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Love for humanity and universal goodwill: reflections on philanthropy through theory of change and the United States Land grant values in Uganda

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Abstract

The increasing levels of food and nutrition insecurity has fostered the development of philanthropy to support the diversification of livelihood strategies. This study describes how the activities implemented by the Center for Sustainable Rural Livelihoods (CSRL) based in the United States, implementing livelihood programs in Uganda through the Iowa State University Uganda Program (ISU-UP) exemplify the classical meaning of philanthropy love for humanity through the operationalization of the land-grant philosophy. The study employed integrated sustainable livelihood framework and theory of change approaches to examine the impact of CSRL/ISU-UP's initiatives on community resilience and sustainable development in Uganda. Mixed-methods design were adopted combining content analysis of program annual reports and 12 focus groups with 125 mothers in nutrition programs. Data were analyzed thematically. The findings reveal that programs implemented operationalize the land-grant mission to enhance livelihood development across different backgrounds. Educational programs, such as vocational training and adaptive homeschooling during COVID-19, promoted student retention and led to human capital development across diverse age groups. We also describe the long-term impact of global service-learning and school gardening on inter-institutional partnerships and community development. Additionally, this study explains various collaborative research efforts that focus on integrating indigenous knowledge with rigorous scientific inquiry to create innovative solutions to pressing food and nutritional security challenges. We also discuss the extension arm, demonstrating the practical application of knowledge and how these activities promote community partnerships and shared responsibility. Focus group participants explained how initiatives benefit community individuals who may not be direct clients, illustrating the ripple effect of knowledge sharing and community engagement. However, they also described limitations like hesitancy and time constraints, which hinder broader participation, ultimately demonstrating the need for tailored outreach strategies. This study explains how CSRL/ISU-UP's approach to sustainable livelihood development synergistically combines the core elements of the land-grant mission to exceed the expectations of classical philanthropy by positioning communities as equal partners and co-creators of change. Program efforts should focus on enhancing outreach and engagement to maximize impact and ensure that program benefits reach all members of the community and also strengthen collaborative efforts with stakeholders in similar causes.

Keywords: 1862 Morrill Act, community capitals, land-grant values, love for humanity, sustainable livelihood, theory of change

Introduction

In 1862, the Morrill Act was signed, which culminated in the establishment of land-grant institutions. ^[1-3] The Act was titled *An Act Donating Public Lands to the Several States and [Territories] which may Provide Colleges for the Benefit of Agriculture and the Mechanic Arts*, thus providing 30,000 acres of federal land to each state. The development of the United States agricultural education programs are embedded within three fundamental values of the land-grant philosophy of learning, discovery, and engagement. *Learning* involves teaching to provide and share knowledge, *discovery* involving research and creation of new knowledge and new use or application of old knowledge, and *engagement* involves extension collaboration, sharing, and application of knowledge.

Historically, Iowa State University became one of the first institutions to accept the provisions of the Morrill Act in 1868 ^[4]. The 1862 Morrill Act metamorphosed into subsequent Acts to cater to the different needs of the community. The 1887 Hatch Act established experimental stations; the 1890 Morrill Act granted Black Colleges land grant status; the 1914 Smith-Lever Act established Cooperative Extension; the 1917 Smith-Hughes Act; 1963 Vocational Education Act; and 1987 NCA-24 Committee focused on high school teaching on farming, training in other agriculture fields beyond high school, and agriculture research respectively; and the 1994 Tribal Colleges all rooted within the land-grant philosophy ^[3].

Over time, many countries across the globe have sought to adopt and adapt the land-grant philosophy through

partnerships with the United States land-grant institutions. Uganda, our case study is one example of such partnerships through sustainable livelihood programs implemented by a state university^[5-7].

Sustainable Livelihood Program in Uganda

By its mission: *create, share, and apply knowledge* Iowa State University joined the world's call to give deliverance to the hungry through *tapping philanthropy*^[5-7]. The university's intent in its sustainable livelihood program is to redefine philanthropy back to its *classical meaning love for humanity ... and readiness to do good to everyone* (p. 10).^[6] To achieve its mission, Iowa State University established Center for Sustainable Rural Livelihoods (CSRL) in the College of Agriculture and Life Sciences. The benefactors of the program wanted their dollars to help *the poorest of the poor*. A thinktank was conducted, and Uganda was selected because of reliable partners, and Kamuli district

became the foundational operational area due to high poverty levels. The CSRL established its base in Uganda in 2004 under a three-partner model with Makerere University and a local non-government organization called Volunteer Efforts for Development Concerns between 2004-2014; and since then, Iowa State University Uganda Program (ISU-UP) is the implementing partner^[6, 8]. The program use gifts from private benefactors, and their generosity is implemented through the theory of change to improve livelihood by building human capacity towards food and nutrition security, building assets, and fostering sustainability of development in communities^[5-7]. A human capacity-building framework (Figure 1) was designed and adopted to guide program operations, starting from supporting infants during their first 1000 days through seniors in an intersection of livelihood programs to end hunger.

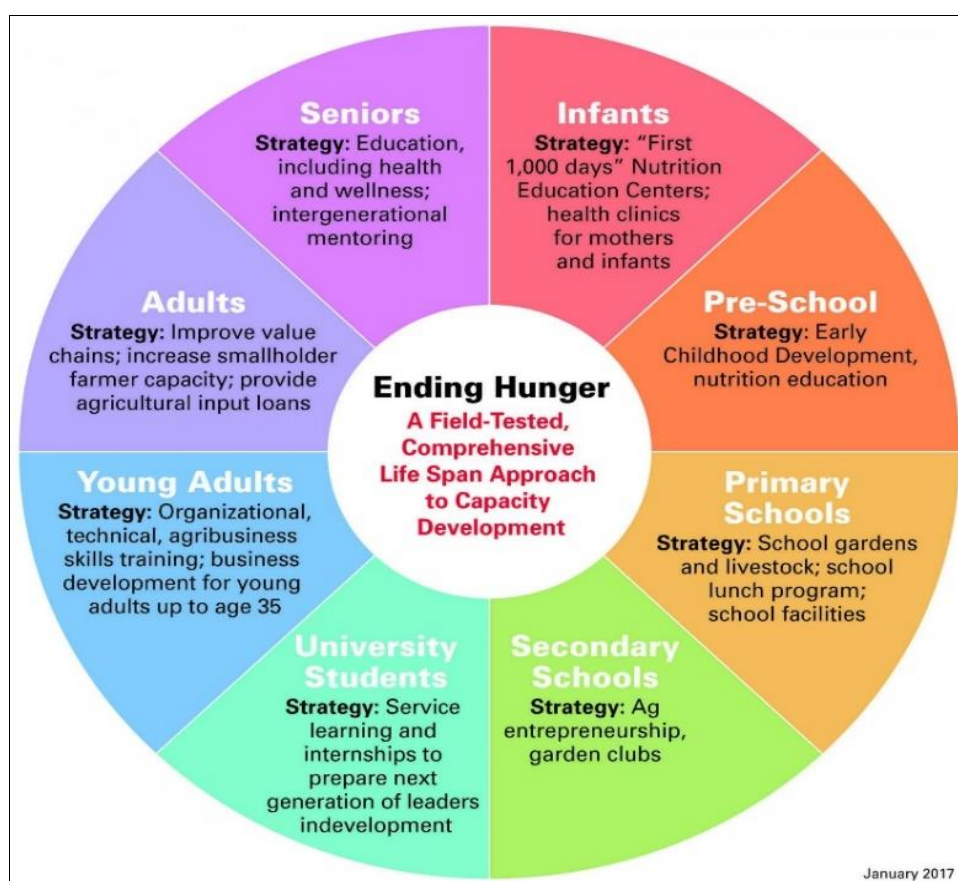


Fig 1: CSRL/ISU-UP Sustainable Human Development Framework in Uganda

The Sustainable Livelihood Framework and the Theory of Change: The CSRL program was developed based on the sustainable livelihood approach, also referenced as the sustainable livelihood framework^[9]. The two livelihood strategies have been revised and a new framework developed to suit the 21st Century's rural development efforts (p. 12)^[10], caring for global shifts in climate and environmental degradation impacting agricultural production. In his seminal work, Scoones asserts that livelihood comprises the capabilities, assets, and activities required for a means of living, and adds that a livelihood is sustainable when it can cope with and recover from stresses (p. 5)^[9].

The livelihood framework has five key asset capitals including human, social, financial, physical, and natural capital the pentagon of assets capital (pp. 10-11)^[11] which are the foundations of the theory of change—a cornerstone of development in many regions, such as Latin America and the Caribbean (pp. 18-19), South Asia,^[12] and learning about rural development^[13]. The CSRL programs were operationalized after an assessment of the assets capital that guided program development priorities^[14]. The theory of change is embedded its mission of using the power of education to develop sustainable communities and vision looking toward developing responsible global citizens and thriving local communities that benefit from food and

financial security (p. 8) ^[6].

The CSRL/ISU-UP conducts community mapping of assets through participatory appraisals to give an idea of how assets can be productively harnessed ^[14]. The program also relies on the indigenous knowledge ^[15] and blending with rigorous scientific research ^[16] to develop livelihood programs and tailored extension education programs for the communities.

In this study, we corroborate community capitals illustrated in Sseguya *et al.* ^[14] as CSRL foundation in determining program priorities, operationalized through the land-grant values of teaching/learning, research/discovery, and extension/engagement to achieve sustainable community development. Therefore, the purpose of this inquiry was to gain knowledge and an understanding of how CSRL/ISU-UP has executed their mission to meet its goal of working within the frameworks of the livelihoods framework, theory of change and land-grant philosophy. The study was guided by two questions:

1. How has CSRL/ISU-UP achieved its philanthropy goals

through the land-grant values?

2. Do program benefits spread beyond its clients to contribute to overall sustainable livelihood?

Methods

This investigation was founded on a social constructivist orientation, driven by a conviction that knowledge is socially constructed, and its meaning is gleaned inductively through an in-depth engagement with study participants ^[17]. A case study methodology was adopted ^[18] and we employed dual qualitative mixed methods, including content analysis and focus group discussions. In question one on how CSRL/ISU-UP has achieved its philanthropy, we conducted content analyses of CSRL annual reports. There were seventeen annual reports available in digital format, 2008-2024, and eleven reports were purposively selected (2014-2024) that focus on CSRL/ISU-UP partnership ^[6, 8]. The data were contained in these reports (Table 1), and each report was analyzed as a case.

Table 1: CSRL/ISU-UP Annual Donor Impact Report for the Case Study Period, 2014-2024.

No.	Year	Theme of the Year	Number of Pages
1	2024	Innovation and Sustainability	20
2	2023	Sustainability and Self-Sufficiency	20
3	2022	Foundation for Independence	20
4	2021	Spirit of Innovation	20
5	2020	Sustaining Resiliency	20
6	2019	Improving Lives, Sustaining Lives	20
7	2018	Sustaining Connections That Matter	20
8	2017	Sustaining Growth Over Time	20
9	2016	Mwebale Inho, Thank You Very Much	20
10	2015	Your Passion, Their Transformation	20
11	2014	Improved Nutrition, Stable Incomes, and Hope for the Future	24

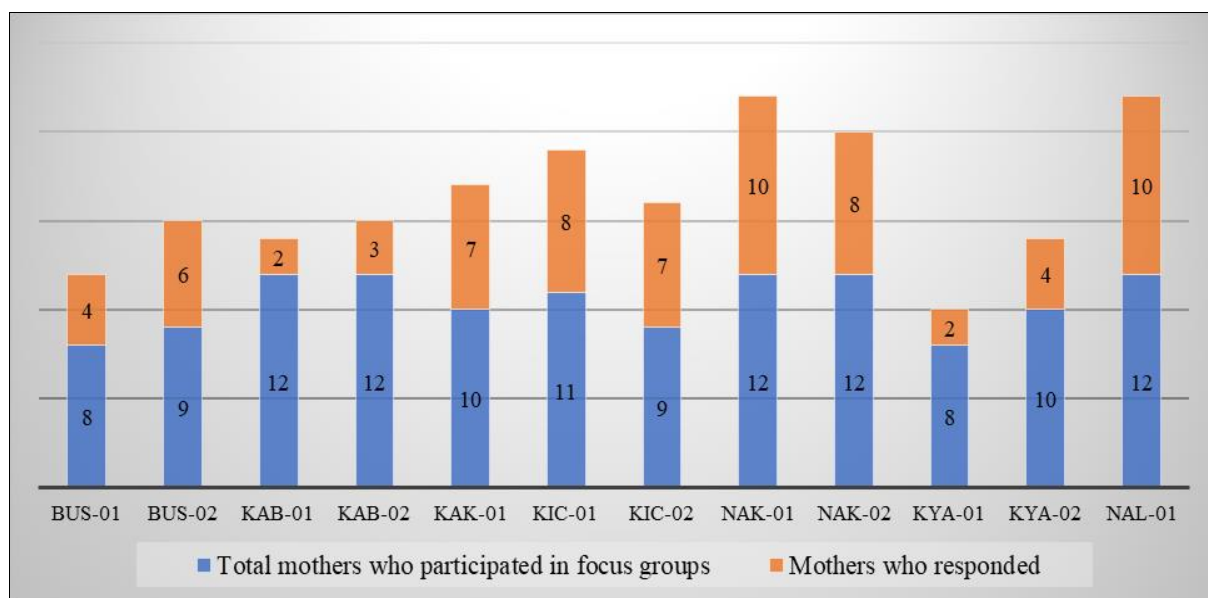
Source: Center for Sustainable Rural Livelihoods ^[19].

During analysis, we engaged in dialogues with our data, sought to recognize and classify commonalities across cases and perspectives that appeared distinct. Three categories of *learning, discovery, and engagement* were assigned *a priori* as land-grant values. We wrote analytic memos to reflect on emerging unique ideas within and across the reports and developed themes inductively ^[20] in line with each category. Additionally, we also critically observed artifacts and pictures captioned in each report and wrote memos on intuitive captions that we used to generate new knowledge on the program’s accomplishments as a form of triangulation. We shared drafts among ourselves for peer reviews to help with discussions and conclusions, making connections between the land-grant values and theory of change elements through community asset capitals.

In question two, which asked whether *program benefits spread beyond its clients*, we used responses from focus group discussions that were conducted as part of a larger study. The study oversight was provided under IRB-18-356-01. Twelve focus group discussions were conducted with a subset of 125 mothers who were attending the at-risk-for-

malnutrition rehabilitation programs at seven nutrition education centers ^[21-22]. We constituted our focus groups with a maximum of 12 mothers (Figure 2), and all locations of nutrition centers are illustrated on the map (Figure 3).

Our focus groups were conducted following the guidelines of qualitative inquiry. The lead author worked with three enumerators. After thorough training of enumerators on focus group dynamics, distinct roles were assigned, such as asking stem questions, managing voice recorders, and writing detailed responses. The lead author managed the focus groups to ensure every mother got a chance to speak and also took up the roles of asking probing questions and writing field memos for use during discussions to improve the trustworthiness of the data. The field team spoke the local dialect, which eased the natural flow of conversations while maintaining the focus on the research goal ^[18, 23]. Handwritten, detailed notes were typed into a Word document. The lead author cross-checked for clarity between typed documents and audio recordings. Alongside these crosschecks, a paper trail of analytic memos was kept in addition to field memos,



Note: Mothers who responded to the question *do program benefits spread beyond its clients* are reflected in orange color but does not represent responses to other focus group questions.

Fig 2: Nutrition Education Centers and Mothers Who Participated in Focus Groups

generating rich data memos that were used in discussions, providing a holistic view of how philosophy is manifested through the theory of change and land-grant values. Inductive coding was used, and interpretations are presented

in the form of themes. Excerpts from the reports are used, and also from mothers with *details, emotions* about their lived experience (p. 172) ^[23].

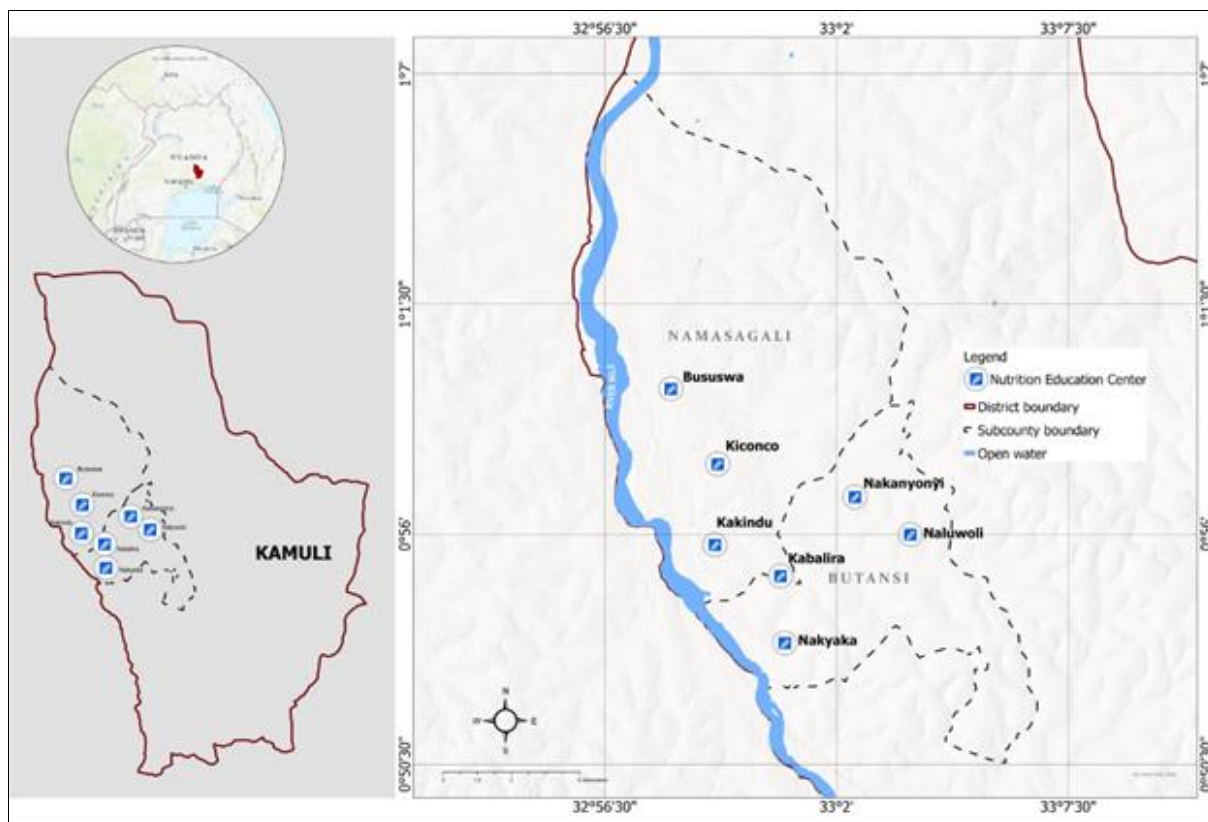


Fig 3: Study Areas in Kamuli District, Uganda

Building Trustworthiness through Reflecting on Positionality and Reflexivity: The authors were well conversant with the study area and the programs. At the time of the focus groups, the lead author had spent two

years as a research assistant assisting with the monitoring and evaluation of the program activities. This role views the lead author as an insider, but coauthors are outsiders. To navigate these insider-outsider tensions, the lead author

relied on the advice of qualitative investigators relating to keeping a trail of journals that included memos relating to the data collection and its process^[24]. Specifically, sticking to research goals during focus groups with minimal personal disclosures and maintaining the natural flow of conversations^[23].

The lead author, who was immersed in focus groups, took the lead in data analysis as well as reflecting on the analytic memos, which eased gleaning knowledge and making connections between and among themes, across cases, linking land-grant values to the theory of change and livelihood capitals. Making these connections was partly because of the lead author's continuous engagement in evaluation activities, as well as constant peer debriefing with the research team. Also, the presentation of data in thick descriptions and excerpts from cases clears personal bias.

Results

Results are presented based on the research question, with themes in each question illustrating interconnected scenarios depicting how philanthropy is manifested through the theory of change, transforming livelihood along the lines of sustainable livelihood capitals and land-grant values. We introduce themes in thick descriptions to illustrate their nuances, followed by excerpts.

RQ1. How has CSRL/ISU-UP achieved its philanthropy goals through land-grant values?

In this research question, we determined the categories *a priori* to focus our analysis on the three land-grant values prescribed by the 1862 Morrill Act, including *learning*, *discovery*, and *engagement*, from which various themes emerged.

Teaching and Learning: Six teaching and learning themes emerged relating to learning and teaching, including global service-learning, vocational education, youth development, home schooling, innovation skilling, and school gardening. The essence reflected in these themes describes an interface between the new knowledge learned and the real world, moving the needle of livelihood strategies to advancing stages in improving livelihood through education.

Global service-learning

This global service-learning theme reflects efforts to develop global competence among students rooted in land-grant values abroad. In 2014, for instance, the report reads that *service-learning is deeply connected to both the mission and culture of Iowa State University* (CSRL, 2014, p. 17). This connection was illustrated in a way that *not only do students learn while contributing to the social good [but also] strengthens their resolve to make the world a better place* (p. 17). Global service-learning is implemented through school gardening and related activities in schools, and *students live together and form lasting bonds as they teach in schools and care for school gardens* (p. 17). In assistance with teaching, it was illustrated that *service-learners worked in schools with children in primary schools and secondary schools by assisting in teaching integrated science and math* (CSRL, 2019, p. 10).

Students also form bi-national teams and in 2014, for

instance, *40 students completed projects in poultry management, irrigation, agroforestry* (CSRL, 2014, p. 17). Service-learning has had several developments, *2018 marked the first time that semester-long service-learning opportunities were offered* (CSRL, 2018). Since its inception in 2006,^[25] *service-learning programs were six to eight weeks [and] the new [semester-long] program allows students to learn about development programs across an entire semester* (CSRL, 2018, p. 17), fostering students learned through deep immersion in communities.

Home schooling

The COVID-19 pandemic altered how education was delivered and CSRL/ISU-UP designed home schooling approaches. It was illustrated that the program worked with school administrators, teachers, local leaders, *guided by the District Education Office, the staff worked with parents to encourage students to continue their schoolwork in small groups in their communities* (CSRL, 2020, p. 10). They added that *as the word of the program spread, students from neighboring schools joined in. The ISU-UP staff also worked with headteachers of each school to enlist teachers who could help in evaluating the students' work* (p. 10). Additionally, the program has engaged elementary pupils in reading clubs to promote literacy and improve their communication skills with service-learners. In 2021, it was reported that the program distributed *home reading materials to 640 fifth- and sixth graders during school closures* (CSRL, 2021, p. 5). The 2024 program report indicated that *since 2022, 600 children have benefited from supplementary reading and writing instruction with teachers, and 3,000 children have engaged in debates at five primary schools* (CSRL, 2024, p. 16).

Vocational education for teen mothers

In 2022, CSRL/ISU-UP launched the vocational program for teen mothers in response to *challenges increased with the COVID-19 pandemic lockdown of schools which forced [most girls] to drop out of school and get married due to poverty* (CSRL, 2022, p. 11). With the promise of rehabilitation, the program reported that *some of the young mothers [could] resume their formal education*, reflecting a commitment to giving teenage mothers another chance at pursuing formal education (p. 11). These initiatives provide mothers with skills that enable them to pursue income-generating activities.

Teen mothers are clustered into groups based on their interests like *Twezimbe—let's develop ourselves, makes exercise books for schoolchildren while Twisa-Kilala—unity is power, makes leather crafts* (p. 16). The sustainability of teen mother programs are embedded in the opportunity it grants students to partner with staff when skilling the mothers, who then provide a service to students who are in school. The program has continued to expand project offerings in *tailoring, hairdressing, baking*, with training delivered by *qualified tutors, three days a week for six months*, thereby allowing participants to *earn income and sustain themselves* (CSRL, 2023, p. 11; 2024, p. 14).

Youth development

Youth programs allow both in- and out-of-school youth to participate in agricultural businesses. At its inception in

2013, Youth Entrepreneurship Program (YEP) had narrow focus on *teaching students how to create and manage crop and poultry enterprises* (CSRL, 2015, p. 15). However, the program expanded to include out-of-school youth to give them renewed purpose (p. 15). In 2016, an in-school youth recounted, *before I joined YEP, my large family never had enough food to eat. The income I earned from poultry allowed me to diversify to other enterprises such as piggery, beekeeping* (CSRL, 2016, p. 7). This level of involvement has also shown that the beneficiaries can extend the same support to other community members. Another out-of-school youth, enrolled in YEP when earned income by *selling handmade knives*; however, through the training provided by the program, [they] *constructed a poultry house and received 70 chicks*, and loan repayments are made through egg sales (CSRL, 2015, p. 15).

The transformation of youth in YEP explains the program's potential to enhance economic independence and skill youth to thrive. The program offerings for in-school youth also include the Youth Institute. It was first held in 2018, and in 2019, the institute successfully engaged *82 youths from 13 schools*, highlighting their capacity to articulate community challenges and propose solutions *while citing existing projects in their schools* (CSRL, 2019, p. 12). This approach to youth development allows them to reflect on their footprints in community development, emphasizing mentorship and peer collaboration, enhancing confidence, and encouraging youth to take active roles in their communities. The program's resilience was evident in 2022 when the Youth Institute resumed after COVID-19, and had 134 participants graduate (CSRL, 2022, p. 6).

Innovation skilling: Through the *community income generating innovations*, innovation skilling focuses mostly on malnutrition-rehabilitated mothers of the nutrition program^[26]. The initiative utilizes local knowledge to create practical solutions that address local challenges and enhance community resilience by supporting women to create sustainable sources of income. As noted in the 2017 report, *sales of the mats, baskets and other items created in crafts project have improved the standard of living for numerous women and families* (CSRL, 2017, p. 2). The program has diversified its offerings to include *craft production, sewing projects, soap making, and notebook construction* (CSRL, 2019, p. 16).

These activities empower women and promote food and income security. For instance, the *Tusubila we have hope* crafts group was certified as a *community-based organization*, launching its enterprise, electing officers, and opening a bank account (p. 16). Tusubila group was bolstered by the establishment of Uganda Alliance a student-led organization at Iowa State University that sells Tusubila's products through a *globe pop-up shop a wheeled cart with cupboard space to carry the baskets and a countertop to display them* (p. 19). Innovation skilling stresses the collaborative efforts of students-mothers, allowing international visibility and sales to support their enterprises.

School gardening

School gardens and related projects, such as livestock, are powerful educational tools, promoting knowledge transfer

and entrepreneurial skills among service-learners, pupils, and communities. One parent noted that, *at first, I did not understand how the children would benefit from school gardening. I now see it is imparting knowledge and life skills* (CSRL, 2015, p. 4). Two parents further explained *we've been impressed with the techniques taught in livestock rearing. Our children advise us on vaccination ...* (p. 4). These insights highlight the multifaceted benefits of school gardening, which extend beyond experiential elementary agricultural education practices to encompass broader outcomes, such as students transferring their gained knowledge and skills to their respective families.

Pupils also learn skills, including marketing, applied in their entrepreneurial endeavors as one parent reported, *my daughter grows her eggplants, and this helps save us money* (p. 4). This approach encourages parents to participate in the learning process, creating reciprocal knowledge exchange and building a community of shared learning. To facilitate the sustainability of school gardens, infrastructure improvements were made based on students' suggestions. At one school, water catchment systems were installed to support irrigation, and one service-learner stated, *this is one way we can save labor and give them [pupils] more time in class* (p. 11). By 2024, *nearly 360 undergraduate students from [Ugandan] University and [State] University [had] completed a binational service-learning program*, enriching their educational experience with communities (CSRL, 2024, p. 16).

Research and Discovery

Five research and discovery themes emerged relating to livestock development, postharvest technologies, food safety, crop and soil improvements, illustrating the integration of local knowledge and scientific practices to enhance agricultural productivity, food security, and community vitality.

Livestock development

In livestock, farmers face significant challenges when selling their animals due to the lack of scales to weigh them, leading to their undervaluation. With program support, a service-learning alumni conducted an experimental study to develop a mobile phone application for estimating pig weight based on specific measurement inputs, including *animal's body length, heart-girth, body width and height* (CSRL, 2014, p. 4). It was reported that the *calculations tested on more than 400 pigs, and the predictions accurate within two or four kilograms* and envisioning empowering farmers when *selling livestock* (p. 4). In feeding, the program also worked with International Potato Center and International Livestock Research Institute to assess *viability of sweet potato vines as a food source for pigs* to address challenges of *seasonal feed shortages* (CSRL, 2016, p. 12). To enhance breeding, the program also introduced *bovine artificial insemination* to increase milk yield, improving their nutrition and income (CSRL, 2021, p. 13).

Food safety

Improving food safety practices in butcher shops and among consumers is relevant for public health. Service-learning alumni collaboratively conducted studies *studying food handling practices used at butcher shops in Kamuli* (CSRL,

2021, p. 5). This study was in conjunction with a meat safety study of *consumers in the United States Virgin Islands when shopping, storing, preparing, and cooking beef at home* (CSRL, 2021, p. 5).

Postharvest technologies

Effective grain storage is necessary to improve food security in communities where grain losses are high due to biohazards like aflatoxins and pests like weevils. A student researched hermetically sealed barrels that decrease damage from common storage pests, intending to transfer the *storage solution* to farmers and schools (CSRL, 2014, p. 3). When the technology was introduced and adopted in school feeding programs, it was reported that it resulted in preservation of *more than 2,400kgs of maize by July 2017* (CSRL, 2017, p. 10).

Additionally, there was a need to improve threshing processes of grain amaranths before drying and storage, a key ingredient in nutrition program ^[21-22]. It was reported that a service-learning alumni with support from the program designed an *amaranth thresher that operates with a hand-powered crank* and further improved with the new design *powered by a small gasoline engine* (CSRL, 2023, p. 3). Yet alumni, designed a *pedal-operated maize cleaner* that has been adopted in communities and schools (CSRL, 2020, p. 14). The program also introduced *steel presses for oil extraction* from crops, a cost-effective technology expected to *become popular enough that farmers will share the device and profits from selling the oil* (CSRL, 2021, p. 16).

Crop improvements: In agronomy programs, experimental studies were conducted to address low crop yields and management practices. For instance, service-learning alumni experimented with pumpkins/squashes, envisioning that *squashes could improve nutritional dietary intake and create farm income* (CSRL, 2021, p. 5). Additionally, in 2022, other alumna was facilitated to set up demonstration garden focused on best practices in tomato production and disease management. The program illustrated the need for this focus, stating that *tomato wilt and root rot diseases had decreased production, which hindered sales* (CSRL, 2022, p. 8). The demos identify locally available practices to combat tomato wilt and root rot.

Soil improvements: The prevalence of parasitic weeds like striga due to soil infertility was found poses significant threats to maize and millet production in the program area ^[27]. Earlier service-learning alumni conducted a study to gauge the severity of striga and provided training on management strategies. The program recognized that *we need to figure out how to control striga, or the gains we've made over the last decade will be wasted* (CSRL, 2015, p. 12). Efforts have been devised by service-learning alumni focusing on soil mapping and testing as major components of sustainable land management in *identifying soil properties and approaches to enhancing agricultural practices* (CSRL, 2021, p. 4).

Extension and Engagement

Six extension and engagement themes emerged, including livestock, agronomy, agroforestry, postharvest, nutrition,

and public health education. These themes explain the role of practical training, resource sharing, and community engagement, encouraging the practical application of discovered knowledge and learned principles, ultimately promoting sustainable development and community resilience.

Livestock education

The program developed targeted extension programs to enhance animal husbandry practices, targeting farmers, including women farmers. It was reported that, for instance, *after attending multiple training sessions, [Sarah], a participant in the nutrition education center poultry program, received 76 birds* (CSRL, 2015, p. 9). The support enabled Sarah to generate income from egg sales. Additionally, the program has invested in improving infrastructure to foster capacity building. The 2019 report indicated that the *construction of the Khursid Livestock Training Pavilion at the Mpirigiti Training Center has further bolstered capacity-building efforts by providing a dedicated space for training and demonstration* (CSRL, 2019, p. 4).

The new facility provides a dedicated training pavilion and livestock demonstration area where [different livestock species] *provide a working model of livestock integration* (CSRL, 2019, p. 4). In livestock, additional programs have been added, for instance, the *send-an-animal initiative has led to the establishment of 18 community groups, comprising 784 members who collectively pool resources to acquire livestock* (CSRL, 2022, p. 14). This approach to agricultural extension education promotes shared prosperity, community solidarity, and empowerment.

Agronomy and land use education

These education programs focus on improving crop production and market access. As an example, the program reported that *after joining YEP, [Agnes] expanded his smallholder tomato operation, owing to the collective training on best practices such as mulching and irrigation* (CSRL, 2016, p. 11). Agnes added that, *I don't think I'll ever stop growing vegetables. I hope to get my truck so I can transport my produce to markets farther away* (p. 11). This sentiment explains the role of agronomical extension in enhancing food, nutritional, and income security. The 2021 report also explains the role of collective marketing as it stated *field team determined that chili pepper is a crop in demand in Europe, so several smallholder farmers began planting and marketing chili peppers for export, under the guidance of vegetable export companies in Kampala* (CSRL, 2021, p. 3). Through agronomy initiatives, the program supported *74 youth-owned startups in agricultural crop enterprises, including chili peppers, green peppers* (p. 3).

Agroforestry, orchards, and natural resources

These initiatives focus on sustainable land management and fruit production. The program has worked with communities to establish tree nurseries, *resulting in the propagation of over 8,540 seedlings and 974 plantings, which are aimed at providing essential resources such as fruit, fuel, fencing, and fodder* (CSRL, 2021). Additionally, the agroforestry binational service-learning teams engaged in hands-on

projects that include planting trees and educating community members about sustainable practices. A service-learner noted that the bi-national team experience *provided an opportunity to apply what [they] has learned as a Forestry major* (CSRL, 2022, p. 7).

Postharvest education: Postharvest extension programs are designed to transfer knowledge to mitigate food losses. Notably, the introduction of hermetic storage solutions earmarked as *a game-changer*, focused on *reducing postharvest losses caused by common pests and mold* (CSRL, 2018, p. 13). By focusing on extension education, CSRL/ISU-UP can enhance the communities' health and well-being. Service-learners help develop culturally relevant and practical solutions like pedal-operated maize cleaners, demonstrating commitment to improving postharvest efficiency (CSRL, 2020, p. 15). The students' experiences as service-learners working with farmers motivated them to design a postharvest machine using knowledge learned from their engineering classes with faculty support.

Nutrition and infant feeding education: In the program, nutrition education centers are critical in promoting community health initiatives through education ^[21-22] especially in the first 1,000 days of children's lives. The program's emphasis on providing nutrient-dense porridge made from locally sourced ingredients is vital for managing malnutrition. The program leader explained that training equips caretakers *with knowledge in nutrition, hygiene, good health practices, and good agronomic practices*, thereby *saving [children's and women's] lives while preparing [the] women to maintain their families' improved health* (CSRL, 2023, p. 12). Additionally, the integration of superfoods like grain amaranth into the local diet has also yielded significant benefits. One mother, Tara, reported that she *received training and seeds and planted amaranth, millet, and soybeans* (CSRL, 2018, p. 6). The program reported that *Tara is now able to feed her family with nutrient-dense foods and earn an income from sales* (p. 6).

Public health education: Program efforts have been instrumental in addressing the community's need for improved access to clean water through activities implemented in the water, sanitation, hygiene, and health (WASH) program ^[28]. It was reported that *in response to this critical and continuing need [for clean water], the program supported the installation of three boreholes* (CSRL, 2019, p. 15). Program staff *work with local communities to establish and train members of water committees who manage use and maintain the operation of the boreholes* (p. 15). WASH program also *established two model homes as training centers for overall health and sanitation practices such as hand washing, drying stands for dishes, garbage disposal, and improved latrines* (CSRL, 2020, p. 15). These efforts are geared towards reducing household predisposition to WASH related illnesses such as malaria and diarrhea among others by constructing and maintaining WASH infrastructures.

RQ2: Do CSRL/ISU-UP benefits spread beyond their clients to contribute to overall sustainable livelihood?

The results 12 focus group discussions with 125 mothers of

the nutrition program are divided into perceived benefits and limitations in reaching non-program members.

Perceived Benefits of the Program to the Communities

Under benefits, five themes, including social networking, motivation, knowledge sharing, complementary services, and open training, emerged. These themes illustrate the benefit mother's gain from the program and actively contribute to the wider community development through their willingness to share knowledge and resources.

Social networking

Social connections facilitated the sharing of resources and knowledge. One mother narrated that *some non-program clients normally come to my home, requesting me to give them some soybean seeds for planting*. She added that *another non-program member was requesting seeds from the friend I had given. This means that many non-program clients are benefiting indirectly* (NAK-01-02). Another mother said, *when I got the eggplant seedlings from the nutrition education center and made my keyhole garden, everyone admired my keyhole garden since it looked nice. So, I shared my harvest with some non-program clients, for example, I gave my friend, [Bennah], who is a non-program client* (NAK-02-01). Additionally, another mother also noted that *most of the people around my community are clients of this program. I was the last in our community to join this nutrition center* (NAL-01-05), indicating the program's influence on community participation.

Motivation

Motivation was derived from visible benefits to direct clients' families. For instance, a mother said that *non-program clients get motivated [to enroll in the program] when they see that our children who take the dense-nutrient porridge are very healthy* (BUS-01-01). Another mother shared, *I was not a nutrition center beneficiary, but now, am fully a member because of the advice of previous beneficiaries* (NAK-02-08). One mother also explained that *when my neighbor told me to bring my child to this nutrition education center, I brought the child and implemented what she told me* (NAK-02-06). These experiences reflect how successful outcomes inspire mothers to engage with the program, the essence of support provided by members in our social circles to influence our behavior change as explained in the theory of planned behavior ^[29].

Knowledge sharing

Knowledge transfer draws on mothers' interactions with non-program clients. One mother narrated that *I trained some non-program clients how to fix a tip-tap at their latrine*. She added, *I trained some other non-program clients how to make a keyhole garden. I used the knowledge at this nutrition center to train them, so they are also benefiting from the program indirectly* (BUS-02-02). Other mothers also emphasized their role in educating others, one stated, *I train non-program clients how to make dense-nutrient porridge. They base on our knowledge to make their porridge* (NAK-01-04). Another mother recounted, *I give advice to non-program clients, based on the skills and knowledge acquired from the training conducted at this nutrition education center, and emphasized, I don't just give*

them vegetable seedlings or seeds, but I also train them how to plant them (NAK-02-03). On public health, one mother explained, *due to the hygiene and sanitation training conducted at this nutrition center, I managed to teach my neighbor, [Okai], to construct a tip-tap at his latrine. I also [encouraged] him to dig a rubbish pit, and he has already implemented what I taught him* (NAK-02-06).

Complementary Services

The program's services are extended to non-clients through nutrition and public health advocacy. One mother explained *I mobilize non-program mothers to bring their children to this nutrition education center to get immunization, and fortunately, most of them bring their children*. She added that *since they no longer move long distances to take their children for immunization [at government health facilities], it means that they also benefit from this program* (KIC-02-07). Another mother echoed a similar sentiment and added that *those clients also get medicines on clinic days at this nutrition education center* (KYA-02-02). The program works alongside nurses from health centers through the Ministry of Health to support immunizations and related education ^[21-22].

Open training

Program beneficiaries also recognized the value of open training opportunities, with one mother explaining, *non-program members are usually invited to attend training at nutrition education centers such as livestock training* (KAB-01-01). Another mother explained, *[before the training] are conducted at this center [the program] invites both the program clients and the non-program clients [to attend the sessions]* (KYA-02-01), demonstrating inclusivity in program initiatives to support a broader goal of comprehensive human capital development (Figure 1).

Perceived Limitations to Non-Program Client Participation: In our focus groups, some beneficiaries reported limitations in the program's outreach and impact. They reported in mainly two themes including hesitancy and time constraints, highlighting the challenges faced in attracting and engaging non-clients, explaining the hindrances to awareness of the program's offerings that can be used to provide avenues for tailored extension programs.

Hesitancy: Some participants explained that non-program clients often used excuses related to their homecare responsibilities. One mother noted that *we try to train the non-program clients, but they pretend to be busy at their homes* (KAB-02-03). Two other mothers echoed similar sentiments, explaining, *most of them pretend that they are very busy and finally ignore the program's activities* (KYA-01-01; KIC-02-04). Another mother stated, *I try to tell some members about the program services, but they show no interest* (NAL-01-01). One mother indicated, *I informed other people about this program, but they have a negative attitude in their response* (NAL-01-05).

Time constraints: Time constraints were among the highlighted barriers to engagement and practice, with one mother explaining that, *I trained Ms. [Wamuwa] about row crop rotation, but she told me that it is time-consuming*

(KIC-01-01). Another mother stated, *[non-program clients] find it hard to participate because it takes too much time* (NAL-01-01), indicating that perceived time investment may deter participation among potential beneficiaries.

Discussion

The discussion synthesizes the findings by tying them back to the conceptual frameworks of sustainable livelihood capitals/theory of change operationalized through the land-grant values of learning, discovery, and engagement, and addressing the core questions regarding perceived benefits and limitations by beneficiaries.

Teaching and Learning

The results reflect the role played by CSRL/ISU-UP's educational programs in bridging knowledge gaps through formal and informal education, empowering individuals across various educational backgrounds. This composite approach to learning is essential to human capital development in regions like Kamuli district, where access to quality education is challenging ^[30-31]. Program beneficiaries reported improvements in agricultural practices and literacy skills, indicating that initiatives such as global service-learning, vocational education, and youth development, equip individuals with the necessary skills to become changemakers in communities.

Global service-learning in the Uganda program, for instance, encourages collaboration between students from Iowa State University and Makerere University, working alongside elementary pupils and high school students in hands-on projects, such as creating school gardens. These experiences enrich their educational journeys and strengthen community ties, leading to long-lasting relationships ^[26, 32-34]. These benefits are supported by several other research on how service-learning promotes international inter-institutional collaboration, civic engagement, and student development ^[35-37].

The CSRL/ISU-UP also demonstrated adaptability and resilience during unprecedented periods of COVID-19, evident through its choice to maintain formal educational engagement during Uganda's longest school lockdown in the world ^[6]. During this period, the program's educational approach transitioned to home schooling and distributing reading materials to individual students, consequently promoting student retention at official resumption of education nationwide. Under the land-grant pillar of learning, the program aligns with the theory of change by focusing on community involvement and human capital development to build assets and diversify livelihood.

Additionally, vocational training programs aimed at youth and teen mother groups provide practical skills that enable participants to pursue income-generating activities ^[26, 38-39]. These programs contribute to financial capital development through entrepreneurship and agribusiness, resulting in rural employment and improved community well-being ^[40]. These findings align with recommendations emphasizing the need for integrated educational interventions to promote individual and community development ^[41-42]. Holistic education combines various elements of experiential learning and community development to ensure that program beneficiaries become ambassadors of community change.

Research and Discovery: The research pillar emphasizes the value of partnerships between communities and land-grant institutions. Collaborative efforts involving program staff, community members, and university researchers have led to sustainable solutions that integrate local knowledge and practices to holistically address societal challenges. Studies in community-based participatory research suggest that effective community needs assessment and the employment of locally available resources enhance capital productivity^[43-44] and uptake of technology^[45]. The study results demonstrate CSRL/ISU-UP's commitment to the application of rigorous scientific inquiry^[16] and blended with indigenous knowledge^[15] to address real-world issues of food insecurity^[46-48] and nutrition insecurity in Kamuli district^[49] and its neighborhoods^[50].

The program's research efforts are evidenced by the notable field-based adaptable solutions developed by service-learning alumni and program associates in programs such as livestock integration,^[51-54] postharvest technologies^[55-61], soil improvements^[62-65], crop production^[66-70], food safety^[71], school feeding^[72-74], and public health^[28, 75-76]. These innovative research projects promote food, nutrition, and income security, and also facilitate learning through extension and engagement which are core principles of the land-grant mission in agricultural transformation.

The findings also indicate that collaborative knowledge development fosters a sense of ownership because the research beneficiaries are actively involved in the research process. The resultant effect of community-based participatory research is an increase in acceptability, adoption, and effectiveness of proposed interventions^[43] and manifestation of an engaged campus model.^[37] Engaging local communities and scientists ensures that the proposed solutions are culturally relevant and practically viable^[15-16, 45, 77]. This approach to practical problem-solving complements the theory of change, which emphasizes the need to uplift communities through applied research that is responsive to local challenges identified by community partners.

Since applied research is iterative, CSRL/ISU-UP adjusts its innovations in line with the needs of the local population, ensuring that the programs remain relevant^[6, 16, 78]. This approach feasible to adapt to external pressures affecting farmers such as extreme climate events such erratic precipitation^[79], landslides^[80], and related impact such emergency of non-native pest^[81] and diseases^[82]. Navigating these challenges requires fostering collaboration among stakeholders in applied research.

Extension and Engagement

The extension arm of the land-grant mission represents the practical application of knowledge gained from learning/teaching and discovery/research. The success of CSRL/ISU-UP extension programs rests on the effective use of social capital, which has been built through trust, cooperation, and shared values among community members and field staff toward food and nutrition security. The engagement of beneficiaries in outreach initiatives reflects the idea of shared benefits and accountability, expanding community impact through active participation.

Interdependent programs like livestock^[51], agronomy,^[27] innovations^[26] have equipped beneficiaries with the

knowledge to generate income through product sales, enhancing household nutrition and educational opportunities for children. Other interrelated programs in water and public health^[28] and nutrition and infant feeding^[76] have also equipped households with skills improve their household and community health by managing WASH-related diseases such as diarrhea and feeding-related illnesses and malnutrition^[28].

The participation of service-learning bi-national teams (in projects such as agroforestry, beekeeping, composting, health and sanitation) in extension initiatives enhances community development efforts by incorporating contemporary student knowledge to promote efficient resource planning and management^[25, 32-34]. Extension and service-learning are integrated into models as direct service support, extension as a client, and extension as a broker through the service-learning programs^[83]. These partnerships encourage community ownership and enrich the educational experiences of the students and communities. Through school gardens, pupils and students program research shows that pupils and students established their vegetable gardens, increasing food production and income from sales, enabling them to obtain personal items for home and school^[84-87].

Perceived CSRL/ISU-UP Benefits and Limitations to Clients' Participation:

Focus groups reveal that beneficiaries recognize the widespread benefits of CSRL/ISU-UP programs. These results align with the theory of change framework, which suggests that empowerment and knowledge diffusion can lead to broader community transformation^[10, 14]. Social capital emerged as a key factor in extending program benefits, leading to behavior modification and encouraging future participation in programs. Many beneficiaries noted that before they participated in program activities, visible improvements in the lives of other participants motivated them to engage with the program.

The findings also identified limitations in outreach, particularly due to prospective participants' hesitancy and time constraints. The results reveal a degree of gendered hesitancy as women are disproportionately burdened with homecare work, ultimately limiting their participation in extension programs. These finding directly contradicts some societal expectations that women only contribute to family development without recognizing their participation in community transformation^[88-91].

Similarly, *time poverty* aligns with findings that development programs sometimes overlook women's unpaid labor constraints and the gender dynamics within different cultural contexts^[92]. These phenomena necessitate the design of culturally responsive extension programs with considerations for participants' contributions to agriculture, their availability for training, and workloads. Research on the effectiveness of extension in Uganda suggests emphasizing the value of adapting outreach efforts to the socio-cultural context to harness community engagement^[93-94].

Conclusions

The findings of this study illuminate the approaches used by CSRL/ISU-UP to fulfill the classic essence of philanthropy

love for humanity, through the synergistic application of the land-grant values, the sustainable livelihood approach, and the theory of change. Rooted in Morrill's 1862 vision of democratizing experiential learning, the program implements its philanthropic intent through numerous transformative programs in rural Uganda to promote sustainable development and community vitality.

Notably, the principle of sustainability is reflected in how the program's impact extends beyond its immediate beneficiaries to the broader community by training future trainers and leaders. These initiatives exceed transactional aid because they aim at promoting sustainable development based on the principles of mutual respect and shared knowledge. CSRL/ISU-UP illuminates the multiprong approaches operationalizing the concept of classical philanthropy through teaching/learning, research/discovery, and extension/engagement.

The CSRL/ISU-UP education programs like global service-learning, youth entrepreneurship, vocational training, and adaptive education during COVID-19, reflect its commitment to human and social capital development. These programs empower individuals to become self-reliant changemakers while building sustainable communities of practice.

The discovery, driven by collaborative research, such as postharvest technologies, livestock improvement, soil management, crop production, school feeding, food safety, integrates local wisdom with scientific rigor, co-creating solutions that address context-specific and practical challenges like food, nutrition, and income insecurity. These initiatives enhance the productivity of financial and natural capital, ultimately contributing to the sustainability of the interventions.

Extension efforts bridges theory and practice by amplifying impact through community partnerships to establish cooperative businesses, nutrition centers, school gardens, and WASH programs. This approach to extensions builds on the principles of social capital to promote shared benefit and resilience. Viewing CSRL/ISU-UP's activities from the theory of change perspective reveals the role of philanthropy in creating *universal goodwill*.

Focus groups explain the undeniable ripple effects of beneficiaries transforming their communities beyond program boundaries. The program model demonstrates that joint application of emancipatory philanthropy and land-grant values promotes sustainable and holistic development. CSRL/ISU-UP honors Morrill's legacy of creating opportunities for underserved communities by establishing partnerships with community members as co-creators of change rather than passive beneficiaries. Some of the current staff members in CSRL/ISU-UP were program beneficiaries at some point and have graduated to become program officers after receiving expert training and also contribute to applied research projects of the program.

Recommendations and Implications

Land-grant institutions involved in community development efforts can glean insights into how to build sustainable partnerships with community-based organizations and community leaders to promote engagement and trust. Such collaborations facilitate the co-creation of outreach strategies that address specific cultural and socio-economic

barriers faced by community members. For CSRL/ISU-UP, enhancing community impact will require an emphasis on adaptive outreach to ensure that beneficiary recruitment targets those who are most underserved. Culturally responsive communication methods should be developed to raise awareness of program offerings.

Building social capital is necessary for needs assessment and collaborative intervention development. When community members and leaders are involved in creating solutions, adoption rates increase due to the relevance of those interventions^[95]. Utilizing community networks and locally available tools for information dissemination can extend program reach, especially in areas with limited resources. Ultimately, this work advances academic discourse and discusses tangible real-world impacts, empowering communities to become active participants in their development journeys.

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