Workshop: Cristalización de estruvita en EDAR, una inversión en forma de fertilizante

PHORWater

Integral Management Model
for Phosphorus recovery
and reuse from Urban Wastewater

LIFE12 ENV/ES/000441

Logroño, 30 de junio de 2016

DAM Depuración de Aguas del Mediterráneo

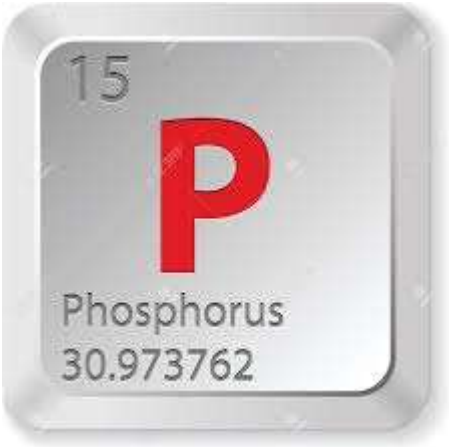
Vniversitat de València

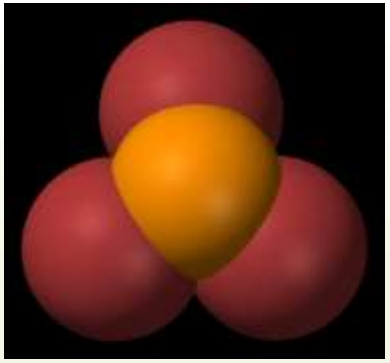
Cal Agua

Université Claude Bernard Lyon 1

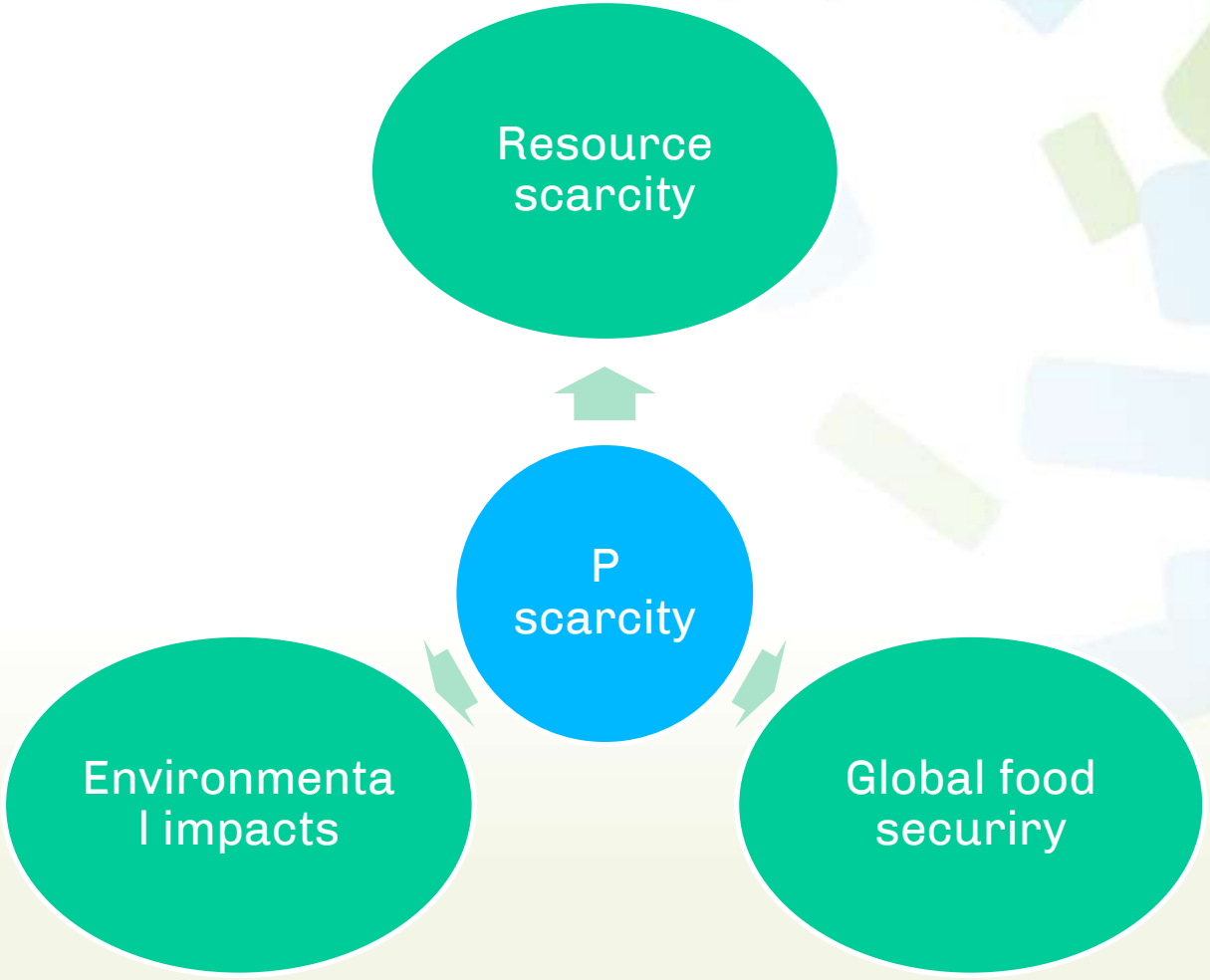
LAGEP

Phosphorus (P)





Phosphorus concerns



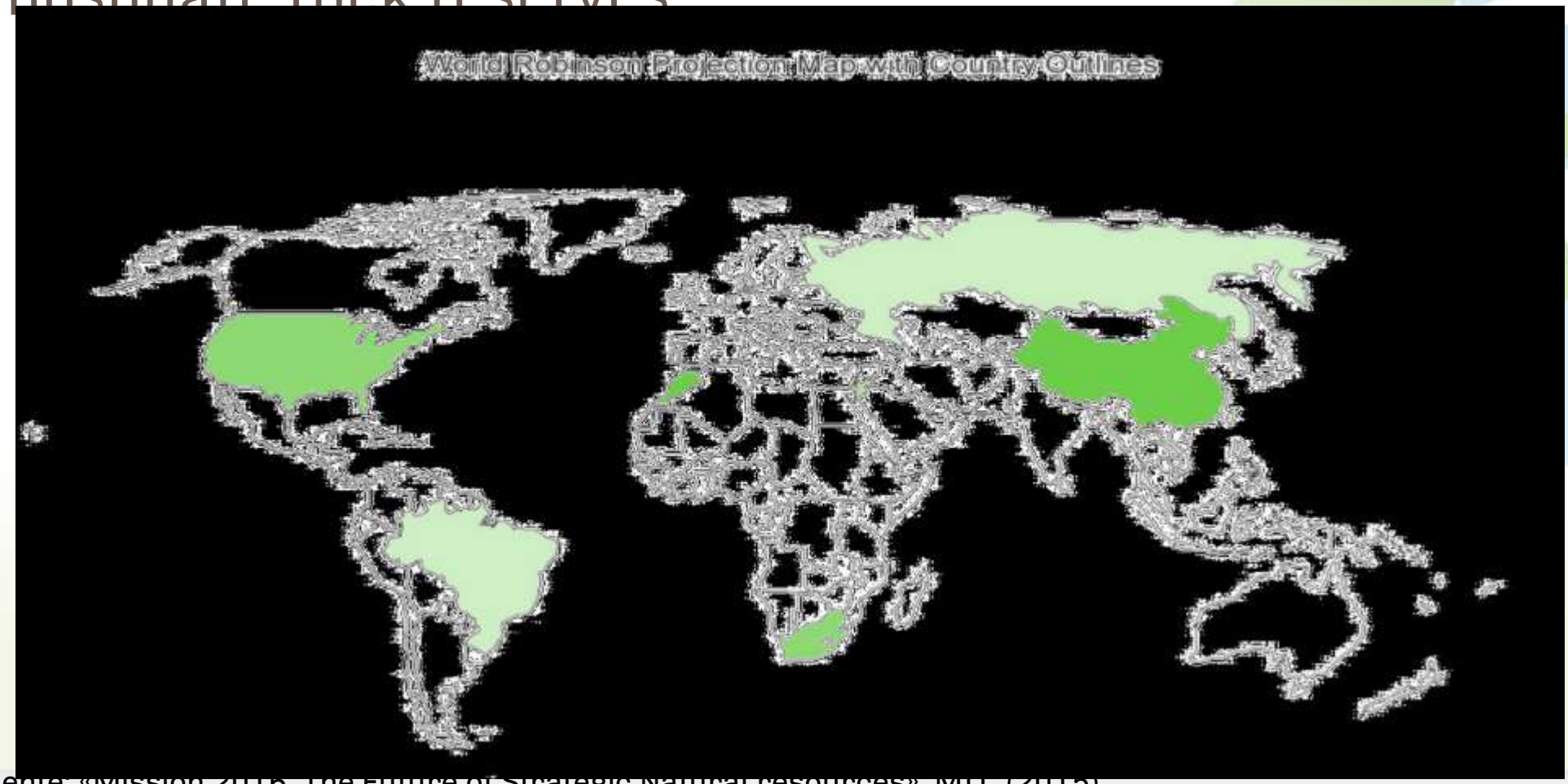
(Adapted from Cordell, 2010) Cordell, D. (2010) The Story of Phosphorus: Sustainability implications of global phosphorus scarcity for food security. PhD. Linköping University, Sweden.

Phosphorus scarcity

Phosphate rock mine

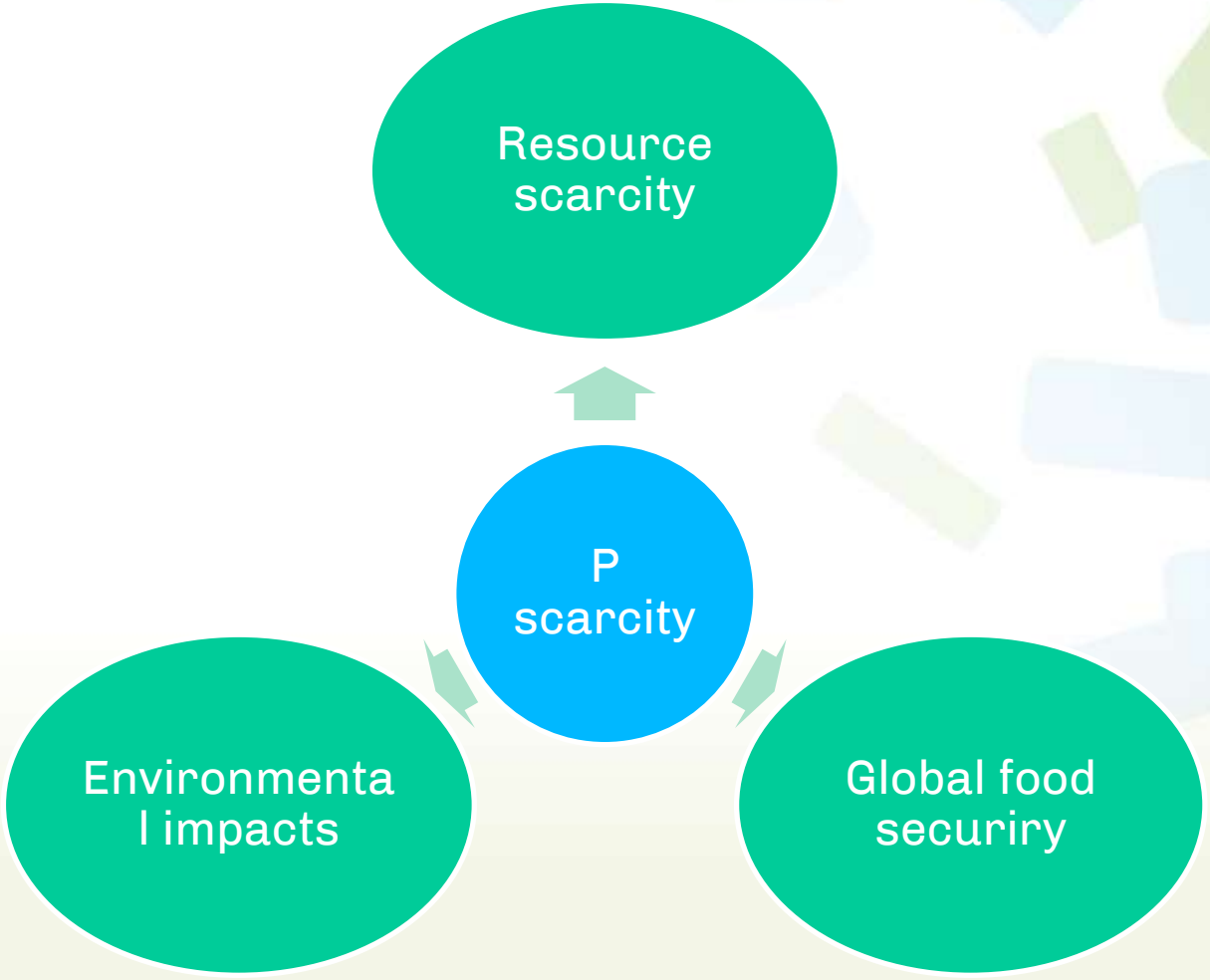
Phosphorus scarcity

Phosphate rock reserves



Fuente: «Mission 2016: The Future of Strategic Natural Resources», MIT. (2013).

Phosphorus concerns



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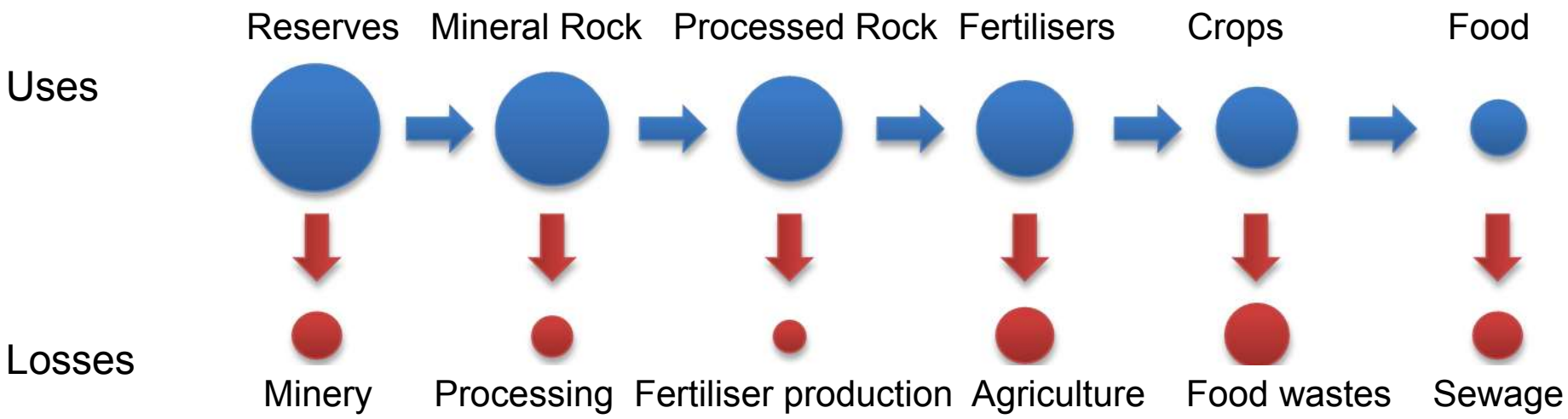
Food security

End Use	Mined P input (%)	Category
Mineral fertilizers	≈ 82	Food production
Animal feed	5	
Food additives	Small (<5)	
Detergents	10	Domestic/Industrial use
Other industrial uses	3	

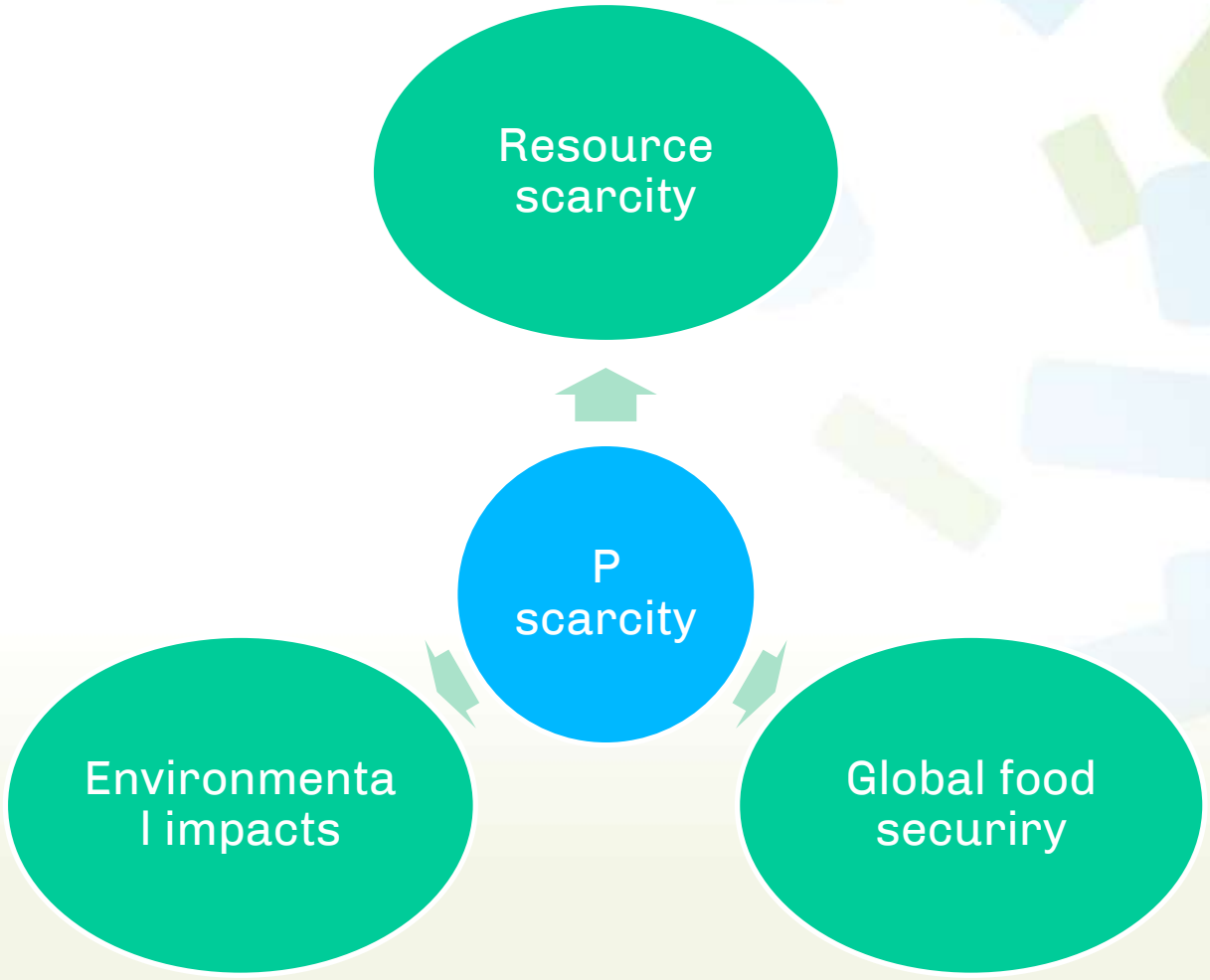
Fuente: Schröder et al., 2010

Food security

Phosphorus flux



Phosphorus concerns



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Environmental impacts

Eutrophication

Environmental impacts

Environment degradation due to phophate rock mining

1. Open pit mines. Big areas
2. Generate lot of waste
3. Large amounts of water are required
4. It requires a high energy consumption
5. The extracted phosphorus requires processing and transported until use
6. Soil contamination by Cd

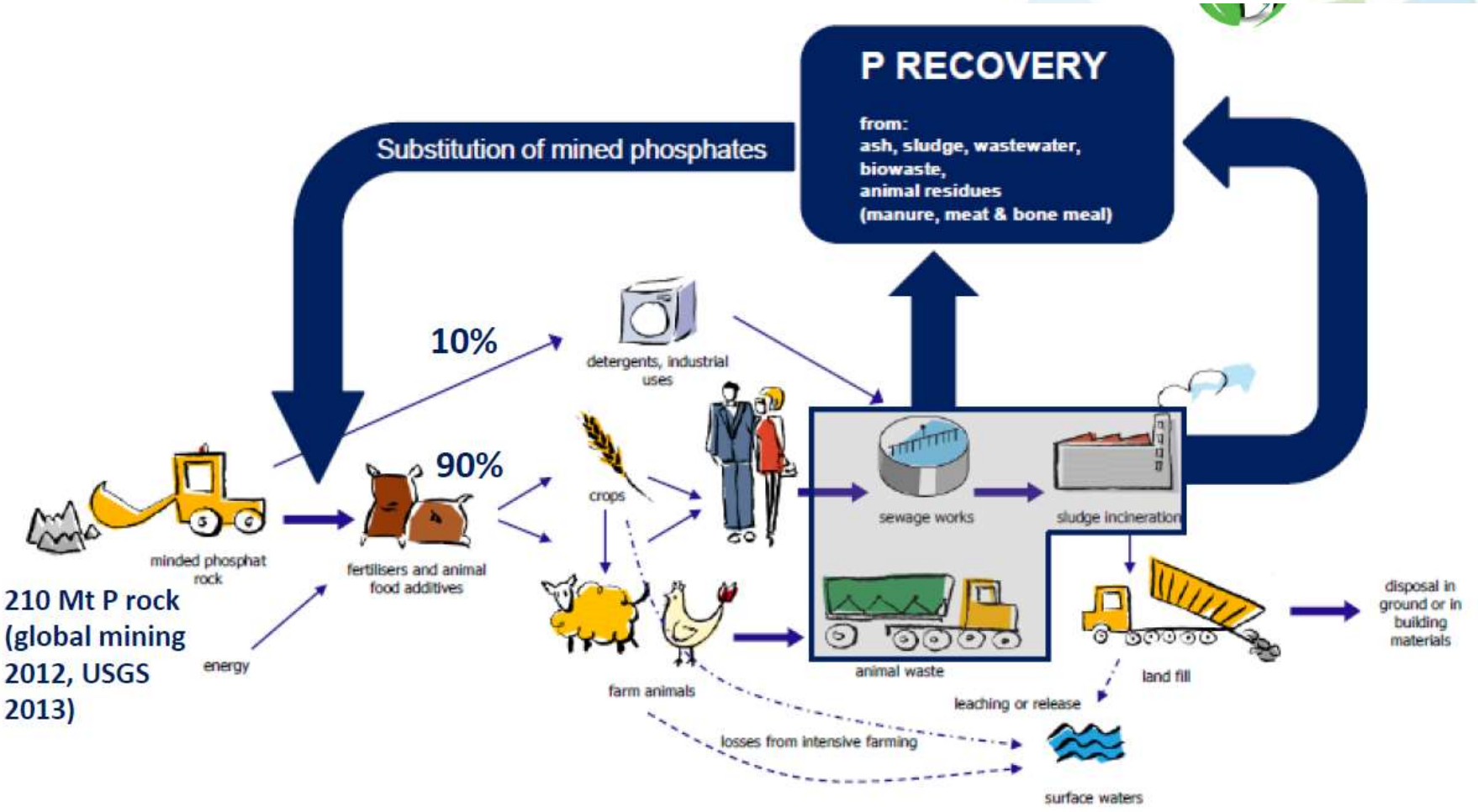
Use P more efficiently as a resource

Not only **efficiency**, but **effectiveness** is needed in the overall management of P to contribute to a better recovery and reuse

Sustainable strategies

1. Reducing mining losses.
2. Efficiency in agriculture.
3. Recovery.

Struvite $MgNH_4PO_4 \cdot 6H_2O$

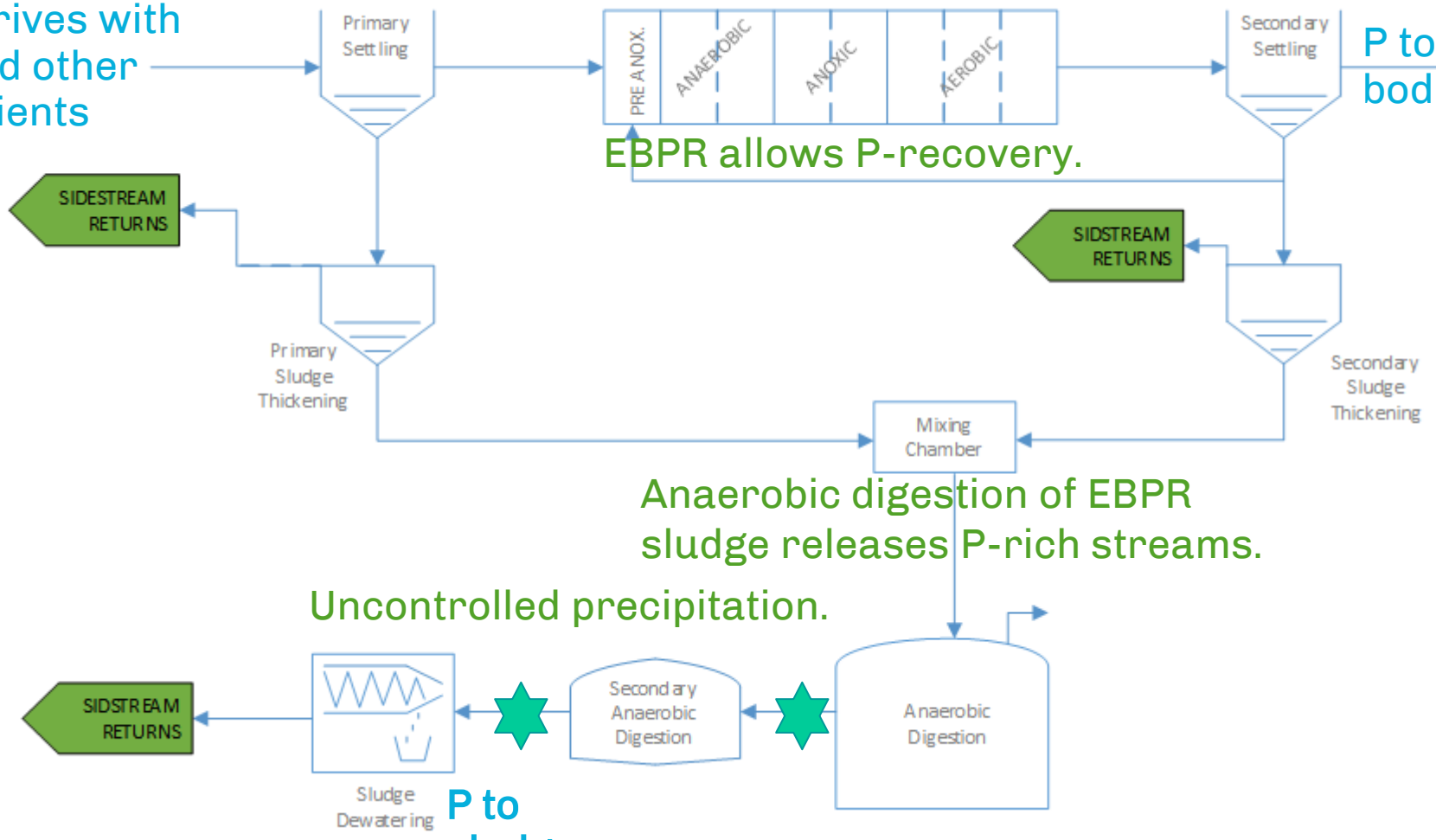


amended from: http://www.nhm.ac.uk/research-curation/research/projects/phosphate-recovery/ceep11.htm

Phosphorus at WWTP

Discharges of phosphorus through WWTP have to be limited.

P arrives with N and other nutrients



Phosphorus at WWTP

Pipe blockage

Equipment damage

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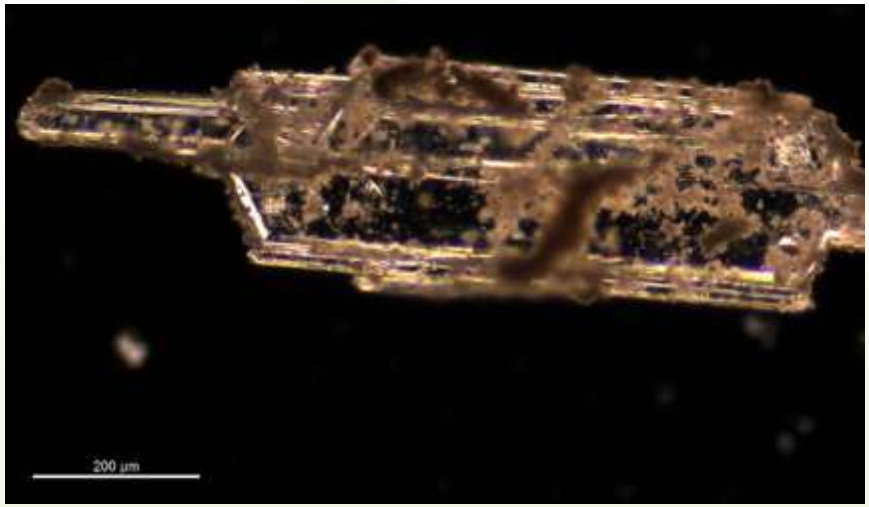
Consortium:

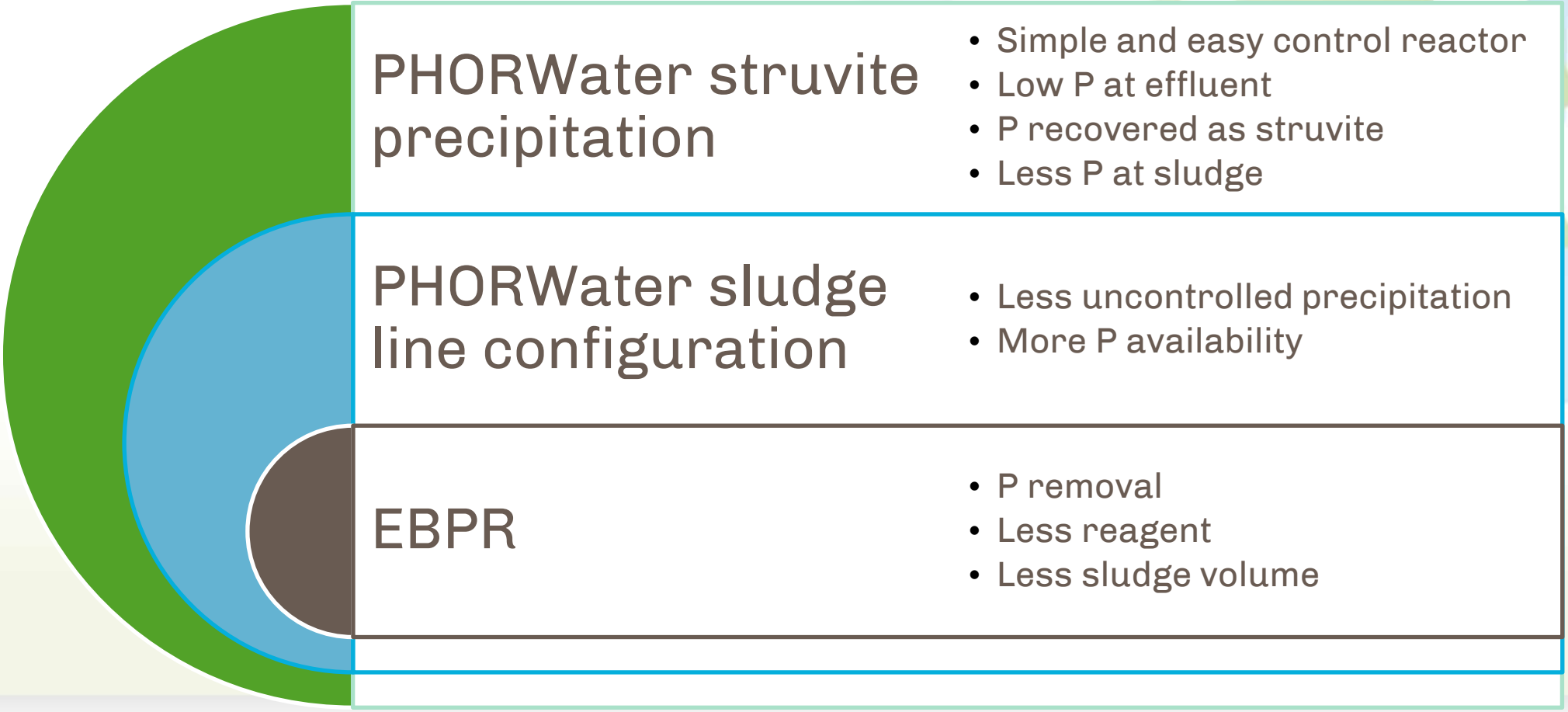
LIFE+ PHORWater (Sept 2013 –Sept 2016)

The main objective of **PHORWater** is to demonstrate, at pre-industrial scale, the viability and sustainability of the correct management of the P in a WWTP obtaining struvite by crystallization.



What make PHORWater different

PHORWater moves **from less to more** at three different levels

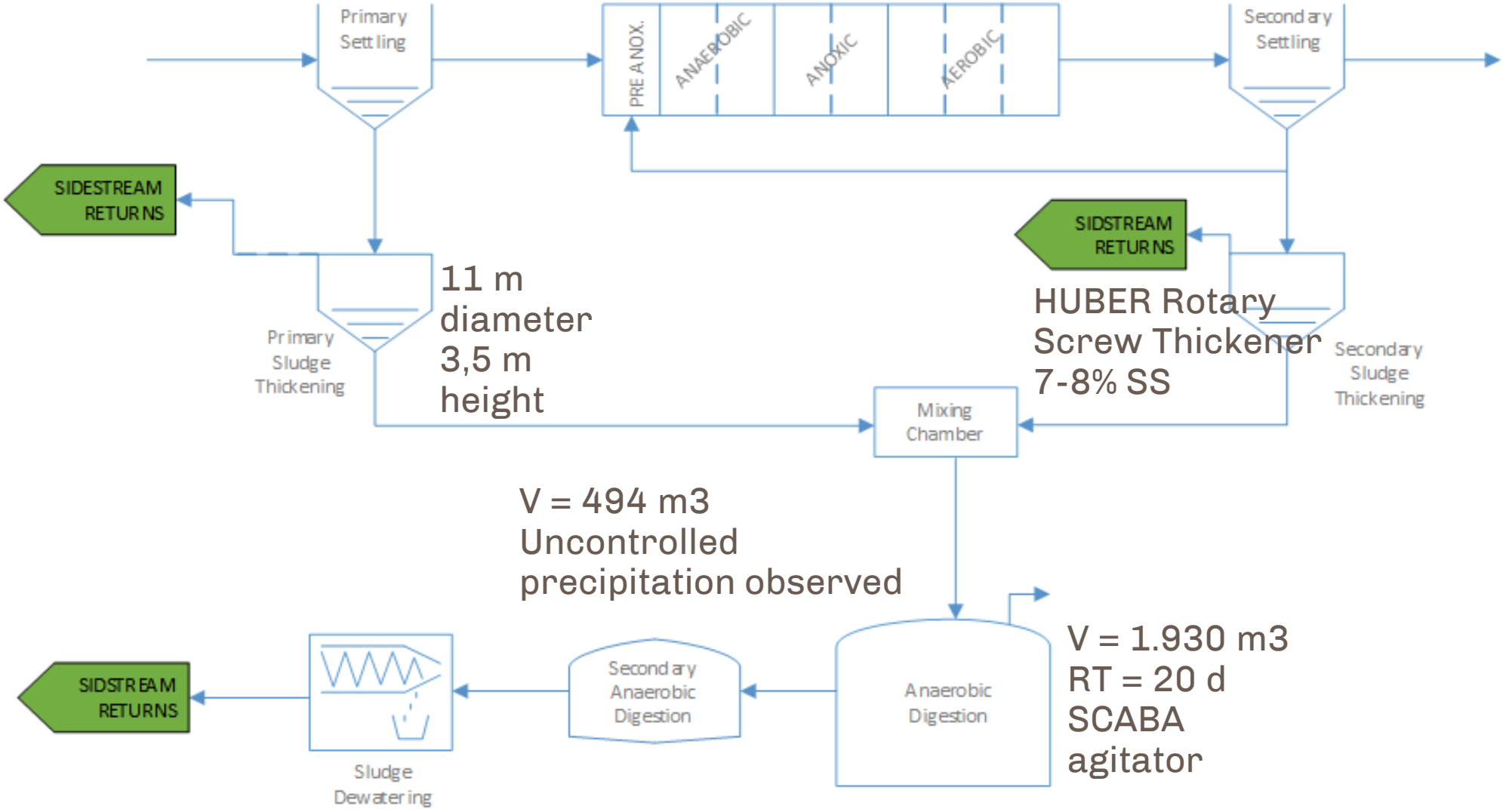


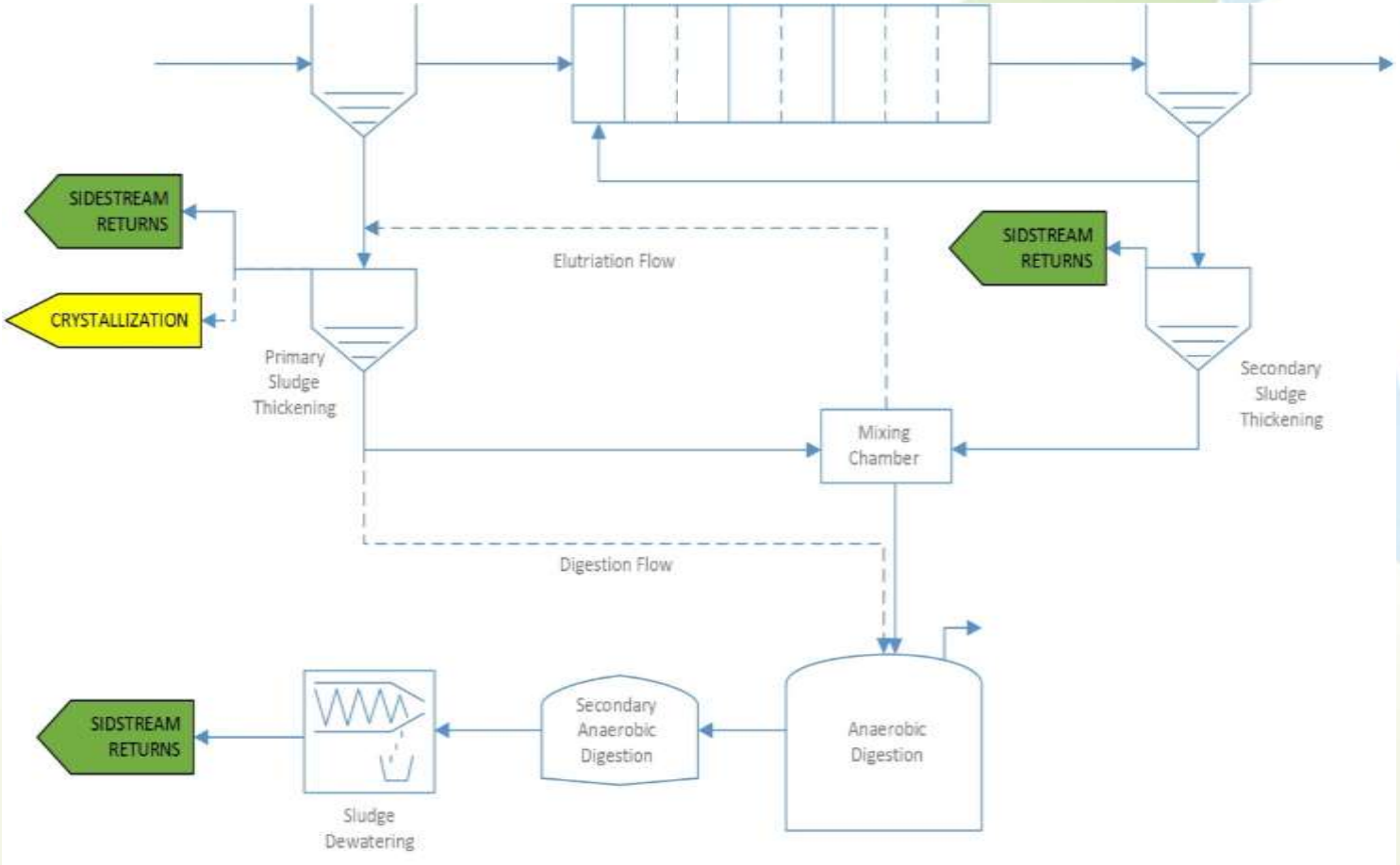
PHORWater

Calahorra WWTP, La Rioja

PHORWater

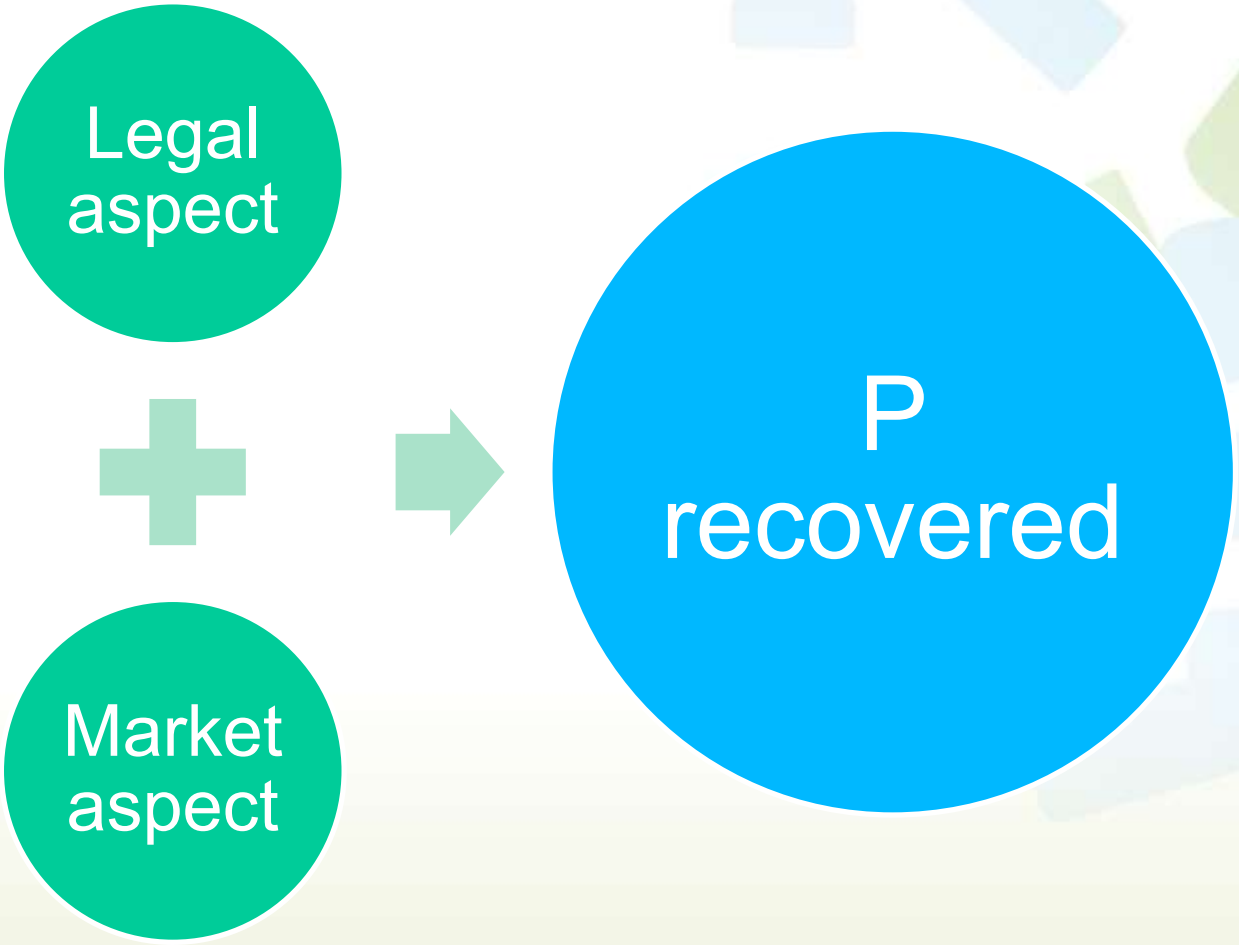
El Cidacos WWTP




SIDESTREAM RETURNS
CRYSTALLIZATION
Elutriation Flow
SIDSTREAM RETURNS
Primary Sludge Thickening
Secondary Sludge Thickening
Mixing Chamber
Digestion Flow
SIDSTREAM RETURNS
Secondary Anaerobic Digestion
Anaerobic Digestion
Sludge Dewatering

Project structure

B. Implementation actions	*B.1 Integral management of the WWTP for optimal phosphorus recovery.*
	B.2 Desing, contruction and start-up of the crystallization process.
	B.3 Implmetation on the Phosphorus recovery demonstration pilot plant. Struvite production.
	B.4 Validation of the obtained struvite as a fertiliser.
	B.5 Economical feasibility study.
C. Monitoring of the impact of the project actions	*C.1 Effectiveness of the project actions. Project results monitoring.*
	C.2 Project socioeconomical impact.
D. Communication and dissemination actions	*D.1 Communication and dissemination of project results.*
E. Project management and monitoring of the project progress	*E.1 Project management.*
	E.2 Networking activities.
	E.3 After LIFE Communication Plan


Legal aspect
Market aspect
P recovered

Legal aspects: European Level

EU Fertiliser Regulation

- The proposed text (17/3/16) of the revised EU Fertiliser Regulation is now publicy available at **http://ec.europa.eu/DocsRoom/documents/15949**, defining how recycled nutrient and organic carbon products can be placed on the market across Europe (CE Mark) as fertilisers or soil amendments

- This will now be subject to consultation and discussion by Member States (Council) and the European Parliament, with an objective of final adoption in 2017-2018

- Defines acceptable input materials (CMC = Component Material Categories) and product specification (PFC = Product Function Categories)

Legal aspects: European Level

EU Fertiliser Regulation

- Materials conform to the criteria of the new Regulation will be considered “products”, will be able to be traded and sold in all EU countries and will automatically cease to be considered as “waste” (End-of-Waste status).

- The revised EU Fertilisers Regulation will enable placing on the European market (CEMark) of recovered nutrient products, so enabling inter-state trade of these materials.

- Member States will also be able to maintain or implement national regulations authorising other types of recycled materials as National Fertilisers or authorise agricultural use under waste-type controlled spreading regulations.

Legal aspects: European Level

EU Fertiliser Regulation

- In parallel to this, as proposed by ESPP, the Commission has launched work led by the EC Joint Research Centre (JRC).

- The goal is to define criteria for:
  - struvite,
  - ash-based materials and
  - biochars,

to add into the revised Fertiliser Regulation Annex II (as additional Component Material Categories) as soon as the new Regulation is published.

Legal aspects: National Level

EU Fertiliser Regulation

- Struvite is not legislated at the moment in Spain
- Not included in RD506/2013 Fertilisers
- Posibilities:
  - Obtain the end of waste condition (Orden Ministerial)
  - Struvite inclusion in RD506/2016 under the positive list for inorganic waste material
  - Apply for the inclusion of a new fertiliser in the RD506/2016 fertiliser list
  - Apply for being a authorised handler (national)

Thank you for your attention

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www.phorwater.eu

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