Return on Investment Study: Green City Force AmeriCorps

Submitted to:
AmeriCorps
250 E St., SW
Washington, DC 20024

Submitted by:
ICF Incorporated, LLC
1902 Reston Metro Plaza
Reston, VA 20190
https://www.icf.com

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AUTHORS

This study was conducted by researchers from ICF and BCT Partners:

- Julia Borgida, ICF, Economics Analyst
- Danny Clark, ICF, Research Analyst
- Benjamin Miller, ICF, Senior Director
- Dominic Modicamore, ICF, Lead Economist
- Janet Pershing, ICF, Vice President
- Phylicia Thompson, BCT Partners, Research and Evaluation Analyst
- George Voigt, ICF, Senior Economics Analyst

Executive Summary

Program Description

AmeriCorps, the federal agency for national service and volunteerism, provides opportunities for Americans to serve their country domestically, address the nation's most pressing challenges, improve lives and communities, and strengthen civic engagement. Each year, the agency places more than 200,000 AmeriCorps members and AmeriCorps Seniors volunteers in intensive service roles; and empowers millions more to serve as long-term, short-term, or one-time volunteers. Learn more at AmeriCorps.gov.

Green City Force (GCF), operating in Brooklyn, New York, uses workforce training to improve the economic mobility of AmeriCorps members, all of whom reside in New York City Housing Authority (NYCHA) housing. During the 6-month program, members gain hands-on experience with building sustainable infrastructure, distributing fresh produce, and engaging in urban agriculture, ultimately leading to green career pathways such as energy conservation assistants, compost coordinators, solar energy installers, energy auditors, and other positions and apprenticeships. AmeriCorps members also prepare for and take the Green Professional Training (GPRO) certification and the OSHA 30-hour Construction and Safety training and 10-hour Site Safety Training, improving their understanding of green building practices and workplace health and safety, better enabling members to attain occupations such as HVAC technicians, plumbers, and electricians. The primary focus of GCF's AmeriCorps activities is to help members gain exposure to aspects of the green economy and prepare members for careers following their time with the program.

AmeriCorps members are part of GCF's Service Corps, where members engage in professional development sessions as well as three key service initiatives centered around improving the sustainability and health of the New York City public housing community. These initiatives include building and maintaining urban farms that distribute free organic produce to residents. They also include a resident-to-resident education program through which AmeriCorps members educate other NYCHA residents on environmental sustainability.

GCF offers career development support to Service Corps members, including those who are AmeriCorps members, following their period of service in the program. GCF provides graduates with career counseling and help accessing trainings and available job opportunities.

To better understand the impact of the program in relation to costs, AmeriCorps commissioned a return on investment (ROI) analysis by ICF, an independent research firm. ROI analyses of national service programs estimate the monetary value of benefits that a program generates per dollar invested.

Overview of Benefits and Costs

To calculate the ROI of the GCF program, program benefits were identified, quantified, and compared to the program's costs. These included benefits from the workforce training for AmeriCorps members that is a primary focus of GCF. The analysis also captured benefits from GCF's production and distribution of fresh produce to NYCHA residents for free and composting of organic waste at GCF farms. Benefits of GCF include:

- **Additional earnings by AmeriCorps members.** Serving in AmeriCorps leads to increased wages and reduced unemployment post-national service through skill acquisition, as well as increased educational attainment post-service. Workforce training is a primary focus of GCF, leading to improved employment outcomes for Service Corps members.
- **Living allowances, stipends, and education awards.** AmeriCorps members receive living allowances and stipends during their national service and receive a Segal AmeriCorps Education Award after successful completion. Due to the high pre-service unemployment rate of this group, the opportunity cost to GCF AmeriCorps members presented in this analysis is negative, meaning the opportunity to participate in the program and earn a stipend outweighs potential forgone earnings for AmeriCorps members.
- **Increased tax revenue for government**. Federal, state, and local governments receive more income tax revenue from increased AmeriCorps member earnings post-service, as well as additional sales tax revenue related to those earnings. Federal, state, and local governments also realize tax revenue from the taxable living allowances, stipends, and education awards provided to AmeriCorps members. Further, federal and state governments realize tax revenue from increased earnings by AmeriCorps members as a result of increased educational attainment.
- **Reduced lifetime spending on corrections, public assistance, and social insurance**. Because of the increase in postsecondary educational attainment for AmeriCorps members and program pariticpants, federal and state governments spend less on these items.
- **Benefits to various stakeholders from GCF program activities**. GCF AmeriCorps members participate in activities such as the Farms at NYCHA program that distributes fresh produce to NYCHA residents for free through the efforts of GCF AmeriCorps members. Benefits of this program include cost savings to NYCHA residents from the distribution of free produce. In addition, composting organic waste at the farms reduces municipal government spending on processing of waste and benefits society by reducing carbon emissions.

There are likely additional benefits related to GCF activities such as benefits resulting from alumni support activities and additional environmental benefits from urban farms operated at NYCHA properties. While many studies speak to these benefits of GCF program activities, the existing research does not yet provide a sufficient basis to rigorously monetize these additional benefits from GCF's work. This is due in part to study designs, data constraints, and program mechanisms. The exclusion of some potential benefits from the analysis makes this a conservative estimate of GCF's ROI.

Program costs for GCF in the 2021–2022 program year totaled $1,444,961. Funding was from the following sources:

- Federal government
- State and local government
- Program service fees[1]
- Foundations

ROI Results

Table ES-1 shows the ROI results for the GCF program. Each row represents a different ROI calculation depending on which benefits are considered (all benefits or only benefits to the federal government) and which funding is considered (federal funding only or all funding). The ROIs are presented as dollars returned for every dollar of investment. The analysis used three different scenarios to estimate benefits under different assumptions. Specifically, the study assumed that increased earnings attributable to the programs last for 1 year (short-term scenario), 15 years (medium-term scenario), or 30 years (long-term scenario).

Table ES-1. ROI Estimates

ROI calculation	ROI scenario		
	Short-term	Medium-term	Long-term
Total benefits per federal dollar	$1.39	$9.45	$17.93
Total benefits per funder dollar	$0.69	$4.09	$7.60
Federal government benefits per federal dollar	$0.21	$1.67	$3.10

The program produces strong returns for the medium- and long-term scenarios for all ROI calculations. The most significant factors driving the positive ROI estimates in the medium- and long-term scenarios are:

- **Educational attainment outcomes of AmeriCorps members**. After serving in the AmeriCorps program, AmeriCorps members receive an education award, which is used by a portion of members to help pay for postsecondary degrees post-service. The additional educational attainment resulting from the use of the education award generates additional earnings for AmeriCorps members.

[1] Program service fees were paid by Clean NYCHA for waste management services provided by Green City Force.

- **Employment outcomes of AmeriCorps members.** GCF AmeriCorps members experience increased employment and increased earnings post-service as a result of the workforce training and career development elements of the GCF program.

In the short-term scenario—which only includes benefits for 1 year post-program—the ROI results indicate that there is a short-term loss on funding invested in the program based on the results of *total benefits per funder dollar* and *federal benefits per federal dollar* ROI calculations. An ROI that is below $1 in the first year post-program is common in programs where there is an initial one-time investment made and benefits accrue in the following years. This is because it can require several years of benefits to recoup the initial investment and generate positive returns.

Introduction

AmeriCorps contracted with ICF Incorporated, LLC (hereafter ICF) to research and quantify the return on investment (ROI) of several programs that rely on national service—specifically AmeriCorps—as a major resource to sustain operations. ROI analyses measure the performance of programs and build the base of evidence for future resource allocation decisions. ROI study results demonstrate the value of AmeriCorps programming to relevant stakeholders.

This project began with a comprehensive literature review and preliminary assessments of whether ROI analyses were feasible for five national service programs. These feasibility studies included thorough reviews of these programs' recent evaluations, detailed logic models, proposed ROI analysis methodologies for each program, and a scorecard mechanism that determined the viability of conducting an ROI analysis for each selected program.

Upon completion of five feasibility studies, AmeriCorps selected four programs to be the subjects of ROI studies for fiscal year 2022: Green City Force AmeriCorps, Montana Conservation Corps, AmeriCorps Urban Safety (AMUS) Program, and the Parent Possible HIPPY program. This ROI study measures the benefits of Green City Force AmeriCorps against its costs.

This study of the Green City Force AmeriCorps program is organized into five sections:

- ***Program Description*** describes the program's design, activities, and objectives, along with the role that national service (specifically AmeriCorps) plays in its operation. This section also provides a brief history of past evaluations, outlines the factors that made this program a strong selection for an ROI study, underscores the population this program serves, and identifies a potential set of comparable ROI estimates for the Green City Force AmeriCorps program.
- ***ROI Methodology*** outlines how this analysis used various data sources to monetize benefits derived from Green City Force AmeriCorps, describes its associated program costs, and explains how opportunity costs were calculated.
- ***Benefits, Forgone Benefits (Opportunity Cost), Program Costs, and ROI Results*** provides a detailed description of the program benefits, forgone benefits (opportunity cost), and program costs that are inputs into the ROI analyses and presents the results of the three ROI calculations across different assumptions.
- ***Recommendations for Further Research*** explores ways AmeriCorps and others could further build the evidence base for this program and similar programs, including how to address limitations of this study.
- ***Conclusion*** summarizes key points from the ROI study overall.

Program Description

Green City Force (GCF), operating in Brooklyn, New York, uses workforce training to improve the economic mobility of AmeriCorps members, all of whom reside in New York City Housing Authority (NYCHA) housing. During the 6-month program, members gain hands on experience with building sustainable infrastructure, distributing fresh produce, and engaging in urban agriculture, ultimately leading to green career pathways such as energy conservation assistants, compost coordinators, solar energy installers, energy auditors, and other positions and apprenticeships. AmeriCorps members also prepare for and take the Green Professional Training (GPRO) certification and the OSHA 30-hour Construction and Safety training and 10-hour Site Safety Training, improving their understanding of green building practices and workplace health and safety, better enabling members to attain occupations such as HVAC technicians, plumbers, and electricians. The primary focus of GCF's AmeriCorps activities is to help members gain exposure to aspects of the green economy and prepare members for careers following their time with the program.

AmeriCorps members are part of GCF's Service Corps, where members engage in professional development sessions as well as three key service initiatives centered around improving the sustainability and health of the New York City public housing community. These initiatives include building and maintaining urban farms that distribute free organic produce to residents. They also include a resident-to-resident education program through which AmeriCorps members educate other NYCHA residents on environmental sustainability.

GCF offers career development support to Service Corps members, including those who are AmeriCorps members, following their period of service in the program. GCF AmeriCorps graduates have access to GCF alumni services, including career counseling, continued trainings, and sector-relevant job listings.

Population Served[2]

GCF's Service Corps program has graduated over 600 AmeriCorps members as of August 2022, with an overall graduation rate of 81 percent. All participating AmeriCorps members are young adults ages 18–24 who reside in the NYCHA housing. Through GCF's service initiatives, AmeriCorps members have engaged with over 50,000 public housing residents. This analysis looked at the outcomes of the specific cohort engaged during the September 2021–October 2022 program year. This included 38 AmeriCorps members whose demographics are outlined in Table 1 below.

[2] Sindri Manzanares, GCF contact, personal communication, November 11, 2022. Hereafter, all instances of GCF referenced as a data source were retrieved from this communication.

Table 1. Demographics of GCF AmeriCorps Members

Demographics	Count	Percentage
Race		
African American	22	57.9%
Two or more	7	18.4%
Other	7	18.4%
American Indian/Alaskan Native	1	2.6%
White	1	2.6%
Ethnicity		
Hispanic origin	16	42.1%
Non-Hispanic origin	15	39.5%
Unknown	7	18.4%
Gender		
Female	20	52.6%
Male	15	39.5%
Nonbinary	3	7.9%

Source: Green City Force

GCF Evaluation History

One recent evaluation has been completed for the GCF, summarized below.

Farms at NYCHA Final Evaluation Report, CUNY Urban Food Policy Institute – June 2019[3]

This evaluation summarized outcomes of the Farms at NYCHA initiative. Farms at NYCHA is one of the service initiatives supported by GCF Service Corps members and is a public–private partnership that has supported six farms across four New York City boroughs since 2016. The farms distribute fresh produce to NYCHA residents free of charge. Service Corps members' tasks include construction, planting, harvesting, and distributing produce. Service Corps members also engage with NYCHA residents and gain professional development experience.

The evaluation grouped the outcomes of Farms at NYCHA into numerous categories, including economic opportunities for GCF Service Corps members, increased NYCHA resident cohesion and safety, improved health and nutrition of residents, and environmental benefits. The evaluation used surveys from GCF Service Corps members to measure effects of the workforce development training, as well as interviews with key

[3] CUNY Urban Food Policy Institute (2019). *Farms at NYCHA final evaluation report*. https://greencityforce.org/wp-content/uploads/2020/04/Farms-at-NYCHA-Final-Report.pdf

stakeholders to understand the outcomes of the program. The evaluation noted that 71.5 percent of non-disabled NYCHA residents between the ages of 18 and 24 are unemployed prior to their service and found that 94 percent of 2016 program graduates and 96 percent of 2017 program graduates transitioned into full-time work or school within 6 months of completing their service The evaluation also tracked farm-related and environmental data, including pounds of organic waste composted and gallons of stormwater absorbed.

This ROI analysis was not able to capture the value of all benefits to NYCHA residents found by CUNY Urban Food Policy Institute due to data limitations. But the analysis captures savings from resident access to free organic produce and benefits related to composting. The analysis also uses CUNY Urban Food Policy Institute results to capture benefits to GCF AmeriCorps members.

Other Data Sources

In addition to the GCF evaluation described above, GCF provided data on the number of program graduates who maintained employment or school for 1 year following completion of their service and their wages. GCF also provided data specific to the activities Service Corps members engaged in during their service, including the pounds of organic produce distributed through the Farms at NYCHA program and the pounds of compost collected through the same program.

Selection of GCF Program for the AmeriCorps ROI Project

ICF recommended the GCF AmeriCorps program for a feasibility study to explore monetizing benefits and costs of a community and economic development program. The availability of data related to the program's evaluation and documented outcomes made it a strong candidate for estimating ROI.

The methodologies developed to measure benefits related to the distribution of free produce and composting organic waste may be applied to other programs that engage in urban farming.

Comparable ROI Estimates

ROI studies of other programs that offer similar services provide context for ROI estimates for GCF. Table 2 summarizes information across studies.

Workforce Training Programs

Previous ROI analyses have estimated the benefit of funding workforce programs. The programs studied have similarities to GCF's green careers workforce development program.

Harper-Anderson (2018) conducted a cost–benefit analysis to examine programming funded in Virginia by two public funding streams: the Workforce Investment Act (WIA) and the Trade Adjustment Assistance (TAA) program. The resulting programming provided workforce training to unemployed individuals. WIA funding is distributed among job training and job search services. TAA utilizes its funding for reemployment services, job search assistance and allowance, training, training income support, relocation allowance, and health coverage. The study found a positive ROI for both WIA and TAA programs when comparing program participants to nonparticipants with similar profiles. On average, WIA programs generated a return of $1.72 for each dollar invested.

The cost-benefit analyses conducted by Hollenbeck (2009) examined the ROI of workforce development programs in Indiana connected to WIA for Adults, WIA for Dislocated Workers, WIA for Youth, TAA, and sub-baccalaureate postsecondary education. WIA programs provide labor market exchange resources, including education and training services to unemployed individuals. TAA assists individuals who lost their jobs due to international competition. Postsecondary education programming offers the opportunity to obtain an associate degree. In this study, all programs yielded positive ROI estimates (WIA-Adults: $7.60, WIA-Dislocated Workers: $2.13, WIA-Youth: $0.22, postsecondary: $9.66), except for TAA (-$0.40). The ROI estimates included the benefits and costs to both program participants and government.

Several studies assess the economic benefits of apprenticeships, which is a workforce development model with similarities to GCF's Service Corps. Kuehn et al. (2022) evaluated the American Apprenticeship Initiative sponsored by the U.S. Department of Labor. The study explored the employment and earnings outcomes and employer costs associated with the participant completing the program. The costs included training, reduced productivity, supplies, and program registration. Direct benefits included the value of products and services provided by the apprentice and reduced costs of hiring for an open role. Indirect benefits included employer loyalty and a reduction in turnover. The benefit of the apprenticeship program had a value of $16,000 per apprentice, and the costs were $11,100. The ROI was $1.44 for an apprentice who worked with the organization for a minimum of 5 years and had the median production value. The apprenticeships in this study included a variety of jobs across several sectors and may not include jobs similar to those that GCF participants received training for.

ICF (2021) conducted an ROI study of YouthBuild AmeriCorps, a youth leadership training program that mirrors traditional workforce development programs. The program intended to improve education and employment outcomes for youth who were not in school and were not gainfully employed. The study estimated YouthBuild AmeriCorps's ROI to be between -$0.40 and $9.58 per funder dollar, depending on how long YouthBuild AmeriCorps participants experience increased earnings from serving and participating in YouthBuild AmeriCorps.

Sustainability Investment

Yang (2016) studied an urban community farm in California. The study calculated the return on the farm's operational costs. When considering both social and environmental benefits of the farm as indicated in a willingness-to-pay survey—including improved food quality and access, beneficial health impacts, community development, ecosystem services and biodiversity, and cultural and aesthetic value—the ROI ranged from $5.01 to $6.87.

Community Development

A cost-benefit analysis conducted by Gurin-Sands et al. (2019) assessed the return on a community development project that built an affordable housing center that included a health center and job training center. This study estimated an ROI of $2.91 attributed to cost savings to health systems, improved medical outcomes, savings from the social cost of carbon, leveraged investments, and income boosts related to affordable housing.

Table 2. Relevant Studies and Their Findings

Study	Study area	Benefits/cost savings evaluated	ROI estimate* (Return in dollars for every $1 in cost)
Harper-Anderson (2018)	Public workforce development	**Costs:** Administrative costs and training costs **Benefits:** Additional taxes revenue attributable to an increase in after-program earnings and savings	**WIA ROI:** $1.72
Hollenbeck (2009)	Public workforce development	**Costs:** Administrative and service fees **Benefits:** Tax revenues, less transfer incomes	**WIA-Adults:** $7.60 **WIA-Dislocated Workers:** $2.13 **WIA-Youth:** $0.22 **TAA:** -$0.40 **Postsecondary:** $9.66

Study	Study area	Benefits/cost savings evaluated	ROI estimate* (Return in dollars for every $1 in cost)
Kuehn et al. (2022)	Apprenticeship	**Costs:** Training, reduced productivity of experienced staff while mentoring, supplies, and staff time devoted to completing documentation **Direct benefits:** Value of apprentices' products or services, reduced costs of hiring and filing a skilled labor position **Indirect benefits:** Employer engagement and loyalty, reduced turnover, an enhanced pipeline of skilled workers, development of future managers, improved company culture	$1.44 (represents ROI considering costs and benefits during apprenticeship and up to 5 years after completion)
ICF (2021)	Youth leadership	**Costs:** Professional opportunity costs including foregone earnings during the program, forgone taxes, state and national grants, education awards, and match funds **Benefits:** Increased earnings for YouthBuild AmeriCorps participants, tax revenue generation, reduced spending on corrections, public assistance, and social insurance.	$0.40–$9.58

Study	Study area	Benefits/cost savings evaluated	ROI estimate* (Return in dollars for every $1 in cost)
Yang (2016)	Urban agriculture	**Costs:** Farm manager's salary, cost of equipment and seeds, cost of water **Benefits:** Value of produce, donations, grant money, social and environmental benefits (food quality & access, health impacts, educational opportunities, community development & social justice, ecosystem services, cultural & aesthetic value, volunteer hours	**Economic ROI:** -$0.38 **Social & environmental benefits:** $5.40–$7.26 **Total ROI:** $5.01–$6.87
Gurin-Sands (2019)	Community development	**Costs:** Community development investment **Benefits:** Healthcare system savings, household income boosts, additional investments of government dollars, carbon savings, reduced mortality	$2.91

Study	Study area	Benefits/cost savings evaluated	ROI estimate* (Return in dollars for every $1 in cost)
Anderson (2018)	Public workforce development	**Costs:** Administrative costs and training costs **Benefits:** Additional taxes revenue attributable to an increase in after-program earnings and savings	N/A

*Where studies did not report ROIs, they were calculated based on the net benefits and net costs, where available.

ROI Methodology

The methodology for estimating the ROI of the GCF program consisted of the following components:

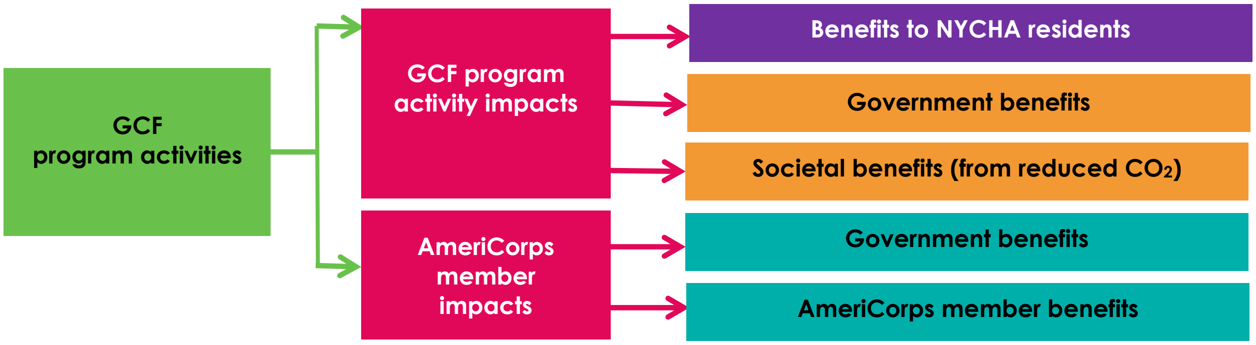
1. **Measuring and monetizing program benefits**. This included using program data provided by GCF, publicly available data, and other third-party sources to determine the benefits to AmeriCorps members, the government, and society.
2. **Estimating forgone benefits (opportunity costs).** This ROI analysis estimated two types of forgone benefits. The first was the professional opportunity cost to GCF AmeriCorps members for their period of national service, during which they could have earned more pay by doing other work. The second was the investment opportunity cost for the GCF program funding that could have been used for other purposes.
3. **Assessing program costs.** GCF provided program costs associated with Cohort 22 within the September 2021–October 2022 program year. GCF program costs included operating costs, AmeriCorps member expenses, and other indirect costs. AmeriCorps member expenses included the living allowance amounts received during service and the expected education awards received post-service.
4. **Calculating the ROI.** The ROI analysis includes three ROI calculations, each assessed under three scenarios representing different assumptions about the persistence of program outcomes:
   - Total benefits per federal dollar
   - Total benefits per funder dollar[4]

[4] The different funder groups whose investment is in this calculation include the federal government (i.e., AmeriCorps) and match funding from state and local governments.

- Federal government benefits per federal dollar

This analytical framework includes only those benefits that could be reasonably monetized given the available data and that likely would not have occurred without the GCF program. Figure 1 shows how GCF program activities can result in benefits to GCF AmeriCorps members; federal, state, and local governments; and society.

Figure 1. Benefits Among Stakeholder Groups From the GCF Program



Available data provided by GCF establishes that GCF AmeriCorps members enjoy earnings impacts as a result of serving in program. However, the data is for 1 year post-program. To address a range of possible durations for those benefits, the analysis includes three scenarios:[5]

- **Short-term.** This scenario assumes short-term earnings impacts. The assumption is that earnings impacts are limited to a single year after program exit. This scenario also assumes that no lifetime benefits are realized.
- **Medium-term.** This scenario assumes a longer duration of earnings impacts. The assumption is that earnings impacts last 15 years. A 3 percent discount rate is applied each year to represent net present value in 2022 dollars.[6] This scenario also assumes that only half of the net present value of lifetime benefits is realized.
- **Long-term.** This scenario assumes sustained earnings impacts throughout GCF AmeriCorps members' working years. The assumption is that earnings impacts last 30 years. A 3 percent discount rate is applied each year to represent net present value in 2022 dollars. This scenario also assumes that the entire net present value of lifetime benefits is realized.

[5] These three scenarios consider varying durations of how long increased employment and earnings benefits last for AmeriCorps members. They also consider varying durations for lifetime benefits that stem from the program. For example, lifetime benefits in terms of decreased public assistance, social insurance, and corrections costs result from AmeriCorps members' higher educational attainment post-service. The analysis estimates lifetime benefits differently in the three scenarios. Specifically, the net present value of the entire lifetime benefit is realized for the long-term scenario, half of the net present value of the lifetime benefit is realized for the medium-term scenario, and no lifetime benefit amount is realized for the short-term scenario.

[6] The Office of Management and Budget (1992) defines a discount rate as, "The interest rate used in calculating the present value of expected yearly benefits and costs" (p. 18). Regarding the 3 percent discount rate, see Office of Management and Budget (2003).

The long-term scenario (i.e., 30 years of sustained employment and earnings benefits) represents roughly a lifetime of working years for a given person, while the short-term scenario assumes benefits for only the year after program participation or service is completed. The medium-term scenario (i.e., 15 years of sustained employment and earnings benefits) represents the midpoint between these two scenarios.

GCF Program Activities That Were Not Monetized

GCF engages in activities that were not captured in the ROI analysis but that likely result in additional benefits. For example, the GCF program provides career services support to alumni of the program post-service. This benefit of the program cannot be measured and monetized with the data currently available. Similarly, the urban farms that are maintained by GCF AmeriCorps members likely result in additional environmental benefits not captured in this analysis due to lack of data. These include benefits related to recycling and stormwater absorption. Finally, benefits to NYCHA residents that were identified in previous evaluations, such as health benefits from access to fresh produce, improved community cohesion and safety improvements, and improved sustainability knowledge as a result of GCF's program activities were not included in this analysis due to lack of available data to monetize them. The exclusion of some potential benefits from the analysis makes this a conservative estimate of GCF's ROI.

Monetizing Program Benefits, Forgone Benefits (Opportunity Costs), and Program Costs

This analysis monetized an array of benefits and included GCF program costs and expected opportunity costs—all in 2022 dollars—to assess the ROI of the GCF program. Additional details on the methodology employed and the calculations used for this analysis are in Appendix B.

Program Benefits

The GCF program results in monetizable benefits to GCF AmeriCorps members; NYCHA residents; society; and federal, state, and local governments. Table 3 summarizes these benefits and data sources by stakeholder group.

Table 3. Benefits Realized From the GCF Program by Stakeholder Group

Stakeholder group	Benefits
GCF AmeriCorps members	• Additional earnings from reduced unemployment • Additional lifetime earnings from increased educational attainment as a result of education awards • Post-tax living allowances and education awards
NYCHA residents	• Savings from access to free organic produce
Society	• Decreased damages to society caused by carbon emissions, due to composting organic waste

Stakeholder group	Benefits
Federal, state, and local governments	• Tax revenue from increased earnings by GCF members post-program and sales tax revenue from the induced increased economic activity • Tax revenue from living allowances and education awards • Reduced lifetime spending on corrections, public assistance, and social insurance from increased educational attainment by GCF AmeriCorps members as a result of education awards • Lifetime tax revenue from increased educational attainment by GCF AmeriCorps members as a result of education awards • Lifetime tax revenue from increased educational attainment by GCF AmeriCorps members as a result of education awards • Reduced spending on processing of waste resulting from composting of organic waste

Benefits to AmeriCorps Members

Post-Tax Living Allowances and Education Awards

Member-specific benefits to AmeriCorps members serving with GCF include post-tax living allowances AmeriCorps State and National members receive during their national service and post-tax education awards they receive after service completion. Both are considered taxable income and thus result in increased government revenue.[7]
The post-tax living allowance and the education award amount that was used to repay student loans were included in the ROI analysis as direct one-time benefits to GCF AmeriCorps members.

Additional Earnings From Reduced Unemployment

GCF AmeriCorps members experience increased employment and increased earnings post-service as a result of the workforce training and career development elements of the GCF program. Not only do GCF AmeriCorps members have reduced unemployment outcomes following completion of their service, but they are also able to obtain higher-paying jobs in specific green industries, including positions in urban agriculture and energy efficiency, such as energy conservation assistants, compost

[7] The tax implications of the AmeriCorps member education award are stated here: AmeriCorps. (n.d.). Segal AmeriCorps Education Award. https://americorps.gov/members-volunteers/segal-americorps-education-award

coordinators, solar energy installers, energy auditors, and other positions and apprenticeships.

According to census data for New York City residents, the average hourly wage accounting for similar racial demographics would be $14.00, and the average hourly wage accounting for the same level of educational attainment would be $16.59—both of which are lower than the post-service wage of $19.26 provided by GCF.

To monetize this benefit following completion of service, the analysis utilized GCF-provided data regarding the number of AmeriCorps members who were employed 1 year following completion of the program, as well as the average wage of these individuals. Using the unemployment rate provided in the 2019 Farms at NYCHA evaluation, the analysis found a corresponding increase in the number of employed individuals.[8] The analysis then proceeded to multiply the number of newly employed individuals by the median wage to determine increased earnings resulting from the GCF program. The earnings metrics were applied and discounted based on the short-term, medium-term, and long-term scenarios to represent net present 2022 dollars.

This analysis applied the GCF-provided average post-service wage of $19.26 only to AmeriCorps members whose post-service employment is attributable to participation in AmeriCorps. Given that other members also earn the higher average wage as a result of upskilling, this is a conservative estimate of the earnings benefit to members.

Additional Lifetime Earnings From Increased Educational Attainment as a Result of Education Awards

Another benefit derived from national service is the higher educational attainment of AmeriCorps members. AmeriCorps members in general—as documented in Friedman et al. (2016)—can use their education awards to pay for additional postsecondary educational attainment or to repay student loans.

GCF-provided data indicated that five AmeriCorps members went on to pursue additional education following completion of the program, while Friedman et al. (2016) reported 33 percent of AmeriCorps State and National members used it to repay student loans.

This analysis estimated the expected increase in lifetime earnings of GCF members attributable to the use of education awards to pay for additional postsecondary schooling. Based on the findings from Friedman et al. (2016), the analysis estimated the amount in post-tax education awards that GCF AmeriCorps members used to pay for additional educational attainment. The analysis then estimated the value of the additional educational attainment attributable to the education awards in terms of lifetime earnings. These estimated additional post-tax lifetime earnings were included as a benefit to GCF AmeriCorps members.

[8] According to the 2019 Farms at NYCHA evaluation, 71.5 percent of non-disabled NYCHA residents between the ages of 18 and 24 are unemployed.

Benefits to NYCHA Residents

Through the Farms at NYCHA program, GCF AmeriCorps members contribute to the operation of urban farms and distribution of organic produce to NYCHA residents. All produce distributed at each of the six farmstands is given to residents for free. The analysis calculated cost savings to residents using a GCF-provided estimate of the number of pounds of produce distributed to residents, combined with an estimate of the market cost of produce.

Benefits to Society

The Farms at NYCHA program composts organic waste generated by NYCHA residents and the Farms at NYCHA itself. GCF provided an estimate of the number of pounds of waste composted through the program. Using Nordahl et al. (2020), this analysis determined the reduction in carbon emissions as a result of composting organic waste and diverting it from a traditional landfill. The difference in carbon emissions was then valued using the social cost of carbon to monetize the benefit to society resulting from the reduction in emitted carbon (Rennert et al., 2022).

Benefits to Government

Tax Revenue Generation and Reduced Spending (Benefits to Government)

The benefits of GCF AmeriCorps members result in benefits to various levels of government.

Benefits to Government From Increased Earnings by GCF AmeriCorps Members

Federal, state, and local governments benefit from increased earnings by GCF AmeriCorps members. Those benefits include:

- **Income tax revenue from increased employment by GCF AmeriCorps members post-service.** Federal income taxes, state income taxes, Medicare taxes, and Social Security taxes were estimated for the additional pre-tax earnings of GCF AmeriCorps members based on 2022 rates. For both federal and state income taxes, the analysis estimated proportional tax rates representing the share of earnings paid in taxes. To estimate proportional tax rates that reflect federal- and state-level progressive tax brackets and standard deductions, the amount of total taxes paid was divided by the pre-tax earnings per GCF AmeriCorps member.
- **Sales tax revenue from the increased economic activity that results from increased employment by GCF AmeriCorps members post-service.** To estimate the additional sales tax revenue generated due to the additional post-tax earnings of GCF AmeriCorps members, the New York state and local sales tax rate was applied to the estimated taxable expenditures of GCF AmeriCorps members based on their post-service pre-tax earnings using Consumer

Expenditure Survey data (U.S. Bureau of Labor Statistics, 2022-a).[9] The resulting product was then applied to the share of post-tax earnings attributable to serving with the GCF program, for AmeriCorps members, to estimate state and local government sales tax revenue.

Benefits to Government From Increased Educational Attainment by GCF AmeriCorps Members

Federal, state, and local governments benefit from increased postsecondary educational attainment by GCF AmeriCorps members. Those benefits include:

- **Tax revenue from education awards.** Education awards provided to GCF AmeriCorps members upon service completion are subject to taxes, resulting in additional government revenue.[10] This ROI analysis applied federal income, state income, Social Security, and Medicare tax rates to the expected total amount of education awards to be given to GCF AmeriCorps members to estimate these additional taxes. Both estimated proportional federal and state income tax rates were used. Sales taxes were not estimated for education awards because they cannot be used for consumer purchases.
- **Reduced lifetime spending on corrections, public assistance, and social insurance from increased educational attainment as a result of education awards and program participation.** Higher educational attainment is associated with less dependence on government assistance programs and lower incarceration rates (Harlow, 2003; Blagg and Blom, 2018). Because of GCF AmeriCorps members' increased postsecondary educational attainment due to the use of the education award and program participation, federal and state governments spend less. To monetize these benefits, the analysis paired the expected increase in postsecondary educational attainment of GCF AmeriCorps members with the expected difference in per-person lifetime government cost savings from Medicaid, SNAP, unemployment insurance, workers' compensation, and corrections for individuals with different levels of educational attainment. The latter values were provided by Trostel (2015).
- **Lifetime tax revenue from increased educational attainment as a result of education awards.** Another benefit related to GCF AmeriCorps members captured in this ROI study is the lifetime tax revenue generated from members' higher postsecondary educational attainment due to the use of the education award. Here, the estimated increase in GCF AmeriCorps members' postsecondary educational attainment was paired with the expected difference

[9] To calculate the estimated taxable expenditures, Consumer Expenditure Survey (CE) Table 1203 was used from the U.S. Bureau of Labor Statistics (2022-a). This table lists the annual expenditure means by pre-tax income tax brackets. Thus, the pre-tax earnings of GCF AmeriCorps members were used instead of their post-tax earnings to calculate this metric. Please visit this site for more details: https://www.bls.gov/cex/tables/calendar-year/mean-item-share-average-standard-error.htm#cu-income.

[10] The tax implications of the AmeriCorps member education award are stated here: AmeriCorps. (n.d.). Segal AmeriCorps Education Award. https://americorps.gov/members-volunteers/segal-americorps-education-award

in per-person lifetime taxes for individuals with different levels of education, as provided by Trostel (2015). This lifetime tax revenue includes federal income, state income, property, Social Security, Medicare, and sales taxes derived from use of the education award.

Benefits to Government From Living Allowances Received by GCF AmeriCorps Members

The living allowance provided to GCF AmeriCorps members during their service term is considered taxable income. This analysis applied a proportional federal income tax rate as well as Medicare and Social Security tax rates to the pre-tax living allowance amount received by GCF AmeriCorps members for the most recent program year. The analysis also applied a sales tax rate to the estimated taxable expenditures of GCF AmeriCorps members based on their post-tax living allowance amount to estimate additional state and local government revenue.

Benefits to Government From Reduced Spending on Waste Processing

Composting from the Farms at NYCHA program results in reduced municipal spending on waste processing. The analysis values the cost savings as a benefit to local government using the GCF-provided estimate of pounds of compost created, combined with an estimate from Farhidi et al. (2022) of the cost that would have been incurred to process that waste in a landfill.[11]

Forgone Benefits (Opportunity Costs)

The analysis estimated forgone benefits of both members and funders because of their participation and investment in the GCF program. These forgone benefits were subtracted from the program benefits to calculate the net benefits of the program. Those net benefits were then compared to program cost to calculate the ROI. These forgone benefits are referred to as the *professional and investment opportunity costs*, described below.

[11] According to Farhidi et al. (2022), composting 1 ton of waste results in government savings of $60, assuming composting can divert 30% of the average waste processed.

Professional Opportunity Cost to GCF AmeriCorps Members

> Using data provided by the NYCHA, the 2019 Farms at NYCHA evaluation noted that 71.5 percent of non-disabled NYCHA residents between the ages of 18 and 24 are unemployed. Due to the high pre-service unemployment rate of this group, the opportunity cost to GCF AmeriCorps members is negative, meaning the opportunity to participate in the program and earn a stipend outweighs potential forgone earnings for AmeriCorps members.

The first forgone benefit was the professional opportunity cost to GCF AmeriCorps members for their period of national service, during which they could otherwise be working and earning higher pay. To calculate this opportunity cost, this analysis estimated what GCF AmeriCorps members would have earned if they did *not* serve with the GCF program. Specifically, this analysis estimated the weighted average annual earnings of this group as well as their weighted unemployment rate using GCF-provided data, data from the Current Population Survey's Annual Social and Economic Supplement for March 2022 (U.S. Census Bureau, 2022-b), and the demographic distribution of GCF AmeriCorps members for the 2021–2022 program year. The demographics included were gender, age, race/ethnicity, and the highest level of education pre-service. The weighted average annual earnings represent the expected earnings of the GCF AmeriCorps members if they were employed but *not* serving with the GCF program. The unemployment rate, taken from the 2019 Farms at NYCHA evaluation, represents how many of the GCF AmeriCorps members would have been unemployed if they did *not* serve with the GCF program. These weighted metrics were used to calculate the aggregate earnings those employed individuals would have made without serving with the GCF program. Namely, they are used to calculate the aggregate post-tax earnings this population would forgo due to serving with the GCF program for one year.

Some of the forgone earnings would have been paid in the form of taxes. To appropriately allocate opportunity costs between GCF AmeriCorps members and government, the analysis estimated the reduced tax revenue for federal income, state income, Social Security, and Medicare taxes. The analysis also estimated the reduction in sales tax from reduced consumption. Combined, these taxes represent what the various levels of government are forgoing in tax revenue when these individuals decide to serve with the GCF program instead of working for higher pay. The summation of all forgone taxes and the forgone post-tax earnings of GCF AmeriCorps members is called the *total professional opportunity cost*.

It is important to note that in the *federal government benefits per federal dollar* ROI calculation, only federal government (not total) benefits are included. Given this, only federal components of the professional opportunity cost are subtracted from all federal government benefits (e.g., tax revenue and cost savings) realized as a result of the GCF program in this ROI calculation. The parts of the professional opportunity cost removed from these total federal government benefits include the federal income, Social Security, and Medicare taxes forgone due to GCF AmeriCorps members forgoing earnings during their service year. The summation of these forgone federal taxes is called the *federal professional opportunity cost*.

Investment Opportunity Cost to Funders

The second forgone benefit used in this ROI analysis is an investment opportunity cost. It estimates the expected forgone return if all funds used to support the GCF program during the 2021–2022 program year were invested in U.S. Treasury bonds instead. This opportunity cost applies to all funders, including but not limited to AmeriCorps. To calculate this, the analysis matched 2021 real interest rates provided by the Office of Management and Budget (2020) to each of the scenarios leveraged in this ROI analysis: short-term, medium-term, and long-term.[12] The rates of return for U.S. Treasury bonds provide a market-based estimate of return for low-risk investments.

The real interest rate for the 3-year maturity was used for the short-term scenario, the average between the 10-year and 20-year maturity rates was used as the rate for the medium-term scenario, and the 30-year maturity rate was used for the long-term scenario. These real interest rates were -1.8 percent, -0.8 percent, and -0.3 percent, respectively (Office of Management and Budget, 2020). Also, the number of time periods elapsed on these bonds was equal to the number of years the short-term, medium-term, and long-term scenarios assume GCF AmeriCorps members' employment and earnings gains are sustained: 1 year, 15 years, and 30 years, respectively. These bonds compound biannually, according to the U.S. Department of the Treasury (2019). The forgone accrued interest was calculated for each of the three scenarios if the funding amount used to support the GCF program was instead invested.

Note that for 1) the *federal government benefits per federal dollar* and 2) the *total benefits per federal dollar* ROI calculations, the investment opportunity cost subtracted from the benefits in these calculations is the forgone accrued interest from investing *only* the federal funds into these U.S. Treasury bonds. This is called the *federal investment opportunity cost*. This is because these ROI calculations only include federal government (not total) program costs. For the other ROI calculation estimated in this analysis, the investment opportunity cost subtracted from the benefits realized is the forgone accrued interest from investing *all* GCF program funds (both federal and non-federal) into these U.S. Treasury bonds. This is called the *total investment opportunity cost*. See Appendix B for details.

Program Costs

The costs for the GCF program, used for this ROI analysis, include federal and required match funding and any other funding used to support program operations. The program costs are specific to funding the activities and positions of GCF AmeriCorps members whose outcomes are measured in this analysis.

[12] The analysis used 2021 real interest rates for U.S. Treasury bonds because the GCF program year analyzed began in 2021.

Table 4 shows the segmentation of GCF program costs by funder.[13] The federal funds included the AmeriCorps State and National grant. Federal dollars also helped pay for the expected education award amounts granted to GCF AmeriCorps members once they completed their service term. Funds provided by state/local governments represent the match funding the GCF program received for the program year.

Table 4. GCF Program Costs by Funder Type

Funder	Funding provided for the program year
Federal government (AmeriCorps)	$486,200
State/local governments (i.e., match funding)	$828,193
Program service fees	$14,006
Foundations	$116,562
Total	**$1,444,961**

ROI Study Limitations

Study limitations include the following:

- The GCF program provides career services support to alumni of the program post-service. This benefit of the program cannot be measured and monetized with the data currently available. As a result, it was not included in the ROI estimates.
- Activities of GCF AmeriCorps members result in environmental benefits not captured in this analysis due to lack of data. These include benefits related to recycling and stormwater absorption. These benefits were not included in the ROI.
- Additional benefits to NYCHA residents that were identified in previous evaluations, such as health benefits from access to fresh produce, improved community cohesion and safety improvements, and improved sustainability knowledge as a result of GCF's program activities, were not included in this analysis due to lack of available data to monetize them.

[13] Program cost data were provided by GCF.

Program Benefits, Forgone Benefits (Opportunity Costs), Program Costs, and ROI Results

This section provides estimates of program benefits, forgone benefits (opportunity costs), and program costs, along with the ROI results.

Program Benefits

Table 5 shows the percentage of total benefits by stakeholder group for each of the three scenarios. Table 6 shows the monetized program benefits by stakeholder group over the three time scenarios. The majority of monetized benefits are realized by GCF AmeriCorps members and the federal government. Together, these two stakeholders experience 89 percent to 94 percent of program benefits, depending on the scenario.

Table 5. Percentage of Program Benefits by Stakeholder Group

Recipient	Benefits by scenario (%)		
	Short-term	Medium-term	Long-term
GCF AmeriCorps members	75%	77%	77%
NYCHA residents*	6%	1%	0%
Society*	0%	0%	0%
Federal government	14%	17%	17%
State/local governments	5%	6%	6%

*NYCHA resident benefits were 0.47% in the long-term. Society benefits were 0.018% in the short-term, 0.003% in the medium-term, and 0.001% in the long-term.

Note: Numbers may not sum due to rounding.

Table 6. Program Benefits by Recipient

Recipient	Benefits by scenario (2022$)		
	Short-term	Medium-term	Long-term
GCF AmeriCorps members	$702,565	$4,874,195	$9,326,670
NYCHA residents	$56,637	$56,637	$56,637
Society	$140	$140	$140
Federal government	$129,877	$1,059,654	$2,053,507
State/local governments	$47,885	$371,441	$717,569
Total	**$937,104**	**$6,362,066**	**$12,154,523**

Note: Numbers may not sum due to rounding.

Forgone Benefits (Opportunity Costs)

Table 7 shows the breakdown of the forgone benefits from the professional opportunity cost to GCF AmeriCorps members and government in net present 2022 dollars. It lists the amount of post-tax earnings that members are forgoing—and the associated taxes forgone—to serve with the GCF program. This is called *the total professional opportunity cost*. For the *federal government benefits per federal dollar* ROI calculation, only the forgone federal income, Social Security, and Medicare taxes were subtracted from the total federal benefits that are realized due to the GCF program. The summation of these forgone federal taxes is called the *federal professional opportunity cost*. Due to the high pre-service unemployment rate of this group, the opportunity cost to GCF AmeriCorps members is negative, meaning the opportunity to participate in the program and earn a stipend outweighs potential forgone earnings for AmeriCorps members.

Table 7. Forgone Benefits From Professional Opportunity Cost

Forgone category	Professional opportunity cost amount across all scenarios (2022$)
Post-tax earnings	-$161,772
Federal income, Social Security, and Medicare taxes	-$598
State income and sales tax	-$1,591
Total	**-$163,961**

Table 8 lists the forgone benefits from the investment opportunity cost incurred by scenario and for when:

a) Total GCF program funds for the program year are invested in U.S. Treasury bonds

b) Only federal GCF program funds (both program and education award funding) are invested in these bonds

Table 8 also lists the 2021 real interest rates and the number of years elapsed (with two payments a year) that were used as inputs to calculate the forgone accrued interest value for each scenario. The analysis used 2021 real interest rates for U.S. Treasury bonds because the GCF program year analyzed began in 2021.

Table 8. Investment Opportunity Cost by Scenario and Funding Stream

Funding stream	Forgone accrued interest by scenario (2022$)		
	Short-term (1.30% interest rate and 1 year elapsed)	Medium-term (1.45% interest rate and 15 years elapsed)	Long-term (1.50% interest rate and 30 years elapsed)
Total GCF program funding	-$29,386	-$185,794	-$141,249
Federal GCF program funding only	-$12,206	-$77,173	-$58,670

Program Costs

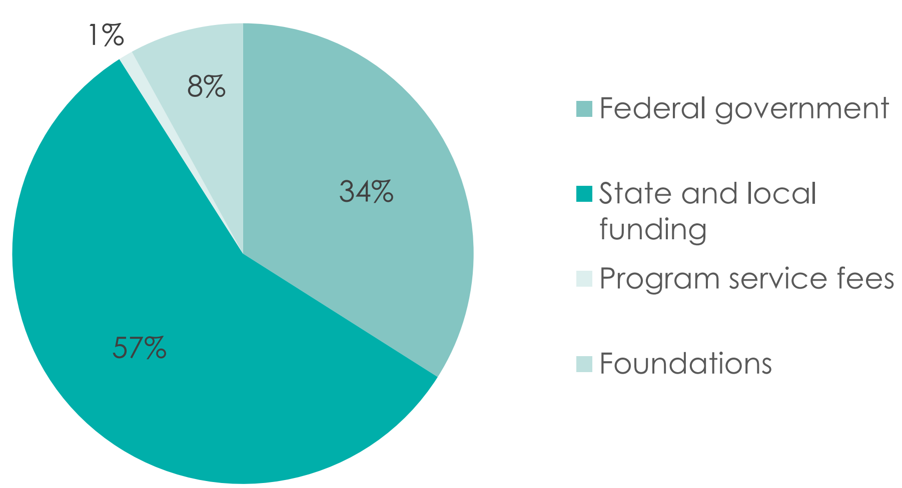
Table 9 shows the cost of GCF for the 2021–2022 program year by funding source, and the percentage from each source is shown in Figure 2. Overall, the total cost of the GCF program for this program year was $1,444,961. This amount includes $486,200 in federal government funding from the AmeriCorps State and National grant and the expected education awards, which constituted 34% of the cost. The remaining 66% of the cost was provided by state/local governments as part of the required match funding, program service fees, and foundations. This match provides the GCF program with the resources to offer more services than would otherwise be available only under the AmeriCorps federal funds. That translates into increased aggregate benefits realized across stakeholder groups.

Table 9. Program Cost by Funding Source for the GCF Program

Funder	Funding provided for the program year
Federal government (AmeriCorps)	$486,200
State/local governments (i.e., match funding)	$828,193
Program service fees	$14,006
Foundations	$116,562
Total	**$1,444,961**

Note: Numbers may not sum due to rounding.

Figure 2. Program Cost by Funding Source



ROI Results

This analysis developed three ROI estimates for the GCF program using the three scenarios (short-term, medium-term, and long-term). As noted above, the ROI calculations compare the net benefits of the GCF program with the program cost to calculate the ROI.

Table 10 shows the program gross benefits, forgone benefits, net benefits, cost of the GCF program, and each of the components that are used to calculate the three ROIs.

Table 7. Program Benefits, Net Benefits, and Program Costs by ROI Scenario

Benefits and costs	ROI scenario (2022$)		
	Short-term	Medium-term	Long-term
Total program gross benefits	**$937,104**	**$6,362,066**	**$12,154,523**
GCF AmeriCorps members	$702,565	$4,874,195	$9,326,670
NYCHA residents	$56,637	$56,637	$56,637
Society	$140	$140	$140
Federal government	$129,877	$1,059,654	$2,053,507
State/local governments	$47,885	$371,441	$717,569
Total forgone benefits (opportunity cost)	**-$205,553**	**-$426,928**	**-$363,880**
Forgone benefits to members (forgone earnings post-taxes)	-$161,772	-$161,772	-$161,772
Forgone tax revenue from members' earnings	-$2,189	-$2,189	-$2,189
Forgone tax revenue federal government	-$598	-$598	-$598
Forgone tax revenue state/local governments	-$1,591	-$1,591	-$1,591
Forgone benefits from total investment (all funders)	-$29,386	-$185,794	-$141,249
Forgone benefits from federal government investment	-$12,206	-$77,173	-$58,670
Total program net benefits (total program gross benefits – total forgone benefits)	**$1,008,609**	**$6,174,983**	**$11,602,808**
Net benefits members (member benefits – forgone benefits members)	$864,337	$5,035,967	$9,488,442
Net benefits federal government (federal government benefits – forgone tax revenue to federal government – forgone benefits from federal government investment)	$144,272	$1,139,016	$2,114,366
Program cost	**$1,444,961**	**$1,444,961**	**$1,444,961**
Federal government cost	$486,200	$486,200	$486,200
Non-federal government cost	$958,761	$958,761	$958,761

Benefits and costs	ROI scenario (2022$)		
	Short-term	Medium-term	Long-term
ROI for total benefits per federal dollar (total program net benefits / federal government cost)	**$1.39**	**$9.45**	**$17.93**
ROI for total benefits per funder dollar (total program net benefits / program cost)	**$0.69**	**$4.09**	**$7.60**
Federal government benefits per federal dollar (net benefits federal government / federal government cost)	**$0.21**	**$1.67**	**$3.10**

Table 11 summarizes the ROI results for the GCF program across the short-term, medium-term, and long-term scenarios. Three different ROI results are calculated for each scenario. Since two of the calculations include benefits to society, the results are expressed as cost–benefit ratios, while maintaining the ROI terminology. Specifically, these ratios take the form of the sum of monetized benefits over the sum of applicable program costs. The ROIs expressed as cost–benefit ratios in this study can be interpreted as the amount of dollars returned for every $1 of investment (or program cost).[14]
See Appendix B for the formulas used to calculate each ROI calculation.

Table 8. ROI Results for the GCF Program

ROI calculation	ROI scenario		
	Short-term	Medium-term	Long-term
Total benefits per federal dollar	$1.39	$9.45	$17.93
Total benefits per funder dollar	$0.69	$4.09	$7.60
Federal government benefits per federal dollar	$0.21	$1.67	$3.10

The program produces strong returns for the medium- and long-term scenarios for all ROI calculations. The most significant factors driving the positive ROI estimates in the medium- and long-term scenarios are:

- **Educational attainment outcomes of AmeriCorps members.** After serving in the AmeriCorps program, AmeriCorps members receive an education award, which is used by a portion of members to help pay for postsecondary degrees post-service. The additional educational attainment resulting from the use of the education award generates additional earnings for AmeriCorps members.

[14] ROIs can be expressed in percentages or as ratios, such as in this study. Although not shown as a ratio in the results, the ROIs in this study show the amount of return for every $1 invested.

- **Employment outcomes of AmeriCorps members.** GCF AmeriCorps members experience increased employment and increased earnings post-service as a result of the workforce training and career development elements of the GCF program.

Due to available data, a limited number of benefits from program activities were able to be monetized, including cost savings to residents of free organic produce and reduced CO_2 emissions due to GCF composting activities. These benefits were relatively small compared to program costs.

In the short-term scenario—which only includes benefits for 1 year post-program—the ROI results indicate that there is a short-term loss on funding invested in the program based on the results of *total benefits per funder dollar* and *federal benefits per federal dollar* ROI calculations. An ROI that is below $1 in the first year post-program is common in programs where there is an initial one-time investment made and benefits accrue in the following years. This is because it can require several years of benefits to recoup the initial investment and generate positive returns.

Government funding serves as a catalyst for private funding of evidence-based social services programs. For the ROI calculations of 1) *total benefits per federal dollar* and 2) *total benefits per funder dollar*, AmeriCorps's requirement of match funding also contributed to the magnitude of outcomes. Federal government funding of the GCF program serves as a catalyst for other funding, specifically that from state and local governments. This additional funding allowed the GCF program to operate at a larger scale than would have been possible under the federal funding alone. Though it may not impact the ROI because it is a per-unit metric, match funding leads to greater investment in the GCF program and thus to a greater impact as more individuals are served.

Recommendations for Further Research

Future ROI studies for national and community service programs, such as the GCF program, can be strengthened in several ways.

Recommendation 1: Determine the persistence of short- and long-term impacts for AmeriCorps members. The persistence of impacts, such as earnings or employment, is often not measured in evaluations because it requires long-term tracking. Although a scenario-based approach that accounts for variations in the persistence of impacts can be used, as was completed in this ROI analysis, rigorous research on the long-term impact of programming will enable AmeriCorps to determine a single value for ROI calculations and avoid relying on the scenario-based approach. For example, Friedman et al. (2016) reported the unemployment status of AmeriCorps member alumni 6 months before service, 6 months after service, and during the summer of 2016. The authors indicate that data for the latter timepoint was collected anywhere from 3 to 11 years after service completion, depending on the AmeriCorps member alumni cohort (i.e., 2005, 2010, or 2013). The varying data collection periods for the cohorts makes it difficult to measure the duration of benefits. Thus, instead of collecting outcome measures at a time that varies by AmeriCorps member, studies should track outcomes of interest at the same intervals, multiple times after program or service completion, to provide greater insight into the duration and consistency of benefits.

Recommendation 2: Document outcomes using third-party data sources. Using third-party data, along with or in place of self-reported data, can also improve the accuracy of program outcome measurements. While self-reported data are easier to obtain—especially via the use of survey instruments—they have several disadvantages. Some answers may be exaggerated, respondents may not answer honestly, and response biases could affect results. AmeriCorps programs should—where possible—leverage data from third-party sources either to provide data for their program evaluation or to corroborate findings from self-reported data. For example, if employment and earnings outcomes are of interest, unemployment insurance data—which are submitted by employers—could be used to verify members' wages or employment status post-service. Additionally, if degree completion data are of interest, such as in the case of this ROI analysis, data from the National Student Clearinghouse (NSC) could be used to verify what portion of GCF AmeriCorps members pursued higher education and which degrees were completed post-program with the help of the education award. Were degree or employment outcomes data available from third-party data sources (like NSC), those data may make more precise ROI estimates possible.

Recommendation 3: Quantify ripple effects. Earnings impacts AmeriCorps members likely have positive benefits for those individuals' families and surrounding communities. Rigorous research on those potential ripple effects would enable AmeriCorps to capture a broader array of benefits of this and other programs, which would be expected to result in an increased ROI. Specifically, the longitudinal impacts on AmeriCorps members could be collected alongside the ripple effects their outcomes have on their families and communities to determine how long these indirect impacts are sustained after program participation or completion.

Recommendation 4: Monetize additional benefits through improved data collection. Future evaluations should attempt to collect data on benefits to NYCHA residents and other program beneficiaries that were not captured in this ROI study. These may spring from program activities and outcomes measured in previous evaluations, such as improved community cohesion, safety improvements, improved sustainability knowledge, additional environmental benefits (e.g., improved stormwater absorption), and efforts to promote the health of community members. Similarly, future evaluations should attempt to capture the benefit of ongoing alumni support AmeriCorps members receive from GCF in the medium- and long-term ROI scenarios. Improved data collection on these topics will allow for a more precise and inclusive ROI estimate.

Conclusion

Based upon these findings, investment in the GCF program results in favorable impacts under the medium- and long-term scenarios. Impacts are driven by increased postsecondary educational attainment and increased employment of AmeriCorps members. In the short-term scenario—which only includes benefits for 1 year post-program—the results are mixed. The *total benefits per federal dollar* calculation estimates that benefits exceed costs in the short-term. The *total benefits per funder dollar* and *federal government benefits per federal dollar* calculations estimate a short-term loss.

Appendix A: Program Benefits, Forgone Benefits, and Program Costs Included in Return on Investment Calculations

In Table 12, the three columns on the right indicate by an “X” if the program benefits, forgone benefits (opportunity cost), or program cost is included in the numerator or denominator of an ROI calculation.

Table 9. Program Benefits, Forgone Benefits, and Program Costs Included in ROI Calculations

Benefit or cost			Total net benefits per federal dollar	Total net benefits per funder dollar	Federal government net benefits per federal dollar
Benefit	**Stakeholder group**	**Data sources**	**X indicates inclusion in the ROI numerator**		
Increased earnings of national service members due to increased employment and education of AmeriCorps members	AmeriCorps members	• GCF • U.S. Census Bureau (2022-a) • U.S. Bureau of Labor Statistics (2022-b) • U.S. Bureau of Labor Statistics (2019-c) • CUNY Urban Food Policy Institute (2019))	X	X	
Increased federal and state income tax revenue due to increased earnings of AmeriCorps members	Federal and state governments	• GCF • U.S. Census Bureau (2022-a) • U.S. Bureau of Labor Statistics (2022-b) • Tax rate data on Bankrate.com and Loughead (Tax Foundation, 2020)	X	X	X
Increased Social Security and Medicare tax revenue due to increased earnings of AmeriCorps members	Federal government	• GCF • U.S. Census Bureau (2022-a) • U.S. Bureau of Labor Statistics (2022-b) • Social Security Administration (2021)	X	X	X

Benefit or cost			**Total net benefits per federal dollar**	**Total net benefits per funder dollar**	**Federal government net benefits per federal dollar**
Increased sales tax revenue due to increased earnings of AmeriCorps members	State and local governments	• GCF • U.S. Census Bureau (2022-a) • U.S. Bureau of Labor Statistics (2022-a) • U.S. Bureau of Labor Statistics (2022-b) • Loughead (Tax Foundation, 2020)	X	X	
AmeriCorps member post-tax living allowances and education awards	AmeriCorps members	• GCF	X	X	
Reduced spending on lifetime public assistance, corrections, and social insurance due to increased educational attainment of AmeriCorps members	Federal, state, and local governments	• Trostel (2015) • Zeidenberg et al. (2016) • U.S. Census Bureau (2022-a)	X	X	X
Savings from access to fresh produce	NYCHA members	• GCF	X	X	
Reduced carbon emissions and social cost of carbon	Society	• GCF • Rennert et al. (2022) • Nordahl et al. (2020)	X	X	
Reduced cost of processing waste	State and local governments	• GCF • Farhidi et al. (2022)	X	X	

Benefit or cost			Total net benefits per federal dollar	Total net benefits per funder dollar	Federal government net benefits per federal dollar
Forgone Benefit (Opportunity Cost)	**Payer**	**Data Sources**	**X indicates inclusion in the ROI denominator**		
Opportunity costs of forgone market wages for AmeriCorps members	AmeriCorps members	• GCF • U.S. Census Bureau (2022-a) • U.S. Bureau of Labor Statistics (2019-c)	X	X	X
Opportunity costs of federal taxes on forgone market wages for AmeriCorps members (e.g., federal income and social security taxes)	Federal government	• GCF • U.S. Census Bureau (2022-a) • U.S. Bureau of Labor Statistics (2022-b) • U.S. Bureau of Labor Statistics (2019-c) • Tax rate data on Bankrate.com and Loughead (Tax Foundation, 2020) • Social Security Administration (2021)	X	X	X

Benefit or cost			Total net benefits per federal dollar	Total net benefits per funder dollar	Federal government net benefits per federal dollar
Opportunity costs of state and local taxes on forgone market wages for AmeriCorps members (e.g., state income and state/local sales taxes)	State and local governments	• GCF • U.S. Census Bureau (2022-a) • U.S. Bureau of Labor Statistics (2019-a) • U.S. Bureau of Labor Statistics (2022-b) • U.S. Bureau of Labor Statistics (2019-c) • Loughead (Tax Foundation, 2020)	X		X
Opportunity costs of federal funders	Federal government	• AmeriCorps • U.S. Treasury Department (2019)	X	X	X
Opportunity costs of other program funders	Non-government funders	• GCF • U.S. Treasury Department (2019)		X	
Program cost	**Payer**	**Data sources**	**X indicates inclusion in the ROI denominator**		
AmeriCorps grant costs (excluding living allowances and education awards provided to AmeriCorps members)	Federal government (AmeriCorps)	• AmeriCorps	X	X	X
AmeriCorps member living allowances and education awards	Federal government (AmeriCorps)	• AmeriCorps	X	X	X
GCF costs	GCF	• GCF		X	

Benefit or cost			Total net benefits per federal dollar	Total net benefits per funder dollar	Federal government net benefits per federal dollar
Other federal government funding (not provided by AmeriCorps)	Federal government	• GCF	X	X	X
State and local government funding	State and local governments	• GCF		X	
Other non-government costs	Non-government funders	• GCF		X	

Appendix B: Additional Information on the Methodology

This appendix provides additional details on the methodology used for this study, as a supplement to the methodology section in the main report. It describes the steps used to calculate the ROI, the results of interim calculations that contribute to the ROI calculations, and assumptions that underlie the analysis.

Methodology Overview

Calculating the ROI for the GCF program included the following steps:

- Measuring and monetizing program benefits to GCF AmeriCorps members, NYCHA residents, society, and the different levels of government
- Estimating forgone benefits (opportunity costs)
- Assessing program costs
- Calculating the ROI

This ROI analysis included only those benefits that could be reasonably monetized given the available data and that likely would not have occurred without the GCF program.

Although GCF AmeriCorps members experience positive benefits from the GCF program in terms of increased employment and earnings (described below), available data do not establish how long these specific impacts are sustained over time. To address a range of possible durations for those benefits, three scenarios were developed for this ROI study:

- **Short-term.** This scenario assumes short-term earnings impacts. The assumption is that earnings impacts are limited to a single year after program exit. This scenario also assumes no lifetime benefits are realized.
- **Medium-term.** This scenario assumes a longer duration of earnings impacts. The assumption is that earnings impacts last 15 years. A 3 percent discount rate is applied each year to represent net present value in 2022 dollars.[15] This scenario also assumes only half of the net present value of lifetime benefits is realized.
- **Long-term.** This scenario assumes sustained earnings impacts throughout GCF AmeriCorps members' working years. The assumption is that earnings impacts last 30 years. A 3 percent discount rate is applied each year to represent net present value in 2022 dollars. This scenario also assumes the entire net present value of lifetime benefits is realized.

[15] The Office of Management and Budget (1992) defines a discount rate as, "The interest rate used in calculating the present value of expected yearly benefits and costs" (p. 18). Regarding the 3 percent discount rate, see Office of Management and Budget (2003).

There are some differences between the three scenarios. One is the length of time that increased employment—and earnings associated with that employment—are sustained. The other is what portion of lifetime benefits, when applicable, are realized.[16] For each ROI calculation, three estimates using the three scenarios were developed, which is shown in greater detail in the Calculating ROI section.

Measuring Program Benefits

The first step in calculating the ROI for the GCF program is to measure and monetize the program benefits. GCF AmeriCorps members, NYCHA residents, society, and various levels of government benefit from the GCF program. These benefits were identified through an extensive literature review and data collection process. The methods used to measure benefits for each of these stakeholder groups are described below.

Benefits to GCF AmeriCorps Members

The GCF AmeriCorps members who provide services as part of the GCF program experience benefits due to their national service. This analysis estimated the following benefits:

- Living allowance and education award
- Increased earnings due to reduced unemployment
- Increased lifetime earnings due to increased postsecondary education derived from the use of education awards

Living Allowance and Education Award

Living allowances are given to AmeriCorps members during their 1-year service term to pay for various living expenses—such as housing and groceries—and they sometimes include members' workers' compensation and health insurance when applicable. Regarding education awards, according to Friedman et al. (2016), a significant portion of AmeriCorps State and National member alumni use them to pay for additional postsecondary education at colleges, graduate schools, and technical/vocational schools, while others (i.e., 33 percent) use them to pay off outstanding student loans. The remaining 21 percent do not use their education awards. Additionally, GCF provided data indicating five program members went on to pursue further education within 1 year following completion of their service.

[16] These three scenarios consider varying durations of how long increased employment and earnings benefits last for GCF AmeriCorps members. They also consider varying durations for lifetime benefits that stem from the GCF program. For example, lifetime benefits in terms of decreased public assistance, social insurance, and corrections costs result from GCF AmeriCorps members' higher educational attainment post-service. The analysis estimates lifetime benefits differently in the three scenarios. Specifically, the net present value of the entire lifetime benefit is realized for the long-term scenario, half of the net present value of the lifetime benefit is realized for the medium-term scenario, and no lifetime benefit amount is realized for the short-term scenario.

Both the living allowances and education awards (considered one-time benefits that are not discounted or spread over time) are taxable and represent member benefits. However, only the portion of education awards used by members to pay off existing student loans is considered a direct member benefit. The portion that is utilized to pursue further postsecondary education is only used in calculating members' additional lifetime earnings due to the increased educational attainment they experience post-service from using the education award. This is done to avoid double counting. This analysis included as GCF AmeriCorps member benefits the post-tax values of the living allowance and the portion of the education award used to repay student loans, which are listed in Table 13. The portion of the education award used to fund additional postsecondary education is discussed in the following section.

Table 10. GCF AmeriCorps Member Benefits From the Living Allowance and Education Award

Benefit	Post-tax value (2022$)	Notes
Living allowance	$364,838	Post-tax living allowances members receive during service
Education award used to pay off student loans	$64,242	Post-tax education award amount used to pay off outstanding student loans
Total	**$429,080**	

Sources: GCF and Friedman et al. (2016)

Increased Earnings due to Reduced Unemployment

According to data provided by NYCHA to GCF for the 2019 Farms at NYCHA evaluation, 71.5 percent of non-disabled NYCHA residents between the ages of 18 and 24 are unemployed (i.e., 28.5 percent are employed).[17] GCF also provided data for the cohort engaged during the 2021–2022 program year indicating 15 of 22 participating AmeriCorps members maintained employment for 1 year following graduation from the program (i.e., 68.9 percent). This represents a 40.4 percent increase in employment of GCF AmeriCorps members following completion of the program.

A direct member benefit from being employed post-service is additional income earned. GCF AmeriCorps members not only see increased employment following completion of their service but earn higher wages as a result of specific job training and upskilling. To monetize this benefit, ICF used GCF-provided data on the average wage of GCF AmeriCorps members who were employed 1 year post-graduation. The analysis then multiplied the 40.4 increase in employment by the number of GCF AmeriCorps member full-time equivalents (FTEs) who served during the most recent program year (i.e., 22). This estimated the number of *additional* GCF AmeriCorps member FTEs

[17] The civilian unemployment rate was 3.8 percent in May of 2018 and 3.6 percent in May of 2022. Overall unemployment has remained relatively similar since 2018, leading to confidence in using the NYCHA-provided unemployment rate of 71.5 percent from the 2019 Farms at NYCHA evaluation in this analysis. https://www.bls.gov/charts/employment-situation/civilian-unemployment-rate.htm

employed due to national service (i.e., 8.88). To estimate the additional pre-tax earnings that stemmed from the reduced unemployment, the analysis multiplied the GCF-provided $19.26 average hourly wage of GCF AmeriCorps members by the additional number of GCF AmeriCorps members employed post-service, assuming a 40-hour work week for 52 weeks of the year. This represents the additional income earned by GCF AmeriCorps members due to serving with the GCF program.

Table 11. Additional Pre-Tax Earnings for GCF AmeriCorps Members From Reduced Unemployment

Metric	Value (2022$)
Average annual earnings (assuming $19.26 hourly wage) of employed GCF AmeriCorps members	$40,061
Reduction in AmeriCorps members' unemployment	40.40%
GCF AmeriCorps member FTEs	22
Cumulative additional pre-tax earnings	**$356,060**
Cumulative additional post-tax earnings	**$280,846**

Source: GCF

To avoid double counting, the additional *post-tax* earnings is used to calculate the direct benefit to GCF AmeriCorps members, rather than the additional *pre-tax* earnings. The post-tax annual earnings for the additional 8.88 GCF AmeriCorps member FTEs employed in Table 14 exclude payroll taxes (e.g., federal and state income, Social Security, and Medicare). The payroll tax rates used are described in more detail in the Benefits to Government section.

Based on these calculations, the cumulative additional post-tax earnings for GCF AmeriCorps members for the three different scenarios—discounted in 2022 dollars using data from the Office of Management and Budget—are shown in Table 15. These monetary amounts represent the additional post-tax earnings realized due to the employment gain that is solely attributed to the GCF program.

Table 12. Cumulative Additional Post-Tax Earnings Derived From Reduced Unemployment due to Serving With the GCF Program by Scenario

Scenario	Cumulative additional post-tax earnings due to serving with the GCF program (2022$)
Short-term	$256,060
Medium-term	$5,340,905
Long-term	$10,681,812

Sources: GCF and Office of Management and Budget (2003)

Increased Lifetime Earnings due to Increased Postsecondary Education Derived From the Use of Education Awards

The AmeriCorps education award pays for some portion of members' increased postsecondary educational attainment, and the future earnings derived from that educational attainment is treated as a direct benefit to GCF AmeriCorps members. To calculate the portion of members' increased educational attainment that is attributable to the GCF program, this analysis used cost data from the National Center for Education Statistics (NCES). Table 15 details the average total cost for each degree type and the portion of the cost that the post-tax education award amount (i.e., $5,622) represents ($7,015 before taxes).[18] The analysis used these percentages to estimate the lifetime benefits of postsecondary educational attainment that can be attributed to the education award. For instance, according to NCES (2021), the average annual cost of a public, in-state, 4-year academic institution during the 2020–2021 academic year was $28,029. This amounts to more than $100,000 for 4 years if expressed in 2022 dollars. The $5,622 post-tax education award only represents 4.8 percent of the cost of that degree, so the GCF program could only be credited with 5 percent of the completion of GCF AmeriCorps members' bachelor's degree post-service.

Additional earnings derived from AmeriCorps members' *reduced unemployment* were calculated annually and then discounted based on the short-term, medium-term, and long-term scenarios in net present 2022 dollars.

For additional earnings derived from AmeriCorps members' *increased postsecondary educational attainment*—due to using education awards—Trostel (2015) did not provide data on how earnings accrue over time. Therefore, this analysis treated the increases in earnings as lifetime values expressed in 2022 dollars. The analysis assumed 100 percent of those lifetime earnings accrued by year 30 (i.e., in the long-term scenario), 50 percent accrued by year 15 (i.e., in the medium-term scenario), and nothing accrued 1 year post-program (i.e., in the short-term scenario).

[18] This analysis used the 2021 to 2022 AmeriCorps education award amount ($7,015). For more information about this education award, please see https://americorps.gov/members-volunteers/segal-americorps-education-award/find-out-more.

Table 13. Average Total Cost of Education and Portion Attributable to Education Award by Degree Type

Degree type[19]	Average cost (2022$)*	Percentage of degree total cost covered by post-tax education award
Associate degree	$28,029	20.1%
Bachelor's degree	$116,275	4.8%
Graduate degree	$35,872	15.7%

*Costs were provided for the 2020 to 2021 academic year by NCES (2021) for associate degree, bachelor's degree, and graduate degree types.
Sources: AmeriCorps (n.d.) and NCES (2021)

To determine the future lifetime earnings (and later, the associated lifetime taxes, which are described in the Benefits to Government section) realized due to the use of the education award post-service, the analysis first determined the number of additional postsecondary degrees estimated to be completed by degree type. GCF provided data indicating all AmeriCorps members had obtained a high school diploma prior to beginning service, and five graduates of the program went on to further education. Therefore, the analysis assumes five AmeriCorps members pursued a bachelor's degree following completion of the GCF program.

Next, the difference in the additional lifetime pre-tax earnings was estimated using data provided by Trostel (2015), which is shown in the fifth column of Table 17 and expressed in 2022 dollars.[20] For instance, using Trostel (2015) data, the lifetime earnings in 2022 dollars of someone with an associate degree is about $1 million, while that of someone with a bachelor's degree is almost $1.5 million. The difference between these two metrics (roughly $483,000 as shown in Table 17) represents the additional lifetime earnings realized as a result of gaining a bachelor's degree if an associate degree was already completed. This process was completed for all postsecondary degree types to conservatively estimate the additional lifetime earnings realized by GCF AmeriCorps members due to an increase in postsecondary educational attainment. Trostel (2015) also included data on lifetime taxes paid, which was converted to 2022 dollars and then used to estimate the post-tax lifetime earnings that would be realized per additional postsecondary degree received. Specifically, the lifetime taxes paid amounts were subtracted from the pre-tax additional lifetime earnings amounts to estimate the additional post-tax lifetime earnings, a direct benefit to GCF AmeriCorps members.

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[19] Costs for an associate degree include tuition, required fees, books, and supplies for a public, in-state, 2-year program; costs for a bachelor's degree include tuition, required fees, books, supplies, and on-campus housing for a public, in-state, 4-year program; costs for a graduate degree include tuition and required fees for a public, in-state, 2-year graduate program.

[20] For an associate degree, comparisons were made between metrics for a high school diploma and those for an associate degree. For a bachelor's degree, comparisons made were between metrics for an associate degree and those of a bachelor's degree. For a graduate degree, comparisons made were between metrics for a bachelor's degree and those of a master's degree.

Table 14. Additional Earnings From AmeriCorps Members' Use of the Education Award

Degree type	Number of degrees pursued using the education award	Percentage of degree total cost covered by post-tax education award	Number of degrees obtained using the education award	Additional pre-tax lifetime earnings per degree type	Additional lifetime earnings from education award (post-tax)	Additional lifetime earnings from education award (post-tax)
Associate degree	0	20.1%	0	$194,929	$95,763	$0
Bachelor's degree	5	4.8%	0.24	$602,351	$289,747	$69,539
Graduate degree	0	15.7%	0	$534,678	$202,162	$0
Total	**5**	**—**	**0.24**	**—**	**—**	**$69,539**

Note: Numbers may not sum due to rounding.
Sources: AmeriCorps (n.d.), GCF, Friedman et al. (2016), NCES (2021), and Trostel (2015)

To isolate the increase in additional lifetime earnings specific to members using the education award, the number of GCF AmeriCorps members who used the education award for this purpose by degree type was reduced by the percentage of the degree cost that can be covered by the $5,622 post-tax education award received post-service, displayed in the third column of Table 17. As a result, the analysis estimated that the use of the education award among GCF AmeriCorps members produced roughly 0.24 additional bachelor's degree post-service. Then, the number of additional degrees *obtained* was applied to the 2022 additional post-tax lifetime earnings by degree type. This calculates the additional lifetime post-tax earnings realized by GCF AmeriCorps members from their increase in postsecondary educational attainment that is credited to the use of the education award post-service. The total additional lifetime post-tax earnings amount was roughly $69,000 across GCF AmeriCorps members. Of note, these lifetime earnings are *in addition to* the earnings derived from GCF AmeriCorps members' gains in employment as delineated in the previous section. To reiterate, the earnings from GCF AmeriCorps members' reduced unemployment differs depending on the scenario (i.e., short-term, medium-term, and long-term) since it is uncertain how long these earnings will persist. For the post-tax lifetime earnings—and all lifetime benefits in this ROI analysis—the entire amount is realized in the long-term, half of it is realized in the medium-term, and no amount is realized in the short-term.

Benefits to NYCHA Residents

Through the Farms at NYCHA program, GCF AmeriCorps members distribute free organic produce to NYCHA residents. GCF provided data indicating 17,589 pounds of produce were distributed during the September 2021–October 2022 program year. Using data from Supermarket News, estimating an average price of $3.22 per pound of organic produce in 2022, the analysis valued the cost savings to NYCHA residents to be $56,637 (Redman, 2022).

Benefits to Society

An additional element of the Farms at NYCHA program is the composting of organic waste. A 2020 study (Nordahl, 2020) looked at the greenhouse gas emissions associated with multiple management scenarios for organic municipal solid waste, including landfilling and composting. The study found that landfilling organic waste has the largest greenhouse gas footprint, emitting an estimated 400 kg of carbon dioxide per metric ton of waste, while composting results in the lowest footprint of -41 kg of carbon dioxide per metric ton of waste.[21] The difference in carbon emissions across these two scenarios equates to 0.441 fewer metric tons of carbon emissions per metric ton of composted material. The analysis next used GCF-provided data that estimated 3,305 pounds of compost collected (i.e., 1.5 metric tons) to calculate the difference in carbon dioxide emissions resulting from the Farms at NYCHA program. This difference came out to 0.66 fewer metric tons of carbon dioxide emitted as a result of composting instead of landfilling.

Rennert et al. (2022) estimates the social cost of carbon dioxide, a monetized value of the damages to society caused by increases in carbon emissions. The social cost of carbon emissions is used in regulatory analysis to evaluate climate policies. It accounts for a variety of impacts on public health, property values, and agricultural production that will result when new carbon dioxide is emitted (Asdourian, 2023). In this recent evaluation, the social cost of carbon is estimated to be $212 per metric ton in 2022 dollars.

Applying the social cost of carbon to the reduction in emissions resulting from GCF composting activities, the analysis estimates a marginal societal benefit of $140 as a result of decreased carbon dioxide emissions due to composting instead of landfilling. While this benefit is negligible due to a relatively small amount of compost collected, larger-scale composting can provide larger carbon dioxide emission reductions and other benefits to individuals, such as health benefits.

Benefits to Government

State and Local Governments

State and local governments benefits from:

- Additional state income tax revenue from GCF AmeriCorps members' increased earnings due to reduced unemployment
- Additional lifetime state and local taxes due to GCF AmeriCorps members' increased postsecondary educational attainment[22]

[21] The Nordahl study assumes that finished compost is subsequently used as soil and fertilizer replacement. The negative result associated with composting results from offsetting emissions from alternative sources of soil and fertilizer.

[22] This benefit was calculated using lifetime tax revenue data from Trostel (2015). These values summed lifetime state income taxes, lifetime property taxes, and lifetime sales taxes by education level.

- Additional state and local taxes from the living allowance and education award received by these members
- Additional state and local sales tax revenue from GCF AmeriCorps members' increased consumption due to reduced unemployment
- Reduced lifetime spending on social insurance and corrections[23] due to GCF AmeriCorps members' increased postsecondary educational attainment
- Reduced spending on waste processing due to composting of organic material

State income tax revenue: To measure income tax revenue generation that stems from reduced unemployment for state governments (any local income taxes are not included), the additional pre-tax earnings of GCF AmeriCorps members that are solely attributed to the GCF program are taxed by a weighted, estimated proportional state income tax rate. This tax rate considers state-specific progressive tax brackets and standard deduction amounts. Based on the taxable income, the analysis estimated the proportional state income tax for each state as the amount of state income taxes paid per GCF AmeriCorps member divided by their pre-tax earnings. This analysis then calculated the weighted average of these state-specific tax rates—using these states' populations from the 5-year estimates of the 2022 American Community Survey—to estimate a weighted national tax rate (i.e., 2.1 percent; U.S. Census Bureau, 2022-a). A weighted national tax rate was used because GCF AmeriCorps members may disperse to various locations nationwide following their service terms and continue to migrate over the course of their working years.

Additional tax revenue derived from AmeriCorps members' *reduced unemployment, living allowances, and education awards* was calculated using tax rates specific to each per-person monetary amount.

For additional tax revenue derived from AmeriCorps members' *increased postsecondary educational attainment*—due to using education awards—as well as from *increased secondary educational attainment*, Trostel (2015) did not provide specific tax rates. Therefore, this analysis treated the increases in tax revenue as lifetime values expressed in 2022 dollars. The analysis assumed 100 percent of those lifetime tax revenues accrued by year 30 (i.e., in the long-term scenario), 50 percent accrued by year 15 (i.e., in the medium-term scenario), and nothing accrued 1 year post-program (i.e., in the short-term scenario).

Lifetime state income tax revenue values are also provided by Trostel (2015) by education level. Based on the number of postsecondary degrees estimated to be obtained due to the use of the education award received after serving with the GCF program, additional lifetime state income taxes are realized. Thus, the values of

[23] Reduced spending on public assistance due to GCF AmeriCorps members' increased postsecondary educational attainment is included as a federal government benefit, not a state and local government benefit. This is because public assistance includes programs funded at the federal level (e.g., TANF, etc.).

additional lifetime state income taxes paid—informed by data from Trostel (2015)—were first converted to 2022 dollars. The analysis then multiplied them by the inferred number of degrees obtained using the education award.

State governments also receive state income taxes from the education awards GCF AmeriCorps members receive post-service. The analysis estimated the pre-tax education award amount in 2022 dollars (i.e., $7,015).[24] Then the analysis multiplied it by the number of GCF AmeriCorps member FTEs expected to redeem the award and use it to pursue postsecondary education or to repay outstanding student loans, based on findings from Friedman et al. (2016) and GCF-provided data. The result represents the pre-tax cumulative education award amount expected to be received by GCF AmeriCorps members. The portion of this value taxed by state income taxes was estimated using a weighted state income tax rate specific to the per-person education award amount. Additionally, state income taxes were estimated for the living allowance amount received by GCF AmeriCorps members during their service term using tax rates specific to the per-person value. The different rates used for these member benefits are enumerated in Table 19.

State and local sales tax revenue: To measure sales tax revenue generation for state and local governments that stems from reduced unemployment, a weighted state and local sales tax rate was applied to the amount of GCF AmeriCorps members' cumulative additional *post-tax* earnings that are available to be spent on taxable goods. To establish a weighted state and local sales tax, this analysis first summed the state sales tax rate and the average local sales tax rate for each state using data from Fritts (2021). Then using 2022 data from the American Community Survey (U.S. Census Bureau, 2022-a), these state-level combined state and local sales tax rates were weighted based on the population of each state. The resulting weighted average sales tax rate used in this analysis was 7.44 percent.

To estimate the additional post-tax earnings as a result of reduced unemployment that was spent on taxable goods, data from the Consumer Expenditure Surveys (U.S. Bureau of Labor Statistics, 2022-a) were used. These data show the amount of spending on a number of different goods and services by national consumers across several different pre-tax income brackets.[25] The proportion of earnings that is spent on taxable goods (such as alcoholic beverages, housekeeping supplies, apparel, etc.) was then calculated for consumers with incomes that matched the per-person average pre-tax earnings of GCF AmeriCorps members. This value was 57 percent. This proportion was then applied to GCF AmeriCorps members' cumulative additional *post-tax* earnings to

[24] This analysis used the 2021 to 2022 AmeriCorps education award amount ($6,495) but adjusted it to net present 2022 dollars using the Consumer Price Index. For more information about this education award, please see https://americorps.gov/members-volunteers/segal-americorps-education-award/find-out-more.

[25] To calculate the estimated taxable expenditures, Consumer Expenditure Survey (CE) Table 1203 was used from the U.S. Bureau of Labor Statistics (2022-a). This table lists the annual expenditure means by pre-tax income tax brackets. Thus, the pre-tax earnings of GCF AmeriCorps members were used instead of their post-tax earnings to calculate this metric. Please visit this site for more details: https://www.bls.gov/cex/tables/calendar-year/mean-item-share-average-standard-error.htm#cu-income.

calculate the post-tax monetary amount they spend on taxable goods. Then the sales tax rate (i.e., 7.44 percent) was applied to estimate the resulting sales tax revenues that go to state and local governments due to GCF AmeriCorps members' reduced unemployment post-service.

Trostel (2015) also provides additional lifetime state and local sales tax values by education level. Using these values, the analysis calculated the additional sales tax revenue realized by state and local governments as a result of GCF AmeriCorps members using their education award to achieve higher postsecondary educational attainment post-service. These values represent a direct benefit to state and local governments in the form of increased tax revenue.

State and local government cost savings: State and local governments also benefit from the GCF program through lifetime savings in public assistance, social insurance, and corrections—as reported in Trostel (2015)—due to the increase in GCF AmeriCorps members' postsecondary educational attainment after program exit and student veterans' postsecondary educational attainment. Of note, social insurance includes unemployment insurance and workers' compensation. To calculate these lifetime non-federal government savings, the analysis first calculated the decrease in social insurance and corrections costs (and thus, savings) from one education level to the subsequent education level using data from Trostel (2015) and then multiplied these monetary amounts by the number of additional postsecondary degrees estimated to be obtained due to the use of the education awards.

To determine what portion of this differential represents lifetime cost savings to state or local governments versus the federal government, a different method was employed for each of these cost savings areas. For social insurance, 50 percent of lifetime unemployment insurance cost savings and all the lifetime cost savings for workers' compensation are apportioned to state and local governments (Oswald, 2018). Regarding reductions in lifetime corrections spending, the portion between the federal and state or local governments was determined based on data from Hyland (2015). Specifically, this report found that 8.4 percent of U.S. corrections costs are paid by the federal government and the remaining 91.6 percent is paid by state and local governments. Therefore, almost 92 percent of the lifetime cost savings in corrections due to GCF AmeriCorps members experiencing an increase in postsecondary educational attainment post-service are allocated to state and local governments.

Federal Government

The federal government benefits from:

- Additional federal income, Social Security, and Medicare tax revenue from GCF AmeriCorps members' increased earnings due to reduced unemployment
- Additional federal income, Social Security, and Medicare taxes from the living allowance and education award received by these members
- Additional lifetime federal taxes due to GCF AmeriCorps members' increased postsecondary educational attainment

- Reduced lifetime spending on public assistance, social insurance, and corrections due to GCF AmeriCorps members' increased postsecondary educational attainment

Federal income tax revenue: To measure federal income tax revenue that stems from reduced unemployment, the additional pre-tax earnings of GCF AmeriCorps members that are solely attributed to the GCF program—as well as the pre-tax living allowance and education award amounts received by GCF AmeriCorps members—are taxed by a federal income tax rate. The rates used are estimated proportional tax rates that consider the standard deductions and progressive tax brackets specific to federal income taxes as provided by El-Sibaie (2019). To reiterate, an estimated proportional tax rate equals the total amount of taxes estimated to be paid divided by the pre-tax amount of the value to be taxed (e.g., per-person average pre-tax earnings). The specific federal income tax rates used for these different benefits are enumerated in Table 20. Of note, different tax rates were used because they were specific to the per-person pre-tax earnings, living allowance, and education award amounts.

For the additional lifetime earnings of GCF AmeriCorps members that is based on their increase in postsecondary educational attainment—fueled by the use of the education award, Trostel (2015) provides additional lifetime federal income tax values. These values are used to calculate the additional income tax revenue realized by the federal government due to members' postsecondary education gains.

Social Security and Medicare tax revenue: Social Security and Medicare tax revenue are measured as fiscal gains as a result of the additional pre-tax earnings of GCF AmeriCorps members from their reduced unemployment and as a result of the pre-tax living allowances and education awards amounts received by members. However, tax rates specific to each revenue source are used. Social Security and Medicare use flat tax rates, 6.2 percent and 1.45 percent, respectively; thus, these rates are applied to the additional pre-tax earnings of GCF AmeriCorps members to calculate the additional amount of revenue the federal government receives. These same rates are also applied to the living allowance and education award amounts received by GCF AmeriCorps members to calculate additional tax revenue.

Moreover, lifetime Social Security tax values are provided by Trostel (2015) by education level. The analysis used these values to estimate the additional lifetime Social Security tax revenue realized by the federal government as a result of GCF AmeriCorps members using their education award to complete different postsecondary education degree types post-service.

Federal government cost savings: The federal government realizes cost savings in public assistance, social insurance, and corrections due to the increased postsecondary educational attainment of GCF AmeriCorps members after program exit. Specifically, the number of additional postsecondary degrees estimated to be earned by GCF AmeriCorps members post-service as well as data from Trostel (2015) were used to estimate the federal government portion of lifetime cost savings on social insurance (which is composed of workers' compensation and unemployment insurance, as noted earlier), public assistance (e.g., SNAP, Medicaid, TANF, etc.), and corrections.

Table 18 shows the lifetime costs to the federal versus the state and local governments for each of these areas—where applicable—by education level in 2012 dollars as presented in Trostel (2015). The differences in these lifetime costs from one education level to the next represent cost *savings* per degree obtained.

Table 15. Government Costs by Educational Attainment Level per Individual's Lifetime

Source of government costs	Associate degree (2012$)	Bachelor's degree (2012$)	Graduate degree (2012$)
Public assistance	**$31,803**	**$14,480**	**$9,394**
Social insurance	**$8,209**	**$5,863**	**$4,732**
Federal	$3,570	$2,660	$2,090
State/local	$4,639	$3,204	$2,643
Corrections	**$4,055**	**$1,190**	**$725**
Federal	$341	$100	$61
State/local	$3,714	$1,090	$664

Note: Numbers may not sum due to rounding.
Source: Trostel (2015)

As mentioned earlier in this appendix, as a result of the GCF program, the analysis estimated an additional 5 GCF AmeriCorps members would redeem the education award to *pursue* additional postsecondary education (i.e., bachelor's degrees). To conservatively calculate the federal government's lifetime savings associated with these education gains, the differences between the public assistance, federal social insurance, and federal corrections lifetime costs for this education levels and those that precede it are calculated and then expressed in 2022 dollars. These values are then multiplied by the number of additional postsecondary degrees estimated to be obtained—where appropriate—to represent the total cost savings realized by the federal government due to the GCF program. As previously mentioned where discussing the state and local governments' allocation of the reduction in lifetime social insurance and corrections expenditures, the federal government receives 50 percent of the lifetime cost savings in unemployment insurance (part of social insurance; Oswald, 2018), and more than 8 percent of the lifetime cost savings in corrections (Hyland, 2015). These federal government savings are shown in Table 20.

Table 19 shows the tax rates applied to GCF AmeriCorps members' additional pre-tax and post-tax earnings (derived from reduced unemployment), depending on the type of revenue being calculated. It also enumerates the tax rates used for the pre-tax living allowance and education award amounts received by GCF AmeriCorps members during their service term or upon service completion, respectively.

Table 19. 2021 Tax Rates and Ratio of Taxable Expenditures for GCF AmeriCorps Members' Earnings, Living Allowances, and Education Awards

Metric	Rate for additional earnings & education award*	Rate for living allowance & education award**	Notes
Estimated proportional federal income tax	10.35%	0.00%	• Tax rates are used that consider the progressive tax brackets and standard deductions specific to federal income taxes. • These rates are dependent on and applied to the pre-tax value of each metric being taxed.
Estimated proportional state income tax	3.13%	1.12%	• Tax rates are used that consider the progressive tax brackets and standard deductions specific to each state's income taxes. Each state's tax rate is weighted based on the state's population and summed to estimate a weighted national average. • These rates are dependent on and applied to the pre-tax value of each metric being taxed.
Social Security tax	6.20%	6.20%	• Social Security tax rate for employees and employers. • These rates are applied to the pre-tax value of each metric being taxed.
Medicare tax	1.45%	1.45%	• Medicare tax rate for employees and employers. • These rates are applied to the pre-tax value of each metric being taxed.
Sales tax	7.44%; N/A to the education award	7.44%; N/A to the education award	• The combined state and average local tax rate for each state was summed and weighted based on states' populations to calculate a national weighted average sales tax rate. • The rate is applied to the additional post-tax earnings of members as well as their post-tax living allowance amount.

Metric	Rate for additional earnings & education award*	Rate for living allowance & education award**	Notes
Ratio of taxable expenditures per national consumer	55%; N/A to the education award	63%; N/A to the education award	• Percentage of post-tax earnings spent on taxable goods and services that is used to calculate sales tax from post-tax earnings. • Ratio is dependent on the pre-tax value of members' additional earnings or the pre-tax living allowance amount.

*These rates are only used for the portion of the education award used to repay outstanding student loans.
**These rates are only used for the portion of the education award used for additional schooling.
Sources: Fritts (2021), Social Security Administration (2021), U.S. Bureau of Labor Statistics (2022-a), and El-Sibaie (2019)

Summary of Benefits to Government

Table 20 shows the amount of tax revenue generated and savings in expenditures for state and local versus federal government that are solely credited to the GCF program and calculated using the methods described above. These government revenue and savings amounts are benefits that are included in the three ROI calculations, and they are derived from GCF program impacts.

Table 16. State/Local and Federal Government Benefits by Stakeholder Group and by Scenario

Benefit type	Benefit (2022$)		
	Short-term	Medium-term	Long-term
State/local government benefits	**$53,279**	**$732,427**	**$1,459,550**
State income tax revenue from education awards	$5,303	$5,303	$5,303
State income tax revenue from employment	$11,137	$167,059	$334,118
State and local sales tax revenue from employment	$36,839	$552,583	$1,105,165
State income, sales, and property taxes from member postsecondary educational attainment (lifetime)	$0	$6,742	$13,485
Savings in reduced public assistance, social insurance, and corrections spending from member postsecondary educational attainment (lifetime)	$0	$740	$1,479

Benefit type	Benefit (2022$)		
	Short-term	Medium-term	Long-term
Federal government benefits	**$129,877**	**$34,939,342**	**$69,812,884**
Federal income tax revenue from education awards and living allowances*	$65,800	$65,800	$65,800
Social Security and Medicare tax revenue from education awards and living allowances*	$64,077	$961,162	$1,922,324
Federal income and Social Security tax revenue from member postsecondary educational attainment (lifetime)	$0	$38,879,968	$67,769,937
Savings in reduced social insurance, corrections, and public assistance spending from member postsecondary educational attainment (lifetime)	$0	$32,412	$64,824
Total	**$183,157**	**$35,671,769**	**$71,272,435**

*Living allowances and education awards are one-time taxable payments. The resulting tax revenue does not vary by scenario.

Note: Numbers may not sum due to rounding.

Measuring Forgone Benefits (Opportunity Costs)

The analysis included two types of forgone benefits, referred to as *opportunity costs*, in each of the three ROI calculations to conservatively estimate the return of the GCF program: forgone benefits from a professional opportunity cost to GCF AmeriCorps members and forgone benefits from an investment opportunity cost to funders. Each of these forgone benefit (opportunity cost) types is subtracted from the total program benefits—that stem from the GCF program—to calculate net benefits. Net benefits are then compared to the program cost to calculate each ROI. The methodologies used to calculate these two forgone benefits (opportunity costs) are described below.

Forgone Benefits From Professional Opportunity Cost to GCF AmeriCorps Members

There is a professional opportunity cost to GCF AmeriCorps members for their period of national service, during which they could have been otherwise employed. This includes both the forgone earnings of GCF AmeriCorps members for their service term and the forgone taxes associated with those lost earnings. To calculate this, the analysis first used the unemployment rate of 71.5 percent provided in the 2019 Farms at NYCHA evaluation to represent how many of these GCF AmeriCorps members would have been unemployed if they did not serve with the GCF program. This unemployment rate was provided by NYCHA and applies to NYCHA residents ages 18–24. Using the unemployment rate and the number of GCF AmeriCorps member FTEs who served during the 2021–2022 program year, the analysis estimated the number of members who would have been unemployed without serving with the GCF program based on their demographic characteristics. Then the analysis multiplied this value by the

weighted post-tax annual earnings. This is derived from the post-tax annual earnings listed in Table 14. The methodology used to calculate this latter monetary amount is described in the previous Increased Earnings due to Reduced Unemployment section. The post-tax amount subtracts all applicable payroll taxes (e.g., federal income, state income, Medicare, and Social Security). Combined, these values represent what GCF AmeriCorps members would have earned in total if they did *not* serve with the GCF program. Separately, the analysis then multiplied the number of GCF AmeriCorps member FTEs who served by the amount they earned during their national service in the form of a post-tax living allowance (i.e., $11,098 per person). This represents the aggregate amount GCF AmeriCorps members earned during their service term.
The difference between what they would have earned if they did not serve and what they did earn because they served equals the total post-tax earnings forgone due to serving with the GCF program. These values and the formula used to calculate the forgone post-tax earnings are shown in Table 21.

Table 17. Forgone Earnings of GCF AmeriCorps Members for a Service Term

Row	Component	Value	Source
A	GCF AmeriCorps member FTEs	38	GCF
B	Unemployment rate	71.5%	2019 Farms at NYCHA evaluation
C	Weighted post-tax annual earnings per person (2022$)	$23,800	U.S. Census Bureau (2022-b), U.S. Bureau of Labor Statistics (2022-b), & GCF
D	Post-tax living allowance per person	$11,098	GCF
E	Total post-tax earnings forgone (2022$)	-$163,965	[A x (1 – B) x C] – (A x D)

Note: Numbers may not sum due to rounding.

The second portion of this professional opportunity cost is the forgone taxes associated with the earnings of GCF AmeriCorps members lost for this year of service. Federal income, state income, Social Security, and Medicare taxes specific to the per-person weighted pre-tax earnings amount were calculated. Specifically, the estimated proportional federal and state income tax rates used were 10.35 percent and 3.13 percent, respectively. The analysis also estimated the sales taxes lost based on the per-person post-tax earnings forgone by the GCF AmeriCorps members. Using data from the Consumer Expenditure Surveys (U.S. Bureau of Labor Statistics, 2022-a), the analysis estimated that based on the per-person weighted pre-tax earnings of GCF AmeriCorps members (i.e., $23,800), 55 percent of their income would have been spent on taxable goods, as opposed to 53 percent of the living allowance. Then the weighted combined state and local sales tax rate (i.e., 7.44 percent)—used earlier in this analysis to calculate government benefits—was applied to the difference in expected spending on taxable goods to represent the resulting sales tax revenue lost due to individuals serving with the GCF program instead of working for higher pay. The totals for these taxes are listed in Table 22.

Table 18. Forgone Taxes Associated With the Forgone Earnings of GCF AmeriCorps Members for a Service Term[26]

Forgone taxes	Taxes without service term (2022$)	Taxes realized from living allowance (2022$)	Net taxes forgone (2022$)
Federal income taxes	$11,945	$19,543	-$7,598
Social Security and Medicare taxes	$19,718	$32,262	-$12,543
State income taxes	$7,705	$12,606	-$4,901
Sales taxes	$10,614	$19,911	-$9,296
Total taxes	**$49,982**	**$84,322**	**-$34,339**

Note: Numbers may not sum due to rounding.

For the *federal government benefits per federal dollar* ROI calculation, only federal government (not total) benefits are included. Because of this, only federal components of the professional opportunity cost are subtracted from all federal government benefits—realized due to the GCF program—in this ROI calculation. The parts of the professional opportunity cost subtracted from these total federal government benefits include the forgone net federal income taxes (i.e., -$7,598) and the net forgone Social Security and Medicare taxes (i.e., -$12,543). The sum of these two values is called the *federal professional opportunity cost*. The sum of all the values listed in Table 22 and the forgone post-tax earnings of GCF AmeriCorps members is called the *total professional opportunity cost*. These naming conventions are referenced in the Calculating ROI section. Although the forgone net taxes are negative, as taxes associated with the living allowance are greater than the pre-service taxes paid by participating AmeriCorps members, we still refer to them as forgone taxes for consistency with other ROI analyses.

Forgone Benefits From the Investment Opportunity Cost to Funders

The investment opportunity cost estimates the expected forgone return if funds used to support the activities and positions of GCF AmeriCorps members during the most recent program year were invested in U.S. Treasury bonds instead. An investment opportunity cost is calculated for two different funding streams: 1) all GCF program funding for the 2021–2022 program year and 2) only federal funding for the same program year. This is done because two of the three ROI calculations only have federal (not total) program costs included. Thus, for 1) the *federal government benefits per federal dollar* and 2) the *total benefits per federal dollar* ROI calculations, the investment opportunity cost subtracted from the benefits in these calculations is the forgone accrued interest from

[26] Due to the high pre-service unemployment rate and low earnings of participating GCF AmeriCorps members, the forgone taxes associated with the earnings of members in the year that they complete their service are lower than the taxes associated with the living allowance. Therefore, net forgone taxes for this group are negative.

investing *only* the federal funds into these U.S. Treasury bonds. For the other ROI calculation, the investment opportunity cost subtracted from the benefits realized is the forgone accrued interest from investing *all* GCF program funds (both federal and non-federal) into these U.S. Treasury bonds. The analysis estimated forgone accrued interests across all three scenarios when 1) all GCF program funds and 2) only federal GCF program funds are invested in U.S. Treasury bonds.

To calculate these forgone accrued interest values, the analysis first matched 2021 real interest rates provided by the Office of Management and Budget (2020) to each of the scenarios included in this ROI analysis. The analysis used 2021 real interest rates for U.S. Treasury bonds because the GCF program year analyzed began in 2021. The real interest rate for the 3-year maturity was used for the short-term scenario, the average between the 10-year and 20-year maturity rates was used as the rate for the medium-term scenario, and the 30-year maturity rate was used for the long-term scenario. These real interest rates were -1.8 percent, -0.8 percent, and -0.3 percent, respectively (Office of Management and Budget, 2020). Also, the number of years elapsed on these U.S. Treasury bonds was equal to the number of years the different scenarios assumed GCF AmeriCorps members' employment and earnings gains were sustained. These values are 1 year, 15 years, and 30 years for the short-, medium-, and long-term scenarios, respectively. Given that U.S. Treasury bonds compound biannually according to the U.S. Department of the Treasury (2019), the formula used to calculate the forgone accrued interest for each of the three scenarios for the two funding streams is listed in Figure 3, where *A* equals the forgone accrued interest (e.g., the investment opportunity cost), *P* equals the amount of one of the funding streams, *r* equals the 2021 real interest rate, and *t* equals the number of years elapsed.

Figure 3. Compound Interest Formula Used to Calculate Investment Opportunity Cost

$$A = P\left(1 + \frac{r}{2}\right)^{t*2} - P$$

Based on this formula, the forgone benefits from the investment opportunity cost calculated by scenario and funding stream are listed in Table 23, along with their associated inputs. The forgone accrued interest amounts for all funding are called the *total investment opportunity costs*, while that for federal funding only are called the *federal investment opportunity costs*. These naming conventions are referenced in the Calculating ROI section.

Table 19. Forgone Benefits From Investment Opportunity Cost Calculation by Scenario and Funding Stream

Metric	Short-term		Medium-term		Long-term	
	All funding	Federal funding only	All funding	Federal funding only	All funding	Federal funding only
Real interest rate	-1.8%		-0.8%		-0.3%	
Years elapsed	1		15		30	
Funding amount	$1,639,941	$681,180	$1,639,941	$681,180	$1,639,941	$681,180
Forgone return (accrued interest)	**-$686,602**	**-$285,193**	**-$185,794**	**-$77,173**	**-$141,249**	**-$58,670**

Measuring Program Costs

Table 24 shows the costs and funding sources of the GCF program. Federal government funding covers 34 percent of the costs, while the remaining program costs are funded by state/local government as part of the required match funding, as well as program service fees and foundations.

Table 20. Funding Sources and Amounts for the GCF Program (2021–2022)

Funder	Funding provided for the program year	Percentage of total (%)
Federal government	$486,200	34%
State/local governments (i.e., match funding)	$828,193	57%
Program service fees	$14,006	1%
Foundations	$116,562	8%
Total	**$1,444,961**	**100%**

Source: GCF

Calculating ROI

To complete the three ROI calculations for the GCF program, the sum of applicable program benefits is reduced by the forgone benefits, or the professional and investment opportunity costs (where appropriate), and then compared to the cost of the program. As described previously, these three ROI calculations are calculated for each of the three scenarios: short-term, medium-term, and long-term.

Since two of the calculations include benefits to society (e.g., GCF AmeriCorps members) the results are expressed as cost–benefit ratios, while maintaining the ROI terminology. Specifically, these ratios take the form of the sum of monetized benefits over the sum of applicable program costs. The ROIs expressed as cost–benefit ratios in this study can be interpreted as the amount of dollars returned for every $1 of investment (or program cost).[27]

The formulas used to calculate each of the three ROIs are shown below:[28]

$$\text{Total Benefits per Federal Dollar} = \frac{\begin{gathered}\text{(Benefits to Non-Government Stakeholders + Benefits to Government) –}\\ \text{(Forgone Benefits From Total Professional Opportunity Cost + Forgone Benefits}\\ \text{From Federal Investment Opportunity Cost)}\end{gathered}}{\text{(AmeriCorps Federal Funding)}}$$

$$\text{Total Benefits per Funder Dollar} = \frac{\begin{gathered}\text{(Benefits to Non-Government Stakeholders + Benefits to Government) –}\\ \text{(Forgone Benefits From Total Professional Opportunity Cost + Forgone Benefits}\\ \text{From Total Investment Opportunity Cost)}\end{gathered}}{\text{(AmeriCorps Federal Funding + Non-Federal Match Funding)}}$$

$$\text{Federal Government Benefits per Federal Dollar} = \frac{\begin{gathered}\text{(Benefits to the Federal Government) – (Forgone Benefits From Federal}\\ \text{Professional Opportunity Cost + Forgone Benefits From Federal Investment}\\ \text{Opportunity Cost)}\end{gathered}}{\text{(AmeriCorps Federal Funding)}}$$

[27] ROIs can be expressed in percentages or as ratios, such as in this study. Although not shown as a ratio in the results, the ROIs in this study show the amount of return for every $1 invested.

[28] Non-government stakeholders in this ROI analysis include GCF AmeriCorps members, NYCHA residents, and society.

Table 25, Table 26, and Table 27 show the total benefits, opportunity costs, program costs, and ROI results for each scenario.

Table 21. ROI Calculations for Short-Term Scenario

Components	Total benefits per federal dollar (2022$)	Total benefits per funder dollar (2022$)	Federal government benefits per federal dollar (2022$)
Total program benefits	$1,066,972	$937,095	$129,877
Total forgone benefits (opportunity costs)	-$12,804	-$193,347	-$12,804
Total program costs	$681,180	$1,639,941	$681,180
Result	**$1.69**	**$0.69**	**$0.21**

Table 22. ROI Calculations for Medium-Term Scenario

Components	Total benefits per federal dollar (2022$)	Total benefits per funder dollar (2022$)	Federal government benefits per federal dollar (2022$)
Total program benefits	$7,420,090	$6,360,717	$1,059,374
Total forgone benefits (opportunity costs)	-$77,771	-$349,755	-$77,771
Total program costs	$681,180	$1,639,941	$681,180
Result	**$11.01**	**$4.09**	**$1.67**

Table 23. ROI Calculations for Long-Term Scenario

Components	Total benefits per federal dollar (2022$)	Total benefits per funder dollar (2022$)	Federal government benefits per federal dollar (2022$)
Total program benefits	$12,151,872	$12,151,834	$2,052,948
Total forgone benefits (opportunity costs)	-$59,269	-$305,210	-$59,269
Total program costs	$681,180	$1,639,941	$681,180
Result	**$17.95**	**$7.62**	**$3.13**

Appendix C: Results by Year

Table 28 shows the breakdown of costs and benefits over a 30-year period. Program activities create a stream of benefits over time for AmeriCorps members, the federal government, and state and local governments. AmeriCorps members' forgone benefits from professional opportunity cost apply to the first year. Funders' forgone benefits from investment opportunity cost accrue over time. Program costs are expended in the first year only. Program benefits are shown in nominal dollars.

Table 24. GCF Program Benefits and Costs per Year

Benefits and costs	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Benefits	**$3,943,634**	**$5,801,232**	**$7,567,415**	**$9,326,048**	**$11,078,724**	**$12,827,023**	**$14,572,523**	**$16,316,799**
AmeriCorps members	$702,565	$723,642	$745,351	$767,712	$790,743	$814,465	$838,899	$864,066
Federal government benefit from members	$96,339	$74,870	$77,116	$79,429	$81,812	$84,266	$86,794	$89,398
State/local government benefit from members	$42,483	$53,776	$55,390	$57,051	$58,763	$60,526	$62,341	$64,212
Government benefit from composting	$90	$0	$0	$0	$0	$0	$0	$0
Societal benefit from composting	$140	$0	$0	$0	$0	$0	$0	$0
NYCHA resident benefit from free produce	$56,637	$0	$0	$0	$0	$0	$0	$0
Forgone benefits (opportunity costs)	**-$192,042**	**$11,693**	**$11,693**	**$11,693**	**$11,693**	**$11,693**	**$11,693**	**$11,693**
Forgone benefits to members	-$163,961	$0	$0	$0	$0	$0	$0	$0
Forgone tax revenue federal government	-$598	$0	$0	$0	$0	$0	$0	$0
Forgone tax revenue state/local government	-$1,591	$0	$0	$0	$0	$0	$0	$0
Federal forgone benefits from investment	-$25,892	$11,693	$11,693	$11,693	$11,693	$11,693	$11,693	$11,693
Program costs	**$1,444,961**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Federal government	$486,200	$0	$0	$0	$0	$0	$0	$0
Non-federal	$958,761	$0	$0	$0	$0	$0	$0	$0

Benefits and costs	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16
Benefits	**$18,061,420**	**$19,807,957**	**$21,557,979**	**$23,313,060**	**$25,074,773**	**$26,844,698**	**$28,624,421**	**$30,415,535**
AmeriCorps members	$889,988	$916,688	$944,188	$972,514	$1,001,689	$1,031,740	$1,062,692	$1,094,573
Federal government benefit from members	$92,080	$94,843	$97,688	$100,619	$103,637	$106,746	$109,949	$113,247
State/local government benefit from members	$66,138	$68,122	$70,166	$72,271	$74,439	$76,672	$78,972	$81,341
Government benefit from composting	$0	$0	$0	$0	$0	$0	$0	$0
Societal benefit from composting	$0	$0	$0	$0	$0	$0	$0	$0
NYCHA resident benefit from free produce	$0	$0	$0	$0	$0	$0	$0	$0
Forgone benefits (opportunity costs)	**$11,693**	**$11,693**	**$11,693**	**$11,693**	**$11,693**	**$11,693**	**$11,693**	**$11,693**
Forgone benefits to members	$0	$0	$0	$0	$0	$0	$0	$0
Forgone tax revenue federal government	$0	$0	$0	$0	$0	$0	$0	$0
Forgone tax revenue sate/local government	$0	$0	$0	$0	$0	$0	$0	$0
Federal forgone benefits from investment	$11,693	$11,693	$11,693	$11,693	$11,693	$11,693	$11,693	$11,693
Program costs	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Federal government	$0	$0	$0	$0	$0	$0	$0	$0
Non-federal	$0	$0	$0	$0	$0	$0	$0	$0

Benefits and costs	Year 17	Year 18	Year 19	Year 20	Year 21	Year 22	Year 23	Year 24
Benefits	**$32,219,642**	**$34,038,353**	**$35,873,292**	**$37,726,097**	**$39,598,418**	**$41,491,922**	**$43,408,296**	**$45,349,244**
AmeriCorps members	$1,127,410	$1,161,233	$1,196,070	$1,231,952	$1,268,910	$1,306,978	$1,346,187	$1,386,573
Federal government benefit from members	$116,645	$120,144	$123,748	$127,461	$131,284	$135,223	$139,280	$143,458
State/local government benefit from members	$83,782	$86,295	$88,884	$91,550	$94,297	$97,126	$100,040	$103,041
Government benefit from composting	$0	$0	$0	$0	$0	$0	$0	$0
Societal benefit from composting	$0	$0	$0	$0	$0	$0	$0	$0
NYCHA resident benefit from free produce	$0	$0	$0	$0	$0	$0	$0	$0
Forgone benefits (opportunity costs)	**$11,693**	**$11,693**	**$11,693**	**$11,693**	**$11,693**	**$11,693**	**$11,693**	**$11,693**
Forgone benefits to members	$0	$0	$0	$0	$0	$0	$0	$0
Forgone tax revenue federal government	$0	$0	$0	$0	$0	$0	$0	$0
Forgone tax revenue state/local government	$0	$0	$0	$0	$0	$0	$0	$0
Federal forgone benefits from investment	$11,693	$11,693	$11,693	$11,693	$11,693	$11,693	$11,693	$11,693
Program costs	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Federal government	$0	$0	$0	$0	$0	$0	$0	$0
Non-federal	$0	$0	$0	$0	$0	$0	$0	$0

Benefits and costs	Year 25	Year 26	Year 27	Year 28	Year 29	Year 30
Benefits	**$47,316,489**	**$49,311,779**	**$51,336,885**	**$53,393,601**	**$55,483,752**	**$57,609,187**
AmeriCorps members	$1,428,170	$1,471,015	$1,515,145	$1,560,600	$1,607,418	$1,655,640
Federal government benefit from members	$147,762	$152,195	$156,760	$161,463	$166,307	$171,296
State/local government benefit from members	$106,132	$109,316	$112,596	$115,973	$119,453	$123,036
Government benefit from composting	$0	$0	$0	$0	$0	$0
Societal benefit from composting	$0	$0	$0	$0	$0	$0
NYCHA resident benefit from free produce	$0	$0	$0	$0	$0	$0
Forgone benefits (opportunity costs)	**$11,693**	**$11,693**	**$11,693**	**$11,693**	**$11,693**	**$11,693**
Forgone benefits to members	$0	$0	$0	$0	$0	$0
Forgone tax revenue federal government	$0	$0	$0	$0	$0	$0
Forgone tax revenue state/local Government	$0	$0	$0	$0	$0	$0
Federal forgone benefits from investment	$11,693	$11,693	$11,693	$11,693	$11,693	$11,693
Program costs	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Federal government	$0	$0	$0	$0	$0	$0
Non-federal	$0	$0	$0	$0	$0	$0

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