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Understanding the emerging phenomenon of food forestry in the Netherlands: An assemblage theory approach

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Abstract

In the Netherlands, food forests have been appearing by the dozens since 2017, resulting in calls by Dutch national and local governments, as well as civil society organizations, for evidence of their parameters and profitability. This paper focuses on the former, mapping and analyzing food forestry (FF) in the Netherlands by drawing on assemblage theory. A survey, and unstructured interviews with five FF experts from the field, resulted in descriptive FF data as well as a map of 231 food forests. The main conclusion from the survey data from 109 participants is that food forests are incredibly diverse and versatile in terms of goal or orientation, although few initiatives focus on profitability. Some similarities include age, as most food forests were planted after 2017, and size, as most are between 0.5 and 2.5 hectares (ha), or between 1.2 and 6.2 acres. The demographics of practitioners, however, are rather homogeneous: university-educated individuals between 40 and 60 years old are the norm. Many practitioners state that the FF community at large has contributed to their access to knowledge and network, as well as their enthusiasm, sense of pride, and hope for the future regarding FF. Moreover, a shared ontological position, the distribution and exchange of knowledge, the institutionalization of FF, and infrastructural conditions both foster cohesion within the FF assemblage and embody exclusionary and disruptive processes. These complex relations confirm the importance of descriptive and contextualized evidence to support FF.

Keywords

food forestry, assemblage thinking, participatory action research

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Introduction

As climate change-induced precarity of food systems is starting to affect most of the world (Brondizio et al., 2019), the need for resilient forms of agriculture that can both provide climate change mitigation and adaptation strategies is higher than ever. A potential candidate is the land-use practice of food forestry (FF) (Park et al., 2017). A food forest is a land-use system that mimics the ecosystem of a natural forest, using edible and perennial plant species (Park et al., 2017). In Dutch food forests, examples of such species include the eastern American black walnut (*Juglans nigra*), figs (*Ficus carica*), aronia berries (*Aronia melanocarpa*), and wild garlic (*Allium ursinum*) (personal observation, 2023). Food forests maintain a higher biodiversity than industrial land-use systems, resulting in beneficial plant-plant interactions (Kumar & Nair, 2004; Park et al., 2017). FF therefore requires little to no external inputs, such as chemical fertilizers and pesticides (Kumar & Nair, 2004). Besides food production, FF can play a role in nature restoration and conservation efforts. The high level of biodiversity provides habitat for wildlife species, and due to the inclusion of perennial species food forests sequester more carbon than their industrial counterparts (Park & Higgs, 2018). FF also has a potentially important pedagogical role; it could help reconnect neighboring human communities to nature (Park & Higgs, 2018).

Rooted in the permaculture tradition (Mollison & Holmgren, 1978) and promoted by FF pioneer Martin Crawford (2010), FF is a recent phenomenon in Europe and North America (Albrecht & Wiek, 2021). In the Netherlands, food forests and FF-related organizations have surged in the last decade, which has been recognized by various actors within the Dutch national and provincial governments, as well as research institutes. Putting words into action, a number of actors signed an agreement in 2017 to promote the development of FF in the Netherlands: Green Deal Voedselbossen (Green Deal Food Forests) (Green Deal Voedselbossen, 2017a).

Green Deal Voedselbossen maintains a precise definition of FF: at least 0.5 ha in size, predominantly consisting of perennial species, with a canopy layer, a rich soil life, and at least three layers of vegetation between them (Green Deal Voedselbossen, 2020). The Green Deal acknowledges FF's potential to mitigate problems incurred by industrial agriculture, but calls for empirical evidence, in the form of statistics pertaining to ecological, social, and economic indicators, to corroborate this potential (Dorp & Stobbelaar, 2020; Green Deal Voedselbossen, 2017c). Correspondingly, the Green Deal was signed on the condition that more FF research would be conducted.

An increasing number of researchers have studied food forests recently. Some focus on one element of FF, such as its role in ecological restoration (Park et al., 2017; Park & Higgs, 2018). Others offer a thorough account of a specific case study, such as the community food forest in Parma, Italy (Riolo, 2019) and forest gardens on Swedish farms (Björklund et al., 2019). Albrecht and Wiek (2020) studied 209 food forests worldwide and found that while most of them scored well on sociocultural and environmental indicators, economic indicators lagged behind. This raises questions about the ability of FF to secure practitioners' livelihoods.

Existing research converges on the heterogeneity and versatility of FF practices, and emphasizes the importance of context, signifying both the ecological landscape and the socioeconomic and political landscape in which a food forest is established (Albrecht & Wiek, 2020; Park et al., 2017). In the case of FF, any generic conceptualization of a food forest might fail to account for the diversity on the ground, which limits its practical relevance. The diversity of FF practices calls for an approach that is sensitive to the nuances and intricacies of the different conditions in which food forests exist.

Respecting this sensitivity, this paper aims to map and analyze the emerging phenomenon of FF in the Netherlands in a descriptive manner, so as to emphasize the representation of individual cases. Assemblage theory (AT) provides a vocabulary that elucidates the wide variety of components that constitute the FF landscape and directs attention to the relations between them. This study aims to uncover how these components synergize and how their interactions contribute to or disrupt cohesion within the FF assemblage. This study takes an exploratory approach and sets the stage for further research on how FF is performed.

Theoretical Framework

AT was originated by Deleuze and Guattari (1980/1987), and other authors have since developed and refined the theory (DeLanda, 2016; Gabriel & Sarmiento, 2020; Sarmiento, 2020). The point of departure is socio-material wholes, or *assemblages*, referring to, for example, social phenomena, networks, or groups (Deleuze & Guattari, 1980/1987). AT views social phenomena as the coming together of many components which interact, producing *emergent properties*. DeLanda (2016) offers the example of a knight to illustrate this; the interaction between a person, a horse, and a weapon constitutes a more powerful whole than the sum of its parts.

Deleuze and Guattari categorize components as *segments of content* and *segments of expression*. While the former simply refers to material components of the assemblage, such as practitioners and food forests, the latter is less definable, but includes the representation of meaning in discourse (e.g., media coverage) as well as practices (e.g., events and gatherings) (DeLanda, 2016). Significantly, DeLanda (2016) emphasizes the relativity of scale. Components are in themselves assemblages, just as assemblages are components of other assemblages (Cameron & Hicks, 2013). DeLanda thus views society not as a coherent social field, but as a population of assemblages. In the case of FF, this phenomenon can be seen as an assemblage, composed of many component parts, such as individual food forests and practitioners.

DeLanda describes two more conditions of assemblages. New properties necessarily emerge from interaction between parts, so that an assemblage is always more than the sum of its parts. And emergent properties are contingent on interaction: when the interaction ceases, those properties cease to exist (DeLanda, 2016). To continue or expand emergent properties, the assemblage therefore needs to be retained. Emergent properties can manifest in tangible ways, such as gaining access to resources, or in nontangible ways. An important type of nontangible emergent property is what Massumi defines as *affects*: "ideological effects through non-ideological means" (Massumi in Roelvink, 2020, p. 428). Affects are experienced emotionally, but they also embody capacities, in the sense that for example the presence of hopefulness or optimism can favorably alter courses of action for those who experience it, thus altering the disposition of those involved (Anderson, 2014; Roelvink, 2020).

The degree to which an assemblage is unified or cohesive is determined by what *relations of dominance* (Sarmiento, 2020), interactions between segments that lead to increased cohesion. Interactions can also have disruptive effects, *relations of difference*, which can decrease cohesion or disband the assemblage altogether.

In short, an AT approach illuminates segments of content and expression in FF, their interactions, and the emergent properties these interactions generate. Moreover, examining the relations of dominance and difference at play provides an understanding of the current state of the FF assemblage.

Methods

This study is the first part of a broader participatory action research (PAR) project investigating social and economic possibilities for FF in the Netherlands at various scales (Kindon et al., 2007). For this particular study, a multi-method approach was used, with the research aim developed iteratively with the survey participants and a guidance committee (Table 1). To ensure reliability, validation strategies such as thick description and member checking (consulting participants) were used (Creswell, 2013).[1] The fieldwork was conducted mostly during 2022, but relevant fieldwork conducted for a different study (Roodhof & Veen, 2021) which started in 2020 was also taken into account.

Results

This section begins with an outline of the identified parts of the FF whole, distinguishing between tangible and nontangible parts: segments of content and expression, respectively. Subsequently, the interactions between these segments will be analyzed for emergent properties. Interactions can either contribute to the cohesion of the assem-

[1] For a more detailed description of thick description and member checking as validation strategies, see Creswell (2013).

Table 1. Overview of the Methods Used for this Research Project

Method	Description	Purpose	Timeline
Participant observation	Attending FF-related events and visiting food forests	Understanding FF and the context in which they occur	Fall 2020–Fall 2022
Online search	Entering the search query "voedselbos" (food forest) in Google and checking the results	Identifying food forests and practitioners in the Netherlands	Spring 2022
Snowballing	Checking the websites of FF organizations in the Netherlands and asking practitioners about other practitioners and food forests	Identifying food forests and practitioners in the Netherlands	Spring and summer 2022
Discussion session	An interactive discussion session with prospective survey participants (*N* = 29)	Iteratively developing the purpose of this study and aligning the content of the survey	Fall 2022
Survey	Closed and open questions (informed by AT) that address the parameters of food forests and practitioner experiences and perceptions	Generating descriptive data on food forests and practitioners in the Netherlands	Fall 2022
Guidance committee	Individual contact with five FF experts in the Netherlands and a two- hour group discussion	Aligning the goals of this research project with the needs of FF practitioners and improving the research quality and reliability	Summer and Fall 2022, Winter 2023

blage, thereby supporting its emergent properties; or they can challenge cohesion, disrupting emergent properties. The section ends with a discussion of relations of dominance and difference within the FF assemblage.

Segments of Content

Segments of content refer to the material components of assemblages. Through an online search as well as via snowball sampling, 231 food forests were identified, 108 of which are represented in this study by a total of 109 practitioners. Besides food forests and practitioners, an array of other segments of content are discussed: government institutions and actors, actors within the private sector, FF organizations and enterprises, key nodes within the FF network, and other individuals and groups related to FF. Below, each subcategory is addressed individually.

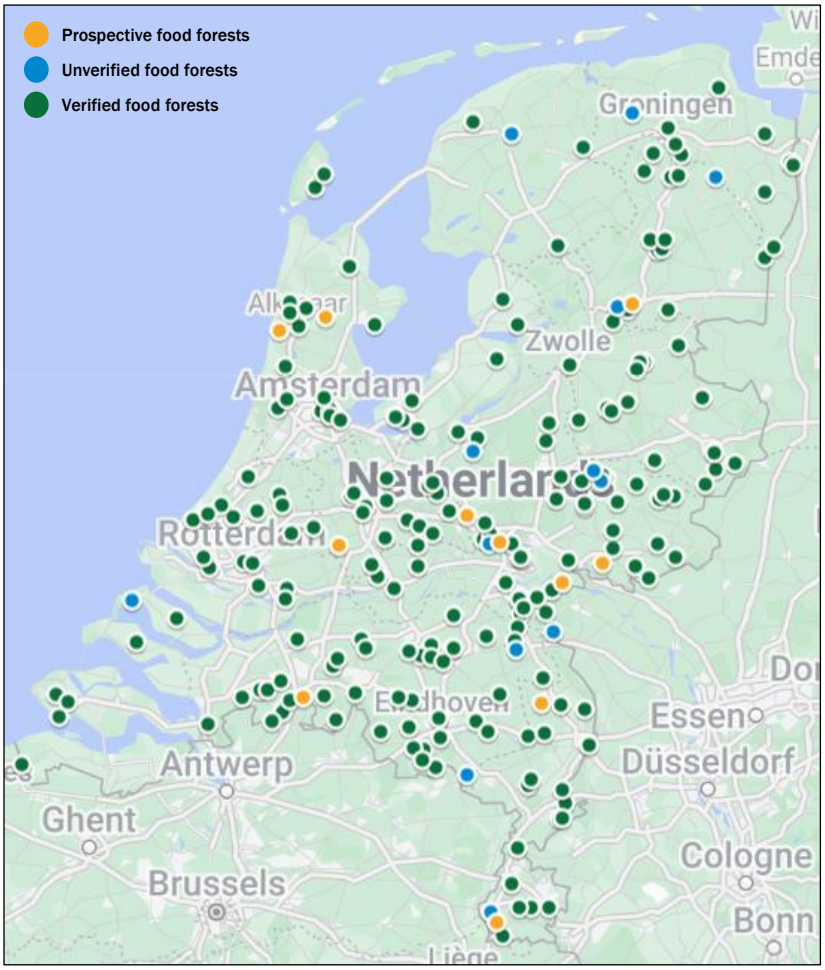
Food forests

Figure 1 shows a somewhat uneven distribution of the 231 FF initiatives, but it should be noted that this map is not exhaustive. For example, practitioner Femmeke Huigens indicated that she knows approximately 200 private food forests in the northeastern province of Drenthe alone, which could not be included due to privacy restrictions on their contact information (2022, personal communication). This number greatly deviates from the number of food forests displayed in Drenthe in Figure 1, suggesting that the actual total number of food forests may be considerably higher than 231.

The existence of 207 of these 231 initiatives was verified through either verbal or written communication with the initiator. The verified food forests are depicted in Figure 1 as green dots. The yellow dots indicate 11 prospective food forests, which have not been realized yet. Thirteen initiatives remain unverified (the blue dots, Figure 1). The prospective and unverified food forests demonstrate that this map is not definitive, but rather an indication of established food forests.

Of the 231 food forests discussed in the previous paragraph, 108 are represented in the survey. Table 2 summarizes their descriptive characteristics and shows that food forests are heterogenous in terms of the main goal or orientation of the food forest, business model, and means of financing. Most food forests are not limited to one orienta-

Figure 1. Map of Food Forestry Initiatives in the Netherlands by Type



tion, and it should be noted that while Table 2 reflects their main orientation(s), many have additional orientations. This shows that food forests are versatile, engaging in an array of activities that are not limited to food production.

The majority of food forests are not (yet) focused on generating income, as less than a quarter of the food forests represented in the survey are a for-profit or social enterprise. Most food forests in the study are nonprofit or for personal use. A possible reason is that many participants see FF as an experimental form of agriculture. The guidance committee mentions that few participants started practicing FF to earn money. For several, FF has eventually grown into full- or part-time jobs, but rarely did the practice begin as one (guidance committee, 2022, personal communication). This is also reflected in the means of financing, which for most food forests (partly) consist of personal assets.

In terms of size and age, the food forests are more similar: most are larger than 0.5 ha, with the majority between 0.5 and 2.5 ha. Most food forests were established between 2016 and 2020.

Practitioners

Table 3 shows that the survey participants share a number of similarities. The majority are Dutch, over 40 years old, and have a university or university of applied sciences degree. Many participants also have a form of employment outside of their food forest.

The characteristics pertaining to income and employment vary considerably. Nearly a quarter of participants indicated that their income was "not applicable," suggesting that they have other means of securing their livelihood. Approximately half of the participants that are employed have a job that is related to their food forest, but these participants are more likely to earn an income that is below average. This does not necessarily imply a precarious financial position; the guidance committee suggested that these practitioners often have savings or a spouse with an income. Accordingly, a secure financial position plays a key role in prospective practitioners' capacity to start a food forest (2022, personal communication). As FF requires considerable seed capital with no immediate returns, it is currently more accessible to those with the means to take a financial risk.

Food forestry experts

With the onset of FF in the Netherlands, a pool of FF experts has emerged: practitioners who engage in consultancy, education, and design services. These experts are key nodes in the FF assemblage,

as they actively recruit new practitioners and connect practitioners with one another. Five of these experts compose the guidance committee introduced in the methods section.

Visitors, volunteers, and others involved with the food forest

While the survey instrument for this research project only included questions pertaining to individual FF practitioners, participants and the guidance committee alike emphasize the importance of local networks and communities in which food forests are embedded. While some food forests are for personal use only, many function as social hubs and engage with many visitors, volunteers, and others.

Table 2. Descriptive Statistics of the Food Forests (*N* = 108)

Descriptive variable	Frequency % (*n*)
Size	
<0.5 ha	16.7% (18)
0.5–2.49 ha	58.3% (63)
2.5–4.49 ha	13.9% (15)
4.5–6.49 ha	5.6% (6)
6.5–8.49 ha	0.9% (1)
8.5–9.99 ha	0.0%
>10 ha	4.6% (5)
Start date	
<2000	1.9% (2)
2000–2010	2.8% (3)
2011–2015	8.3% (9)
2016–2020	61.1% (66)
>2021	25.9% (28)
Main orientation(s)[a]	
Education	52.8% (57)
Research or experimentation	44.4% (48)
Nature or biodiversity	26.9% (29)
Social or recreation	51.9% (56)
Production	50.9% (55)
Business model	
Nonprofit	30.6% (35)
Social enterprise	4.6% (5)
For-profit	19.4% (21)
Cooperative	2.8% (3)
Public	1.9% (2)
Own use	33.3% (36)
To be determined	3.7% (4)
Means of financing[a]	
Personal assets and/or savings	69.4% (75)
Public subsidies	40.7% (44)
Private investment	9.3% (10)
Donations or grants	30.6% (33)
Loans	1.9% (2)

[a] Participants were able to select more than one answer.

Table 3. Descriptive Statistics of the Participants of the Survey (*N* = 109)

Descriptive variable	Frequency % (n)
Gender	
Male	53.2% (58)
Female	45.0% (49)
Nonbinary	0.9% (1)
Don't want to say	0.9% (1)
Level of education	
Post-graduate degree	6.4% (7)
University degree	40.4% (44)
University of applied sciences degree	40.4% (44)
Vocational education	9.2% (10)
High school diploma	2.7% (3)
Other	0.9% (1)
Age	
<30	3.7% (4)
30–40	10.1% (11)
41–50	28.4% (31)
51–60	27.5% (30)
>60	30.3% (33)
Nationality	
Dutch	98.2% (107)
Belgian	0.9% (1)
Australian	0.9% (1)
Income[a]	
Below average	31.2% (34)
Average	22.0% (24)
Above average	23.9% (26)
Not applicable	22.9% (25)
Employment status	
Full-time employment	14.7% (16)
Part-time employment	18.3% (20)
Self-employed	21.1% (23)
Freelance employment	28.4% (31)
Unemployed	17.4% (19)
Employment food forestry-related	
No	42.2% (46)
Partly	22.0% (24)
Yes	18.3% (20)

[a] In 2022, the average income in the Netherlands was €38.000 before taxes.

Consumers

As food forests are a form of agriculture, food production for consumption is an important aspect. This study survey was not directed towards consumers, but participants stated that the consumption of FF products occurs in various ways: personal consumption, sharing, and product sales to individual customers, local businesses, or restaurants. Participant experiences with FF product sales are very diverse and highly context-dependent: 15% struggles to find customers, whereas 16% experiences no problems in this respect. Most food forests, however, are not yet productive and thus have little to be consumed.

Infrastructure

Another key segment of content is infrastructure, which includes laws and regulations and financial support. Infrastructural circumstances vary considerably by province or even municipality (guidance committee, 2022, personal communication). In some provinces and municipalities, subsidies have been made available for food forests and zoning laws have become more inclusive (guidance committee, 2022, personal communication). In most provinces, however, the current laws and regulations impose restrictions on food forests, because they maintain a strict separation between nature and agriculture and food forests fall within neither of those categories (Green Deal Voedselbossen, 2021). Besides problems with laws and regulations, participants expressed that subsidies and loans are difficult to obtain, as indicated in Table 2.

Upon discussing the survey results pertaining to infrastructure with the guidance committee, land and plant scarcity emerged as additional challenges (guidance committee, 2022, personal communication).

Education and research institutes

Several universities and research institutes engage with FF. Many students are interested and involved, contributing to FF research through their master theses or internship projects. They often do so in collaboration with the National Monitoring Programme Food Forests,[2] as discussed below.

Food forestry organizations, coalitions, and enterprises

Numerous organizations, coalitions, and enterprises have been established around food forests that play a crucial role in generating and distributing FF knowledge. The primary coalition is Green Deal Voedselbossen, which unites stakeholders from the public and private sector and initiated the National Monitoring Programme Food Forests, an organization that does longitudinal research, tracking approximately 35 food forests (Green Deal Voedselbossen, 2017a; 2017b). Another important organization is Voedsel uit het Bos, a citizen-science platform that unites hundreds of practitioners and asks them to provide data on their food forests (Voedsel uit het Bos, n. d.). Practitioners can also connect with each other. In addition, Stichting Voedselbosbouw is a platform that aims to facilitate FF in the agricultural sector, providing consultancy and design services, as well as offering FF courses and workshops (Stichting Voedselbosbouw, n. d.). Likewise, several FF practitioners have formed enterprises that offer workshops and trainings for other practitioners.

While many organizations, coalitions, and enterprises exist as part of the FF whole, there is no overarching authority that unites them. They often overlap in terms of jurisdiction, services offered, and topics discussed.

Food forestry networks

The social media platform Facebook is regularly used by practitioners in the Netherlands to connect and share information. In total, I identified nine networks fully or partially mediated on Facebook; some also have a separate website and/or newsletters. Five of the groups are regional and have between 140 and 1500 members. The other four are thematic (e.g., sharing food forest recipes) and have between 1700 and 35500 members.

[2] The National Monitoring Programme Food Forests adheres to UK spelling and grammar, which I retain when referring to this program.

Segments of Expression

The segments of expression, the nontangible component of the FF assemblage, that I identified suggest two subtypes: segments of expression internal to the existing FF assemblage and segments that go beyond it. Some segments are oriented both within and beyond the actualized FF assemblage.

Segments within the food forestry assemblage

Knowledge sharing and facilitation

The majority of participants designed their own food forest; a multitude of resources is available for those who choose to do so. The platforms Stichting Voedselbosbouw and Voedsel uit het Bos, as well as the website of Green Deal Voedselbossen, offer much open- source information FF practitioners can freely access. The platforms also have newsletters, promoting events and relevant courses and sharing knowledge. There are many courses, workshops, trainings, and consultancy services to which practitioners can resort. These often require a participation fee, but many are open to discussing options with practitioners who cannot afford it. Due to the rapid increase in the number of food forests in the Netherlands, however, consultants and designers struggle to keep up with the growing demand for such services (guidance committee, 2022, personal communication). Moreover, as FF is a grassroots phenomenon, available resources are dispersed and not subject to quality control (guidance committee, 2022, personal communication).

Events within the FF assemblage

There are many organized FF activities. Vertical activities, such as tours and courses, connect experts to new or prospective practitioners and other aficionados, and horizontal or assemblage-wide events foster network building and knowledge exchange among practitioners. One example is a workshop organized by a FF foundation with the aim of identifying bottlenecks in the development of food forests. Attendees included most of the experts central in the FF assemblage and many other practitioners from all over the Netherlands.

Segments beyond the food forestry network

Politics

While the Dutch government has expressed support for FF, support has yet to be fully integrated into laws, regulations, and available subsidies (guidance committee, 2022, personal communication). One barrier is lack of evidence concerning the scalability of food forests (Green Deal Voedselbossen, 2017b). While several large-scale production food forests exist, they are still in development and evidence about their profitability is yet to be produced. Nevertheless, evidence alone will likely be insufficient to increase government support for FF: the guidance committee emphasizes political will and the mindset of civil servants as additional conditions for support, which require further investigation (2022, personal communication).

Media exposure

Media exposure of food forests has steadily increased recently. In 2022, national major newspapers as well as regional and local newspapers have written about FF and related topics, introducing their readers to the concept. FF has also been presented on several radio talk shows, which invited FF experts to discuss their experience and perspectives (BNNVARA, 2021).

In addition to the mainstream media, Voedsel uit het Bos launched a podcast on Spotify, which publishes episodes about 50 minutes long every two weeks. In the episodes, the hosts invite a guest, often an expert, to talk about FF, potentially recruiting prospective practitioners and contributing to knowledge exchange among practitioners.

Events beyond the food forestry network

Events beyond the FF network actively seek out people who might not know about food forests or be skeptical about them. An example is the Floriade Expo, an international horticultural exposition organized every ten years in various Dutch cities. The 2022 edition included a food forest; the Expo was visited by 685,000 people, about three-fourths of whom were Dutch, and was well-received (Omroep Flevoland, 2022). The food forest designer also talked about FF on a national radio show, where he was invited as a guest twice in 2022.

Interactions and Emergent Properties

The interaction between the segments of content and expression leads to emergent properties (DeLanda, 2016). Using the survey, participants were asked to rate their experiences regarding their access to knowledge, access to networks, access to volunteers or employees, access to customers, and their experience with the overall circumstances for FF in the Netherlands. Moreover, participants were asked to rate their perceptions of the following affects: enthusiasm, sense of knowledgeability, confidence, sense of pride, hope for the future, and ability to cope with setbacks. These two lists, and the corresponding sets of questions, aimed to investigate the extent to which participants experience emergent properties of the FF assemblage. They had been composed based on participant observation and discussion with prospective survey participants.

The survey results indicated that participants most strongly experience the emergent property of access to knowledge, because of the approachability of experts, knowledge exchange within their network, the availability of courses and workshops, and the open-source information online. Participants nevertheless emphasized that FF is still in an early stage of development, with little organized knowledge. A recurring term used to describe this stage was "pionieren" (pioneering). Underpinning this notion is the shared belief that FF has by no means reached its "climax ecosystem" yet. Moreover, participants noted that there are many contradictory voices and that scientific knowledge about FF is scarce. Some participants emphasized that they knew little about how their food forest can secure their livelihood.

Participants experience the emergent property of access to networks to a slightly lesser extent, approximately half describing it as "good" or "very good." The primary benefit mentioned was a strong will among practitioners to share experiences and knowledge. While most participate in a network and appreciate it, some participants indicated that they would like to improve their network, but that they are unable to put in the necessary time to achieve this. Participants also mentioned that finding relevant contacts is especially difficult for outsiders or newcomers. A FF course could mitigate this, but survey participants list course fees as a participation barrier. Some participants asserted that FF is a bubble in which most practitioners share similar values and motivations. Correspondingly, participants who perceived their values as different indicated feelings of isolation. The next section further unpacks participants' perceptions of whether values are shared in relation to cohesion.

Experience of access to volunteers or employees and access to customers were more diffuse. Nearly half of the participants do not have a need (yet) for volunteers, employees or customers. Their food forests are often maintained by a small group of people, often acquaintances, family, or friends. Likewise, many food forests produce only for personal use. For many participants, however, the sale of produce will likely be a key goal in the future, once their food forests start producing higher yields. Of those who did indicate a need for volunteers, employees, or customers, experiences varied. Some participants are very content: volunteers independently find these food forests, and customers present themselves. Other participants, however, struggle to find customers or reliable volunteers. In addition, volunteers often lack expertise and require supervision. Thus access to volunteers, employees and customers might be less connected to the FF concept as a whole and more dependent on a food forest's development stage, management plan, and socio-geographical context.

Finally, experiences concerning the circumstances of FF in the Netherlands are varied, but on average participant experiences are positive. This could be explained by the affects that the FF assemblage generates, on the one hand: the majority of participants experience affects from their involvement with FF, most notably in terms of their hope for the future, their enthusiasm about FF, their sense of knowledgeability, and their sense of pride. These sentiments possibly alter practitioners' dispositions to cope with the current circumstances of FF, which could ultimately improve their ability to do so (Anderson, 2014; Roelvink, 2020). An example is the previously mentioned experience of "pionieren" shared among practitioners: practicing FF entails the excitement of being part of a new, grassroots movement that

gives a sense of purpose, while also having a sense of insecurity. However, the excitement and sense of purpose could help mitigate any anguish or perceived insecurity. On the other hand, three participants strongly expressed that they do not feel connected to FF at large nor do they see FF as a coherent whole in the first place, and therefore they do not experience any emergent properties.

Thus the survey shed light on participants' perceptions of emergent properties of the FF assemblage, pertaining to tangible benefits (e.g., access to knowledge) and nontangible benefits (e.g., enthusiasm). The majority of the participants were satisfied with their access to relevant knowledge and networks and experience notable affects resulting from the FF assemblage. However, likely due to the heterogeneity of food forests in terms of orientation and socio-geographical location, practitioners experience access and affect to different degrees. A minority of participants reject the idea of emergent properties altogether, as they do not perceive FF as a coherent whole, but rather as fragmented and unconnected.

Relations of Dominance and Difference

The interactions of the segments described in the previous section both generate and are simultaneously guided by the very nature of the interaction (Deleuze & Guattari, 1980/1987). Some interactions generate cohesion and foster emergent properties, and others work in the opposite direction, pulling apart the segments. Sarmiento (2020) calls these forces relations of dominance and difference, respectively. In this section, the relations of dominance and difference within the FF assemblage are analyzed. Five categories emerge from participant answers: recruitment, values, FF definitions, organization, and infrastructure.

Recruitment

A vital dominance relation involves recruiting new practitioners, which often occurs via readily existing networks, as more than half of the survey participants were introduced to FF through their personal networks. This aligns with the perception that the FF network is a "bubble," a somewhat homogeneous group of practitioners with specific ideas about the practice and which can be difficult to penetrate for outsiders. But not all participants were introduced to FF through their personal connections, suggesting that if such a bubble exists, it is expanding beyond readily established personal networks. A core but expanding group of FF enthusiasts plays an active role in recruiting these new practitioners, both locally (through connections with other local food networks) and translocally (through media and actively seeking out prospective practitioners in the agricultural sector) (guidance committee, 2022, personal communication). Recruitment has been quite effective, as the number of food forests and practitioners has grown substantially in the last five years. Practitioner John Vermeer states: "For a long time, we had to rebel against conventional agriculture, we were a niche. But now our numbers are growing, and the regime can no longer ignore us, which gives us a better position" (Vermeer, 2022, personal communication).

Recruitment can be both a relation of dominance and of difference. On the one hand, it strengthens the position of FF as a legitimate type of agriculture, as more people have been convinced (guidance committee, 2022, personal communication). On the other hand, more practitioners could also lead to greater diversity of values and opinions, leading to conflict among practitioners, to be addressed in the next section.

Value-driven cohesion

Another dominance relation is retention of practitioners through value-driven cohesion. Many survey participants experience strong cohesion with other FF practitioners: they see them as likeminded peers, who share values such as wanting to contribute to nature and society, and to prioritize access to healthy food. Participants typically engage with food forests other than their own, potentially contributing to perceived connectivity with other practitioners. Likewise, most participants partake in courses, activities and events, resulting in new connections and strengthening existing ones. Participants indicated that interaction and collaboration with other practitioners often leads to inspiration, motivation, and, more practically, to knowledge exchange. The role of organizations, local and regional governments, the media and experts that

promote FF is described as "verbindend," roughly translated as "creating a sense of unity." Those experiencing the strongest sense of cohesion are mainly survey participants avid about networking as well as experts. Particularly, the guidance committee views FF as a political project to transform agriculture at large, which creates a greater sense of togetherness (2022, personal communication).

Cohesion can also be considered a relation of difference, as a small number of participants indicate no experience of cohesion whatsoever. According to them, the lack of organization and institutionalization renders FF an isolated activity. Some practitioners express little interest in cohesion: to them, FF is merely a personal hobby. Others feel excluded by the previously mentioned "bubble" of FF practitioners. The distribution of cohesion within FF thus seems uneven.

While values unite many practitioners, values require further unpacking to understand how they can still promote relations of difference. The survey showed that many participants are driven by underlying conceptions about the human-nature relationships; i.e., that humans are part of nature and that food production and nature conservation are not mutually exclusive. Participants enact these values in different ways, however. Some want to persuade others of their ontological position, whereas others simply want to practice what they preach, and keep the preaching to a minimum. While participants often share an ontological position, the decision on how to act on that position sets them apart.

Definition(s) of food forestry

Most participants agree on a general definition of FF: it entails a sustainable form of agriculture in which both nature values and food production are at the forefront. Three-fourths of participants define FF in resonance with the definition set by Green Deal Voedselbossen (2020), and many expressed concern about FF being "hype"; that is, adopting the term without adhering to the basic terms set by Green Deal Voedselbossen. Contrarily, a few participants oppose a rigid definition, calling it exclusionary and pretentious.

The guidance committee strongly favors a clear definition to prevent ambiguity about the concept, which it fears would harm the reputation of FF as a serious type of agriculture, with government institutions, investors, and banks dismissing FF as an amateurish hobby (guidance committee, 2022, personal communication). The lack of a definition could also lead to a false sense of security due to misinformation: practitioners could obtain an inaccurate understanding of what it means to design, implement, and maintain a food forest (guidance committee, 2022, personal communication). More than half of the participants found maintenance of their food forest challenging, perhaps due to the previously mentioned hype, which posits FF as a silver-bullet solution. Consequently, practitioners might underestimate the work required for upkeeping a food forest and fail to do so effectively (guidance committee, 2022, personal communication). This could demotivate practitioners and spotlight unsuccessful FF projects, thus threatening the FF assemblage.

Organization or lack thereof

Many participants characterize the FF landscape as unorganized. This may be because it is a relatively young grassroots phenomenon (guidance committee, 2022, personal communication). However, opinions about this lack of organization vary considerably. Many see it as an asset, as it allows practitioners to adapt the FF concept to their individual situations, making the practice more accessible and thus supporting expanding the FF assemblage. Others, including the guidance committee, prefer a higher degree of organization to discourage misinformation about what practicing FF entails, thus prioritizing cohesion within, rather than expansion of, the FF assemblage to ensure its continuation.

Infrastructure

Infrastructure and related knowledge point to another relation of dominance (and difference). The provincial governments of Drenthe and Noord-Brabant implemented changes to support the development of FF (guidance committee, 2022, personal communication). In those provinces, the number of food forests is considerably higher than in provinces that have not implemented such changes, such as Noord-Holland (guidance committee, 2022, personal communication). While it is

unclear which came first, the number of food forests or supportive policies, the latter is a crucial relation of dominance. Flexible laws and regulations, such as inclusive zoning laws that allow for food forests, enable prospective practitioners to initiate projects. Many participants name laws and regulations pertaining to FF, as well as lack of financial opportunities (specifically subsidies and loans), as a severe challenge. These challenges have been ascribed to FF often falling through bureaucratic cracks: governments and banks do not recognize it as a form of agriculture, due to the sheer number of trees, but issues also arise when it is categorized as nature, as the dominant perception of nature does not involve food production (guidance committee, 2022, personal communication).

Lack of knowledge about legal and financial aspects of food forests exacerbates infrastructural limitations. More than half of the participants indicated that their financial position did not affect their food forest design, and three-quarters indicated that they did not beforehand consider laws and regulations, but most participants experienced infrastructural issues later on. This suggests that because practitioners did not consider infrastructure when designing their food forests, problems manifested in subsequent stages. This aligns with the findings by Björklund et al. (2019) that forest gardens, a similar land-use system to FF, were more likely to succeed if extensive analysis of the socio-geographic context was conducted beforehand.

This section has illustrated how the different sets of relations can simultaneously contribute to cohesion and to disruption of the FF assemblage. The main relations of dominance are recruitment through personal networks, events, and exposure in traditional and social media channels, shared values about the human-nature relationship, the Green Deal Voedselbossen definition of FF, and infrastructural support. The main relations of difference correspond to these relations of dominance, with three standing out. The same values that bind some practitioners together seem to exclude practitioners, or prospective practitioners, who do not share these values. Misinformation about FF practices can demotivate practitioners and harm FF's image as a legitimate form of agriculture. Lack of infrastructural support and knowledge pose key challenges to many practitioners.

Discussion and Conclusion

This study has aimed to create a thorough inventory of the FF practice in the Netherlands and analyze it through AT. The components of the FF landscape in the Netherlands were identified, as well as emergent properties resulting from their interactions, which can be characterized as relations of dominance and difference. It should be noted that the FF landscape is rapidly changing and therefore this study merely presents a snapshot in time, adding to the existing literature by zooming out from food forests as isolated entities, demonstrating their embeddedness in the personal networks of practitioners, local communities, and the FF landscape on a national level. This section presents the conclusions of this paper, with its limitations and recommendations for future research.

Participant observation and an online search, in combination with the survey, resulted in an extensive overview of the material elements of the FF assemblage. The following categories were identified: food forests, practitioners, buyers and retailers, government bodies, actors and companies in the private sector (banks, account managers, investors), education and research institutes, organizations and enterprises, and experts. A survey generated data from 108 food forests and 109 practitioners as well. The immaterial assemblage components—the segments of expression, such as linguistic expressions, practices, and activities—were also identified. These segments include knowledge sharing and facilitation, networks, events, politics, bureaucratic context, and media exposure. They often connect segments of content and are a means through which relations of dominance and difference manifest. All these make up the FF assemblage in the Netherlands.

Furthermore, survey participants experience notable emergent properties resulting from the FF assemblage, particularly relating to "pionieren": a shared disposition that combines excitement and hope for the future with a sense of insecurity. Due to the heterogeneity of food forests and their dispersed socio-geographical locations, participants

have varied experiences with access to customers, volunteers and employees.

This study found several trends or tendencies in how emergent properties are sustained or challenged that can be described as relations of dominance or difference. A preliminary observation is that the categories of "dominance" and "difference" are not mutually exclusive. Factors that promote cohesion within the FF assemblage, such as having a shared ontological position and political agenda, can also exclude (prospective) practitioners who do not share them. While institutionalization of FF, which is currently limited to a fixed definition of the practice set by Green Deal Voedselbossen, reduces misinformation and promotes legitimacy of FF in the eyes of government and private actors, it also excludes practitioners who do not adhere to the definition, which some participants describe as "pretentious" or "elitist." Interactions between practitioners and infrastructure, such as laws and regulations and financial opportunities, have resulted in both productive collaborations and frustration. Bureaucratic categories impose limitations on FF, although these conditions have changed in certain provinces and municipalities. This illustrates that infrastructure cannot be reduced to bureaucracy: political will and agency of civil servants, bank managers, and practitioners affect the trajectory of infrastructural circumstances. This corroborates Wiek and Albrecht's (2021) argument about the importance of FF practitioner entrepreneurial skills for effecting favorable changes.

The use of AT as a lens to study FF in the Netherlands has yielded a nuanced overview of the FF landscape, vital to conceive a better understanding of the phenomenon. While food forests are heterogeneous, a significant common denominator is their multifunctionality. AT has also illuminated the complex nature of emergent properties resulting from interactions between the different segments, and it has pointed towards relations of dominance and difference which support or challenge these emergent properties. While this study focuses on practitioners and their experience, an AT approach also sets the stage for a focus on the more-than-human, such as technology or trees.

Moreover, AT emphasizes the relativity of scale, important in the case of FF. For this study, a national scale was maintained to examine the parameters of the FF whole in the Netherlands. Social wholes, however, are always a component of a larger assemblage, as they are composed of segments which are assemblages themselves. This applies to the FF practice, which is highly influenced by the permaculture movement (Mollison & Holmgren, 1978) and forest gardens (Crawford, 2010), which originate outside of the Netherlands. FF can thus be seen as a segment of a larger, supranational assemblage, as well as in themselves assemblages, consisting of practitioners, trees, materials, tools, and so forth. A further exploration of FF through AT, focusing on different scales or other socio-geographic locations could result in a more complete picture.

Several questions arose during this study suggesting limitations to be addressed in future research on FF. While AT has been useful to describe practitioners' current strategies and challenges regarding infrastructure, it has not led to insights about underlying power dynamics between practitioners and infrastructural actors. Research at the level of particular food forests is necessary to examine these. The extent to which practitioners are empowered or could be empowered to alter existing dynamics is another question to explore. And while this study has identified many segments of content and expression (e.g., food forests, infrastructure, events, and consumers), research at a smaller scale is needed on how food forests are incorporated into the daily lives of individuals, such as consumers. Future research could also investigate the specific activities in which practitioners engage, as well as the strategies practitioners employ to maintain and advance their food forests.

While this study has not provided scientific evidence for the scalability and productivity of FF as called for by participants and the guidance committee alike, it has taken a first step in understanding what this evidence could entail. Understanding scalability and productivity requires focus on (diverse) economic practices in production-oriented food forests with a for-profit business model, and implies a positivist approach to studying the parameters of FF. However, due to the heterogeneity of food forests in the Netherlands, and

with few food forests having reached their climax ecosystems, few generalizations can be made. Therefore, there is a discrepancy between the type of evidence practitioners want and the type of data that can be generated. This study has attempted to start bridging this gap, an attempt that will have to be continued in future research. Research can include rich descriptions and thorough understandings of different types of food forests, in terms of size, age, and orientation. In other words, a focus on the particular, rather than the generic, might best demonstrate the potential of food forests. 

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References

Albrecht, S., & Wiek, A. (2020). Food forests: Their services and sustainability. *Journal of Agriculture, Food Systems, and Community Development, 10*(3), 91–105. https://doi.org/10.5304/jafscd.2021.103.014

Albrecht, S., & Wiek, A. (2021). Implementing sustainable food forests: Extracting success factors through a cross-case comparison. *Journal of Agriculture, Food Systems, and Community Development, 11*(1), 183–200. https://doi.org/10.5304/jafscd.2021.111.019

Anderson, B. (2014). *Encountering affect: Capacities, apparatuses, conditions.* Routledge.

Björklund, J., Eksvärd, K., & Schaffer, C. (2019). Exploring the potential of edible forest gardens: Experiences from a participatory action research project in Sweden. *Agroforestry Systems, 93,* 1107–1118. https://doi.org/10.1007/s10457-018-0208-8

BNNVARA, (2021, December 20). *Bereikcijfers radio/podcast 2021* [*Radio/podcast reach figures 2021*].

Brondizio, E., Díaz, S., Settele, J., & Ngo, H. T. (Eds.) (2019). *Global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (Version 1).* Zenodo. https://doi.org/10.5281/zenodo.3831673

Cameron, J., & Hicks, J. (2013). Performative research for a climate politics of hope: Rethinking geographic scale, "impact" scale, and markets. *Antipode, 46*(1), 53–71. https://doi.org/10.1111/anti.12035

Crawford, M. (2010). *Creating a forest garden: Working with nature to grow edible crops.* Green Books.

Creswell, J. W. (2013). *Qualitative inquiry and research design: Choosing among five approaches* (3rd ed.). Sage.

DeLanda, M. (2016). *Assemblage theory*. Edinburgh University Press. https://doi.org/10.1515/9781474413640

Deleuze, G., & Guattari, F. (1987). *A thousand plateaus: Capitalism and schizophrenia* (B. Massumi, Trans.). University of Minnesota Press. (Original work published 1980).

Dorp, D. van, & Stobbelaar, D. J. (2020). Voedselbossen: Een landbouwsysteem met veel potentie [Food forests: An agricultural system with great potential]. *Landschap, 1,* 5–9. https://www.landschap.nl/mp-content/uploads/2020-1_Voedselbossen.pdf

Gabriel, N., & Sarmiento, E. (2020). On power and the uses of genealogy for building community economies. In J. K. Gibson-Graham & K. Dombroski (Eds.), *The handbook of diverse economies* (pp. 411–418). Edward Elger. https://doi.org/10.4337/9781788119962.00058

Green Deal Voedselbossen. (2017a). *C-219 Green deal voedselbossen* [*C-219 Green deal food forests*]. https://www.greendeals.nl/sites/default/files/downloads/GD219-dealtekst-Voedselbossen.pdf

Green Deal Voedselbossen. (2017b). *Nationaal monitoringsprogramma voedselbossen (NMVB)* [*National food forest monitoring program (NMVB)*]. https://www.greendealvoedselbossen.nl/nationaal-monitoringsprogramma-voedselbossen-nmvb/

Green Deal Voedselbossen. (2017c). *Over de Green Deal* [*About the Green Deal*]. https://www.greendealvoedselbossen.nl/over-de-green-deal/

Green Deal Voedselbossen. (2020). *Factsheet voedselbossen: Voor provincie, gemeente en waterschap* [*Food forests fact sheet: For provinces, municipalities and water boards*]. https://greendealvoedselbossen.nl/wp-content/uploads/2020/10/Factsheet-Voedselbossen_2020.pdf

Green Deal Voedselbossen. (2021). *Handleiding wet- en regelgeving voedselbossen* [*Manual on legislation and regulations for food forests*]. https://greendealvoedselbossen.nl/handleiding-wet-en-regelgeving-voor-voedselbossen/

Kindon, S., Pain, R., & Kesby, M. (Eds.) (2007). *Participatory action research approaches and methods: Connecting people, participation and place.* Routledge. https://doi.org/10.4324/9780203933671

Kumar, B. M., & Nair, P. K. R. (2004). The enigma of tropical homegardens. In P. K. R. Nair, M. R. Rao, & L. E. Buck (Eds.), *New vistas in agroforestry* (*Advances in agroforestry*, *vol. 1*), (pp. 135–152). Springer. https://doi.org/10.1007/978-94-017-2424-1_10

Mollison, B., & Holmgren, D. (1978). *Permaculture one: A perennial agricultural system for human settlements*. Tagari Publications.

Omroep Flevoland. (2022, October 9). *Floriade trok in totaal 685.189 bezoekers* [*Floriade attracted a total of 685,189 visitors*] [News article]. https://www.omroepflevoland.nl/nieuws/304720/floriade-trok-in-totaal-685-189-bezoekers

Park, H., & Higgs, E. (2018). A criteria and indicators monitoring framework for food forestry embedded in the principles of ecological restoration. *Environmental Monitoring and Assessment, 190*, Article 113. https://doi.org/10.1007/s10661-018-6494-9

Park, H., Turner, N., & Higgs, E. (2017). Exploring the potential of food forestry to assist in ecological restoration in North America and beyond. *Restoration Ecology, 26*(2), 284–293. https://doi.org/10.1111/rec.12576

Riolo, F. (2019). The social and environmental value of public urban food forests: The case study of the Picasso Food Forest in Parma, Italy. *Urban Forestry & Urban Greening, 45*, Article 126225. https://doi.org/10.1016/j.ufug.2018.10.002

Roelvink, G. (2020). Affect and subjectivity: Learning to be affected in diverse economies scholarship. In J. K. Gibson-Graham & K. Dombroski (Eds.), *The handbook of diverse economies*, (pp. 428–435). Edward Elgar. https://doi.org/10.4337/9781788119962.00060

Roodhof, A. M., & Veen, E. J. (2021). Finding quality in quantitative methods: The case of food forestry in the Netherlands. *Urban Agriculture & Regional Food Systems, 7*(1), e20024. https://doi.org/10.1002/uar2.20024

Sarmiento, E. (2020). Field methods for assemblage analysis: Tracing relations between difference and dominance. In J. K. Gibson-Graham & K. Dombroski (Eds.), *The handbook of diverse economies* (pp. 486–492). Edward Elgar. https://doi.org/10.4337/9781788119962.00067

Stichting Voedselbosbouw. (n. d.). *Stichting Voedselbosbouw* [*Food Forestry Foundation*]. https://www.voedselbosbouw.org/de-stichting-link/de-stichting/

Voedsel uit het Bos. (n. d.). *Over dit platform* [*About this platform*]. https://voedseluithetbos.nl/en/over-dit-platform/

Wiek, A., & Albrecht, S. (2021). Almost there: On the importance of a comprehensive entrepreneurial ecosystem for developing sustainable urban food forest enterprises. *Urban Agroforestry & Regional Food Systems, 7*(1), Article e20025. https://doi.org/10.1002/uar2.20025