monitoring Horses and Equine Facility Management with Waspmote

http://www.libelium.com/smart-farming-monitoring-horses-equine-facility-management-waspmote/#!prettyPhoto
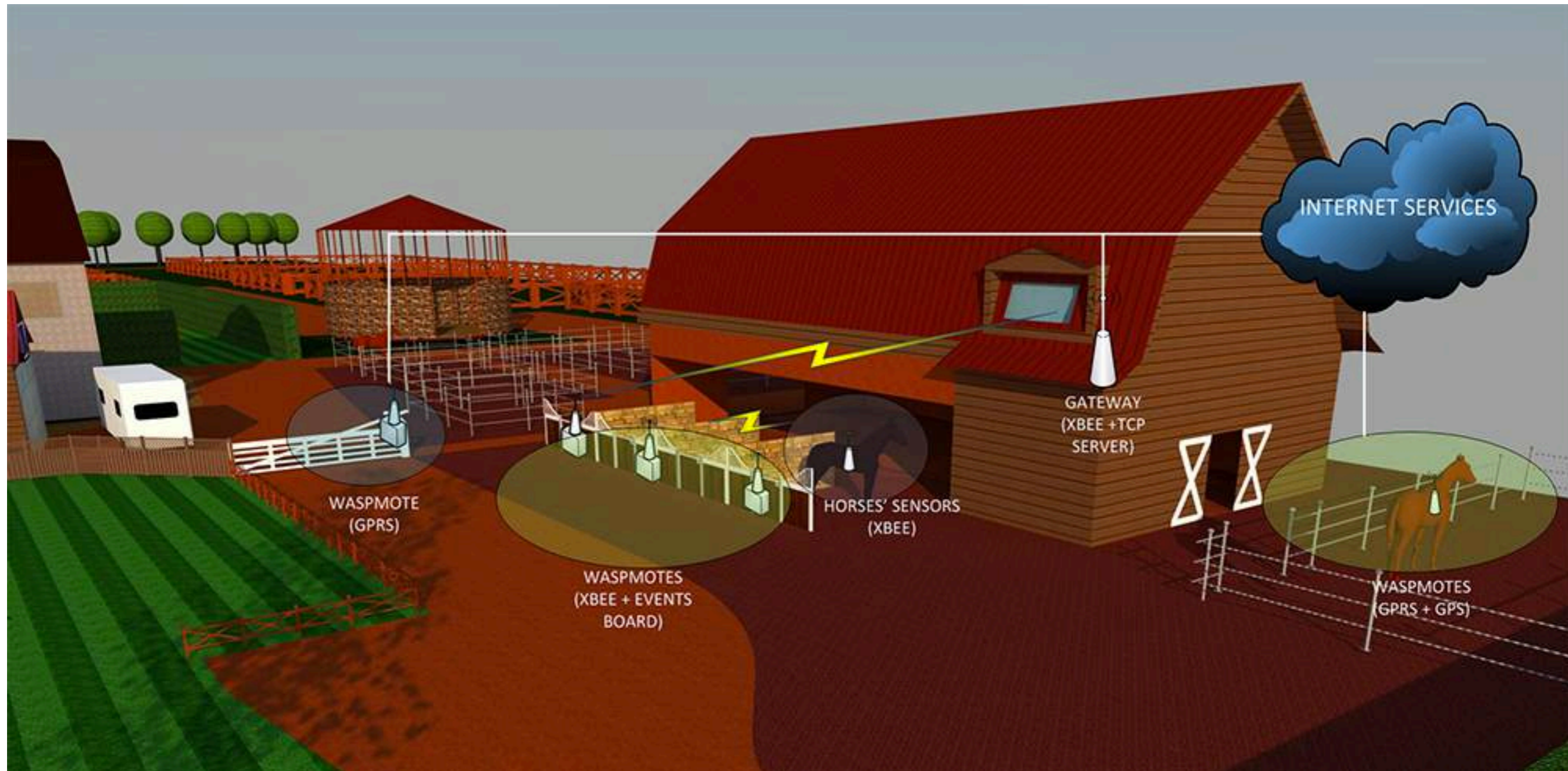
Preventing environmental impact in wastewater irrigation area for the largest meat industry in Australia

The deployment involve Libelium Plug & Sense **soil moisture sensors** installed in a **wastewater irrigation** area as the basis of a real-time operational tool to guide management in **turning irrigation systems on and off using soil moisture as a key indicator**.

**Management of soil moisture in wastewater irrigation is essential for the protection of groundwater from nitrate contamination.**

3G / GPRS

3G / GPRS

Cloud Server
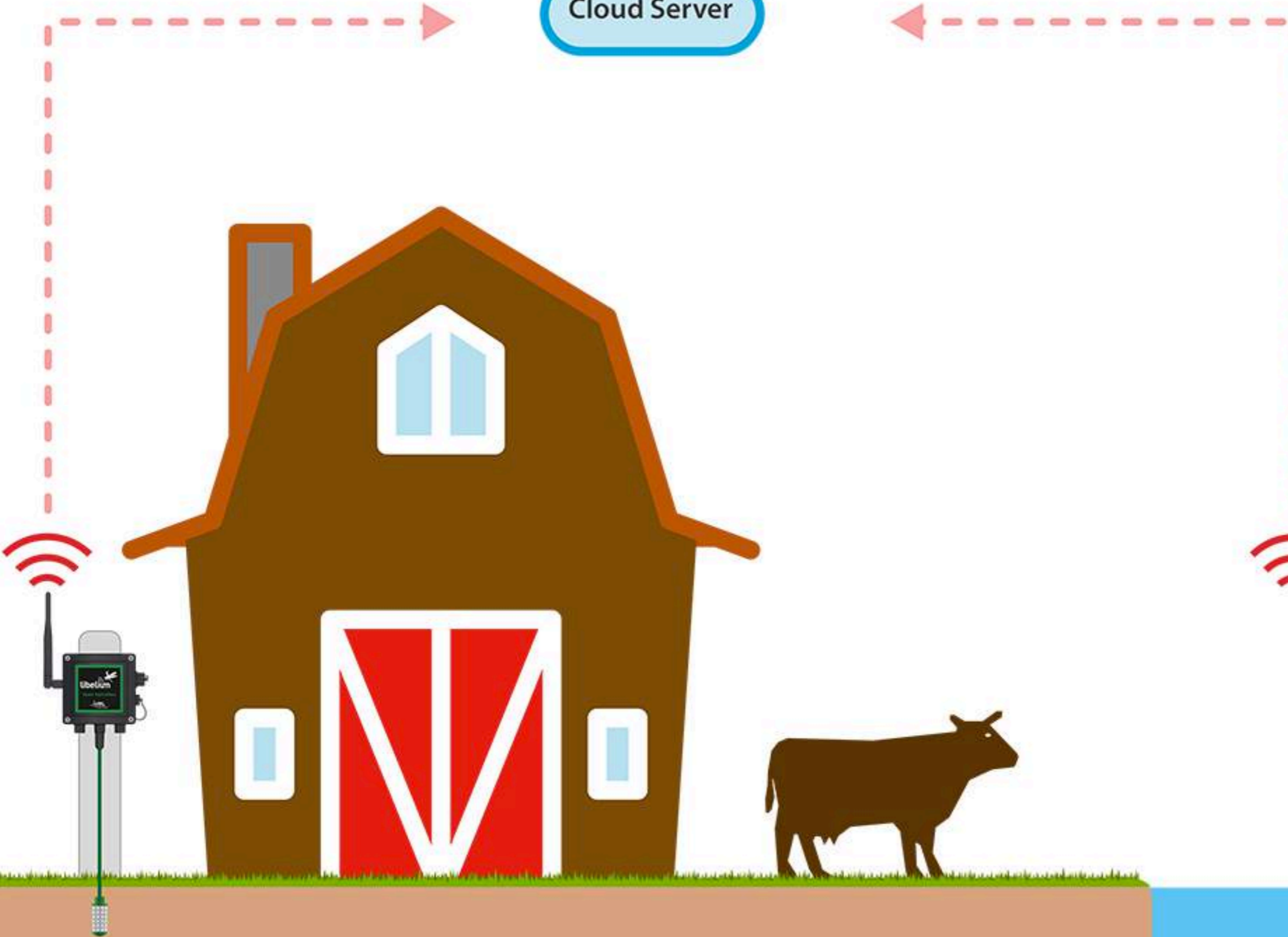
- Monitoring environmental factors is not enough and complete solution to improve the yield of the crops.

- **There are number of other factors that affect the productivity to great extent**. These factors include **attack of insects and pests** which can be controlled by **spraying the crop with proper insecticide and pesticides**. Secondly, **attack of wild animals and birds** when the crop grows up. There is also possibility of **thefts** when crop is at the stage of harvesting. Even after harvesting, farmers also face problems in storage of harvested crop.

- So, in order to provide solutions to all such problems, it is necessary to develop **integrated system** which will take care of all factors affecting the productivity in every stages like; cultivation, harvesting and post harvesting storage.

- The paper aims at making agriculture smart using automation and IoT technologies. The highlighting features of this paper includes **smart GPS based remote controlled robot** to perform tasks like; **weeding, spraying, moisture sensing, bird and animal scaring, keeping vigilance**, etc. Secondly, it includes **smart irrigation** with smart control based on real time field data. Thirdly, **smart warehouse management** which includes; **temperature maintenance, humidity maintenance and theft detection** in the warehouse.
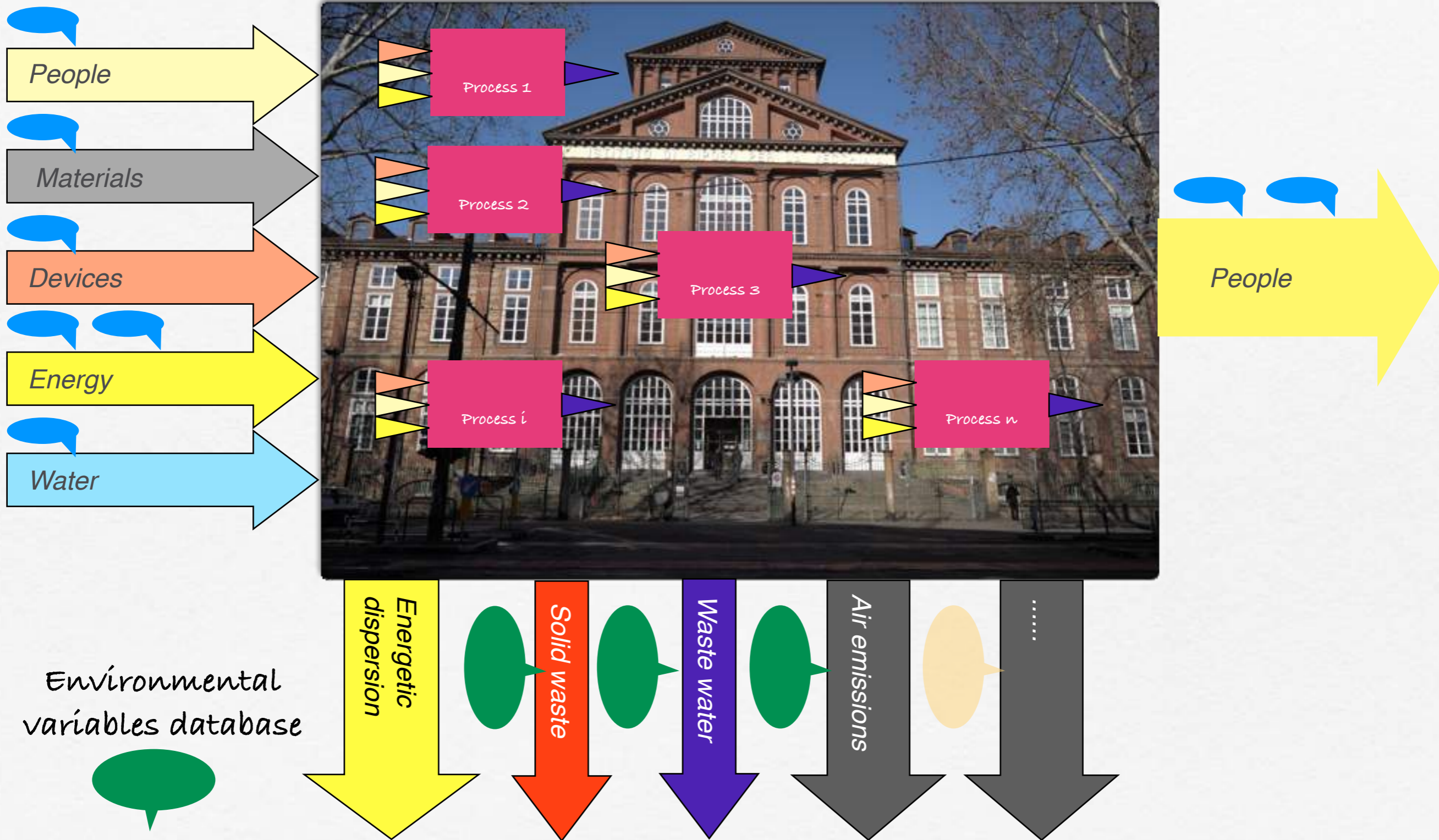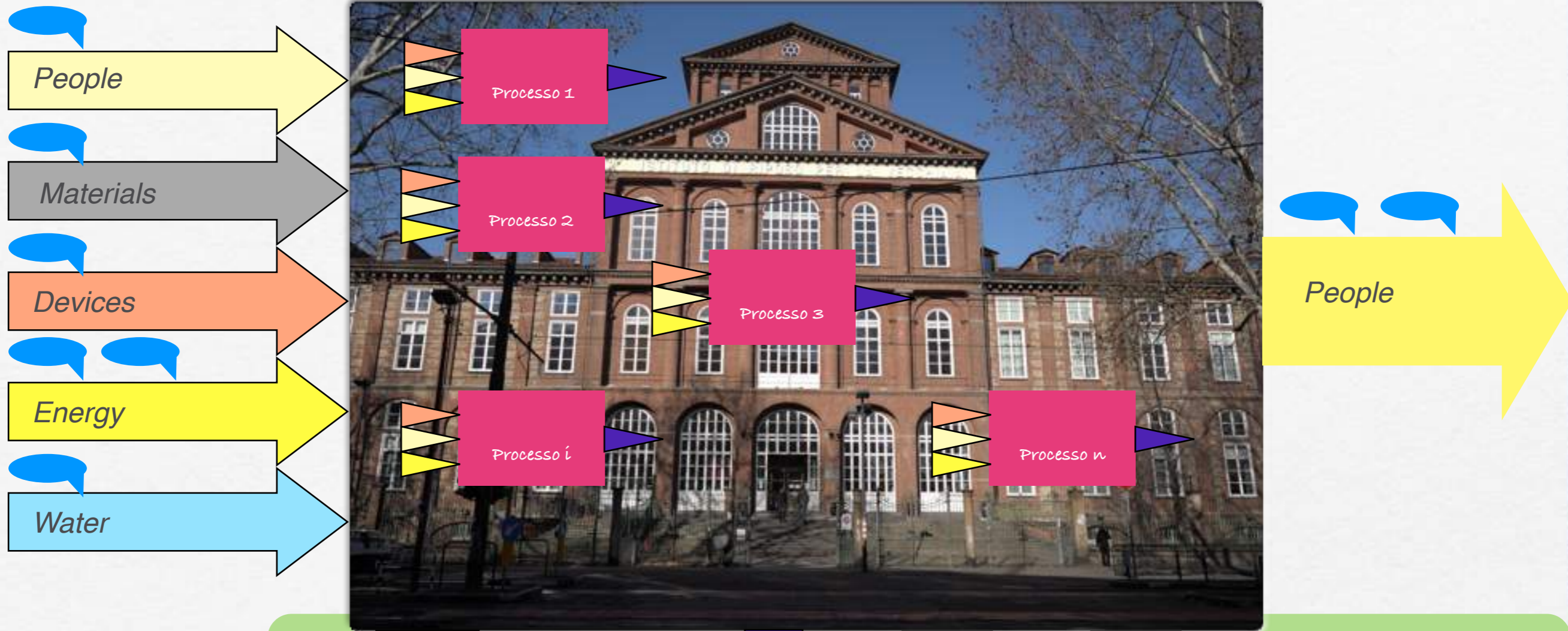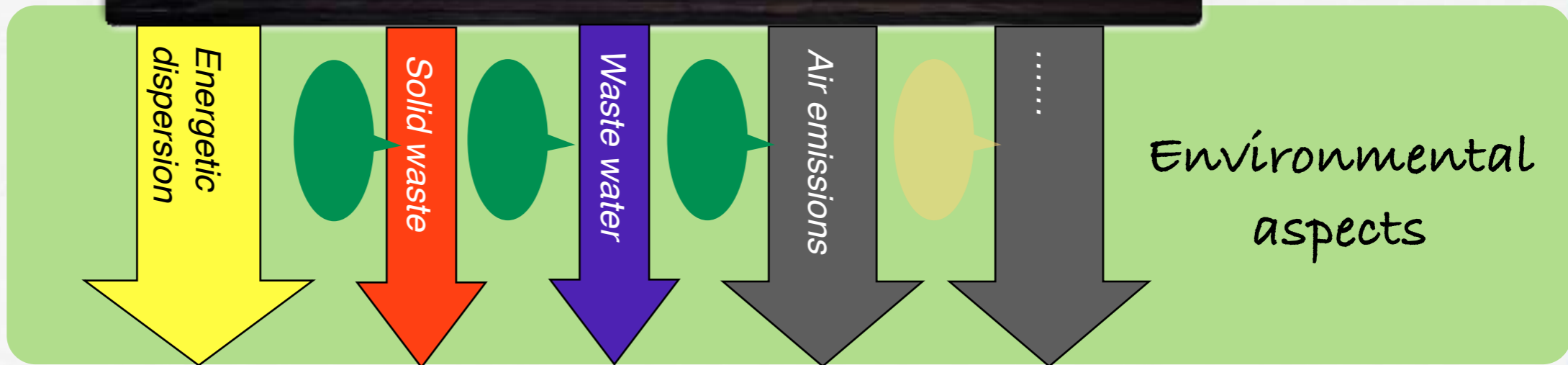
MANAGEMENT SYSTEMS (MMSS)
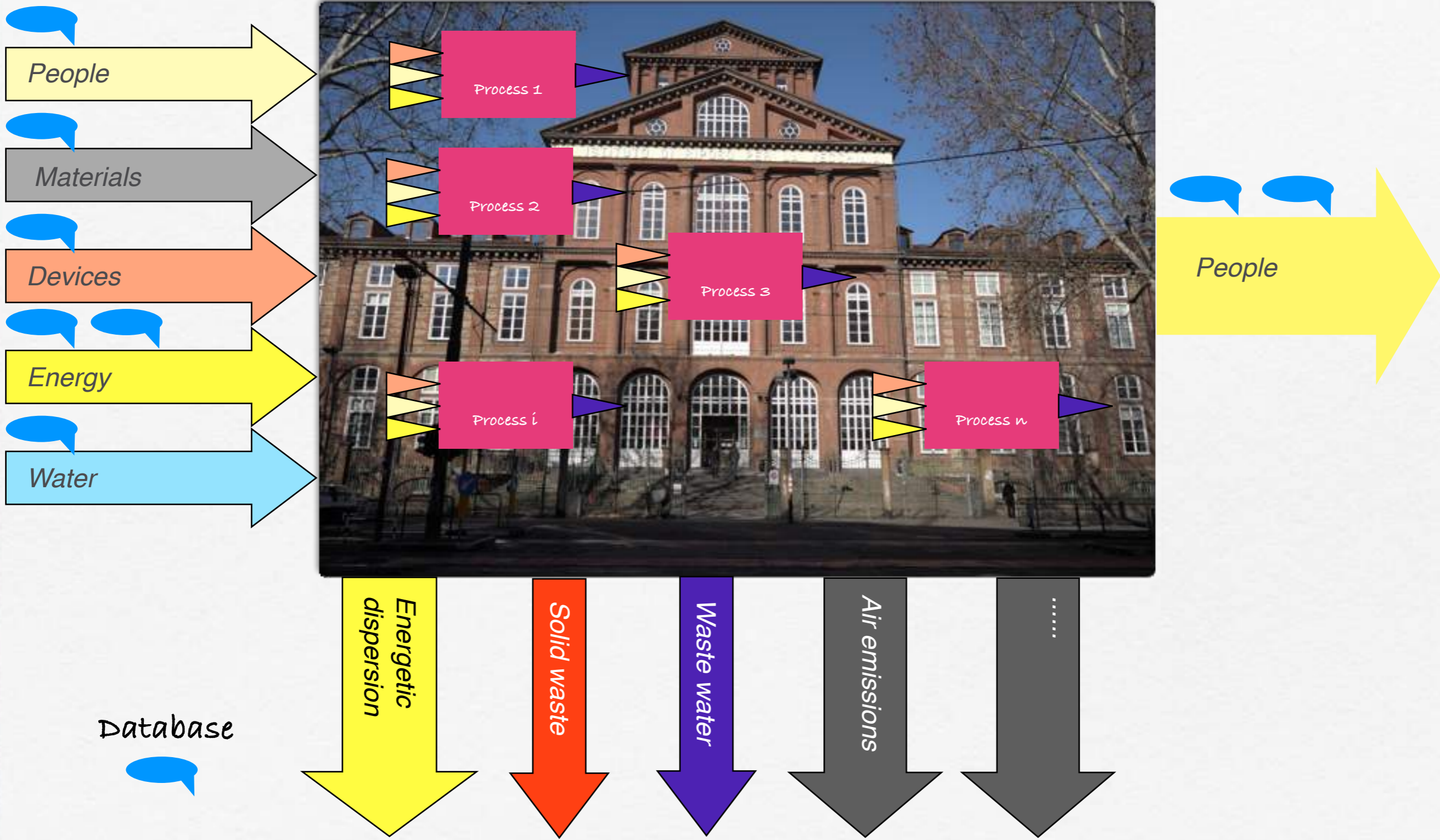
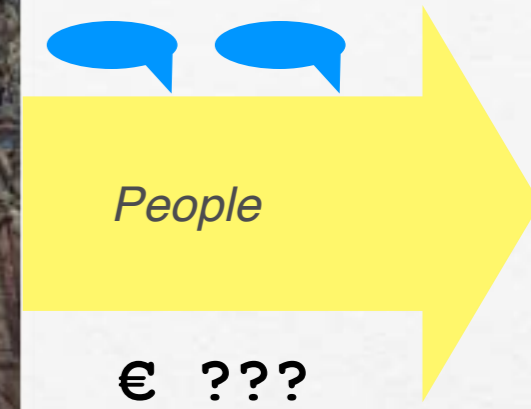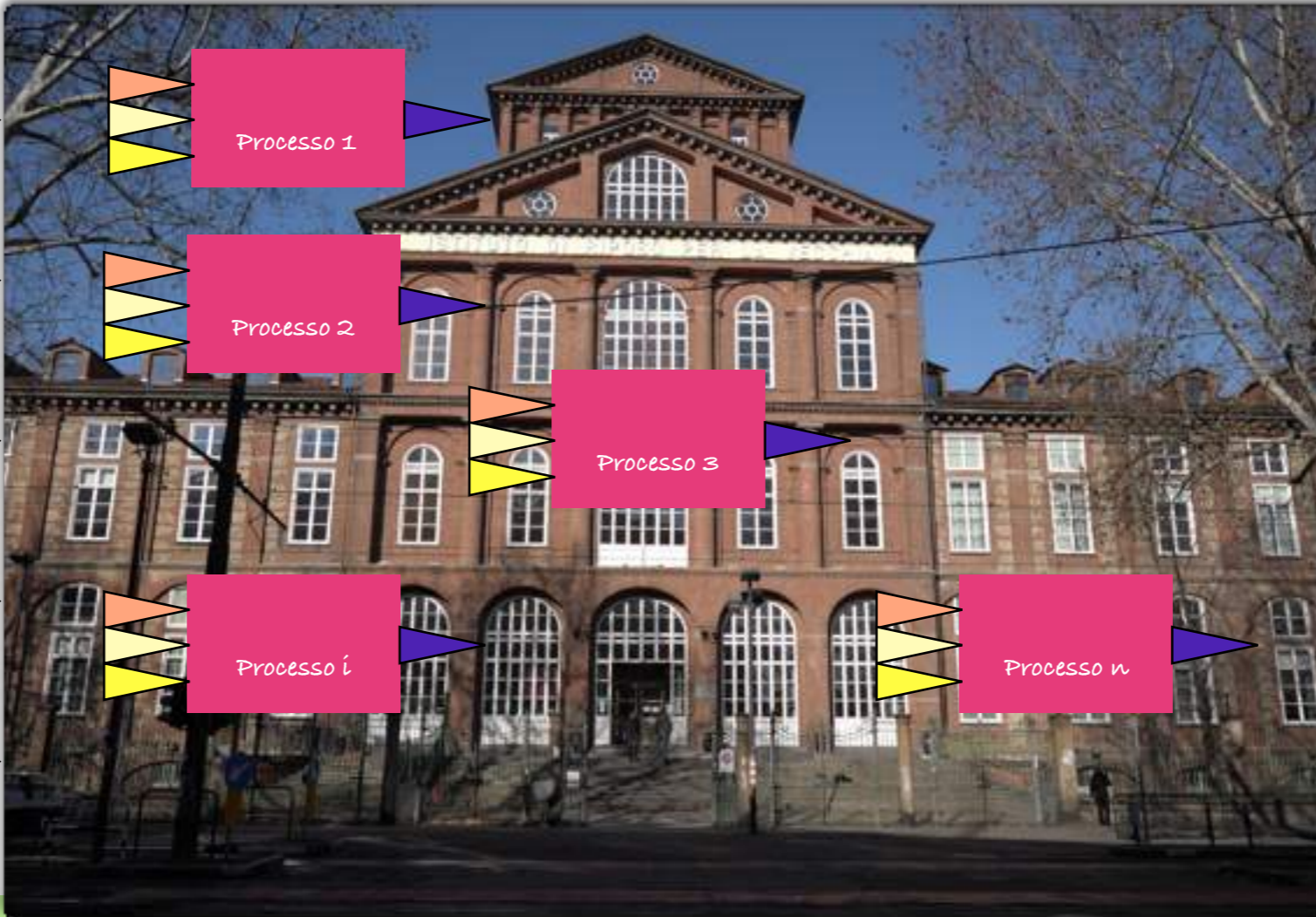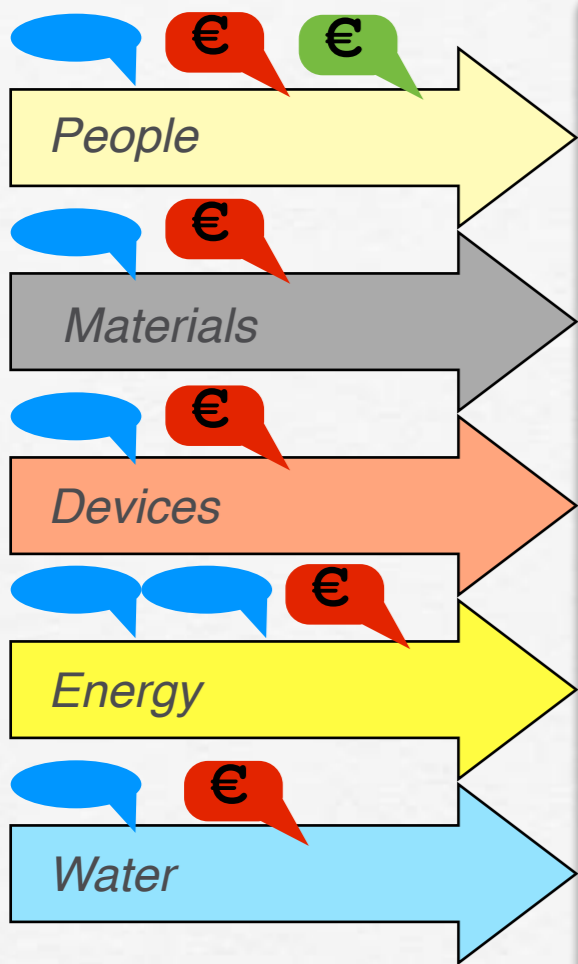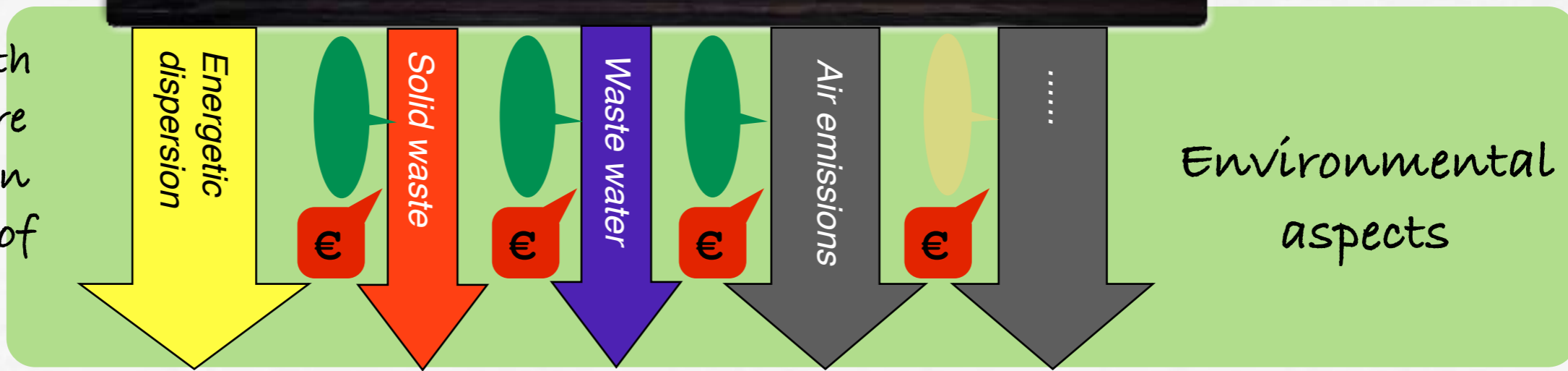# MANAGEMENT SYSTEMS

- ISO 9000: standards for quality management systems

- ISO 14000 standards for environmental management systems

- ILO-OSH: occupational safety & health management systems

- SA8000: social accountability.

Environmental Management Systems

- The EMSs are based on two schemes:

  - International Standard ISO 14001:2015
  - European Regulation EMAS (1221/2009)

- Both of them are founded on the Deming Cycle methodology.
  - Plan.
  - Do.
  - Check.
  - Act.

THE ENVIRONMENTAL MANAGEMENT SYSTEMS

- **Plan**: evaluation of the environmental aspects and their relevance, the evaluation of the legal requirements and the identification of objectives

- **Do**: implementation of all the necessary procedures (communication, documents, training, etc)

- **Check**: verify the correct implementation of the EMS in terms of performances, evaluation of the non conformances

- **Act**: review the EMS and re-determine objectives and the environmental policy

- **First of all: Environmental Preliminary Analysis**
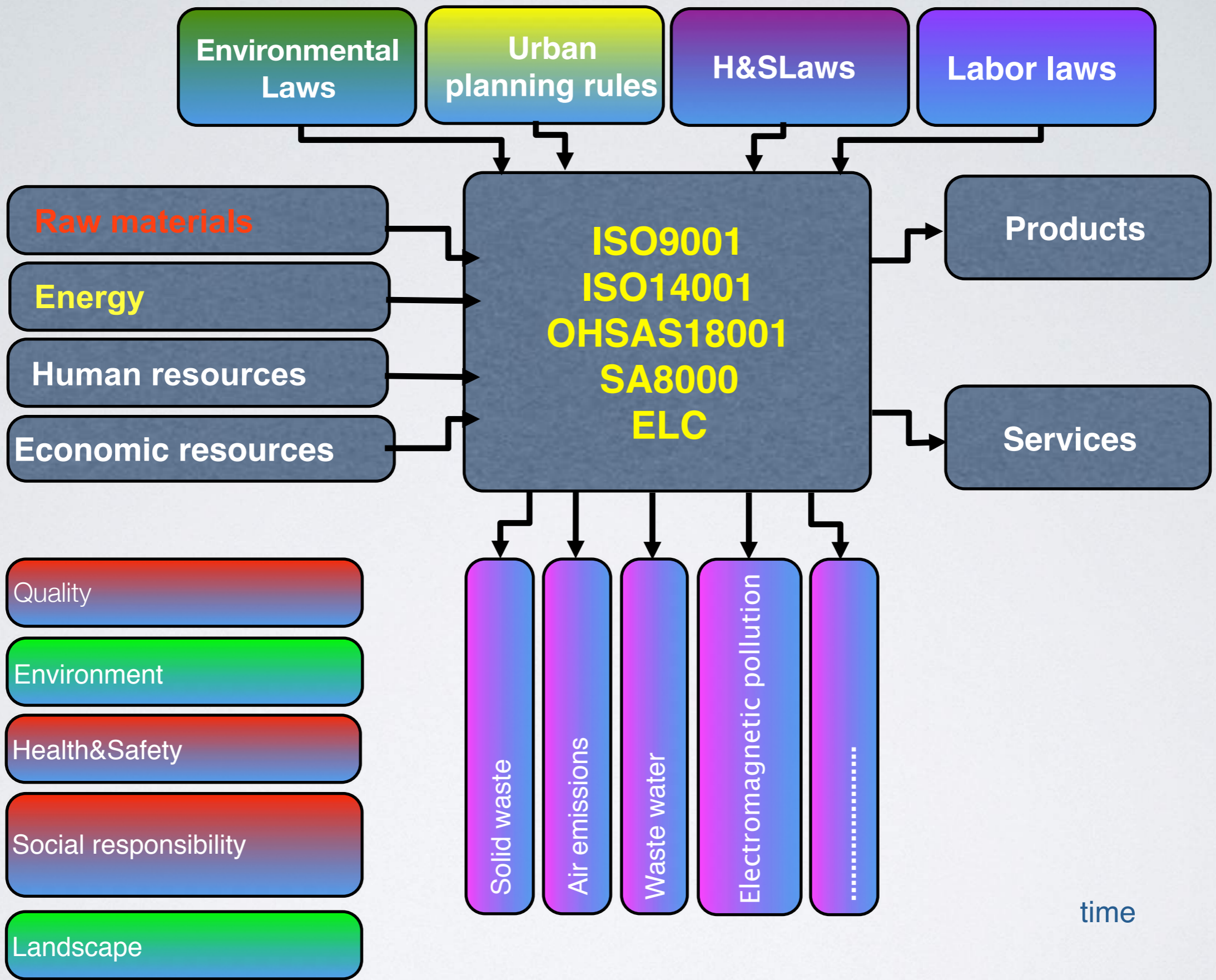
-Official statistics of the European EMAS Helpdesk-
Evolution of Organisations and Sites* (October 2016)

Sustainability report as company value, Prof. Beltramo, Unito

http://ec.europa.eu/environment/emas/emas_registrations/statistics_graphs_en.htm

-Official statistics of the European EMAS Helpdesk-
Leading Service Sectors* (October 2016)

-Official statistics of the European EMAS Helpdesk-
Leading Industrial Sectors* (October 2016)

http://ec.europa.eu/
environment/emas/
emas_registrations/
statistics_graphs_en.ht
m

Top 10 countries for ISO 14001 certificates

1	China	114,303
2	Japan	26,069
3	**Italy**	**22,350**
4	United Kingdom	17,824
5	Spain	13,310
6	Romania	10,581
7	Germany	8,224
8	France	6,847
9	India	6,782
10	United States of America	6,067

**UPDATE
ISO 14001:2004: 22,163
sites
(**ACCREDIA, Italian Organisation for Accreditation, 2017)

Top five industrial sectors for ISO 14001 certificates 2015

1	Construction	43,759
2	Basic metal & fabricated metal products	24,171
3	Electrical and optical equipment	22,183
4	Wholesale&retail trade, repairs of motor vehicles	17,967
5	Machinery and equipment	14,024

ISO Survey, 2015

The Environmental Management System concept
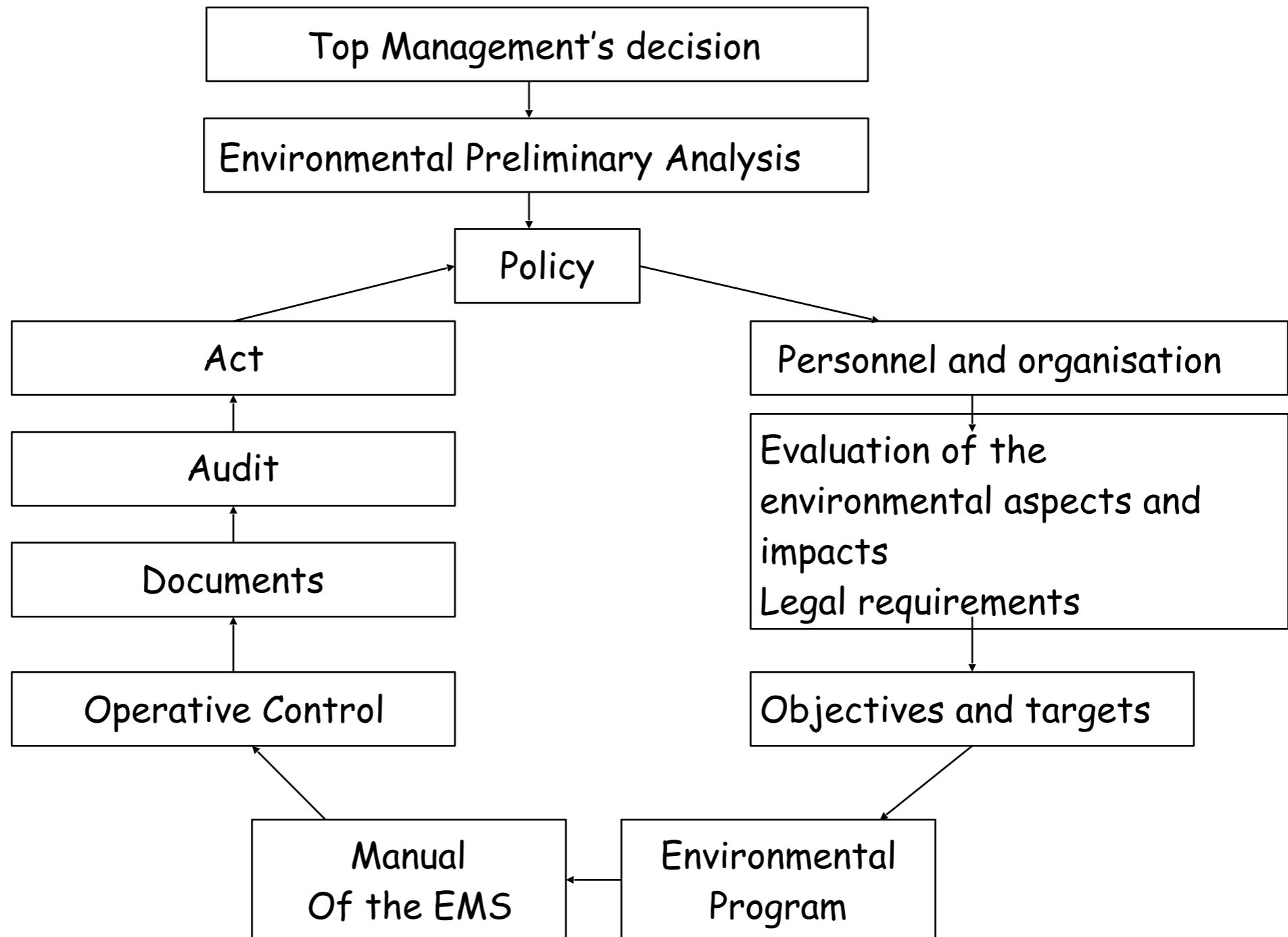
```
                    ┌─────────────────────────────┐
                    │   Top Management's decision  │
                    └──────────────┬──────────────┘
                                   ↓
                    ┌─────────────────────────────┐
                    │ Environmental Preliminary Analysis │
                    └──────────────┬──────────────┘
                                   ↓
                            ┌──────────┐
                            │  Policy  │
                            └──────────┘
                          ↙              ↘
```

| Act | | Personnel and organisation |

| Audit | | Evaluation of the environmental aspects and impacts / Legal requirements |

| Documents | | Objectives and targets |

| Operative Control | | Environmental Program |

| Manual Of the EMS | |

□ Mission:

Spreading the culture of Sustainable Development

☐Vision: A Scatol8® for all ovvero To Each His own Scatol8®
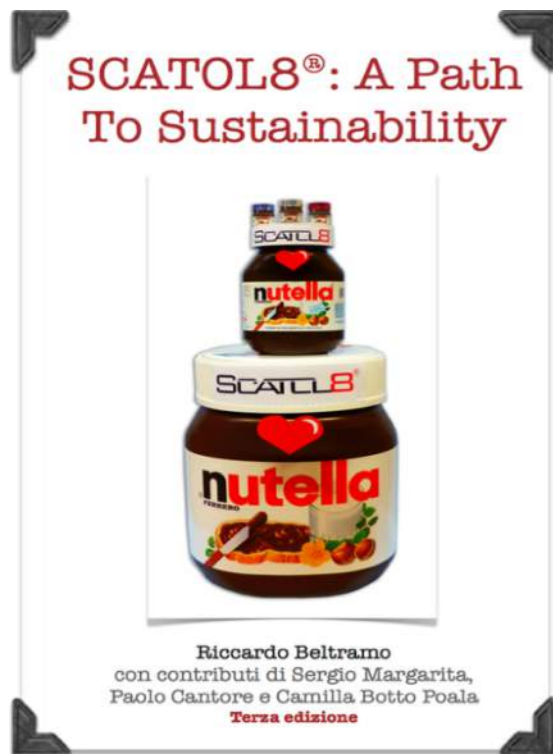
ACCESSIBILITY

MODULARITY

ENVIRONEMENTAL COMPATIBLITY

Hardware and software are fully based on open technologies

The system is constituted from time to time, according to the requirements and specifications of each application

When possible, all electronic devices are placed in recycled containers or made of wood, on individual aestethic taste

SCATOL8®: A Path To Sustainability

Riccardo Beltramo
con contributi di Sergio Margarita,
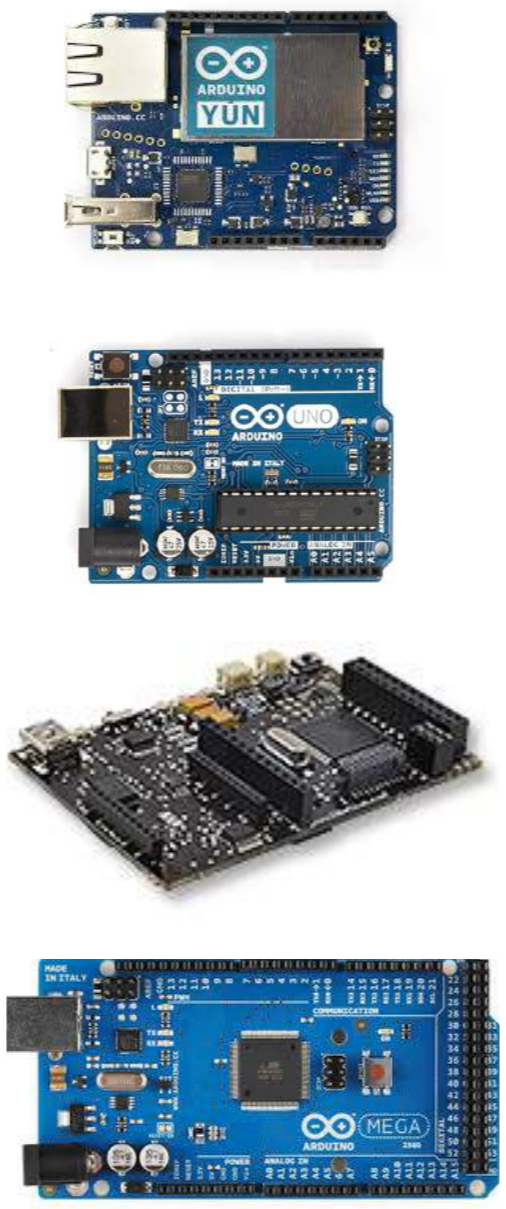Paolo Cantore e Camilla Botto Poala
Terza edizione

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Scatol8®

- Records are the key points for checking the system and calculating indicators.

- Scatol8® is a remote sensing network of environmental, landscape and management variables based on free and open technology (hardware and software)

- Scatol8® consists of a central unit and of peripheral units, connected in a network. Sensors are connected to peripheral units which transmit the data to a central unit, connected with a server.

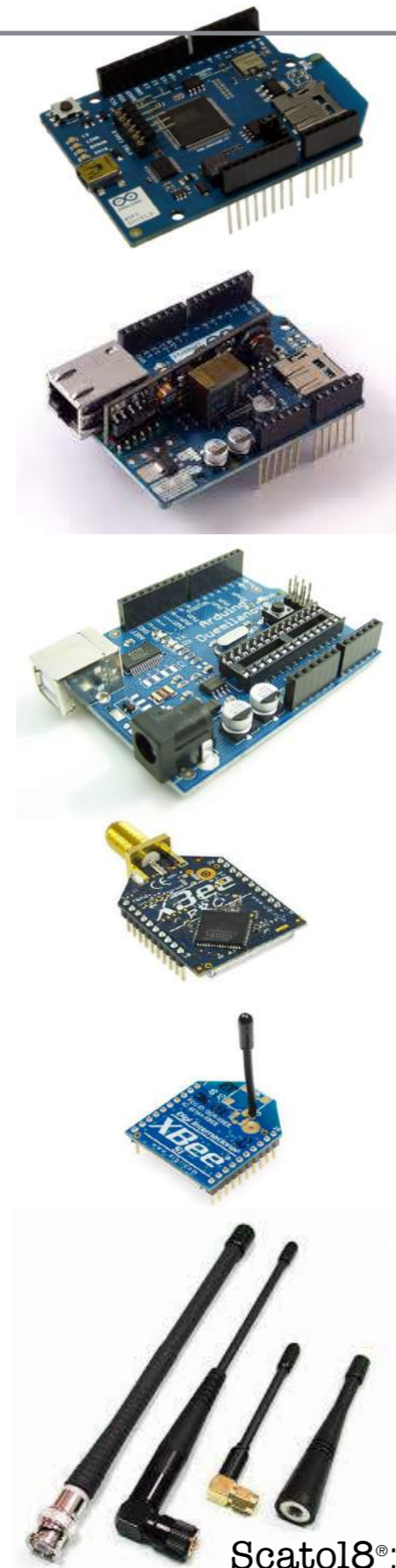- It is possible to create a real-time monitoring of each measured variable, as well as evaluate their performance over time.
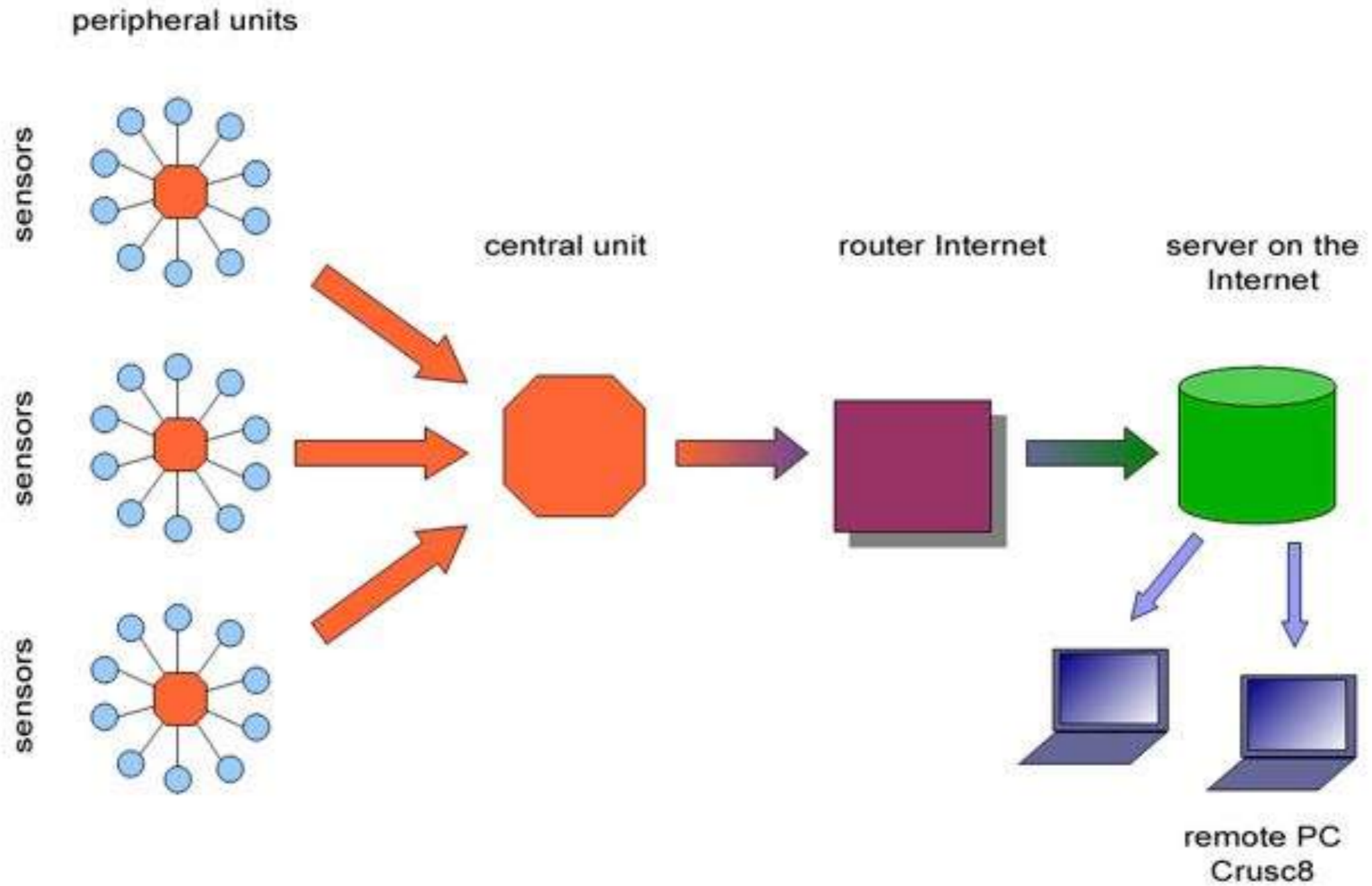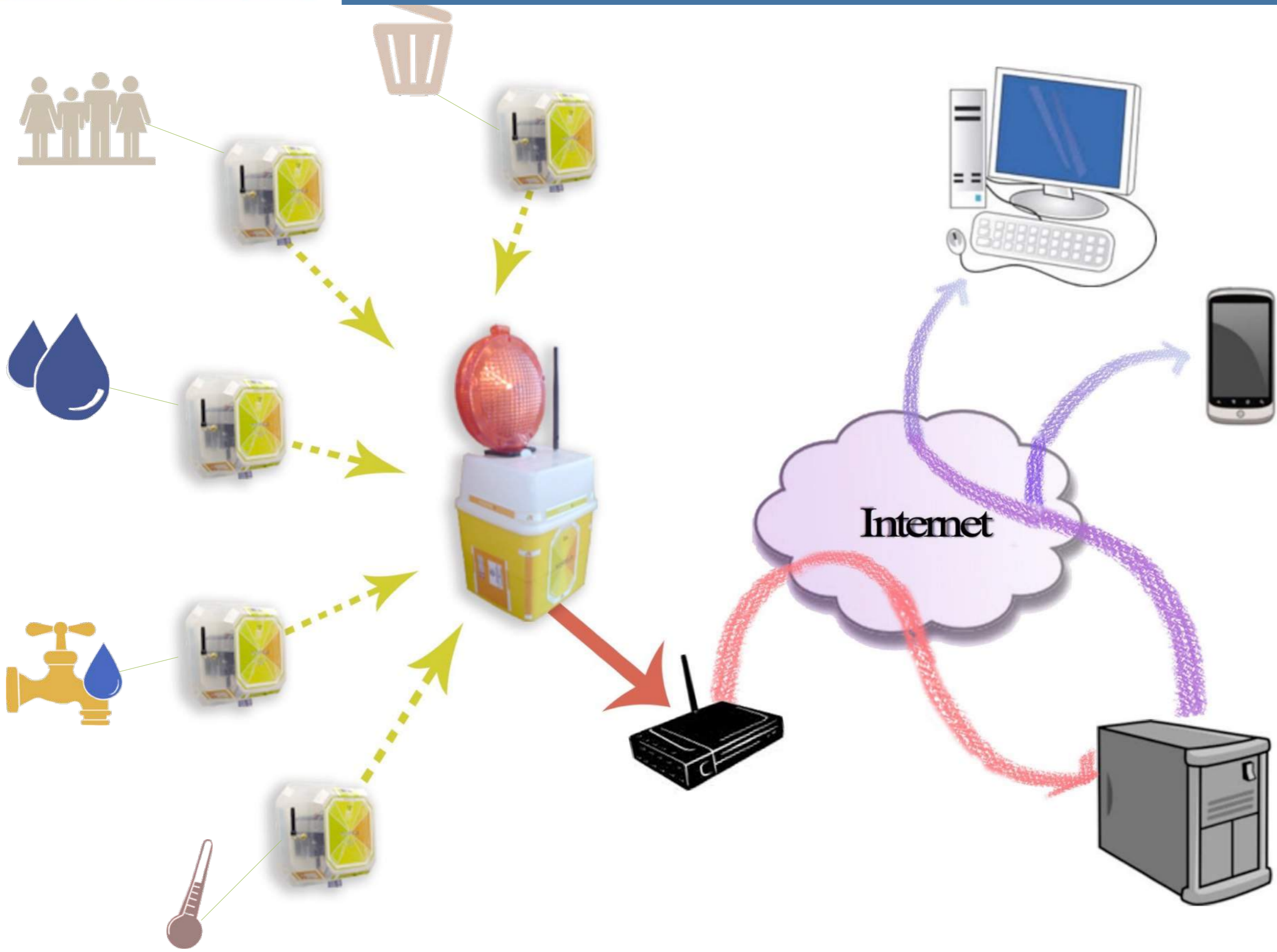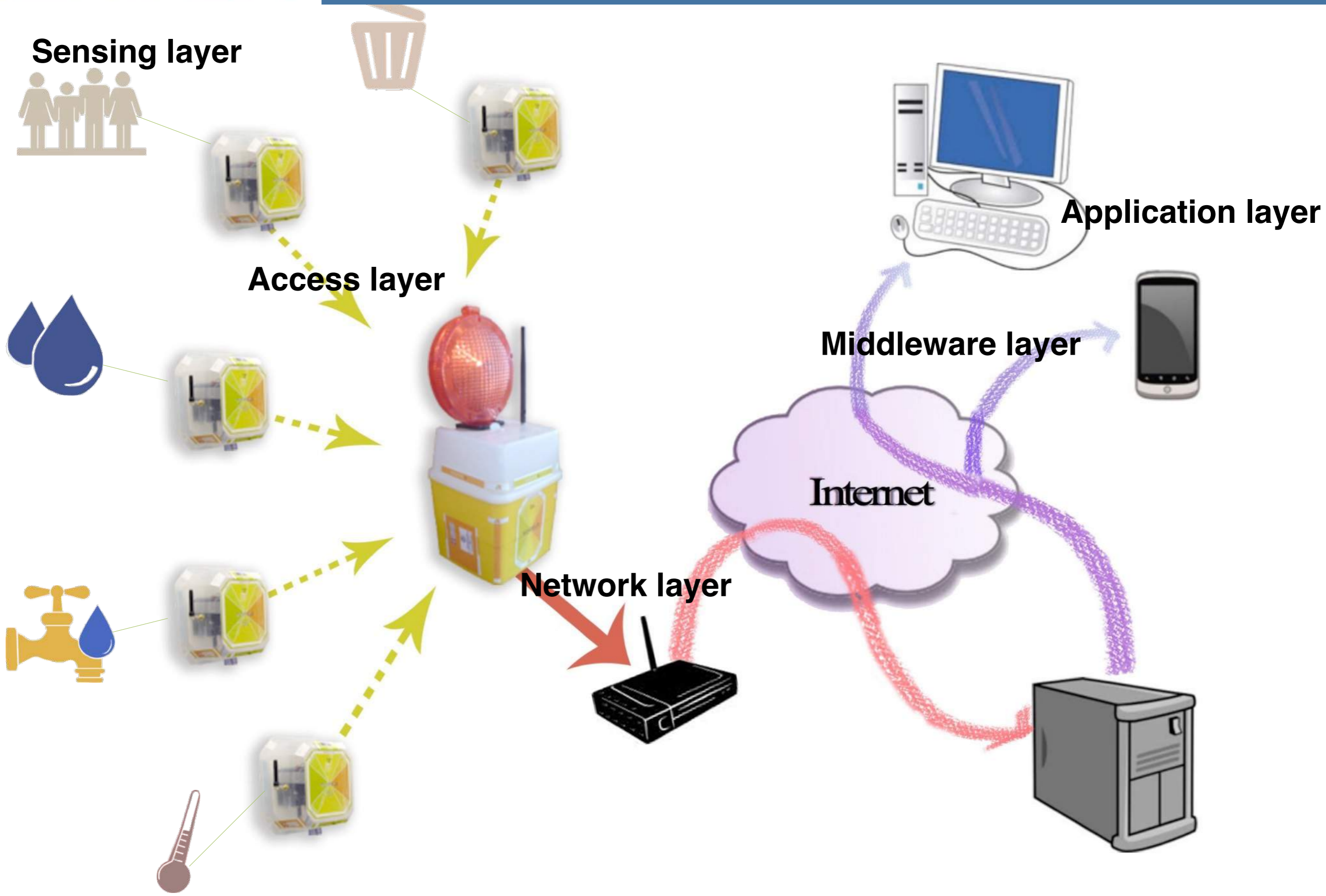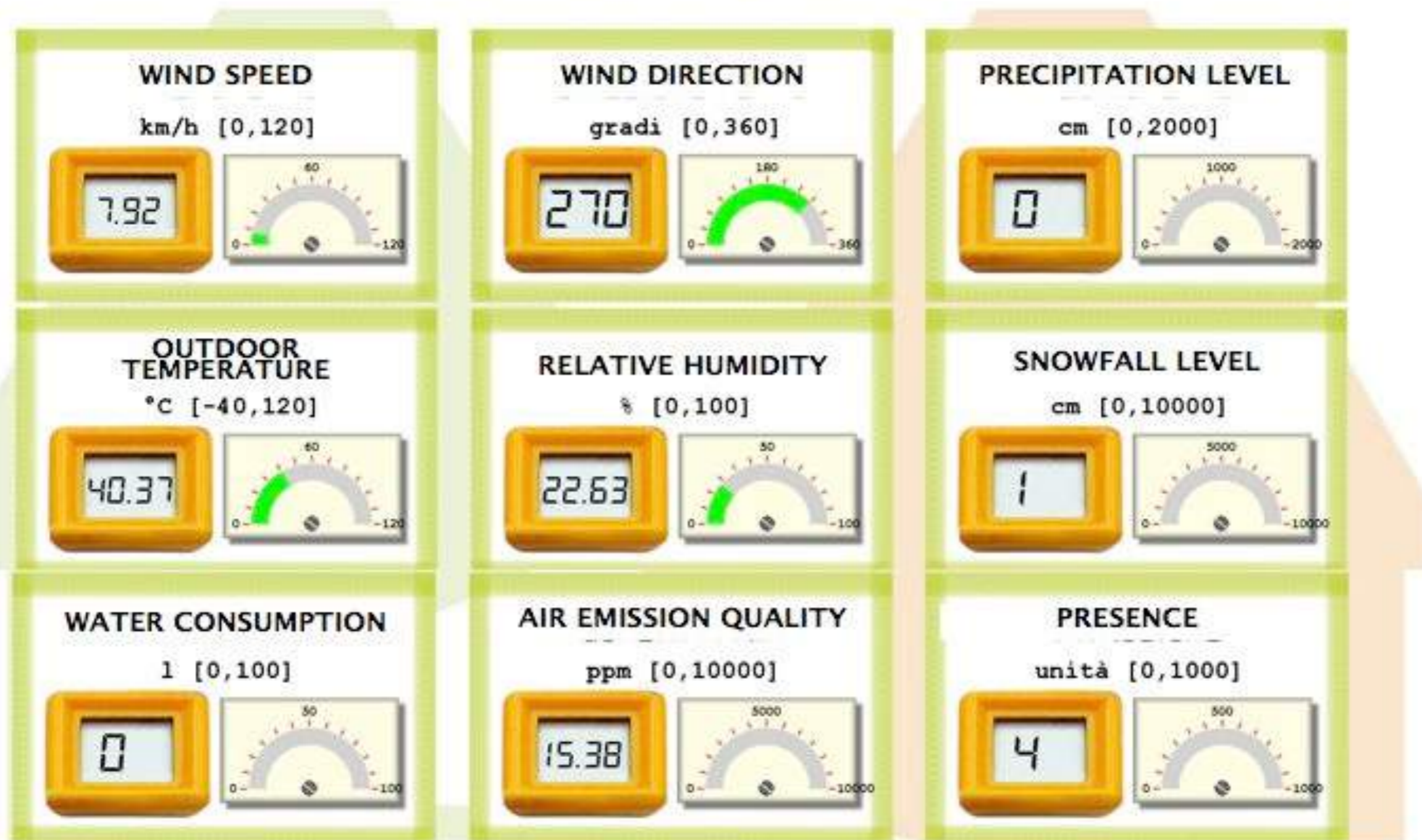
sensors

microcontroller

transmission

actuators

SCATOL8®

Scatol8®: A Path To Sustainability

peripheral units

sensors

sensors

sensors

central unit

router Internet

server on the Internet

remote PC Crusc8

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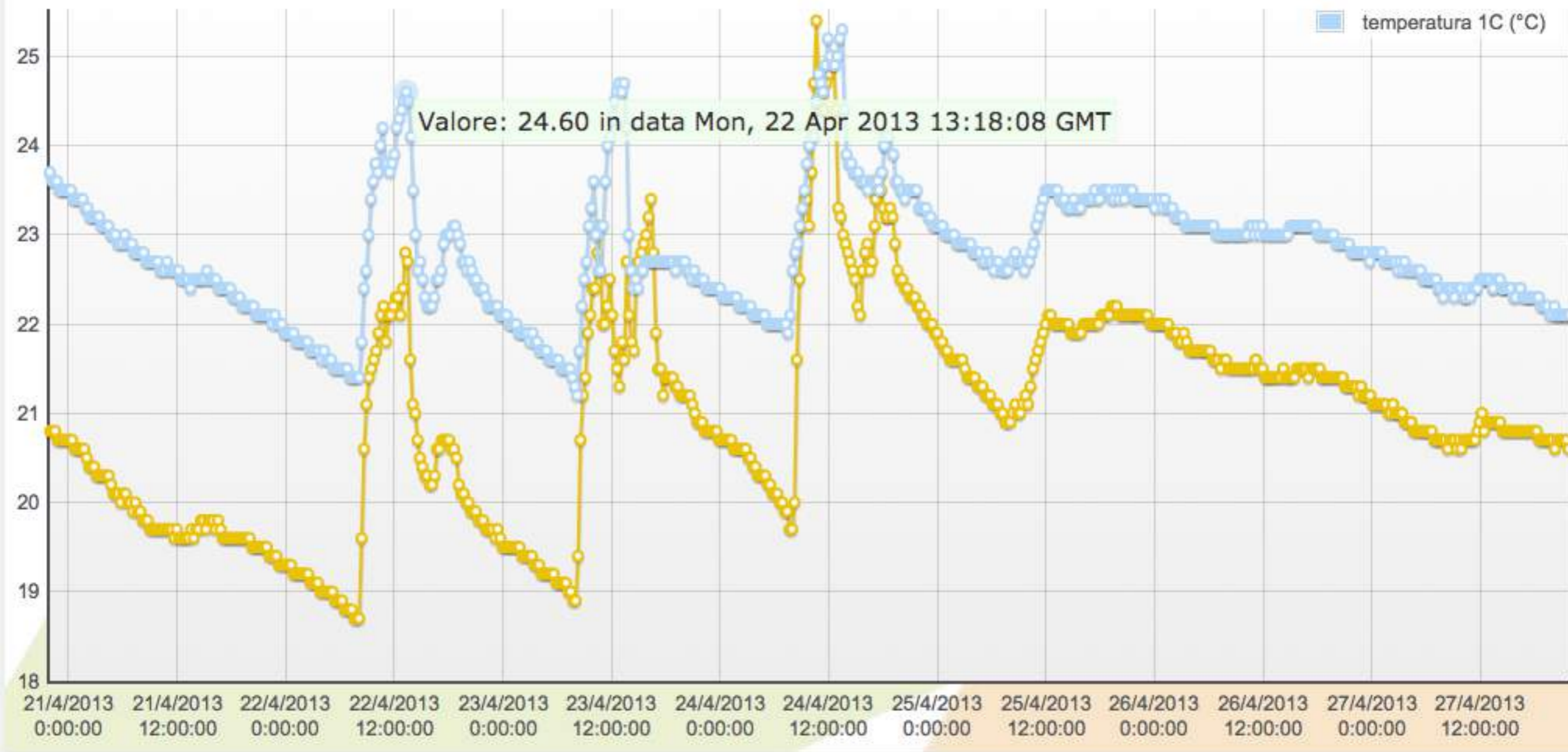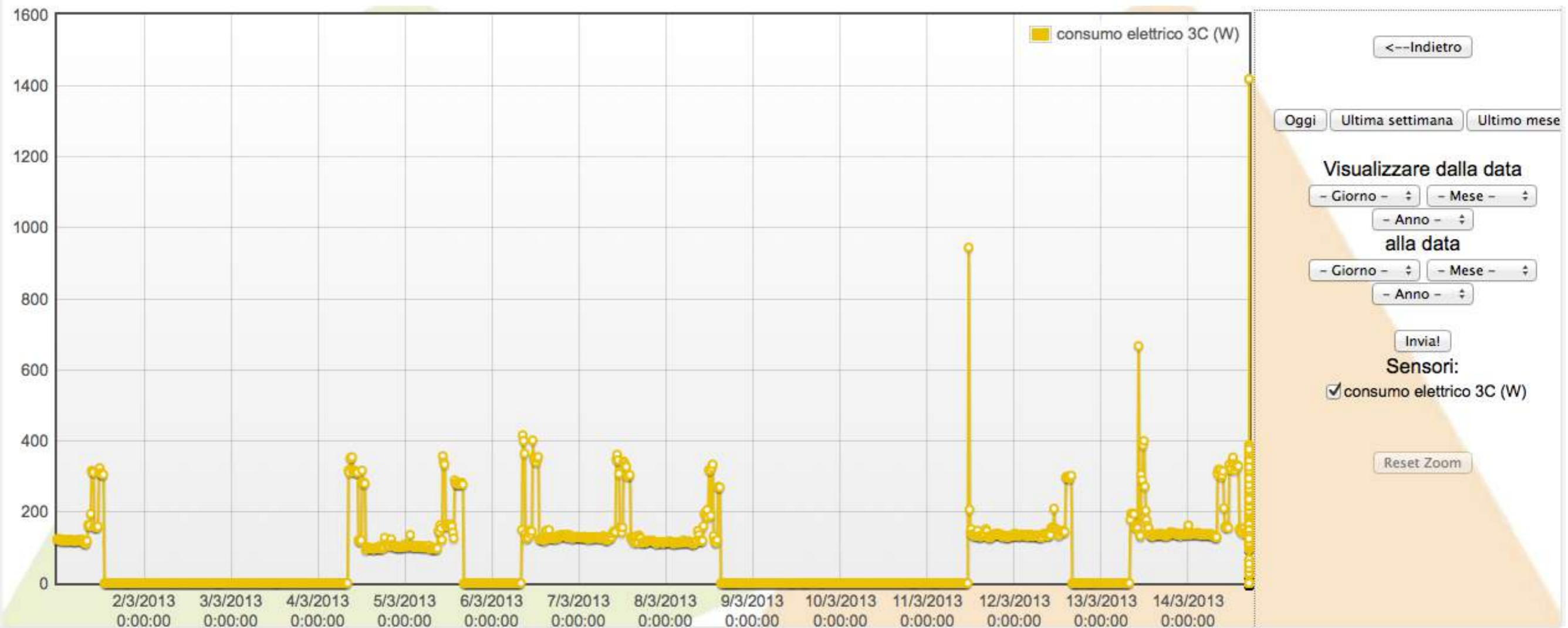Tailor-made sensors & network

Data observation and analysis

Comparison of time series

Identification of patterns

Our experience

Precision Agriculture: Predicting Vineyard Conditions, Preventing Disease

Wireless sensor networks enable many new opportunities and innovations in the field of Predictive systems.

With these, **pest prevention and irrigation can be administered when necessary**. The end result is improved management, better grape quality, and lower costs.

The sensors are camouflaged as fanciful animals…

…and the dashboard shows the intensity of monitored variables…

Baril8

scatol8.net

Partner

Lo Scatol8 per la Sostenibilità

Cantina Cooperativa Terre dei Santi

Cà Mariuccia

Malino Felice

Fratelli Savio

Distilleria Beccaris

Baril8 - Sistema per l'introduzione di modelli innovativi di viticoltura circolare, per produzioni di qualità tracciate territoriali sostenibili
Lo schema progettuale
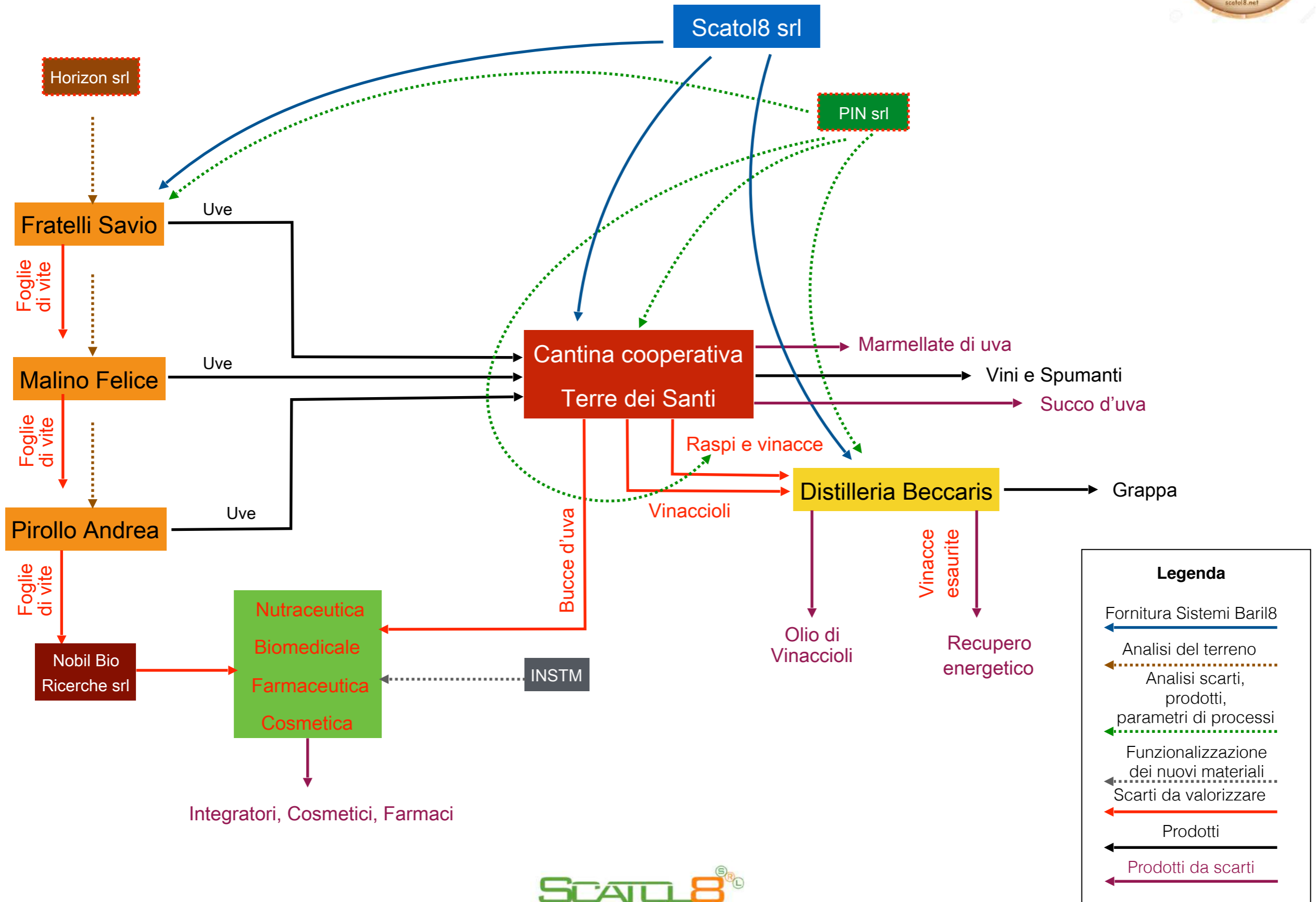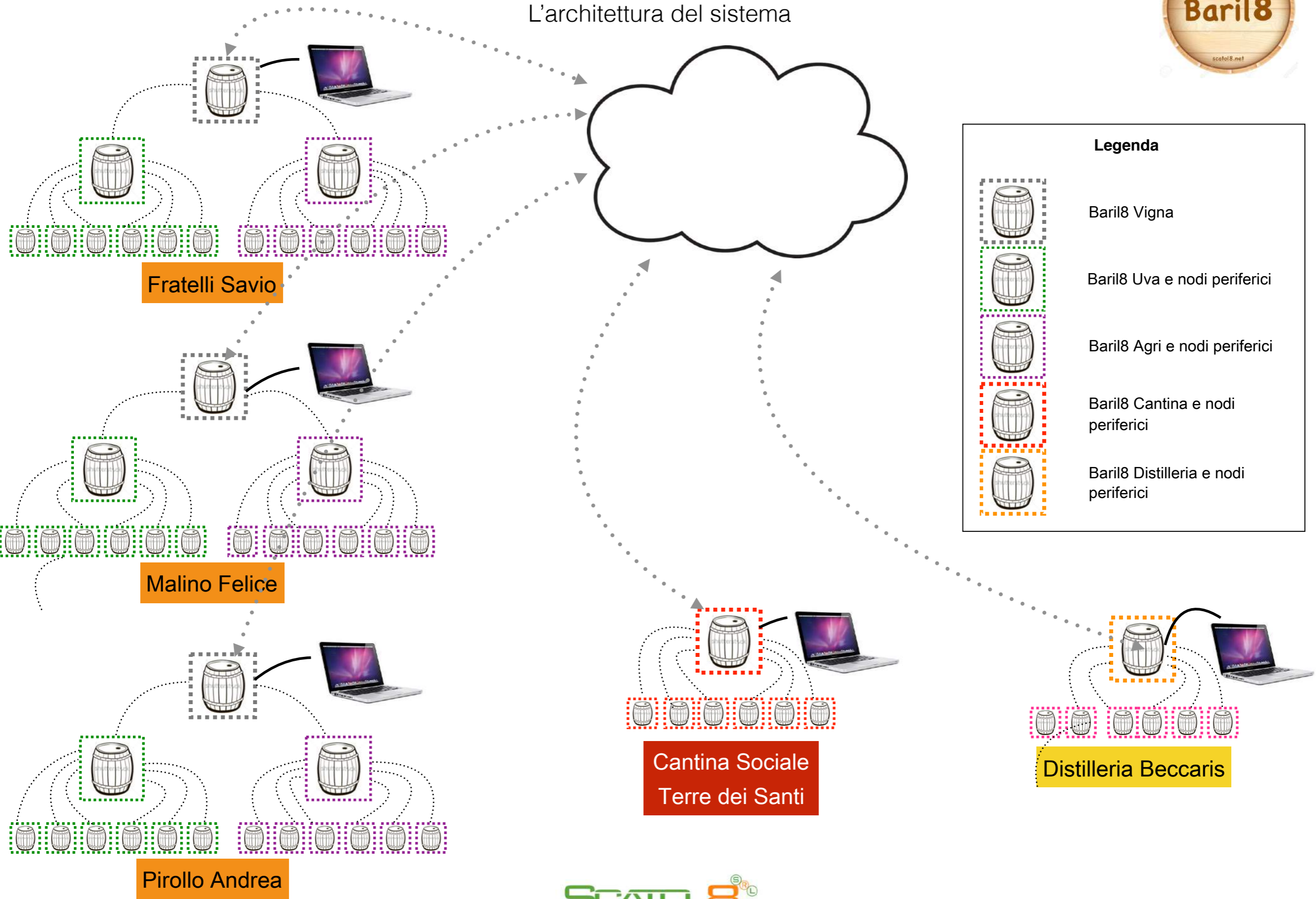
Baril8 - Sistema per l'introduzione di modelli innovativi di viticoltura circolare, per produzioni di qualità tracciate, territoriali e sostenibili

L'architettura del sistema

Baril8

scatol8.net

Fratelli Savio

Malino Felice

Pirollo Andrea

Cantina Sociale Terre dei Santi

Distilleria Beccaris

Legenda

Baril8 Vigna

Baril8 Uva e nodi periferici

Baril8 Agri e nodi periferici

Baril8 Cantina e nodi periferici

Baril8 Distilleria e nodi periferici

SCATOL8 ®SRL
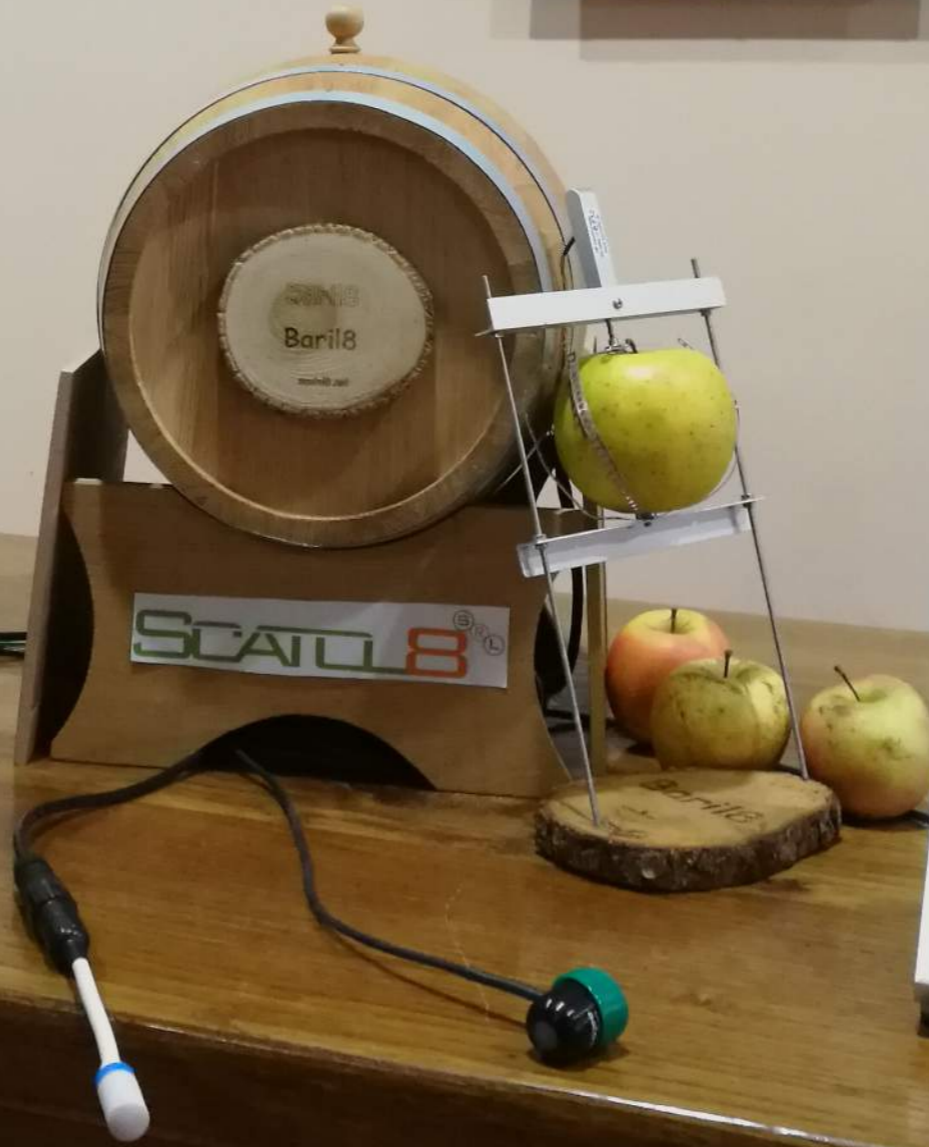
IS THE INTERNET OF THINGS HELPFUL TO MANAGEMENT SYSTEMS IMPLEMENTATION?

RELATIONS BETWEEN SCATOL8 AND EMS		
DEMING CYCLE PHASES	DIRECT CONTRIBUTION	INDIRECT CONTRIBUTION
PLAN		
4.3.1 – Environmental aspects	★	
4.3.2 – Legal and other requirements		★
4.3.3 – Objectives, targets and programme(s)	★	

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DEMING CYCLE	DO	
4.4.1 – Resources, roles, responsibility and authority		
4.4.2 – Competence, training and awareness	★	
4.4.3 – Communication	★	
4.4.4 – Documentation		
4.4.5 – Control of documents		
4.4.6 – Operational control	★	
4.4.7 – Emergency preparedness and responses	★	

DEMING CYCLE   CHECK

4.5.1 – Monitoring and measurement	★	
4.5.2 – Evaluation of compliance	★	
4.5.3 – Non-conformity, corrective and preventive action	★	
4.5.4 – Control of records	★	
4.5.5 – Internal audit	★	

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The Top management should review the EMS at planned intervals for ensuring its adequacy, effectiveness and suitability		★

Thank You for Your kind attention!
riccardo.beltramo@unito.it

http://scatol8.net
http://www.slideshare.net/scatol8
https://www.youtube.com/user/Scatol8
https://www.facebook.com/scatol8/