Workshop

The National Initiative for Consumer Horticulture: Focusing on the Critical Role of Communication and Collaboration to Further Research, Extension, and Industry Goals

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SUMMARY. The National Initiative for Consumer Horticulture (NICH) is a diverse consortium of leaders who provide a unified voice for promoting the benefits and value of consumer horticulture (CH). NICH endeavors to unite national research efforts with the goals of the diverse stakeholders in the industry, the public sector, and the gardening public in an effort to advance knowledge and increase benefits and application of horticulture for cultivating a healthy world through landscapes, gardens, and plants, and an improved quality of life. Benefits of CH are broadly applicable, whether economic, environmental, or community- and health-related. A benefits approach to marketing sets the stage for unprecedented collaboration, such as that demonstrated by NICH. NICH members have developed three broad goals: recognizing CH as a driver of the agricultural economy; highlighting that CH restores, protects, and conserves natural resources through research and education; and cultivating healthy, connected, and engaged communities through CH. Three NICH committees (Economic, Environmental, and Community and Health Benefits) have focused their efforts on NICH goals for the past 10 months. The three committee chairs, representing ≈ 30 committee members, presented the results of their efforts and future directions for their committees. The Economic and Environmental committees have proceeded with campaigns to better market CH by promoting the benefits of plants and to increase environmental benefits by changing consumer behavior. After reviewing current research, the Community and Health Benefits Committee suggested that a gap exists in research related to specific benefits of CH and personal gardening (as opposed to benefits accrued by enjoying forests, horticulture therapy, indoor atriums, community gardens, parks, and other public places). The committee suggested that overcoming this gap requires strategic collaboration of skill and expertise from a more diverse group of industry representatives, specialists, and scientists. This approach has tremendous potential to affect the CH marketplace, especially when drawing multiple sources of value from the products and experiences.

The NICH is a consortium of leaders, representing academia, government, industry, public gardens, and nonprofits, and includes

researchers, extension agents, Extension Master Gardener volunteers, growers, retailers, industry providers, and others who actively participate in

CH (NICH, 2017). NICH provides a unified voice promoting the benefits and value of horticulture in cultivating a healthy world through landscapes, gardens, and plants—both indoors and out (Bradley et al., 2017a). The consortium's "overarching goal" is to "unite national research and educational efforts with the goals of the diverse stakeholders in the industry, the public sector, and the gardening public to advance knowledge and increase benefits and application of horticulture for an improved quality of life" (Bradley et al., 2016).

Since its inception, NICH has presented its members the rare opportunity to reach across the silos created by universities, industry, and the very diverse consumer populations they serve (Bauske et al., 2015). To date, NICH has held two national meetings, created a strategic plan, developed an extensive mailing list, and released many newsletters (NICH, 2017). The Executive Committee meets bimonthly to move the NICH agenda forward.

NICH has developed three goals and associated objectives (NICH, 2017), and three committees meet regularly to address their respective goals. The goal of the Economic Committee is to assure that CH is recognized as a driver of the agricultural economy. The goal of the Environmental Committee is to highlight the many ways in which CH restores, protects, and conserves natural resources through research and outreach. The goal of the Community and Health Committee is to underscore the impact CH has on cultivating healthy, connected, and engaged communities. Committee members bring broad expertise in nonprofit horticulture and agriculture trade groups, as well as academic expertise from extension, agriculture, natural resources, and economics. Many committee members volunteered, whereas others were actively recruited.

The three committee chairs, representing ≈ 30 committee members (NICH, 2017), were asked to present the results of their efforts at CH and Master Gardeners Professional Interest Group Workshop at the American Society for Horticultural Science (ASHS) Annual Conference in Wai-koloa, HI. Summaries of these reports are presented herein. Collaboration and communication among industry,

academia, the scientific community, and consumers are essential for continued progress.

Materials and methods

On 19 Sept. 2017 at the annual conference of the ASHS in Waikoloa, HI, the CH and Master Gardeners Professional Interest Group hosted a workshop with the objective of examining the direction, progress, and results of the three NICH committees (Bradley et al., 2017b). After a brief introduction by Dr. Lucy Bradley, North Carolina State University, in which she reviewed the history, purpose, and strategies of NICH, Ms. Debbie Hamrick, NC Farm Bureau Federation, presented the work of the Economic Committee, with contributions from Dr. Bridget Behe, Michigan State University, and Dr. Jill Callabro, AmericanHort (Hamrick et al., 2017). Ms. Julie Weisenhorn, University of Minnesota, presented the progress of the Environmental Committee (Weisenhorn, 2017b). Ms. Pamela Bennett, Ohio State University, described the results of a collaborative literature review conducted by the Community and

Health Committee (Bennett, 2017). Workshop participants included CH extension professionals, such as program coordinators, agents, and academics (extension specialists and researchers), as well as other ASHS members connected to CH, including other academics (economists, department heads, and graduate students), as well as industry representatives (public garden managers).

Results and discussion

MEETING ECONOMIC GOALS. The Economic Committee began its work by prioritizing NICH objectives. The group identified the first objective, to “document, comprehensively measure, and disseminate the economic impact and benefits of consumer and community horticulture” (NICH, 2017), as its most important work.

From the economist’s perspective, plants have four types of value to customers (Smith and Colgate, 2007). First, the functional/instrumental value is the plant’s ability to do something, such as a tree that provides shade (sold by size and tree caliper) or perennials that attract pollinators (sold by pot size). Second, plants have hedonic value, or the pleasurable aspects, related to the experience of using them, such as the experience of enjoying a crunchy apple (*Malus* sp.). Third, plants have symbolic value related to memories and connections, such as planting marigolds (*Tagetes* sp.) in the vegetable garden because a beloved family member did so. Last, value can come from the cost/sacrifice element, similar to the benefits achieved when someone uses gardening to increase physical exercise.

Neglecting the other dimensions of perceived value, such as the experiential or hedonic values, short-changes potential profits. All too often, products are promoted and sold by focusing on the functional value. Horticulturists tend to focus marketing of green industry products and services exclusively on the functional value, such as the container size, lawn area, or bloom size.

An increase in perceived value of goods and services could translate into increased profits at every point in the CH production-to-sales chain. The committee members were inspired by the work of Hall and Dickson (2011)

which offered a compilation of benefits received from CH. This study summarized the peer-reviewed literature that documents benefits of plants to people in three areas: economic, environmental, and health and well-being. This article served as the foundation of the committee’s work. The committee members concluded that this approach could be used in communication and marketing materials to help enhance the perceived value of green industry products and services.

After realizing the potential of using experiential and symbolic values for marketing CH and the importance of presenting the research-based information in small, easy-to-understand segments, NICH’s Economic Committee developed the first of several infographics. An infographic is a simple outreach tool that conveys a complicated topic; it carries the meaning of information, materials, and visual expression (Choi et al., 2013). Infographics can be used to visually communicate complex instructions and simple stories using graphics and pictures (Lazard and Atkinson, 2014; Lester, 2011).

The Economic Committee’s infographic, titled #PlantsDoThat (Fig. 1), communicates complicated economic relationships to both CH industries and consumers. It highlights the benefits of plants (established through scientific research) presented in vignettes, such as home, work, shopping, and parks. Each vignette features a factoid to illustrate the benefits of horticulture for the wealth and health of communities. For example, the “Where We Work” subtitle shares that office plants reduce employee sick time by 14% and improve work productivity and speed. The back page of the infographic cites the literature used in its development so the information can be quickly accessed by scientists as well. The individual vignettes have been separated and individually featured as graphics for poster and sign production (Fig. 2).

The title of the infographic contains a hashtag symbol (#) to promote the use of the title in social media tags, as used by Twitter (Twitter Co., San Francisco, CA) and Facebook (Facebook Corp., Menlo Park, CA). It has been embraced by nursery, greenhouse production, and landscape management communities, and featured by multiple trade

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Fig. 1. The infographic, titled #PlantsDoThat (National Initiative for Consumer Horticulture, 2017), conveys to the public the economic benefits of consumer horticulture.

publications (Hodson, 2017; Hoffman Nursery, 2017; Nursery Management, 2017). The #PlantsDoThat infographic has been shared on more than 30 websites, including Facebook commercial pages, government sites, nursery sites, and university sites. It has also been widely distributed in paper form at several trade shows.

Building on the initial success of the #PlantsDoThat infographic, next steps have been identified and implemented. The Economic Committee has developed other value-added messaging for consumers and industry (NICH, 2018). Additional infographics have been created that detail the multitude of ways indoor plants affect the home, workplace, medical centers, and schools.

MEETING ENVIRONMENTAL GOALS. The seven-member Environmental Committee was tasked with

highlighting the ways in which CH restores, protects, and conserves natural resources through research and education. There has been abundant research on the impact of CH on environmental sustainability and health (Carey et al., 2013; Lin et al., 2015; Lovell and Taylor, 2013; Wilde et al., 2015; Zhou, 2014). The committee quickly focused on the clear and insightful work by Hall and Dickson (2011) highlighting the ecological benefits of CH.

Many committee members are active extension educators, and the committee focused their efforts on cultivating public awareness about the positive impact of environmentally friendly gardening on ecosystem services. The committee developed a concept for an online, interactive infographic that would present the environmental benefits of CH and

would engage, educate, and encourage the adoption of environmentally friendly gardening practices by users.

Although people generally agree with the importance of environmentally friendly gardening, getting people to actually adopt specific practices can be a challenge. Having more information does not necessarily change behavior (Orams, 1997; Roggenbuck, 1992). Well aware that people are not likely to make environmentally friendly changes with information alone (Shaw, 2010), the committee chose to use their extension strengths to distill research results into useful information for the everyday practitioner.

Fogg (2012) proposed that three elements must converge at the same moment for a behavior to occur: motivation, ability, and trigger. Clearly, behavior change is more likely when

Fig. 2. This display was used at Cultivate'17, an annual education and trade show event hosted by the green industry. It was created from the examples included in the #PlantsDoThat infographic (National Initiative for Consumer Horticulture, 2017).

motivation (i.e., pleasure, pain, hope, and fear) and ability (i.e., time, money, and physical effort) are high. Without an appropriate trigger, no behavior change will occur. Triggers should be simple so that the consumer feels motivated to do something without feeling persuaded.

Drawing on the Fogg behavior model, the Environmental Committee set out to develop an educational tool that would engage consumers at their level of motivation and ability (suggesting a variety of external triggers). They designed an online, interactive infographic that presents

the environmental benefits associated with CH, creating a simple and fun portal to engage consumers. This communication strategy tailors the message to fit motivation level and ability of the consumer to help reduce the gap between environmental knowledge and the adoption of environmentally friendly behavior (Ballantyne and Hughes, 2006; Pelletier and Sharp, 2008).

Backyard composting provides an example of how the interactive infographic will work (Fig. 3). Backyard composting reduces organic waste in landfills while creating

a beneficial soil amendment. A consumer may be interested in composting, yet they are not sure where to start. They visit their local garden center or extension website, find the infographic, and click on the button "Compost kitchen and yard waste." Options appear that require different levels of motivation and ability for starting a compost bin, such as 1) build a wooden bin with a cover (high motivation, high difficulty), 2) use poles and chicken wire (medium motivation, low difficulty), and 3) start a pile in the corner of the property (low motivation, low difficulty). The user clicks on the level that matches their motivation and ability. Resources for varying levels of ability appear, such as reading and understanding a compost bin plan and material list (requiring considerable time and effort, but not much money) or purchasing and setting up a prefabricated bin (requiring little time and physical effort, but more money). Simple external triggers, such as placing a bucket under the kitchen sink for collecting food waste, will be suggested. A label might be affixed to the bucket with a list of what should and should not go into a compost bin. Taking full advantage of extension resources developed throughout the country, additional educational tools could include videos, apps, podcasts, publications, and social media pages, from which users can choose to suit their preferred timeline and learning style.

Visitors to the infographic will be able to find something at which they can succeed at their particular level of motivation and ability in their yard and garden. People can take on and succeed at harder tasks that promote the adoption of best management practices for landscapes and plants, such as water conservation, nutrient management, composting, and planting for energy conservation and pollinator habitat.

To document behavior change and impact on consumers, the interactive infographic may include an online self-audit. Determining "how environmentally friendly is your landscape?" may be similar to the "how pollinator friendly is your landscape?" (Weisenhorn, 2017a) or the 40-Gallon Challenge (Sheffield et al., 2016). Other additions may include digital kiosks in garden centers that

Fig. 3. This is a prototype of the online, interactive infographic proposed by the National Initiative for Consumer Horticulture's Environmental Committee. It illustrates how the graphic can engage and educate consumers about environmentally friendly gardening practices.

access the interactive infographic and resources and seasonal employee training by extension educators about the topics showcased on the infographic.

True to NICH's spirit, an interactive infographic has potential as a collaborative marketing tool, connecting academic outputs with local green industry goods and services. It offers opportunity for extension and industry to support positive CH behaviors that promote the industry and restore, protect, and conserve natural resources. Hosted on extension websites across the nation, content would be customizable by host institution for the particular hardiness zone(s) and landscape types served in that region, ensuring information that is both appropriate to the consumer and available from the industry. The academic institution developing the infographic would be encouraged to

collaborate with local garden centers and service providers, allowing the industry to offer training opportunities for employees and consumers and prepare businesses to meet the demand of informed and motivated clients. This presents opportunity to increase sales for the local green economy and strengthen the economic importance of CH.

MEETING COMMUNITY AND HEALTH GOALS. The Community and Health committee took a different approach to addressing its broad focus on cultivating healthy, connected, and engaged communities through CH (NICH, 2017).

The committee chose to explore the current state of research. In a review article, Lohr and Relf (2000) stated that "the need for research on the impacts of plants on people is relatively new." The Hall and Dickson article

revisited the subject in 2011. Not convinced that they had the latest research from which to work, committee members determined that, before work started on its assigned NICH objectives, it was essential to have a current view of research already conducted regarding community and health benefits of CH. The committee focused on the literature from subsequent years.

A review of existing research and literature addressing community and health benefits of CH was conducted to verify latest research trends and identify any research gaps. Only research published in the last 10 years (since 2007) was considered for review. The committee took a broadly qualitative approach to reviewing the literature, rather than conducting a formal meta-analysis. Recognizing that a comprehensive literature review can

take years to complete, the committee met monthly through 2017 to review the progress.

To accommodate the expansive CH field, research documenting the community and health benefits of CH was divided into four categories: nutrition, social, psychological, and physical benefits. Members of the committee developed a spreadsheet tool for tracking resources reviewed. After identifying potential journals, committee members divided up the selection and review of pertinent literature. The committee members reviewed 162 articles. Nineteen concerned nutritional benefits, 33 related to physical benefits, 77 pertained to psychological benefits, and 33 identified social benefits.

A large portion of the research found by the committee (75 of 162 articles) was performed in the United States, although 35 countries were represented in the literature. Fifteen articles were published collaboratively by researchers in two or more countries. Research in the United States tended to focus on restorative benefits of CH, whereas research outside of the United States tended to focus on horticultural therapy.

Determining whether sufficient volume of published work has been reviewed to identify gaps was challenging. A wealth of the literature was found in journals with other focus areas outside of horticulture (i.e., medicine, urban design, and psychology). The articles reviewed represented 43 journals, only 10 of which were related to horticulture.

Often a systematic or comprehensive research approach was not apparent to committee members. Although it is difficult to assess methodology from other fields, it appeared that much of the research reviewed could be strengthened by expanding research scale, adding control groups, increasing sample size, using random samples, adding more replications, and looking at results over longer periods of time (longevity studies). Imprecise use or lack of horticultural terms, whether from country-based dialog, translation, or unfamiliarity, made interpretation challenging.

Few efforts focused on the specific benefits of CH and personal gardening. A vast majority of the literature reviewed focused on benefits accrued by enjoying forests,

horticulture therapy, indoor atriums, community gardens, parks, and other public places. These benefits may or may not be the same as benefits derived from the active engagement of plants achieved through domestic or personal gardening (Cameron et al., 2012).

Discussion

The independent work of NICH's three content committees highlights the critical role of communication and collaboration with the public, industry, and within the scientific community for the success of CH. Two of the three committees developed communication strategies for extension and industry (infographics and interactive infographics) to address their respective NICH goals. The third committee focused its efforts on scientific communication.

The #PlantsDoThat infographic has been used to promote the industry and position CH as integral to life quality within popular press (Khachatryan, 2017; Williams, 2012). The infographics support the approach of all three NICH committees—that the benefits of a product or service are more compelling to potential customers than features (Bauske and Waltz, 2013). Furthermore, the undefined benefits received from the personal act of gardening may offer additional hedonic and cost/sacrifice values that can increase the positive impact of plants on life quality and offer economic growth opportunities for the industry.

The committee work highlights the dearth of academic study of the impacts of personal gardening on human beings and communities, as opposed to the impacts of forests, horticulture therapy, indoor atriums, community gardens, parks, and other public places. Cameron et al. (2012) acknowledged the importance of this research area, noting that the greatest benefit of domestic gardening may be its benefit to human health and well-being, but further research is required to fully understand the importance of cultivating (active engagement with) plants to humans and broader society. To strengthen research in this arena, a framework for studying health benefits of nature, such as that suggested by Shanahan et al. (2015), could be modified to further study the community, health, and well-being benefits of gardening.

The literature review substantiates Bauske et al. (2015) observation that few resources are dedicated to CH research, education, and extension. Most CH specialists have extension appointments with little or no responsibility for research or support from research teams. Many CH practitioners, including members of the NICH committees, also carry extension and teaching responsibilities that prevent them from focusing exclusively on research. Extension faculty typically conducts applied research; however, a basic researcher may be more suitable as a primary or copriary investigator to achieve specific research goals.

The work of the three committees underscores the need for critical collaborations between diverse disciplines, such as medicine, psychology, sociology, horticulture, and leisure studies (relevant research appeared in journals in these areas). As noted by Shoemaker et al. (2000), social science methodologies unfamiliar to horticulturists may be useful in further understanding CH benefits. NICH serves as a vehicle to facilitate communication and collaboration with its continued presence and messages at professional society meetings, including ASHS, American Horticultural Therapy Association, and American Public Gardens Association. NICH's ability to facilitate collaboration is helpful in advancing CH research in the areas of health and well-being benefits, environmental studies, and economic impacts, yet there are challenges.

Fortunately, some federal funders recognize this need for broad collaboration. The U.S. Department of Agriculture National Institute for Food and Agriculture (USDA NIFA), which sustains horticultural research, education, and extension at the land-grant universities, requires multidisciplinary and cooperative approaches for solutions (USDA NIFA, 2017).

Unfortunately, funding tied to health-related research studies generally does not originate within the USDA, the typical funder of agricultural research with which horticulture scientists are familiar. Sources and clearinghouses of funds that may support CH research (i.e., Occupational Safety and Health Administration, National Institute for Health, and

grants.gov) are not familiar to horticulture scientists. In addition, there may be funds available for CH for which horticulture scientists may not be best positioned to be the lead researcher. Because grant funds are more widely available to medical practitioners and researchers, horticulturists need to reach out and seek collaborations with these scientists about the value of CH inclusion in their studies.

Although research efforts to date have offered a foundation on which NICH committees can build, there is still work to be done. As noted by the Community and Health Committee, little research progress has been made in recent years. Studies are highly focused with few repetitions, weak controls, and confounding factors. Research can be made stronger by connecting to community health indicators for which large datasets are available (such as food insecurity, food deserts, crime rate, graduation rates, and employment rates) or using reliable research tools of other disciplines to measure results (e.g., anger response scales and brain responses).

In the words of Dr. Diane Relf (personal communication), “the stage is now set for the horticulture/floriculture industry to aggressively pursue deeper understanding of the importance of access to plants and the opportunity for care and cultivation of plants in all places where people work, play, and seek a sustainable quality of life.” NICH’s three working committees and three councils have provided a model for working groups and a framework for continued collaboration and innovation.

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