Bioeconomy ⇄ Internet of Things

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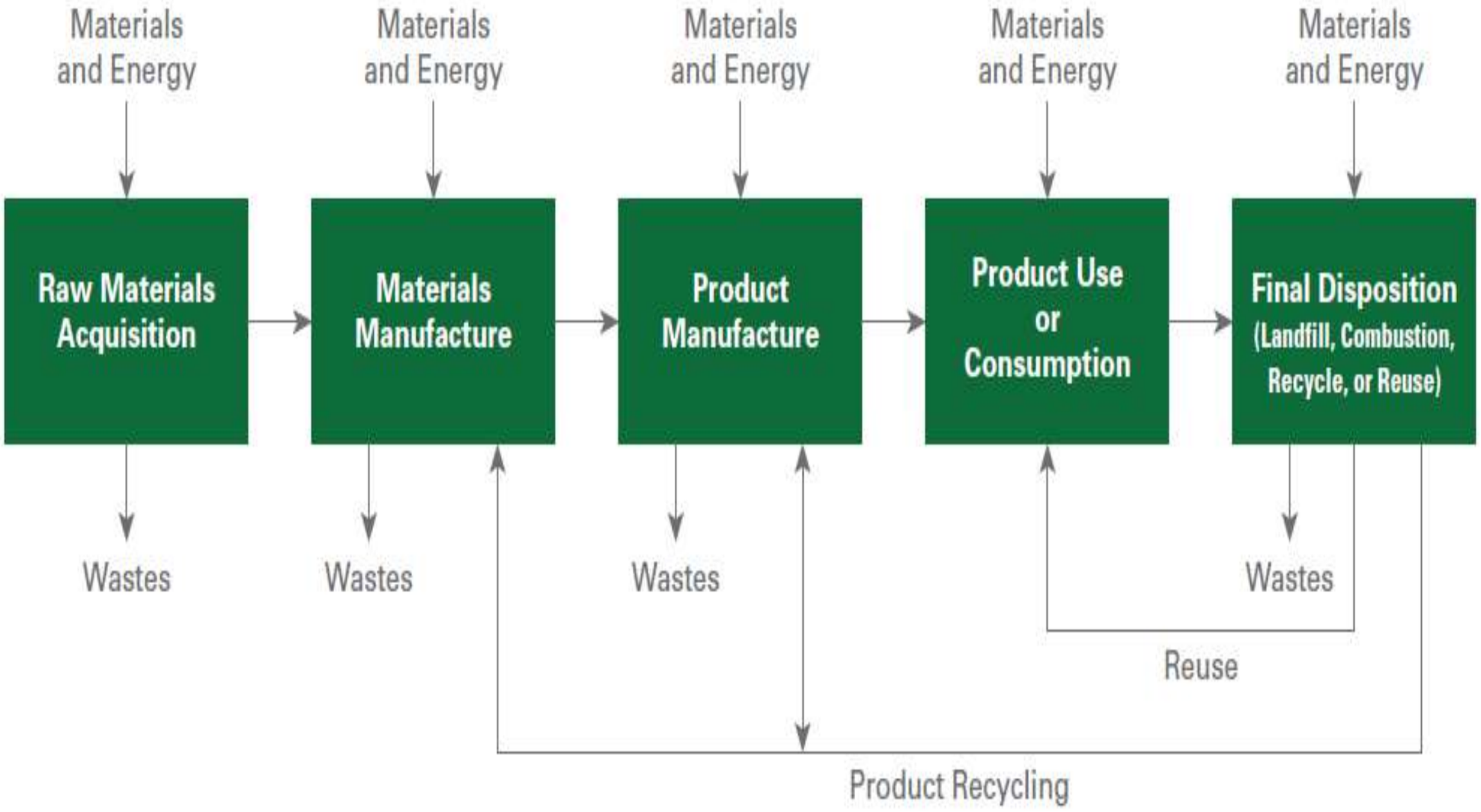
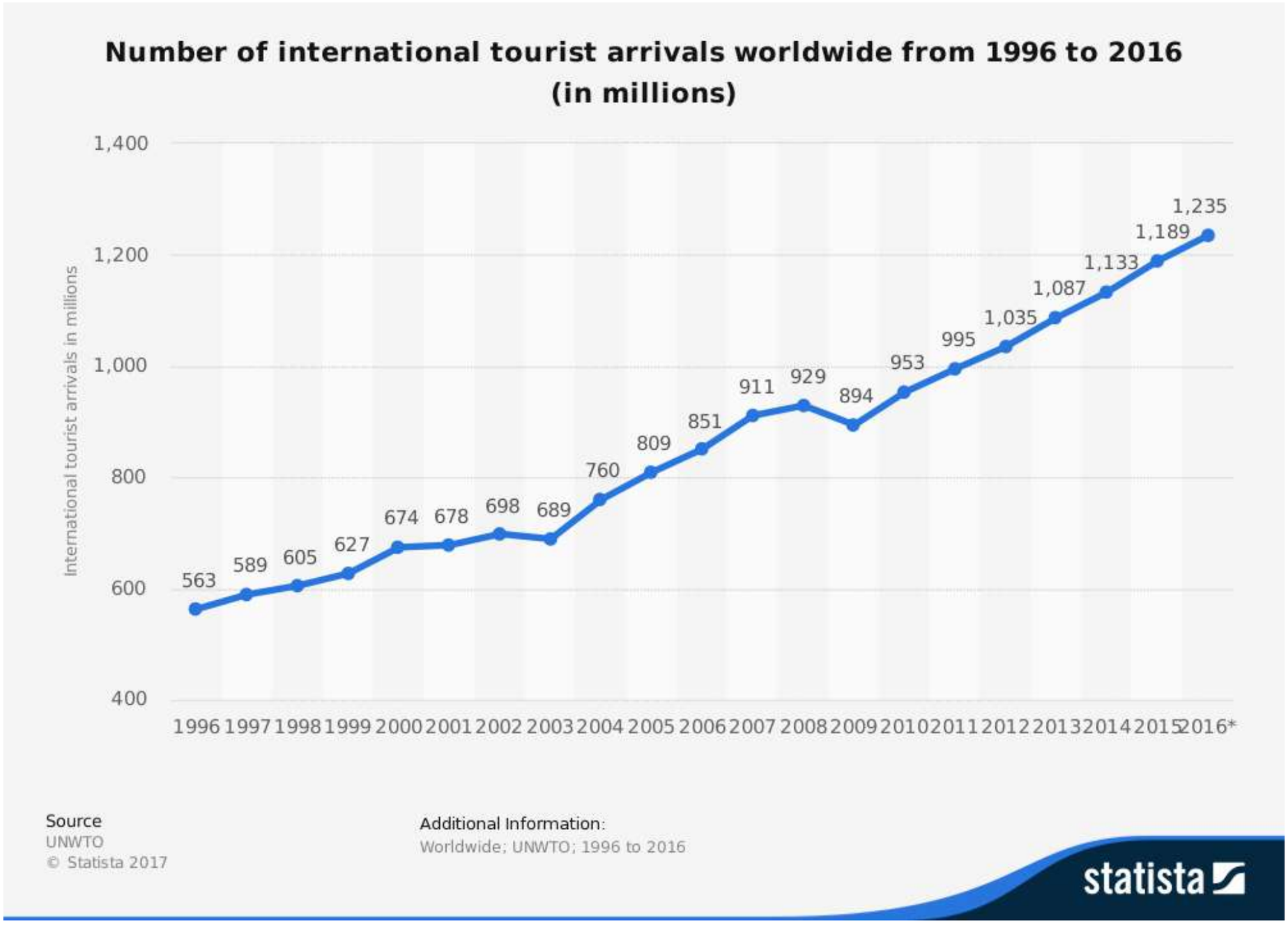
The product life cycle



What is the fastest growing economic sector?

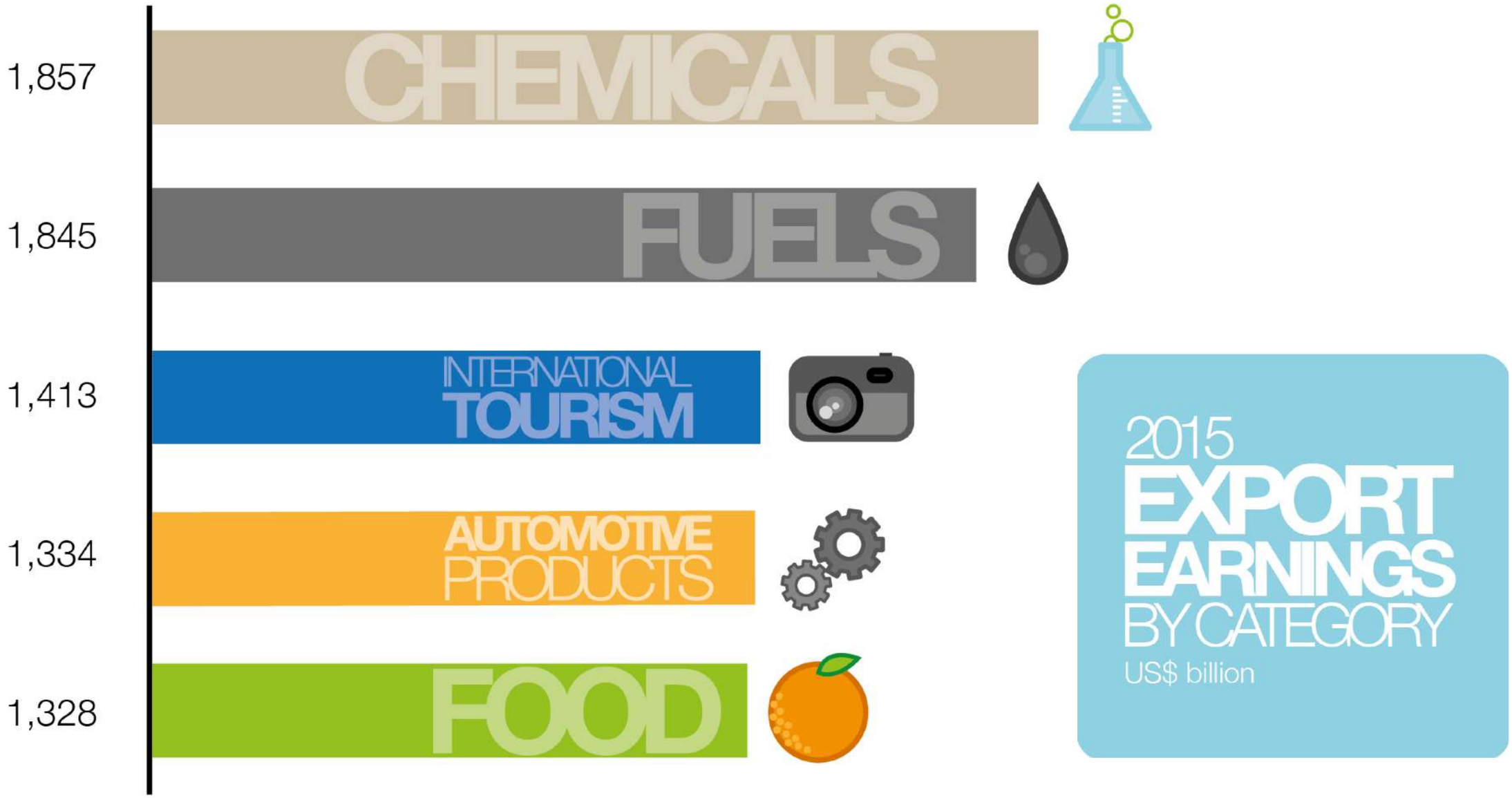

Number of international tourist arrivals worldwide from 1996 to 2016 (in millions)
International tourist arrivals in millions
1,400
1,200
1,000
800
600
400
563
589
605
627
674
678
698
689
760
809
851
911
929
894
953
995
1,035
1,087
1,133
1,189
1,235
1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016*
Source
UNWTO
© Statista 2017
Additional Information:
Worldwide; UNWTO; 1996 to 2016
statista

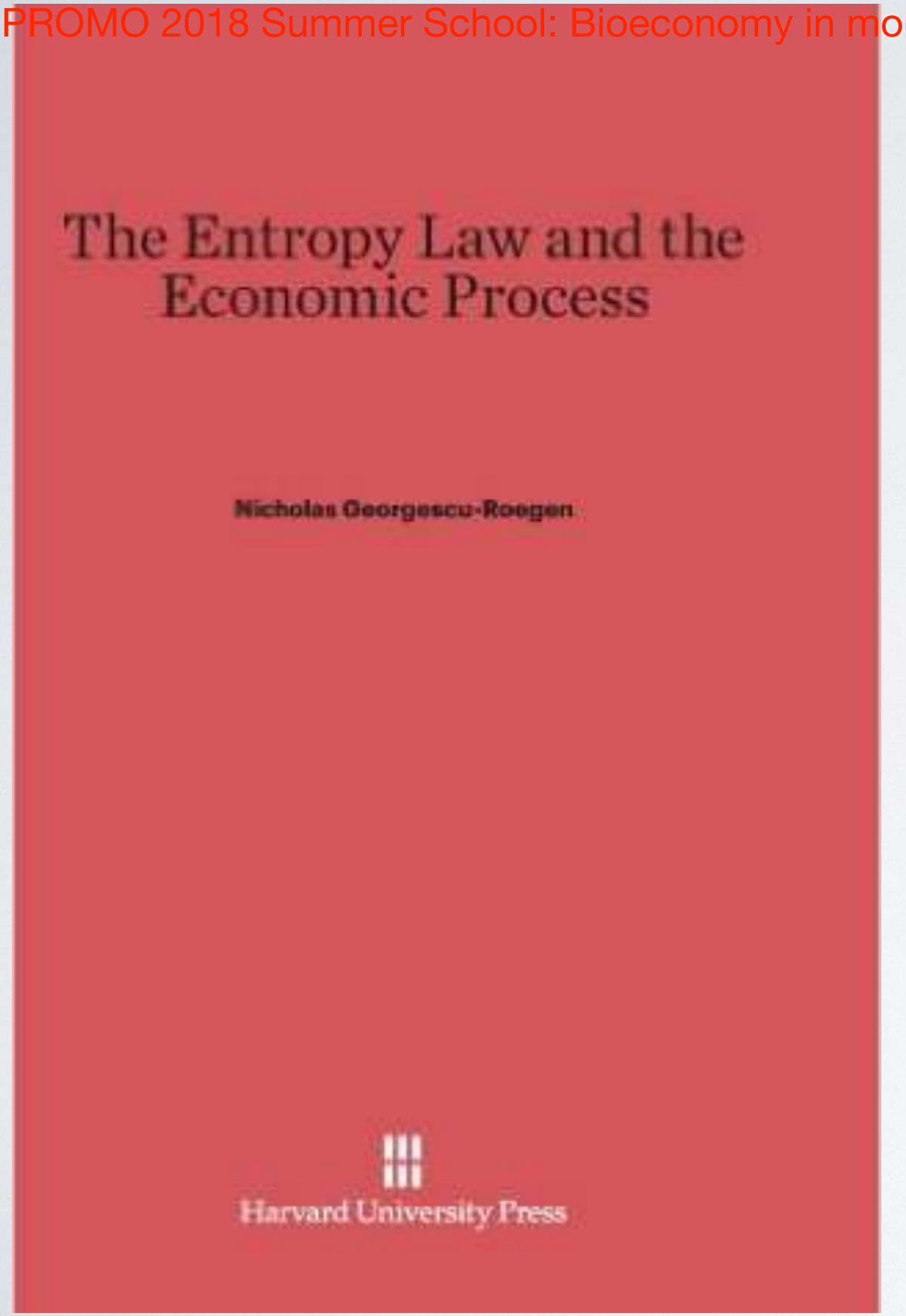
International tourist arrivals (overnight visitors) in 2016 grew by **3.9%** to reach a total of **1,235 million** worldwide, an increase of 46 million over the previous year.

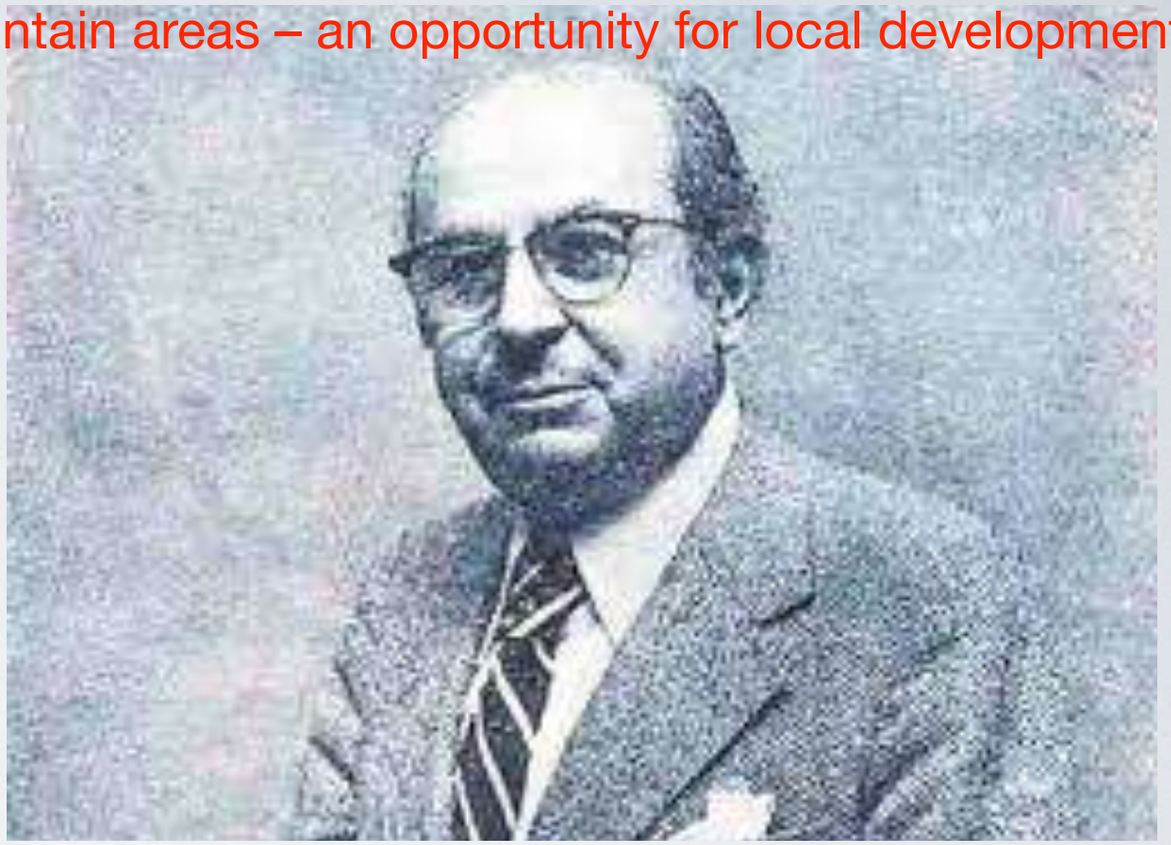
It was the seventh consecutive year of above-average **growth** in international tourism following the 2009 global economic crisis.

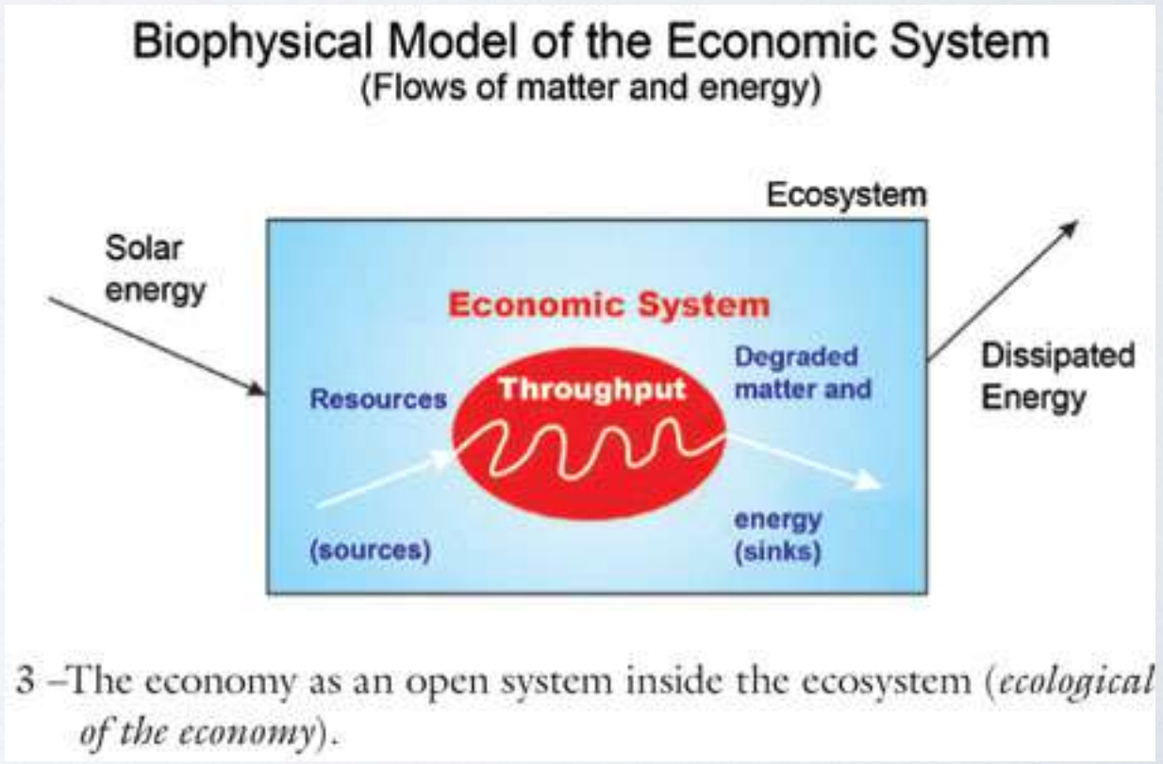
A comparable sequence of **uninterrupted solid growth** has not been recorded since the 1960s.

Source: World Tourism Organization (UNWTO)


1,857
CHEMICALS
1,845
FUELS
1,413
INTERNATIONAL TOURISM
1,334
AUTOMOTIVE PRODUCTS
1,328
FOOD
2015
EXPORT EARNINGS
BY CATEGORY
US$ billion



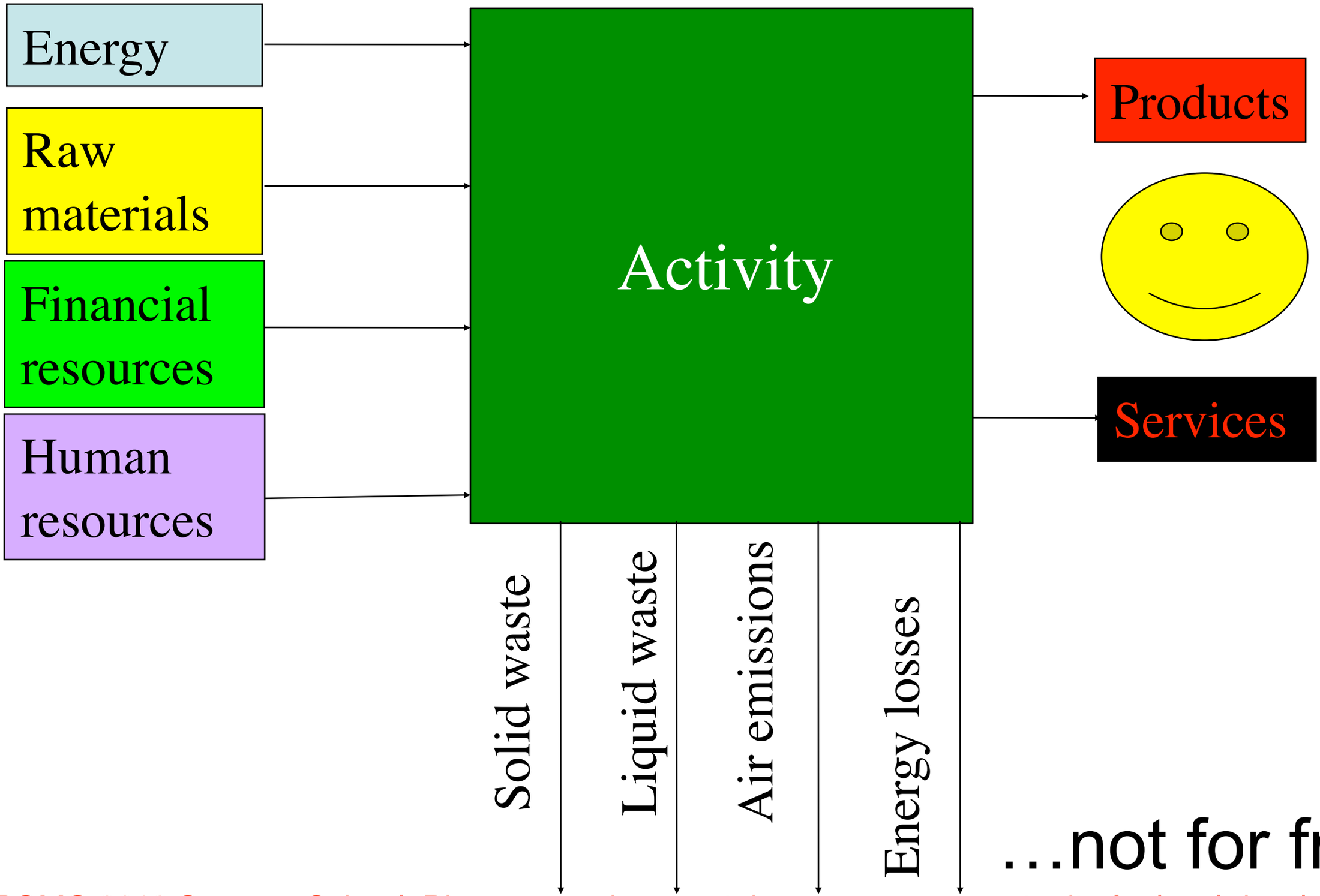




3 –The economy as an open system inside the ecosystem (*ecological of the economy*).

OPEN SYSTEMS

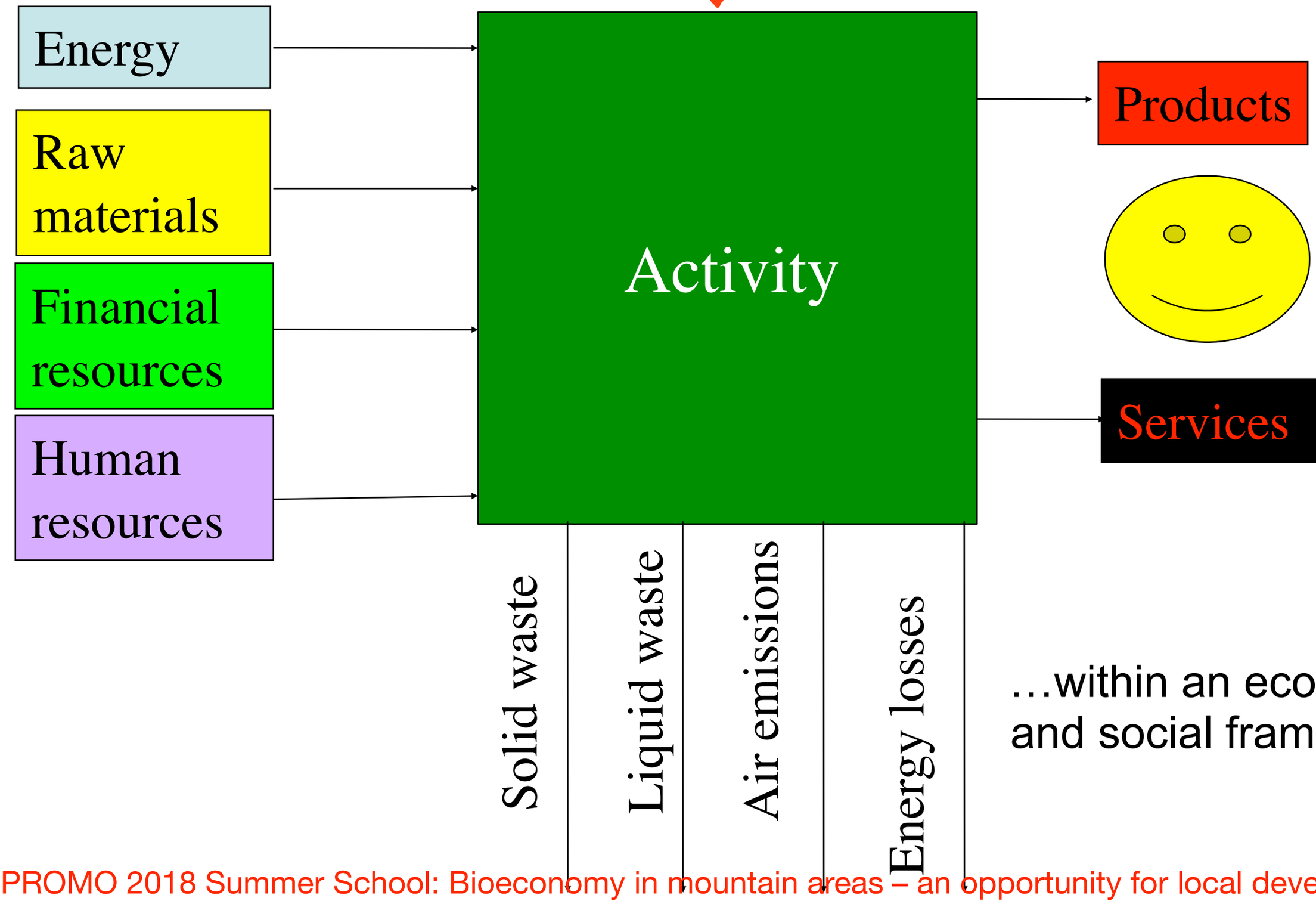
A transformation process…



…not for free

A transformation process…

Laws



…within an economic and social framework

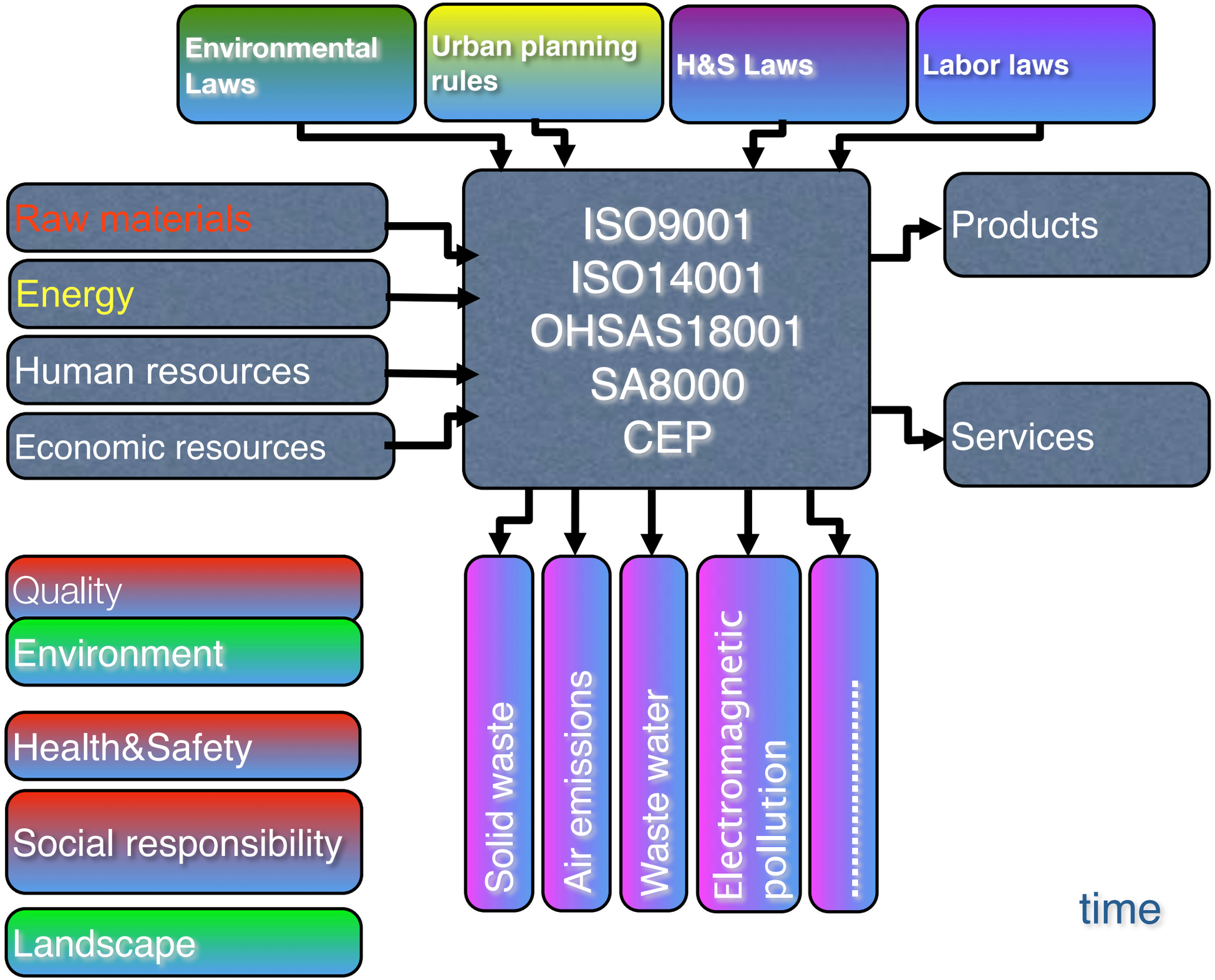
Tools

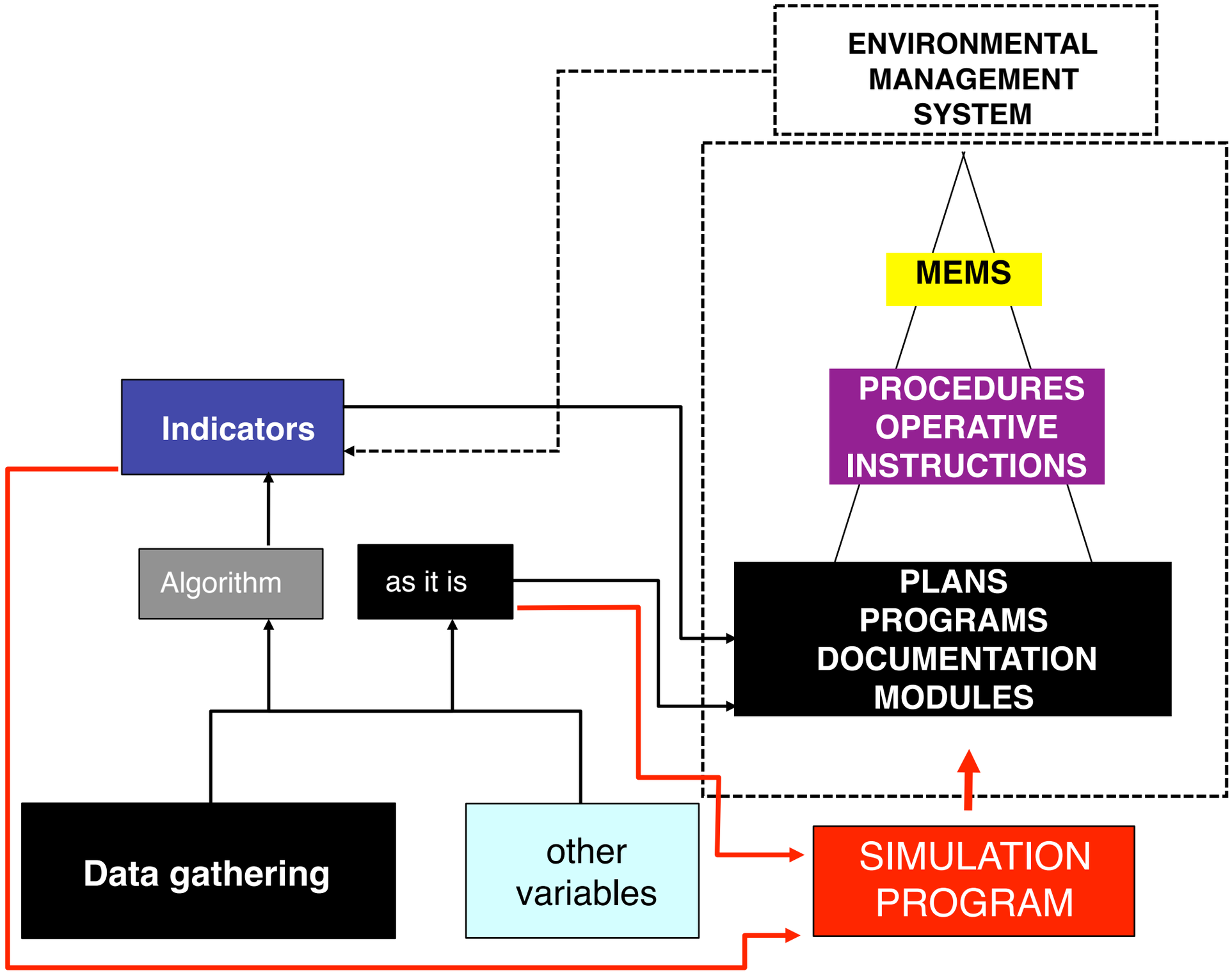
Processes

- ISO 14001 + EMAS
- Sustainability Reports
- GRI Standards

Products

- Ecolabel
- Thousands of labels
- ……


Environmental Laws
Urban planning rules
H&S Laws
Labor laws
Raw materials
Energy
Human resources
Economic resources
ISO9001
ISO14001
OHSAS18001
SA8000
CEP
Products
Services
Quality
Environment
Health&Safety
Social responsibility
Landscape
Solid waste
Air emissions
Waste water
Electromagnetic pollution
.....
time

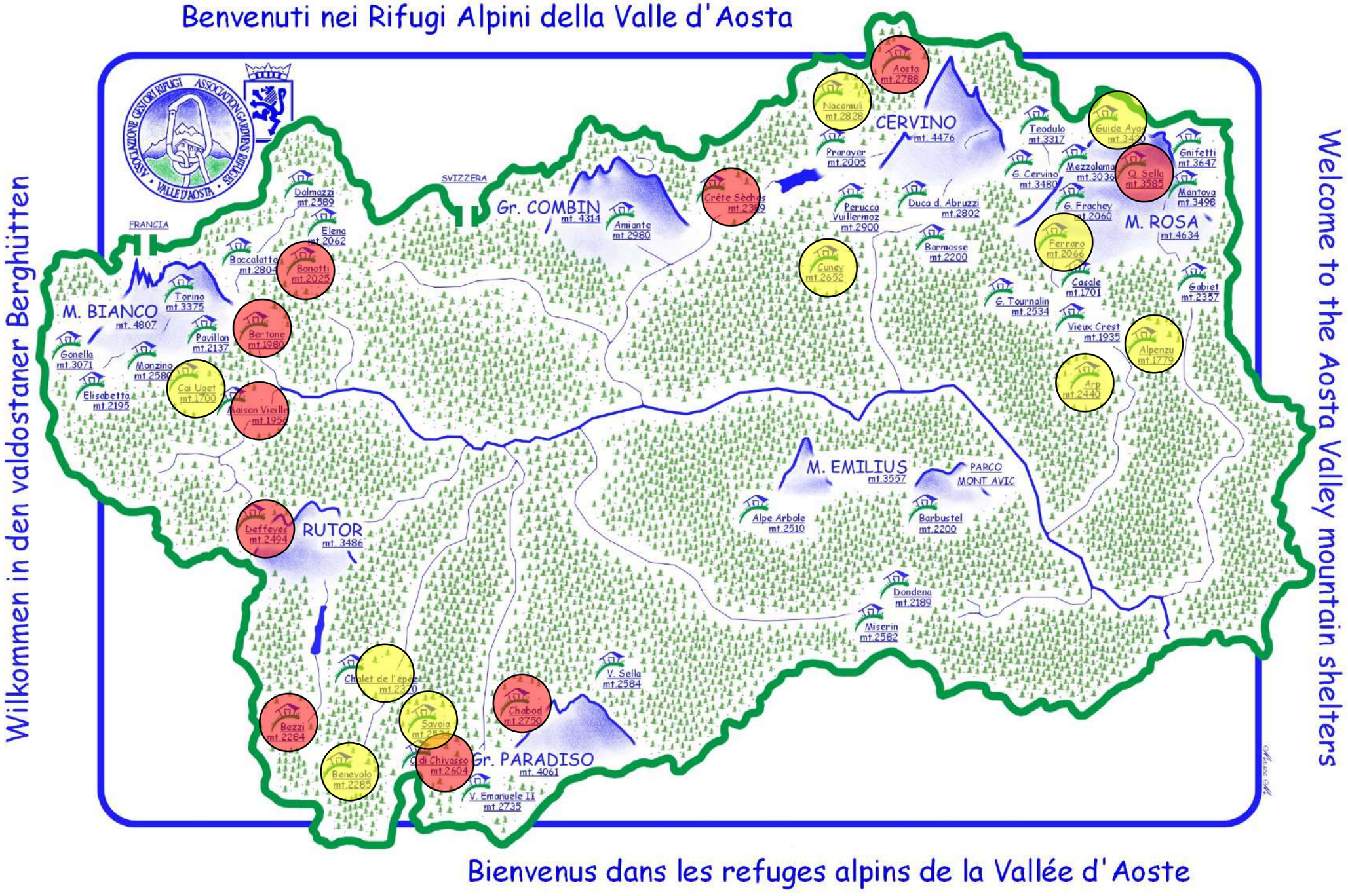

ENVIRONMENTAL MANAGEMENT SYSTEM
MEMS
PROCEDURES OPERATIVE INSTRUCTIONS
PLANS PROGRAMS DOCUMENTATION MODULES
Indicators
Algorithm
as it is
Data gathering
other variables
SIMULATION PROGRAM

1997-98

2002


G. B. FERRARO
Resy
m.2.066


RIFUGIO MBIANCO CAI UGET


Benvenuti nei Rifugi Alpini della Valle d'Aosta
Welcome to the Aosta Valley mountain shelters
Wilkommen in den valdostaner Berghütten
Bienvenus dans les refuges alpins de la Vallée d'Aoste
ASSOCIAZIONE GESTORI RIFUGI ALPINI VALLE D'AOSTA
FRANCIA
SVIZZERA
M. BIANCO mt. 4807
Gr. COMBIN mt. 4314
CERVINO mt. 4476
M. ROSA mt.4634
RUTOR mt. 3486
M. EMILIUS mt.3557
Gr. PARADISO mt. 4061
PARCO MONT AVIC
Aosta mt.2788
Nacamuli mt.2828
Prarayer mt.2005
Crête Sèche mt.2359
Amiante mt.2980
Perucca Vuillermoz mt.2900
Duca d. Abruzzi mt.2802
Barmasse mt.2200
Cuney mt.2652
Teodulo mt.3317
G. Cervino mt.3480
Mezzalama mt.3036
Q. Sella mt.3585
G. Frachey mt.2060
Ferraro mt.2066
Casale mt.1701
G. Tournalin mt.2534
Vieux Crest mt.1935
Arp mt.2440
Gnifetti mt.3647
Mantova mt.3498
Gabiet mt.2357
Alpenzu mt.1779
Dalmazzi mt.2589
Elena mt.2062
Baccalatte mt.280-
Bonatti mt.2025
Torino mt.3375
Bertone mt.1980
Pavillan mt.2137
Ganella mt.3071
Monzino mt.258-
Elisabetta mt.2195
Cai Uget mt.1700
Maison Vieille mt.195-
Deffeyes mt.2494
Alpe Arbole mt.2510
Barbustel mt.2200
Dondena mt.2189
Miserin mt.2582
V. Sella mt.2584
Chalet de l'épée mt.23-0
Bezzi mt.2284
Savoia mt.25-4
Chabod mt.2750
Benevolo mt.2285
di Chivasso mt.2604
V. Emanuele II mt.2735

2003

Sagarmatha National Park

Nepal

IPROMO 2018 Summer School: Bioeconomy in mountain areas – an opportunity for local development

IPROMO 2018 Summer School: Bioeconomy in mountain areas – an opportunity for local development

IPROMO 2018 Summer School: Bioeconomy in mountain areas – an opportunity for local development

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2004

Spedizione K2-2004
50 anni dopo

Pakistan

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Sensori ambientali

- Temperatura
- Innevamento
- Velocità vento
- Precipitazioni

Sensori prevenzione inquinamento

- Sensore presenza di fumo incendio
- Sensore cisterna acqua
- Sensore scarica accumulatori FV
- Sensore cisterna gasolio
- Sensore vasca Imhoff

Sensori variabili ambientali

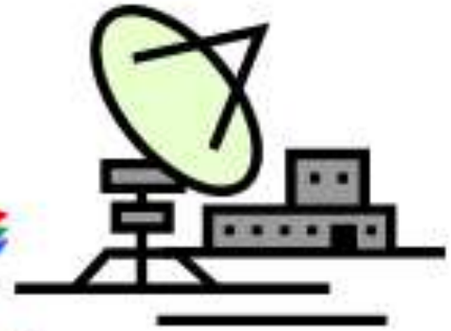
- Sensore scarico fumi generatore
- Sensore cisterna gasolio
- Sensori vasca Imhoff
- Sensore consumo acqua
- Sensore cisterna acqua
- Sensore impianto distribuzione acqua
- Sensore scarica accumulatori FV
- Sensore produzione Energia da microcentrale idroelettrica
- Sensore bilancia per rifiuti

Altro

- Webcam
- Temperatura interna
- Antifurto/anti-intrusione

Alimentazione delle apparecchiature con energia FV o FV/eolica

Invia dati in tempo reale



Segnale satellitare/cellulare: permette di interfacciare il gestore con il rifugio nello scambio di dati ed informazioni ed avvertirlo del pericolo

Gestore.
Riceve il messaggio in tempo reale e dà l'allarme.

Software.
Inserisce i dati ambientali in automatico nelle schede di rilevazione.

qualità in quota

UNIVERSITÀ DEGLI STUDI DI TORINO

Progetto V.E.T.T.A.

Valorizzazione delle Esperienze e dei prodotti Turistici Transfrontalieri alle medie ed Alte quote

INTERREG
ITALIA-SVIZZERA ITALIE-SUISSE ITALIEN-SCHWEIZ
Le opportunità non hanno confini

REGIONE PIEMONTE

FESR

RegioneLombardia

ERSAF
ENTE REGIONALE PER I SERVIZI ALL'AGRICOLTURA E ALLE FORESTE

SCATOL8 S.R.L.

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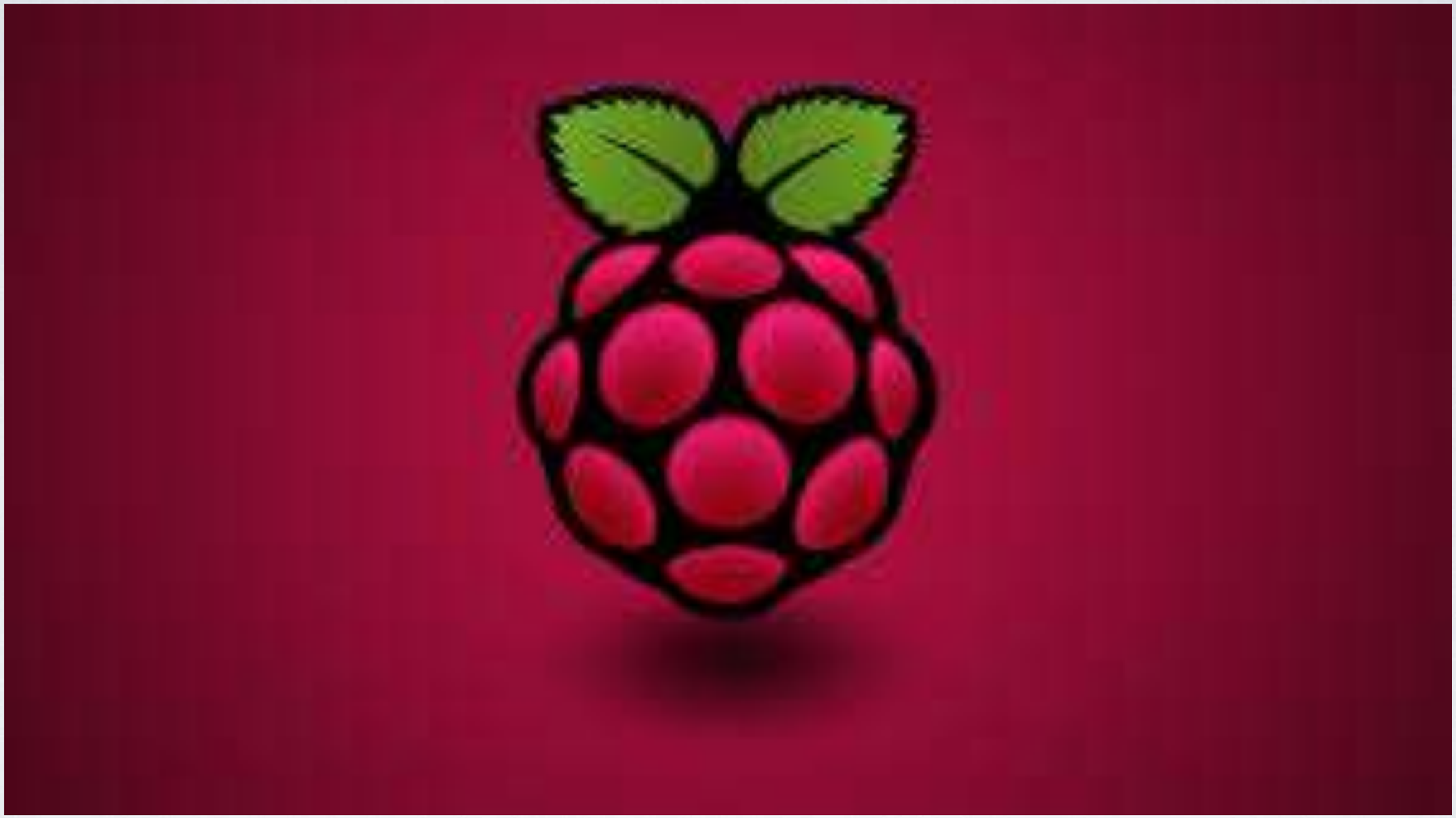
MADE
IN ITALY
DIGITAL (PWM~)
UNO
ARDUINO
ON
TX
RX
RESET
ICSP
POWER
ANALOG IN
WWW.ARDUINO.CC

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



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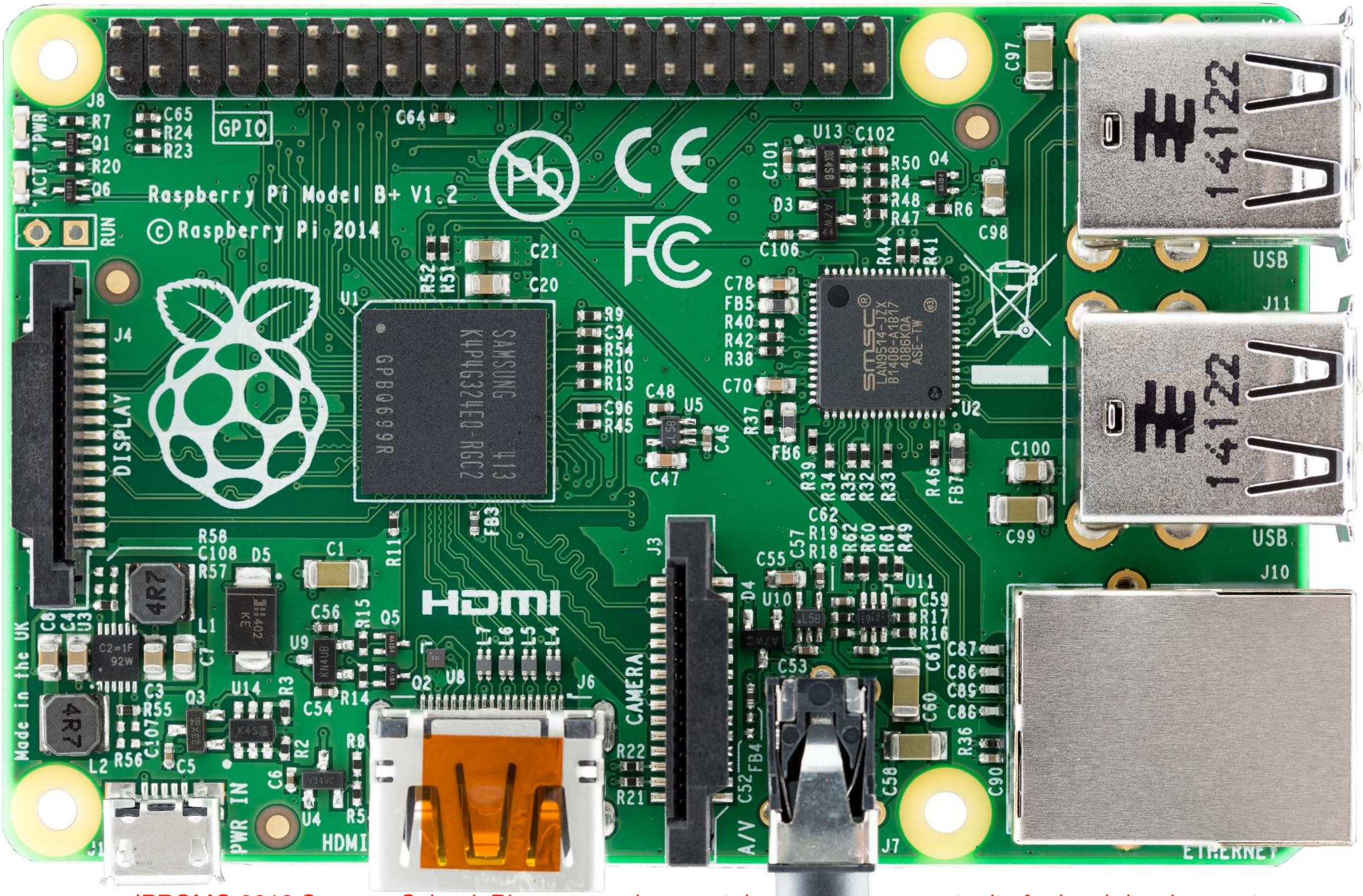

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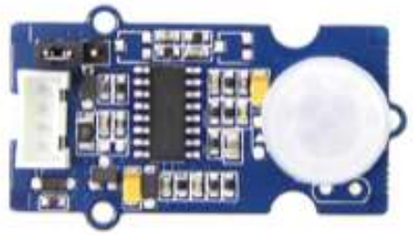
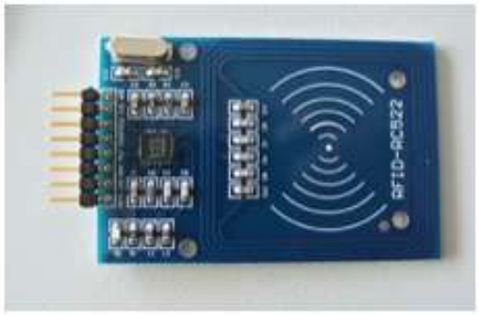
Environmental parameters / 1		
Acceleration		
Power consumption		
Wind speed and direction, Rain level		
Distance		
Liquid flow rate		

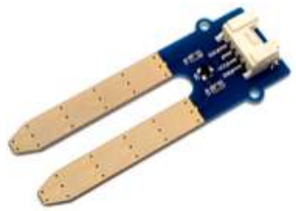
Illuminance		Seed Studio Light sensor
Illuminance		Seed Studio Digital Light sensor
Illuminance		Phidgets Precision Light sensor

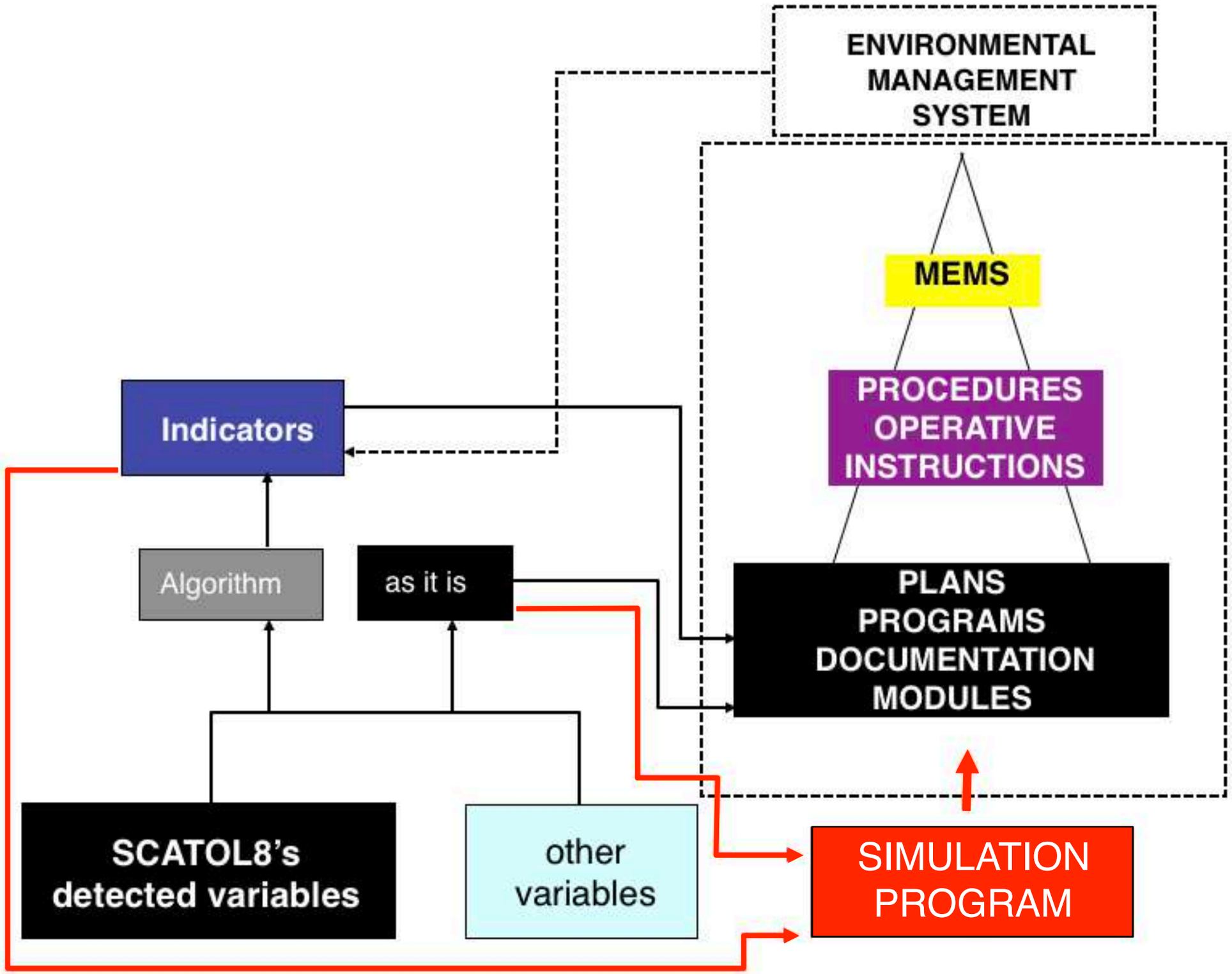
Carbon Monoxide		
Carbon Dioxide		
Ozone		
Methane		
Hydrogen		
Air quality (presence of smoke, benzene, carbon dioxide, LPG, propane, hydrogen, oxygen, methane, carbon monoxide)		

Mass (eg. Production of waste)		
Movement (eg. Intrusion, counting pieces, etc.).		Seed Studio Motion sensor
Presence, numerosity		RFID-RC522 RF IC Card Sensor
Oxidation-Reduction Potential		ORP Lab Electrode
pH		PH Lab Electrode

Atmospheric pressure		Seed Studio Barometer Pressure
Radioactivity (α, β, γ decays)		Sparkfun Geiger Counter
Noise		Seed Studio Sound sensor
Presence, numerosity		RFID-RC522 RF IC Card Sensor

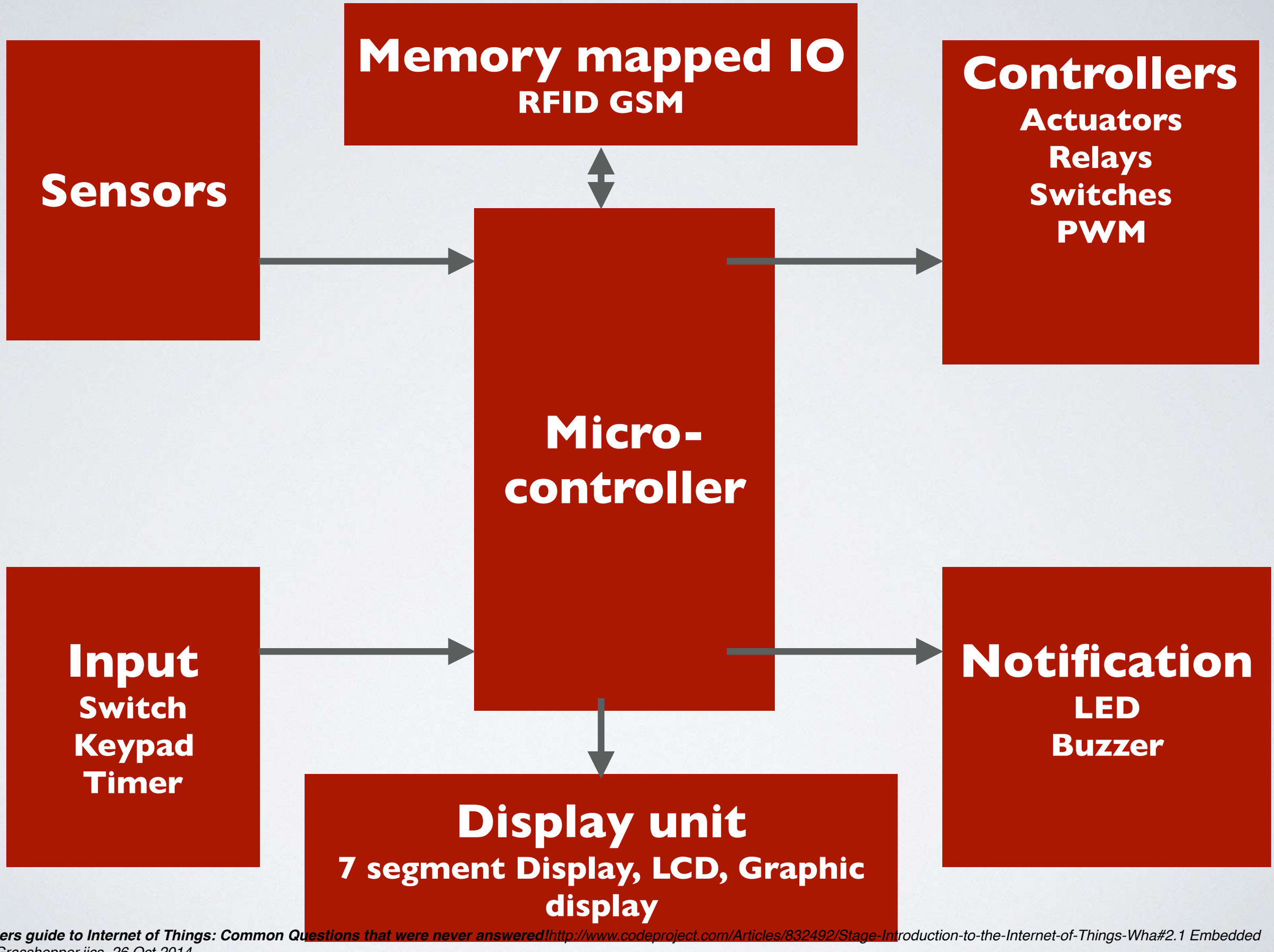
Temperature of liquids		
Soil temperature		
Air temperature		Seed Studio Temperature Sensor
Air temperature		Phidgets Precision Temperature Sensor
Soil moisture		Seed Studio Soil Studio Temperature & Humidity sensor

Temperature & Humidity		Seed Studio Temperature & humidity sensor Pro
Temperature & Humidity		Seed Studio Temperature & Humidity sensor
Humidity		Seed Studio Moisture Sensor
Wind speed and direction, Rain level		Nicegear weather station
Vibration		Seed Studio Piezo Vibration sensor
Vibration		SM-24 Geophone


ENVIRONMENTAL MANAGEMENT SYSTEM
MEMS
PROCEDURES OPERATIVE INSTRUCTIONS
PLANS PROGRAMS DOCUMENTATION MODULES
Indicators
Algorithm
as it is
SCATOL8's detected variables
other variables
SIMULATION PROGRAM

Things

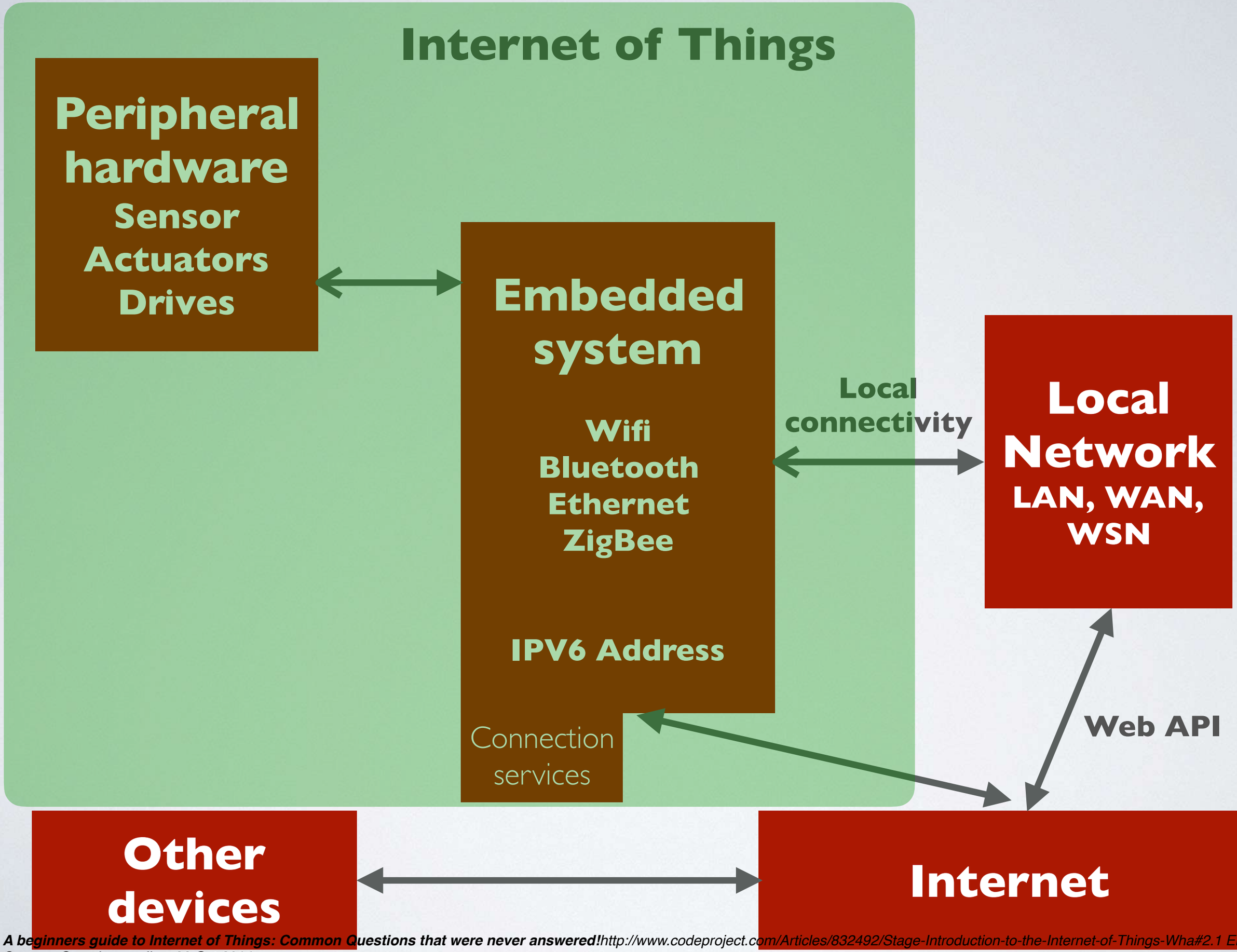
- Things (components)
    1. Microprocessors
    2. Sensors
    3. Actuators
    4. Dashboards
- Connected Things (connections)



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*

Internet of Things

- Things (components)
- Connected Things (connections)
- Connectivity to the Internet



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*

THE INTERNET OF THINGS

AN EXPLOSION OF CONNECTED POSSIBILITY

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 10 years.

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

2010
34.8 BILLION

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.

2013
11.2 BILLION
According to forecasts from Machina Research, global machine-to-machine connections will swell to 28 billion by 2020, thanks in large part to consumer electronics and intelligent buildings.

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

2015
18.2 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.

2017
28.4 BILLION

2019
42.1 BILLION

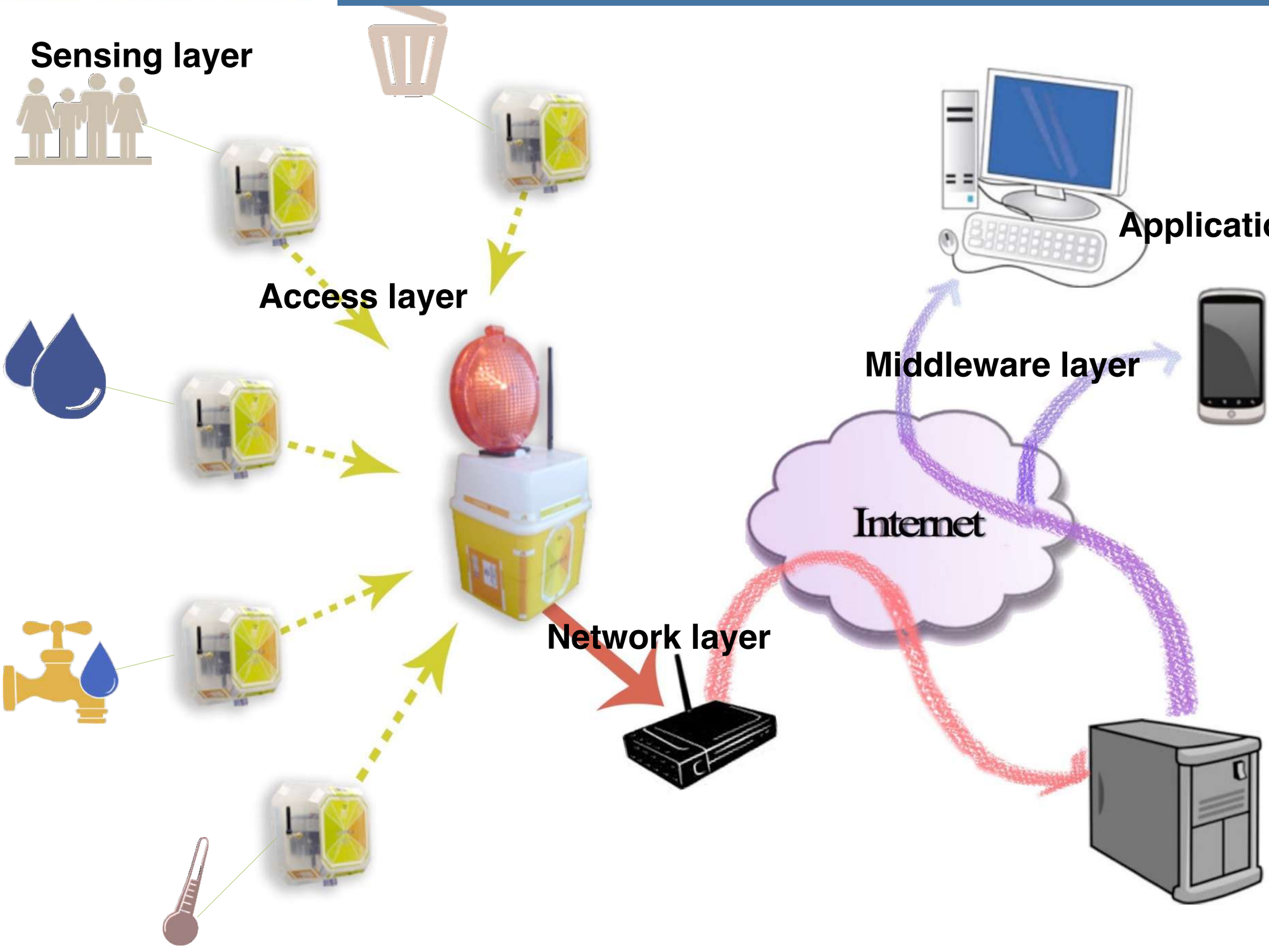
2020
50.1 BILLION
Taking population predictions into account, there will be about 6.6 devices per human on the planet.

'90 '92 '94 '96 '98 '00 '02 '04 '06 '08 '10 '12 '14 '16 '18 '20

YEAR

https://www.mesh-net.co.uk/what-is-the-internet-of-things-iot/

Tailor-made sensors & network



- 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**.

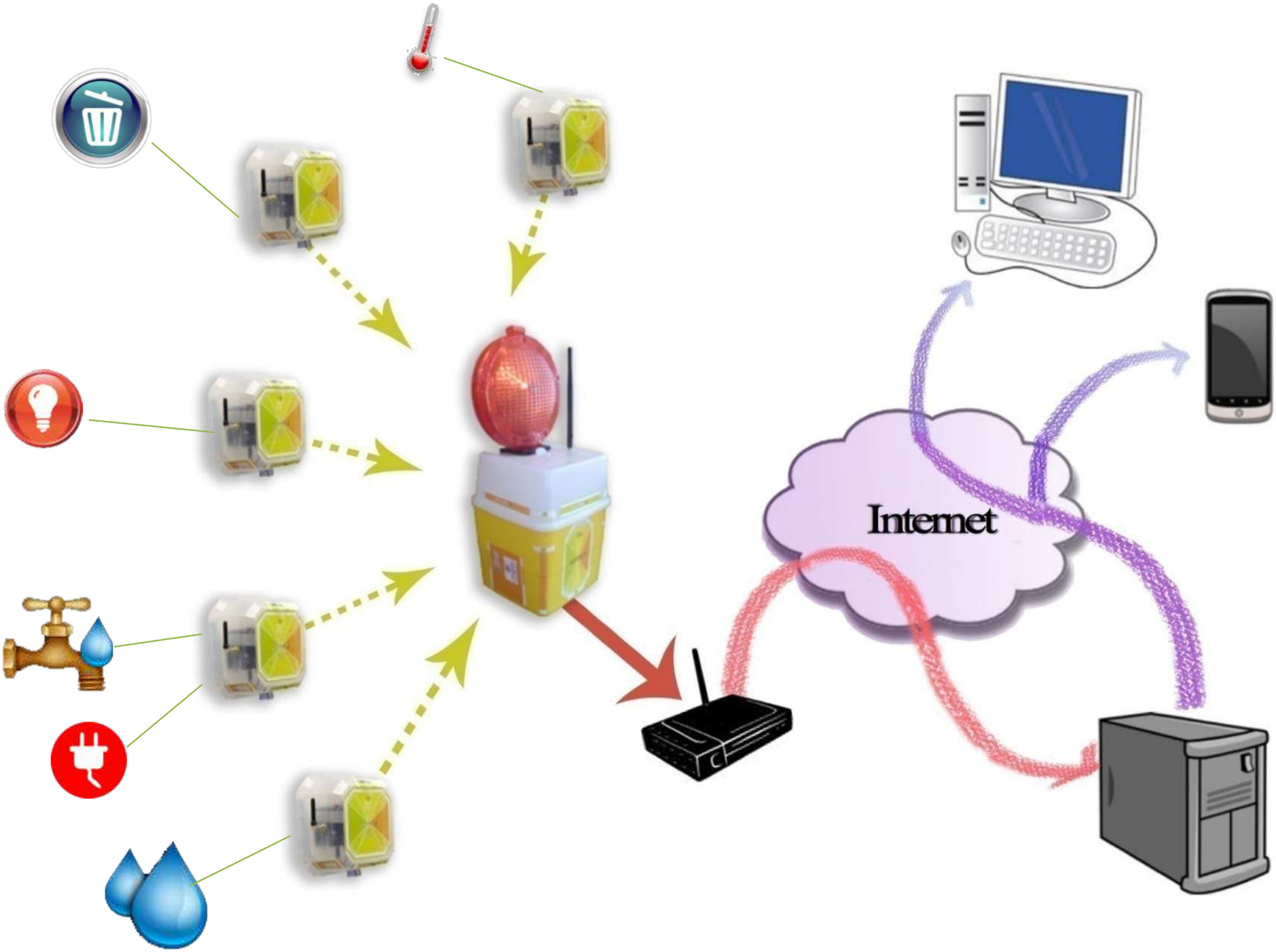
- **Access layer**: this layer's main function is to **transfer** information from the sensing layer to the network layer through existing mobile networks, wireless networks, wireless LANs, satellite networks and other infrastructure.

- **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.

Struttura rete



qualità in quota

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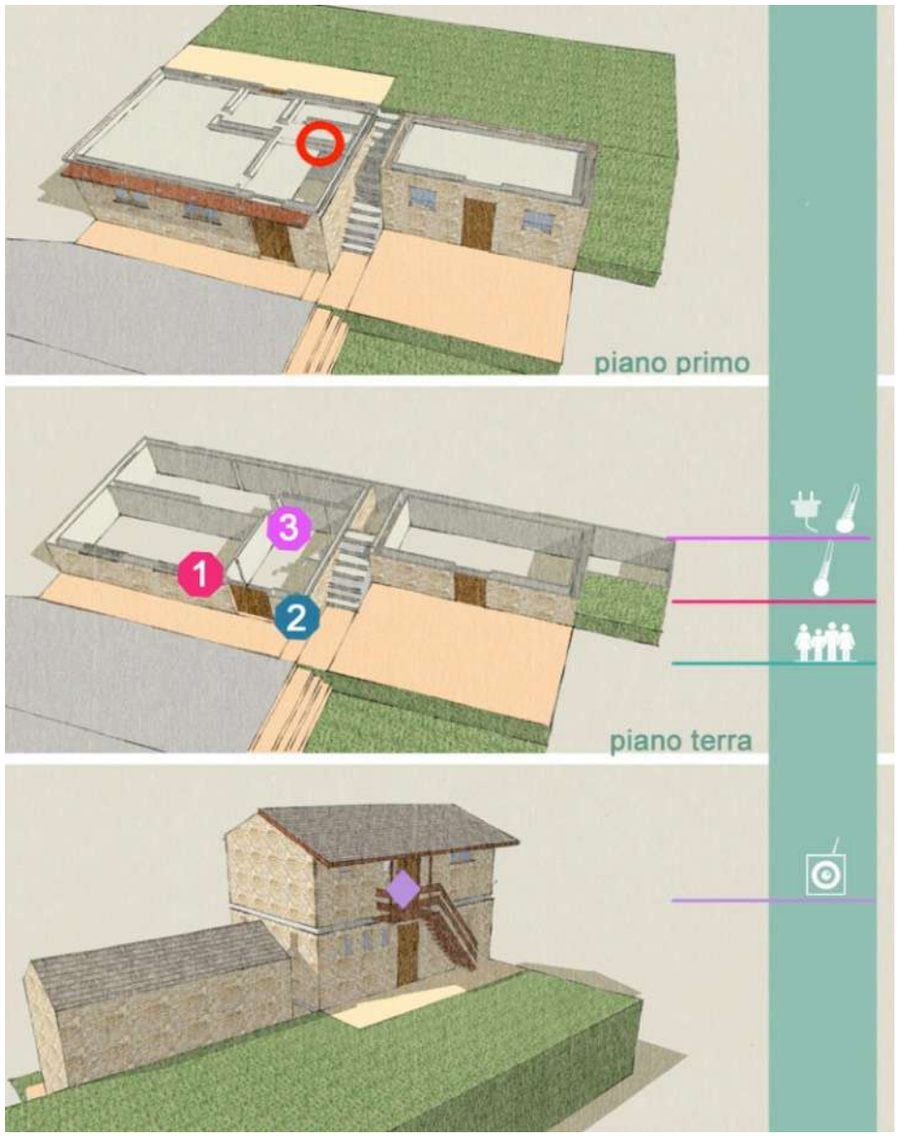
The remote sensing system was tested in four Alpine huts of the VCO:

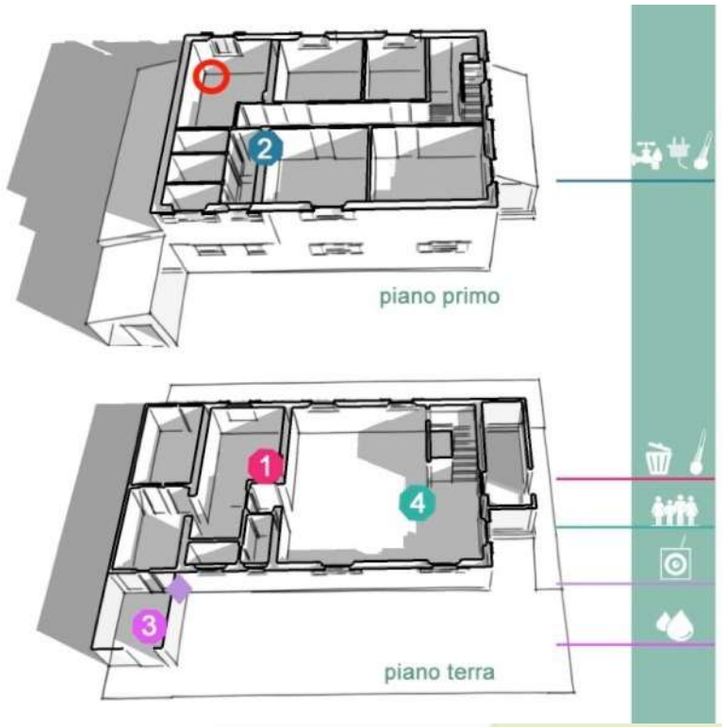
Città di Novara (2011)

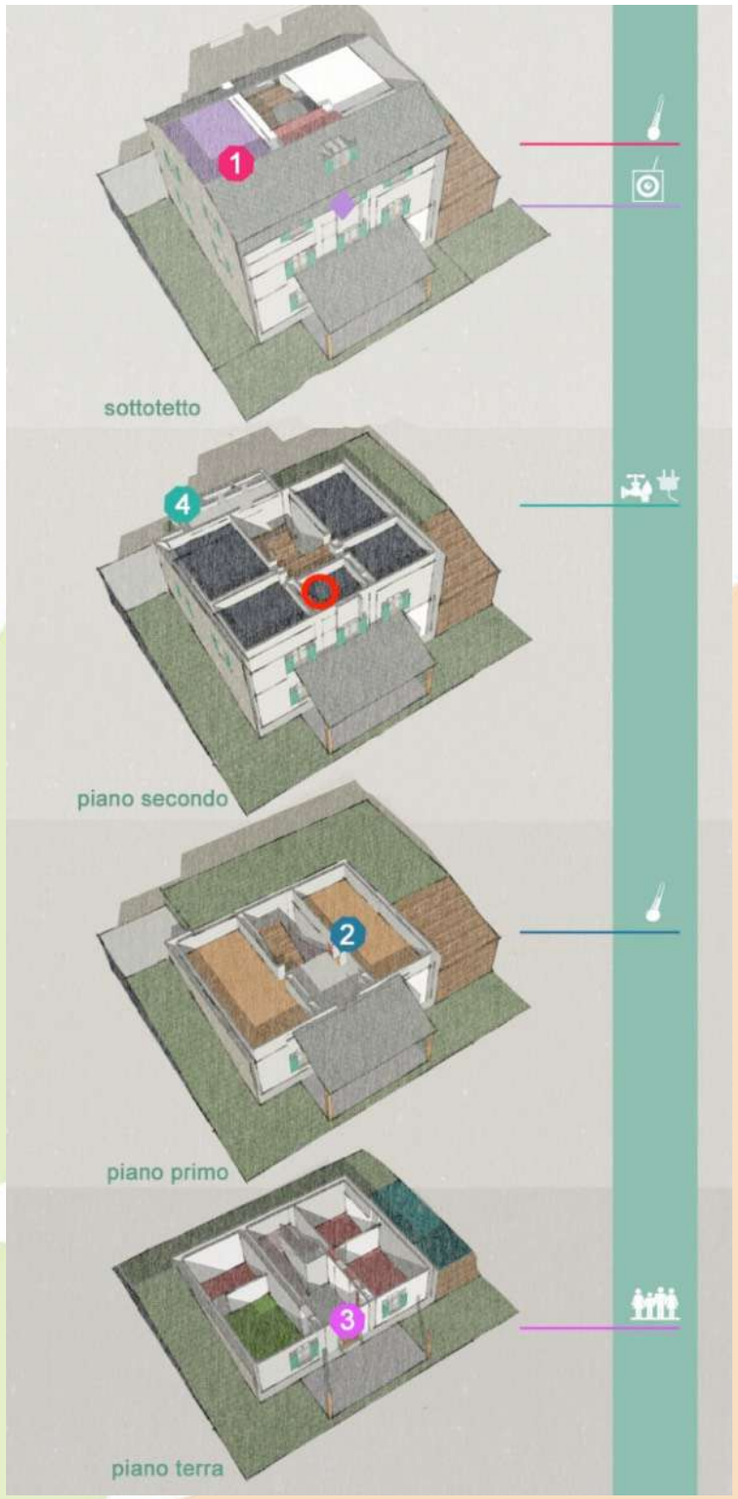
Andolla (2011, 2012)

Enrico Castiglioni (2011, 2012)

Pietro Crosta (2012)







Clockwise:
Rifugi Andolla,
Castiglioni e Crosta

Riccardo Beltramo - Dipartimento di Management

qualità

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PROTOTIPO DEL SISTEMA DI MONITORAGGIO AMBIENTALE

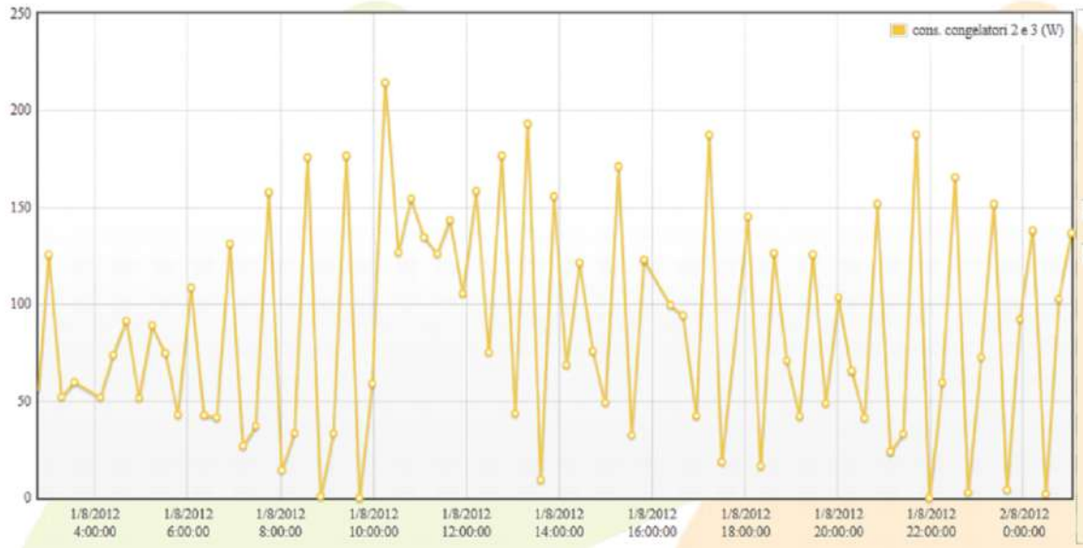
cambia wsn | invia Twitt

castiglioni

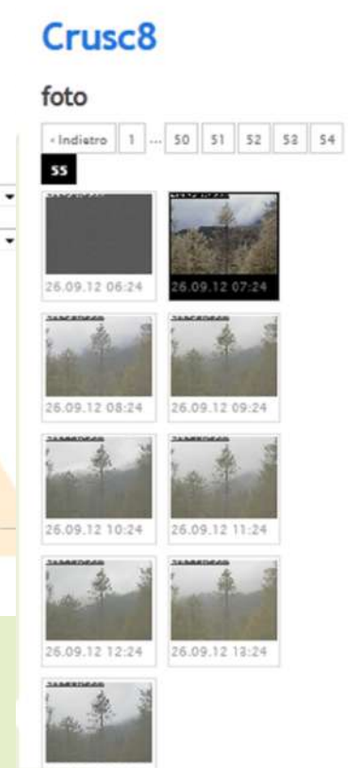
RIFIUTI	TEMP. CUCINA	UMIDITA' CUCINA	CONS. ACQUA LAVATRICE	CONS. EL.T. LAVATRICE
kg [0,60]	°C [-40,50]	% [0,100]	l [0,100]	W [0,6000]
8.2	28.92	56.46	0	296.7

PH FOSSA	FOTO	INTRUSIONE	TEMP. TOILETTE	UMIDITA' TOILETTE
ph [0,14]		unità [0,250]	°C [-40,50]	% [0,100]
7.1		26	25.4	59

PROTOTIPO DEL SISTEMA DI MONITORAGGIO AMBIENTALE



PROTOTIPO DEL SISTEMA DI MONITORAGGIO AMBIENTALE



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qualità in quota

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Riccardo Beltramo - Dipartimento di Management

Castiglioni
Test

Castiglioni
Network Architecture

SCATOL8 SRL

Rifugio Castiglioni
Network configuration:

- Intrusion
- Electric consumption
- Gas
- Waste production
- Luminance
- External and internal humidity
- Liquid flow
- External temperature
- Internal temperature at different heights

PROTOTIPO DEL SISTEMA DI MONITORAGGIO AMBIENTALE

ANEMOMETRO

km/h [0,120]

DIREZIONE VENTO

gradi [0,360]

PLUVIOMETRO

cm [0,2000]

TEMPERATURA ESTERNA

°C [-40,120]

UMIDITA' ESTERNA

% [0,100]

LIVELLO NEVE

cm [0,10000]

FLUSSO LIQUIDI

l [0,100]

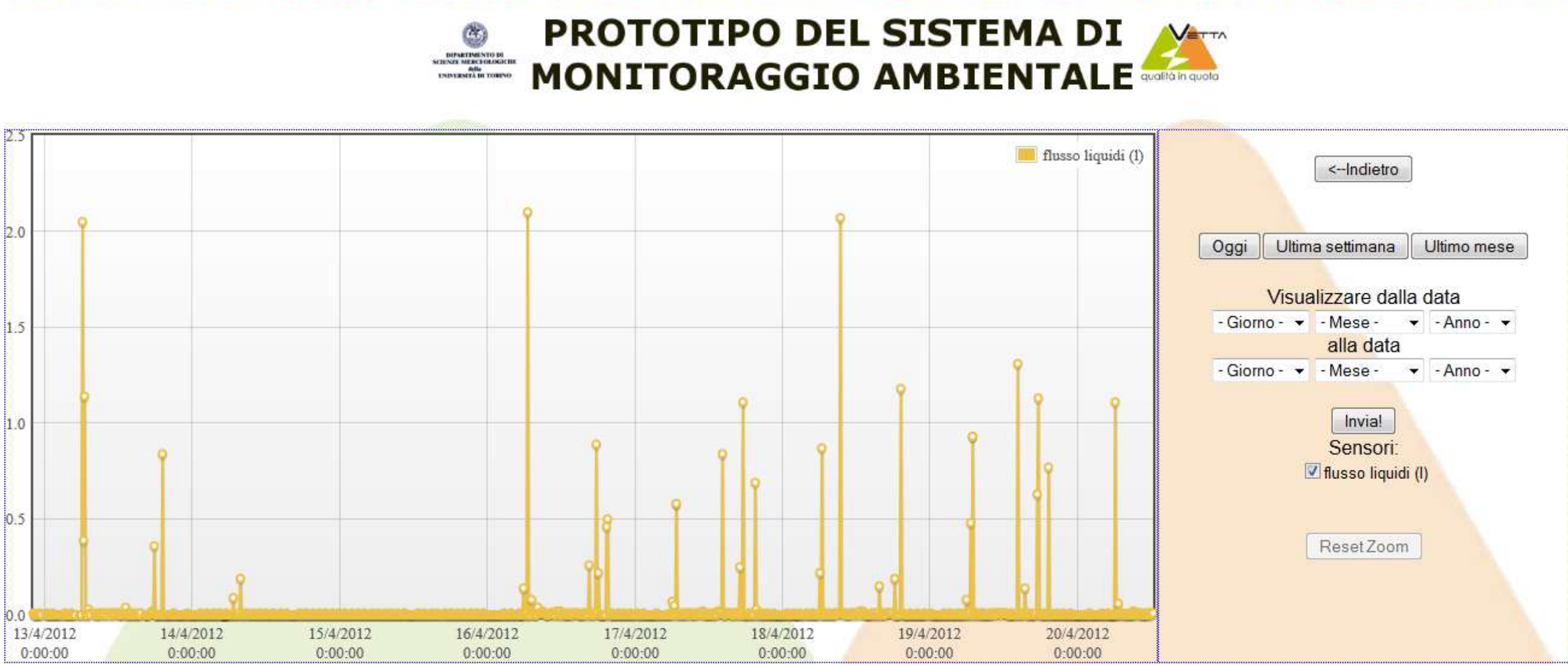
QUALITA' ARIA

ppm [0,10000]

INTRUSIONE

unità [0,1000]

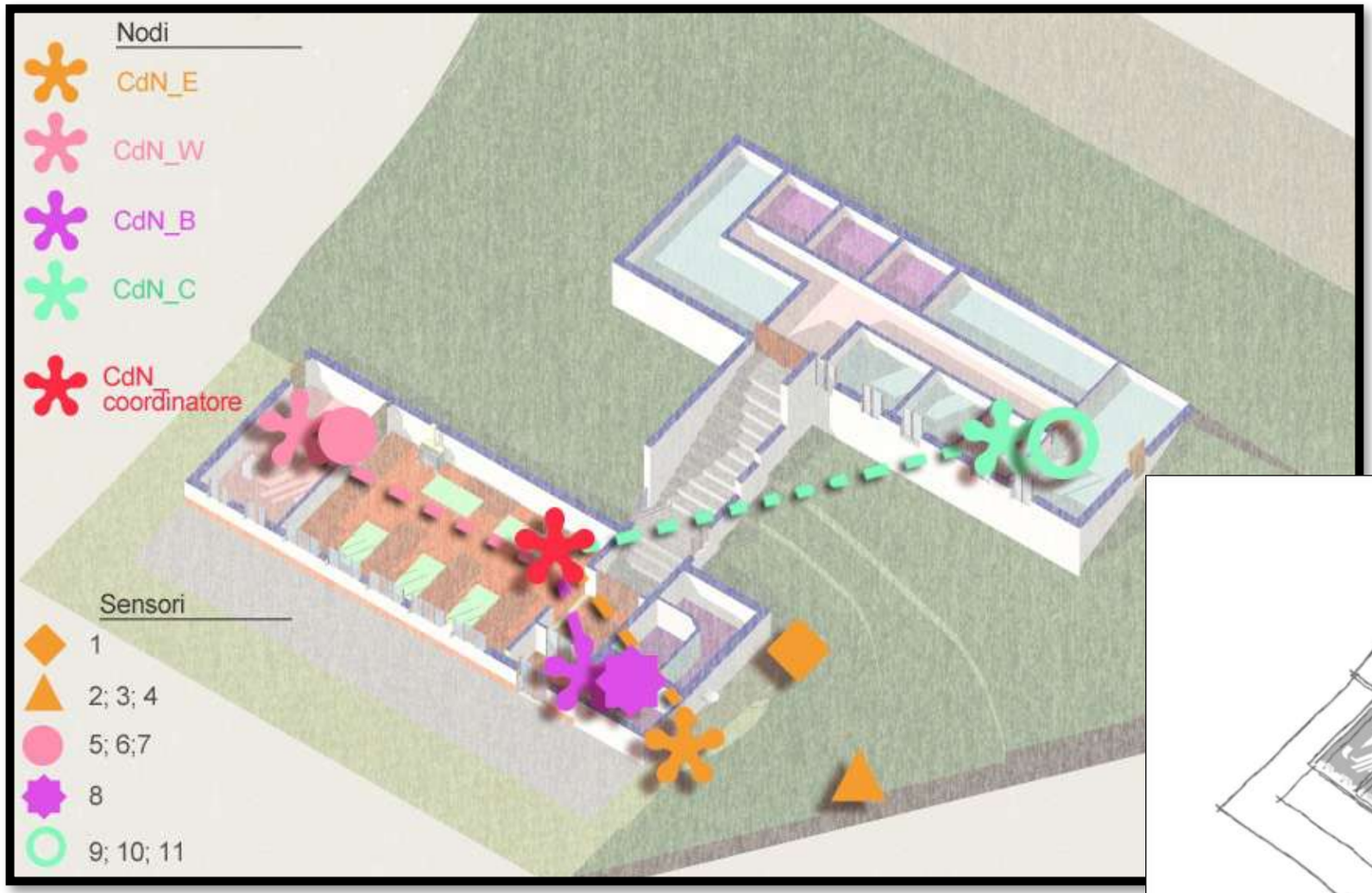
Graphs

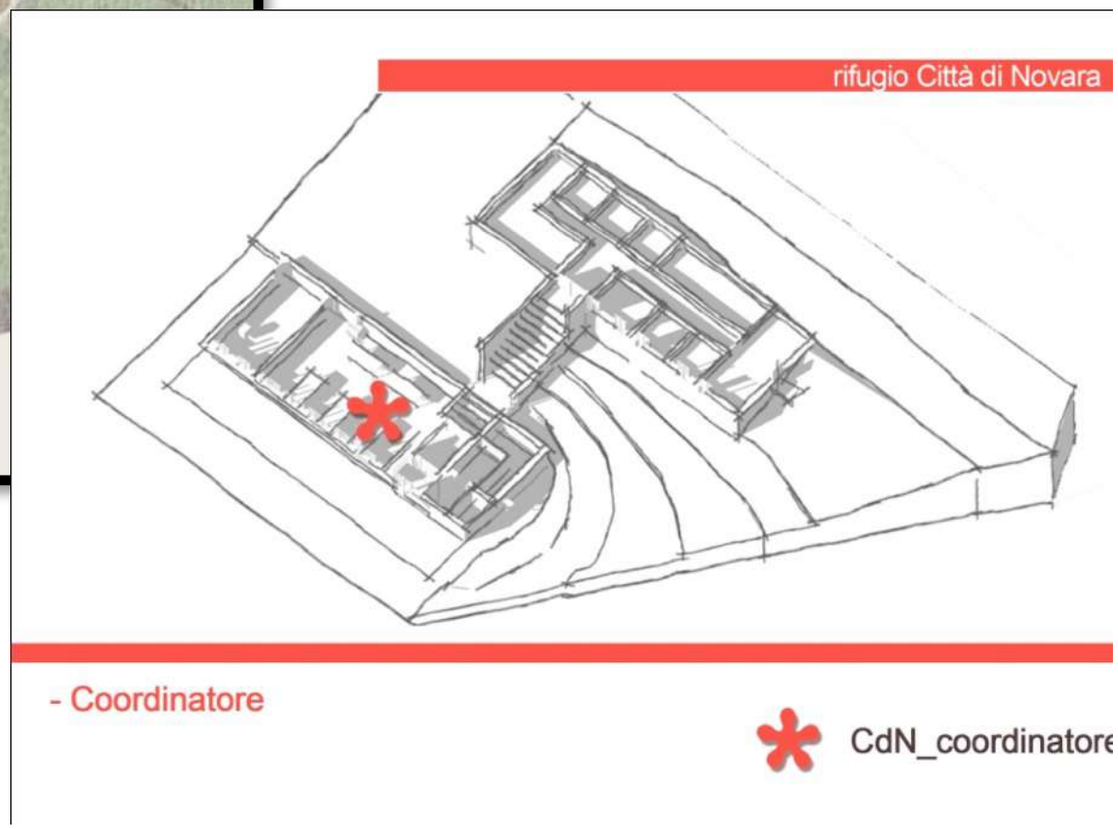


SCALE8 S.R.L.

Città di Novara

Network configuration





Rifugio Città di Novara configurazione

Snow level

Anemometer

Wind direction

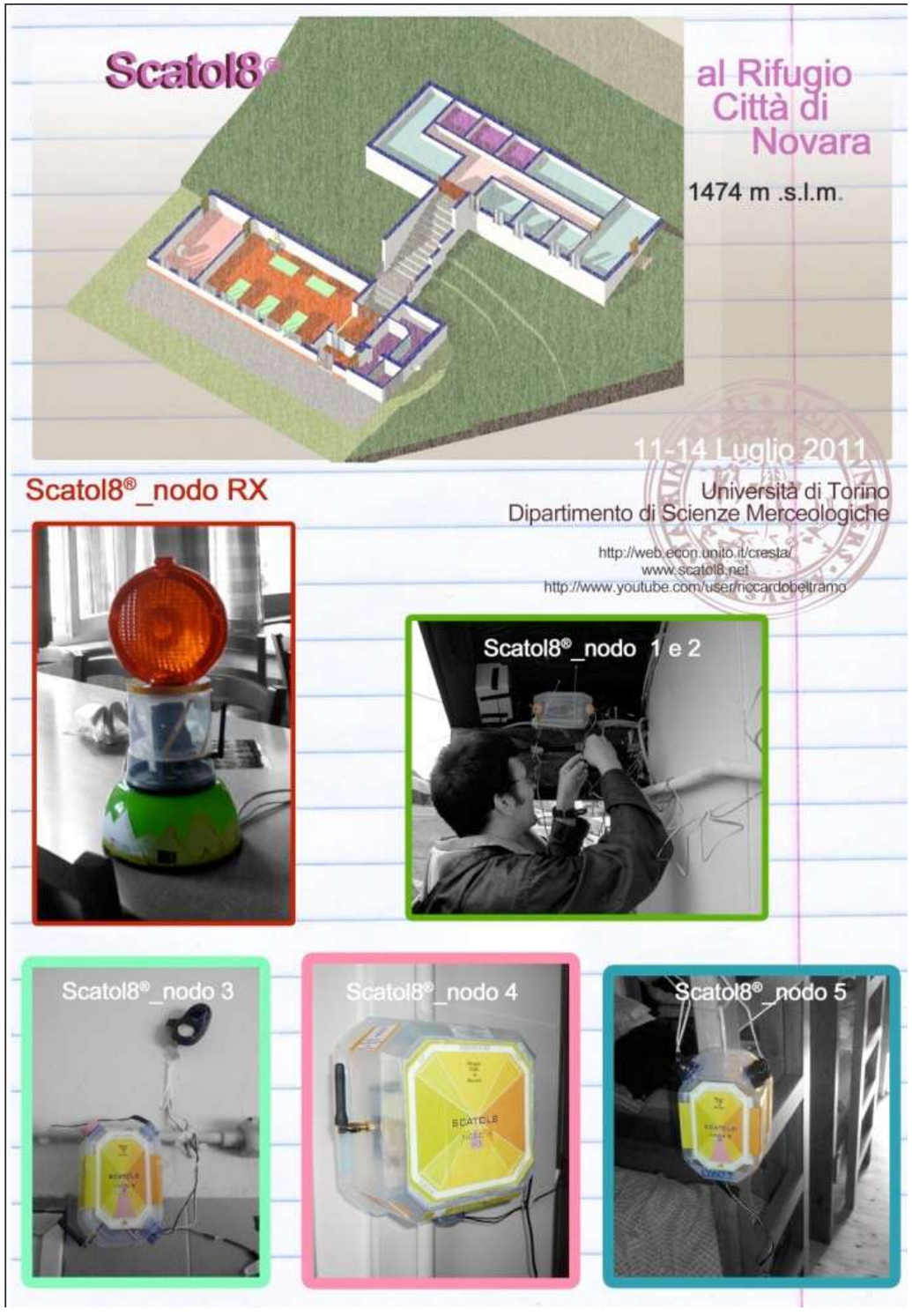
Rain Gauge

Kitchen temperature and rooms

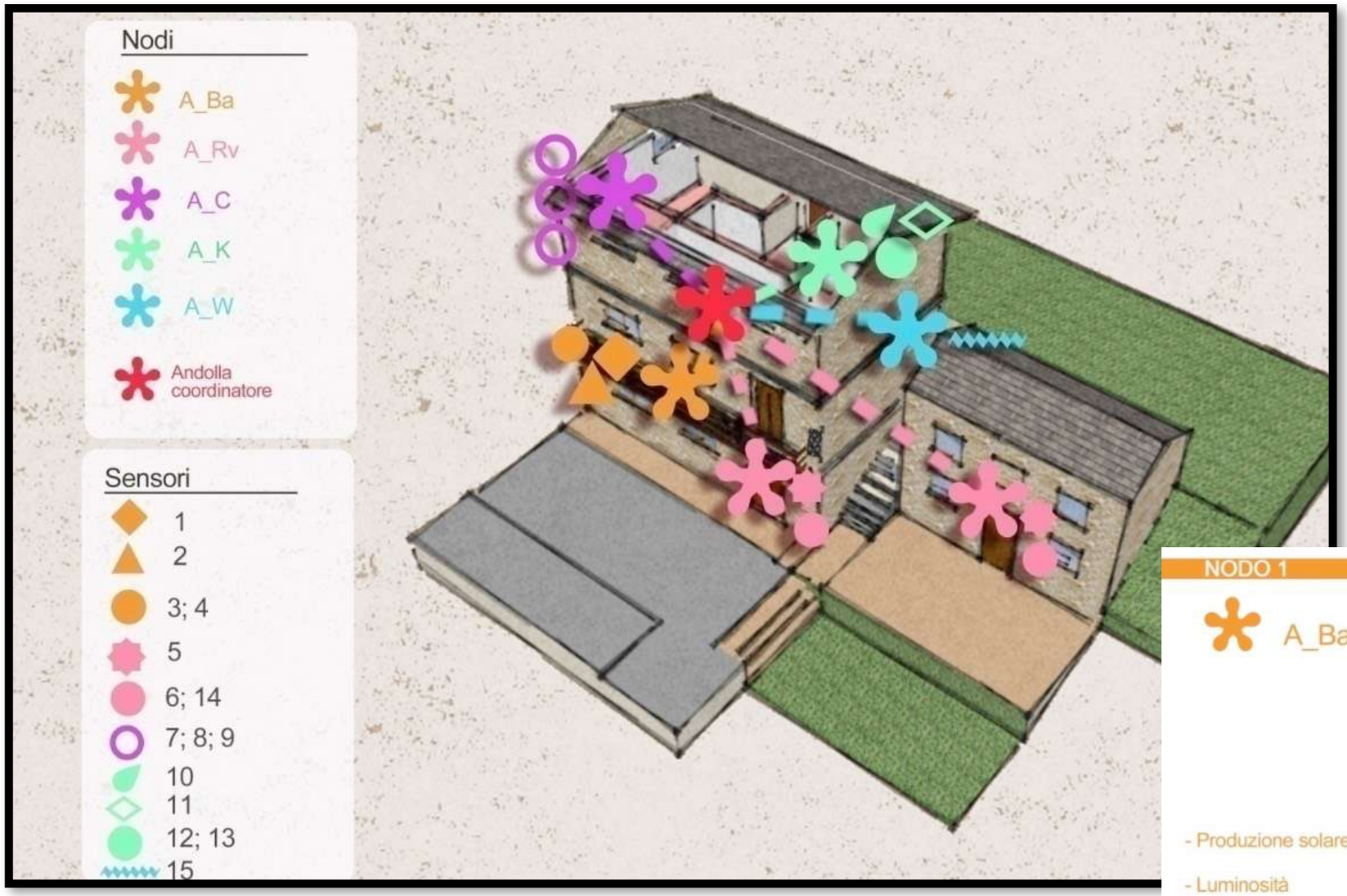
Humidity: kitchen and rooms

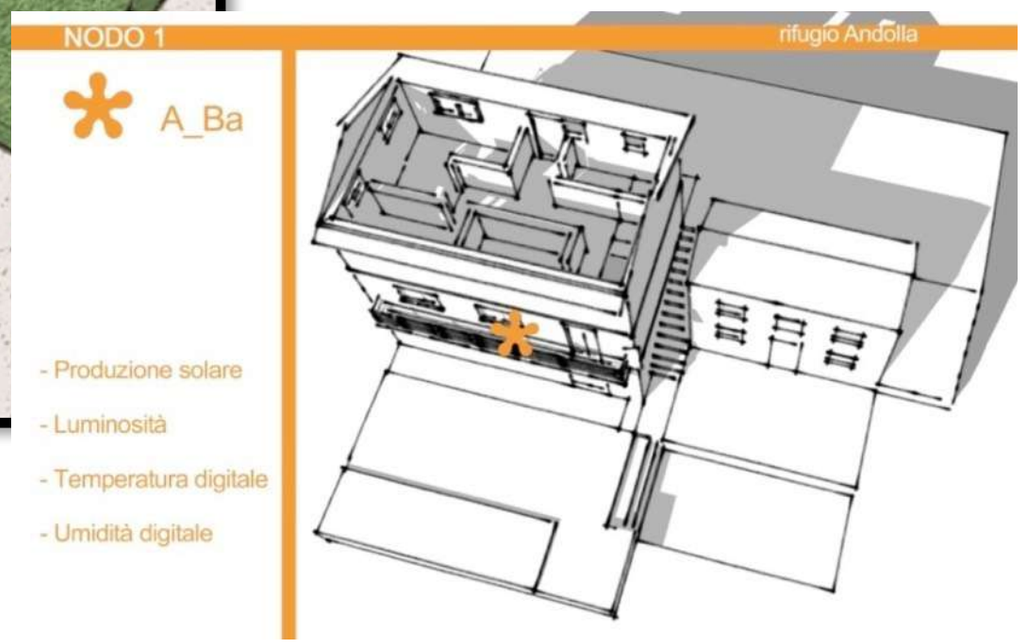
Gas

Liquid flow



Rifugio Andolla
Network configuration

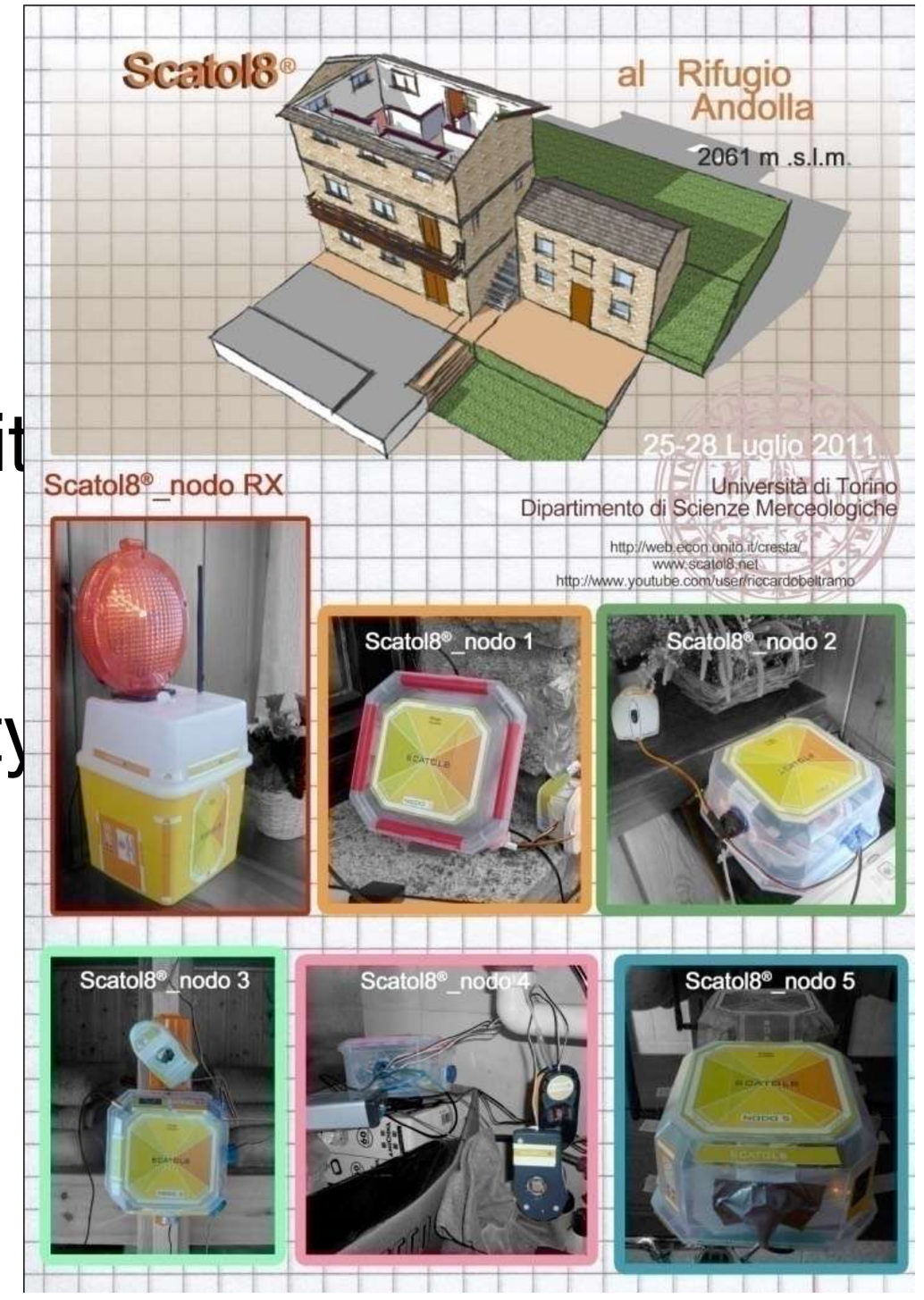




SCATOL8 S.R.L.

Rifugio Andolla
Network Configuration

- Solar production
- External luminance
- External temperature and humidit
- Electric stove consumption
- Internal temperature and humidity
- Waste production
- Gas
- Liquid flow



IS THE INTERNET OF THINGS HELPFUL TO MANAGEMENT SYSTEMS IMPLEMENTATION?

DEMING CYCLE PLAN

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)	★	

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	★	

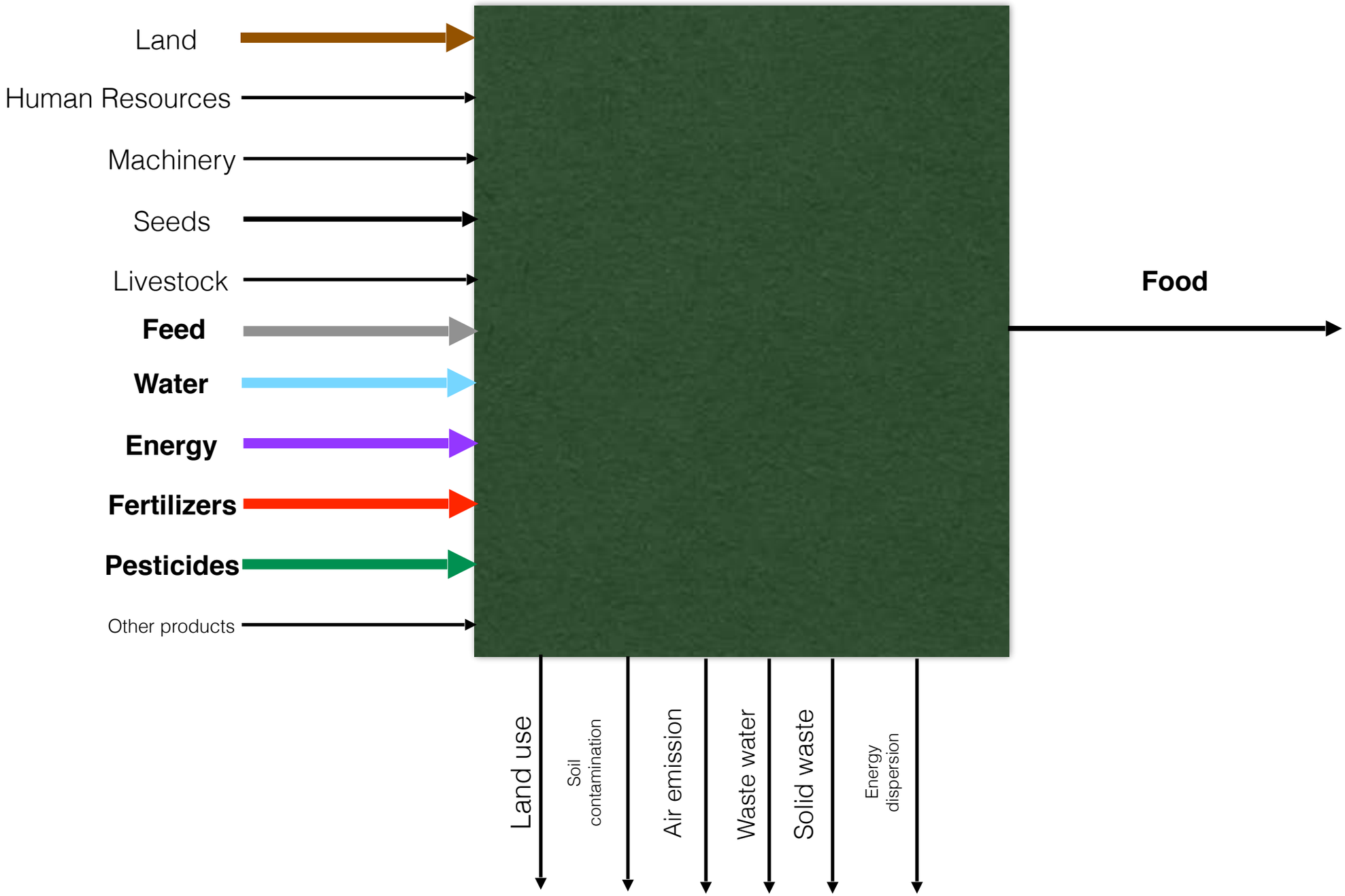
DEMING CYCLE CHECK

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	★	

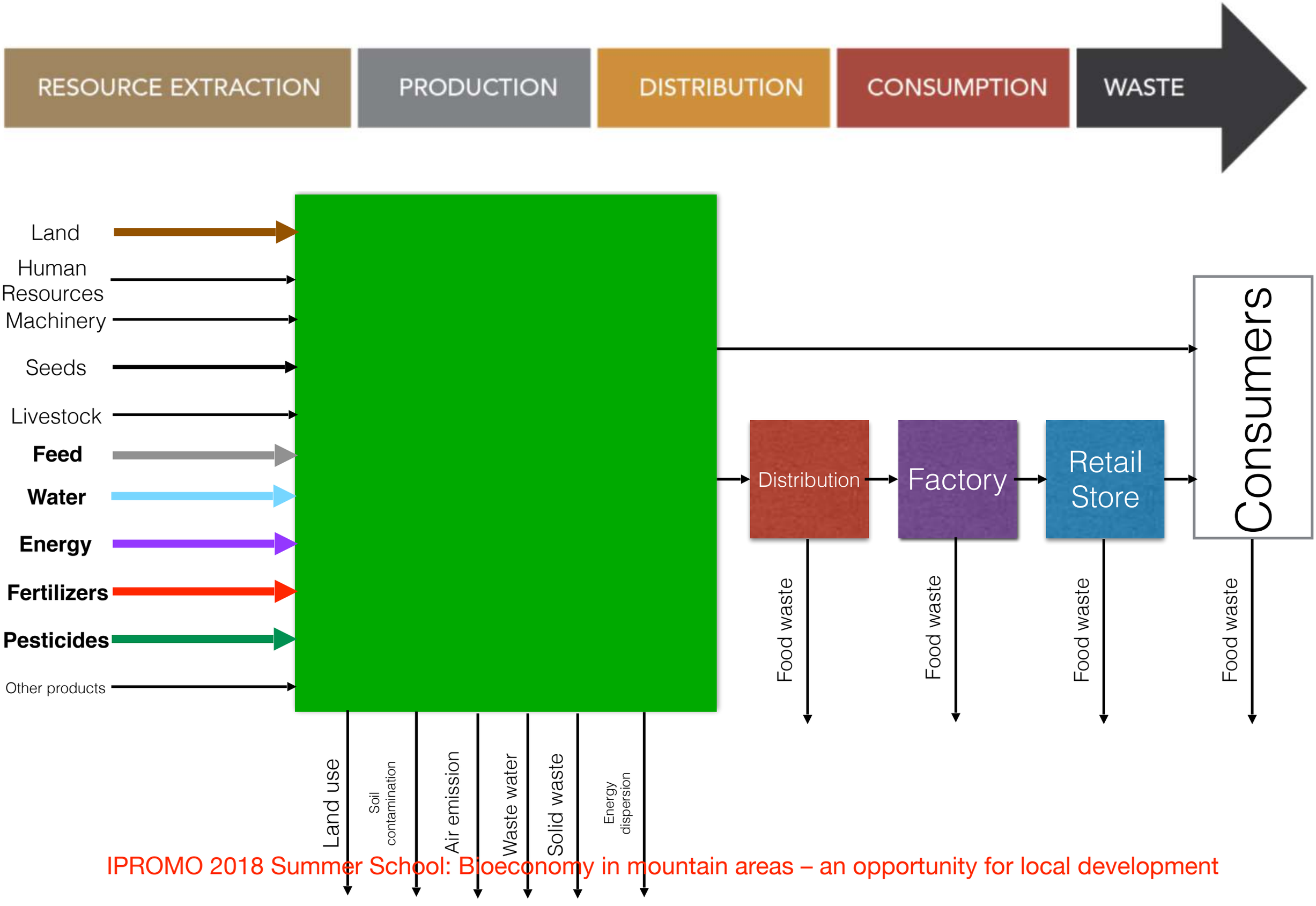
DEMING CYCLE ACT

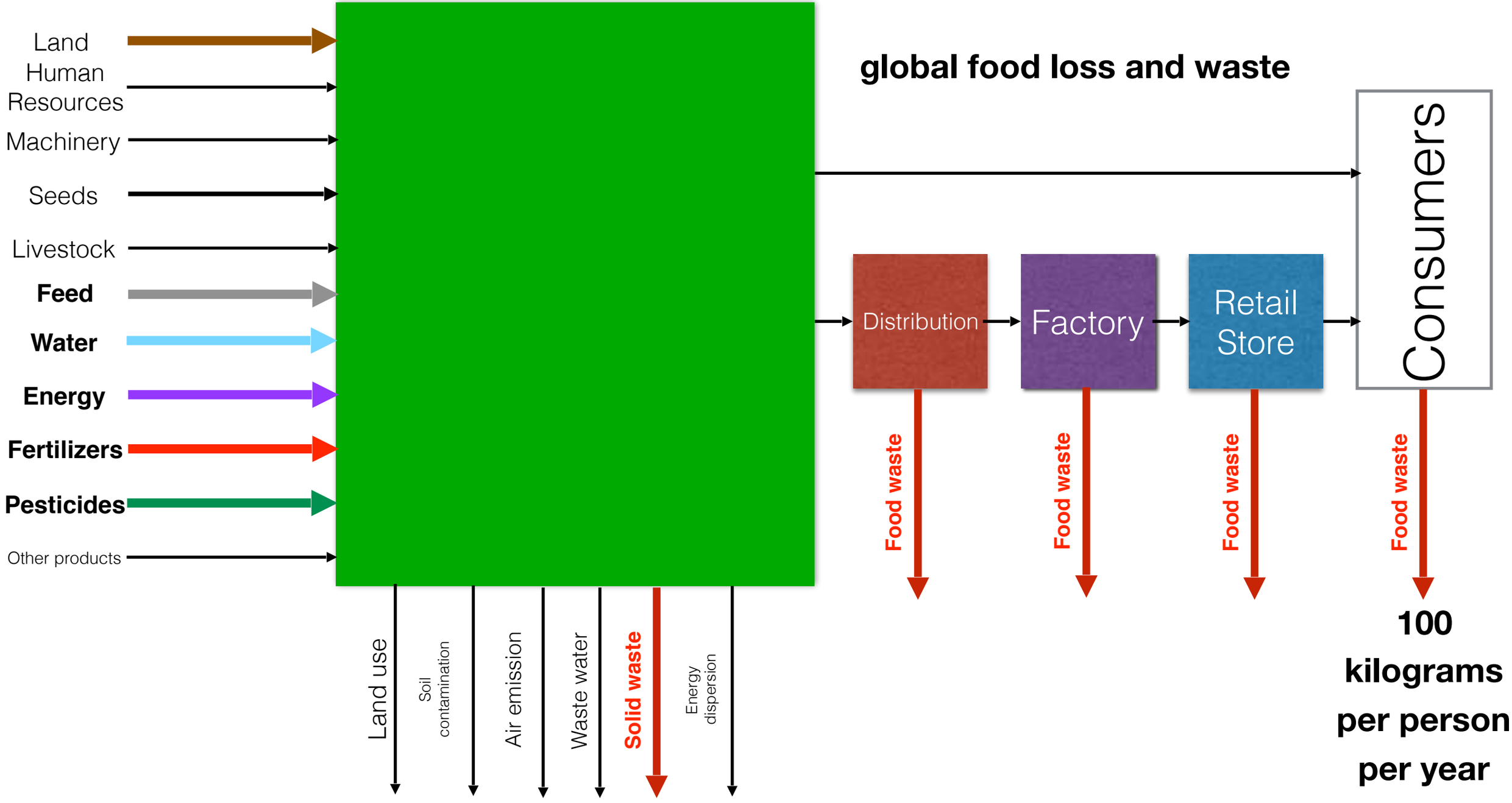
The Top management should review the EMS at planned intervals for ensuring its adequacy, effectiveness and suitability		★

Agriculture & Environment



LINEAR ECONOMY





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

Biomass for energy production

Food

Pharmaceutical

Nutraceutical

Cosmetics

Waste valorization

MULTIFUNCTIONALITY

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

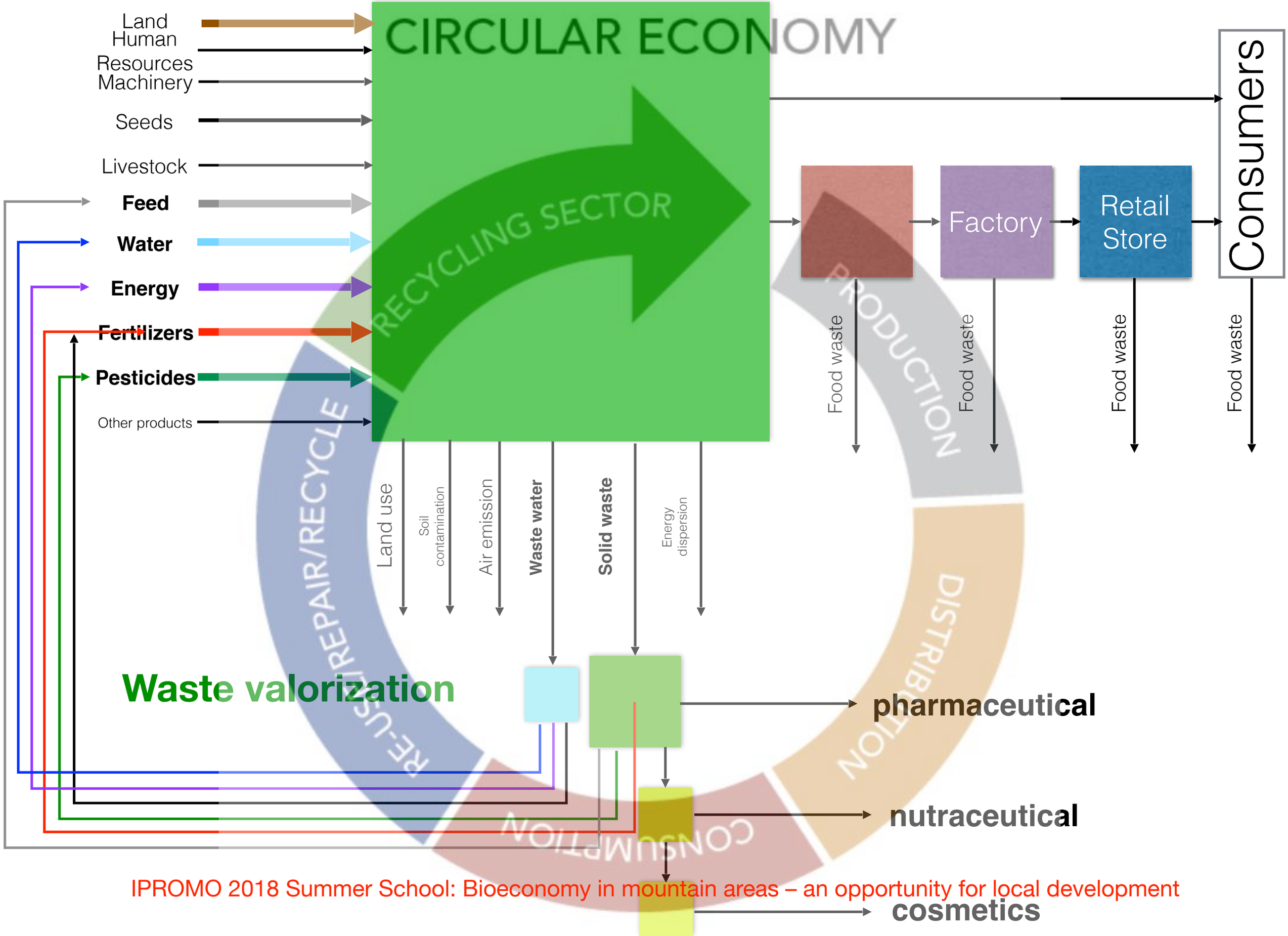
Food waste
Factory
Food waste
Retail Store
Food waste
Consumers
Food waste

Waste valorization

pharmaceutical

nutraceutical

cosmetics


CIRCULAR ECONOMY
Land
Human Resources
Machinery
Seeds
Livestock
Feed
Water
Energy
Fertilizers
Pesticides
Other products
RECYCLING SECTOR
PRODUCTION
DISTRIBUTION
CONSUMPTION
RE-USE/REPAIR/RECYCLE
Factory
Retail Store
Consumers
Food waste
Food waste
Food waste
Food waste
Land use
Soil contamination
Air emission
Waste water
Solid waste
Energy dispersion
Waste valorization
pharmaceutical
nutraceutical
cosmetics

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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!

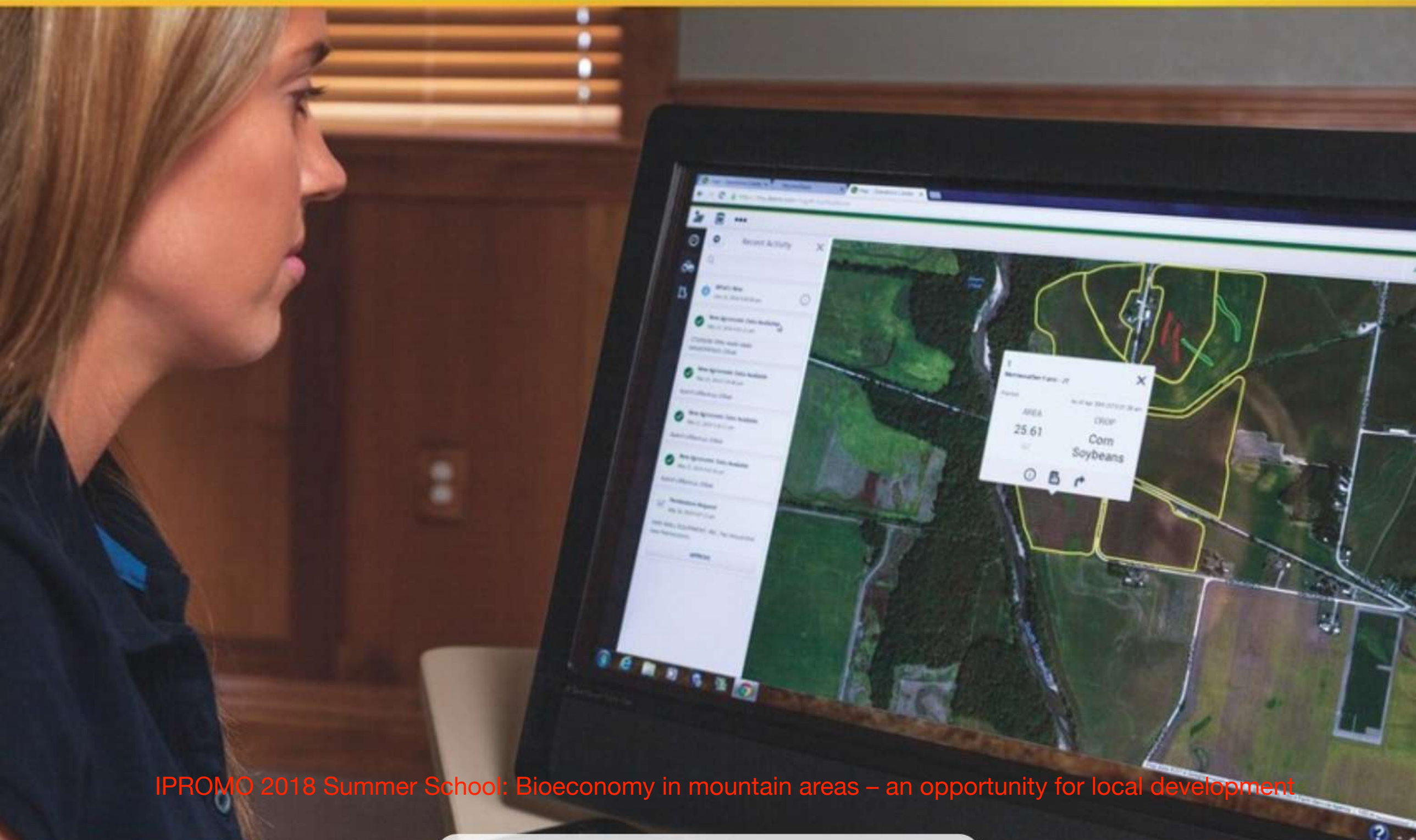
And now, the John Deere Field Connect advantage is even stronger, with new environmental sensors!

***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

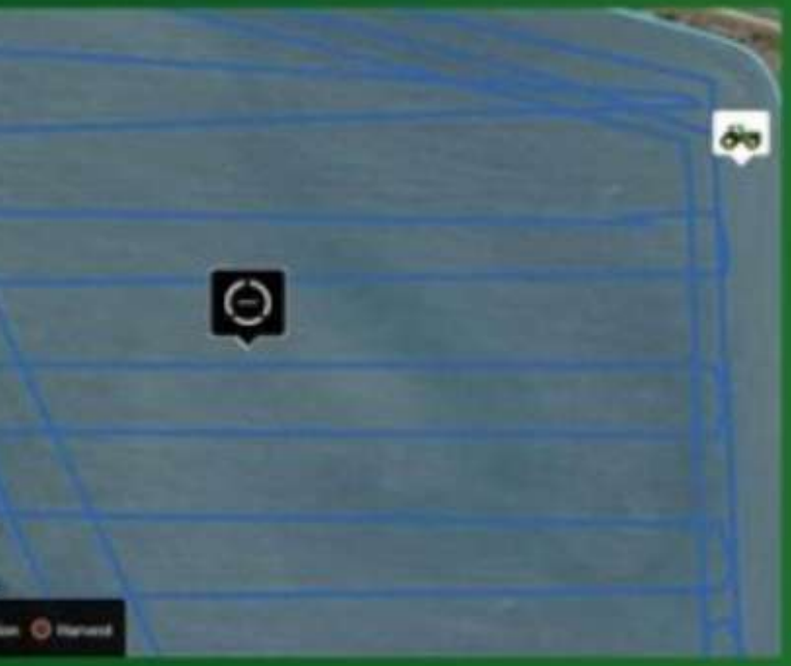
JOHN DEERE



Harvest Mobile

Technology that helps you harvest with confidence

JOHN DEERE



critical and timely information
ut your machines, online.

e **Location History** to see where your machines
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.

2 Lithoin U.S.A. (16-02)

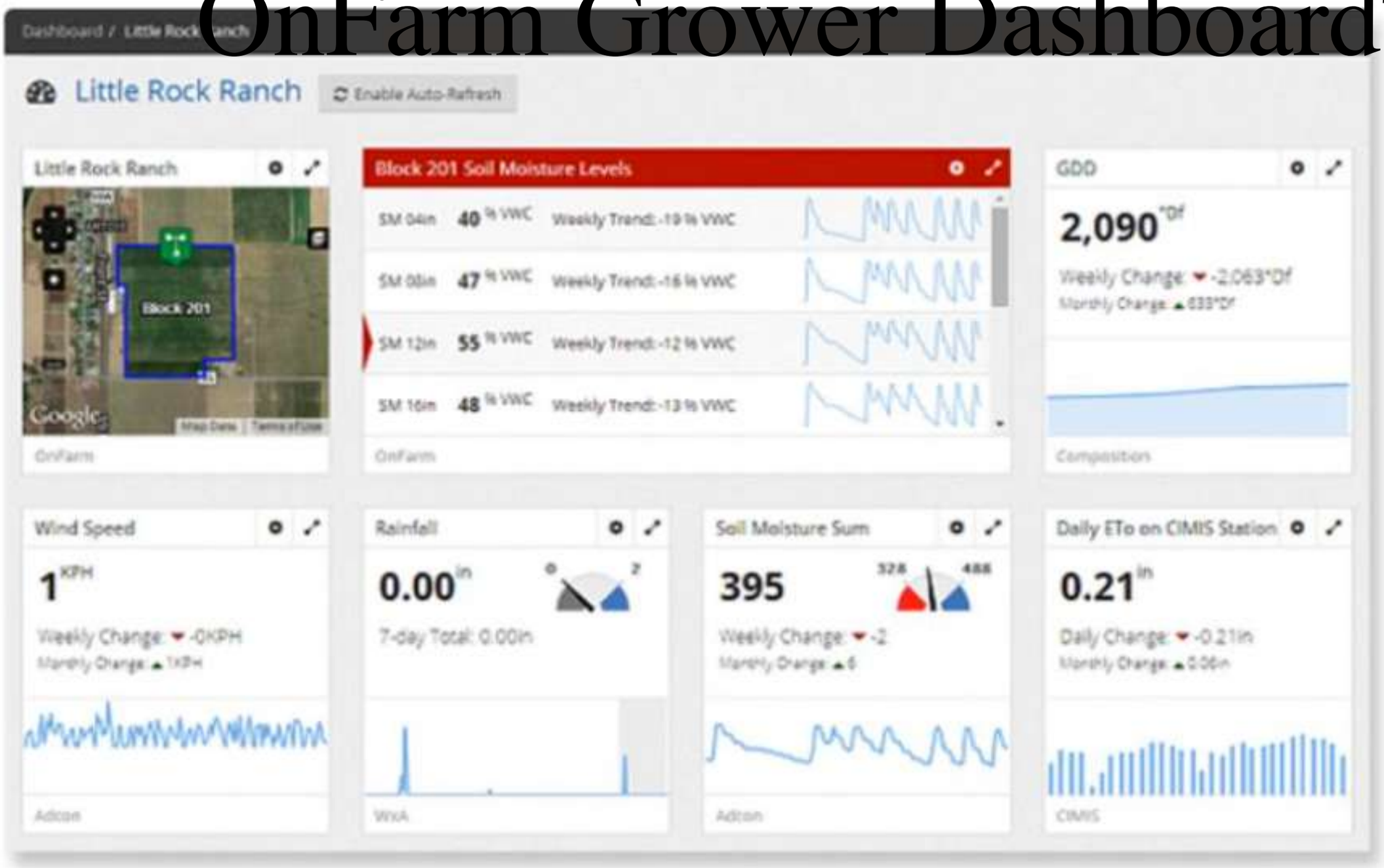
JohnDeere.com/Preci

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

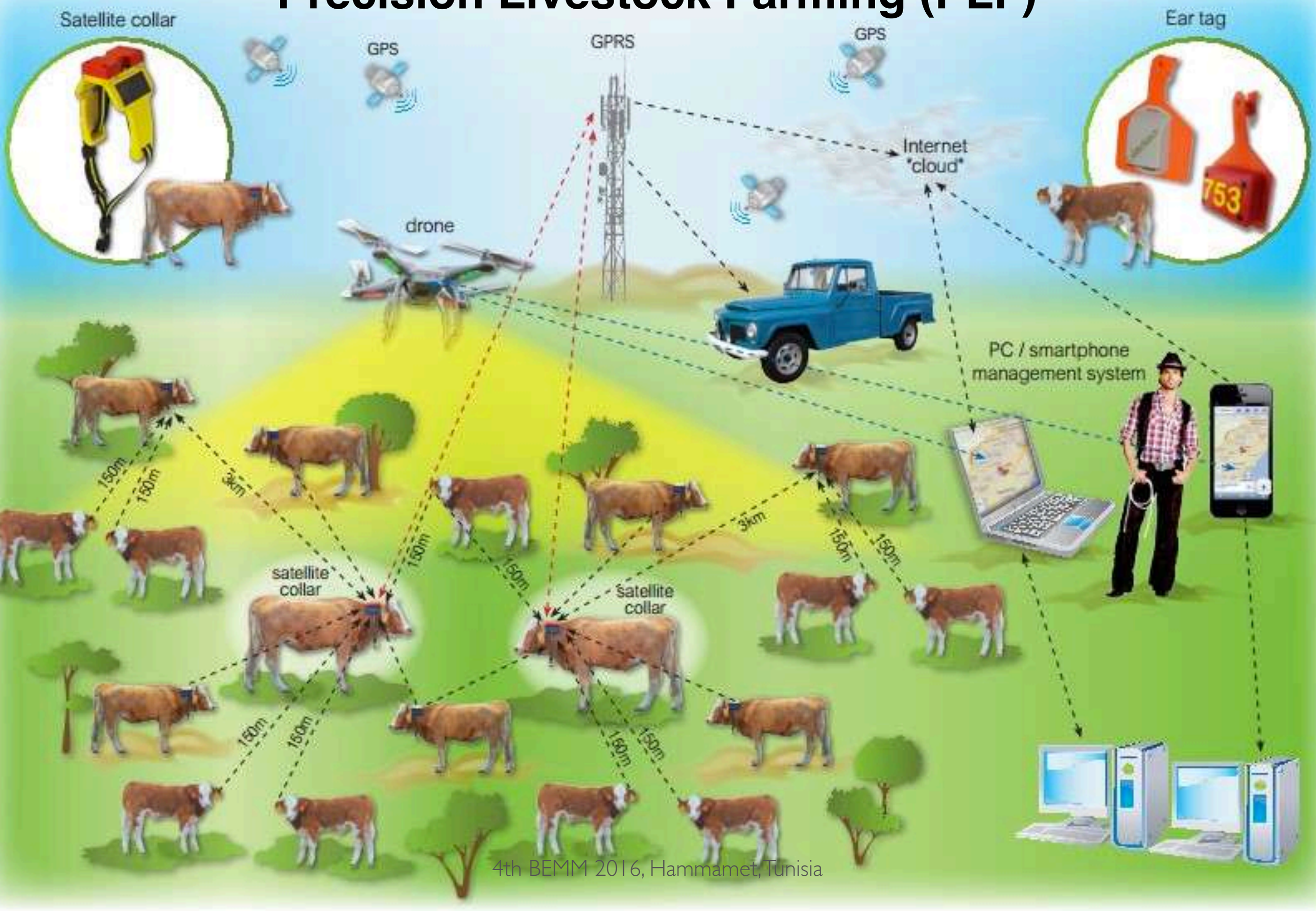


BLUE HILL RESEARCH

Translating Technology to Success

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.

Federico Guerrini, The Future Of Agriculture? Smart Farming, Forbes, FEB 18, 2015, http://www.forbes.com/sites/federicoguerrini/2015/02/18/the-future-of-agriculture-smart-farming/#1e0857bd337c

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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**.

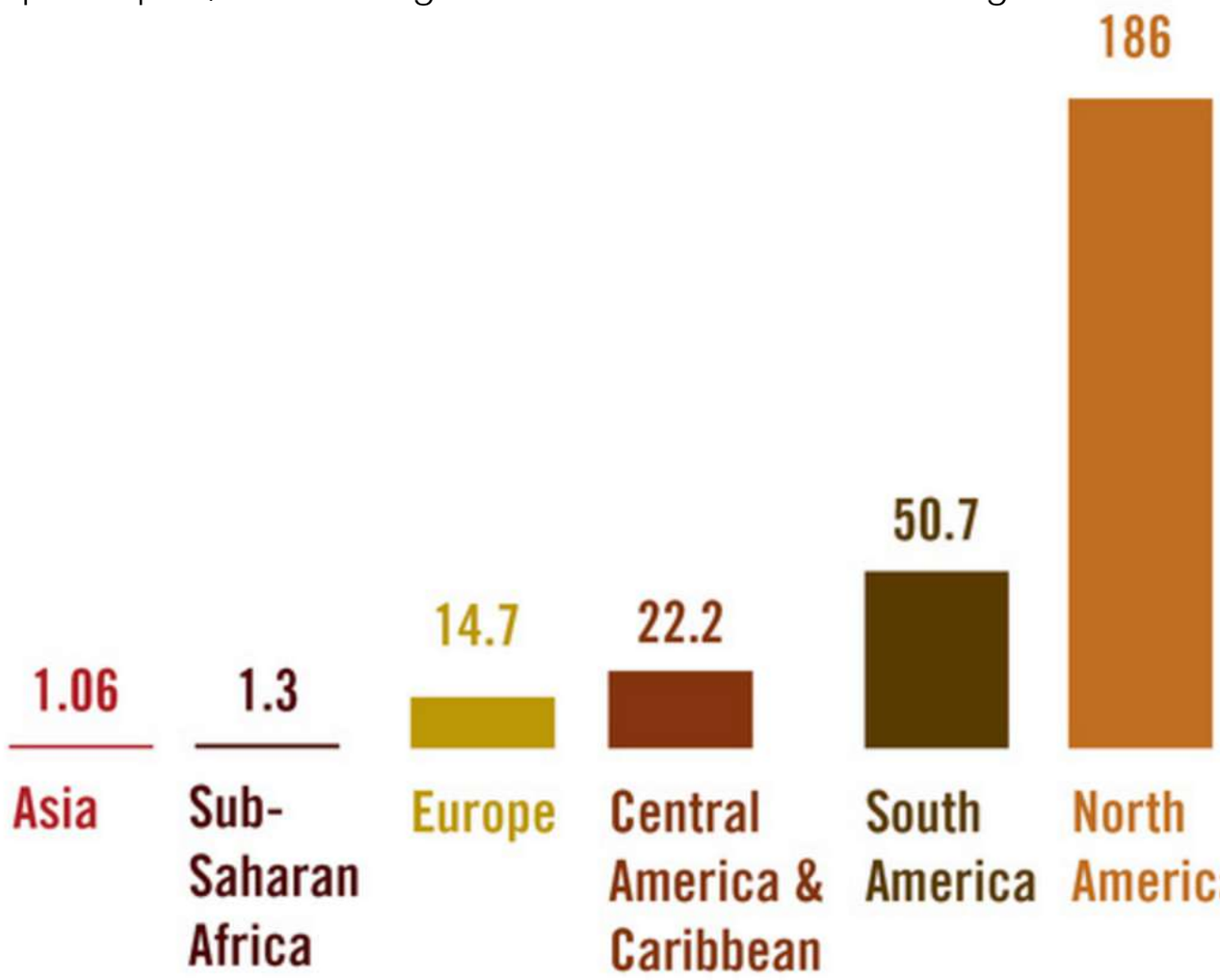
But before RFID-tagging becomes common practice in the forestry industry, tag prices must come down and more solid business cases must be demonstrated. Meanwhile, RFID shows promise as a tool to help control wildfires.


A03
A01
A02
A04
A05

Expensive

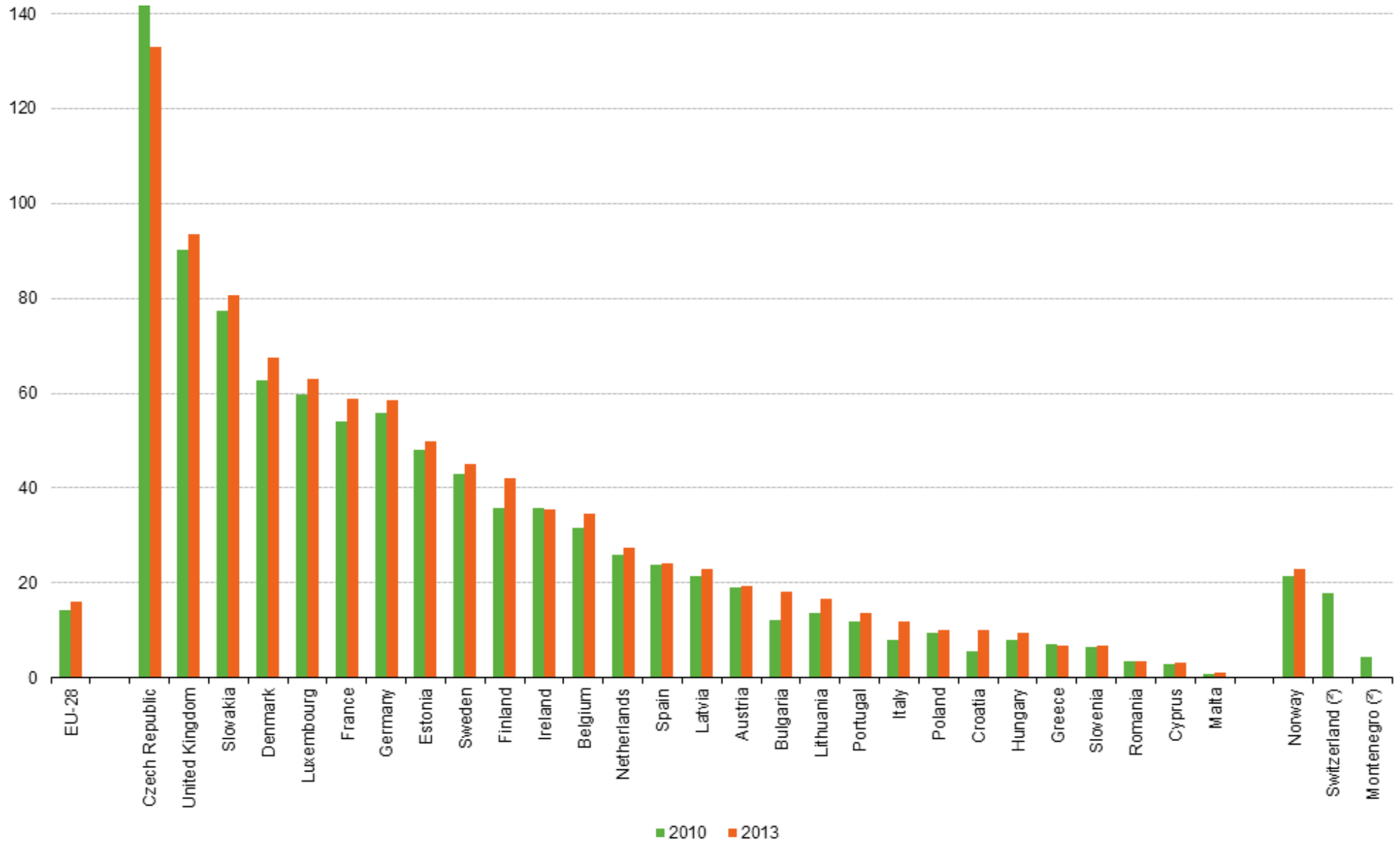
Big farms can afford them
but
the average farm in Europe is…

http://www.globalagriculture.org/report-topics/industrial-agriculture-and-small-scale-farming.html



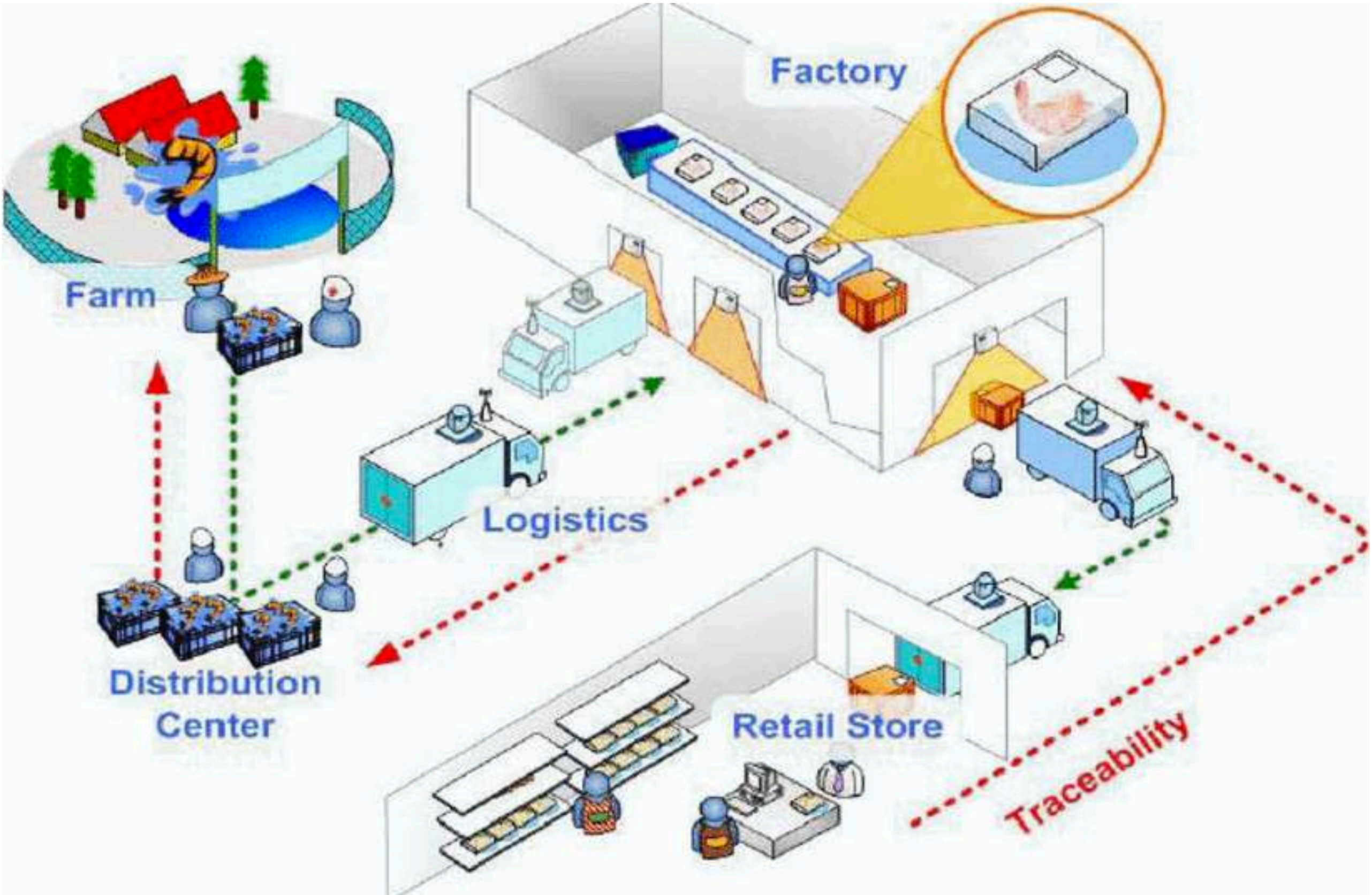
Source: IFAD (2010)

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

Our experience

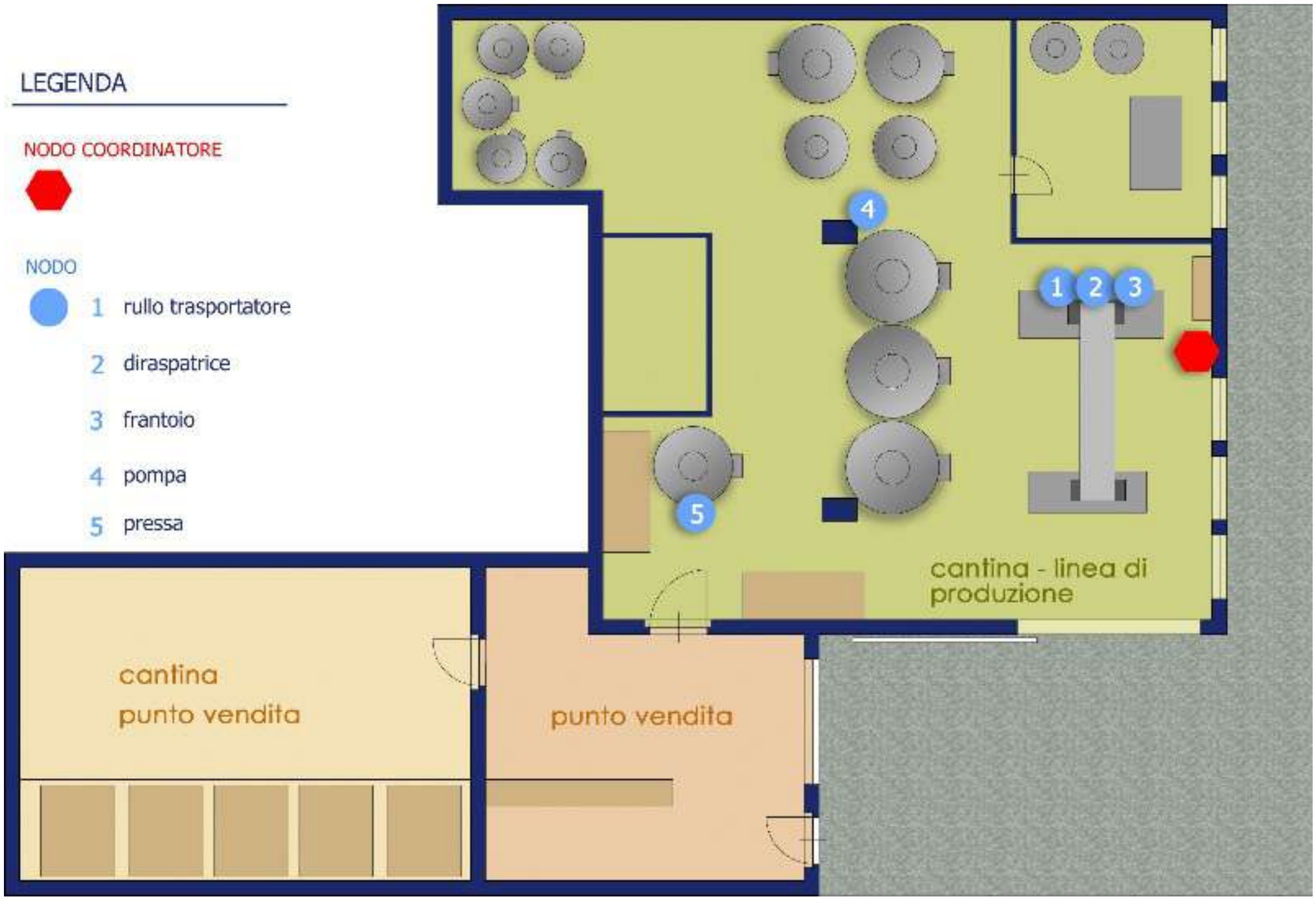
Cantina dei produttori di nebbiolo di Carema

- Need to quantify the consumption of machinery made by hand and without theoretical data available
- Machines running at intervals
- 15 amperometric forceps
- Monitoring of the entire harvesting period of the whole grape (about 715.57 quintals)

Misurare -> Nodi e sensori -> Crusc8 -> **Esempi di casi pratici**

Cantina Produttori di Nebbiolo di Carema

Cantina Produttori di Nebbiolo di Carema



Cantina Produttori di Nebbiolo di Carema

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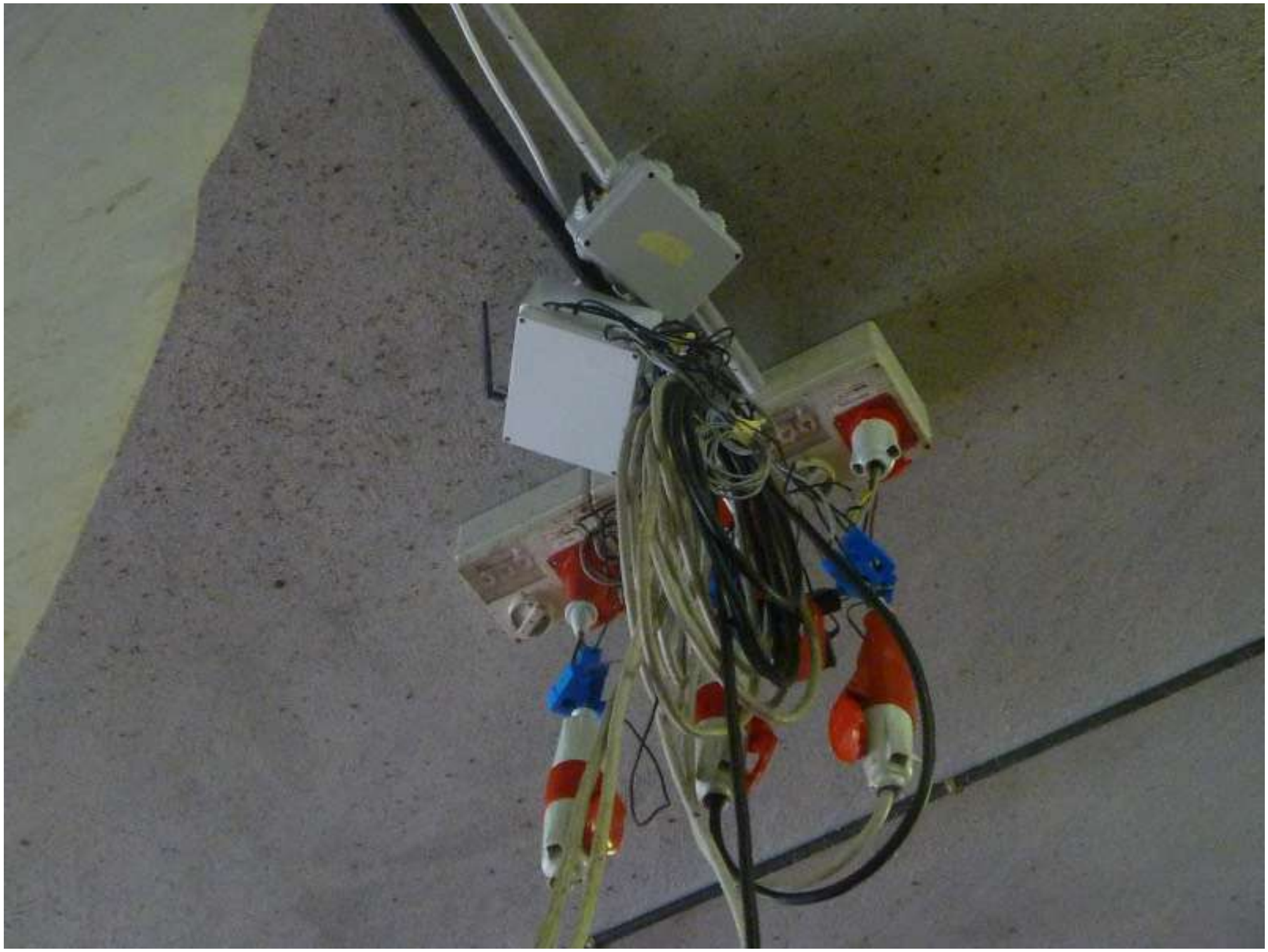
Cantina Produttori di Nebbiolo di Carema

IPROMO 2018 Summer School: Bioeconomy in mountain areas – an opportunity for local development

Cantina Produttori di Nebbiolo di Carema



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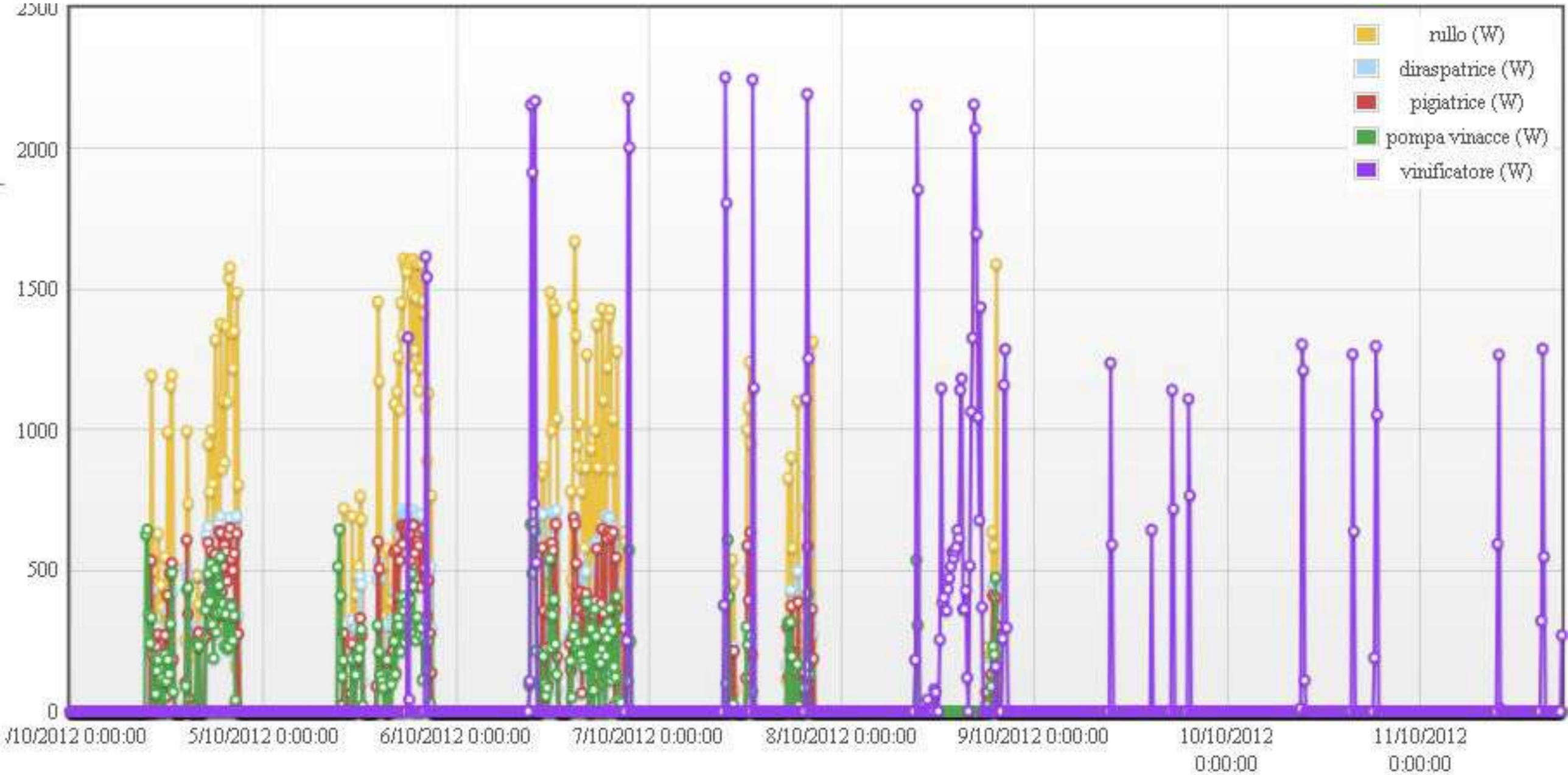
Cantina dei produttori di nebbiolo di Carema



Misurare -> Nodi e sensori -> Crusc8 -> **Esempi di casi pratici**

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…

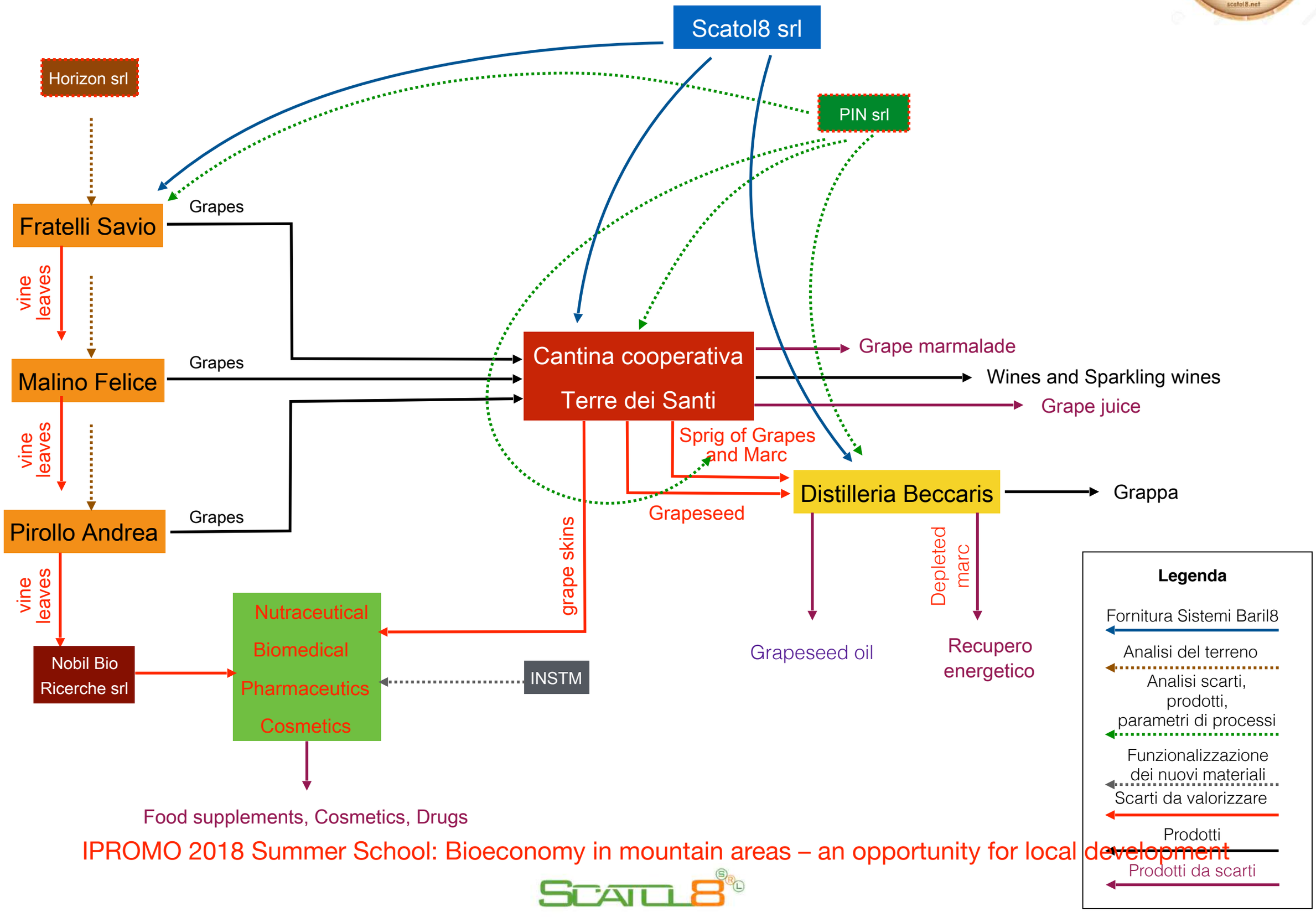
…and the dashboard shows the intensity of monitored variables…


Baril8
scatol8.net


Partner
Lo Scatol8 per la Sostenibilità
Cantina Cooperativa Terre dei Santi
Cà Mariuccia
Malino Felice
Fratelli Savio
Distilleria Beccaris

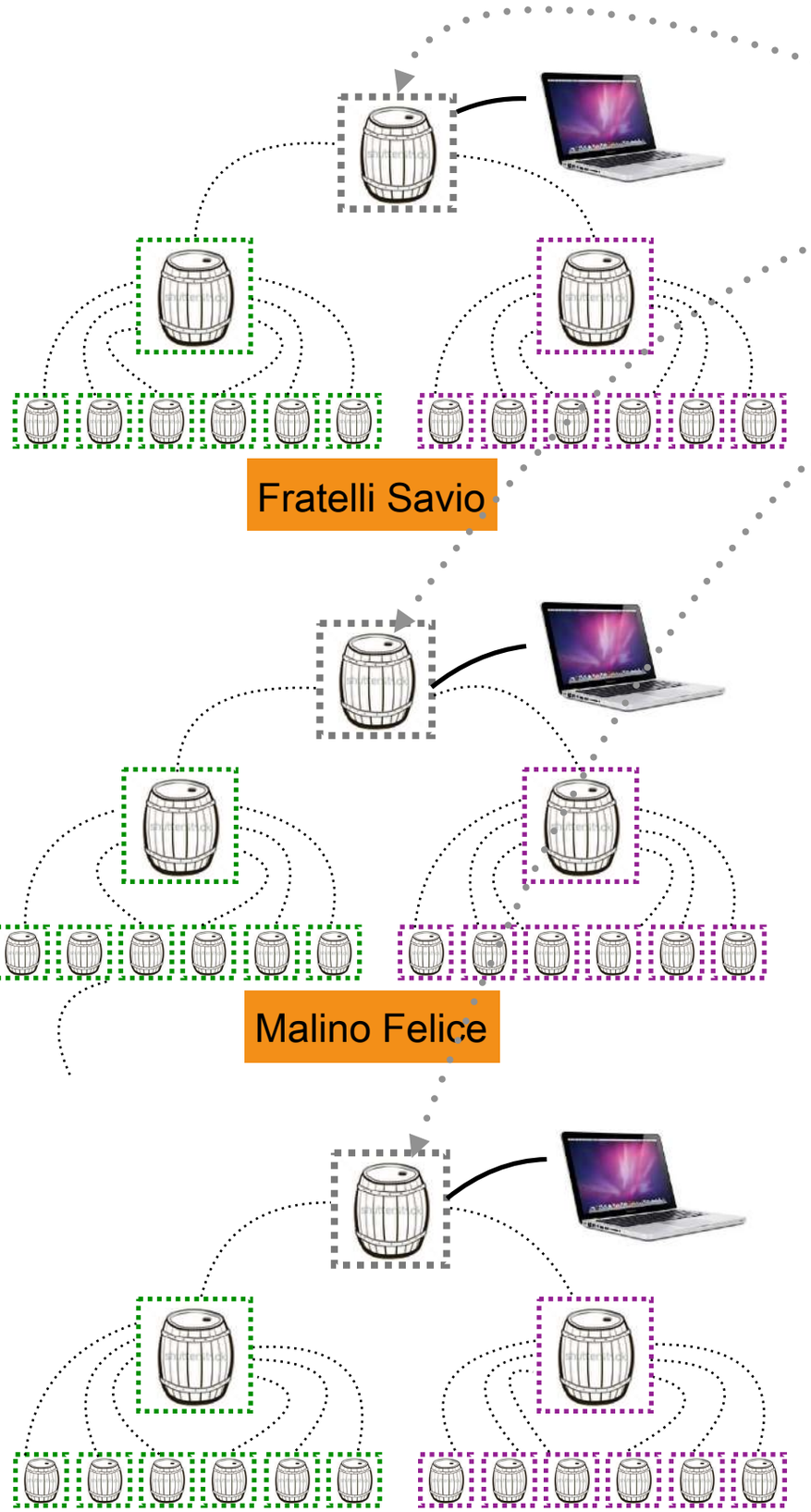
Baril8 - System for the introduction of innovative models of circular viticulture, for production of sustainable territorial quality features

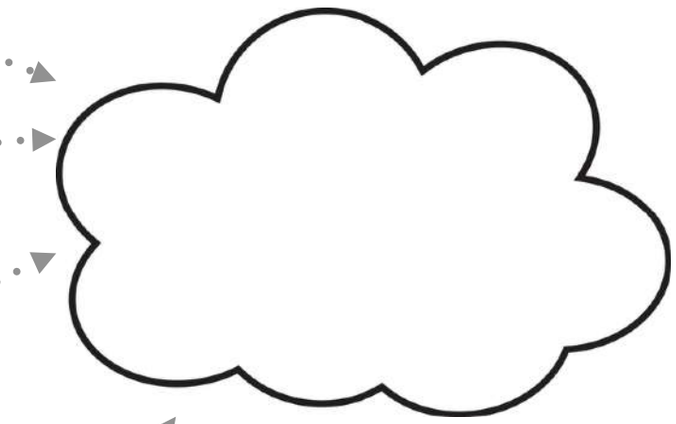
The planning scheme

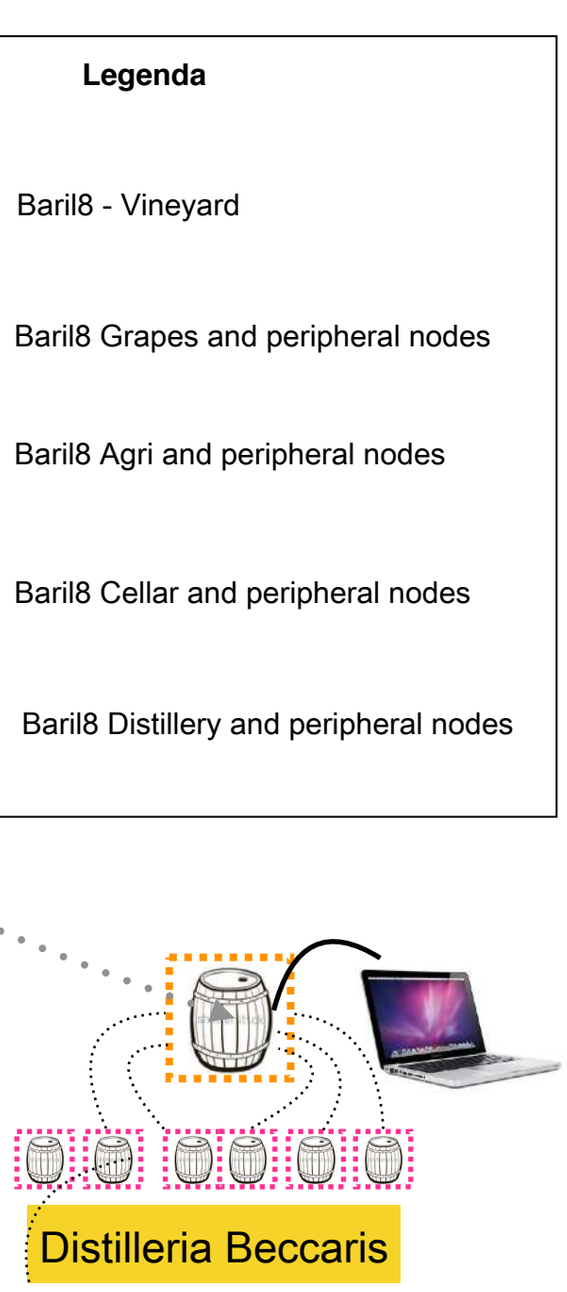


Baril8 - System for the introduction of innovative models of circular viticulture, for production of sustainable territorial quality features

The architecture of the system







Legenda

- Baril8 - Vineyard
- Baril8 Grapes and peripheral nodes
- Baril8 Agri and peripheral nodes
- Baril8 Cellar and peripheral nodes
- Baril8 Distillery and peripheral nodes


WINE
WINE
WINE
Baril8
SCAIL8

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Data

and then?

- Business Intelligence: Management systems, Sustainability Report
- Products
- Education

Educational side

- Progetti con le scuole


SCATOLE

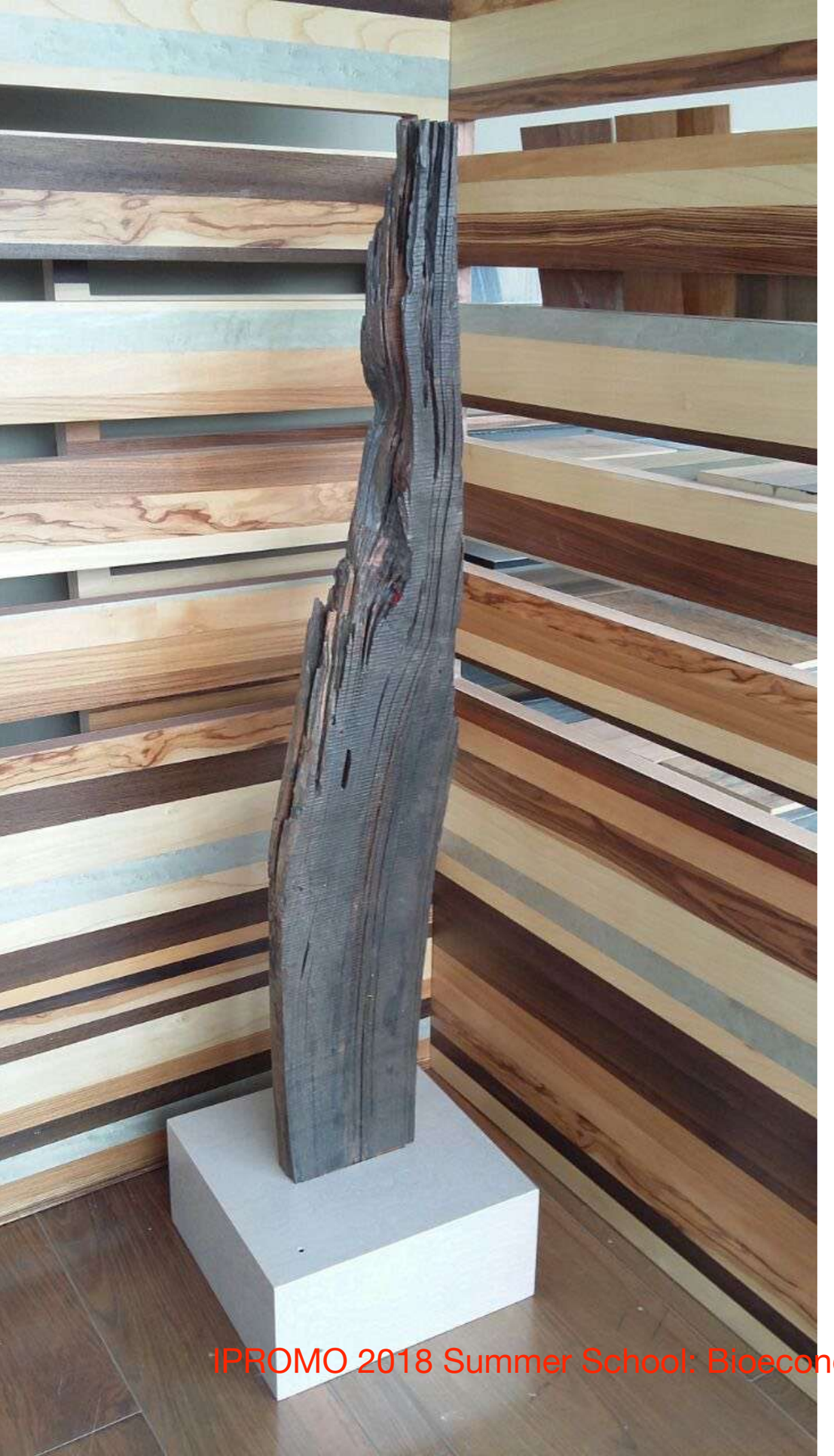

SCATOLE

S8-SIL
Rubia Tinctorum

S8-LIL
Chestnut tannin

Don_Bosco_Lamp
Poplar plywood

S8-Vela
Chestnut wood and chestnut tannin tincture



S8-Vela
Chestnut wood and chestnut tannin tincture

S8-VELA

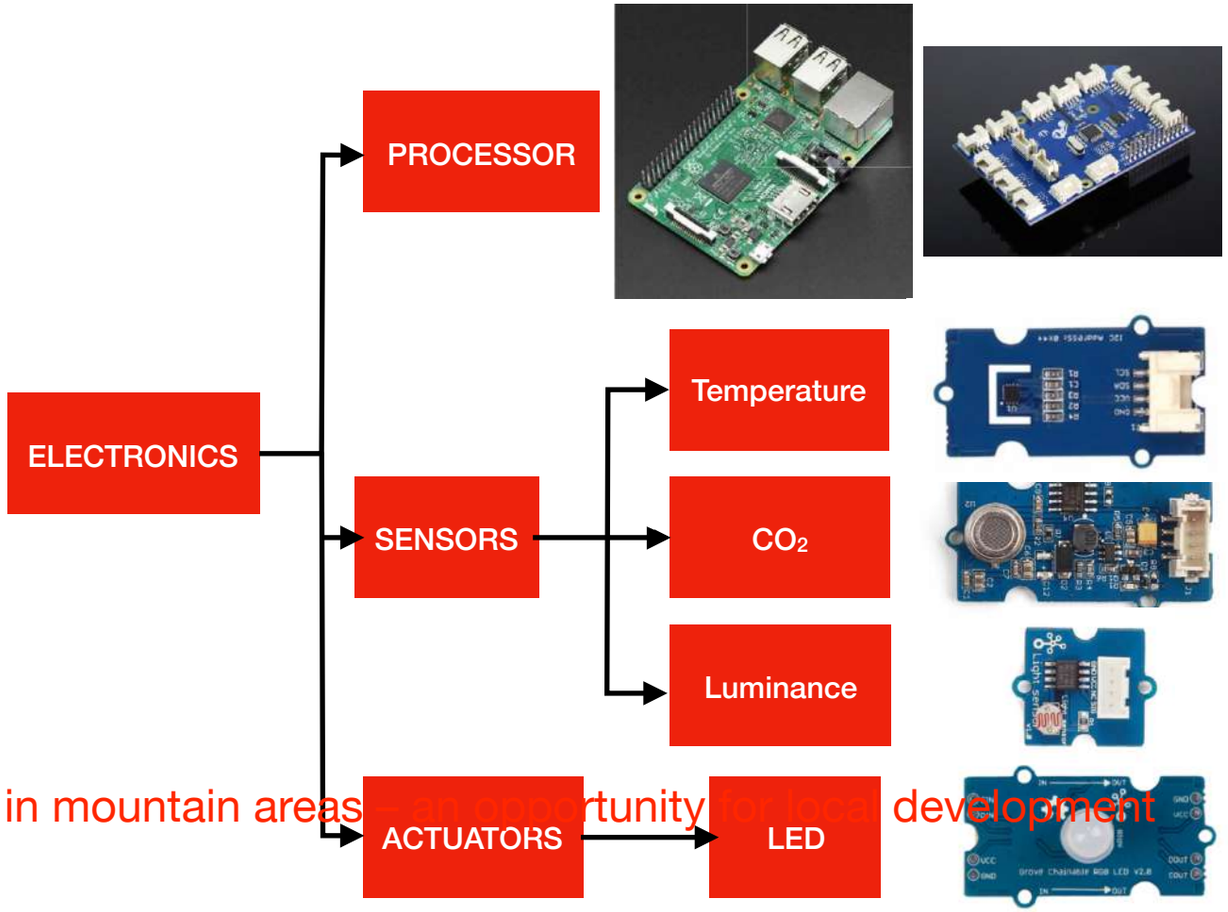
DC rating: 5,1 V; ⎓ 2,5 A

SCATOL8®

Lo Scatol8 per la Sostenibilità srl

CE 2017

Made in Italy



Nodes + Lamps

T-shirt: Flow-chart of the first collection

Indigo Laboratories

Electric energy

Human resources

Computer

Graphic ideation

SCATOL8®

Electric energy

Human resources

T-shirt printing machine

Colors

Printer X

Selection t-shirt suppliers **Environmental criteria**

Scatol8®

Electric energy

Human resources

Computer


SCATL8
message in the bottle


SCATL8
nutella

T-shirt: Flow-chart of the second collection “eco-printing”

Indigo Laboratories

Electric energy

Human resources

Computer

Graphic ideation

Laboratorio QuMap

Electric energy

Human resources

Computer

Production vegetable dye

Scatol8®

Electric energy

Human resources

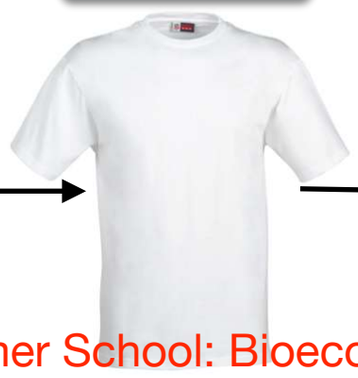
Computer

microcontrollorers

sensors

actuators

Selection t-shirt suppliers



Scatol8®

Electric energy

Human resources

T-shirt printing machine

Eco-printing Lab

CONFIDENCE IN TEXTILES

Tested for harmful substances

according to Oeko-Tex® Standard 100

00000000 Institute

ORGANIC 100 content standard

BSCI

Business Social Compliance Initiative

GLOBAL ORGANIC TEXTILE STANDARD

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IPROMO 2018 Summer School: Bioeconomy in mountain areas – an opportunity for local development

T-shirt: Flow-chart of the third collection “eco-printing+sensors”

Indigo Laboratories

Graphic ideation
t-shirt selection

Electric energy

Human resources

Computer

SCATOL8®

Electric energy

Human resources

T-shirt printing machine

Eco-printing Lab

Production vegetable dyes

Electric energy

Human resources

Computer

Scatol8®

Electric energy

Human resources

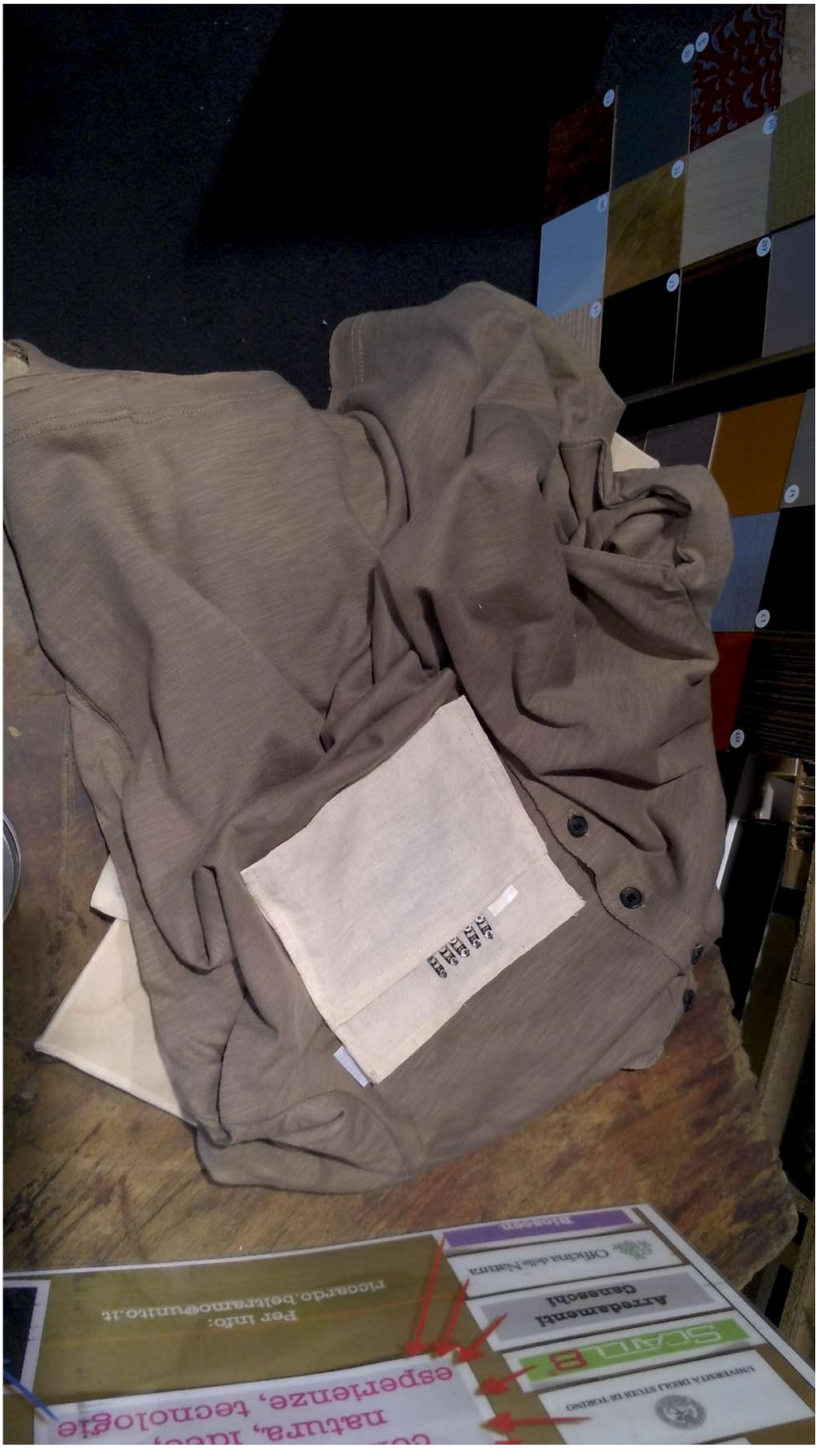
Computer

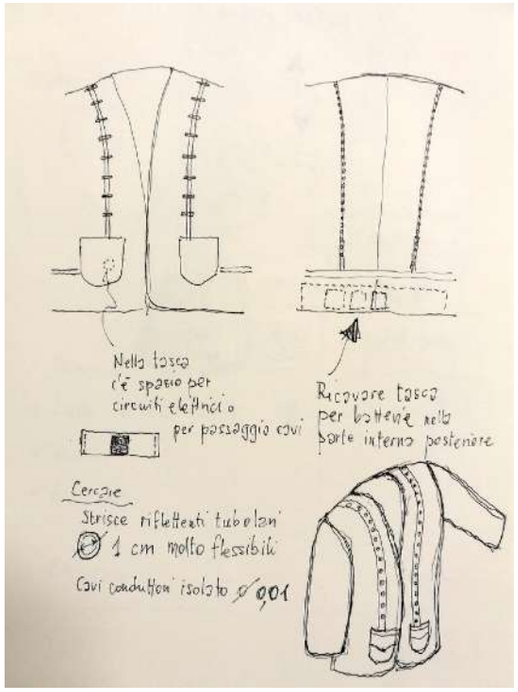
microcontrollorers

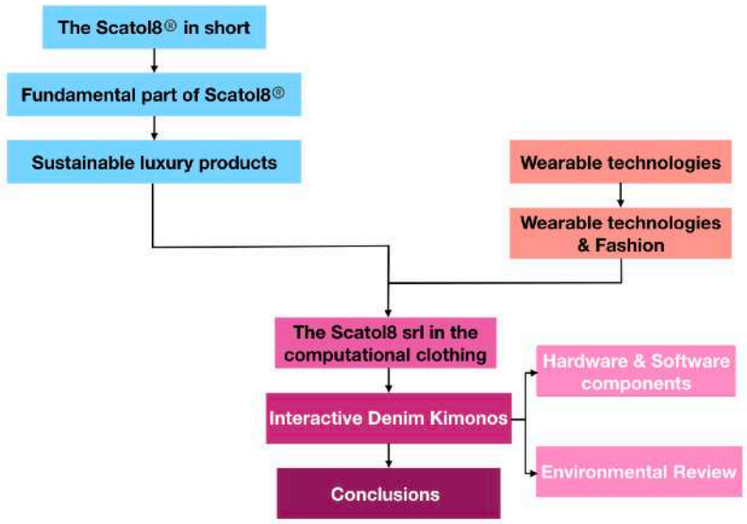
sensors

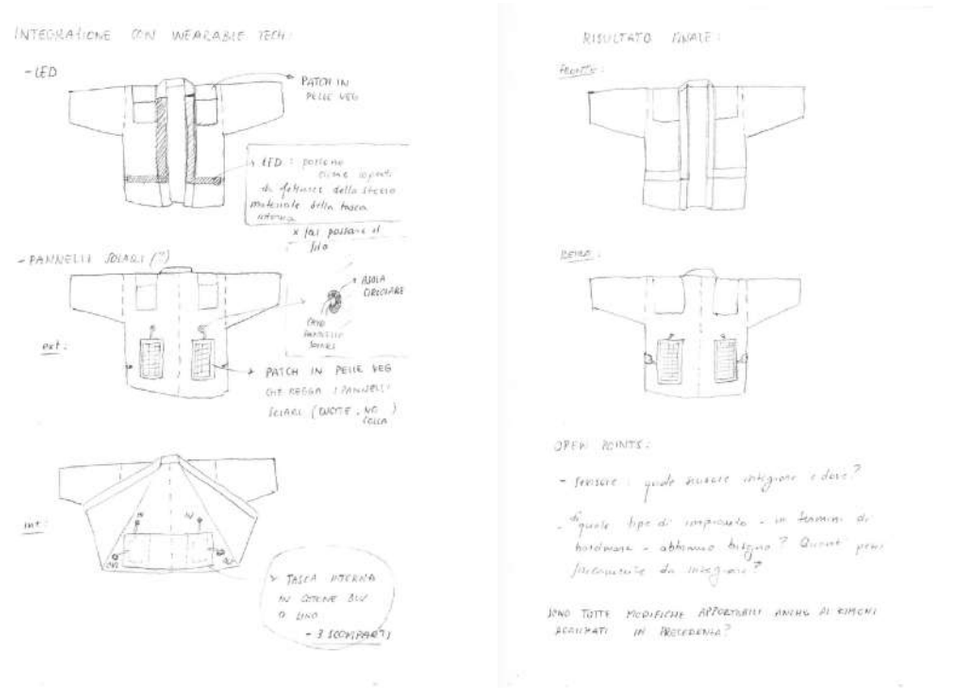
actuators


SCATTL8®
nutella
Yale


Per info:
ricciardo.beltramo@unito.it
Officina della Natura
Arredamenti
Generali
SCUOLA
UNIVERSITÀ DEGLI STUDI DI TORINO
natura, idee,
esperienze, tecnologie

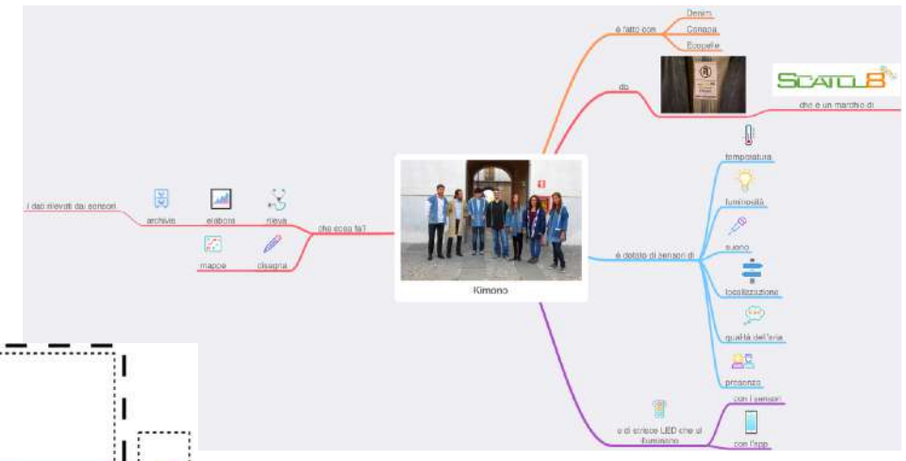


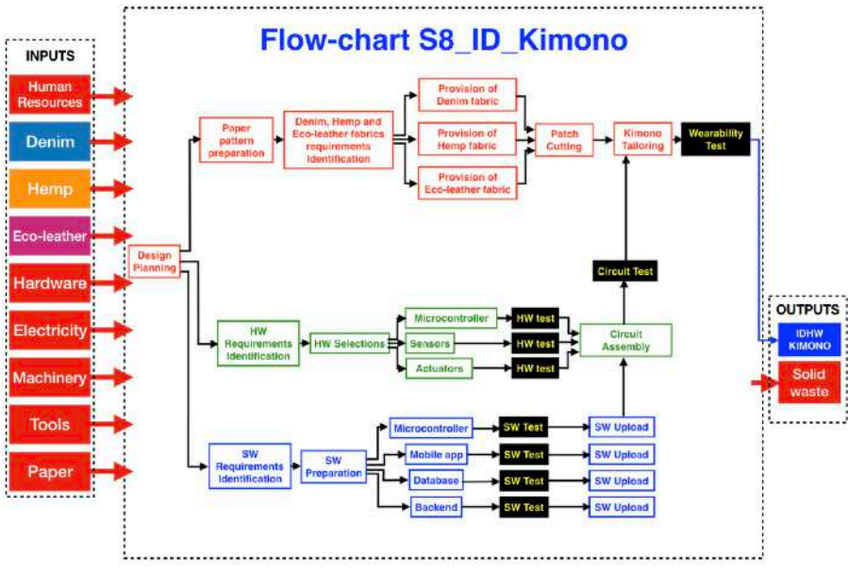


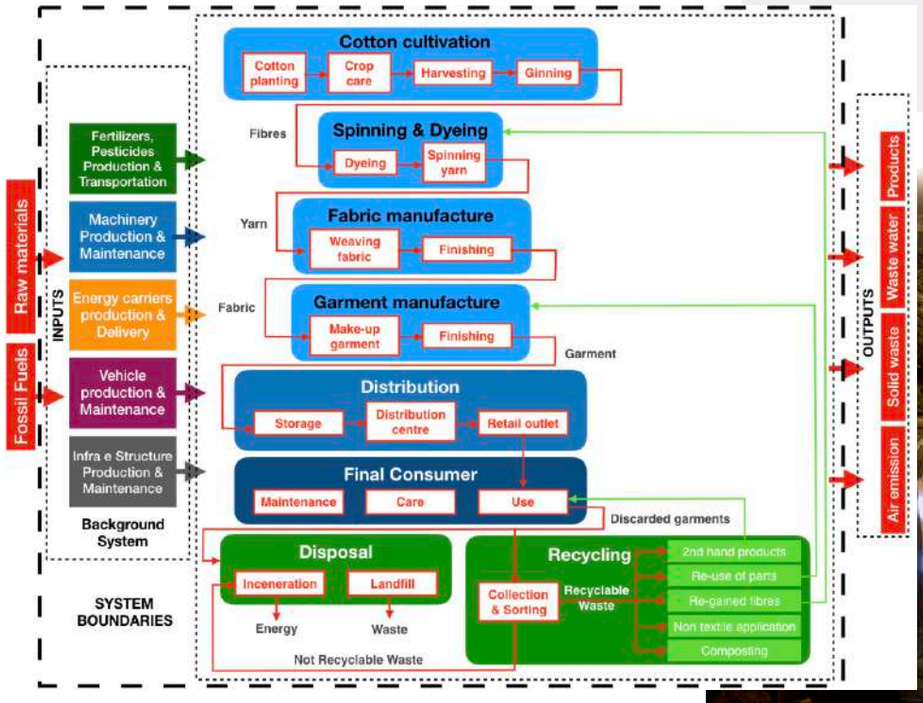


How to make fabrics talk environment: the Scatol8 per la Sostenibilità way

Riccardo Beltramo, Jacopo Beltramo, Paolo Cantore and Annalisa Romani







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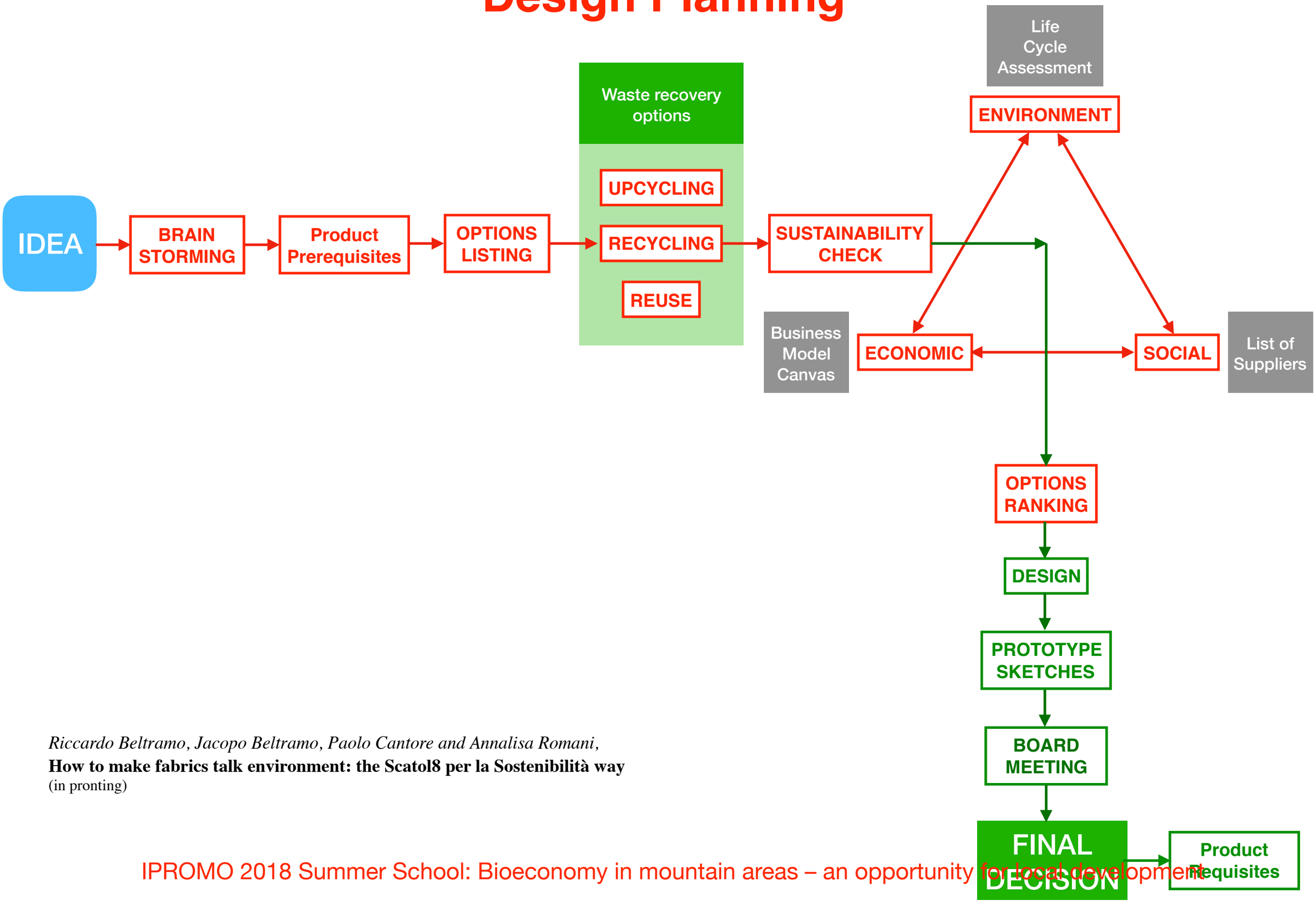
Design Planning



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(in pronting)

Flow-chart S8_IDHW_Kimono

Human Resources

Denim

Hemp

Wineleather

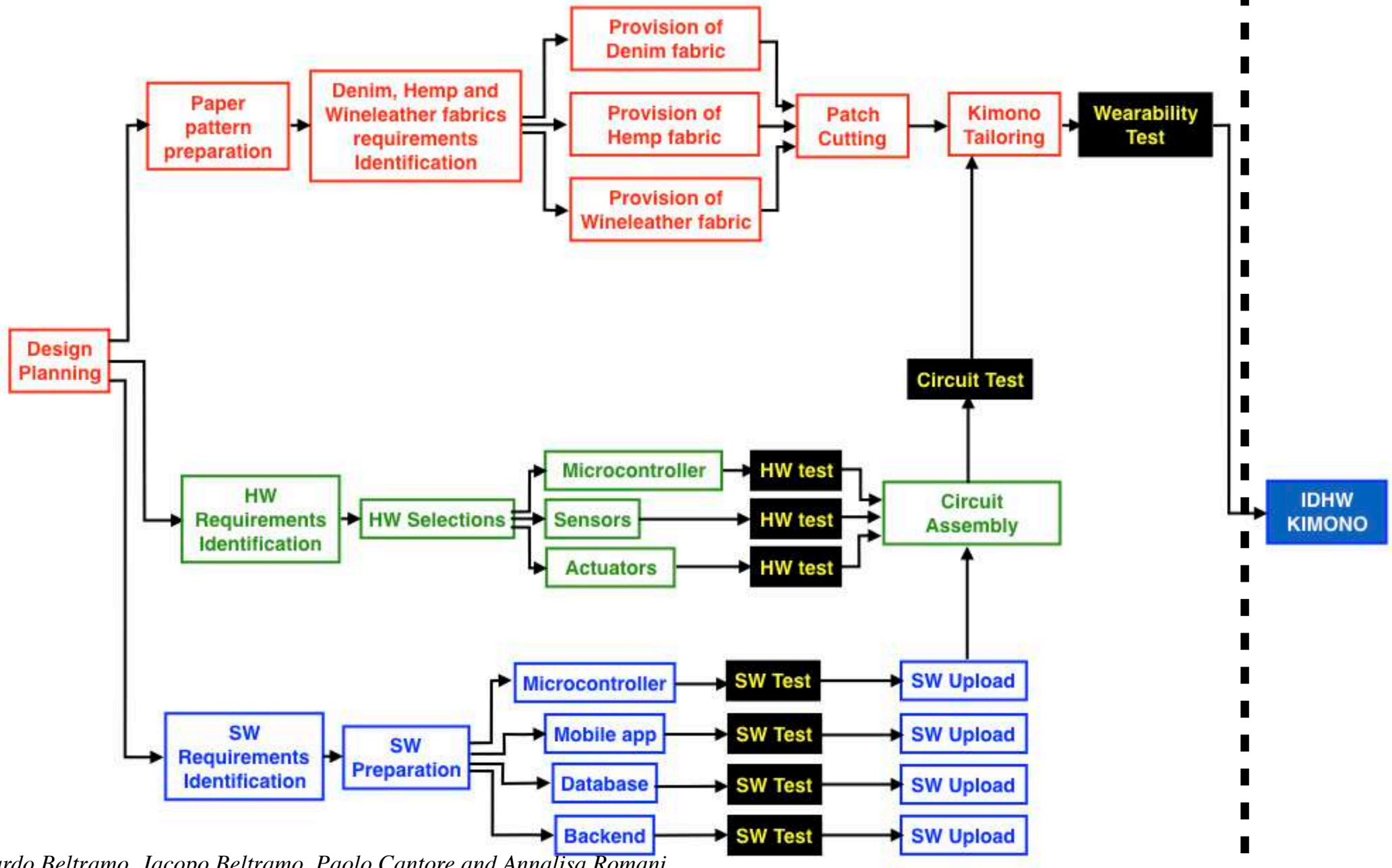
Hardware

Electricity

Machinery

Tools

Paper



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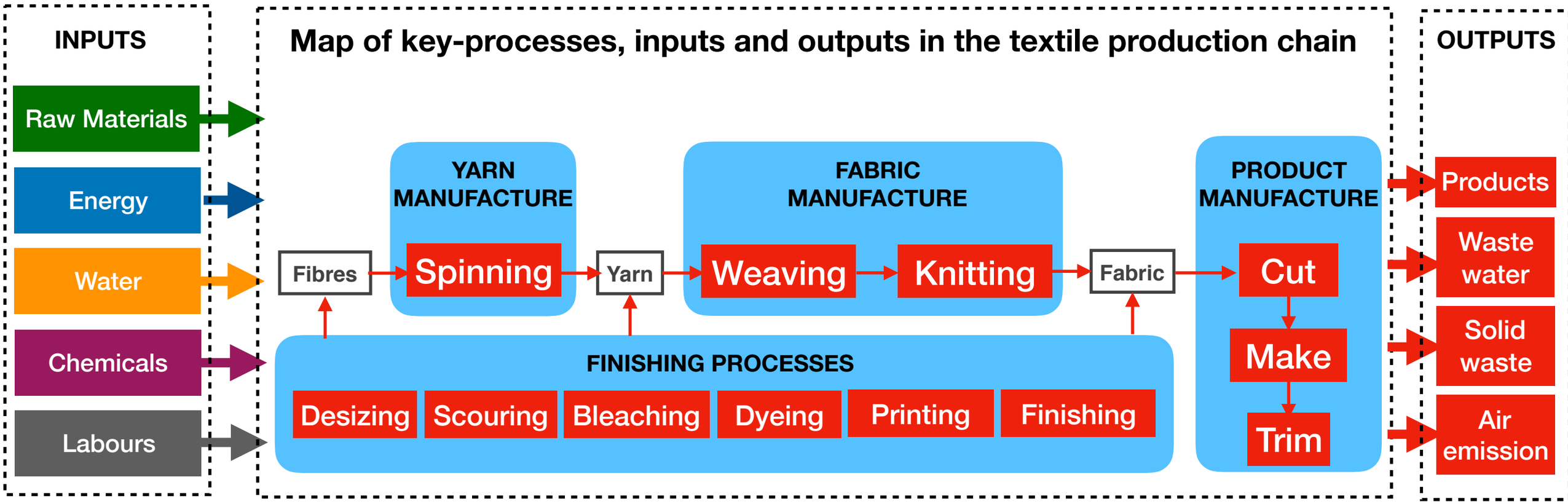

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Cotton

Cotton cultivation
Cotton planting → Crop care → Harvesting → Ginning

Fibres

Spinning & Dyeing
Dyeing → Spinning yarn

Yarn

Fabric manufacture
Weaving fabric → Finishing

Fabric

Garment manufacture
Make-up garment → Finishing

Garment

Distribution
Storage → Distribution centre → Retail outlet

Final Consumer
Maintenance | Care | Use

Discarded garments

Disposal
Inceneration | Landfill

Energy | Waste

Not Recyclable Waste

Recycling
Collection & Sorting → Recyclable Waste

- 2nd hand products
- Re-use of parts
- Re-gained fibres
- Non textile application
- Composting

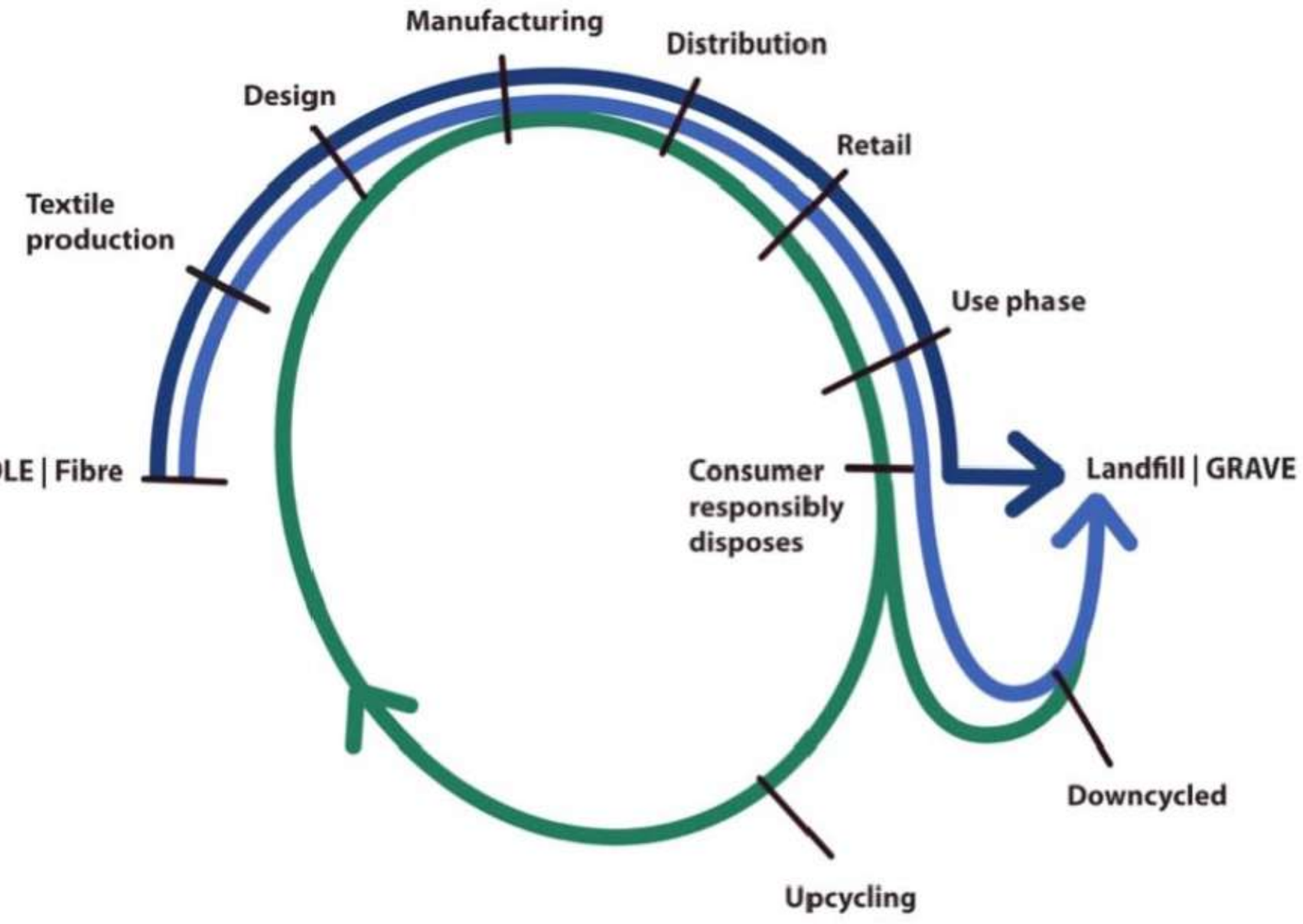
INPUTS
- Raw materials
- Fossil Fuels
- Fertilizers, Pesticides Production & Transportation
- Machinery Production & Maintenance
- Energy carriers production & Delivery
- Vehicle production & Maintenance
- Infra e Structure Production & Maintenance

Background System

SYSTEM BOUNDARIES

OUTPUTS
- Products
- Waste water
- Solid waste
- Air emission

UPCYCLING


Manufacturing
Distribution
Design
Retail
Textile production
Use phase
CRADLE | Fibre
Consumer responsibly disposes
Landfill | GRAVE
Downcycled
Upcycling

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KIMONO:
05/08
100 % VINTAGE DENIM
PRIMO
BY
INDIGO LABORATORIES









Kimono is:

- made with recovery denim and wineleather fabric;
- equipped with five led strips: four perform animations and change color according to the tastes of the wearer and one changes color according to the intensity of the variable monitored by the sensor

App:

- allows you to change colors and animation;
- receives and displays the intensity of the variable monitored by the sensor;
- send the intensity of the variable and the position to the server

Server:

- receives and displays georeferenced data on dedicated Crusc8

Algoritmo:

- process the data
- **draws maps of environmental quality**

Indigo Laboratories

S8®_IDH_Kimono

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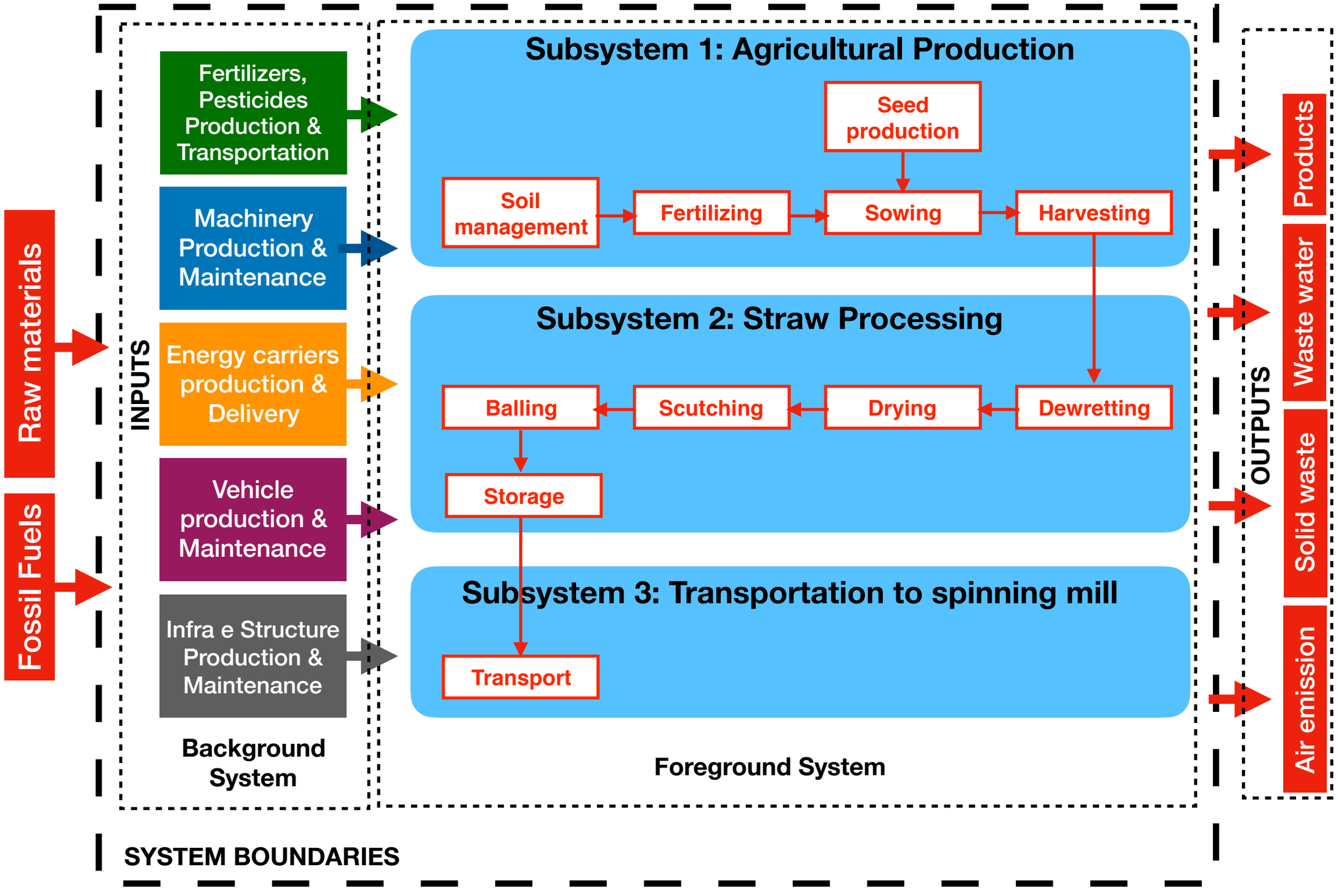
Hemp



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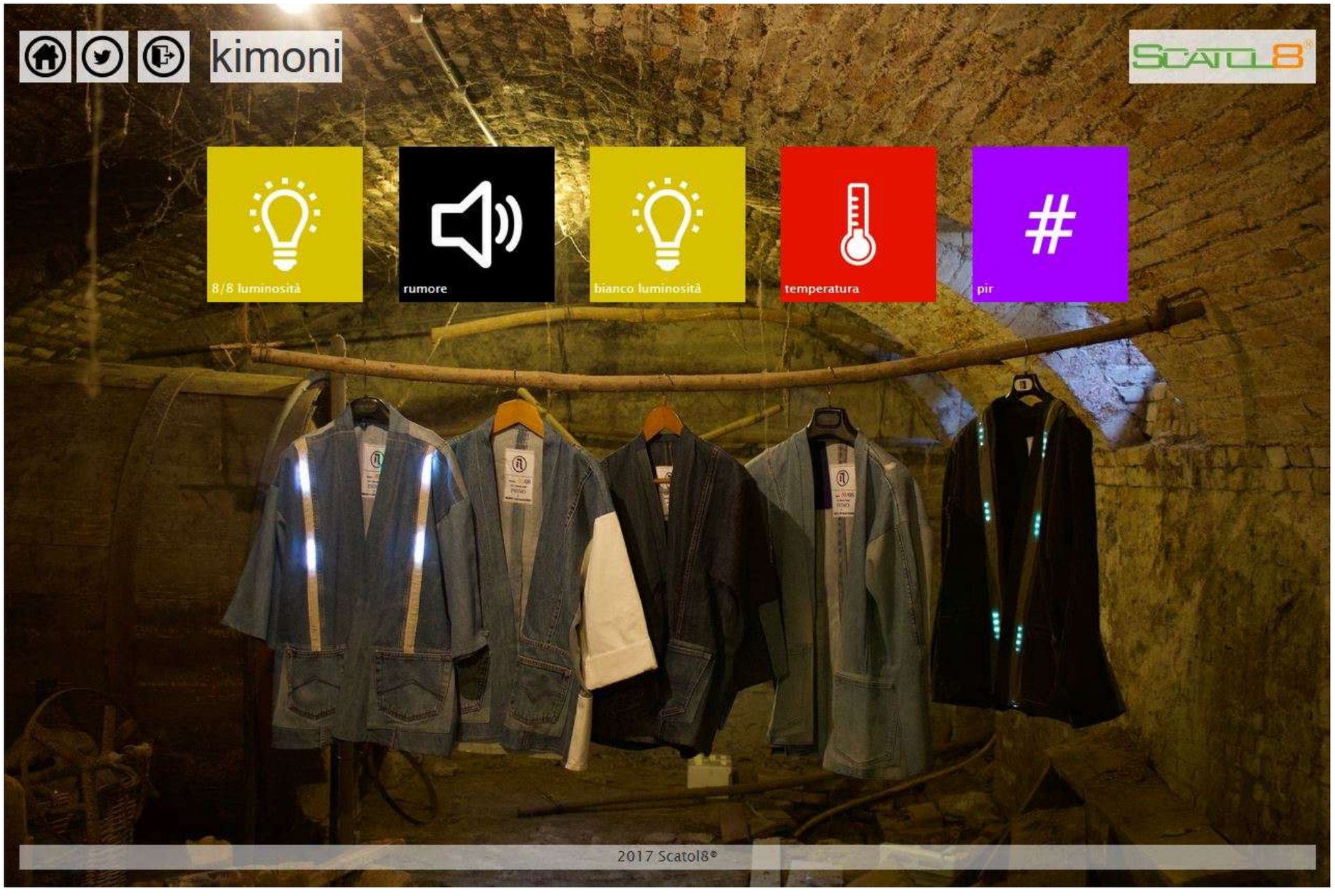
Denim + Hemp

SCATOL8 SRL



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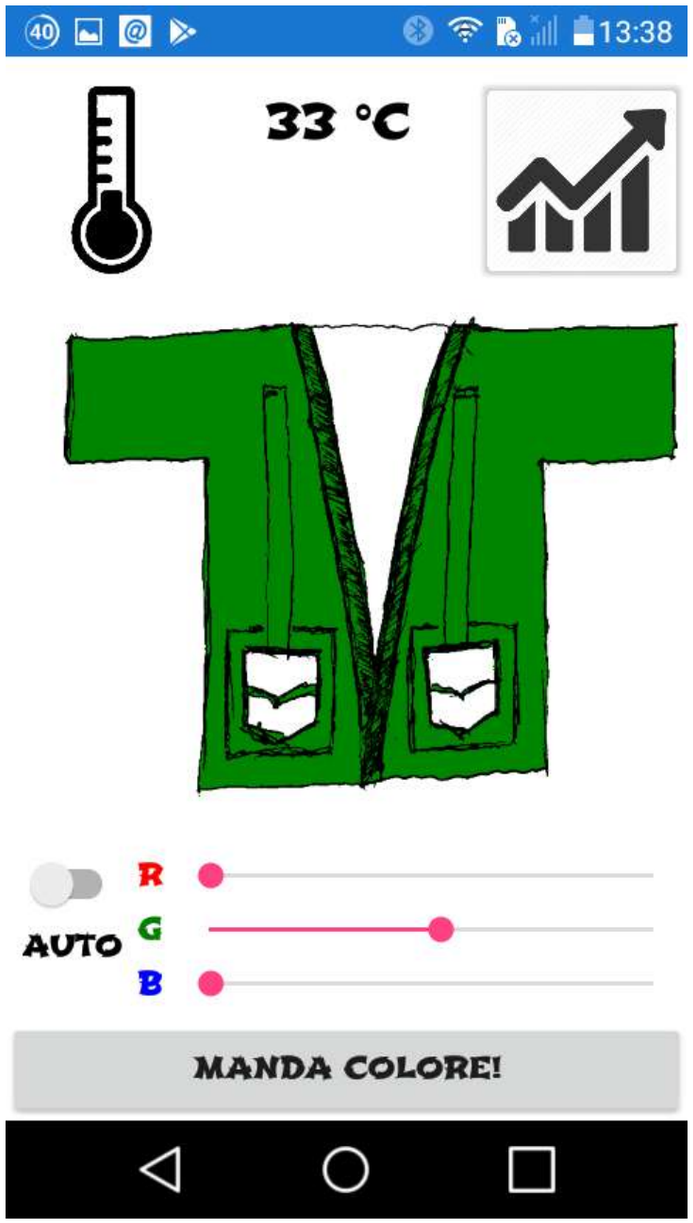

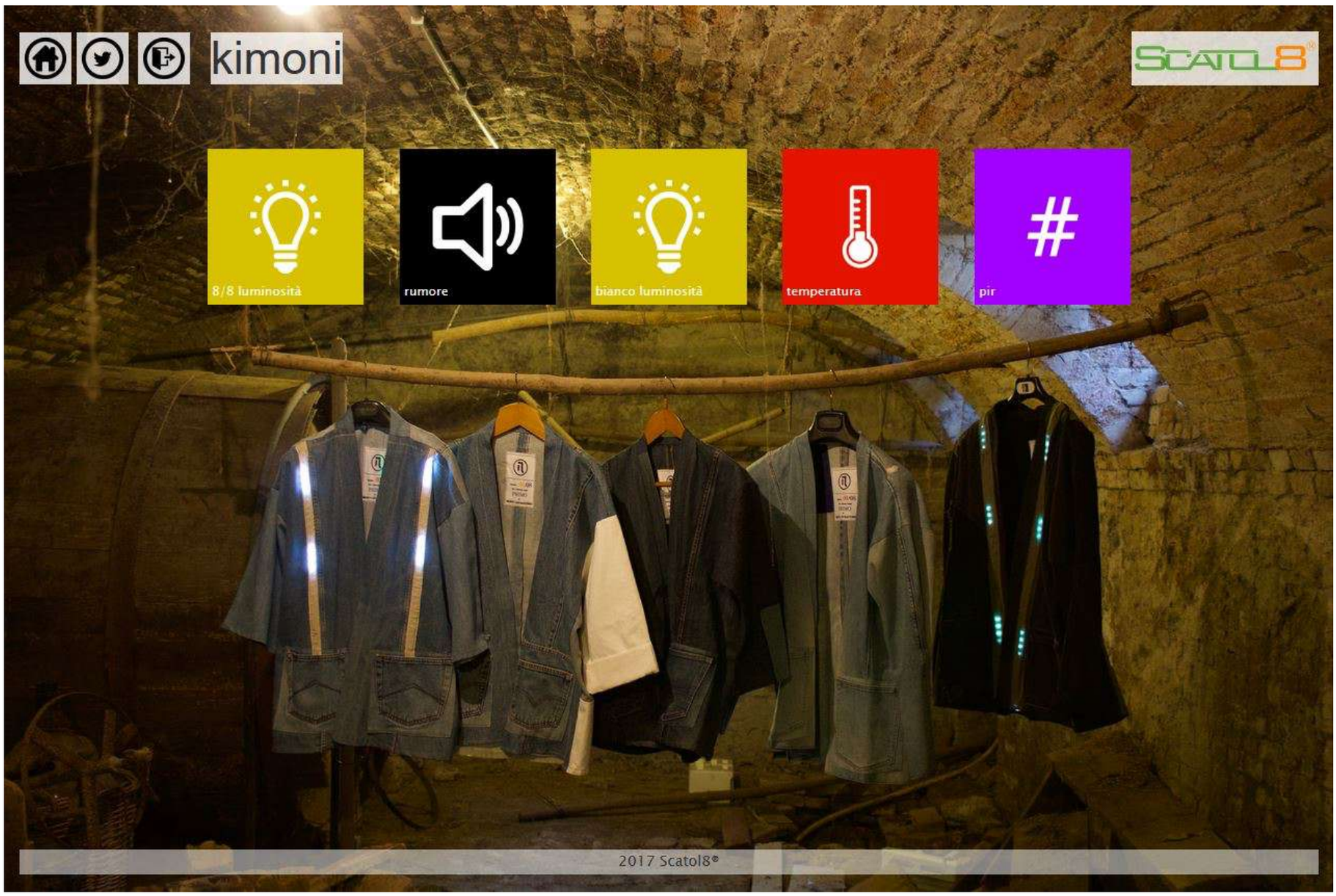

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SCATOL8 SRL

Filatoio Galleani di Caraglio

Hemp, Jeans, Interactivity: The Kimono of the Future

October 7, 2017

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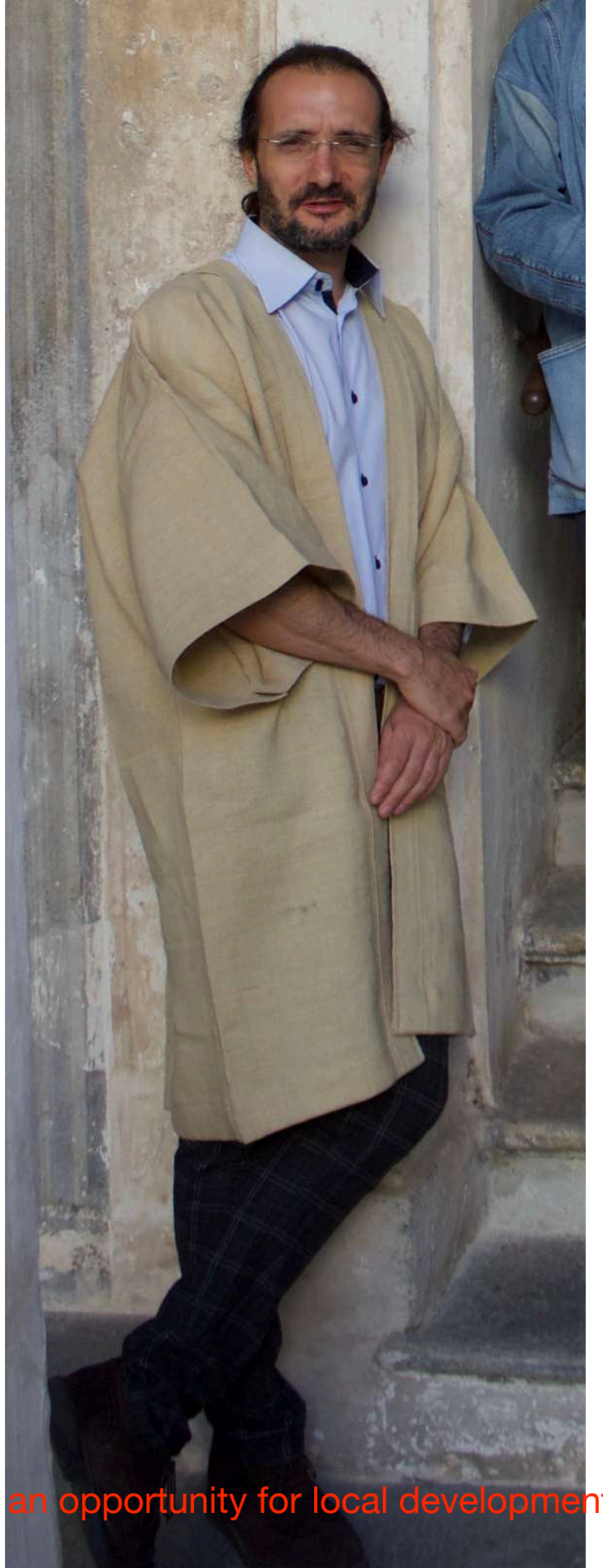
SCATOL8 S.R.L.

Hemp



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Your experience in IoT

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Ormea, June 27 2018

Surname_____Name_____

1. “Have You been directly involved in IoT projects?” YES NO

1.1 If 1 = YES then “Can You describe one of the projects? Goals, scope, partners, strong and weak points, results, development.”

1.2 If 1 = NO then “Have You heard about IoT projects in you area?” YES NO

1.2.1 If 1.2 = YES then “Can You describe one of the projects? Goals, scope, partners, strong and weak points, outcomes, development.”

1.2.2 If 1.2 = NO then “Why? Not interested in IoT Barriers Other”

2. “What do you think it could be a useful contribution of IoT in Your competence / geographic areas?”

Competence

Geographic

3. Share our experience!

4. Has this exchange provided useful hints?

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Conclusion

- “The confluence of efficient wireless protocols, improved sensors, cheaper processors, and a bevy of startups and established companies developing the necessary management and application software has finally made the concept of the Internet of Things (IoT) mainstream.” ,
  Report sudy, 2 August 2016

- Today, the IoT is a reality that is spreading and, in agriculture, proprietary systems are available which are incorporated into the machinery. Access costs are a barrier.

The challenge of the IoTs in support of the bio-economy is not to improve the efficiency of standardized productions, but to increase the efficiency of niche ones, which carry forward the wealth deriving from the variety. There are and there will be standardized mass products, next to which today niche products will be more accessible, deriving from food raw materials grown with less effort and may productivity. The IoTs lead to the growth of companies (micro and small businesses) able to create customized systems, with a high knowledge content, but at what economic conditions?

Thank You for Your kind attention!

riccardo.beltramo@unito.it

http://scatol8.net

http://www.slideshare.net/scatol8

https://www.youtube.com/user/Scatol8

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