Starch from residues for starch plastics in Colombia

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Goal of the project

Understand and establish the possibility to obtain starch from the side streams of banana and palm oil industry in Colombia in order to produce a 100% biobased and/or biodegradable plastic film to be used as a packaging material or in other applications.

Deliverables:

- Fact sheets
- Feasibility study of starch extraction and films manufacturing

Consortium

- RB Biobased Institute B.V.
- Agrivalue B.V.
- Colombian partners (Cenibanano, Augura, Daabon)
- Royal Netherlands Embassy

RODENBURG Biopolymers

Ministerie van Landbouw, Natuur en Voedselkwaliteit

DAABON

augura asociación de bananeros de colombia

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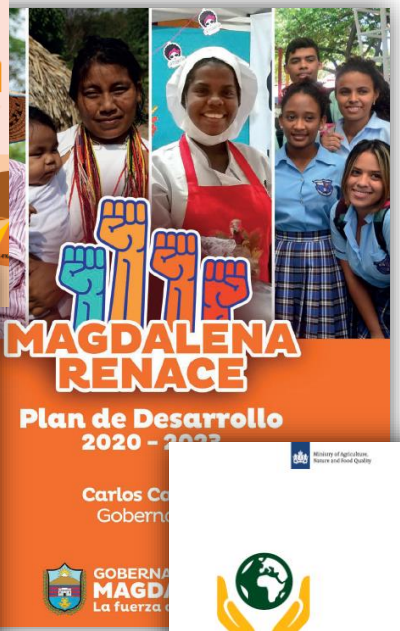
Background

- Colombia is a pioneer in circular economy in Latin America.
- Different local, national and international initiatives to stimulate the circular economy
- Opportunities to improve the agro-logistics chain through the introduction of biobased and/or biodegradable plastics to replace fossil plastics and making better use of biomass



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Approach

Working Plan	Realized
1) Select Colombian crops residues (together with partners) • Identify starch containing residues (WFBR, literature) • Composition of residues (other potentially interesting raw materials) • Definition of requirements for starch containing residues	March – July
2) Collecting available information on fact sheets • Identify information needed in fact sheet • Visit to Colombia (replaced by **online meetings / interviews** with stakeholders as Covid-19 did not allow travelling)	July – October
3) Feasibility study • Assessment of amount of contained starch and quality • Assessment of its use in film blowing applications	July- December

Potential crops producing starch residues (priority list)

1. Oil palm trunks (trunks become available every 25 years.)
2. Banana residues
3. Avocado (rejects + stone, unclear available amounts)

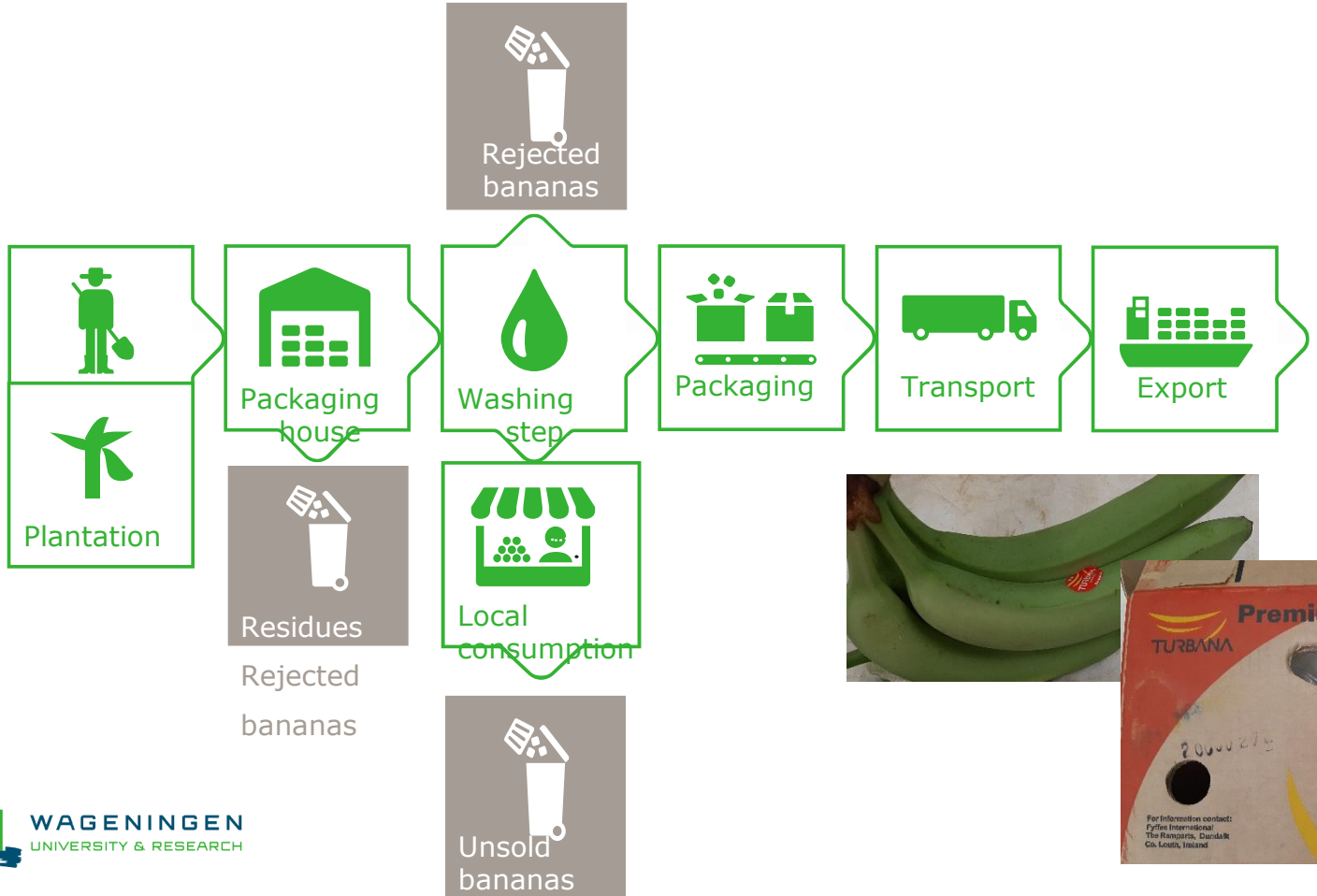
Depending on processing:

4. Potato (in water of potato processing factories)
5. Cassava (in water? Peels? Rejected cassava)?
6. Pumpkins (for example seeds)
7. Mango stone
8. Others (sweet potato, cashew presshusk, etc)

Methodology to obtain information on residues

- Interviews with different banana exporters, delegates of the Embassy and of the Colombian banana Association.
- Focus on export bananas, type Cavendish.
- Participation in the Dutch-Colombian Matchmaking Forum (interviews with 7 different companies of the value chain)

Banana residues estimated chain



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Banana harvesting main organic residues

- Pseudostem, leaves, crown and other small cuts → A lot stays in the field to protect the soil (maintain humidity of the ground) and to avoid spreading of diseases (currently fusarium).
- Green bananas which are not suitable for the export → they are transported to the packaging house and sold for lower price (0.1$/kg vs 0.5$/kg for export product)
    - 15-20% of total production!! → at least 315kton/year rejected green bananas!!


Banana cultivation in Colombia

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Banana crop main inorganic residues

- Inorganic residues:
  - Protecting bags
  - Plastic foam
  - Rope
  - Ribbons
  - Textile bags

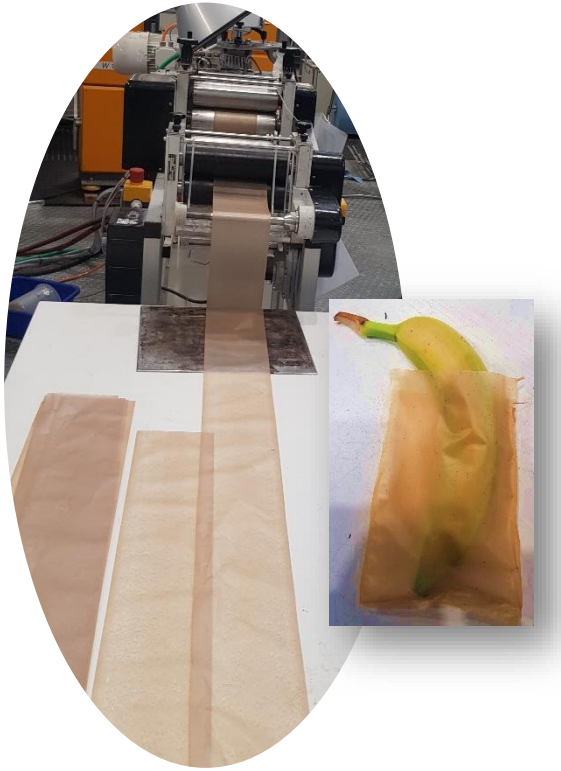
- Some inorganic residues are being recycled but probably in very small scale (different views).

Feasibility study: green bananas

The dried powder from the green bananas contains around 70-75% granular starch

Banana starch

and it is possible to make pellets and films



Next steps

- Study other potential sources of organic residues for example avocado, mango pits.
- TKI idea (LWV21.188) ”Circular valorisation of starch containing **a**gricultural **r**esidues for **p**roduction of **B**ioplastics and other **p**roducts (Car4pBp)” submitted with positive advice in 2021, complete project proposal postponed to 2022.
- Potential projects on other topics such as plastics recycling, polymer production from sugar containing residues.

Questions

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