

BIOTECHNOLOGICAL VALORISATION OF AGRICULTURAL BY-PRODUCTS FOR CIRCULAR BIOECONOMY AND SUSTAINABLE FOOD SYSTEMS

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Why is this topic important?

LARGE AMOUNTS



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n recover and use them again.

What are agricultural by-products?

Agricultural by-products include;

- | | | | |
|---|--------------|---|--------------------------------|
| 1 | Fruit peels | 4 | Bagasse |
| 2 | Spent grains | 5 | Whey |
| 3 | Husks | 6 | Other food processing residues |

These materials still contain valuable nutrients.

They are rich in;

Proteins
Fibers
Lipids
Minerals
Pigments
Bioactive compounds



Applications

These compounds have many applications. They can be used in;

1 — Food

2 — Animal feed

3 — Agriculture

4 — Cosmetics

5 — Pharmaceuticals

6 — Biomaterials



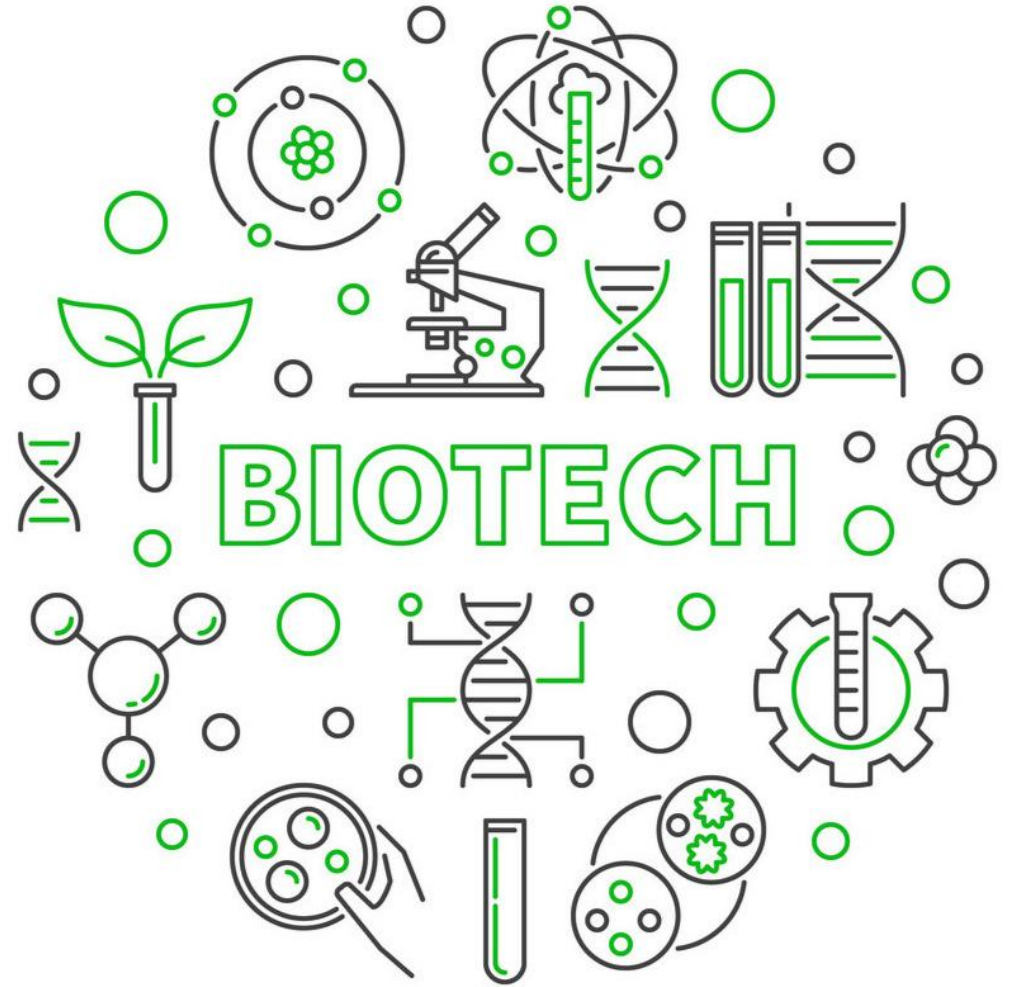
Biotechnology

Biotechnology helps us recover these valuable compounds.

Different methods can be used.

- Fermentation
- Enzymes
- Microorganisms
- Membrane technologies
- Biorefineries

These technologies increase product value.



Products

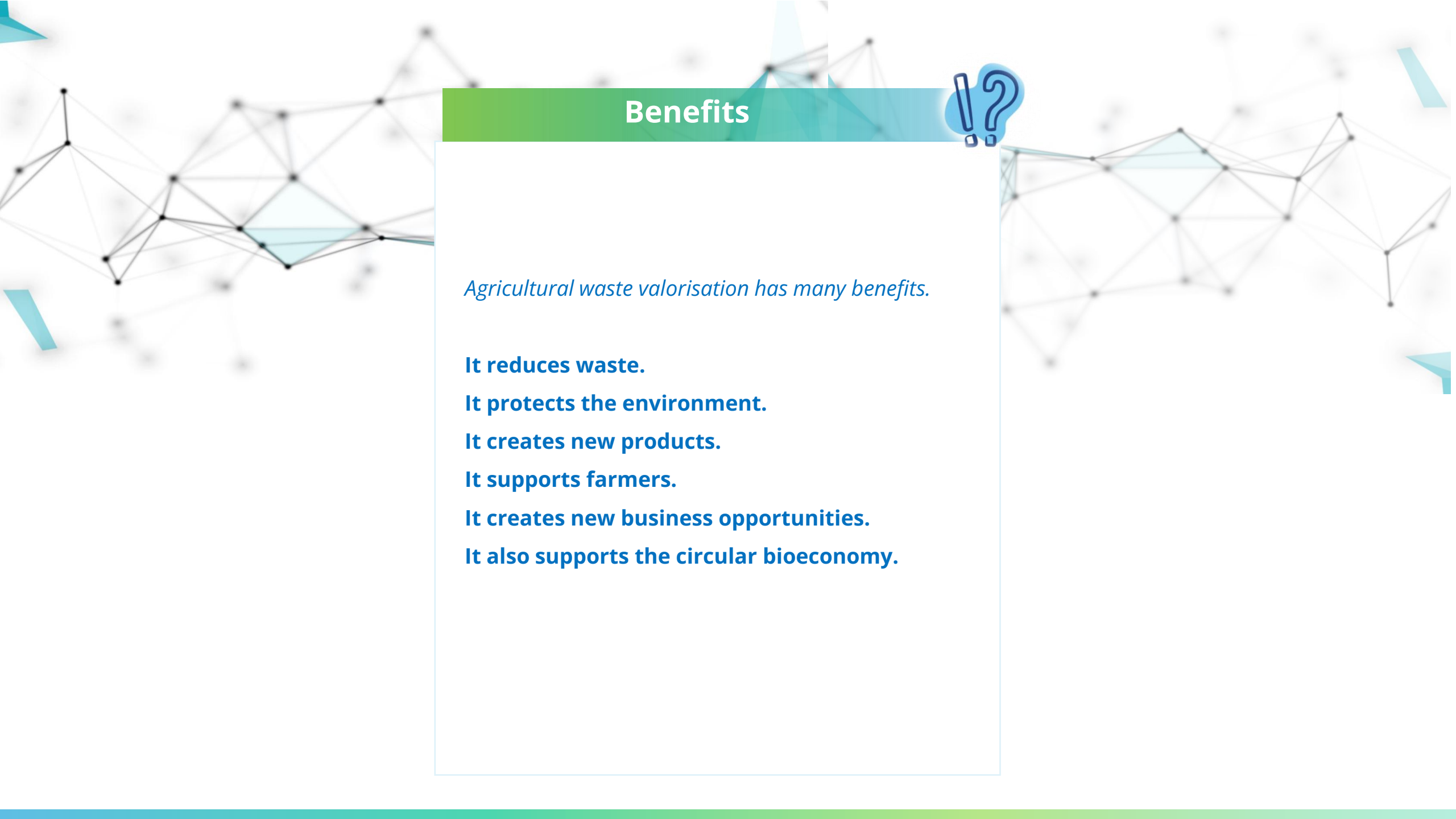
We can produce;

- **Functional foods**
- **Nutraceuticals**
- **Enzymes**
- **Biofuels**
- **Bioplastics**
- **Organic fertilizers**
- **Bio-based chemicals**

***New extraction technologies
improve recovery efficiency.***

eg.

- Supercritical fluids
- Encapsulation



Benefits



Agricultural waste valorisation has many benefits.

It reduces waste.

It protects the environment.

It creates new products.

It supports farmers.

It creates new business opportunities.

It also supports the circular bioeconomy.

Challenges



However, there are still some challenges.

Large-scale production is difficult.

Costs are sometimes high.

Regulations can be complex.

Consumer acceptance is also important.

Future



In the future, we need;

More research

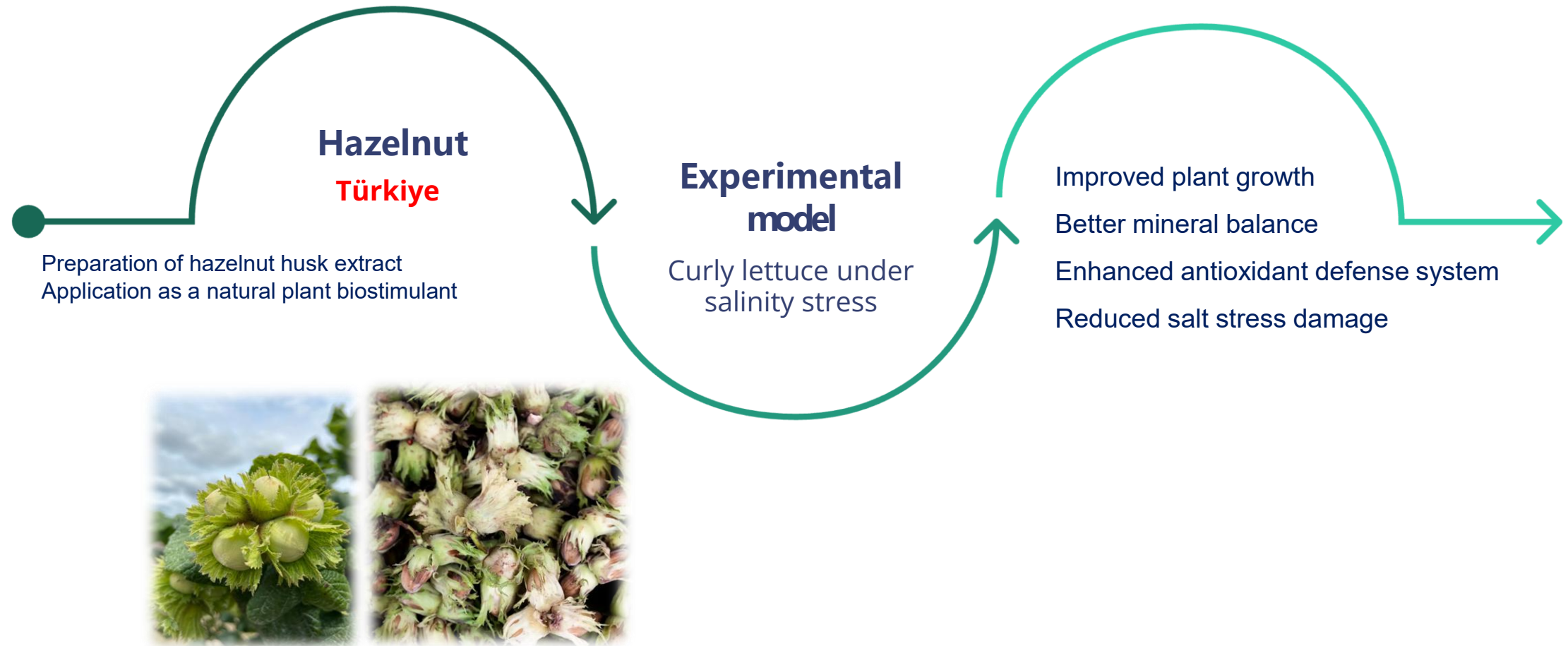
Pilot-scale applications

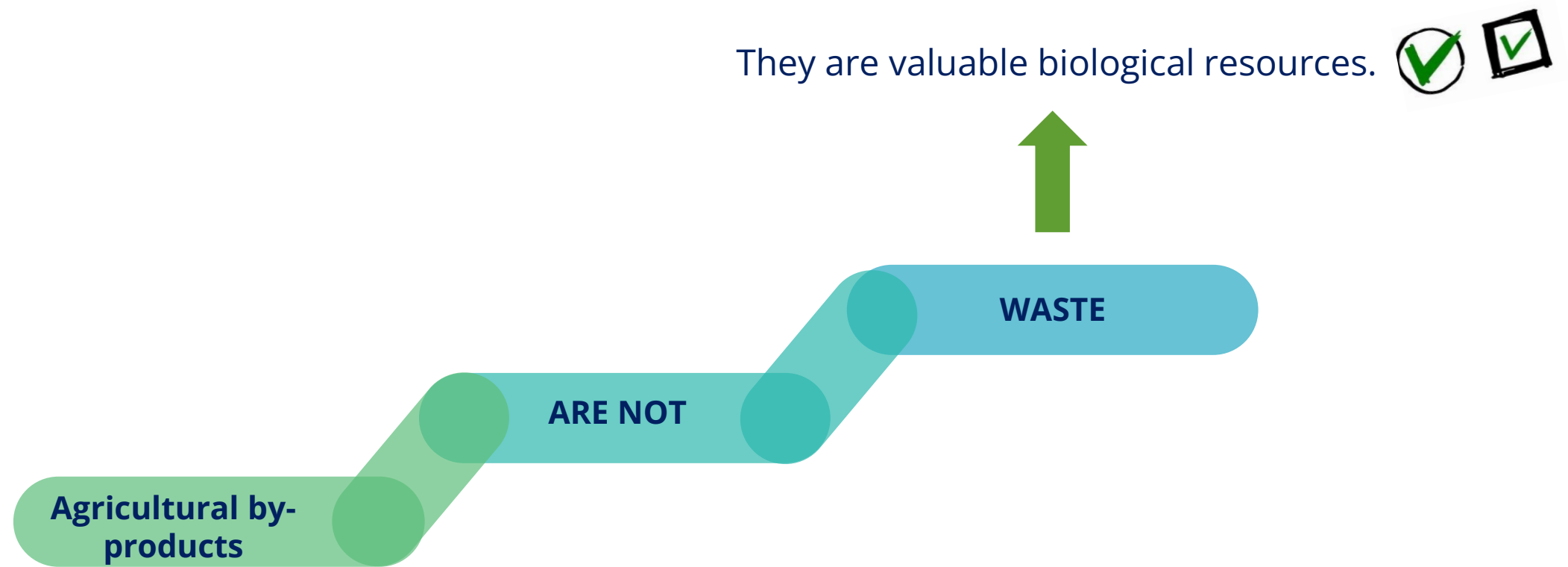
Stronger collaboration

Better policies

Sustainable industrial solutions

Case Study: Valorisation of Hazelnut Husk as a Plant Biostimulant







Thanks

