Redefining Poverty in Rural Ghana Through Co-Development of a Well-Being Survey with Akyem Dwenase

Chiara Smith, Ian Wright, Salma Riad, and Owen Beaver

Abstract

Poverty in the West focuses on monetary wealth and material possessions. Under this definition, many parts of the developing world are classified as impoverished. For purposes of validity, there is a need for a poverty metric that recognizes the complexities of local cultures and lifestyles. Using Martin Burt's non-traditional Poverty Stoplight methodology, our team worked with the community of Akyem Dwenase in the Eastern Region of Ghana to develop a well-being survey that reflects community standards of success and areas of improvement. We used co-design and participatory approaches to mobilize the survey, and in so doing critically contextualized poverty, identified areas of need, and proposed preliminary solutions to the Poverty Stoplight metric which could be applied throughout rural Ghana.

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"The work you do here will be admired by all of Ghana."

Kwasi Anane Asare, Head Farmer of Akyem Dwenase

"Because of my religion, men and women should be treated equally."

Madam Georgina Konadu, Head of an Akyem Dwenase Household

"Thank you for taking time to ask me these questions. God bless you."

Comfort Adgywaa, Head of an Akyem Dwenase Household

"Hold my hand . . . we are all one people, we must all work together."

Robbin Kpoayor, Accra Hotel Guest

"I help you here so that when I come to America, you do the same."

Asiamah Ernest, Taxi Driver in Accra

Figure 1. From Left-Right and Top-Bottom: Ian and other IQP students learning how to play traditional Ghanaian drums. Owen and Akyem Dwenase children play tic tac toe on a hot afternoon. Chiara and Owen walk to the Sunday Presbyterian church service. Students attend a traditional funeral of a deceased village chief.

Towards Decolonizing Poverty

Introduction

"We [hope] to inspire journeys of decolonizing design through [participatory design] in the intersections of work and life in other contexts, and among other constellations of people."[1]

Torretta et al., Sweden, 2023

Figure 2. A morning house visit with Mark Asante (translator), Gloria Darqua (participant), Chiara, and Ian.

Poverty is a complex global issue that spans from economic hardships to social challenges. By Western standards, poverty appears more widespread in Africa due to the enduring impact of colonialism inflicted by the Global North. During the Scramble for Africa in the 1880s, European imperialists invaded and colonized most of Africa. Their actions were backed by theories of "The White Man's Burden" and "Social Darwinism," both of which asserted racial superiority over African peoples.[2] In Ghana, the Portuguese, Dutch, Danish, and British colonialists exploited people for labor, taxes, and the land for natural resources including gold and cacao.[3]

Prior to colonialism, the transatlantic slave trade had depopulated the West African coastline by extracting and exporting to the New World viable manpower that could have developed the subcontinent.[3] This created a void that enhanced the colonization of the subcontinent and the long-term impoverishment of African peoples and societies.

After becoming the first sub-Saharan African country to gain independence in 1957, Ghana faced resource mismanagement with a long period of political and economic instability.[4] In the 1980s, this trend began to reverse, with the country beginning to gradually work towards elected democratic rule and economic growth. The establishment of the Economic Recovery Programme (ERP) in 1983 addressed an economic crisis caused by overspending and mismanagement, enhancing trade and encouraging productive economic activity. In 1992, a constitution was created, reintroducing participatory democracy in Ghana.[4] These policies have aided reform, but areas that contribute to general poverty around the country still remain. Limited access to quality education led to 13% of children in rural areas never attending school in 2021,[5] while the spread of artisanal gold mining has turned many young men away from education. The healthcare sector is highly underserved, leading to increased vulnerability and precarity.[5] The economy is centralized around agriculture, which is the largest contributor to Ghana's GDP, contributing 19.57%.[6] Between 44.1% and 51.5% of Ghanaians work on farms as their primary occupation, yet agriculture remains non mechanized and subject to backbreaking labor.[7] Due to climate change and lack of centralized management, there are inadequate plans for farm and market access. These are just some components that contribute to poverty in Ghana.[8]

Even with good intentions, existing poverty indices often overlook individual well-being and focus solely on income. If an individual is above the "poverty line," meaning they make more than the monetary threshold, they are considered "not impoverished."[27] While these allow government agencies to efficiently measure financial wealth, they fail to encompass the multidimensional factors of poverty (e.g., education, health, livelihoods, environment, and much more). These ignore the well-being of the family and as such lack a human-centered approach to assessing poverty.

Index	Scope	Unit of Measurement	Details	Successes	Limitations	Comparison to PS
OPHI	100 Developing Countries	Health, Education, Living Standards	10 indicators, weighted scores for different poverty dimensions	Simple weighted score representing poverty, easy statistics, accounts multiple dimensions	Poverty crunched to one number, not all dimensions represented	Doesn't contain all relevant indicators, no in-person interaction, no intervention model
OPM	United States	Income	Monetary poverty threshold, families placed according to income	Represents monetary success, quick and easy statistics	One dollar amount representing success, fails to see past monetary value, threshold sometimes too low	Only considers monetary success, no in-person interaction, no intervention model
FFI	100 Developing Countries	Material Wellbeing, Spiritual Wellbeing	7 indicators, basic physiological/social needs, spiritual freedom, average of percentages for each	Averaged score representing world poverty in different areas, multifaceted, able to track yearly progression	Generalized globally, not all dimensions represented	Doesn't contain all relevant indicators, no in-person interaction, no intervention model, not personalized

Table 1. Chart comparing poverty indexes. From left to right: index, location/scope, unit of measurement, details of assessment, successes, limitations, and comparison to Poverty Stoplight.[9,10,11]

We examine the characteristics of some of the most widely accepted poverty metrics in the table above: Oxford Poverty and Human Development Index (OPHI), Official Poverty Measure (OPM), and Fordham Francis Index (FFI). Unlike these assessments, the Poverty Stoplight approach is more effective in addressing the multidimensional factors of poverty. The core of the methodology is based on five theories: well-being (freedom to live life), conscientization (developing awareness), integral theory (root of issues), self-efficacy (taking control), and positive influence.[12] The indicators cover six categories that address social, economic, and personal aspects: income, health/environment, education/culture, infrastructure, organization, and motivation. Implementation requires a nuanced understanding of the local context, enabling the creation of a series of multidimensional indicators that are individually digestible and actionable. By implementing these targets, we can discern the impact of poverty on families based on survey results.

After the data is collected, an intervention model is constructed based on the families' responses to each indicator. These intervention steps are based on the "Life Map" and "Solutions Bank." A "Life Map" is distributed to families after the survey which provides a visual representation of which indicators are green, yellow, or red. The responses in the red and yellow categories are prioritized first.[13] The map helps participants reflect on the reasons for the reds and yellows. Participants will then use the "Solutions Bank" to create actionable steps to address the prioritized indicators. The "Solutions Bank" provides realistic goals for families to alleviate poverty using the resources around them.[13]

Due to time limitations, our team prioritized the data collection aspect, leaving the construction of an intervention model based on the families' responses to each indicator for future work. In conjunction, data collection and a well-planned intervention model form a strategy that is useful for both community leaders and survey participants to enhance their overall well-being.

Co-Design Application in Poverty Metrics

Chapter 1

“[Community members] must be included in the [co-designing] process since they are experts of their reality. By integrating community needs and values, researchers have demonstrated that solutions have a better chance of being adopted and used sustainably.**”**[1]

Amollo Ambole, Kenya & Uganda, 2019

Figure 3. Our team and Abigail Ansoh’s family joined hands, symbolizing our collaboration with Akyem Dwenase.

Co-design is crucial in the progression of designing for development. It challenges the lack of inclusivity in approaches used in projects that significantly impact the lives of others, particularly critiquing the minimal community involvement in the methodology.[1] This chapter explores the journey of design, starting with early development approaches to the contemporary concepts of social and cross-cultural design.

The History of Co-Design

The history of development design is based on the progression from top-down approaches, initiated by Western ideologies in the 20th century, to more inclusive and participatory methods.[15] Authorities from industrial nations would impose a solution to *perceived* problems in less developed regions, without collaboration or consent.[16] This resulted in consequences of paternalistic tendencies and power imbalances due to Western nations asserting their dominance, marginalizing the voice of the community they aimed to assist.[17] Local cultures, traditions, and knowledge were not considered, leading to culturally insensitive and unsustainable solutions. While not intended, this often resulted in the exploitation of land, resources, and human labor; a failure in the design.

The underlying assumption was that Western industrialization could be universally applied to diverse contexts around the globe, assuming that a full universal perspective exists.[20] This was justified using the idea of the White Man's Burden and the theory of Social Darwinism. White Man's Burden is the idea that those of the white race must bring their knowledge and culture to "uncivilized" parts of the world.[18] Social Darwinism applies Charles Darwin's theory of natural selection to categorize social groups, where some races and cultures are more "fit" to dominate society than others, particularly Western cultures.[4] This gave psychological justification for the subjugation of the African continent and the belittlement of Africans.

While outdated, these ideas still subtly persist in designs for development today. Poverty assessments developed in the West are applied to Africa without thought of adapting to the culture, traditions, or norms that inaccurately define poverty. Poverty metrics are based only on monetary value, ignoring the holistic well-being of the family.[27] "Poverty experts" come up with income thresholds, defining poverty without engaging or communicating with those affected. Such approaches enhance paternalism and ignore the multidimensional characteristics of poverty, and more significantly, the agencies of the individuals and communities concerned. The result is a failure in design, leading to misalignment with complex realities, sustainability challenges, and cultural appropriation.

As a response to the shortcomings of these conventional strategies, rooted in Social Darwinism, the "White Man's burden," and paternalism, there is a shift in design for development to involve

co-design, social design, and cross-cultural design. Western biases, colonization, power imbalances, and exploitation of valuable resources are eliminated when all project stakeholders have equal value and opportunity. “Co-design means working ‘with’ people with [instabilities], not ‘to’ them.”[19]

Co-Design and the Poverty Stoplight Methodology

The framework of co-design includes elements of social and cross-cultural design for development. We found the Poverty Stoplight Methodology to be appropriate as an approach that is interdisciplinary, inclusive, applicable, and meaningful for all project stakeholders. The approach is participatory, and bottom-up rather than top-down.

Poverty Stoplight, as an alternative methodology to traditional poverty measurement approaches, involves a survey with indicators categorized into green (no poverty), yellow (moderate poverty), and red (extreme poverty) tresholds. Our collaboration with the Stoplight team in Paraguay helped develop a survey that assesses the families’ wealth and well-being relevant to Akyem Dwenase's context. It involved a co-design process to identify relevant indicators and thresholds based on the community's understanding of poverty and potential solutions.

As co-designers from diverse cultures, our initial step was ethnographic research, actively engaging with the community through activities like soccer games, church services, and funeral ceremonies. This engagement created a sense of familiarity and comfort, which was vital for effective cross-cultural design. For instance, we noted the need for a male translator based on cultural observations that men often take the lead in tasks. Another observation was the community's early start to the day, influencing the decision to administer the survey in the morning.

This cross-cultural design extended to social design, where we modified indicators and thresholds to reflect the complex nature of poverty relevant to Akyem Dwenase’s cultural norms. For instance, the income indicator reflected the community's economic level, setting green to be above 500 cedis per week, yellow to be 250-500 cedis per week, and red to be under 250 cedis per week. The indicator adjustment to local contexts and culture, uncommon in traditional poverty metrics, played an important role in shaping our methodology.

Additionally, in implementing social design, we collaborated with both community leaders, such as Osabarima Owusu Baafi Aboagye III, the chief of the village, and residents to adjust survey indicators and their thresholds with the community’s needs and norms. This eliminated imposing a Western view of how life “should” be in the village and prioritized the local cultural, social, and economic contexts. Osabarima helped us modify the 50 indicators down to 17 relevant and applicable indicators that reflect the community’s human experience. This utilized social design, as the survey contextualizes a family’s

poverty standing, a complex concept, through adaptable holistic indicators and thresholds unique to local circumstances. Another way we utilized co-design through social design was during the survey administration as we created a self-survey, providing the families an opportunity to evaluate their circumstances and attain self-sufficiency and achieve sustainability. This allowed poverty to be defined by the community of Dwenase.

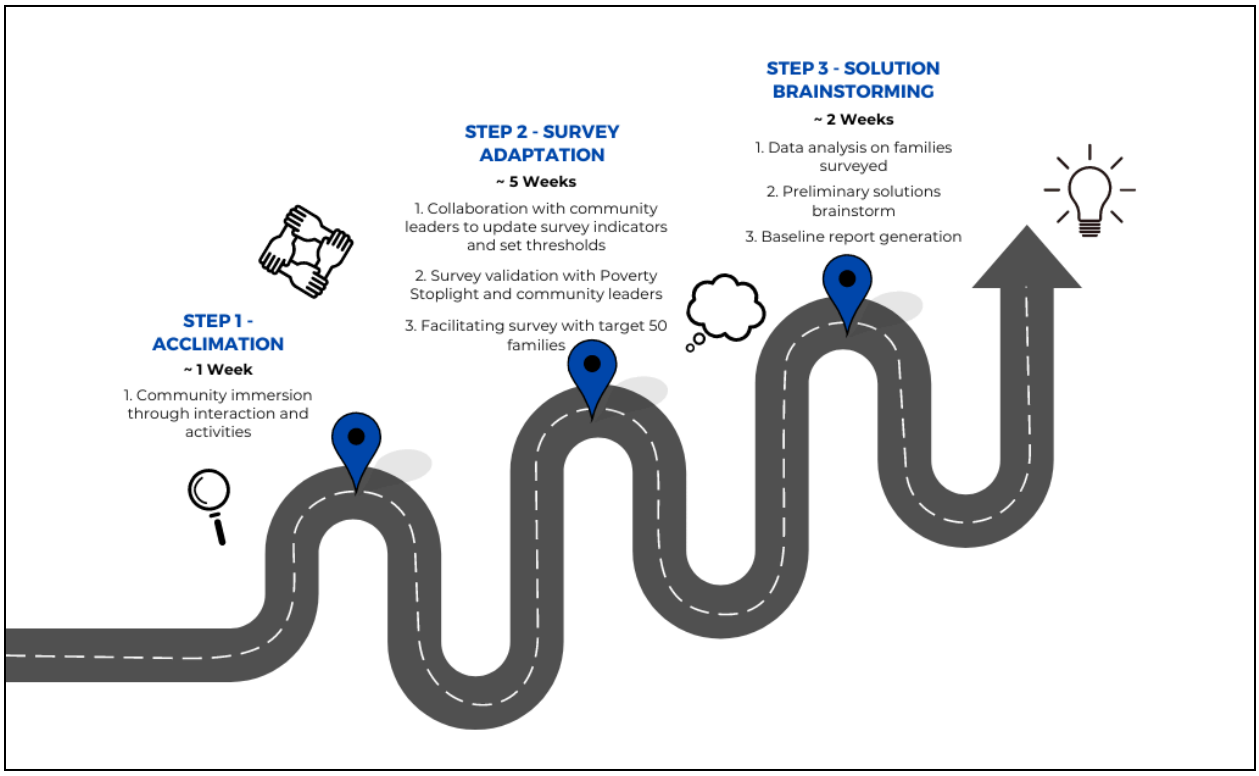


Figure 4. Planned co-design process for developing the survey in Akyem Dwenase.

Design Changes Through Community Engagement

Chapter 2

"We must carefully decide how to define a family—here, family is more than just the people that live under the same roof."

Alexander Attah-Asante, Akyem Dwenase, 1/16/2024

Figure 5. An afternoon group soccer game with junior high school students.

From the outset, we knew our survey's final design would be heavily influenced by community interactions, many of which would be informal. To have these meaningful conversations, a level of trust with the residents was required. Consequently, we sought to follow the best practices set out by modern ethnographic research from the outset. This chapter delves into the overarching goal and specific objectives and explores the process of acclimating to the community leading to crucial insights that influenced initial design changes.

Goal and Objectives

On a surface level, our seven-week goal was to produce a wealth and well-being survey for rural parts of Ghana, using Akyem Dwenase as a case study. The Poverty Stoplight methodology and co-design principles were entwined with all aspects of project work, as we tasked ourselves with collaborating with community leaders to determine indicator thresholds and conversing with local families to determine their personal stoplight standings. After initial meetings with local leaders, e.g., Osabarima, we decided to include a maximum of 17 indicators. These are connected to income/employment, education, housing/infrastructure, health/environment, and emotional well-being of residents. Therefore, our objectives were to:

(1) Determine indicator thresholds with the chief of the village and have them approved by the Poverty Stoplight team.

(2) Administer the survey to at least 50 families in the community to obtain data that recognizes the complexity of experiences in a rural Ghanaian community.

(3) Develop preliminary solution ideas based on survey data analysis and conversations with families. Before survey development could begin, achieving and understanding the local context was critical.

Acclimation in the Community

Modern ethnographic research informs us that before any meaningful social access - such as the kind required to develop an accurate survey - can occur, the researchers must first pass through two critical stages.[21,22]

The first stage is always gaining access. Tight-knit communities, such as Akyem Dwenase, tend to be mistrustful of outsiders. For community members to even consider interacting with strangers, they must be given a reason to trust them. This trust can be granted by trusted local leaders, sometimes referred to as gatekeepers.[23] Our first gatekeeper was Osabarima. When we arrived, we met with him in his palace and were introduced to other key figures, such as Boadu Tinyase, Osabarima's linguist, Kwasi Anane Asare, Akyem Dwenase chief farmer, and Alexander Attah-Asante, chairperson of the Akyem Dwenase development committee. With this initial level of access achieved, the next weeks were spent trying to immerse ourselves in the rich traditions of Akyem Dwenase, in an attempt to gain a relationship with the culture and the residents. We traversed the full area of Akyem Dwenase, recording thoughts and taking pictures as necessary. We ventured to local markets and small shops to get a feel for the culture and types of goods sold. Most importantly, we interacted with residents whenever possible and inquired about their daily lifestyles and livelihoods, gaining trust and a connection with families along the way

The second stage is building trust and accruing social capital. Although community members were willing to tolerate and help us, they were not yet ready to share possible sensitive information we needed to create an accurate survey. To build this trust within the community, we participated in numerous activities that the people of Akyem Dwenase enjoy.

One of the first activities of this nature was a funeral on the Akyem Dwenase grounds. There we made formal introductions to those present, which proved a significant portion of the community. We also had the opportunity to observe the unique celebration of life known as the "call to glory," a concept central to Ghanaian views on death. We watched and participated in traditional songs and dance, and observed the lavishness of the celebration. We learned that the local leaders who show up, the duration of the funeral, the number of dancers, the number of people, and the offerings and lavishness all correlate with the person's perceived impact on the community and their perceived success. The funeral we attended was for a deceased local leader, so it was extremely large and luxurious. This made us reconsider our Western notions of wealth - in the US, the lavishness of a funeral would be directly correlated to the finances of the deceased. Here, it is about what they did for those around them. This had a direct impact on how we framed several of our survey indicators. For example, in our self-esteem indicator, we ask if others would say the individual in question is competent. After this experience, we also noticed that many community members knew our names and were more willing to greet us and informally interact with us.

Additionally, we attended the Akyem Dwenase Presbyterian church service. Everyone dressed in traditional red, white, or black clothing, and sang and danced. We each paid offerings of a few cedis out of respect and conversed with churchgoers and children attending Sunday school. After this experience, many community members commented on our appearance at church and asked when we would be back. This proved an effective conversation starter and again enhanced our ability to converse with the populace. This experience demonstrated to us that all of Akyem Dwenase is one big family - everyone knows everyone else, and everyone looks after each other. This made us realize that many resources in Dwenase are communal - for example, many familial compounds will share the same electrical connection or water pipe. This had a direct impact on how we framed the electrical and water access indicators and their respective thresholds.

Finally, we played soccer with the local children. We observed their sense of sportsmanship and were able to make meaningful connections. Through these connections, we were able to get tours of Akyem Dwenase from local children, gaining access to people we weren't able to before.

All of these experiences noticeably improved our field entry, field presence, visibility, and trustworthiness in the community. Afterward, community members were noticeably more talkative and commented on our appearances at various events. Ethnographic and design research informs us that this change in access is what should happen - by challenging our assumptions on what ought to be, we can

gain a level of respect and understanding for the community.[24] From this, we engaged in honest discussions about what life in Akyem Dwenase is like, how to measure success, and what can be done to achieve success.

Initial Design Changes

Methodologically, these interactions were significant in that they gave us a better idea of what our survey should look like and how to administer it. It quickly became clear that a Twi translator was necessary to convey some of the more difficult concepts we wanted the survey questions to reflect. Additionally, we realized that the time of survey administration was an important factor as many members of the Akyem Dwenase community would be at work on the farms during the working day. We had originally planned for interviews around 3 pm, but our experiences indicated the most optimal time ended up being between 7 am and 8:30 am before farmers had left for work. This time proved optimal as we were able to find community members of nearly every gender, age, profession, and education level demographic. This showed us that understanding daily, weekly, and seasonal village routines is critical to the success of cross-cultural research.

Another hurdle was deciding how to define the family, as the familial convention in the West is not the same as in Ghana. In the US, a family is defined as "a group of one or two parents and their child or children living together as a unit."[25] After consulting with the head of the Akyem Dwenase Development Board, Alexander Attah-Asante, we asserted the family to be the people living under the same roof, or often in the same compound, since oftentimes multiple generations will live together. In Akyem Dwenase, most people live in compounds.

As for the survey itself, we decided to rule out many potential indicators. For example, the indicators talking about domestic violence were eliminated because Osabarima knew we would not get honest answers. We also removed indicators covering topics such as access to credit and internet access, as those are only realistic concepts for the wealthiest residents in Akyem Dwenase. We also decided to combine indicators where possible to reduce the time the survey took, since our interactions made it clear keeping the family in place for 50+ questions would be difficult. In the end, we reduced the original 56-question survey to 17 questions that are relevant to the social climate of Akyem Dwenase.

The final survey covered topics of income, savings, access to water, pollution, personal hygiene, access to electricity, nutrition, access to healthcare, home safety, sources of clothing, reliable transportation, education, self-esteem, and gender equality. Initial administration produced a variety of responses across nearly every indicator, thus proving the efficacy of the indicators, their thresholds, and our administration methods.

Community Immersion Insights

Chapter 3

"Here in Akyem Dwenase, everyone knows everyone. We are all family."

Kwasi Anane Asare, Head Farmer of Akyem Dwenase

Figure 6. Collage of the team and various interviewed families. From left-to-right, top-to-bottom, Owen, Comfort Asiamah, Salma. Owen, Yaa Frema, Salma. Chiara, Mark, Comfort Adgywaa, Ian. Mark, Gloria Darqua, Chiara, Ian. Emmanuel Bosompem, Salome Banfoaa, Owen, Salma, Comfort Anime. Salma, Owen, Faustine Anima, Kate Dansowa.

Throughout our time in Akyem Dwenase, we seized every opportunity we could to connect with the community. Immersing ourselves in their culture enabled us to value diverse perspectives and enrich

our perceptions as we evolve into global citizens. This chapter delves into our observations and conversations with people in Akyem Dwenase including sources of happiness, differing gender roles, abundance of air pollution leading to possible health risks, and productivity levels about our project.

Rediscovering Happiness

As we spent more time with the people of Akyem Dwenase, we learned that having less does not inevitably lead to unhappiness. There is a Western assumption that people in poverty have "lower levels of happiness" and higher "levels of depression" compared to wealthier countries.[26] The explanation for this rationale is that "poverty causes stressors such as insecurity in food, housing, [and] income."[26] However, this is a potentially misleading assumption which doesn't speak to the situation in Akyem Dwenase. Through observation and community interaction, we derived insights into the values that people in Akyem Dwenase hold most dear: human connection. When walking down the main roads, we noticed everyone greeting and catching up with each other. We later learned of the cultural expectation to greet one's friends and neighbors daily regardless of how close they are. This practice contrasts life in the US, where everyone is too busy to acknowledge friends and neighbors every day. Akyem Dwenase is truly a community that looks out for each other and there are many aspects we could adopt to make our lives more fulfilling. For example, we befriended one of the families we interviewed, Abigail Ansoh, and played with her baby, Nana Kwame. This friendship evolved into weekly hangouts. Spending time with the community allowed us to appreciate human connection on a deeper level, transcending the cultural and language barriers. One of the indicators in the survey was about happiness and capability, with the question, "Do you feel happy and capable?" 77% of the responses were the green category "I always feel happy and capable." For this indicator, 0% of the responses were red. This demonstrates that it is possible to be happy with less and sustaining relationships will provide more than material goods ever will. This provides an excellent summary of why we use the Poverty Stoplight methodology in general – poverty is not as simple as the idea of a "monetary poverty line" would imply.[27]

Navigating Gender Norms

While the Akan are a matrilineal society, and many women and men believe that both genders should be treated equally because that is the foundation of the Christianity they practice, we found that the village, and by extension, the kingdom, has deeply entrenched gender roles often leading to contrasting attitudes towards men and women and unequal power relations. The Organization for

Economic Cooperation and Development views unequal power relations and participation in decision-making processes as one of the "structural causes of social and political instability that generates poverty."[5] When meeting with Osabarima, the village chief, we agreed that it would be critical to ask a question about gender equality to determine if this is an area in need of improvement. Our translators had to be male for us to effectively communicate between genders. Utilizing a female translator could lead to male participants refraining from interacting or disclosing information due to a perceived lack of authority in women.

A popular response to the question, "Do you believe men and women should be treated equally?" was that men should always be the head of the household. One of our male participants, Tutu William, explained that "men are physically stronger than women so they must be the leaders of the house and take on the physically demanding jobs." From this, it is clear that gender roles in Akyem Dwenase often mean that men hold physically demanding positions establishing gender roles.

Our survey diverges from conventional poverty measures, usually focusing on income and monetary wealth, because we ask each participant about their opinions on gender roles, shifting the metric to focus on how people are treated. When questioning participants about their views on gender equality, they responded based on societal expectations of gender roles rather than equal opportunities. Encouraged by Tutu's comments, we decided to utilize co-design to reframe the question to: "Do people deserve fair treatment and equal opportunities distinctive of their gender?" This reformation aimed to shift the focus on typical social roles to ensuring equitable opportunities for all.

Addressing Air Pollution Awareness

Going further, air pollution is one of the main causes of mortality across the globe. It significantly affects lower-income countries.[28] In Ghana, fighting air pollution costs over $2 billion per year and "causes the premature death of 16,000 people per year (mainly elderly)."[29] The air in Akyem Dwenase is often heavy with smoke, and sometimes haze fills the sky and we cannot fully see the sun.

Since women of Akyem Dwenase take on typical domestic tasks, they are exposed to the most pollutants e.g., fuel and smoke from cooking, garbage/plastic burning, and brush fires.[4] This sparked us to include a question about pollutants in the survey. However, when we asked residents what they thought about the smoke, most of them did not mention the smoke and odors around the town. We asked people if they thought they were being exposed to harmful pollutants, and almost all said no. This illustrates that residents do not realize that they are inhaling smoke and chemicals, let alone the health risks, and it has become part of the norm. This disconnect suggests that future works can be put towards better educating the community about pollution and improving their health and quality of life.[4]

Redefining Productivity

Lastly, time, deadlines, and productivity are not stressed in Akyem Dwenase. According to the NIH, poverty can negatively affect productivity in two ways.[30] The first way is that "financial constraints dampen physical and cognitive performance through nutritional deficiencies, low educational quality, and poor health conditions."[30] These are all factors that contribute to productivity.[30] Poverty also may "lower [people's] willingness to take risks and to forgo current income in favor of higher future incomes" which decreases the opportunity for financial improvement.[30] It is evident that the West quantifies poverty through monetary value i.e. salary or number of hours worked.[31] Americans think that "work is the single most important way of proving your worth."[31] Because this belief is deeply ingrained in American culture, people will work cruel hours and overextend themselves to gain money which correlates to an increase in status and respect.[31] This leads to unnecessary anxiety and physical tension in the body due to an increase in stress hormones and fatigue. Binging on work without breaks is detrimental to happiness levels.[32]

In contrast to the Western lifestyle, Akyem Dwenase operates oppositely. The strict schedule and intense emphasis on work do not apply to Ghana. People have a more stress-free schedule because their job does not singularly determine their worth or happiness. Life is not as fast-paced as it is in the West, also contributing to this stress-free aura. In Akyem Dwenase, productivity is measured by how many items you sell per week, highlighting the distinct approach to measuring success and fulfillment. The community's emphasis on a more holistic, balanced, and interconnected lifestyle opposes a work-centric way of life. These lessons have changed our perspectives about what a rich livelihood means and brought us a step closer to being better global citizens.

Reflecting on Survey Co-Creation

Chapter 4

“The Poverty Stoplight breaks down the overwhelming concept of poverty into smaller, more manageable problems that can be solved through simple interventions, making the “invisible” manifestations of poverty visible in the shape of simple, understandable indicators.**”**

Poverty Stoplight, Paraguay, 2023

Figure 7. An initial meeting with Osabarima on 1/9/24.

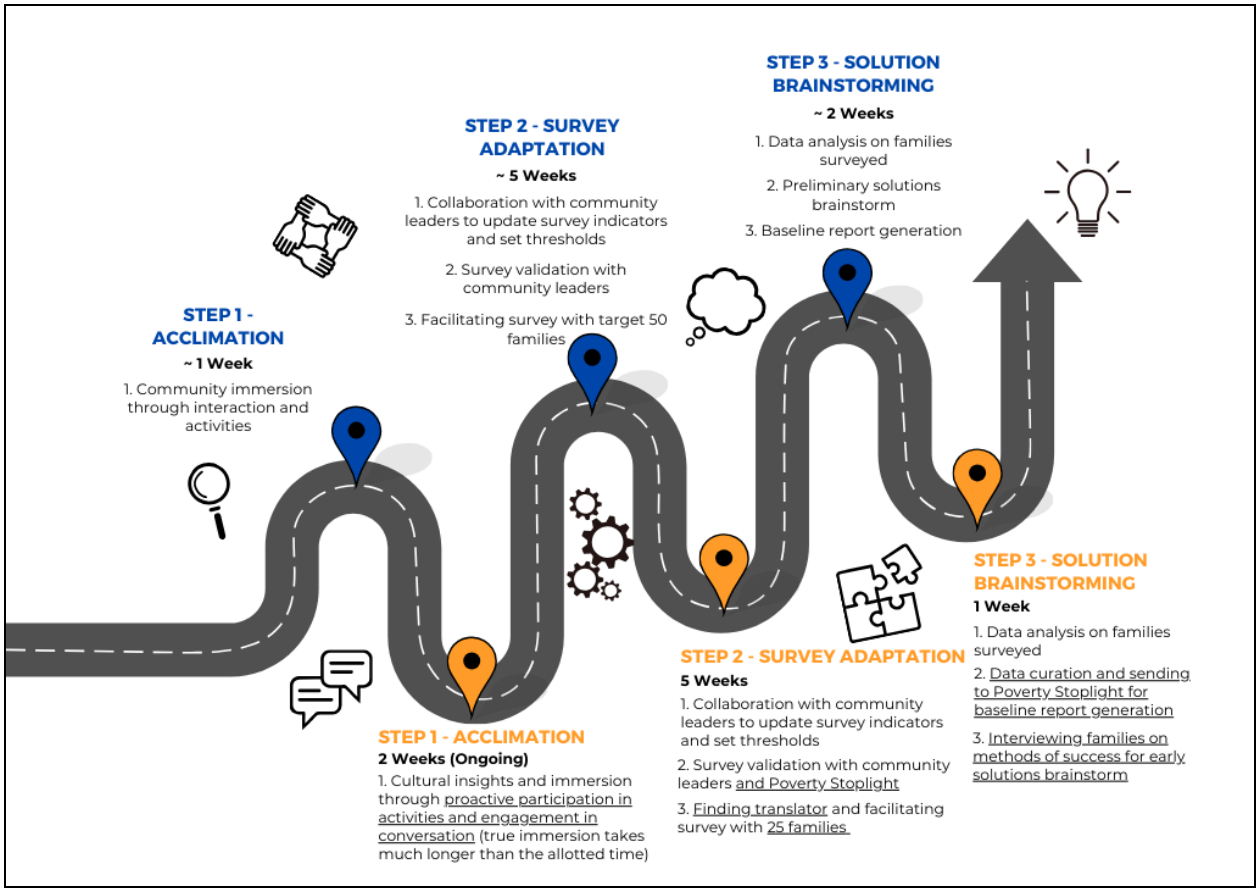


Figure 8. Figure demonstrating the original planned co-design process (blue) and final implemented co-design process (orange) with changes underlined.

The journey of survey adaptation, survey administration, data analysis, and preliminary solution creation in Akyem Dwenase has incorporated theoretical design concepts while facing practical challenges. This section of the report explores how our process unfolded reflecting on possible weaknesses and improvements to our methodology.

Survey Adaptation

After assimilating to the community and a preliminary meeting with Osabarima, we delved into the main part of our project: survey adaptation. We first reviewed the original 56-question survey developed by the Poverty Stoplight team and found it to be outdated and irrelevant to rural Ghana.

We administered the survey to Alexander Attah-Asante, a resourceful member of the Akyem Dwenase Traditional Council and a retired public service official in education administration, to see which indicators need to be updated, changed, or deleted. One takeaway was that the survey was too long

and complicated, so to avoid wordy questions and answers we decided to make the questions and thresholds simpler and more concise. This made it easier for families to understand, especially due to language barriers and indirect translations. Another key takeaway from this test survey was that the family structure in Akyem Dwenase is significantly different from that in the US due to Dwenase's extended kin networks. Households in Dwenase often contain 'family members' that are not directly related. Therefore, for our project, we defined a family as people who eat and sleep under the same roof. However, we found this complicated as people in Akyem Dwenase live in compounds. We said that "under the same roof" means "in the same compound" but excluding those that rent. Attah also mentioned that savings are not a concept in Akyem Dwenase as there are no banks nearby (except in major cities). Families primarily rely on weekly income, leaving little room for savings. If a family can afford to save, they often save via informal methods like a Susu group, a localized practice of rotating savings among a small group of people. This cultural aspect was incorporated in the savings indicator where green indicates that the family saves in formal institutions like a bank, yellow indicates that the family saves in informal institutions like a Susu group, and red indicates no savings.

We also spoke with Osabarima to obtain his opinions about the indicators and their thresholds, working towards adapting the survey to Akyem Dwenase. Osabarima also mentioned that the survey was too long with 56 questions. As a team, we went through the indicator questions and combined indicators that were related and deleted indicators that were irrelevant to the community, narrowing the survey down to 17 questions. These indicators covered topics such as income, savings, environmental pollution, and nutrition. We confirmed the updated indicators with Osabarima and set green, yellow, and red thresholds for each one, relevant to the context of Akyem Dwenase. With input from Poverty Stoplight professionals, such as Victorinne Nasi, we modified these indicators and their respective thresholds even further. The updated questions and their thresholds are displayed in Figure 9 below. The justification for each indicator can be seen in the executive summary.

Osabarima also helped us develop pre-screening questions that were asked before administering the survey (this can be seen in the Appendix). This helped us validate the questions and threshold concepts before we gathered the final data. For example, regarding the savings indicator, the pre-screening question was about whether they covered a school fee for their child. Osabarima clarified that paying a school fee implies having saved money, even if it isn't formally stored in a bank or informally stored with a Susu group.

INDICATOR	GREEN	YELLOW	RED
INCOME	FAMILY 500+ CEDIS/WEEK	FAMILY 250-500 CEDIS/WEEK	FAMILY 0-250 CEDIS/WEEK
SAVINGS	FORMAL INSTITUTION	INFORMAL SAVINGS (SUSU)	NO SAVINGS
ENVIRONMENT POLLUTION	NO SMOKE/BAD/CHEMICAL ODORS	SOMETIMES ODORS FROM LIVESTOCK/CHEMICALS	CONSTANT ODORS FROM LIVESTOCK/CHEMICALS
WATER ACCESSIBILITY	YES→ IN THE HOUSE	YES→ HAVE TO WALK (>30 MINS)	NO OR HAVE TO WALK +30 MINS
PERSONAL HYGINE	ALL FAMILY MEMBERS BATHE/SHOWER, BRUSH THEIR TEETH, AND WASH HANDS	SOME FAMILY MEMBERS DO 2 OF THESE	SOME FAMILY MEMBERS DO 0-1 OF THESE
NUTRITION	VARIETY (DAIRY/VEGGIE/FRUIT/PROTEIN)	LESS VARIETY	NO VARIETY
HEALTHCARE ACCESSIBILITY	ACCESSIBLE FROM A HOSPITAL	ACCESSIBLE FROM THE LOCAL CLINIC	NOT ACCESSIBLE
HOUSE FUNCTION	1 PERSON/BEDROOM	1-2 PEOPLE/BEDROOM	3-4 PEOPLE/BEDROOM
HOUSE MATERIALS	CONCRETE BLOCKS	MUD BLOCKS	WOOD
CLOTHING	FOREIGN/WESTERN	GHANA/ACCRA	LOCAL-DWENASE
ELECTRICITY	PERMANENT ACCESS	INTERMITTENT ACCESS	NO ACCESS
TRANSPORTATION	CAR	MOTORCYCLE/ COMMERCIAL BUS	WALKING
EDUCATION	ACCESS TO OWN BOOKS, IN SCHOOL	BORROWED/GOVERNMENT BOOKS, IN SCHOOL	SHARED BOOKS/NOT IN SCHOOL
CONTENTNESS	I ALWAYS FEEL HAPPY & CAPABLE	I SOMETIMES FEEL HAPPY & CAPABLE	I RARELY/NEVER FEEL HAPPY & CAPABLE
GENDER EQUALITY	YES	SOMETIMES	NO
SAFETY	ALWAYS	SOMETMES	NEVER
INFLUENCE IN THE PUBLIC SECTOR	ISSUES ADDRESSED CONSISTENTLY AND ON-TIME BY GOVERNMENT	ISSUES ARE SOMETIMES ADDRESSED	ISSUES ARE NEVER ADDRESSED
WORKING FAMILY MEMBERS	2+ STABLE SOURCES OF INCOME	1 STABLE SOURCE OF INCOME	0 STABLE SOURCES OF INCOME

Figure 9. Full list of 17 indicators and thresholds discussed with and approved by Osabarima according to Akyem Dwenase standards.

Administration of Survey

As we engaged with the community, we noticed that people get up around 6:00 am to get their children ready for school, cook breakfast, and prepare for their day of farming or selling. From 8:30 am to around 5 pm, everyone would be at work or school and therefore we decided to administer the survey from 6:30 am to 8:30 am while it's still cooler and all family members are present.

As encouraged by the Poverty Stoplight team during our training sessions, we asked two trustworthy members of the community, Mark Asante and Alexander Attah-Asante, to translate our questions when administering the survey, effectively implementing cross-cultural design principles to overcome the language barriers. It was important to find translators the community respects and trusts, as the questions may be sensitive to some families. Before each session, we introduced ourselves, and our translator outlined the survey's purpose, length, and confidentiality and sought verbal consent to ensure the family's comfort. We used simple word choices so that the translators could translate as accurately as possible. For example, instead of asking “Do you feel like there are a lot of pollutants in your environment?” we asked, “Does the smoke from burning trash bother you?” We strategically grouped potentially sensitive indicators and sought additional consent before addressing these questions, prioritizing the comfort and willingness of the families to share their responses. Our training also taught us that eye contact is very important to maintain comfort and respect, therefore we were attentive to this, especially considering the presence of a translator facilitating communication. Our training also emphasized that the survey administrator sat beside respondents at eye level, avoiding standing or hovering, ensuring equality and respect.[33] This approach included social design principles as it allowed us to administer the survey with an understanding of the families' perspectives. We surveyed 26 families, undershooting our goal of 50, but had more thorough conversations.

To gather data efficiently, we designed the survey using Google Forms due to its faster loading time given the slow internet in the area. Additionally, while awaiting confirmation of our indicator edits on the Poverty Stoplight website, Google Forms enabled us to continue data collection without delays. We manually input participants' responses into the Google Form (this can be seen in the Appendix), later transferring the data to the Poverty Stoplight website.

Preliminary Solution Brainstorming

We examined the data gathered from each family, noting the indicators that were ranked yellow and red the most to keep note of which indicators needed improvement (this can be seen in Figure 15).

In line with one of our objectives to initiate brainstorming for methods to enhance families' positions in various indicators, our approach encompassed co-design, social design, and cross-cultural design. The exploration of solution banks from Nigeria and Sierra Leone from the Poverty Stoplight initially sought cross-cultural insights, however Victorinne informed us that they did not have this resource. This presented a challenge as we had no experience in coming up with ways to improve people's quality of life. So, the Poverty Stoplight team advised a shift in strategy. We sough input from the community itself, specifically families that ranked green in many indicators, implementing a social design perspective. This shift not only reinforced co-design by directly involving the community in the solution-finding process but also incorporated the importance of adapting solutions to the specific cultural context of Akyem Dwenase.

Many families that ranked mostly green across the indicators mentioned that the reason why they are successful is access to education and opportunities. These factors influence success across various categories highlighting the crucial role education plays in shaping the well-being and livelihoods of Akyem Dwenase residents. The correlation between education and success in other indicators suggests that improving the educational system in the community could have long lasting impacts.

On the other hand, there is an absence of red rankings in the education indicator, which can be seen in the executive summary. While this may indicate that the educational system is secure, it could also highlight the potential limitations in the survey's ability to assess the challenges within the educational system. It prompts an extensive exploration of the specific aspects of education that might not have been incorperated in the survey, such as the quality of education, access to educational resources, or potential barriers that residents might face. Ultimately, an understanding of the educational system in Akyem Dwenase can aid interventions that empower residents with the knowledge and skills to improve their overall wellbeing.

We sent the collected data to the Poverty Stoplight team in Paraguay which enabled them to create an analyzed report on poverty in Akyem Dwenase to further understand and develop long-lasting solutions.

Critical Analysis and Reflections of Methodology

Reflecting on our project, we've identified areas for refining our methodology. We realized that data collection heavily depended on the availability and reliability of translators. The unique slow-time culture in Akyem Dwenase was an initial challenge, differing significantly from the fast-paced norms we are used to in the US. Scheduling meetings with the translators on the day of or the day before was ineffective due to this cultural distinction, resulting in data collection delays. We also observed that there

was a tardiness of community members, with a typical delay of 20 minutes or more, which is part of the culture. However, this complicated the coordination process, especially when securing translators for survey administration. To prevent delayed data collection, we adapted to this cultural context and found that scheduling activities at least three days in advance ensured a more punctual and effective execution of our tasks.

The involvement of our translators, Mark Asante, and Alexander Attah-Asante, created a limitation in our data collection process, specifically in the selection of families. As they come from wealthier parts of Akyem Dwenase, they have connections with wealthier areas, introducing a bias in family selection. This results in a lack of diversity in the gathered data. This bias can be seen in the many green rankings in Table 2, especially the lack of red rankings for the income indicator, of the executive summary, creating a misleading impression that Akyem Dwenase is not in poverty. However, our observations contradict this, suggesting potential inaccuracies in our data collection methodology.

A potential source of inaccuracy lies in language inconsistencies, despite our efforts to simplify questions for accurate Twi translation. Due to the complexity of languages, translations may not be precise, leading to potential misunderstandings and confusion in responses, therefore affecting the accuracy of our data collection. Furthermore, due to an added layer of translators, there could potentially be misunderstandings in the relay of information between us.

Moreover, the survey only covered 26 families, falling short of our 50 family target. This was primarily due to the lack of translator availability. Along with this, the majority of the participants were 60 years old or older (which can be seen in the pie chart in Figure 11), also creating a bias in results and could be a reason for the large number of green rankings for the indicators. The limited representation, combined with a focus on wealthier areas, prevents the generalization of our data for Akyem Dwenase, let alone rural Ghana.

For example, the analysis of Table 2 shows a discrepancy in the electricity indicator compared to reality, showing no red standings, a few yellow standings, and mostly green standings. Ranking green for the electricity indicator means that the family has permanent access to electricity without many power outages. However, from our personal experience in the village, electricity interruptions were a common occurrence. This shows a misalignment between the data and reality prompting critical reflections on the methodology representativeness. Given that our accommodations in the village were on the wealthier side, the absence of red standings does not accurately reflect the broader circumstances in Akyem Dwenase. This shows the limitation in the diversity of data collection, suggesting that the sample may not fully represent the range of living conditions within the community. This emphasizes the importance of contextual understanding and community engagement in the survey process to obtain aspects of daily life that may not be accurately reflected in the current data set. Future work could revolve around prioritizing

a more comprehensive and diverse selection of families, ensuring that accurate reflections analyses, and applications to rural Ghana can be made.

In B term, we planned to train individuals within the community, empowering them to take over the project. This approach aimed to foster sustainable solutions and ensure long-term improvements in the community's conditions and well-being. However, due to the lack of availability, we found it difficult to find individuals who were willing to take over the project. This creates a threat to the sustainability of the project, however further IQPs can revolve around developing this project to enhance development in the community.

As mentioned earlier, we shortened the original 56-question survey to a more concise 17 questions, focusing on simplicity, eliminating redundancy, and ensuring relevance to Akyem Dwenase's traditions and culture. However, the shortness of the survey poses a limitation. Determining the wealth and well-being of families through just 17 questions may not capture the complexity of poverty comprehensively, which was a goal of this project. While our current survey may not be the final, generalized survey for application in rural parts of Ghana, it is a great start as the survey's relevance shows its potential, setting it up for future development.

Survey Expansion for Rural Empowerment

Chapter 5

"One of the methodology's greatest strengths lies in motivating positive results from what is measured. By seeking solutions to each indicator, it helps generate actions and priorities to better channel existing resources and to promote collaboration among all stakeholders."

Poverty Stoplight, Paraguay, 2023

Figure 10. The main road in Akyem Dwenase, which leads to the nearby town of Apinamang.

As we venture to the next phase of our journey in Akyem Dwenase and beyond, the pinnacle of our survey efforts demonstrates the beginning of a new initiative in hopes of empowering rural communities in Ghana. As discussed in the critical analysis and reflections of methodology section, the

methodology has multiple limitations that could be further developed, leaving room for future work. This final chapter explores how the design process could be developed differently leading to future works that need to happen next in order for our project to be sustainable and have long-lasting positive impacts.

Methodology Evolution and Next Steps

Based on the reflections and limitations identified in the current application of the methodology, several improvements and steps can be considered for the development of methodology in future works. To address the bias in family selection introduced by the translators from wealthier areas, a village map could be used to keep track of which families were interviewed. This would aid in obtaining diverse data that is applicable to Akyem Dwenase and potentially rural Ghana. Another improvement could be to gather a broader group of translators from various socio-economic backgrounds to gain connection to different parts of the village, again obtaining a diverse data set.

While shortening the survey to 17 questions helped make a more concise and simple tool to assess a family's poverty, the survey could be expanded to capture the complexity of poverty more comprehensively, ensuring that all relevant aspects are adequately addressed. More work needs to be done in order to balance the need for simplicity with the necessity of obtaining detailed information. Modification to the indicators and their thresholds would be the first next step to our project through extensive field testing.

To gather data that can be generalized to Akyem Dwenase, and potentially rural Ghana, a larger more diverse sample size needs to be met. This introduces the next step in the process which is to administer the survey to more families with different socio-economic backgrounds and of all ages and genders. Our goal was to interview 50 families, however this was not met due to the lack of availability in translators. Therefore, another methodology change could be to create a version of the survey in Twi to eliminate the dependence of translators, limitation of language barriers and translation inconsistencies, potentially affecting the accuracy of the results. This along with learning enough Twi to introduce ourselves, the projects and hold a small conversation would increase productivity in administering the survey.

While the self-survey implements social design, there is the possibility of respondents providing dishonest answers for a more favorable portrayal of their lifestyles. Therefore, an added step of verification of survey responses needs to be developed into the methodology to ensure honest and accurate results.

Due to no access to a printer, we were not able to give the families' their "Life Map" (see definitions in the introduction). Therefore, administering the families' life map is the next step in the process to enable individuals to easily visualize their strengths and weaknesses. This is how the methodology empowers community members to improve their quality of life.

In the future, more data will prove useful to local leaders, such as Osabarima or the Akyem Dwenase Development Board, chaired by Alexander Attah-Asante, who acted as a translator for our team. This will be a significant step since it will bring attention to existing but invisible issues and challenges throughout the village that need to be addressed. For example, we identified that access to reliable and safe transportation is a pressing issue for residents of Akyem Dwenase. We hope that from this data, leaders will allocate resources to improve the lives of the residents and other concerns found by the survey.

Limitations of the Poverty Stoplight

Although the Poverty Stoplight methodology enabled us to develop an effective survey, it is not perfect. Its biggest concern is that it assumes local facilitators will have both the desire and ability to create and administer a survey. This is because local facilitators wouldn't face many of the obstacles we did - such as needing to acclimate to and gain trust within the community, or having to navigate the presence of a language barrier. They would also have a better picture of life in the target area - something we couldn't truly gain in the short time we had. Additionally, there were some topics we could not inquire about as outsiders that were important on the original survey, i.e. sexual health and domestic violence, no matter how much time we spent in the community. We found the Poverty Stoplight training course we took in December didn't cover how to find and recruit additional survey facilitators and consequently, we would recommend the relevant material be revised to provide better instruction, especially for rural areas.

Another concern is the length of the typical Poverty Stoplight survey. Generally, a Poverty Stoplight survey is given with 50 indicators, which in our experience can take upwards of an hour to administer. We found this to be too long for an area such as Akyem Dwenase, where residents have many pressing concerns on weekends and it can be difficult to schedule with them. The best solution we found was to eliminate indicators that were not strictly relevant to the local context and combine indicators when possible. However, we were not immediately aware this would be something we could do within the bounds of the methodology - we recommend this possibility be made clear to all future organizations from the outset.

The final problem we encountered was the use of the term "poverty" in "Poverty Stoplight." Our advisors struggled with this as well, on the basis that it has an immediate negative connotation and describes a nuanced community in a black-and-white way. This prevents people from seeing that the methodology accomplishes the opposite when implemented. We began referring to our team as the "Stoplight" team, and our project as a "wealth and wellbeing survey" to combat this complication. Fundación Paraguaya, the creator of the Poverty Stoplight, has had similar problems, as many of their official documentation and publications use the term "Stoplight" over "Poverty Stoplight." We recommend the word "poverty" be officially dropped from the name to better reflect what the program attempts to accomplish.

Decolonizing the Meaning of Poverty

This paper has discussed the lingering effects of colonialism on poverty in Africa. Traveling to Ghana from the United States, a nation with a history of colonialism and slavery, we were tasked with rerouting our views on poverty to decolonize our minds. The majority of project research occurred before we left the U.S., but no amount of online reading could have prepared us for the distinctive experiences that Akyem Dwenase has to offer. Learning through direct exposure in such a close community has given us a clear representation of poverty, and highlighted key differences in how it is defined.

Without understanding the community, a Westerner may classify the majority of residents as living in poverty. There is limited access to food variety, water is not always guaranteed (as we know from our experience with an empty water tank during our stay), roads are in poor condition, and as many residents have told us, the local health clinic is inadequate in dealing with more pervasive health issues. Without understanding the community, a Westerner may classify the majority of residents as living in poverty. Through our conversations with the people of Akyem Dwenase, we learned this was not the case.

In a tight-knit, rural community like Akyem Dwenase, everyone is interconnected and considered family. The village is bustling in the morning before most people begin work or school, and neighbors greet each other warmly. Those who do not travel for work are outside most of the day, engaging in conversation with passersby. In the evening, when everyone returns from work, meals are eaten all together and socializing is strongly encouraged. We felt the strong familial sense when children and adults alike were eager to say hello, learn our names, and teach us Twi phrases; treating us as a part of the community. The excitement and overall optimism are indicative of happiness and more spiritually enriching lives, stemming from the family-oriented environment. While some residents do live with material deprivations, there is an elevated level of social and emotional richness that must be accounted for in poverty diagnoses. We were quick to abandon our preconceived notions of physical poverty and

take on more complex dimensions of psychological well-being and freedom. These dimensions are considerably more difficult to gauge but are equally if not more vital than the physical poverty metrics. In any case, our co-design approach to the Poverty Stoplight project and our passive daily observations of life in Akyem Dwenase have changed our definition of poverty.

Executive Summary

Problem Statement

Poverty is a complex and multifaceted issue, encompassing many dimensions that extend beyond monetary value. The current metrics used to measure poverty, including the Fordham Francis Index (FFI), World Bank, US OECD, Oxford Poverty and Human Development Index (OPHI), and the Official Poverty Measure (OPM) are inadequate in assessing the multidimensional reality of the situation. These measures fail to provide insight into the holistic well-being of families and individuals and overlook crucial aspects such as access to education, healthcare, housing, and overall quality of life. The assessments are conducted by policymakers who are disconnected from the reality of the situation, leading to poverty interventions that are not the most beneficial or effective. Fundamentally, these measurements lack the inclusion of the families and individuals in the process. There is a need for a more adequate poverty measurement, focusing on the diverse and interconnected factors that contribute to the complexity of poverty beyond economic value.

Proposed Solution

This project uses co-design to implement the Poverty Stoplight methodology in the village of Akyem Dwenase in the Eastern region of Ghana in hopes of establishing a more inclusive and accurate way of assessing the family's well-being and wealth in rural Ghana. The Poverty Stoplight methodology differentiates itself from other poverty metrics by exploring all dimensions of poverty (well-being, conscientization, integral theory, self-efficiency, and positive influence). The methodology is entwined with principles of co-design, working closely with community leaders to develop the survey and allowing families to assess their poverty. A survey is administered containing indicators that encompass six categories: income, health/environment, education/culture, housing, organization, and motivation. By assessing the data, improvements, and solutions can be proposed for indicators that tend to be lower. The survey, results, and solutions brainstorming aid community leaders and the Akyem Dwenase community in improving conditions, with the eventual goal of disseminating the survey throughout rural Ghana.

Objectives

An actionable plan was established to fully optimize our short seven-week timespan in Akyem Dwenase. We delegated three main tasks for our implementation of the Poverty Stoplight: acclimation through community engagement, survey adaptation and dissemination, and solution brainstorming. At each step, co-design practices were utilized.

The first task of acclimation involved establishing our presence and connecting us with important figures who could help with the project. To accomplish this, we allocated the first 2 weeks of our time to community engagement and became proactive in participating in cultural events. We created mental maps of the village layout and locations of peoples' residences and introduced ourselves despite our limited knowledge of Twi. Whenever possible, we bought goods from store owners, used laundry services, and played games with children. Through these efforts, we became more comfortable in our interactions with Akyem Dwenase residents and established trust and familiarity. Immersing ourselves in the environment gave us a feel for the figures in the village who could help us, namely the village chief, Osabarima Owusu Baafi Aboagye III, the Development Board, Alexander-Attah Asante and Mark Asante, and Head Farmer, Kwasi Anane Asari. These leaders helped us adjust the survey to the context of Akyem Dwenase.

Survey adaptation featured several meetings with community leaders to determine poverty indicators sensitive to Akyem Dwenase's environment. During conversations with Osabarima, we determined the traditional 50-indicator survey was too complicated. The language barrier and time constraints of translators needed for survey administration would make a 50-question survey too lengthy and not capture the full attention of interviewees. We also found some of the indicators the Poverty Stoplight team created for Ghana did not apply to Akyem Dwenase or were redundant. Slimming down the survey, we consolidated the dimensions of poverty to 17 relevant indicators and gauged their respective thresholds with Osabarima. An important consideration was the phrasing of the question, which would affect the responses we received. Community leaders were integral in helping dictate the way that each question was asked.

The second portion of the survey adaptation was dissemination among the Akyem Dwenase community. We set a target of 50 families to administer the survey to, obtaining data based on the community's perspective of poverty that recognizes the complexity of experiences in rural Ghana. We enacted cross-cultural design in selecting translators to help us interview families, traveling with Alexander-Attah Asante and Mark Asante in the mornings to facilitate. The translators also helped us plan routes for survey administration each morning, selecting families that were both willing to participate and represented diverse socioeconomic status. During survey administration, we made traditional greetings and maintained full transparency of questions, taking as much information from interviewees as possible. Data collected from interviews gave us a complete picture of each family's situation and we could make modifications to the survey as necessary.

The third and final objective was to develop preliminary solutions based on survey data analysis. We curated the family responses to the survey to look at trends in personal and community deprivations. Indicators with a majority of yellow or red responses marked areas of focus and intervention for community leaders and the Poverty Stoplight. Based on the responses to the interviews, we revisited

families that ranked majority green in indicators and asked how they were successful. In asking the families themselves, we were given solution ideas that are culturally applicable and acceptable.

Project Justification

The implementation of the Poverty Stoplight methodology in Akyem Dwenase was helpful to all parties involved. Our team embraced principles of cross-cultural learning and knowledge exchange with other cultures, traditions, and peoples. By engaging with the Akyem Dwenase community, the project aimed to not only improve living conditions but also enhance our understanding of the nature of poverty. The endeavor was driven by the ambition to refine poverty measurements, moving beyond conventional metrics to embrace a holistic approach that considers the unique socio-cultural landscape of Akyem Dwenase. Additionally, the project sought to create a strong tool for sustainable improvements in the quality of life for communities beyond Akyem Dwenase, contributing to a broader knowledge base for effective poverty alleviation.

Research Process

Redefining poverty for a community very different from our own proved an abstract task requiring critical thinking and cross-cultural design. Central to rerouting our mindsets for this project was the assumption that the way things "ought to be" did not apply to the unfamiliar environment of Akyem Dwenase. Upon accepting this assumption, we could open our minds to different communication styles necessary to accomplishing our goal. Before arriving in the village, we conducted research on the mechanisms of co-design and deep-rooted colonial practices in Ghana, challenging our Western beliefs. Through our active research and consumption of co-design media, we began to understand the basic principles and build a strong foundation for work in Akyem Dwenase.

The most powerful medium of information intake was through direct exposure to the Akyem Dwenase community. We actively participated in events whenever possible, recording observations and thoughts in individual daily journals. The evolution of journal entries over our acclimation period in the village marked our journey of decolonizing our mindsets and shifting the definition of poverty. Our team conducted meetings to discuss the events of each day and the trajectory of the project as a whole. In this way, our project became flexible to the constraints of Akyem Dwenase, and through our mindful practices, we were open to this change.

As mentioned, the survey was modified to be more relevant to Akyem Dwenase to invoke the most helpful responses from interviewees. We consolidated the outdated 50-question survey into 17 indicators that best encompassed the dimensions of poverty concisely. Working with community leaders, we refined the survey to contain the following indicators and thresholds:

1. *Income and Employment*

   Green: Family income above 500 Cedis per week

   Yellow: Family income between 250 and 500 Cedis

   Red: Family income below 250 Cedis

   Justification: We have discussed the downsides of using income as a measurement of poverty. Yet, understanding a family's income level still gives valuable information about the ability to afford necessities. The monetary thresholds were chosen based on our conversation with Akyem Dwenase residents, with some input from village leaders. We observed that people who had had difficulties obtaining food and water made some amount below 250 Cedis, while those in the yellow category of 250 to 500 Cedis could afford amenities but not entirely comfortably. Above 500 Cedis per week, one could live comfortably in such an environment.

2. *Family Savings*

   Green: Family members have savings from formal institutions

   Yellow: Family members have savings from informal institutions (Susu, money kept at home, Airtel Money, etc.)

   Red: Family members do not have savings

   Justification: The question about savings was changed from two separate inquiries regarding lines of credit and bank accounts. These practices weren't widespread among the residents of Akyem Dwenase. Saving money through a bank was seen as advantageous, signaling a lack of poverty and therefore a green indicator. Families in the yellow category used informal methods to save and were also unconcerned about finances. However, families without any savings were in a tough spot, relying on sporadic small cash payments, which posed significant challenges.

3. *Environmental Pollution*

   Green: Family lives in an unpolluted environment (no smoke, livestock waste, chemical waste, proper waste disposal systems)

   Yellow: Family lives in an environment that is sometimes contaminated

   Red: Family lives in an environment that is often contaminated

   Justification: We noticed a lack of a waste disposal system in the village, as most residents burned the plastic outside of their homes periodically. The smoke generated was often harmful upon

inhalation and could travel across neighbors. This indicator serves as a meaningful gauge of poverty for the village, as there are varying amounts of exposure to pollutants at different levels of poverty.

4. *Access to Drinking Water*

   Green: Family has access to drinking water on tap inside house
   Yellow: Family has access to drinking water within 30 minutes walk from house
   Red: Family consumes non-potable water or must walk more than 30 minutes from house

   Justification: As an essential human need, access to clean drinking water was determined to be a central indicator. Community leaders asserted that drinkable water sources in the house should be green while drinking water within a close walk would be yellow. At the level of extreme poverty were families that could not access clean potable water nearby, instead traveling far distances of potentially risking their health to drink unclean water (having no other options).

5. *Personal Hygiene Practices*

   Green: All family members wash hands, brush teeth, bathe
   Yellow: Some family members do not engage in one of these practices
   Red: Some family members do not engage in more than one of these practices

   Justification: Hygienic practices help to stop spread of sickness and maintain good health. We did not modify this indicator from the original survey much except to dictate the three main hygienic practices listed above as opposed to a much wider range. Asking about more than these three practices could be complicated in an interview, and the yellow and red levels were also simplified to exclude 1 or 2 of these practices.

6. *Access to Nutritious Food*

   Green: The Family has access to a variety of local foods (fufu, kenke, yam, plantains, oranges, porridge, fish, and chicken)
   Yellow: The Family has less variety of foods
   Red: The Family has no variety of foods

   Justification: Having good nutrition and food variety is also important in maintaining good health. Through observation, we saw that some families in the village did not get to eat fish, chicken, or

some of the higher-quality foods. We decided that having access to local food varieties would be green with less/no variety being yellow/red, respectively.

7. *Access to Healthcare/Health Services*
   Green: Family members had access to the hospital when needed
   Yellow: Family members did not have access to the hospital, used local clinic
   Red: Family members did not have access to a hospital or local clinic

   Justification: The local clinic in Akyem Dwenase has at times been unable to adequately treat health problems, and patients may be forced to travel to a hospital to receive treatment. In the case that they do not have access to a hospital and health issues prevail, extreme poverty levels are present. Here we were on the fence for yellow and green categories, but community leaders determined that receiving treatment from the local clinic without hospital access was yellow, and having full access to a hospital when needed was green.

8. *Housing Infrastructure (Material)*
   Green: House is made of concrete blocks
   Yellow: House is made of mud blocks
   Red: House is made of wood planks

   Justification: Housing material is a simple yet useful metric for determination of house structural integrity and overall quality. We learned that the nicest and most effective material to comprise houses in Akyem Dwenase was concrete blocks, which we placed at the green level. Houses made of mud blocks were still sturdy and durable, though not as fine in quality, signaling a yellow categorization. Some houses were also built with wood planks, but community leaders advised against using this as a building material in the village due to limits in longevity and sturdiness. We gauged wood planks as being at the red level.

9. *Separate Bedrooms in House*
   Green: Family members get their bedrooms
   Yellow: Family members do not get their bedrooms, bedrooms are shared by 2 family members
   Red: Family members do not get their bedroom, bedrooms are shared by 3 or more family members

Justification: This indicator is attempting to deal with overcrowding situations that can be characteristic of families living in extreme poverty, with several people living in one bedroom. We decided this indicator was necessary to include, with the green, yellow, and red levels corresponding to 1, 2, and 3+ family members per bedroom.

10. *Sufficient Clothing and Variety*

    Green: Family buys clothes from the West

    Yellow: Family buys clothes from Accra (outside the local area)

    Red: Family buys clothes locally

    Justification: We condensed two questions about sourcing of clothes and sufficient clothing variety into this indicator. When interacting, we noticed residents of Akyem Dwenase were more proud of clothes they had gotten from the United States or other Western nations. Local clothes were taken for granted, and clothing from Accra or Kumasi, for example, was of higher standing. This indicator inadvertently dealt with aspects of community social status simply through one's clothing. We determined the green, yellow, and red levels would be the different geographical proximities of clothing purchases: global, national, and local.

11. *Access to Electricity*

    Green: Family has access to electricity within the house

    Yellow: Family has unstable access to electricity or shares/borrows with neighbors

    Red: Family does not have access to electricity

    Justification: There is a fluctuating electricity supply to the village with brownouts (outages) happening a few times a week. Regardless, electricity is essential for many tools to ease daily living, and community leaders named stable in-house electricity access as the gold standard. At the yellow level is unstable access in the house or the sharing of electrical supply between multiple houses. This leaves families with no access to electricity and the red level.

12. *Transportation*

    Green: Family has regular access to a personal vehicle

    Yellow: Family has regular access to a motorbike or public transportation

    Red: Family does not have access to means of transportation

Justification: Access to means of transportation was determined to be an essential need. Akyem Dwenase has a large biker presence, and while motorbikes are functional they are prone to breaking down and are extremely noisy. Owning a car is the best form of transportation, while motorbikes and commercial buses are in the yellow category. No access to transportation is red.

13. *School Attendance and School Supplies*

    Green: Family members are able to attend school and have their own supplies
    Yellow: Family members are able to attend school but do not have all school supplies
    Red: Family members may not be able to attend school or do not have any school supplies

    Justification: This indicator was derived from 2 indicators relating to family education enrollment and possession of adequate school supplies. The enrollment of children in the village preschool, primary, secondary, and junior high is nearly perfect, with a solid portion of college-age kids traveling to senior high for higher education. As a baseline, family members would be enrolled in schools, and the green category would symbolize access to personal books and school supplies, yellow meaning less access or borrowing of books, and red meaning no enrollment in school or no access to books.

14. *Self-esteem*

    Green: Family members feel good about themselves and competent/capable
    Yellow: Family members sometimes feel good about themselves or competent/capable
    Red: Family members do not feel good about themselves or competent/capable

    Justification: We felt this indicator was important to include in the survey as it deals with a less material and more psychological assessment of poverty. One's self-worth is important to assess, and community leaders gave us input on the best way to ask the question and gauge the thresholds. Competency and capability of doing things in one's life were characteristic of a green level, whereas fluctuating self-worth was yellow and having no confidence was red.

15. *Gender Equality*

    Green: Family members are treated equally regardless of gender
    Yellow: Family members are not always treated equally because of gender
    Red: Family members are never treated equally because of gender

Justification: Cultural practices in Akyem Dwenase dictate distinct roles of men and women in society. Although a matrilineal society, men have more social power, and subtle and not-so-subtle misogyny may exist in daily interaction. As such, we wanted to include a question on gender equality to see how interviewees would react, with advocacy for equality being green, unequal treatment being red, and a middle ground of yellow.

16. *Security/Safety*

    Green: Family members feel safe in living conditions
    Yellow: Family members sometimes feel unsafe
    Red: Family members frequently feel unsafe

    Justification: This indicator was not modified from the original survey, as all stakeholders agreed on the importance of evaluating safety and security.

17. *Influence in the Public Sector*

    Green: Family is able to use local authorities for help with issues or does not have problems requiring intervention
    Yellow: Family is sometimes able to use local authorities for help with problems and sees some solutions
    Red: Family is unable to use local authorities for help with problems

    Justification: Ghana has a decentralized federal government, and communities rely on local leadership for help with problems. Rarely in Akyem Dwenase would leaders not respond to basic issues, but lack of adequate resources or hesitancy in addressing problems could prevent timely issue solving. Community leaders helped us determine the best way to phrase this question as one which centers the family as having the ability to contact local authorities when problems arise, and whether they are solved or not.

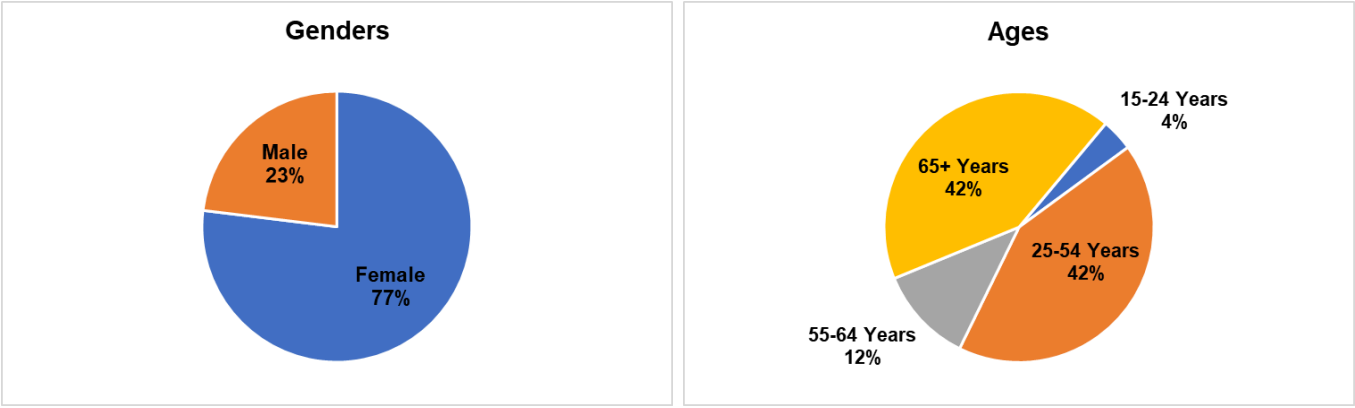
These indicators were developed over several iterations of survey modification. The thresholds, with much input from community leaders, took into account the environment of Akyem Dwenase and are better suited for residents to answer. Finalizing our survey with these 17 indicators, we touch concisely on the dimensions of poverty that give the most complete picture of a rural Ghanaian family. Discussion of limitations of this final survey can be found in Chapter 4 and 5, and in the Discussion section below.

Another important consideration was how cultural practices would interplay with our interview processes. Beyond the survey content and modifications, our interview etiquette would need to meet cultural standards. We researched some Akan traditions, learned to converse at a basic level in Twi, and received briefings on behavior and manners from Attah and Mark Asante. Once our confidence was built, we felt ready to travel around the community and conduct formal interviews to collect data.

The final cornerstone of research revolved around how to deal with the data we collected. Thankfully, Victorinne Nasi of the Poverty Stoplight team helped generate the baseline report for our findings, but we were still keen to analyze the results as well. Here we studied methods of qualitatively analyzing such datasets to develop a more meaningful analysis of our compiled data. From the generated graphs, we could see the indicators that had the highest deprivations and the associated solution bank catered to these areas. All the work we put into establishing an effective Stoplight in Akyem Dwenase was made possible through our active efforts to promote co-design and cross-cultural design.

Key Research Findings

This section deals with the responses we received from families in the Akyem Dwenase community. We interviewed 26 families across 10 mornings, accomplished in 4 weeks. The survey began with entering demographic information: the family member's names, ages, number of family members in the household, jobs, and the question of whether the household was the interviewee's primary residence. The charts below represent our findings from the demographic section of the survey:



Figures 11-12. Gender and age demographics for interviewees.

Based on the data represented in Figure 11, 20 of the respondents answered female while 6 answered male. The age division as shown in Figure 12 was such: 1 respondent (4%) answered they were in the 15-24 year age range (early working age), 11 respondents (42%) answered they were in the 25-54 year age range (prime working age), 3 respondents (12%) answered they were in the 55-64 year age range

(mature working age), and 11 respondents (42%) answered they were above 65 years of age (elderly). According to the Ghana IndexMundi Census for 2021, 37.44% of the country's population is in the 0-14 year age range, 18.64% is in the 15-24 year age range, 34.27% is in the 25-54 year age range, 5.21% are in the 55-64 year age range, and 4.44% are 65 years and older.[35]

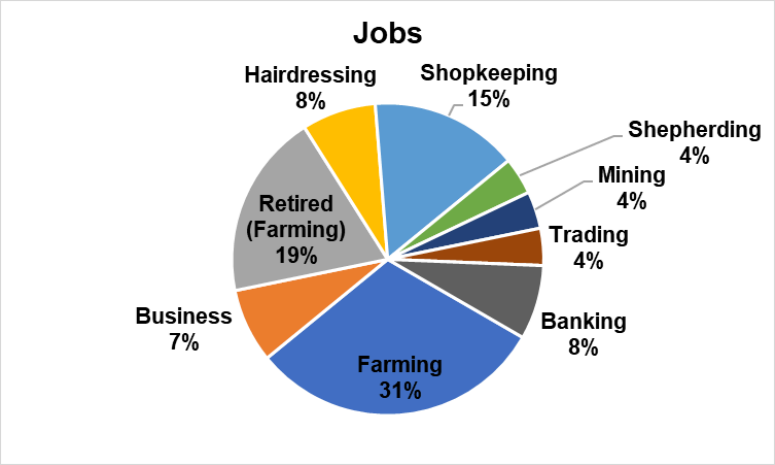


Figure 13. Sources of employment for interviewees.

Sources of employment were more diverse among interviewees: 8 respondents were farmers, 2 were business owners, 5 were retired farmers, 2 were hairdressers, 4 were shopkeepers, 1 was a shepherd, 1 was a miner, 1 was a trader, and 2 were bankers. In rural Ghana, the main source of employment is farming, with farmers accounting for a range of 44.1% to 51.5% of all laborers.[36] In combining current and retired farmers interviewed, we amount to 50% farmers.

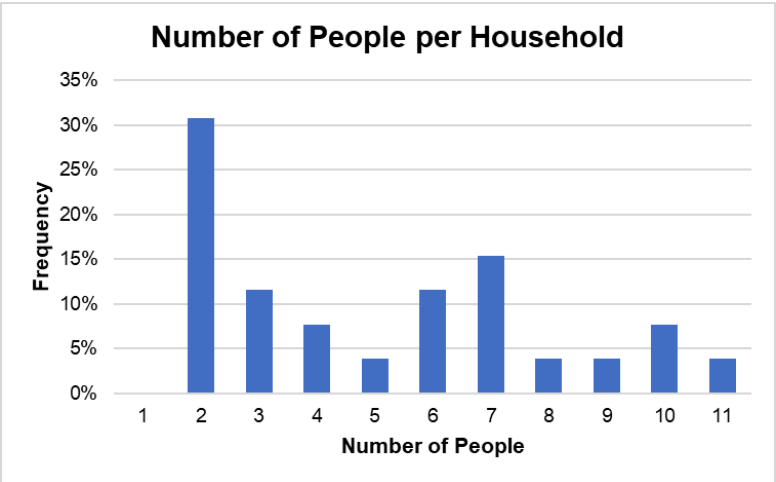


Figure 14. Numbers of people per household by frequency.

We defined a family, the unit of survey measurement, to be the number of people per household, comprising the data in the figure above. In this case, the majority of households had 2 people, with 8 families (31%), followed by households with 7 people, with 4 families (15%), and households with 3 and 6 people following, 3 families each (12%). We then asked if the house of each interviewee was their primary residence, and 23 out of 26 families said it was.

After these demographic questions, we moved to the survey indicators. The graph below was constructed showcasing all families' responses to the 17 indicators:

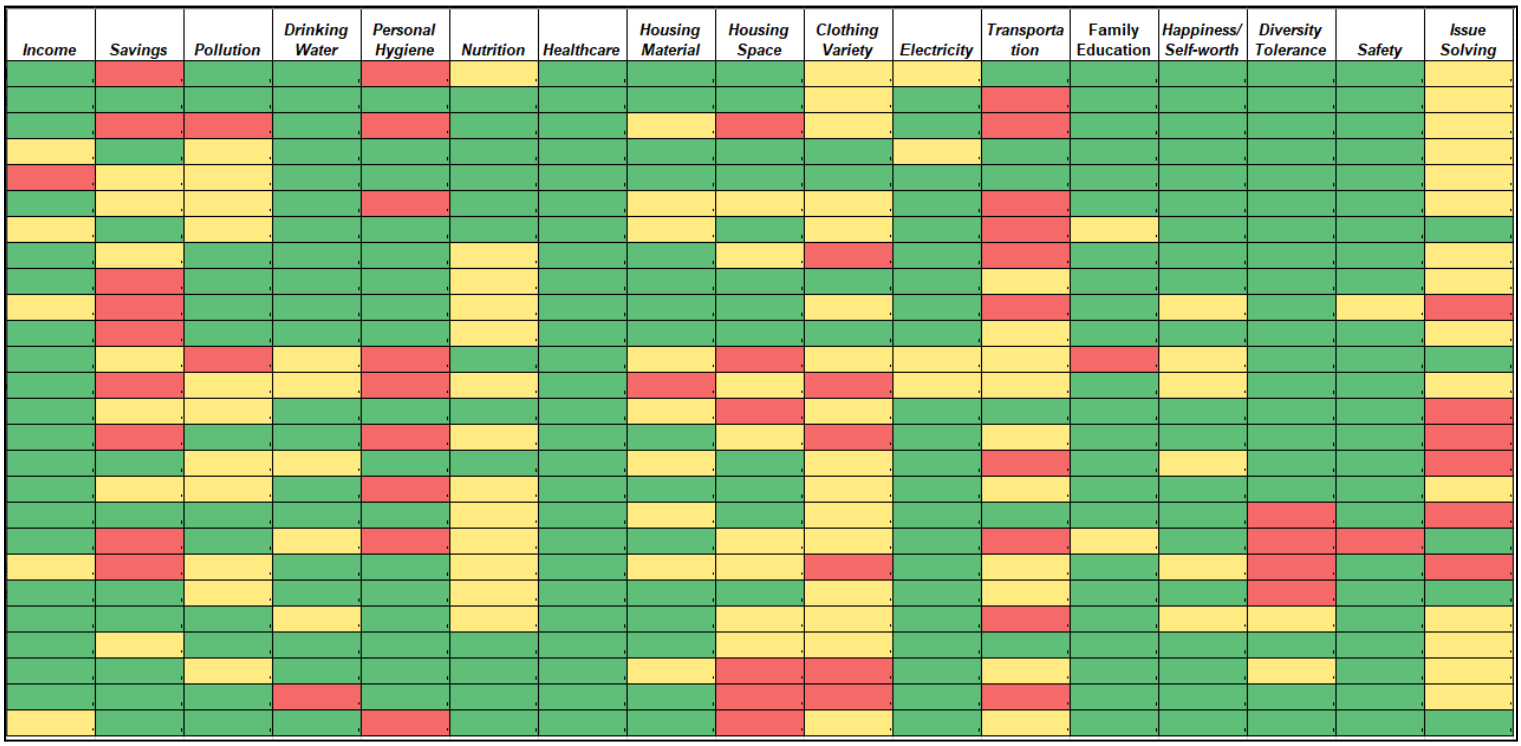


Table 2. Interview Responses to 17 Poverty Indicators from Survey. The horizontal axis has all indicators and the vertical is responses by family, so each row is one family's responses to all questions. Green squares represent green responses (no poverty), yellow squares are yellow responses (moderate poverty), and red squares are red responses (extreme poverty).

This table shows each family's responses to the 17 indicators contained in the survey with each row representing a different family. To highlight non-green answers, Figure 15 (below) was constructed by combining all responses to see where deprivations may occur.

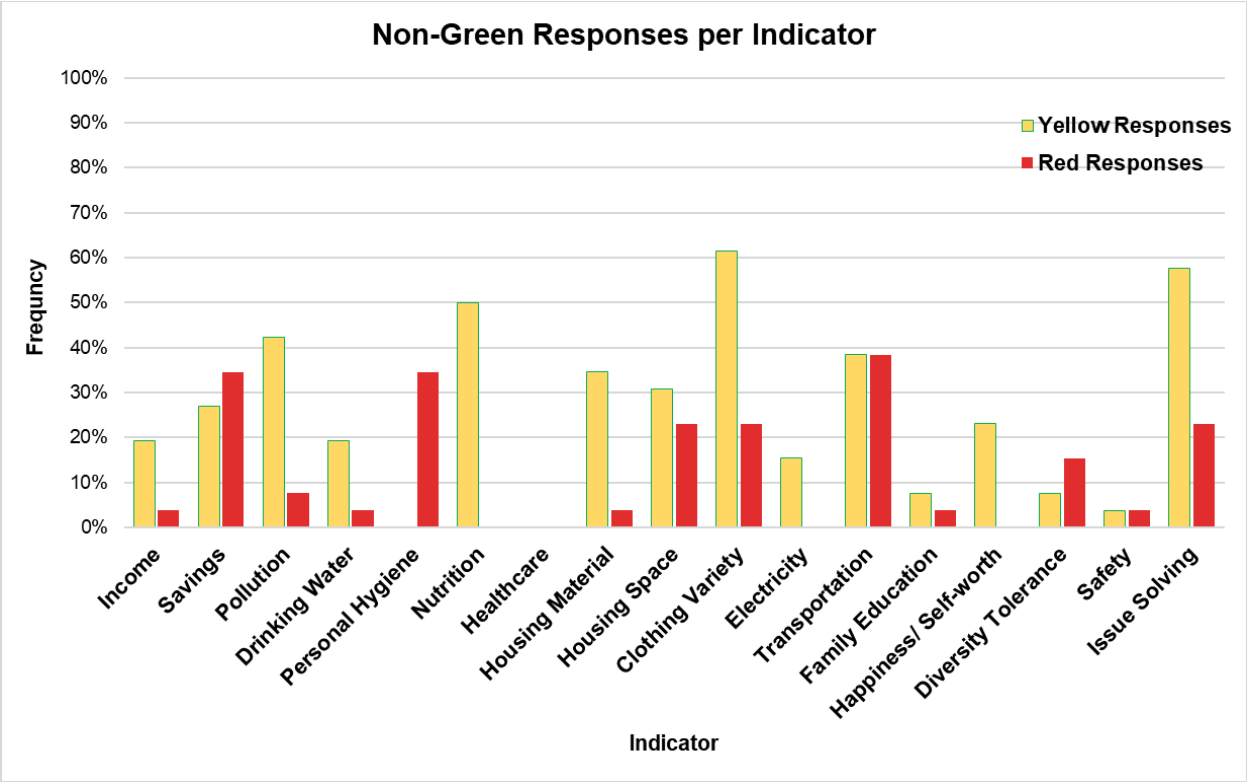


Figure 15. Non-Green Family Responses per Indicator

In this graph, we can see some of the indicators are more deprived than others. “Clothing variety” has the highest percentage of yellow responses, above 60%, followed by “issues addressed by leadership” and subsequently “nutrition”. Transportation has the highest level of red responses at nearly 40%, followed by personal hygiene and savings. We now step through each indicator contained in the survey, where the full survey with indicator descriptions can be found in the Research Process section or the Appendix.

1. *Income and Employment*

   20 respondents (77%) answered in the green category for this indicator, 5 respondents (19%) in the yellow category, and 1 respondent in the red category (4%). The summative non-green responses were 6, or 23%.

2. *Family Savings*

   10 respondents (38%) answered in the green category for this indicator, 7 respondents (27%) in the yellow category, and 9 respondents in the red category (35%). The summative non-green responses were 16 (62%).

3. *Environmental Pollution*

   13 respondents (50%) answered in the green category for this indicator, 11 respondents (42%) in the yellow category, and 2 respondents in the red category (8%). The summative non-green responses were 13 (50%).

4. *Access to Drinking Water*

   20 respondents (77%) answered in the green category for this indicator, 5 respondents (19%) in the yellow category, and 1 respondent1 in the red category (4%). The summative non-green responses were 6 (23%).

5. *Personal Hygiene Practices*

   17 respondents (65%) answered in the green category for this indicator, no respondents in the yellow category, and 9 respondents in the red category (35%). The summative non-green responses were 9 (35%).

6. *Access to Nutritious Food*

   13 respondents (50%) answered in the green category for this indicator, 13 respondents (50%) in the yellow category, and no respondents in the red category. The summative non-green responses were 13 (50%).

7. *Access to Healthcare/Health Services*

   All 26 respondents answered in the green category.

8. *Housing Infrastructure (Material)*

   16 respondents (62%) answered in the green category for this indicator, 9 respondents (35%) in the yellow category, and 1 respondent in the red category (4%). The summative non-green responses were 10 (39%).

9. *Separate Bedrooms in House*

   12 respondents (46%) answered in the green category for this indicator, 8 respondents (31%) in the yellow category, and 6 respondents in the red category (23%). The summative non-green responses were 14 (54%).

10. *Sufficient Clothing and Variety*

    4 respondents (15%) answered in the green category for this indicator, 16 respondents (62%) in the yellow category, and 6 respondents in the red category (23%). The summative non-green responses were 22 (85%).

11. *Access to Electricity*

    22 respondents (85%) answered in the green category for this indicator, 4 respondents (15%) in the yellow category, and no respondents in the red category. The summative non-green responses were 4 (15%).

12. *Transportation*

    6 respondents (23%) answered in the green category for this indicator, 10 respondents (38%) in the yellow category, and 10 respondents in the red category (38%). The summative non-green responses were 20 (77%).

13. *School Attendance and School Supplies*

    23 respondents (88%) answered in the green category for this indicator, 2 respondents (8%) in the yellow category, and 1 respondent in the red category (4%). The summative non-green responses were 3 (12%).

14. *Self-esteem*

    20 respondents (77%) answered in the green category for this indicator, 6 respondents (23%) in the yellow category, and no respondents in the red category. The summative non-green responses were 6 (23%).

15. *Gender Equality*

    20 respondents (77%) answered in the green category for this indicator, 2 respondents (8%) in the yellow category, and 4 respondents in the red category (15%). The summative non-green responses were 6 (23%).

16. *Security/Safety*

    24 respondents (92%) answered in the green category for this indicator, 1 respondent (4%) in the yellow category, and 1 respondent in the red category (4%). The summative non-green responses were 2 (8%).

17. *Influence in the Public Sector*

    5 respondents (19%) answered in the green category for this indicator, 15 respondents (58%) in the yellow category, and 6 respondents in the red category (23%). The summative non-green responses were 21 (81%).

Discussion

Our project process in Akyem Dwenase had several strengths emerge from our incorporation of co-design, cross-cultural, and social design principles. Collaborating with Osabarima and the Development Board and seeking resident feedback aided the modification of survey indicators and their respective thresholds, ensuring cultural relevance. The collaboration with the Poverty Stoplight team further enhanced this process, emphasizing a collective effort in refining the survey. Our cross-cultural approach, employing male translators due to cultural dynamics, demonstrated adaptability and sensitivity to the community's uniqueness, ensuring effective communication during survey administration. Engaging with the community through social design challenged our assumptions and expanded our

cultural understanding of Akyem Dwenase. Participation in soccer games, funerals, and church services facilitated a deeper connection with the community, providing context to poverty and helping create adaptable holistic indicators. Families being able to take the survey and evaluate their circumstances allowed poverty to be defined by the community of Akyem Dwenase.

Looking at the Results section, the demographics of interviewees were fairly diverse in terms of gender, age, and employment. As Akyem Dwenase is a matrilineal society and women are regarded as the head of the household, most of the main interviewees were female (77%). For age ranges, the most senior member of the household usually responded, which confirms our age range of 65 and above having many responses (42%). There was an equal margin in the 25-54 age range as well (42%). Employment-wise, the amount of farmers (current and retired) who answered the survey was exactly 50%, similar to the portion of farmers in rural Ghana (44.1% to 51.5%).[36]

Limitations in our Stoplight implementation existed with potential translator bias in the type of family selection and challenges in indirect language translation. The failure to reach our 50-family goal highlighted the need for improved scheduling with translators for more interviews. To address the weaknesses due to the language barrier, learning more Twi and adapting the survey in Twi would give us more effective answers.

Reflecting on the Poverty Stoplight method, its collaborative and adaptive nature proved beneficial, emphasizing the importance of community-driven approaches to defining and addressing poverty. While the self-survey allows for families to assess their situation, it also risks dishonest answers. Therefore, the Poverty Stoplight Methodology needs to have another layer of assessment, beyond the families' assessment to comprehensively understand a family's indicator standings leading to solutions to better their quality of life. Each implementation of the Poverty Stoplight in a different part of the world continuously strengthens and improves the methodology, promoting community driven approaches to accurately define and address poverty in different contexts.

Endnotes

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  - Translator & guide
  - Chairperson of Akyem Dwenase Development Board
- Isaac Asante Mireku
  - Translator & guide
- Victorinne Nasi
  - Poverty Stoplight Coordinator

Figure 11. All team members holding Nana Kwame, the 2-month-old of Abigail Ansoh (one of the families we befriended). From left to right: Chiara, Ian, Salma, and Owen.

Appendix

Appendix 1: Pre-Screening Questions Presentation

Indicator 1: Income source/job type

Pre Screening Questions

- What is your job/source of income?
- Weekly income?

Question: ***What is your weekly income? How many sources of income?***

Green: 50 -100 cedis per person per day, 2+ sources of income from different people

Yellow: 25 - 50 cedis per person per day, 2+ sources of income from same person

Red: 1- 20 cedis per person per day, 1 or 0 sources

Indicator 2: Savings

Pre Screening Questions

- Do you pay a school fee for your child?
  - yes/no

Question: ***Do 1 or more family members keep savings?***

Green: One or more family members have savings through formal institution in the past 6 months

Yellow: One or more family members have savings through informal savings (susu) in the past 6 months

Red: No savings

Indicator 3: Pollution

Pre Screening Questions

- Are there things you are exposed to that are bad for your health?
  - Waste from mining sites?
- What do you consider to be pollutants?

Question: Do you live in an unpolluted environment?

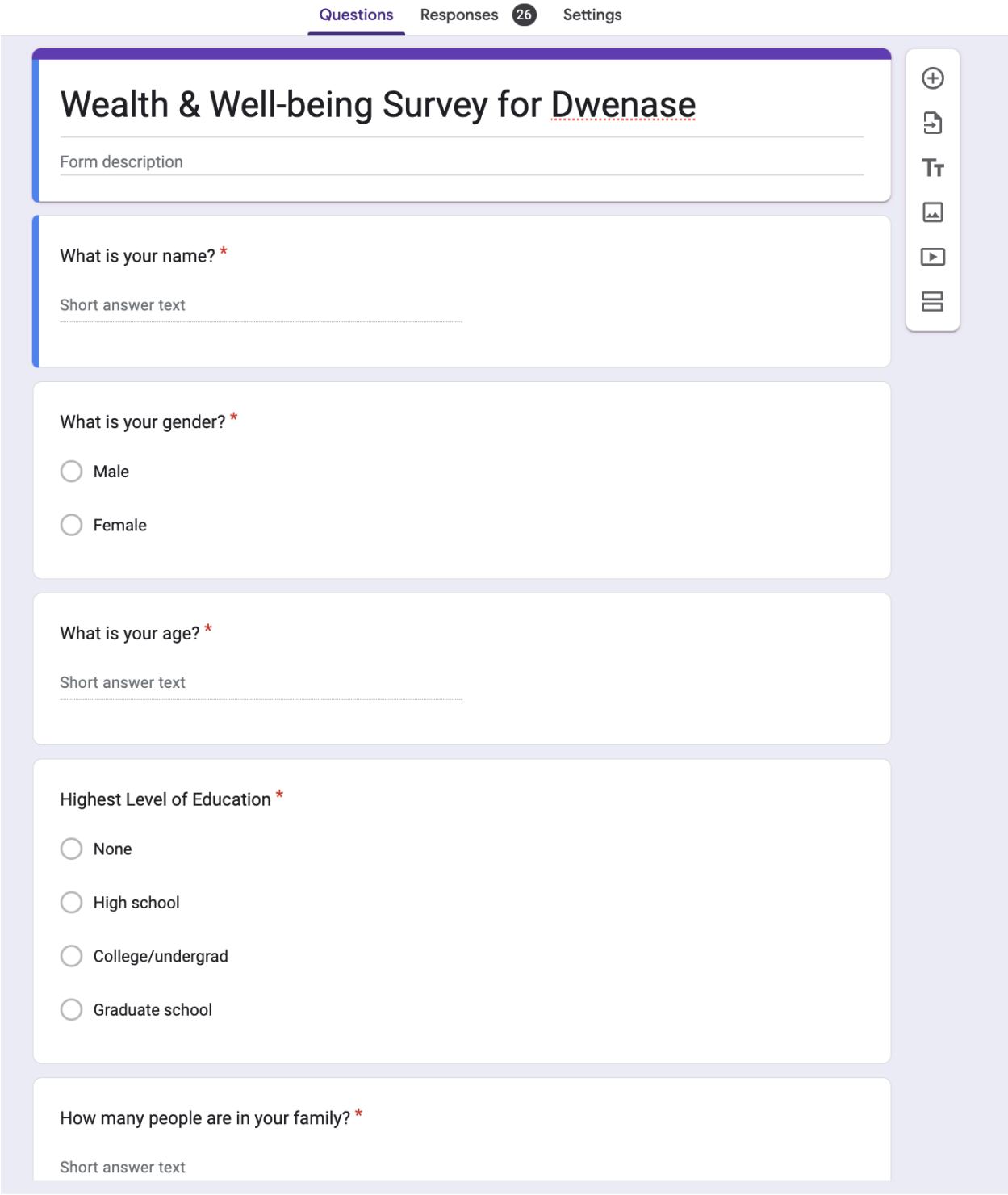
Green: no smoke/bad/chemical odors from livestock & production

Yellow: sometimes odors from livestock/chemicals

Red: constant odors from livestock/chemicals

Our first 3 indicators, with their thresholds and pre-screening questions. The rest of the indicators can be seen in this Presentation: https://docs.google.com/presentation/d/1nEIiS2CTVxEzXZQ1vDR4GhrfZssseQxhN21e-kYcBT4/edit?usp=sharing

Appendix 2: Survey Google Form



Screenshot of our google survey we used to record data from interviews. The form can be found at the link here:

https://forms.gle/6zF9xmCSqNbm2qLa6

Appendix 3: Poverty Stoplight Final Indicators PowerPoint

Income and Employment

Indicator 1 - Income and Revenue Sources

Shortname: Income
Lifemap name: We have enough income

Our family income is 500+ Cedis per week.

Our family income is above 250 Cedis per week but less than 500 Cedis per week.

Our family income is below 250 Cedis per week.

Definition: The international poverty line was recently raised from earning the equivalent of $1.25 to earning the equivalent of $1.90 dollars per day.
No poverty: $1.90 per day or above
Poverty: Below $1.90 per day and $1.25 per day
Extreme poverty: Below $1.25 per day

Income and Employment

Indicator 2 - Family Savings

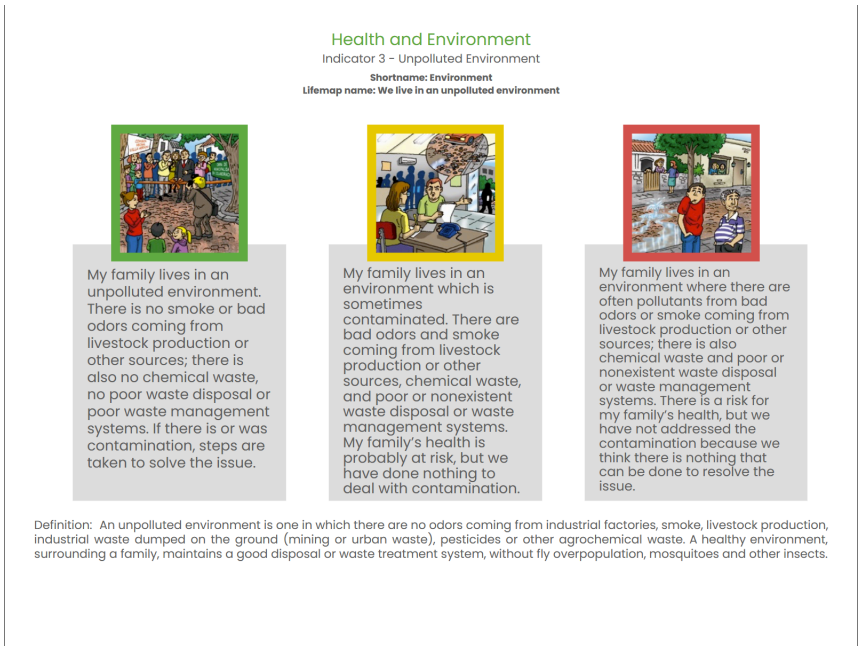
Shortname: Savings
Lifemap name: We have savings

One or more family members have savings for at least 6 months from formal institutions.

One or more family members have informal savings (susu, they keep money at home, airtel money, etc) or they have had savings accounts for less than 6 months.

The family has no informal or formal savings.

Definition: Family savings are defined as the portion of a family's income that is not spent, rather it is saved and deposited into a bank account belonging to a legal financial institution, to cover future or unexpected needs. The indicator records if the family saves regularly (every month), as well as if they have practiced this for at least the last 6 months.



Screenshot of the first 3 slides in our final indicator survey PowerPoint. The presentation can be found at the link here: https://docs.google.com/presentation/d/1qt4qY1HPyDHczGasnv5jWZDn4Lw_JJ8f/edit?usp=sharing&ouid=112054518612187026584&rtpof=true&sd=true