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Virginia independent food retailer perceptions of their role in planetary health promotion

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Abstract

Healthy food retail initiatives have been common approaches to promote nutrition security in the U.S.; however, they have under-emphasized planetary health promotion, despite the close connections of healthy earth systems to ensuring nutrition security. The purpose of this study was to explore the perceptions of independent food retail owners and managers about their role in planetary health promotion, identify potential planetary health promotion practices, and describe barriers and facilita-

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tors to implementation. Twelve semi-structured interviews, informed by the Consolidated Framework for Implementation Research (CFIR) 2.0, were conducted with independent groceries, cooperatives, and on-farm store members of Virginia Fresh Match, a statewide fruit and vegetable incentive food retailer network. Descriptive inductive codes and *a priori* barrier and facilitator codes from CFIR constructs were used by two independent coders to describe and categorize the data. Results showed that retailers had a range of interest in planetary health promotion, with cooperatives including planetary health in all business decisions, farm stores primarily focusing on agricultural practices, and grocers most interested in those practices that aligned with profit potential and customer expectations. Among all retailers, amenability to planetary health practices varied by community context. Planetary health practices included: agricultural practices of suppliers, bulk offerings, energy usage, food miles, local foods, animal source protein reduction, and waste reduction. Profit potential and alignment with customer expectations were the most important consideration for retailers to implement any planetary health practice and were barriers and facilitators depending on practice and community context. Partnerships and other external supports were identified as facilitators for planetary health promotion. The results can inform future research that investigates differences in retailer-preferred practices across contexts, explorations of how to frame planetary health messages to align with customer expectations, and tailoring of implementation strategies.

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Keywords

healthy food retail, planetary health promotion, food retailers, agents of change

Introduction

Nutrition security in the U.S. involves the accessibility, availability, and affordability of foods that support high-quality diets and optimal health across all segments of the population (Mozaffarian et al., 2021; Seligman et al., 2023; Thorndike et al., 2022; Tucker et al., 2024). Current definitions of nutrition security exclude planetary health, defined as the vitality of the natural systems on which humans depend for survival (Whitmee et al., 2015). Planetary health and nutrition security are intertwined, as food systems contribute significantly to planetary health outcomes, and nutrition security across populations requires healthy and resilient natural systems (Swinburn et al., 2019; Webb et al., 2020; Willett et al., 2019). There is an urgent need to address planetary health promotion in food systems to support positive concurrent public and planetary health outcomes (Shah & Merlo, 2023; Webb et al., 2020; Zurek et al., 2022). Nevertheless, planetary health considerations are excluded from most nutrition security conceptualizations in the U.S., a meta-ethnography noting that only one of 58 qualitative studies used to inform a nutrition security framework explicitly addressed planetary health promotion (Faul et al., 2025).

Healthy food retail is a type of initiative that uses policy, systems, and environmental change strategies to promote nutrition security, and that is often implemented in independently owned food businesses (Fergus et al., 2021; Jilcott Pitts et al., 2021; Karpyn et al., 2020; Minkler et al., 2019). In the U.S., healthy food retail emphasizes five components of the food environment: affordability, availability, quality, convenience, and promotion, while a sixth component, the planetary health impacts associated with foods from land to landfill—or farm to fork—are under-emphasized in current efforts (Falbe et al., 2024; Hearst et al., 2021; Hecht et al., 2020; Kao et al., 2023; Pinard et al., 2016; Sutton et al., 2019), although food retail practices contribute to planetary health outcomes (Winkler et al., 2020). Because of the connections between nutrition security and planetary health

promotion, adapted programming that is designed to improve outcomes for people and the planet could be delivered through existing public health infrastructure, but the under-emphasis on planetary health promotion in current U.S. healthy food retail programming means that the perspectives of key actors, practices, and resources needed to integrate planetary health promotion into existing initiatives are poorly understood.

Owners and managers of food retail sites (hereafter referred to as retailers) are key decision-makers and agents of change within independent food retail settings, and their perspectives are critical to inform healthy food retail programs, including identifying barriers and facilitators to implementation (Andreyeva et al., 2011; Bahl Szczepaniak et al., 2022; Boys et al., 2021; Gittelsohn et al., 2014; Haynes-Maslow et al., 2018; Houghtaling et al., 2019, 2020; Martinez et al., 2018; McDaniel et al., 2018; Meza et al., 2021). Independent food retailers often have more autonomy regarding store layout, stocking patterns, marketing, and other business practices than stores with corporate ownership (Houghtaling et al., 2019; Martinez et al., 2018; Pinard et al., 2016). While all food retail ownership models contribute to planetary health outcomes (Winkler et al., 2020), independent food retailers are an appropriate sample for exploratory research on new initiatives because their decision-making can be more aligned with community and owner or manager priorities, and understanding decision-maker perspectives can inform healthy food retail practice. Given that the primary goal of an independent food retailer is to generate profit, prioritizing the perspective of decision-makers within the business is critical to understand how planetary health promotion strategies could be integrated to support both public and planetary health and profit potential. Addressing planetary health through healthy food retail could be an opportunity to leverage existing program infrastructure to support the built and the natural environment determinants of nutrition security, but the perspectives of U.S. independent food retailers on planetary health promotion has not been explored.

Informed by contextual inquiry, implementation science is the study of how to translate evidence-based innovations into practice in a range of contexts and its use supports more efficient research to practice translation for public health promotion (Bauer et al., 2015; Davis & Beidas, 2021; Eccles & Mittman, 2006; Shelton et al., 2020). Implementation strategies are techniques that improve the adoption, uptake, and scaling of evidence-based practices across settings, and may include, for example, technical assistance, leveraging partner organizations, facilitating peer learning, and provision of resources (Balis et al., 2024; Leeman et al., 2017; Powell et al., 2015). Expanded application of implementation science to healthy food retail has been recommended to inform transfer of innovative practices and tailoring of implementation strategies for the range of situations in which healthy food retail programs operate (Houghtaling et al., 2023). Contextual factors like community setting, store size, and ownership structure influence the design and implementation of healthy food retail interventions (Gupta et al., 2022; Rushakoff et al., 2017; Sanchez-Flack et al., 2021; Thatcher et al., 2017), and applying implementation science to exploratory research can help categorize contextual factors with standardized language, so that interventions can be designed with consideration for key barriers and facilitators.

The purpose of this study was to explore the perceptions of independent food retailers about their role in planetary health promotion. A secondary purpose was to identify barriers and facilitators to implementing planetary health promotion practices, using an implementation science approach. This information can be used to inform expanded research and practice of healthy food retail to include planetary health promotion.

Methods

The exploratory study used principles of community engaged research and qualitative inquiry.

Approach

This study was a collaboration between academic researchers and Virginia Fresh Match (Fresh Match), a statewide network of Supplemental Nutrition Assistance Program (SNAP)-authorized food retail sites, including groceries, on-farm stores, and food cooperatives, that offer produce

point of purchase incentives. At the time of data collection, Fresh Match had 15 grocery, farm store, and cooperative members that were the participant population for this study. Fresh Match was interested in expanding membership and technical assistance among these brick-and-mortar sites, and the author team, which included the director of operations for Fresh Match, collaborated to ensure utility of the project to inform Fresh Match programming. This study was deemed an evaluation and 'not research by the Virginia Tech Institutional Review Board (#23-1306) in December 2023. The principles of template analysis, a type of codebook-based descriptive analysis, were applied in this stud, to capture the *a priori* implementation constructs and an inductive description of the data (Brooks et al., 2015; King, 2012). Researchers drew on a realist approach for data collection and analysis (Wiltshire & Ronkainen, 2021).

Positionality

The first author, a White female with advanced degrees, had no relationship with Fresh Match prior to the conceptualization of this study. The senior author had collaborated with Fresh Match on a range of projects for more than eight years and facilitated the connection between the first author and Fresh Match during study conceptualization and design. All authors lived in areas where they could access one or more Fresh Match retail locations as a customer.

Instrumentation

In consultation with Fresh Match leadership, MD developed a semi-structured interview guide with six questions. Questions addressed retailer perceptions of their role, potential planetary health promotion practices, and barriers and facilitators to implementing practices. The Consolidated Framework for Implementation Research 2.0 (CFIR) (Damschroder et al., 2022), an implementation determinants framework, was used to develop the interview guide in tandem with a conceptual framework for a healthy food retail environment (John et al., 2023). Constructs within two CFIR domains, inner and outer settings (inner setting signifies the domain in which implementation specifically takes place, the outer setting is the overall domain in which the inner setting exists; Damschroder et al., 2022, p. 5), were used as probing questions to collect additional information about contextual factors that were barriers and facilitators to planetary health promotion. Probes for example planetary health promotion practices were derived from the Business Impact Assessment-Sustainability (BIA-Sustainability) indicators (Mackay et al., 2022), a list of planetary health domains that are directly actionable by food retailers. Potential practice probes spanned the BIA-Sustainability domains of packaging, greenhouse gas emissions, energy use, food loss and waste, animal-source foods, and relationships with other organizations (Mackay et al., 2022). Retailers were asked to define planetary health and describe practices; the interviewer provided example practices, if needed, from BIA-Sustainability indicators to help the retailer define planetary health. A pilot test of an early version of the guide was conducted with a Fresh Match retailer who was not part of the final study sample. Following the pilot test and in consultation with Fresh Match leadership, additional questions on resources required to implement planetary health promotion practices were added to the guide. Two authors with experience in healthy food retail research and practice reviewed the guide. MD conducted a mock interview to test flow and readability, after which small changes to question wording and order were made. Table 1 displays the primary six questions included in the final interview guide.

During the interview, retailers were asked to provide their age, race, gender, and how long they had worked in their current position. Rurality of retail locations were classified according to the 2023 Rural-Urban Continuum Codes (U.S. Department of Agriculture Economic Research Service [USDA ERS], 2023).

Participants and Recruitment

The director of operations for Fresh Match sent email invitations to 15 member groceries, on-farm stores, and cooperatives in April 2024, with instructions to contact MD for scheduling an interview. The "warm handoff" recruitment strategy, with initial contact made by a familiar person, was recommended by Fresh Match leadership to maximize retailer response. Twelve member retailers

Table 1. Semi-Structured Interview Guide Questions to Explore Independent Food Retailer Perceptions of Their Role in Planetary Health Promotion

Topic	Question
Retailer Role in Planetary Health Promotion	What do you consider the role of your store to be in your community?
	When I say the words "planetary health," what does that mean to you?
Planetary Health Promotion Practices	How do your store and business practices influence planetary health, as you just defined it?
	If you were going to make changes in your store to support planetary health, what would they be?
Barriers and Facilitators	Let's discuss some of the factors that might influence how easy or difficult it would be to make the change you just stated.
	What support do you need to make [x change]?

completed interviews and received a US$20 gift card for their time. The three retailers who did not participate cited a lack of time. As the purpose of the study was to inform programming for Fresh Match, no recruitment of food retailers outside Fresh Match membership was conducted. Other interview- based exploratory healthy food retail studies have used data from less than twenty interviews to draw preliminary conclusions on a novel topic (Bahl Szczepaniak et al., 2022; McDaniel et al., 2018; Nussbaumer et al., 2019).

MD conducted interviews via Zoom (n = 9) and phone (n = 3) according to retailer preference and schedule. Interviews lasted between 18 and 58 minutes and were recorded and auto-transcribed by Zoom. Immediately following interviews, MD prepared a summary, noting significant takeaways and points of emphasis from each retailer.

Data Analysis

A codebook was developed to include *a priori* codes from the inner and outer settings of the CFIR and descriptive, inductive codes from the interview data. The inner and outer settings of the CFIR were selected to form a preliminary understanding of how the food retail environment and community context may influence the eventual implementation of a range of planetary health promotion practices (innovations). Following CFIR guidance, the CFIR inner setting was defined as the in-store food retail environment, with factors external to this organizational setting, the community where the store is located and the broader U.S. food system, were defined as the outer setting. Each inner and outer setting construct of the CFIR was described with language for food retail settings and used as an *a priori* code (Appendix A). Inductive descriptive codes were developed in an iterative process between two authors using three transcripts that represented the data (Brooks et al., 2015). Authors met to refine the codes until consensus was reached for six descriptive codes (Appendix A).

The coding was completed in NVivo 15. Two authors (MD and VO) independently coded each of the twelve transcripts and met four times to discuss alignment, refining the codebook at each meeting through discussion. Some data were coded to multiple constructs, representing the interconnected and overlapping factors that influence implementation in community settings. Following coding completion, MD sorted the *a priori* and descriptive CFIR codes into categories for reporting the most prominent results, following recommendations for template analysis (King, 2012). The categories are combinations of the CFIR construct codes and inductive descriptive codes. One inductive descriptive code (planetary health practices) aligned with the CFIR domain of innovation, "the thing being implemented" (Damschroder et al., 2022, p. 5). Several CFIR constructs from the inner and outer domains (Appendix A) had no applicable data and were not included in the results. The results are presented in the order in which interview questions were asked, with a description of each retailer's definition of planetary health promo-

tion and examples of practices provided first, followed by a description of barriers and facilitators, presented in order of prominence.

Results

Twelve retailers, representing three cooperatives, three on-farm stores, and six groceries participated in semi-structured interviews. Retailer participants were five females and seven males between the ages of 25 and 69. Retailers identified as White (n = 8), Black (n = 1), and Native American (n = 1). Two retailers did not identify their race. Participants had been in their current positions from 18 months to 27 years. Retailers operated in metro (n = 9), nonmetro (n = 2), and rural (n = 1) regions.

Definition of Planetary Health (CFIR Innovation Domain)

Grocers defined planetary health at various levels of detail, from descriptions like "organic, eco-friendly, something along those lines" (Grocer) to more specific statements that included goals for decreasing pollution and use of chemicals and plastics. The farm store participants had a range of planetary health definitions; one retailer said "health for all life on earth," one specified access to nutritious food across social and economic segments of the population, and one described their agricultural practices: "We feel organic if you want it, if you want to call it that, we don't use any chemicals. Everything that we have is healthy. We offer all natural products" (Farm). All cooperative participants described planetary health promotion as a core component of their store's mission:

> Planetary health is everything from the health of all the ecosystems … not just the earth, but also the people, microbes, animals, and plants, and the whole ecosystem … being good stewards to all of those things. … Planetary health means recognizing that all of those things, including us, are interconnected. (Cooperative)

Planetary Health Promotion Practices (CFIR Innovation Domain)

Planetary health promotion practices were identified across seven categories: agricultural practices of suppliers, bulk offerings, energy use, food miles, animal-source protein reduction, local foods, and waste reduction. Retailers identified practices currently implemented and the considerations for practices they might be willing to implement in the future. There was general interest in these practices among retailers, with variations by store type and locality (Appendix A). Cooperatives and grocers recognized the impact that agricultural practices of suppliers have on planetary health and were interested in procuring from suppliers that used environmental stewardship practices or were local to the retail store. Farm stores focused on their own agricultural practices and the potential to reduce single-use packaging.

Improving energy efficiency and sources and reducing food miles were the practices of most interest among all the retailers interviewed. Cooperatives, grocers, and farm stores discussed food miles in terms of local procurement and with consideration to consumer access, sharing that a rural store location or offering produce in bulk decreases the distance and frequency that consumers must travel to obtain groceries. Retailers presumed that bulk produce offerings decreased the number of shopping trips that a consumer would need. Cooperatives had implemented bulk food offerings, and grocers were interested in expanding this practice. Across all store formats, food waste reduction was perceived as important for planetary health promotion, retailers stating that they implemented many practices to sell food and divert potential waste from landfills. Cooperatives and farm stores highlighted the dual financial and planetary health benefits of avoiding landfills. Cooperatives, grocers, and farm stores stated that there was little more they could do to reduce food waste in their business, and that their current practices were sufficient. Cooperatives and grocers shared how they reduced non-food waste through recycling systems or use of suppliers with less single-use packaging, but that cost was a common barrier to expanding these practices.

When asked about animal and plant proteins, cooperatives and grocers perceived plant-based foods to be novel plant-based protein alternatives, but grocers did not perceive a customer demand for those products. Grocers stated they would

stock more plant-based protein alternatives if there were sufficient customer demand. Cooperatives stocked a robust selection of plant-based protein alternatives. Grocers and cooperatives stated that their store layout promoted plant foods like fruits and vegetables, and that they would consider using shelf-stable plant foods (e.g., dry beans) on endcap displays; however, amenability to this practice varied by community context, with rural retailers less willing to consider this practice.

In Table 2, we present general implementation considerations that span multiple planetary health promotion practices in independent food retail settings identified in this study.

Table 2. Prominent Implementation Factors for Planetary Health Promotion in Independent Food Retail Settings and Retailer Perceptions of Factors as Barriers or Facilitators

Implementation Factor(s)	CFIR Construct(s) Aligned with Implementation Factor	Noted as a Barrier	Noted as a Facilitator	Recommended Implementation Strategy for Future Tailored Definitions and Development Research
CFIR Inner Setting: Food Retail Store				
Cost	Available resources	• Low profit margins in food retail and high initial investment for many practices • Purchasing from producers that are local and/or use environmental stewardship practices is often more expensive • Hesitation to pass on initial cost of planetary health investments to consumers	• Tax incentives for energy system improvements • Planetary health promotion is a long-term investment in the health of the community, with the perceived value of the investment also related to local attitudes • External funding for special projects	• Providing resources • Leveraging funding sources • Tailoring recruitment strategies
Time resources and compatibility	Compatibility, available resources, relative priority	• New practices may require staff training or adjusting workflows • Evaluating procurement options and planetary health partnerships can be time-burdensome or technically difficult	• Partners providing consumer education or marketing materials would decrease time burden on retailer • Bulk products can lessen labor hours for packing and unpacking	• Providing resources • Providing technical assistance
CFIR Outer Setting: Community Context				
Customer expectations and satisfaction (local attitudes)	Local Attitudes	• Consumers are motivated by cost	• Independent food retailers have some agility to respond to customer requests • Store infrastructure upgrades have been well-received by customers in the past	• Choosing strategic partner organizations • Engaging partners
Local attitudes and conditions	Local attitudes and conditions	• Planetary health promotion not perceived as a priority for consumers or as culturally inappropriate	• Consumers are proud of hometown store, want to support an independent business and efforts to keep dollars local • Local infrastructure supports planetary health promotion through policies and programs	• Choosing strategic partner organizations • Engaging partners • Tailoring recruitment strategies

Mission Alignment and Relative Priority (CFIR Inner Setting)

Food cooperatives shared that planetary health promotion was integral to their store goals, and described ongoing initiatives, including energy efficiency upgrades, bulk product offerings, and elimination of single-use bags. Grocery retailers gave examples of energy efficiency projects, food waste reduction, and purchasing goals that promote planetary health. One cooperative described how planetary health is prioritized in decision making:

> One of our core values is sustainability and we strive to center that in all our decisions. It's not just something on the side. … Our store does a lot in terms of sustainability, and it's something that's never completed. It's something we can always improve in every aspect of our co-op.

Grocery and farm store participants were amenable to planetary health practices if the practices supported profitability and customer expectations. For example, when asked how easy or difficult it would be to eliminate single-use paper or plastic bags at checkout, one retailer explained that while there was interest in eliminating bags, they were concerned about how the action would influence customer perceptions of the store:

> I think [it would] affect the customer more than it would affect me. We don't charge for bags, but it is a huge expense, so I wouldn't mind seeing some kind of change there. We're paying about three to five cents per bag right now, so you figure customers get five to ten bags, that adds up … but there's a lot of customers that don't want paper bags… (Grocer)

Issue and Message Framing (Inductive Descriptive)

Retailers often framed their amenability or averseness to practices as based on economic considerations or through the lens of expected customer priorities. For example, retailers had high interest in improving their energy efficiency across store format and local conditions because of the perceived cost savings or tax credits. One grocer explained: *"*We're trying to increase our efficiency and reduce our electrical usage. It's both a financial and social decision.*"* Cooperatives stocked a range of plant-based food products, and grocers were willing to consider increasing them if they perceived customer demand.

Retailers discussed their in-store or social media communication strategies (i.e. shelf tags, in-store signage, cashier communication) they currently used or would consider using to inform their customers about planetary health promotion. While retailers were amenable to using these techniques to share information about planetary health with customers, they emphasized that customers would likely be more interested in potential cost-saving, local economic stimulus, or nutrition and personal health as co-benefits of planetary health promotion. Other retailers discussed the importance of the local natural environment, with one retailer framing planetary health promotion practices as a protection for natural resources located in the community:

> One of the primary things, take care of our bees. Take care of our properties. When it comes to planetary health, I honestly think that [region] has, other than our coal mining indus
>
> try, they got it pretty close to being nailed when it comes to taking care of the ground because that grows our foods … even property around the house, where you're growing your garden. … I think people here are more careful most of the time with their land, because they know. Hey, I can't pour this out, or that out because it's going to destroy the property, and I won't be able to grow anything there, if the ground is hurt. (Grocer)

Partnerships and Connections (CFIR Outer Setting)

Retailers discussed how their existing relationships could influence their capacity to implement planetary health promotion practices. Grocers and food cooperatives were amenable to business connections for procurement from suppliers with agricultural practices that supported planetary health. Across all store formats, retailers were interested in technical assistance for identifying external funding

and assessing trade-offs for planetary health promotion practices. Retailers stated their uncertainty about best practices for planetary health promotion and asked for external guidance, while emphasizing that existing barriers may still limit action:

> I've tried reaching out to different package-free businesses … and just asking them for guidance … if there is some model to follow or some resource for doing that kind of thing, I would love to know about it, but I don't know of any. It feels like everything we've done so far … [is] just making [it] up as we go. … We did have support from one local retailer … [who] went through our store, and gave us suggestions, and all of their inventory sheets before we opened, and all of their wholesalers, and made some good suggestions for what sells the best. … My original vision was to be zero waste, but it evolved. … Maybe we could get to be a completely package-free store. That would take a lot more work. It's hard to know whether that would be profitable. (Grocer)

Retailers described multiple opportunities for partners to support their efforts, with high levels of interest for consumer education efforts, grant acquisition, and marketing. Implementation strategy assistance that required minimal input from the retailer was preferred, and retailers emphasized that any effort must promote profit opportunities:

> We've talked about it, doing all those things, but it's really, it would just be better if somebody else did it. And they can use the space to do whatever. We're more interested in just if it can drive traffic and if it could have a positive outcome for everybody that would be good. … If you guys have like a demo team … (Grocer)

Available Resources and Financing (CFIR Inner and Outer Setting)

Retailers were interested in expanding planetary health promotion practices, but cost was a prominent barrier: *"*Money. Money. That's legitimately. That's the thing*"* (Grocer). Retailers emphasized the economic benefits of reducing food waste, installing more efficient energy systems and reducing packaging in their supply chain.

> Recognizing that grocery retail operates with low profit margins, retailers were interested in funding sources for special projects, such as self-serve bulk bins. Several retailers shared examples of previous grant-funded projects and stated an interest in future external opportunities. Additional, specific resources that retailers stated would support planetary health promotion included electronic shelf tags, community event spaces, and partnership coordinators.

Local Attitudes (CFIR Outer Setting)

Retailers described their perceptions of how community members and store shoppers made food decisions and how local attitudes could influence planetary health promotion efforts in the retail setting. The perceived priorities of each community varied, as retailer participants operated in a range of socio-cultural contexts. Some planetary health practices were more aligned with local attitudes in certain contexts. Many retailers perceived selling organic foods to be a planetary health promotion practice and one grocer discussed how local attitudes about organic foods influenced their stocking decisions:

> If I put the word "organic" on it anywhere, it will rot before it sells off that shelf. They refuse. I don't care if it's produce, if it's organic cereals, anything, you can take something that isn't organic, and put the word organic on it, and they still will not buy it. (Grocer)

However, another retailer shared that when they first opened their business, they did not label organic food, believing that their customer base was uninterested. The retailer later discovered that customers were interested in organic food, and started labeling products as such. Nuances of planetary health promotion practices and the difficulty of understanding impacts in order to make business decisions were explained by this retailer:

> But then around, organic produce pesticides, those kinds of things. I would say people are aware of it, but they are not interested in it, or willing to pay for the price of it, particularly our low-income folks are not willing to pay that price. … And we try to get organic produce … customers are like, oh, we want this organic, it's better. Well, that organic produce is from the Baja Coast of Mexico, while, we have noncertified organic, no spray produce that is, from like three miles away. There's a weird disconnect around larger system thinking. I would like to start carrying more organic but I wouldn't want to be organic from the Baja Coast. (Grocer)

Depending on the practice, local attitudes were described as either a barrier or a facilitator to implementation. One retailer, who used Facebook to ask customers to bring plastic bags to the store in lieu of offering new single-use bags, described how local perceptions of the store bag policy was a facilitator, but that planetary health promotion was a secondary effect from this practice:

> Recycling the bags wasn't a move that I made for planetary purposes. … It was that people need to feel like their own hometown store. And that was one of the things that I thought, oh, everybody has bags at home. So yeah, everybody has been bringing in bags … their old grocery bags, and that works out great. (Grocer)

Another retailer, when asked about removing single-use plastic bags, described the local perception of that practice as a barrier:

> I couldn't imagine anyone really liking it. They're used to the plastic bag. They use them for other stuff. That's just the reality. At least right now. … It's another part, where it'd be nice, but, at least at this point, not practical … it's just business wise. (Grocer)

While several retailers stated that they had a personal interest in planetary health promotion, they did not perceive that their customers prioritized planetary health in their food purchasing practices and thus the retailers aligned their business to support customer preferences. Retailers dis\cussed the importance of demonstrating benefit to the local community of any new initiative:

> I think people would like it as long as it highlighted how it benefited this community. Not just, the overall earth … like to help the environmental health of this community. I think that's what people care about here. Local is a big factor, which I think is for the overall environment as well. (Grocer)

Local Conditions (CFIR Outer Setting)

Local conditions such as availability of suppliers, recycling infrastructure, social cohesion, and transportation options influenced retailers' capacity to participate in planetary health promotion. When discussing food waste reduction, several retailers explained that expired food was diverted from landfill because community members collect the food and use it for compost or feeding farm animals. Retailers recycled their non-food waste, but were limited by infrastructure that accepted only a limited number of materials or did not offer pickup services: *"*We recycle, of course. That did become a little more complicated because our town got rid of recycling. I have to drive the recycling myself to the recycle center, which is like a 10 min, 15 min journey*"* (Grocer).

Informal food access networks were a barrier for some retailers to stock locally produced items, but ultimately benefited consumers:

> These are really, really good people in this area. If you're a local farmer and you grow extra and you know somebody down the road is struggling. You go give it to them. You don't sell it to a grocery store. … But it's a barrier again, that I'm like I can't knock them for being good people. Try to take care of their neighbors. That's a blessing. … That's been a drastic barrier as far as trying to get locally grown produce in here, when they're busy giving it away. (Grocer)

Compatibility (CFIR Inner Setting)

Retailers stated that favorable planetary health practices would align with their current business systems and workflows. One retailer provided an example when discussing single-use plastic reduction:

> Last year, we used compostable packaging, but I will tell you frankly, that it was a lot of work because you had to heat seal, and the bags, because they are compostable, they are quite a bit lighter, so taking them to market, often, the seams would either break or something, so we're going to have to move away from that this year. We would love for there to be some better options. (Farm)

Grocery and cooperative retailers recognized the potential impact of their procurement decisions on planetary health and shared that they had high levels of autonomy in making purchasing decisions: "There's no procedure. We just buy from whoever we want to…It's a very quick decision. If we want to buy from someone we buy from them. If we don't, we don't*"* (Grocer). Despite store-level autonomy in purchasing decisions, retailers were constrained by price and volume misalignment between distributors, farmers, and small stores:

> Sometimes we don't have the size to get products from certain types of distributors, because it would be incredibly costly, the freight is either really expensive or you have to reach minimums that we might not be able to reach. In terms of local farmers, it really has to do with consistency. A lot of the farmers that we work with because they can consistently. … I think that there are smaller farmers that we may support, they just don't have the ability to grow the volume that we would need. (Cooperative)

Incentive Systems (CFIR Inner Setting)

Retailers discussed fruit and vegetable incentive systems as approaches to improving food access and nutrition security, but did not connect these existing incentive systems with planetary health promotion. The only mention of incentive systems for planetary health promotion was a retailer who described their glass milk bottle return program. While the retailer recognized the program's impact in reducing single-use packaging to promote planetary health, they described operational barriers to the program like customers returning dirty bottles or not returning bottles at all.

Structural Characteristics (CFIR Inner Setting)

Retailers discussed physical structures, such as displays and building components, that would influence their potential to promote planetary health. Farm stores stated that they could reduce single-use packaging by providing bulk bins of produce but were uncertain how to do so within food safety regulations. Among grocers and cooperatives, current practices included quick-sale racks at the front of the store, to encourage buying close-to-date foods, and large bins with food items in bulk. All retailers were interested in making physical improvements to increase energy efficiency, with cost as the most commonly cited barrier.

Policies and Laws (CFIR Outer Setting)

Retailers shared examples of regional or local government policies that affected their capacity to participate in planetary health promotion. Policies that would incentivize energy improvements, local food procurement, and recycling infrastructure installation were desired among retailers in all contexts. Retailers recognized that policy could be a mechanism to mitigate some of the cost barriers to implementing planetary health promotion, one retailer discussing solar panels: "One policy would be making [energy company] actually honor the tax credit for solar panels. We want to put them on our other two stores, but they are aggressively fighting that. … They are refusing to comply [with the tax credit]*"* (Grocer).

Discussion

Healthy food retail initiatives in the U.S. present an opportunity for increased focus on planetary health promotion. This is the first study to document owner and manager perceptions of planetary health promotion in U.S. independent food retail settings. This study provides initial evidence that planetary health promotion practices are possible and of

some interest for independent food retailers, if the practices align with retailer motivations for profit potential and if customer satisfaction and implementation support is available. The perceived role for planetary health promotion varied based on store format and community context. The main findings extend what is known from existing healthy food retail literature into planetary health topics (Adam & Jensen, 2016; Alsubhi et al., 2024; Blake et al., 2019; Gupta et al., 2022; Sanchez-Flack et al., 2021; Setiono et al., 2024).

Food cooperatives were the most interested in planetary health promotion among the 12 retailer participants and had already implemented many practices. Previous research suggests that cooperatives have a holistic view of community health promotion and their role in it, including human and planetary health promotion, (Dillahunt-Holloway, 2023; Hale & Carolan, 2018; Shariatmadary et al., 2023; Sumner et al., 2014) thus this study aligns with these results. Two food cooperative participants shared that they voluntarily reduced profit potential or contributed in-kind donations to support planetary health promotion. Cooperatives may be more willing to embrace planetary health promotion, and healthy food retail researchers and practitioners should consider these settings for future research and pilot initiatives. Working with food cooperatives also necessitates careful consideration of inclusivity and accessibility, due to perceptions that alternative food business models may not be designed for historically marginalized communities (Alkon et al., 2019; Clark et al., 2019; Johnston & Szabo, 2011). In the interviews, food cooperative owners and managers were aware that their stores may not seem accessible to consumers with limited financial resources, and stated that participation in fruit and vegetable incentive programs expanded their accessibility.

Among farm store participants, their role in planetary health promotion seemed to be primarily related to agricultural practices. This finding could represent an opportunity for healthy food retail researchers and practitioners to collaborate with agricultural experts in technical assistance partnerships. Cooperative Extension, a land-grant university-based system with practitioners in many U.S. communities, provides technical assistance and other implementation strategies for healthy food retail programs and is often a trusted partner among retailers (Bahl Szczepaniak et al., 2022; Boys et al., 2021; Powers, 2018; Stotz et al., 2023; University of Missouri Extension, 2023). Extension systems could consider cross-disciplinary work, because of the rich agricultural knowledge in the Extension system and its current focus on leveraging the system for public health promotion (Buys & Rennekamp, 2020; USDA National Institute of Food and Agriculture, 2025). Farm store interview participants were also interested in plastic reduction, but were uncertain of the tradeoffs the practice necessitates, particularly regarding cost and food safety concerns. Technical assistance could support farm stores with food safety education for bulk product offerings, and draw on the extensive food safety outreach and education capacity within the Extension system for farm and farm-adjacent retail settings (Rajagopal et al., 2016; Scheinberg et al., 2022; Shaw et al., 2015).

The 12 independent retailers interviewed shared examples of practices they have implemented or would like to implement because of their economic benefit. Initial and long-term costs and profit potential must be prioritized as researchers evaluate the trade-offs of economic benefit and planetary health impacts in implementing planetary health practices in food retail settings. A recommended best practice is for public health partners to use economic data to make a viable business case for new practices that retailers can implemented (Setiono et al., 2024). Those working in healthy food retail partnerships may consider discussing new planetary health practices in economic terms to align with retailer priorities. Framing planetary health promotion as an opportunity for economic gain is a long-recommended strategy to encourage buy-in among a range of groups (Nisbet, 2009; Spence & Pidgeon, 2010). The tailored framing of planetary health practices under economic considerations could be developed and named as the implementation strategy of tailored recruitment strategies (Balis et al., 2024), in which food retailers are the priority population.

Partners like Extension could play a role in alleviating barriers to implementing planetary health promotion practices, as implementation

strategies are needed for successful healthy food retail programs and multiple retailer-desired opportunities for support were identified in this study (Boys et al., 2021; Caspi et al., 2016; Greco et al., 2020; Rushakoff et al., 2017). Retailers were interested in low-input options like signage or social media messaging to promote planetary health, consistent with previous findings that practices requiring few retailer resources (e.g., shelf tags) are often favored by retailers for healthy food retail initiatives (Cameron et al., 2016; Karpyn et al., 2020). Additional opportunities for technical assistance were identified, including identification of and assistance with grant applications and partnership development. Our findings that retailers valued and were interested in partner support is an important foundation to inform future research on defining and tailoring implementation strategies, such as providing technical assistance, choosing strategic partner organizations, providing resources, leveraging funding sources, and engaging partners (Balis et al., 2024).

Community context (e.g. local attitudes and conditions) were key determinants of retailer interest and amenability to planetary health promotion, particularly among grocery participants. As retailer participants represented twelve different community contexts, and interviews were designed to identify key implementation determinants rather than explore determinants in detail, we provide only general recommendations and discussion on the role of community context in planetary health promotion for healthy food retail. Robust understanding of the context in which the store operates is crucial for successful programming, and our findings indicate that local understanding may be even more important for planetary health promotion, given the polarizing nature of the topic (Goldberg et al., 2021; Hornsey et al., 2018; Kellstedt et al., 2008; Sarathchandra & Haltinner, 2021; Scapin et al., 2024). Knowing the characteristics and attitudes of customers must be a foundational step in future work to integrate planetary health promotion into healthy food retail practices, reflecting existing research recommendations (Hecht et al., 2020; Scapin et al., 2024). Understanding the community context can inform appropriate issue and message framing to align planetary health promotion with the salient values and priorities of store customers (Fielding & Hornsey, 2016; Hurst & Stern, 2020; Wolsko et al., 2016), and would contribute to a robust implementation strategy of tailoring recruitment strategies to encourage participants in healthy food retail programming (Balis et al., 2024). Tailored message framing could potentially mitigate the perceived disinterest or confusion about planetary health promotion that retailer participants in this study described among their customers. An additional area of local attitudes and conditions to explore is consumer perspectives on planetary health, and desire or disinterest in accessing food stores that promote planetary health. Such inquiry would provide valuable information on consumer demand for planetary health promotion that could inform development of retail-level practices that align with customer expectations.

Retailers recognized policy, especially at the local level, as an important "outer setting" contextual factor for implementation of planetary health promotion practices, particularly to improve energy efficiency. Exploring policy options to support independent food retailers may be an enabling factor for a retailer to implement new practices, and would align with recommendations for healthy food retail research to work with local governments (Scapin et al., 2024). Although energy sources and energy efficiency are not within the scope of current healthy food retail programming, it is important to note that retailers were highly interested in improving their energy use practices to support planetary health. Policy options within healthy food retail for energy improvements could include prioritizing refrigeration systems with low global warming potential through infrastructure grants, as refrigeration is expensive for the retailer and a high emitter of greenhouse gases (Coulomb, 2021; Vuppaladadiyam et al., 2022). One area for future interdisciplinary research is to evaluate trade-offs of planetary health practices across key environmental indicators (e.g., greenhouse gas emissions, water use, land use, biodiversity) and social, economic, and public health considerations. Defining the practices that have the most impact on priority planetary health indicators is a much-needed evidence base to inform decision making

(Béné et al., 2019; Blackstone et al., 2024; Cattaneo et al., 2021; Mackay et al., 2022).

This was an exploratory study that included three food retail store formats in one U.S. state and that was focused on understanding general perceptions of independent food retailers for planetary health promotion. The planetary health promotion practices identified each has specific implementation considerations that need to be explored in depth, as the results of this study indicated that some practices, like food waste reduction, were more amenable among retailers than other practices, like animal-source protein reduction. The factors listed in Table 2 could inform future research assessing the trade-offs that are inherent in planetary health promotion, particularly in business settings, and are a starting point for future exploration of detailed barriers and facilitators and tailoring of implementation strategies across contexts. Recommended implementation strategies to further define and test are tailoring recruitment materials, leveraging funding sources, providing technical assistance and resources, and choosing strategic partner organizations and engaging potential partners (Balis et al., 2024)

Limitations

While conducting the interviews via Zoom and phone allowed for more flexibility in scheduling, multiple retailers had poor connections, however, and despite the interviewer's efforts asking for repeated answers, some information was likely lost. Several retailers had limited time available for an interview, and thus the interviewer had to be judicious when probing about specific practices; having to work within retailer's busy schedules is a common consideration in healthy food retail research (Ayala et al., 2017; Houghtaling et al., 2021; Zhang et al., 2024). Use of the term "planetary health" may have influenced how retailers described their perceived roles. The author team selected "planetary health" as the term they anticipated to be the least politicized for discussions regarding ahistoric shifts in weather patterns and natural systems, to mitigate potential bias among retailer responses. Terminology can influence stated perceptions and responses to probes (Feinberg & Willer, 2012; Hurst & Stern, 2020), and future research should explore the most appropriate terminology to use when discussing planetary health topics with food retailers. Retailers were asked to define planetary health, so results are skewed through the retailer perceptions of planetary health promotion, and robust exploration of known high-impact strategies for planetary health promotion in the food system (e.g., promoting plant food as a substitute for animal-based protein; Willett et al., 2019) did not occur in all interviews. Additional focused research is needed to understand how food retailers can operate using high-impact planetary health strategies, particularly support for plant-based diets. Future research should explore potential effects of social desirability bias on food retailer's reported planetary health practices.

Recommended Next Steps

The partnership with Fresh Match for this study provided a statewide sample of food retailers already engaged in nutrition security programming, and results can inform practice efforts within Virginia. To inform healthy food retail programming nationwide, larger studies with additional retailer perspectives are needed. Differences across store format and community context are of particular interest for future research, given their importance in these findings and previous recommendations for healthy food retail research (Hecht et al., 2020). Application of implementation science frameworks and compilations to explore contextual factors and implementation strategies should be prioritized in future efforts in order to facilitate transferability of findings across settings (Balis et al., 2024; Bauer et al., 2015; Houghtaling et al., 2023; Shelton et al., 2020).

This study identified a potential set of planetary health promotion practices for independent food retail settings. In addition to defining implementation strategies for planetary health in food retail, future studies could use existing resources for measuring feasibility and appropriateness to assess how a larger sample of food retailers might prioritize the practices identified in this study. Understanding the feasibility and appropriateness of planetary health promotion practices, coupled with assessments of the impact of practices on key planetary health indicators, is necessary to prioritize

practices that are realistic for implementation in independent food retail settings.

Conclusions

This study was informed by implementation science and used interviews with twelve independent food retailers located in Virginia to explore their perceptions of planetary health promotion and identify barriers and facilitators to planetary health promotion practices. Overall, the findings indicated that retailers could play a role in planetary health promotion, although retailer amenability to planetary health practices depended on alignment of practices with profit potential and customer expectations. Preferred practices varied by store format and community context and were influenced by customer expectations in these settings, thus highlighting the need to tailor implementation strategies and other program aspects. Results of the study align with and extend known considerations for healthy food retail research and practice into the previously unexplored topic of planetary health promotion in independent food retail settings. Implications of these results are that healthy food retail researchers and practitioners can leverage known best practices and infrastructure to work on designing expanded programming that includes planetary health promotion. As the first study to document U.S. independent food retailers' perceptions of their role in planetary health promotion, the results provide formative evidence for future research that investigates differences in retailer-preferred practices across store type and communities, explores message framing with healthy food retail partnerships, and defines and tailors recommended implementation strategies.

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Appendix A. Codebook and Supplemental Results

Table A1 presents methodological information and displays the *a priori* CFIR construct codes and descriptive code names and definitions that were developed in a collaborative process between two authors. Table A2 presents findings and displays the planetary health promotion practices that were identified across the interviews and implementation considerations that varied by store format and community context.

Table A1. A Priori CFIR Construct Codes and Descriptive Code Names, Definitions, and Illustrative Quotations for Semi-Structured Interview Data from Independent Food Retailers

***A Priori* Codes from Inner and Outer Setting Constructs from Consolidated Framework for Implementation Research (CFIR)**		
Name of Code	**Definition**	**Illustrative Quotation**
CFIR Outer Setting Constructs		
Critical Incidents	Large-scale and/or unanticipated events influence implementation and/or delivery of planetary health practices	No data
Local Attitudes	Sociocultural values (e.g., shared responsibility in helping to promote planetary health) and beliefs (e.g., convictions about the worthiness of planetary health) influence the community to support or not support implementation and/or delivery of planetary health practices	On one side of it, they're [customers] like, look here, I've got garden fresh tomatoes. I'll go home and make me a tomato sandwich. But then on the flip side of it, if you have organic tomatoes, for some reason, those are different. Those are not like any other tomato. Organic tomatoes, they get you sick, in their mind. I think there's kind of an attitude here, where it's like, we live in the country…what we do out here is not bad for the earth. What the city people do is bad. You know what I mean…Don't come up in here and tell us what to do. That kind of attitude.
Local Conditions	Economic, environmental, political, and/or technological conditions influence the community's desire to implement and/or deliver planetary health practices	We recycle, of course. That did become a little more complicated because our town got rid of recycling. So I have to drive the recycling myself to the recycle center, which is about like a 10 min, 15 min journey. To eliminate plastic bags … we would definitely have to increase our stock on reusable bags. We already sell them … maybe the county imposes a tax on plastic bags, for the customer, for the consumer. So that way, it's not looked at like bad, and I wouldn't lose customers over it, but you know we're all in it together.
Partnerships and Connections	The food retail store is networked with external entities, including referral networks, academic affiliations, and professional organization networks	Fifteen or 20 years ago those food co-ops got together and they created a national organization that they owned. It's like a co-OP of food co-ops, called the National Co-OP grocer. So [we are] part of that co-OP, we all own collectively, and they negotiate with producers, and suppliers for things that we can't buy locally … like cereal or soap, or you know, pasta, or whatever, they negotiate really good prices so to save money for the food co-ops nationally. For rural areas … our biggest challenge would be the driving. One of our other ideas was to try to figure out a way where many people up here in businesses, food businesses up here are driving down to Costco and then coming back like on the same day … sometimes you're behind them. It would be great if we could find a way to combine that

		into one vehicle that's doing these runs and coming back up. So that was one of the things we had thought of for a grant application.
Policies & Laws	Legislation, regulations, professional group guidelines and recommendations, or accreditation standards influence implementation and/or delivery of planetary health practices	As far as planetary health, we have difficulties dealing with our town, with incentives on power savings, because they buy the power from [power company] and are a reseller of it. So all of these opportunities that [power company] presents, we don't have access to, because there is a middleman. It's really hard with a lot of our products coming from not around here … we would actually like to buy local product, if you could get it at a decent price. Like if it was subsidized … you have to subsidize either the farmers or the wholesalers, because it doesn't make sense. … Fresh Match is kind of a headache for retailers and it's a headache for customers. But if you did it on the back end, and you pushed Virginia product…
Financing	Funding from external entities (e.g., grants, reimbursement) is available or not available to implement and/or deliver planetary health practices	It would be really great if we had some sort of grant that had something so we could bag produce, and it was, actually recyclable or reusable, obviously would be ideal.
External Pressure	External pressures drive or inhibit implementation and/or delivery of planetary health practices	No data
CFIR Inner Setting Constructs		
Structural Characteristics	Infrastructure components support functional performance of the food store. Including layout and configuration of space and materials; telecommunication, electronic documentation, point-of-sales systems, and data storage, management, reporting, and analysis; Organization of tasks and responsibilities within and between individuals and teams, and general staffing levels	We have a lot of vegan offerings throughout the store, a lot of organic offerings throughout the whole store. We have a separate vegan, plant-based meat … two kinds of yeah, they're not frozen, but they're refrigerated sections, with plant based, just plant-based selections. We have plant- based cheese, plant-based milk interspersed with the dairy-based stuff. One big problem we've had, a recurring problem, is our freezers. This used to be a [brand store]. It's a pretty old building, refrigeration is old, and other things are old, as far as freezers are. Our freezer section has gone out twice now, to the point where we've had to get rid of every single product in the freezer, and we restock. So that's happened, two times, that that's a major one right there.
Relational Connections	There are high quality formal and informal relationships, networks, and teams within and across store staffing levels and business departments	No data
Communications	There are high quality formal and informal information sharing practices within and across store staffing levels and business departments	No data

Culture	There are shared (between management, staff, and investors) values, beliefs, and norms across the food store for inherent equal worth and value of all human beings, caring for welfare of customers and employees	No data
Tension for Change	The current operating model of the food store business is intolerable and needs to change	No data
Compatibility	Planetary health practices fit or do not fit with workflows, systems, and processes	Last year, we used compostable packaging, but I will tell you frankly, that it was a lot of work because you had to heat seal, and the bags, because they are compostable, they are quite a bit lighter, so taking them to market and stuff, often, the bags themselves, the seams would either break or something, so we're going to have to move away from that this year. We would love for there to be some better options.
Relative Priority	Implementing and delivering planetary health practices is important compared to other initiatives	So in the context of our business, it's something that we wouldn't be against [planetary health promotion]. But currently, we kind of go with things based off of mostly quality and partially cost. We don't try to just get the least cost, because most of the time that's not gonna be the best quality. But we don't go for the top, top tier quality also because we have to keep the cost in mind. It's a balance. Good quality products, but not the highest end. Another aspect that we're working toward is to have more and more of our products be local…we prioritize buying local, we're right around 15% of our products are local…we want to keep bumping up that local percentage for a couple of reasons. One, that, we don't need to be shipping- if we can buy products locally instead of shipping them from around the world, it reduces that transportation, the use of fuel for that for transporting those items. And that has a direct benefit to the environment. Secondly, we want to keep the dollars local, within our local community.
Incentive Systems	Tangible and/or intangible incentives and rewards and/or disincentives and punishments that support implementation and delivery of planetary health practices in a food store	One of my big pet peeves with our glass bottle milk is people don't clean the glasses when they bring them back to the store … we sometimes have to wash them because the glass bottles for milk get picked up once a week and so then that's like super stinky and not exactly food safe to have these dirty bottles just like lying around in your storage area. We have actually gotten stricter about that with customers, and we're like, sorry you don't get your deposit back until this bottle is clean. And then a lot of customers are just really bad with our bottle deposit program on the milk … I think we're running, already this year, we're already at a 300 bottle deficit. It's not running neutral.
Mission Alignment	Implementing and delivering planetary health practices is in line with the overarching commitment, purpose, or goals of the food store	Most farmers pick things by bushel, or, 50 pounds of potatoes into a single bag, and then you take it to your grocery store, and then you break open that bag and re bag it, or bag it up, and, every time you touch something that makes it more expensive. … We offer a bulk rate. Like for planetary health, it's less packaging overall, less trips to the grocery store folks have to make, more food preservation. And on our retail end, we see less waste, because okay, you bought 50 pounds of potatoes, and there might be 3, or 4, or 5, 6 bad potatoes in your 50 pounds, but the store doesn't throw it away and the customer pays for them.

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Available Resources	Resources are available to implement and deliver planetary health practices in the food store, including funding, physical space, and supplies	If I had everything I wished for to make an in more of an impact at the shelf level … at least currently it is out of reach for us, but electronic shelf tags. That's something that could both promote attributes and efficiency. Right now, we're doing paper coated paper shelf labels that that get thrown away. They can't even be recycled. And it's wasteful, and it's a lot of time and effort on our part. If we had electronic shelf labels, that would help the labor piece for us. And also you can program those so that they not only show the price, but they can revolve through some messaging at the shelf level, which is really interesting for me … it is very expensive.
Access to Knowledge and Information	Guidance and/or training is accessible to implement and deliver planetary health practices	No data
Descriptive Inductive Codes		
Role in Food Access	Descriptions of how the store or business contributes to food access in the community, including descriptions of specialized roles or cultural representation	We have two dollar stores, so we don't have a grocery store. We're not really filling that middle range just like a typical grocery store role, we're more of like a natural food store. The options are dollar store or natural food store. There's nothing in between … and we also sell a lot of the local produce and local meats and all that kind of thing … we are filling a hole that was there.
Role for Technical Assistance Partners	Descriptions of support needed for changes or current business practices; responses to how Extension could help facilitate change; statements about "I wish there were someone who could …"	I don't know how to do it, but, some kind of communication line to the local farms via Fresh Match. To say, hey, these are our partner locations. You may want to pop in and see if they're interested in buying local from you. It would be really great if we had some sort of grant so we could bag produce, and something that is either, actually recyclable or reusable, obviously would be ideal. And then, have some information on that tag about, why, it's important to use reusable things, or why it's important to recycle. Stuff like that, as far as marketing goes.
Planetary Health Practices	Statements of strategies or business practices that influence planetary health. Both current and desired practices. Includes retailer perception of store contributions to certain practices. Subcodes include specific details of practice, such as food waste reduction- composting	We have a heavy focus on local. We're reducing the amount of miles the food is traveling to get to people. Supporting the local environment, we tend to purchase, you know, only from farmers that don't use pesticides, not necessarily certified organic or anything like that, but, and then same with the meat production … all our meat comes from local farms, that, raise small amounts of animals. And I see them as beneficial for the land … like regenerative farms. We don't sell any like fake meat, but we do sell tofu, and I mean certain vegetables have protein. But we don't sell, what do you call it? Like soy chicken, like I don't consider that good for the environment. Just don't eat chicken if you're not going to eat chicken. That's just my viewpoint on it. If we get a request for something like that, we do pick it up for people when we go on Mondays. If there was a demand for like a soy-based pepperoni, or whatever, we would add it based on what people request.
Interpretive Framing	How public health organizations and researchers need to think and communicate issues like planetary health to partners. Considerations for framing for partners to direct partners attention to planetary health. Researchers and public	When you were looking at [name of the business], I don't have anything referencing the [name] Park on it. It's one of our largest interstate parks, it's one of the few interstate parks, because it goes over [two states], and it's less than 10 miles from [name of the business]…You'll be able to see what kind of terrain that I'm talking about, our woodland areas, things like that. And as far as planetary, the Nature Conservancy owns

	health organizations need to understand moral foundations, social norms, and relationships of partners to frame planetary health promotion within partner's worldview	about 86% of [County] … our area does more a little bit more to put forth the effort, I think, than some other areas, do that makes sense? I'm not sure, if we're affecting the entire planet. But I do know that people here care about the woods and the trees and our mountainsides, and our dirt and our ground and our animals, and through the entire ecosystem.
Message Framing	Descriptions of how the store is messaging to customers through their in-and out-of-store advertising and social media accounts	We have indicators on our shelf tags, and we're not real happy with the effectiveness of it, because the shelf tag is so small, it's about an inch and a half by 3 quarters of an inch, but we have little round colored shapes on there that indicate several attributes of products: Gluten free, certified organic, locally grown … a variety of them. … And then we have the description of what those mean tagged around the store in places where, if customers are interested, they can find what that information is. But the lucrative way that we've put this [Fresh Match] in front of the customer, is just cashier engagement at the register. We've got a couple cashiers that are very verbal, and that seems to make the biggest impact. I do all the social media. … I post what we have available that week. And it is actually, really helpful. It works here, because the people out here use Facebook for everything. … People do actually look at our Facebook and Instagram, and use it to come make their shopping choices.
Store and Community Culture	How the in-store culture must match the community values and culture; descriptions of how the store environment must be comfortable for shoppers from the community	People here, ok, like at [name of their business], if I put the word organic on it anywhere, it will rot before it sells off that shelf. They refuse. I don't care if it's produce, if it's organic cereals, anything, you can, you can take something that isn't organic, and put the word organic on it, and they still will not buy it. That's the first thing.

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Table A2 displays the planetary health promotion practices that retailers identified for potential implementation. For each practice, the key perceptions of retailers are listed and supported with illustrative quotations.

Table A2. Key Perceptions of Independent Food Retailers towards Planetary Health Promotion Practices

Category of Planetary Health Promotion	Key Perceptions	Illustrative Quotations
Agricultural Practices of Suppliers	• Farm stores shared their status as certified naturally grown or certified organic farms, or their farming approaches to promote planetary health • Grocery and cooperative retailers recognized nuance and trade-offs in agricultural practices • Procurement of organic, certified natural, or regenerative food overlapped with discussions of local food procurement	We don't use chemicals. So we're not gonna contaminate our water…So I guess, our business contributes because we make sure we don't use chemicals" What orchard would be going out willy nilly spraying an extra [US]$5,000 worth of product? You would never overspray…I like the organic because it's a respected label. But some of it to me is like, is it actually better for the environment if it's from, you know, 1,000 miles away? So we just really focus on carrying local stuff within 150 miles.
Bulk Offerings	• Offering food items in bulk quantities, or customer-determined quantities, was a favorable practice • Consumer 'sticker shock' at per pound prices is an initial barrier but has been successfully mitigated by several retailers • Retailers requested support on food safety considerations for customer self-service • Physical space and cost barriers for some retailers to purchase additional bulk bins	It's less packaging overall, less trips to the grocery store folks have to make, more food preservation. And then on our retail end, we see less waste, because okay, you bought 50 pounds of potatoes, and there might be 3, or 4, or 5, 6 bad potatoes in your 50 pounds, but the store doesn't throw it away and the customer pays for them. I think once people get past the hurdle of like, this is confusing and I don't want to do it wrong, people really seem to like that department. And past the sticker shock, of thinking, I'm paying so much money, you're really not.
Energy Usage	• In-store energy use and energy sources were unpromoted responses when asked how business practices influenced the natural environment • High interest in improving energy efficiency of store operations, lighting, refrigeration, and installation of solar panels • Barriers to energy improvements included high start-up costs and operating in historic sites	We have solar panels on our main store on the roof. We're trying to increase our efficiency and reduce our electrical usage. It's both a financial and social decision.

Food Miles	• Highlighted and discussed often by retailers • Rural stores noted their location may influence the environmental impact of customer transportation	In [rural area], to go to either of the other stores, you're gonna be traveling about seven to ten miles. Seven one way, ten the other…Say you need a gallon of milk. You're gonna drive 20 miles, all total to get a gallon of milk, or you're going to go less than a mile across the [river] and go to [name of the business]. And so I think that helps with planetary health, as far as keeping the travel, the distance down. Keep the trucks off the road. Keep trucks coming from closer, rather than further away from us. So we try and maximize things.
Local Foods	• Focused on reducing environmental impact of food transportation • Social and economic considerations of local food procurement were discussed	Most of our produce…has a local footprint, so that there's less fossil fuel used to transport it. Often we take a lower margin on local products, especially things that have a shorter shelf life…Local products tend to have a higher price point than nationally sourced or internationally sourced products. And we try to get that price point as best we can of the local product close enough to that nationally sourced product…and we're encouraging them [customers] to make the decision supporting…all the attributes that local products bring.
Animal-Source Protein Reduction	• Retailers perceived plant foods to mean novel alternative protein products or plant-based milk products • Food cooperatives stocked a wide selection of plant-based food products, and integrated the selection throughout the store • Grocers discussed the expectations of their consumers and local culture as key factors that influence the promotion of plant-based foods in their store	One of the facts, that a lot of people don't want to talk about is that animal food consumption has a very negative impact on planetary health…but] it's a personal decision. We're not the food police. And it's not all, all or nothing kind of thing. But we have a great selection of vegan products. We don't only sell vegan products, but we have a great selection. I would say the best in town by far. In general, our clientele is not, I would say they're just not exactly interested in that. And then, we do carry a lot of plant-based stuff. And a lot of the plant-based stuff is related to planetary health, but nobody really seems to care. That's all dietary, not environmentally concerned. Our community perception is that when you're poor, that's what you have to eat, is beans, because you can't afford anything else…Beans in this area…are what you get at the end of the month, when you run out of money. That's the way they see beans. So that's a cultural thing.
Waste Reduction	• Retailers recognized the environmental impact of food waste but were not concerned about food waste in their operations and shared multiple reduction and diversion strategies • Interest in reducing single-use packaging but cost and customer expectations were barriers • Participated in recycling; time and cost could be barriers to entry	Our fresh baked bread does, some of it comes in a plastic bag. Like in the thin bread bag…I would like to cut that out, as long as it wouldn't affect the freshness of the bread…maybe use the compostable bags on the on the roll. But I don't know that our wholesaler offers them. We need to find out and find out the cost. We recycle, of course. That did become a little more complicated because our town got rid of recycling. I have to drive the recycling myself to the recycle center, which is about like a 10 min, 15 min journey.