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Workshop Report



INITIATIVE ON
Fruit and Vegetables
for Sustainable
Healthy Diets

Understanding Food Environments Using Photovoice: A Participatory Approach

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BACKGROUND

Malnutrition remains a significant issue in the Philippines, affecting both children and adults. While the 2023 National Nutrition Survey shows a slight decline in underweight and overweight cases across the population since 2021, obesity among adults remains high at 39.8%. Further, among school-age children, both stunting and overweight rates have decreased since 2021, yet stunting remains prevalent at 23.6%, and wasting remains a concern at 5.6% (DOST-FNRI NNS, 2023).

One factor contributing to the country's nutritional challenges is inadequate fruit and vegetable consumption. According to the 2021 Expanded National Nutrition Survey, Filipino adults consume far below the World Health Organization's (WHO) recommended daily intake of 400 grams (or five portions) of fruits and vegetables. On average, they consume less than one cup of vegetables and less than a quarter of a small-sized fruit per day (ENNS, 2018-2019). Similarly, data from the DOST - Food and Nutrition Research Institute (FNRI) shows that many Filipinos consume less than half of the WHO's recommended intake (DOST-FNRI NNS, 2023).

The CGIAR Initiative on Fruit and Vegetables for Sustainable Healthy Diets (FRESH) uses an end-to-end approach to increase fruit and vegetable intake and in turn improve diet quality, nutrition, and health, while also improving livelihoods, empowering women and youth, and mitigating environmental impacts. The Philippines, with its potential for improving fruit and vegetable consumption, is one of the four focus countries of the Initiative. Given the ongoing nutrition transition in the country, where traditional diets rich in fruits and vegetables are increasingly being replaced by processed foods high in salt, sugar, and unhealthy fats due to factors such as urbanization, globalization, and shifting dietary preferences (ENNS, 2018-2019) this Initiative is particularly timely.

The International Institute of Rural Reconstruction (IIRR) has been actively contributing to Work Package 5 of FRESH, focusing on characterizing the food environment in the Philippines (Bioversity International, World Vegetable Center, Department of Science and Technology – Food and Nutrition Research Institute [DOST-FNRI], & International Institute of Rural Reconstruction [IIRR], 2023). In 2022, IIRR conducted an in-depth desk review of literature, policies, and guidelines related to school food environments in the country (Umali et al., 2023). Building on these findings, a Collaborative Needs Assessment (CNA) workshop was held in 2023 with various stakeholders to explore the broader food environment, identifying critical needs, barriers, and potential solutions (Bioversity International et al., 2023). In 2024, IIRR collaborated with the Alliance of Bioversity International and CIAT, the World Vegetable Center and the Food and Nutrition Research Institute of the Department of Science and Technology (FNRI-DOST), together with the local consulting firm Innovative Multidisciplinary R&D Project for Accelerating Community Transformation (IMPACT R&D), to further investigate the food environment using the Photovoice approach.

As a participatory approach, Photovoice “places the power of photo documentation in the hands of research subjects, empowering them to document and reflect on social issues and cultural phenomena important to them” (Allen, 2012, p.443). By involving participants directly, the Photovoice approach therefore promotes a deeper understanding of local food environments from the community's perspective, fostering dialogue and driving action to address food security and nutrition issues. Combined with the results from in-depth interviews and GIS mapping, the Photovoice approach will help create a broader story map, capturing and visualizing the diverse

perspectives of communities to inform strategies for enhancing food environments and promoting healthier dietary behaviours.

This report details three Photovoice workshops facilitated by IIRR. The workshops were held in Barangay Linglingay and Barangay Valle in Nueva Ecija, encompassing both rural and urban settings to capture diverse perspectives—particularly those of vulnerable households struggling to acquire and sell fruits and vegetables. The main objectives of the workshops were to characterize the local food environment and gain a deeper understanding of lived experiences within these settings. The workshops also sought to investigate the relationship between consumers and vendors, a key factor in shaping supply and demand. During the workshops, participants analysed their photographs, identified key themes for discussion, and explored potential food environment interventions to improve fruit and vegetable consumption.

METHODOLOGY

Collaborative Needs Assessment

The Photovoice approach builds on findings from the Collaborative Needs Assessment (CNA), which provided the foundation for an integrated analysis of food environments in the Philippines. The CNA explored and documented the diverse needs and priorities of stakeholders across multiple sectors—including government, civil society, research and academic institutions, and the food production sector—highlighting gaps between consumer needs and other stakeholders' perceptions (Bioversity International, World Vegetable Center, Department of Science and Technology – Food and Nutrition Research Institute [DOST-FNRI], & International Institute of Rural Reconstruction [IIRR], 2023). Drawing on CNA findings, qualitative, photographic, and participatory methods, including Photovoice, were employed to generate an in-depth understanding of food environments in the Philippines. This approach enabled the assessment of food environment-related opportunities and barriers affecting different stakeholder groups and aimed to facilitate the co-design of interventions to improve the accessibility, affordability, and desirability of fruits and vegetables, particularly for vulnerable consumers (Bioversity International et al., 2023).

Photovoice Approach

For the workshop, with the Photovoice approach being chosen, workshop participants (both consumers and vendors) used their own devices to capture images of their interactions with food environments. This approach provided valuable visual insights into their daily challenges, opportunities, and decisions surrounding food access and nutrition. The emphasis was not on the technical quality of the photos, but rather on the authenticity of the experiences they represented, whether the images were high or low resolution (Bioversity International et al., 2023). An online group chat was created for workshop participants to submit their photos to the study team. To facilitate this, each participant was provided with a PHP 100 (USD 1.72) load card for data, allowing them to upload their photos within 5-6 days before the next workshop session.

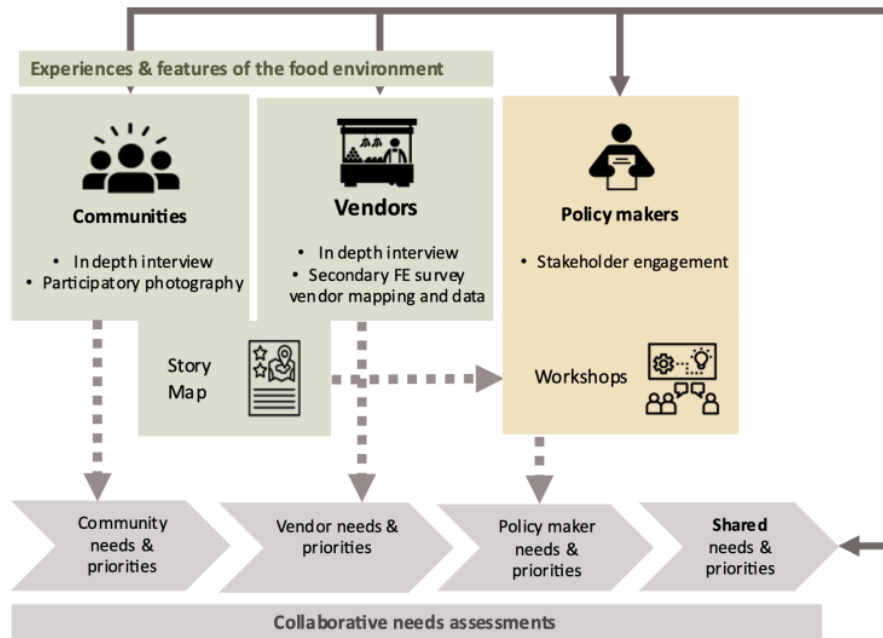


Figure 1. Process diagram of integrated approach (Source: adapted version of Sri Lanka joint protocol illustration by Colombo Urban Lab and Institute of Development Studies, 2024)

Research Sites

Two *barangays* (i.e., a small territorial and administrative district forming the most local level of government), Barangay Linglingay and Barangay Valle, in the Province of Nueva Ecija, Philippines, were selected as the primary research sites based on factors such as urbanization level, community interest in participation, proximity to main roads and markets, and access to food retail outlets. These barangays were specifically chosen to represent contrasting food environments, with Barangay Linglingay reflecting a peri-urban setting and Barangay Valle representing a rural one. Together, they provide a comprehensive view of the province’s diverse food environments, supporting coordinated efforts to improve diets and make fruits and vegetables more accessible, affordable, and equitable for all.

This site selection also aligns with the FRESH Initiative’s end-to-end approach, which addresses the interconnected barriers to fruit and vegetable intake by working across the value chain—spanning demand, supply, and food environments. Under this approach, FRESH has already been instrumental in establishing two crop museums in Nueva Ecija to conserve and promote indigenous vegetables, serving as hubs for capacity building and seed distribution. Good agronomic practices have also been piloted and scaled in Nueva Ecija and Bulacan through 27 field demonstration sites and training sessions (CGIAR Research Initiative on Fruit and Vegetables for Sustainable Healthy Diets, 2025). Studying the food environment in Nueva Ecija therefore complements and strengthens the end-to-end approach by linking community-level insights with ongoing system interventions.

Participant Selection

Prior to participant selection, the research team conducted coordination visits with barangay officials of the target sites to identify the type of consumers and vendors present in the area. During this time, the team also observed the local food culture and traditions among the target groups, with

particular attention to food preparation, sharing practices, and gender roles related to food acquisition and selling. These observations highlight how cultural factors influence the food environment in these communities.

The selection criteria for workshop participants were as follows: consumers were required to be the primary food purchasers and preparers in their households, preferably from families with children under five. Vendors needed to have been selling fruits or vegetables for at least six months and represented various types, including mobile, street, *sari-sari* store (i.e., local convenience stores), *talipapa* (i.e., temporary makeshift stands), farmer, large market, and supermarket vendors. Selection criteria emphasized inclusivity, prioritizing participants from Conditional Cash Transfer (4Ps) households, large families with more than five members, female-headed households, and those with elderly members. Both consumers and vendors had to have lived in the target area for at least six months and be willing to share their experiences in workshops.

The IIRR team collaborated with local government units (LGUs) and barangay officials to select 10 vendors and 10 consumers per site. A two-phase outreach approach was used for participant selection: first, public announcements were made during community gatherings, followed by in-person visits to explain the workshops' objectives, activities, and voluntary participation guidelines. Barangay Captains, who serve as the chief executive of the Barangay Council, and *Kagawads*, who function as the legislative body of the barangay and are also members of the Barangay Council, supported the latter, ensuring potential workshop participants met the inclusion criteria during house-to-house validation. Barangay Nutrition Scholars (BNS) and *Barangay Kagawads* also accompanied the research team to assure participants of the project's coordination with local authorities.

Ethics approval

The Photovoice research protocol underwent a full review by the Social Science Ethics Review Board (SSERB) of the Philippine Social Science Council. The submission package included the research protocol, informed consent forms, and study instruments. The protocol was first submitted for initial review on 24 September 2024. The full review was completed by 25 October 2024, with the decision letter recommending revisions. Following these revisions, ethics clearance to implement the study in Nueva Ecija was granted on 14 November 2024.

WORKSHOP 1: INTRODUCING THE PHOTOVOICE PROCESS

December 3 and 4, 2024

The first workshop was held over one full day in both *barangays*, with the day divided into two sessions, the morning session for consumers and the afternoon session for vendors. At the beginning of each session, participants registered their names and contact information. All participant details were recorded and securely stored in a virtual tracker, accessible only to the project team. Upon arrival, the organizing team formally introduced themselves and expressed gratitude to the participants for attending the workshop. Participants were then provided with: (1) a brief overview of the workshop, outlining its primary objectives, (2) an introduction to IIRR, and (3) an explanation of the FRESH Initiative.



Photo 1. IIRR Project Associate, Shanerisse Tamondong, provides a quick overview of IIRR and its programs

As part of the orientation session, the organizing team introduced participants to the Photovoice approach, provided instruction on basic photography techniques, and emphasized the importance of captioning photos. Participants were also briefed on ethical guidelines for photography, particularly regarding the need to ensure the anonymity and confidentiality of the images captured. While the photos were intended to reflect shared community experiences, it was crucial to uphold the privacy of individuals involved. Although participants were encouraged to take photos that best represented their personal experiences, the organizing team instructed them to capture at least two (2) photos for each thematic category to ensure a well-rounded representation of the food environment.

Table 1. Discussion themes for consumers

THEMES FOR CONSUMERS:
1. <i>Saan ka kumukuha o bumibili ng prutas at gulay?</i> (Where do you usually get or purchase fruits and vegetables?)
2. <i>Ano ang karaniwang mong kinakain sa araw-araw?</i> (What kind of food do you typically eat everyday?)
3. <i>Anu-ano ang hamon na kinakaharap mo sa pagkuha o pagbili ng prutas at gulay?</i> (What difficulties do you experience when trying to get or purchase fruits and vegetables?)

Table 2. Discussion themes for vendors

THEMES FOR VENDORS:
1. <i>Saan ka kumukuha o bumibili ng itinitinda mong prutas at gulay?</i> (Where do you source or buy the fruits and vegetables you sell?)
2. <i>Ano ang karaniwan mong itinitinda sa araw-araw?</i> (What kind of goods do you typically sell everyday?)
3. <i>Anu-ano ang hamon na kinakaharap mo sa pagtitinda ng prutas at gulay?</i> (What difficulties do you experience while selling fruits and vegetables?)

WORKSHOP 2: SELECTING AND DESCRIBING PHOTOGRAPHS

December 9 - 11, 2024

The second workshop session was also divided into two parts - the morning session for consumers and afternoon session for vendors. The workshops for Barangay Linglingay and Barangay Valle were held on December 9 and 10, respectively. The organizing team also scheduled two additional special sessions on December 11 to accommodate participants' availability and ensure all of them completed the workshop series.

The second series of workshops began with participants registering upon arrival, with the organizing team verifying the attendance of those who had participated in the first workshop. To help participants settle in, a few were invited to share a brief recap of key takeaways from the previous session. After the introduction, the moderator provided instructions for the workshop. Participants were then divided into smaller groups of 3 to 5, each assigned a facilitator to guide the discussion and a documenter to record key points. To ensure thorough documentation, group discussions were captured in both video and audio formats, with prior informed consent obtained from all participants. Additionally, name tags were distributed during registration to aid in identification.



Photo 2 and 3. Consumers and vendors from Barangay Valle, share personal experiences during their small group discussions

Next, the organizing team distributed printed copies of all the photos submitted by participants prior to the workshop. The moderator then instructed participants to select three (3) photos from the six (6) they had submitted, choosing those that best represented the three themes for discussion (refer to Tables 1 and 2). Once participants had made their selections, the facilitator initiated the small group sharing session, which was structured into three rounds—one round for each theme. During each round, the facilitator called on each participant to share narratives or personal reflections about their chosen photo. Facilitators also asked follow-up questions (refer to Table 3) to clarify details or encourage further discussion



Photo 4 and 5. Participants Tarcila and Fe share photos of their usual everyday meal

Table 3. Guiding questions for facilitators

S	What do you SEE here?	<i>Ano ang nakikita mo dito?</i>
H	What’s really HAPPENING here?	<i>Ano talaga ang nangyayari dito?</i>
O	How does this relate to OUR lives?	<i>Paano ito nauugnay sa ating mga buhay?</i>
W	WHY does this problem or situation exist?	<i>Bakit umiiral ang kondisyong ito?</i>
E	How could this image EDUCATE others (the community, policy makers, etc.)?	<i>Paano maaaring turuan ng litratong ito ang ibang tao (komunidad o mga gumagawa ng polisiya?)</i>
D	What can we DO about the problem or situation?	<i>Ano ang maaari nating gawin tungkol dito?</i>

After the group discussions were completed, participants were instructed to write captions for their photographs, summarizing the insights they had gained during the discussions. Following this, participants arranged their photos according to the respective themes. A sheet of brown paper was placed at the front of the room, where participants could attach their photos to the appropriate section or theme, allowing them to identify recurring themes from the shared photos.



Photo 6 and 7. After writing captions, participants match their photos to the corresponding theme.

Once all photos were organized by theme, participants were asked for their consent to use the photos for the project's reports and publications. Consent forms were distributed and read aloud, and participants signed the forms once they agreed. To conclude the workshop, the moderator invited a few participants to share their personal reflections on the activity. After providing reminders for upcoming activities, the workshop was adjourned.

WORKSHOP 3: VALIDATION OF THEMES, PRESENTATION OF STORY MAP

December 12-13, 2024

In preparation for the third workshop, participants' photos were reprinted with the captions they wrote during the second workshop. The focus of the third session was on identifying and verifying shared experiences. Participants provided feedback on photos submitted by participants from the opposite session, allowing them to validate or challenge each other's insights. To facilitate a thorough review, the moderator and facilitators encouraged participants to carefully read each captioned photo and write feedback on sticky notes, which were then placed on the corresponding photos.

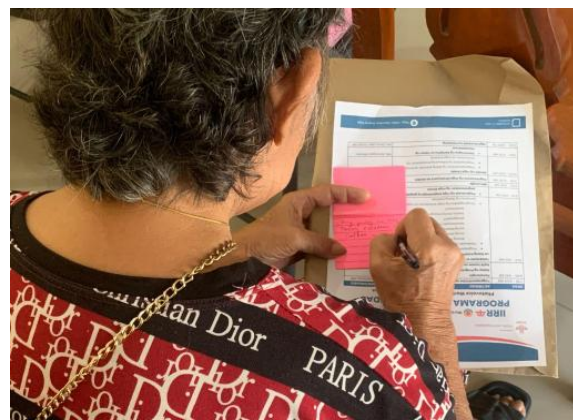


Photo 8 and 9. After reviewing photos from others, participants may leave feedback. This feedback process provides another layer of validation and nuance on existing themes and narratives.

Once all participants had finished providing feedback, the moderator shared a brief synthesis of the comments received. Special attention was given to photos with multiple sticky notes, as these indicated the most engaging and interesting images for the group. Following the synthesis, participants were given a short break while the organizing team prepared for the public exhibit of the photographs. The photos that received the most feedback during the workshop were selected for reprinting and displayed for other community members to view. In addition to showcasing the participants' work, the exhibit provided an opportunity for the broader community to reflect on shared experiences, promoting deeper understanding and awareness.



Photo 10 and 11. Vendors from Barangay Linglingay view their photo exhibit, featuring the photos they took.

Once participants had the opportunity to view the exhibit, they were invited back to the venue for a brief awarding ceremony. To celebrate their completion of the three-part workshop series, participants were presented with certificates and tokens of appreciation for their commitment and active participation throughout the workshops.



Photo 12 and 13. After three workshops, participants are awarded with certificates and tokens of appreciation.

KEY THEMES

Differences between Urban and Rural Food Environments

The workshop revealed clear differences in the food environment between rural and urban areas, which play a crucial role in shaping dietary patterns, nutritional outcomes, and overall health of communities. These variations are influenced by factors such as food accessibility, availability,

affordability, and cultural preferences. Through the exploration of these interconnected factors, this report provides meaningful insights into the lived experiences, challenges, and opportunities that impact dietary behaviors, with a focus on fruit and vegetable consumption, in the selected *barangays*.

In peri-urban areas such as Barangay Linglingay, food environments appear to be characterized by a greater diversity of food options, including supermarkets, convenience stores, and an abundance of restaurants. However, the widespread availability of processed and fast foods often encourages unhealthy eating habits. While fresh fruits and vegetables are accessible in many urban settings, they may be less affordable or deprioritized in favour of more convenient, calorie-dense alternatives. This dietary shift is closely linked to the growing prevalence of obesity and diet-related noncommunicable diseases (NCDs) in urban populations.

Conversely, rural areas such as Barangay Valle, are typically more reliant on local food systems, such as home gardens and small-scale farming, which can provide fresher, more nutrient-dense fruits and vegetables. These systems often promote traditional diets rich in plant-based foods, which support better nutritional outcomes. However, rural communities face challenges in accessing a wide variety of fruits and vegetables due to limited infrastructure, fewer food retail outlets, and logistical barriers in transporting perishable goods. Seasonal food insecurity and the impacts of climate change further exacerbate these challenges, reducing the consistency of fruit and vegetable availability.

Despite the differences, both rural and urban food environments struggle to meet the World Health Organization's (WHO) recommended intake of 400 grams, or five servings, of fruits and vegetables per day. Urban residents are hindered by affordability and competing food options, while rural communities face barriers related to accessibility and food diversity. Addressing these disparities requires a nuanced approach that considers the specific needs and vulnerabilities of rural and urban areas, fostering equitable access to nutritious and affordable food for all communities.

Diversity of Fruits and Vegetables Available in the Local Food Environment

Workshop findings highlighted a diverse range of vegetables sold by vendors in the selected *barangays*, including leafy greens, non-leafy vegetables, and tubers (Table 4). While the list is comprehensive, it is not all-encompassing, as it may not fully reflect the entire range of seasonal varieties or lesser-known regional vegetables commonly available in these local markets. Nevertheless, the table presents a shared selection (highlighted in bold) of vegetables sold in both *barangays*, such as *repolyo* (cabbage), *saluyot* (jute mallow), *talong* (eggplant), *kamatis* (tomato), *sitaw* (string beans), *ampalaya* (bitter melon), *okra* (lady's finger), and *kalabasa* (squash). These vegetables are essential ingredients in Filipino households, frequently featured in traditional meals and a wide array of local dishes. Notably, vendors from Barangay Valle specifically mentioned selling aromatics, spices, and flavouring agents- a detail absent from the responses of vendors in Barangay Linglingay.

The findings from the workshop align with regional agricultural trends observed in other studies. A study by Abilgos-Ramos (2018) conducted in select provinces in Central Luzon, which includes Nueva Ecija, identified string beans, eggplant, mung bean, okra, corn, sweet potato, bottle gourd, bitter melon, sponge gourd, and tomato as the top 10 crops planted in Central Luzon. In terms of permanent crops, coconut, sugarcane, banana, corn, lemon and mango are cultivated. The study

further revealed that more than 30% of households in the region include okra, string beans, eggplant, sweet potato, bitter gourd, bottle gourd, and ribbed gourd in their diet.

Table 4. Commonly Sold Fruits and Vegetables in Barangays Linglingay and Valle, as Reported by Participating Vendors (Items Sold in Both Barangays are in bold)

BARANGAY LINGLINGAY	VEGETABLE GROUP	BARANGAY VALLE
Cabbage (<i>Brassica oleracea</i>) Chinese cabbage (<i>Brassica rapa subsp. pekinensis</i>) Amaranth (<i>Amaranthus spinosus</i>) Jute mallow leaves (<i>Corchorus olitorius</i>) Water spinach (<i>Ipomoea aquatica</i>)	LEAFY VEGETABLES	Cabbage (<i>Brassica oleracea</i>) Mustard leaves (<i>Brassica juncea</i>) Jute mallow leaves (<i>Corchorus olitorius</i>) Sweet potato leaves (<i>Ipomoea batatas</i>)
Bitter gourd (<i>Momordica charantia</i>) Bottle gourd (<i>Lagenaria siceraria</i>) Cauliflower (<i>Brassica oleracea var. botrytis</i>) Eggplant (<i>Solanum melongena</i>) Green chillies (<i>Capsicum annuum</i>) Lady's finger (<i>Abelmoschus esculentus</i>) Squash (<i>Cucurbita maxima</i>) String beans (<i>Phaseolus vulgaris</i>) Tomato (<i>Solanum lycopersicum</i>) Vegetable hummingbird (<i>Sesbania grandiflora</i>) Winged bean (<i>Psophocarpus tetragonolobus</i>)	NON-LEAFY VEGETABLES	Bitter gourd (<i>Momordica charantia</i>) Carrots (<i>Daucus carota</i>) Cucumber (<i>Cucumis sativus</i>) Eggplant (<i>Solanum melongena</i>) Green chillies (<i>Capsicum annuum</i>) Lady's finger (<i>Abelmoschus esculentus</i>) String beans (<i>Phaseolus vulgaris</i>) Squash (<i>Cucurbita maxima</i>) Tomato (<i>Solanum lycopersicum</i>)
Sweet potato (<i>Ipomoea batatas</i>)	TUBERS AND OTHERS	Garlic (<i>Allium sativum</i>) Onion (<i>Allium cepa</i>) Philippine lime (<i>Citrus × microcarpa</i>) Potato (<i>Solanum tuberosum</i>) Sweet potato (<i>Ipomoea batatas</i>) Tamarind (<i>Tamarindus indica</i>) Taro (<i>Colocasia esculenta</i>)
Banana (<i>Musa sapientum</i>)	FRUITS	Apple (<i>Malus domestica</i>) Banana Lakatan (<i>Musa acuminata</i>) Dalanghita (<i>Citrus nobilis</i>) Green Banana (<i>Musa acuminata × balbisiana</i>) Grapes (<i>Vitis vinifera</i>) Mango (<i>Mangifera indica</i>) Watermelon (<i>Citrullus lanatus</i>)

However, notable differences were observed in the selection of fruits offered by vendors. Those from Barangay Valle sold a wider variety, including *ubas* (grapes), *pakwan* (watermelon), *saba* banana, *lakatan* banana, *mangga* (mango), apple, and *dalanghita* (green tangerine). In contrast, the range of fruits sold in Barangay Linglingay seemed more limited, with *saging* (banana) being the primary option. While bananas are an affordable and convenient choice, rich in potassium, vitamin B6, and energy, relying solely on them may lead to gaps in essential nutrients such as vitamin C, fibre, and antioxidants, which are more abundant in other fruits.

According to vendors, there is less incentive to sell other fruits such as pomelo, papaya, or guava, as these are commonly grown in the backyards of residents and are therefore readily available without purchase. Bananas, on the other hand, remain the most popular choice among customers, further encouraging their sale. Some vendors also noted they only sold fruits in season or during special occasions like Christmas, emphasizing that selling vegetables tends to be more profitable.

Ensuring a consistent and diverse supply of fruits and vegetables is crucial for promoting adequate nutrient intake and enhancing dietary diversity. While the shared availability of key vegetables across both areas is a positive sign, addressing the limited fruit options in Barangay Linglingay presents an opportunity to bridge nutritional gaps and improve overall diet quality. Furthermore, validating the reported specialty items, such as aromatics and spices, and exploring other fruits potentially available in Barangay Linglingay could further enrich local dietary patterns. Enhancing access to these foods would not only support nutritional needs but also enhance culinary variety and foster cultural expression within the community.



Photo 14. “These are my newly planted vegetables. There are chilies and papaya here that I harvest and sell in the market.” (Leonora, Barangay Valle)

Fruit and Vegetable Consumption Patterns and Preferences

The food environment and preferences for fruits and vegetables in Barangay Valle and Barangay Linglingay reflect the unique characteristics of their respective communities and agricultural landscapes (see Table 5). Barangay Linglingay, located in the Science City of Muñoz, thrives on its strong agricultural foundation. Renowned for its rice farming and diverse crop production, the community places a high value on sustainable farming practices and local traditions, shaping its food environment to prioritize homegrown and foraged produce. Based on workshop findings, leafy vegetables such as *talbos ng kamote* (sweet potato leaves), *malunggay* (moringa), and *saluyot* (jute mallow) are staples in local diets, providing essential nutrients at minimal cost. Non-leafy vegetables, including *ampalaya* (bitter melon), *talong* (eggplant), *sitaw* (string beans), and *kalabasa* (squash), are cultivated in backyard gardens or small-scale farms. Indigenous vegetables like *himbabao* or *alukon* (birch flower) reflect the community's strong connection to traditional and sustainable food practices.

Fruit consumption in Linglingay is similarly influenced by the availability of locally and backyard-grown produce. *Suha* (pomelo), papaya, *bayabas* (guava), and *granada* (pomegranate) are commonly available, while indigenous fruits such as *santol* (cotton fruit), *duhat* (black plum), and *dalandan* (local orange) provide seasonal variety and cultural significance. This close relationship with nature and agriculture fosters a food environment that is cost-effective, sustainable, and deeply rooted in the community's traditions.



Photo 15. “This is our daily food that we need.” (Evelyn, Barangay Linglingay)

Conversely, Barangay Valle, benefits from the province's rich soil and well-developed irrigation systems. Known for its agricultural productivity, particularly in rice, Valle combines traditional agricultural practices with modern innovations to support local farmers' livelihoods. This progressive yet grounded approach shapes the *barangay's* food environment, resulting in a greater diversity of fruits and vegetables due to its access to both local and commercial markets.

Leafy greens such as *talbos ng kamote* (sweet potato leaves), *malunggay* (moringa), *saluyot* (jute mallow), and *katuray* (sesbania flower) are widely consumed in Barangay Valle, appreciated for their nutritional benefits and versatility. Non-leafy vegetables such as okra (lady's finger), *ampalaya* (bitter melon), and root crops such as sweet potato, taro, and potato provide a broader spectrum of nutrients and energy-rich carbohydrates. The inclusion of flavour-enhancing ingredients like

kalamansi (Philippine lemon), *sibuyas* (onion), and *bawang* (garlic) reflects the rural preference for taste and convenience.

Fruit consumption in Valle also underscores its connection to what is commonly available in their backyard and their cultural preferences. In addition to fruits such as *suha* (pomelo) and *bayabas* (guava), the community enjoys a wider array of fruits, including *atis* (sugar apple), banana, *mangga* (mango), *langka* (jackfruit), and *kaymito* (star apple). Seasonal options like *duhat* (black plum) and *dalandan* (local orange) enrich the diet and highlight the community's access to both homegrown and market-sourced produce.



Photo 16. “We harvested these vegetables from our small garden. This is where we get our food that my husband and I grow. We sometimes sell our produce to our neighbours when we need money for our children's education.” (Leonila, Barangay Valle)

The contrasting characteristics of Barangay Linglingay and Barangay Valle are evident in their food environments and the patterns of fruit and vegetable consumption among their residents. Linglingay, as a peri-urban barangay, emphasizes sustainability and self-reliance through backyard gardening, foraging, and traditional farming practices, but still depends on what is available in the public market, resulting in a diet closely tied to indigenous and locally available produce. Meanwhile Barangay Valle's position as an agriculturally productive yet more market-integrated *barangay* allows for a more diverse and commercially influenced diet. While traditional farming remains integral to the community's identity, access to markets has broadened dietary options, enabling residents to incorporate a greater variety of fruits and vegetables into their meals.

Table 5. Commonly Consumed Fruits and Vegetables in Barangays Linglingay and Valle, Based on Consumer Reports (Items Consumed in Both Barangays Highlighted in bold)

BARANGAY LINGLINGAY	VEGETABLE GROUPS	BARANGAY VALLE
Amaranth (<i>Amaranthus spinosus</i>) Moringa (<i>Moringa oleifera</i>) Snow cabbage (<i>Brassica rapa</i>) Sweet potato leaves (<i>Ipomoea batatas</i>) Water spinach (<i>Ipomoea aquatica</i>)	LEAFY VEGETABLES	Amaranth (<i>Amaranthus spinosus</i>) Cabbage (<i>Brassica oleracea</i>) Jute mallow leaves (<i>Corchorus olitorius</i>) Moringa (<i>Moringa oleifera</i>) Snow cabbage (<i>Brassica rapa</i>) Sweet potato leaves (<i>Ipomoea batatas</i>)
Bitter gourd (<i>Momordica charantia</i>) Breadnut (<i>Artocarpus camansi</i>) Carrots (<i>Daucus carota</i>) Cauliflower (<i>Brassica oleracea var. botrytis</i>) Eggplant (<i>Solanum melongena</i>) Lady's finger (<i>Abelmoschus esculentus</i>) String beans (<i>Phaseolus vulgaris</i>) Vegetable hummingbird (<i>Sesbania grandiflora</i>) Tomato (<i>Solanum lycopersicum</i>) Winged bean (<i>Psophocarpus tetragonolobus</i>)	NON-LEAFY VEGETABLES	Birch flower (<i>Broussonetia luzonica</i>) Bitter gourd (<i>Momordica charantia</i>) Carrots (<i>Daucus carota</i>) Eggplant (<i>Solanum melongena</i>) Papaya (<i>Carica papaya</i>) Sponge gourd (<i>Luffa acutangula</i>) Squash (<i>Cucurbita maxima</i>) String beans (<i>Phaseolus vulgaris</i>) Tomato (<i>Solanum lycopersicum</i>)
Green chillies (<i>Capsicum annum</i>) Onion (<i>Allium cepa</i>) Sweet potato (<i>Ipomoea batatas</i>)	TUBERS AND OTHERS	Garlic (<i>Allium sativum</i>) Mung bean (<i>Vigna radiata</i>) Onion (<i>Allium cepa</i>) Philippine lime (<i>Citrus × microcarpa</i>) Potato (<i>Solanum tuberosum</i>) Sweet potato (<i>Ipomoea batatas</i>) Tamarind (<i>Tamarindus indica</i>) Taro (<i>Colocasia esculenia</i>)
Pomelo (<i>Citrus Maxima</i>) Papaya (<i>Carica papaya</i>) Pomegranate (<i>Punica granatum</i>) Guava (<i>Psidium guajava</i>) Banana (<i>Musa sapientum</i>)	FRUITS	Apple (<i>Malus domestica</i>) Banana (<i>Musa sapientum</i>) Cotton fruit (<i>Sandoricum koetjape</i>) Dalanghita (<i>Citrus nobilis</i>) Jackfruit (<i>Artocarpus heterophyllus</i>) Java plum (<i>Syzygium cumini</i>) Mango (<i>Mangifera indica</i>) Star apple (<i>Chrysophyllum cainito</i>) Sugar apple (<i>Annona squamosa</i>)

The link between market availability and consumer preferences was also observed in both rural and peri-urban communities. In Barangay Valle, which relies on backyard gardens and traditional farming, residents favour a mix of locally grown and commercially sourced fruits and vegetables,

allowing for a diverse diet. Seasonal fruits like *duhat* (black plum) and *dalandan* (local orange) complement staples such as bananas, mangga (mango), and patatas (potato). However, indigenous or less popular vegetables like *himbabao* (birch flower), are consumed and sold less frequently due to lower demand compared to more widely available and preferred produce.

In contrast, Barangay Linglingay, despite its established access to commercial markets, maintains a food environment that remains largely independent of commercial market trends. Consumer preferences align with what is locally grown, foraged, or seasonally available, such as *talbos ng kamote* (sweet potato leaves), *malunggay* (moringa) and *himbabao* (birch flower). However, these ingredients, often cultivated on a small scale for household consumption, may not be as prominent in urban markets, where higher commercial value and mass appeal drive availability. Consequently, while Barangay Linglingay residents appreciate the affordability and sustainability of indigenous produce, its limited market availability often leads to its underrepresentation in urban diets.

There is an intricate interplay between market supply and consumer demand, where availability influences preferences, and in turn, consumer choices shape market offerings. Less commercially profitable produce, such as neglected and underutilized species (NUS), risk being marginalized despite their nutritional and cultural significance. Bridging this gap requires raising awareness of NUS, many of which are indigenous, while promoting their cultivation and integration into commercial markets. This approach helps ensure their continued presence in the broader food system, enhances diet quality by offering a wider range of nutrients, and supports healthier lifestyles.

Alternatively, communities can counter market-driven limitations through backyard gardening. Programs such as the Conditional Cash Transfer (CCT) Program of the government have been encouraging backyard gardening for decades. By cultivating their own fruits and vegetables, families reduce dependence on market purchases, enhancing food security in peri-urban communities like Barangay Linglingay and rural communities like Barangay Valle, and offering an opportunity to conserve indigenous crops.

In many communities, such as Barangays Linglingay and Valle, sharing homegrown produce such as fruits, vegetables, and other staples is a common and deeply rooted cultural practice. Families and neighbours frequently exchange or share surplus crops from their gardens, ensuring that everyone has access to nutritious foods, even if they cannot regularly afford to purchase them. This practice not only helps to reduce food waste but also fosters a sense of community and mutual support, creating a local food environment where fresh, homegrown produce is more accessible to all, regardless of economic status. This sharing culture ensures that even in peri-urban and densely populated areas where fresh produce may be more expensive or less accessible, families can still benefit from nutritious fruits and vegetables.



Photo 17. “We usually get vegetables from our garden in the yard and from our neighbour. This sweet potato tops and eggplant were harvested from our backyard garden, while the pumpkin was given to me by my neighbour.” (Rhodora, Barangay Valle)

Sourcing of Fruits and Vegetables

Fruit and vegetable vendors from Barangays Linglingay and Valle reported similar sources for their produce, demonstrating a mix of localized and strategic sourcing methods. The most common sources cited were nearby markets (*palengke*), which offer convenience and accessibility. Several vendors also mentioned sourcing goods from the farmers’ market (*bagsakan*), where they can buy in bulk at wholesale prices. This strategy is particularly effective for those seeking to maximize profit margins while catering to high customer demand. Notably, certain vendors often rely on their backyard vegetable gardens, showcasing the role of small-scale agriculture in supporting local livelihoods. This practice reduces procurement costs and ensures freshness and control over produce quality

However, some vendors opt to travel farther than their backyard for cheaper or superior-quality goods, highlighting the trade-off between cost, quality, and effort. These vendors may purchase directly from farms, emphasizing the value of cutting out intermediaries to secure competitive pricing and fresher goods. At the workshop, certain vendors also shared that they sourced produce from a family relative or an employer’s farm, illustrating how personal networks and relationships play a critical role in the supply chain of small-scale vendors. This approach can offer vendors reliable access to goods and potentially favourable pricing.

A unique community-driven approach to sourcing produce was observed in Barangay Valle, where a local vendor highlighted an informal yet effective method of procurement. By going house to house, the vendor collected fruits and vegetables directly from households with backyard gardens, creating a diverse stock while fostering local trade. A trust-based system allowed the vendor to defer payment until the goods are sold. This procurement method offers a crucial opportunity for micro-entrepreneurs with limited upfront capital to maintain and grow their businesses.



Photo 18. “This is where I shop for my goods because there are many cheap ones, and I also have many acquaintances and buyers here at the Munoz market and it is also closer to us.” (Analyn, Barangay Linglingay)



Photo 19. “This is where I get my goods to make sure that what I sell is fresh.” (Annaliza, Barangay Valle)

In conclusion, the diverse sourcing strategies employed by these vendors demonstrate their adaptability and resourcefulness in addressing market challenges. These practices not only reflect

the resilience of local entrepreneurs but also highlight broader trends in rural and semi-urban trade systems, where the combination of traditional and innovative approaches plays a crucial role in sustaining livelihoods and meeting the evolving needs of the community.

Affordability of Fruits and Vegetables

The affordability of fruits and vegetables is influenced by factors such as local availability, transportation costs, demand, and natural hazards like typhoons and droughts. Recent typhoons in Central Luzon have severely disrupted crop supply, reducing yields and driving up market prices, placing a financial strain on both consumers and vendors.

According to the Department of Agriculture's price monitoring site, the average prices of certain fruits and vegetables in National Capital Region (NCR) markets rose in January 2025 compared to December 2024, despite typically higher demand during the holiday season (DA Bantay Presyo, 2025). For instance, eggplant prices fell from PHP 191 (USD 3.32) per kilogram in November to PHP 127 (USD 2.21) in December but increased again to PHP 132 (USD 2.29) in January 2025, which is a notable shift from the usual PHP 50–80 (USD 0.87- 1.39) price range in Luzon public markets. Tomatoes, a staple in many Filipino households, currently cost around PHP 154 (USD 2.68) per kilogram, or even higher in urban supermarkets. These elevated prices have made fresh produce less accessible, significantly impacting consumption patterns.

The damage caused by typhoons in agricultural provinces like Nueva Ecija underscores the cascading impact of natural disasters on crop availability and pricing. Rising costs of vegetables and fruits, such as mangoes and bananas, have forced households to modify their diets. In urban areas, consumers often opt for cheaper food alternatives, reducing their intake of nutrient-rich produce and potentially compromising dietary diversity and nutrition. While rural households may be more self-sufficient through backyard gardening, they still face limited variety when certain crops become scarce. These challenges highlight the critical role of affordability in ensuring consistent access to nutrient-rich foods, particularly during natural disasters and economic hardships.

Types of Vendors

The workshop highlighted various types of vendors, including farmer vendors (individuals who sell harvest from their own farmlands), rolling store vendors, *talipapa* (i.e., temporary makeshift stands) vendors, and by-foot vendors, each playing a distinct role in shaping local food access. In Barangay Valle, where the central market is distant, rolling stores - wheeled vehicles with customized sidecars (*kolong-kolong* or tricycles) - are the most common. These mobile vendors deliver goods directly to communities, providing convenience and accessibility while fostering trust and loyalty with their *suki* (loyal patrons). Rolling stores not only expand vendors' reach but also enable them to diversify their offerings and cater to a wider range of customer needs, making them a dependable one-stop shop for fresh produce and essential goods.



Photo 20. *“This is the tricycle I use to sell vegetables. This is where I put the fresh produce and fruit. Sometimes my tire breaks or the chain comes off.” (Virgie, Barangay Valle).*

By-foot vendors operate with limited resources, carrying goods in baskets as they sell directly in residential areas. Unlike motorized vendors, they lack storage capacity, restricting them to small product quantities and limiting their ability to meet diverse customer demands. Frequent restocking trips are both time-consuming and physically demanding, further reducing their profit margins. Their mobility is also restricted to smaller territories, where they often face intense competition.

Additionally, safety concerns pose significant risks, as they navigate busy roads alongside larger vehicles and may encounter threats such as theft or harassment, particularly in isolated areas. Despite these challenges, by-foot vendors play a vital role in improving food accessibility, especially in marginalized communities. Financial support, such as low-interest loans for rolling stores or subsidies for bicycles and pushcarts, could enhance their capacity and safety. Establishing designated vending areas and providing business management training would further empower them, fostering more sustainable livelihoods.



Photo 21. “These are my staples because they are easy to grow and sell. I harvest every two days. This is what I sell. I sell with a bilao (large woven tray) and a bucket while walking.” (Arman, Barangay Linglingay).

Each type of vendor—farmers, rolling stores, *talipapa* (small markets), and by-foot sellers—plays a vital role in enhancing food security, especially in underserved or low-income areas with limited access to fresh produce. Small markets offer a stable, stationary option, while by-foot vendors bring fresh goods directly into neighbourhoods, fostering community engagement. However, each type of vendor faces unique challenges, from the fuel and maintenance costs of rolling stores to space limitations in *talipapas* and the physical demands on by-foot sellers. Despite these obstacles, their resilience and adaptability highlight their essential role in local food systems, ensuring fresh, nutritious food reaches those who need it most.

Consumers’ Access to Fruits and Vegetables

Workshop participants from the two barangays, Linglingay and Valle, provided similar insights into their sources of fruits and vegetables. They highlighted the localized and community-driven nature of their food systems which plays a crucial role in building resilience against market fluctuations and external disruptions, such as economic crises or natural disasters.

Many households in these barangays maintain backyard vegetable gardens, which serve as a primary source of sustenance. These gardens enable families to meet their daily nutritional needs without incurring additional costs. Additionally, some households cultivate indigenous vegetables that grow naturally around their homes, such as *katuray* (birch flower), *kulitis* (amaranth), and *talbos ng kamote* (sweet potato leaves). When households produce a surplus of vegetables, they often sell this to generate supplementary income. This practice underscores the dual benefits of small-scale gardening—enhancing food security while providing economic opportunities.

Beyond individual household efforts, resource-sharing is a common practice. Family members frequently share excess harvests with relatives and neighbours, ensuring that even those without gardens have access to fresh, homegrown produce. Even substandard vegetables—those that are too small, misshapen, discoloured, or unsold—are often freely distributed among neighbours. While these may not meet market standards, they remain nutritious and valuable, reflecting the community’s resourcefulness and commitment to minimizing waste. Further, neighbours with larger plots often allocate space for those without land. Even vacant spaces near schools are converted into vegetable gardens, reinforcing the communal spirit of these barangays, where collective well-being often takes precedence over individual interests. This culture of generosity not only mitigates food scarcity but also strengthens social bonds within the community.

For families that cannot rely solely on backyard gardens, shared harvests or shared meals, nearby markets, such as *talipapa* (makeshift markets) and rolling stores, provide accessible options for purchasing fruits and vegetables. These local markets are particularly beneficial for families with limited gardening capacity or during periods when homegrown produce is insufficient. Their presence ensures a steady supply of fresh produce, even for those not engaged in gardening.

To further strengthen the local food system, the FRESH initiative, under *Work Package 2: Biodiversity, Genetic Innovation, and Seed Systems*, has established Crop Museums in the target city and municipality in Nueva Ecija. These Crop Museums serve as repositories for neglected and underutilized species (NUS) and have the potential to enhance the food environment in the study sites. By increasing the availability and affordability of local vegetables in both markets and communities, these efforts contribute to a more sustainable and accessible food system. Additionally, these practices promote environmental sustainability by reducing dependence on long supply chains and maximizing the use of locally available resources.

Despite these benefits, challenges persist. In Barangay Linglingay, limited land availability restricts opportunities for gardening, as many households have minimal space. In contrast, Barangay Valle has more available land for backyard gardens, allowing greater flexibility in food production. Furthermore, families who rely on shared or donated produce may have limited control over the variety and quality of their food. Addressing these challenges through policies that promote urban agriculture, communal gardening projects, and sustainable farming techniques could enhance the capacity of these communities to achieve long-term food security.

The experiences of workshop participants reflect a strong culture of self-sufficiency, resourcefulness, and communal support. By leveraging backyard gardens, sharing resources, and utilizing accessible markets, these communities have developed resilient and adaptive strategies to meet their nutritional needs. Strengthening these practices through targeted support, infrastructure development, and policy interventions could further enhance food security and overall community well-being.

Potentials of Local Eateries (Carinderias)

Carinderias (local eateries) play a vital role in providing accessible and affordable cooked meals. Their convenience is particularly beneficial for busy individuals, single-person households, and families with working members who have limited time to cook. By offering ready-to-eat meals at budget-friendly prices, *carinderias* help families balance nutrition, expenses, and time constraints. Additionally, *carinderias* provide significant benefits by creating jobs and sustaining the livelihoods

of owners, cooks, and staff. These eateries often source ingredients from local markets and small-scale farmers, fostering economic interdependence and supporting the broader food supply chain.

For low-income households, purchasing meals from *carinderias* can often be more economical than buying raw ingredients, especially when cooking in small quantities leads to food waste or higher per-meal costs. *Carinderias* typically sell meals in portion sizes tailored to individual or small-group consumption, further enhancing their cost-effectiveness. The diverse range of dishes available caters to various preferences and dietary needs, making them an inclusive and flexible option for many.

Beyond affordability and convenience, *carinderia* owners play a crucial role in local food systems. They act as intermediaries who transform raw produce into accessible, ready-to-eat dishes. This responsibility extends to ensuring food safety, variety, and nutritional quality. Given that *carinderias* serve a diverse clientele—including children, the elderly, and individuals with specific health concerns—proper food handling, storage, and preparation practices are essential in preventing contamination and ensuring meal safety.

With their influence on community diets, *carinderia* owners have an opportunity to promote healthier eating habits by incorporating balanced and nutrient-dense meals into their menus. Offering vegetable-rich dishes, lean proteins, and whole grains can contribute to improved public health. This is particularly crucial in communities where malnutrition or diet-related illnesses such as hypertension and diabetes are prevalent. Additionally, *carinderias* help preserve culinary heritage by serving traditional dishes alongside modern fare, ensuring that local food traditions remain part of the community's daily diet.

To further strengthen the role of *carinderias* in the local food environment, targeted interventions could include training programs on food safety, nutrition, and business management to enhance operational standards; access to microloans or subsidies to support kitchen upgrades and ingredient sourcing; and partnerships with local governments to promote healthy eating through *carinderia*-based initiatives.



Photo 22. “I bought it at the *carinderia* for PHP 20 (USD 0.35) per *takal* (serving) because I can't cook anymore and I'm alone at home.” (Meann, Barangay Linglingay).

ADDITIONAL KEY INSIGHTS

Adaptive and Innovative Strategies Employed by Vendors

Beyond selling fruits and vegetables through rolling stores or as foot peddlers, vendors from Barangays Linglingay and Valle employ a range of strategic approaches to optimize their operations, enhance profitability, and maintain customer satisfaction. These strategies highlight their adaptability and resourcefulness in navigating the challenges of the trade.

- **Selective Purchasing for Quality Assurance**

Many vendors prefer to personally select their produce rather than buy in bulk from wholesalers. This hands-on approach allows them to meticulously assess the quality of each item, ensuring they offer only the best to their customers. By prioritizing quality, vendors build trust and foster customer loyalty.

- **Seasonal and Demand-Driven Inventory Management**

Vendors commonly stock fruits and vegetables that are in season, as these are fresher, more abundant, and often more affordable. Additionally, they focus on popular consumer preferences, tailoring their inventory to maximize sales potential.

- **Bulk Selling for Homegrown Produce**

Farmer vendors who grow their own produce often go in groups and bundle items in bulk for wholesalers to pick up. This strategy reduces transportation costs, streamlines operations, and allows them to focus on cultivation while ensuring wider market distribution.

- **Expanding Market Reach and Pricing Strategies**

Some vendors extend their sales reach by traveling to nearby communities, tapping into additional customer bases. Others adopt discount pricing to boost sales and minimize waste. While offering lower prices may reduce immediate profits, it ensures steady cash flow and strengthens customer relationships.

- **Waste Minimization and Value-Added Strategies**

To reduce losses, vendors repurpose unsold produce through various methods:

1. Cooking leftover vegetables for personal consumption.
2. Preparing and selling cooked dishes using unsold vegetables, providing customers with ready-to-eat options.
3. Distributing excess items to relatives and *suki* (loyal patrons), fostering goodwill.
4. Trimming damaged portions and repackaging the remainder into mixed vegetable bundles for resale.

These practices not only sustain vendors' livelihoods but also contribute to local food security by ensuring that surplus or imperfect produce is utilized rather than wasted. By prioritizing quality, minimizing waste, and catering to diverse customer needs, vendors play a crucial role in maintaining access to fresh and affordable produce in their communities.

Supporting these initiatives through training, resources, and policy interventions could further enhance their impact and resilience. Training programs focused on inventory management, food

safety, and marketing strategies could help vendors improve efficiency and reduce losses. Additionally, digital literacy training could empower vendors to leverage online platforms, expanding their customer base and streamlining operations.

Motivation for Entering the Fruit and Vegetable Trade

Fruit and vegetable vendors in Barangays Linglingay and Valle are drawn to this business for both practical and personal reasons. One of the primary motivators is the low capital investment required compared to other types of merchandise. While many vendors express a desire to diversify their product offerings, financial constraints often limit their ability to do so. Despite these challenges, some find creative ways to boost their earnings by adding complementary food items to their carts, such as *tinapa* (smoked fish), *puto* (rice cakes), and other cooking essentials.

In addition to financial practicality, some vendors have shown interest in learning basic farming techniques, such as growing papaya, which could serve both as a source of sustenance and an additional income stream. One vendor shared that the health benefits of fruits inspired her decision to sell them. By offering fresh, nutritious produce, vendors not only sustain their livelihoods but also contribute to their customers' well-being. Overall, the combination of practicality, resourcefulness, and a commitment to health makes selling fruits and vegetables a sustainable and meaningful livelihood for vendors in these communities.

Consumer Motivations for Choosing Fruits and Vegetables

Consumers in Barangays Linglingay and Valle highlighted several reasons for incorporating fruits and, more frequently, vegetables into their meals. These motivations fall into three key areas: health and nutrition, financial considerations, and cultural traditions.

Fruits and vegetables are often recommended by doctors for their health benefits. Workshop participants shared that they were advised that vegetables such as okra, moringa, and sweet potato leaves are beneficial for managing diabetes and lowering blood sugar levels. Meanwhile, fruits such as pomelo are valued for their high vitamin C content, fibre, and antioxidants. Overall, participants believe that regular consumption of fruits and vegetables helps prevent illnesses and promotes overall well-being.

For many, vegetables provide a cost-effective way to meet dietary needs. As a more affordable source of nutrition, they are often favoured as primary viands—dishes that accompany rice in a typical Filipino meal. Participants also shared that buying less expensive vegetables or sourcing them from their own gardens helps them save on food expenses. This allows them to reallocate their budget toward other household necessities, such as utilities, medications, school allowances, and staple foods like rice and meat. Some shared resourceful practices, such as using bananas as a simple viand when financial constraints arise.

Cultural traditions and dietary habits also influence preferences for fruits and vegetables. For instance, chili is often purchased to enhance the flavour of spicy dishes, reflecting local taste preferences. Many participants shared that cooking and serving vegetables is a long-standing practice passed down from their parents and elders. This tradition has become integral to their daily meals and culinary identity.

CHALLENGES FACED BY FRUITS AND VEGETABLE VENDORS AND SUGGESTED RECOMMENDATIONS

Fruit and vegetable vendors in Barangays Linglingay and Valle play a vital role in ensuring food availability and accessibility within their communities. However, they encounter numerous challenges that impact their operations and sustainability (see Table 6). Implementing targeted programs and policies can help address these challenges, strengthen vendor livelihoods and support the stability of local food systems.

Table 6. Challenges Faced by Vendors and Suggested Recommendations

CHALLENGES	SUGGESTED POLICIES AND PROGRAMS
Many vendors struggle with insufficient funds to purchase merchandise or expand their operations. At least four people mentioned consistently availing of microfinance for their capital.	<ul style="list-style-type: none"> ▪ Microfinance institutions or government-backed loan programs that offer low-interest loans and grants to small-scale vendors. This financial support can help vendors buy in bulk, invest in tools, and improve their operations. ▪ Subsidy Programs that can provide seed capital for vendors who demonstrate consistent efforts in growing their businesses or farming.
Buyers often purchase on credit, reducing immediate cash flow.	<ul style="list-style-type: none"> ▪ Introduce mobile payment solutions (e.g., Gcash payment) or any digital wallets for vendors to encourage cashless transactions, reducing dependency on credit sales.
Vendors with backyard farms face limitations due to inadequate land.	<ul style="list-style-type: none"> ▪ Promote communal gardens and urban farming initiatives by allocating unused public land for farming. Local Government Units can provide resources such as seeds, tools, and training to maximize productivity.
Pest infestations and natural disasters significantly affect yields.	<ul style="list-style-type: none"> ▪ Provision of training on pest management, crop seasonality, organic farming techniques, and climate-resilient crops. ▪ Develop affordable crop insurance tailored to small-scale farmers to mitigate losses from typhoons, pests, and other disasters. ▪ Establish emergency funds or grants to support vendors affected by severe weather conditions.
Rising fuel costs and vehicle rental expenses significantly cut into profits.	<ul style="list-style-type: none"> ▪ Provide fuel subsidies or discounted rates for vendors using rolling stores. ▪ Facilitate shared transportation systems where vendors pool resources to reduce costs.
Damaged produce and spoilage during transit result in financial losses.	<ul style="list-style-type: none"> ▪ Build community cold storage units where vendors can safely store perishable items to prevent spoilage. ▪ Upgrade roads and create dedicated vendor transport routes for safer and more efficient logistics.

Vendors are unable to raise prices and often face reduced demand due to changing consumer behaviour,	<ul style="list-style-type: none"> ▪ Promote awareness about the value of fresh, local produce and the importance of supporting small vendors. ▪ Allocate affordable vending spaces in public markets, reducing competition from larger retailers and stabilizing costs.
Vendors face safety challenges on busy roads and risks of robbery during transit.	<ul style="list-style-type: none"> ▪ Enforce stricter road safety regulations and provide safe parking spaces for rolling stores. ▪ Deploy mobile units offering security assistance and first-aid services for vendors on the road.
Some vendors are particularly vulnerable to harassment.	<ul style="list-style-type: none"> ▪ Educate the public about respectful behaviour toward vendors and promote inclusivity

Growing one’s own food or sourcing it from local producers, such as community gardens or nearby stores, is an effective way to ensure affordability and food safety. Both consumers and vendors in Barangays Linglingay and Valle have emphasized the value of this practice. Many have expressed deep gratitude for being able to rely on their garden produce, particularly during times when finances are tight and purchasing food becomes a challenge. This not only provides a reliable and affordable source of fresh fruits and vegetables but also enhances food security and reduces dependence on external supply chains. By cultivating their own produce, individuals can ensure they have access to nutritious, safe food without the added financial strain.

The challenges faced by fruit and vegetable vendors are intertwined with financial, logistical, and social factors. Through targeted programs and policies, these barriers can be addressed effectively, allowing vendors to thrive while enhancing food accessibility and security in their communities. Collaboration among government agencies, non-profits, and the private sector is essential to implement sustainable solutions and foster an environment where vendors can operate safely and profitably.

BARRIERS AND FACILITATORS OF FRUITS AND VEGETABLE CONSUMPTION

Despite the clear preference for vegetables in many households, consumers from Barangay Linglingay and Barangay Valle highlighted several challenges in consistently consuming fruits and vegetables through the Photovoice study. These barriers include financial constraints, logistical difficulties, dietary preferences, and the need for greater support and education.

One major barrier is the limited household budget, which restricts the ability to purchase fresh fruits and vegetables regularly. Nueva Ecija is one of the eight provinces in Region 3, Central Luzon. According to a report by the Philippine Statistics Authority (PSA) in 2020, the average annual family income in the region was PHP 334,000 (USD 5790.92) in 2018, reflecting an 11.7% increase from PHP 299,000 (USD 5184.09) in 2015. In 2018, the annual per capita income required to be considered non-poor in Nueva Ecija was PHP 25,466 (USD 441.53). The poverty rate for families in Nueva Ecija was 6.6%, compared to the regional rate of 5.2% in 2018. Additionally, annual family expenditures rose by 13%, from PHP 239,000 (USD 4143.80) to PHP 270,000 (USD 4681.28) per year. Food expenses accounted for 42.7% of total family expenditures, with families earning less than PHP

40,000 (USD 693.52) spending the highest proportion at 61.1%. From this, only 3.7% is spent on fruits and vegetables. It was also observed that as the income level increases, expenditure for fruits and vegetables decreases.

The limited household budget in Nueva Ecija, as highlighted by the PSA report, is a key barrier to regular consumption of fruits and vegetables. While the average family income in the region increased in 2018, food expenses still took up a large portion of the household budget, particularly for lower-income families who spent over 60% of their income on food. Despite the rise in food expenditure, only a small portion of it was allocated to fruits and vegetables. This suggests that even with increased income, families tend to prioritize other essential food items, leaving limited funds for fresh produce. As income levels increase, the proportion spent on fruits and vegetables decreases, further highlighting the challenge of making healthy, fresh produce affordable and accessible for all income groups.

With regards to logistical difficulties, accessing the municipal market, where fruits like apples and grapes are sold, often incurs additional transportation costs, such as hiring vehicles or spending on gasoline. As a result, households prioritize other essential expenditures, limiting their fruit purchases to more affordable and locally available options like bananas and *dalandan* (Philippine oranges). Vegetables are more commonly served at meals because they are relatively accessible and cheaper. However, participants noted that lowering the prices of vegetables would allow them to purchase and consume more, recognizing the preventive health benefits that fruits and vegetables provide.

Another barrier to consider is the dietary habits and preferences, particularly among children, which further limit fruit and vegetable consumption. Many children prefer processed and ready-to-eat foods, such as luncheon meat, *tocino* (a sweet cured meat), hotdogs, instant noodles, and bread from local bakeries, which are more convenient and appealing. Breakfast often consists of bread and coffee, while eggs and noodles are common dinner staples, especially when children are busy with schoolwork. Health concerns also influence food choices; one participant shared that her grandchild avoids certain vegetable dishes due to allergies. However, another parent proudly noted that her children enjoy a variety of vegetables, with mung beans being the only exception.

Participants provided thoughtful suggestions to overcome these challenges, such as lowering prices, promoting backyard gardening, nutrition campaigns, being frugal, and hard work. Many participants emphasized the importance of making fruits and vegetables more affordable, recognizing that healthier diets could prevent illnesses, which are often more costly to treat. Households expressed a desire to sustain and expand their backyard gardens to ensure a steady supply of fresh produce. Some participants suggested receiving free seeds to support their gardening efforts. Participants acknowledged the need to teach children the value of eating vegetables, aiming to shift dietary preferences toward healthier options over time. Families recognized the importance of saving money, practicing frugality, and working diligently to allocate resources for fruits and vegetables.

CONCLUSION

In conclusion, the food environments in Barangays Linglingay and Valle highlight both the challenges and the strengths of these communities in accessing fruits and vegetables. While urban areas struggle with affordability and rural areas face difficulties with availability, both communities show resilience through practices like backyard gardening and supporting local markets. By addressing

issues such as the high cost of fresh produce, transportation barriers, and changing food preferences, fruits and vegetables can be made more accessible. Educating families about healthy eating, promoting gardening, and supporting local vendors can create lasting improvements in food security. With the right support and collaboration, these communities can overcome these hurdles and ensure everyone has access to the fresh, healthy food they need.

REFERENCES

- Abilgos-Ramos, R., & Ballesteros, J. (2018). *Food consumption, diet quality and diversity of rice-based farm households in Central Luzon, Philippines*. Retrieved from https://www.researchgate.net/profile/Josefina-Ballesteros/publication/330778598_Food_Consumption_Diet_Quality_and_Diversity_of_Rice-Based_Farm_Households_in_Central_Luzon_Philippines/links/5c5405d1458515a4c74e79d5/Food-Consumption-Diet-Quality-and-Diversity-of-Rice-Based-Farm-Households-in-Central-Luzon-Philippines.pdf
- Allen, Q. (2012). Photographs and stories: Ethics, benefits, and dilemmas of using participant photography with Black middle-class male youth. *Qualitative Research*, 12(4), 443–458. <https://doi.org/10.1177/1468794111433088>
- Bogard, J. R., Andrew, N. L., Farrell, P., Herrero, M., Sharp, M. K., & Tutuo, J. (2021). A typology of food environments in the Pacific region and their relationship to diet quality in Solomon Islands. *Foods*, 10(11), 2592. <https://doi.org/10.3390/foods10112592>
- Bioversity International, World Vegetable Center, Department of Science and Technology – Food and Nutrition Research Institute (DOST-FNRI), & International Institute of Rural Reconstruction (IIRR). (2023). *Food Environment in the Philippines: Issues, Priorities and Needs – Collaborative Needs Assessment Workshop Report*. <https://hdl.handle.net/10568/176973>
- CGIAR Research Initiative on Fruit and Vegetables for Sustainable Healthy Diets. 2025. Annual Technical Report 2024: CGIAR Research Initiative on Fruit and Vegetables for Sustainable Healthy Diets. Montpellier, France: CGIAR System Organization. <https://hdl.handle.net/10568/174142>
- Colombo Urban Lab, & Institute of Development Studies. (2024). *Photovoice user guide*. <https://www.csf-asia.org/wp-content/uploads/2024/05/PV-Toolkit-MAY-17-2024.pdf>
- Department of Science and Technology – Food and Nutrition Research Institute. (2022). *Philippine nutrition facts and figures 2018–2019 Expanded National Nutrition Survey (ENNS): Food consumption survey*. Retrieved from <https://enutrition.fnri.dost.gov.ph/uploads/2018-2019%20Facts%20and%20Figures%20-%20Food%20Consumption%20Survey.pdf>
- Department of Science and Technology – Food and Nutrition Research Institute. (2023). *Key findings of the 2022 National Nutrition Survey*. Retrieved from https://enutrition.fnri.dost.gov.ph/uploads/10_2023_NNS_REGIONAL%20ESTIMATES%20OF%20SELECTED%20INDICATORS.pdf
- Department of Agriculture. (n.d.). *Price monitoring*. Retrieved from <https://www.da.gov.ph/price-monitoring/>
- Philippine Statistics Authority. (2020). *Regional Social and Economic Trends (RSET) Central Luzon 2020*. Retrieved from <https://rso03.psa.gov.ph/sites/default/files/2020%20RSET.pdf>

Turner, C., Salm, L., Spires, M., Laar, A., & Holdsworth, M. (2023). Capturing the moment: A snapshot review of contemporary food environment research featuring participatory photography methods. *Current Opinion in Environmental Sustainability*, 65, 101364.

<https://doi.org/10.1016/j.cosust.2023.101364>

Umali, D. J., Itliong, K., Anunciado, M. S., Monville-Oro, E., Gonsalves, J., Hunter, D., Borelli, T., & Mendonca, S. (2023). *Desk review of school food environment literature, policy and guidelines in the Philippines* (Working Paper No. 03). Alliance of Bioversity International and CIAT.

<https://hdl.handle.net/10568/135107>



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