# Master thesis: Protein-rich Fabaceae in the Dutch food system

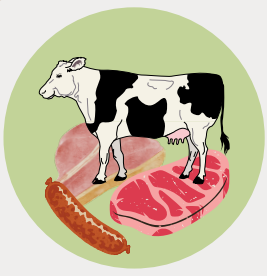
## Problem statement

Deforestation

Land degradation

GHG emissions

Excessive water use



Western diets are dominated by animal-based proteins. These have a relatively high environmental impact since the livestock industry has severe negative environmental effects. Therefore, many scholars and politicians argue for a **protein transition**

**Protein transition: transition to a food system that rebalances the ratio between animal- and plant-based proteins in people's diets by shifting to more plant-based and other new protein sources**

Within the Dutch protein transition, one particularly promising solution direction are **protein-rich crops**. More specifically, in the Netherlands there is increasing attention for **protein-rich Fabaceae crops**, such as faba beans and lupins. Fabaceae not only provide a **substitute to animal-based proteins** through the pulses they create; they also offer several **environmental benefits**. For instance, Fabaceae contribute to **biodiversity** and have the **ability to fix nitrogen** meaning that their cultivation requires **less to no fertilizers**, which in turn positively affects **soil conditions and soil life**.

**Fabaceae were once quite dominant** in the Dutch agricultural sector, but **disappeared almost entirely from the Dutch landscape** due to the lifting of the market protection for European protein crops in 1992. Now, for Fabaceae to establish in the Dutch food system, **actors in the Dutch Fabaceae ecosystem need to perform activities** that support the **development and diffusion of Dutch Fabaceae and related innovations.**

## Protein-rich Fabaceae

Fixing nitrogen

Source of protein

Biodiversity

Soil quality

## Green Deal protein-rich crops

**Also termed as Bean Deal. In development since 2020, signed in July 2022***

**Mission**

Scale the Dutch cultivation and processing of protein-rich crops, with a focus on nitrogen-fixing Fabaceae, primarily intended for human consumption

**56 signatories**, ranging from ministries and provinces to value chain actors

*when this thesis was written, this Green Deal was still in development

**Research question: how can protein-rich Fabaceae be established in the Dutch food system and what role may the mission of the Green Deal Protein-rich Crops play in this regard?**

## Methods

Desk research

30 experts interviews

Multi-stakeholder workshop

Attended stakeholder meetings

## Results

### Dutch protein-rich Fabaceae ecosystem

Not exhaustive

**Politics, policy and institutions**

**European Union** (Green Deal, European Soy Declaration, National Protein Strategies, F2F, European Food 2030, new EU CAP)
**Dutch Government** (Transitieagenda Circulaire Economie Biomassa & Voedsel, Nationale Eiwitstrategie, eco-schemes)
**Ministry of Agriculture, Nature and Food Quality (ANFQ), Dutch provinces, Dutch municipalities**

**Research and education**

**Educational organisations**
WUR, HAS den Bosch, Hanzehogeschool Groningen

**Research institutes**
Louis Bolk Instituut, NIZO Food Research, TNO

**Supply**

**Breeders:** Limagrain, Keygene, DSV Zaden, Wiersum Plantbreeding
**Protein farmers:** PO Eiwitboeren van Nederland, LuPeel, Lekker Lupine, individual protein farmers
**Processors:** Herba Ingredients, Inveja, Meelunie, Ruitenberg Ingredients, Meatless, ME-AT
**Food brands:** Vegetarisch Slager, Bumi, BOON Bonen, HAK, Bonduelle

**Demand**

**Food service**
Catering, restaurants

**Retail**
Supermarkets (e.g. Albert Heijn, Ekoplaza), online retail, farm shops

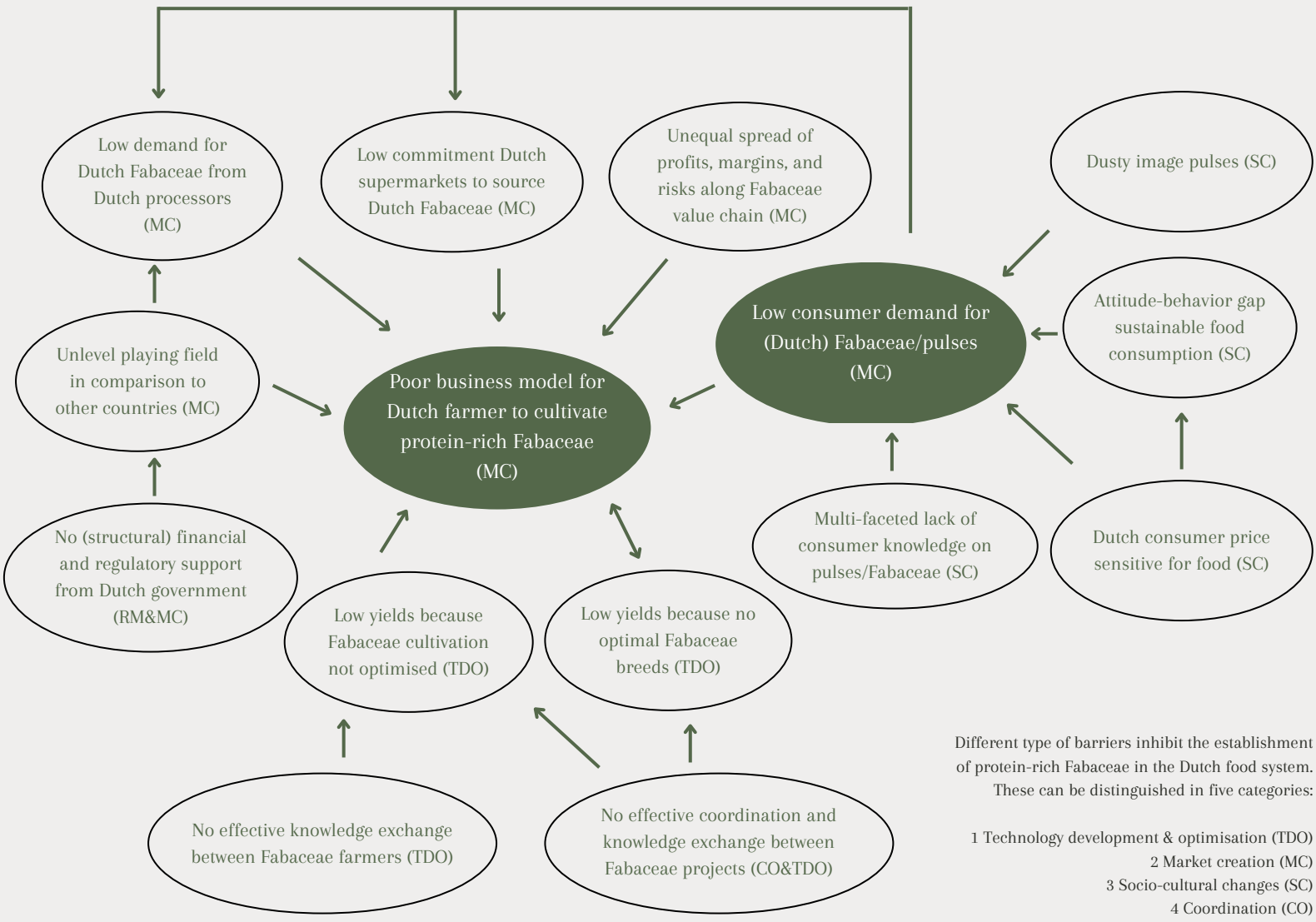
**Consumers**

**Support organisations**

**Financial institutes:** Rabobank, Triodos Bank, ING Bank, Startlife, InvestNL
**Branch organisations:** BO Akkerbouw, NAV, ZLTO
**Cooperatives:** CZAV, Agrifirm, Cosun

**Network organisations:** PO Eiwitboeren van Nederland, Lekker Lupine, LuPeel, Foodvalley NL, The Protein Community, Transitiecoalitie Voedsel
**Consultancy:** MFH Pulses
**NGO's and others:** WNF, Natuur en Milieu, Voedingscentrum

# What are current barriers for the successful establishment of protein-rich Fabaceae in the Dutch food system?




Different type of barriers inhibit the establishment of protein-rich Fabaceae in the Dutch food system. These can be distinguished in five categories:

1 Technology development & optimisation (TDO)
2 Market creation (MC)
3 Socio-cultural changes (SC)
4 Coordination (CO)
5 Resource mobilisation (RM)

# Which activities ought to be performed to facilitate the establishment of protein-rich Fabaceae in the Dutch food system?

Several activities by various type of actors in the Dutch protein-rich Fabaceae ecosystem, of which amongst others Green Deal signatories, already target the most pressing barriers identified above. However, numerous additional activities are needed to establish protein-rich Fabaceae in the Dutch food system. The following most important activities (thus not exhaustive) aim to solve the identified barriers, which are clustered around two most pressing barriers.

## Improve business model of the farmer

- **Lobbying for financial support** to optimise breeding, stimulate cultivation, and foster value chain collaborations
- **Initiate research on the exact environmental benefits of Fabaceae** to strengthen the negotiation position of farmers
- **Initiate research programs on improving Fabaceae breeds**
- **Network organisations**, such as Foodvalley NL and The Protein Community (TPC), should **facilitate network effects** between their members focusing on Fabaceae and **encourage value chain collaborations**
- PO Eiwitboeren van Nederland could **collect cultivation questions to coordinate research efforts** in order to improve yields
- **Farmer organisations**, such as PO Eiwitboeren van Nederland and Lekker Lupine, should **facilitate knowledge exchange** among their members through organising meetings and setting up a system for effective knowledge exchange in order to optimise Fabaceae cultivation
- **Protein farmers** could increasingly **operate in short value chains or take on more processing steps** themselves to appropriate more returns
- Numerous Fabaceae ecosystem actors should **approach supermarkets with success stories and new application opportunities**, in line with current food trends and routines (e.g. meal boxes, ready-made meals)
- Both governmental organisations and industrial actors should **act as a launching customer**

## Increase consumer demand

- **Protein farmers should take on a more prominent role in the legitimisation of Dutch Fabaceae.** Collectives of farmers could **market collaboratively** (e.g. open days, banners in field, social media) to increase consumer knowledge and awareness, and to change norms and values in favour of Dutch Fabaceae
- **Communication and marketing efforts by a broad range of actors** is pivotal. It is essential that these separate efforts are tailored to the target group of the messenger, and the norms, values and routines that this target group represents or performs (e.g. focus on protein content of Fabaceae vs. focus on environmental benefits of Fabaceae)
- **Changing the food environment in favor of Dutch Fabaceae**, especially supermarkets and (business) restaurants. Fabaceae farmers and other Fabaceae ecosystem actors should collaborate frequently and structurally with restaurants to familiarize consumers with Dutch Fabaceae. Furthermore, catering companies and business restaurants should increasingly start offering products with Dutch Fabaceae
- **Explore the effectiveness of a (certification) label for Dutch Fabaceae** in specific, in what form it should be introduced, and what type of organisation should develop and launch the label
- **Advocate for true pricing**, **explore various forms** and opportunities to introduce true price for protein-rich products, and **examine its effectiveness** on the actual sales of plant-based products
- **Educational actors should try to intensify the coverage of Fabaceae/pulses in their educational programs.** Different type of Fabaceae ecosystem actors should **seek relationships with education** to increase knowledge, awareness and popularity of Dutch Fabaceae

# What role may the mission of the Green Deal protein-rich crops play in establishing protein-rich Fabaceae in the Dutch food system?

- The **directionality,** or focus, of the Green Deal Protein-rich Crops is on protein-rich Fabaceae primarily for human consumption. This focus **strengthens, stimulates and supports the activities** needed to establish protein-rich Fabaceae in the Dutch food system
- Signatories of the Green Deal are particularly **well-experienced with Fabaceae for human consumption**, especially lupins and faba beans
- Signatories of the Green Deal Protein-rich Crops **well-represent a broad range of actors in the Fabaceae ecosystem** ranging from breeders, farmers and processors, till network organisations, Dutch provinces and the Ministry of ANFQ. Therefore, the Green Deal and its versatile group of signatories have the ability to **direct, strengthen, and support activities** needed to establish protein-rich Fabaceae in the Dutch food system, as well as have the ability to **contribute significantly to performing these activities**

BEAN DEAL

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