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The Netherlands Seed Valley: A Small Giant in Agribusiness

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ABSTRACT

The Netherlands has emerged as a global leader in plant and vegetable seed breeding, as evidenced by 10 of 11 top seed companies in the world having a headquarters or R&D facility in the Netherlands. My research explores important factors contributing to the Netherlands' prominence in this field, by reviewing research papers and interviewing agribusiness leadership: 1) The early emphasis on seed breeding dating back to the 19th century laid a foundation for the industry, fostering a culture of innovation. 2) The mutual trust between Dutch seed breeders and corporate producers facilitates rapid development. The trust has built up over time, as traditional family farms like Sijp B.V. passed down ownership within families and converted to seed R&D facilities or were acquired by larger seed producers like Enza Zaden and Monsanto, but they still retain the local "family farm" culture. 3) Tracing back Dutch companies within present day large seed breeding corporations 4) The Netherlands' expertise in greenhouse cultivation has provided an optimal environment for advancing seed breeding techniques. Collectively, these factors help to explain why the Netherlands is a leader in plant and vegetable seed breeding.

Objectives

Key questions this research paper aims to answer:

- What is seed breeding and where does it fit within the food production value chain?
- Who are the main vegetable seed breeding companies in the world and what is their relative market position?
- What is the importance of the Dutch seed breeding industry on the global stage?
- What is the history of the Dutch seed breeding industry and 'Seed Valley', in particular?
- What role does Sijp B.V. fulfill in the broader seed breeding value chain?
- How did Seed Valley nester itself in the Netherlands?

Introduction

The emergence and progress of seed breeding is in large part due to Seed Valley, an area located in Noord Holland, Netherlands. Their geographical advantage near the sea, strong emphasis on research from institutions like Wageningen University, and strong tradition on agriculture has ultimately allowed Seed Valley to flourish. Not only that, but the strong emphasis on collaboration between farmers, seed breeders, and research institutions has also helped Seed Valley come about.

Due to global population increase, the seed industry is integral for global food security and agriculture. In 2060, the global population is predicted to reach 10.2 billion (22). How will this affect smaller countries like the Netherlands with limited agricultural space? Jenno Sijp (whose expertise will be explained shortly) expresses his opinion on the matter: "The amount of food production per square meter must be higher" (23). He also says that many people do not want fertilizer to be used to grow plants because of negative health effects like Alziehemers which are caused by toxic levels of cadmium and aluminum in the soil (24). However, to increase the amount of food production

per square meter, it will be necessary to use more fertilizer to increase the food production. Compromisation must be met between agriculturalists and the public or new methods to produce more food to support the extra 2 billion people in 2060 will take place.

Given this urgency, this paper will focus on key success factors within the seed industry which has resulted in the Netherlands becoming one of the strongest countries within the vegetable seed breeding industry.

Background

The Netherlands has its foot in the majority of the top 10 vegetable seed breeding companies today. This is due to the fact that companies have either originated in the Netherlands or have key research and development facilities in the Netherlands. Although it does not seem like the Netherlands has a large business footprint in the seed breeding industry today, tracing back its roots of Seed Valley says otherwise. Dutch agriculturalists like Simon Groot brought attention to Seed Valley. In 1982, Groot established the East West Seed in the Philippines, providing Filipino farmers with seeds that were ideal for tropical conditions, more disease resistant, and had higher yields. Additionally, the Netherlands is the second largest food exporter in the world behind the United States, earning slightly over $100 billion in food exports (1). This small country's innovation has set it on a stage worth investigating. By focusing on one company, this paper will address the economic significance of seed breeding and the company's role in the seed breeding value chain.

History Of Sijp and Partnerships

Sijp's Cultuur en Handelsonderneming B.V. (Sijp B.V.) is the company that will be used for this case study. In 1952, Sijp B.V. was founded by Piet Sijp in Hoorn, Netherlands. Driven on family spirit, Sijp B.V. became a historically family owned business, currently owned by Wilco Sijp and soon to be owned by Jenno Sijp. As the business progressed, Sijp B.V. closed a deal with Enza Zaden, the sixth best vegetable seed breeding company in the world. Enza (Enza Zaden) tasks Sijp B.V. to grow their seeds under special conditions that Sijp B.V. would have to create. for example, simulating conditions in Spain for large-scale production of a new specific seed. The two companies have been working together for 30 years, and as a result are trusted with complex projects that Sijp B.V. would otherwise not receive.

When Sijp B.V. was offered a partnership with Syngenta, Syngenta wanted Sijp B.V. to establish and build a replica to the business Sijp B.V. already had. Sijp B.V. refused. The loyalty and trust that they had built with Enza would take years to establish with Syngenta, and Sijp B.V. was satisfied with only one customer. The loyalty that Dutch seed companies have for each other demonstrates why the seed industry was able to take off in Seed Valley, where companies could look past mistakes that their business partners would make.

This was not the case for a local Dutch company which was working with Syngenta. Syngenta sued the Dutch company for a virus that had killed the seed production that was supposed to go back to Syngenta. "It had gotten a bacterium in the seed production, which meant it had to be cleared, everything had to go... so Syngenta started a lawsuit against its producer about the lost income" (17 Jenno Sijp). "That wouldn't happen with Enza that way, you wouldn't get a whole army of lawyers on your doorstep" (18 Sijp).

Dutch Influence on Vegetable Seed Breeding

Table 1. The top 11 vegetable seed breeding companies in the world (2).

Company	Headquarters (country)	R&D centers

1. American Takii Inc.	United States	United States, Japan, the **Netherlands,** France, Chile, Thailand, China (6, 7)
2. BASF SE	Germany	United States, Brazil, China, England, Germany, India, Italy, Japan, Korea, Poland, Russia, Singapore, South Africa, Switzerland, Taiwan, Thailand, the **Netherlands** (8).
3. Bayer AG	Germany	Germany, United States, Kenya, South Africa, Tanzania, Zambia, India, Indonesia, Philippines, Vietnam, Pakistan, Thailand, the **Netherlands** (12)
4. Bejo Zaden B.V.	**Netherlands**	India, Vietnam, Indonesia, South Africa, the **Netherlands** (9).
5. East-West Seed Group	Thailand	Thailand, Indonesia, India, Philippines, Tanzania, Benin, Guatemala, the **Netherlands** (10)**.**
6. Enza Zaden Beheer B.V.	**Netherlands**	The **Netherlands,** China, South Africa, India, Indonesia, Malaysia, Philippines (11, 13).
7. Groupe Limagrain Holding	France	In 49 countries, including France, India, and the **Netherlands** (15).
8. Namdhari Seeds Pvt Ltd.	India	Bangladesh, Myanmar, Thailand, Indonesia, Bulgaria, Egypt, Turkey, Spain (14).
9. Rijk Zwaan Zaadteelt en Zaadhandel B.V.	**Netherlands**	**The Netherlands**, Vietnam, China, Spain, France, Brazil Tanzania, Chile, Australia (5).
10. Sakata Seed Corporation	Japan	United States, Brazil, Italy, Spain, Turkey, France, the **Netherlands**, Jordan, China, South Africa, Mexico (4).
11. Syngenta Crop Protection AG	Switzerland	United States, Brazil, Switzerland, United Kingdom, Malta, India, Belgium, the **Netherlands** (3).

Currently, ten out of the top 11 companies in the world either have an R&D facility or headquarter in the Netherlands. In other words, the Netherlands has had a significant impact on the majority of vegetable seed breeding companies because of its superior research capabilities and institutions. Turning the clock back, it is apparent that some of these large companies had origins in the Netherlands. Not only does the East-West Seed group have a Dutch R&D center, but it also was founded by a Dutch man in 1982 (16), Simon Groot, who was mentioned in the introduction. Originally founded in the Philippines, Groot taught Filipino farmers modern ways of farming and supplied them with seeds that would do better in tropical conditions, have higher yields, and were more disease resistant.

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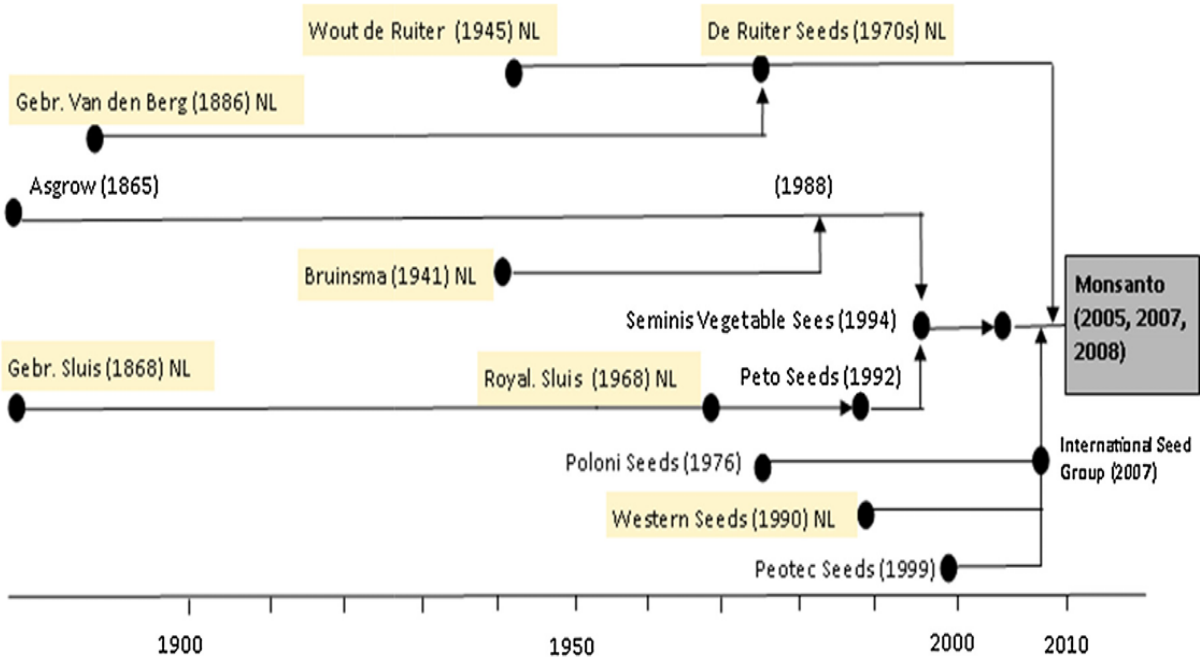

Figure 1. Historical overview of acquisitions and mergers which led to the seed breeding company Monsanto.(20).

Figure 1 shows that the Netherlands also has its roots in large companies past mergers and acquisitions. In 2015, Monsanto was the number one vegetable seed breeding company in the world. Due to many criticisms from the public about Monsanto's use of toxic chemicals (19), Monsanto was acquired by Bayer Crop Science AG, the current number one seed company. The complexity of the large company Monsanto reveals that more than half of the companies made up of Monsanto are Dutch. Evidently, the seed breeding industry has become very international and intertwined with the amount of international acquisition, as well as the many seed breeding companies having R&D facilities in almost every continent.

Agricultural Focus on Vegetables

The Netherlands is more impressive because of its agricultural focus on vegetables. Growing and breeding vegetables like tomatoes, cucumbers, and bell peppers is usually more efficient than growing crops like rice or corn, giving vegetables higher margins "Tomatoes bell pepper, cucumber, those are the seeds that are the most valuable... the margin is relatively high, for example corn or rice or something like that, much larger articles where the margin is

smaller" (21 Jenno Sijp). These higher margins are due to higher turnover rates (most vegetables can be harvested multiple times a year, while rice and corn are only able to be harvested once a year) and selling vegetables at higher prices for freshness.

Additionally, vegetable seed breeding, or any type of seed breeding, falls at the very start of the vegetable food production chain, in which their breeding affects all other sectors in the chain. Seed breeding is the process of creating an entire generation of seeds to exclusively favor one specific trait. For example, if seed breeders want to create an exclusively yellow bell pepper, they will first have to randomly grow or find a yellow bell pepper and then replant its seeds. There will likely still be bell peppers of other colors, but replanting only the yellow bell pepper seeds will ensure that over tens or hundreds of generations there will be a bell pepper grown with exclusively yellow genetics. The prevalence of CRISPR and other genetic techniques allow scientists to combine genes from two related plants to combine their traits. However, this process will take many generations and goes by the technique described in the first example.

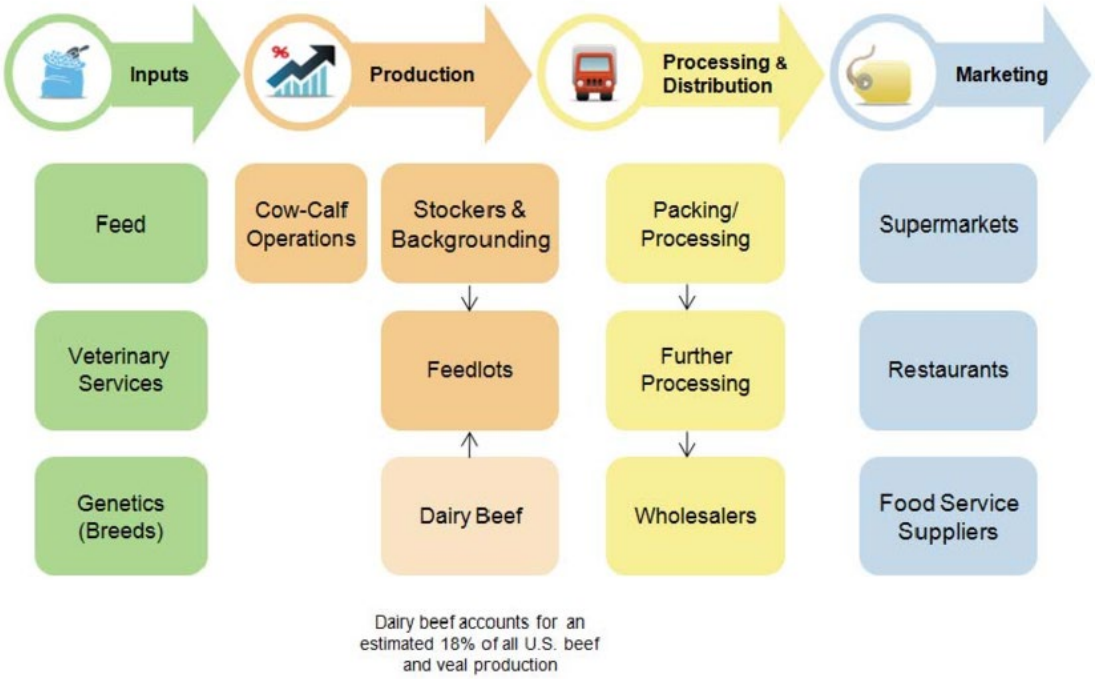

Figure 2. Food production value chain

The Netherlands' Greenhouse Expertise

Due to the Netherlands' location near the arctic and limited land space, the small country turned to more efficient practices like greenhouses in 1850 (25). One of Seed Valley's most prominent discoveries came from using stone wool blocks in greenhouse practices. The Dutch were the first to do this, which many other scientists praise and analyze. For example, Chinese scientists thoroughly analyzed the effect of stone wool blocks on greenhouse practices, praising the Dutch for their discovery (26). This method is extremely effective because 1) the stone wool blocks provide drainage, allowing for roots receiving the right amount of moisture and draining the rest. 2) The fibrous structure of the stone wool allows for sufficient air circulation, 3) the stone wool is able to retain moisture, reducing

the frequency of watering the soil. Finally, 4) stone wool is sterile and therefore prevents bacteria, fungi, or pests from infecting the plant(s).

Conclusions

Seed Valley, a region in Noord Holland, Netherlands, has been coined its name due to its immense amount of seed production due to their geographical advantage near the sea, strong emphasis on research from institutions like Wageningen University, and strong tradition on agriculture. Most importantly, this region has been named seed valley because of the Netherlands' mentality. Dutch seed breeders and farms put their full trust in each other which allows faster development and discoveries, shown by the relationship between Sijp B.V. and Enza. However, this trust does not occur in many countries beyond the Netherlands. Seed breeding company Syngenta (owned by China) even sued one of their partners for lost income from a seed disease. As said by Jenno Sijp, this type of situation would be almost unheard of between local Dutch companies.

It is also important to note that the Netherlands has R&D facilities in 10 out of the 11 top vegetable seed breeding companies, and a headquarters in three of them. Research institutions and r&d facilities like Wageningen University are valued by international seed breeding companies, explaining why the Netherlands has a large influence on the industry.

The Netherlands not only has R&D connections to large vegetable seed companies, but also has companies which are made up of large corporations. Seven Dutch companies have been acquired directly and indirectly by the number one vegetable seed breeding company in the world, Bayer AG. The early emphasis of seed breeding from the 19th century and beyond has resulted in the Netherlands being a leader in innovation and production of seed.

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