

Aligning Rayuwa with the **SUSTAINABLE DEVELOPMENT GOALS (SDGs)**

To improve the livelihoods and resilience of smallholder Nigerian farmers and their communities.



Program Overview

John Deere, PYXERA Global, smallholder farmers, and the Government of Nigeria share a common vision—to achieve an economically stable, food secure, and prosperous Nigeria. Rayuwa, which means “life” in Hausa, is a holistic, demand-driven community development program co-created by the partners to strengthen Nigeria’s agriculture and education systems and bring this shared vision to life.

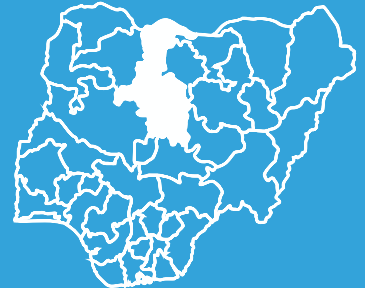
Rayuwa’s mission is to improve the livelihoods and resilience of Nigerian smallholder farmers—by investing in the farmers of “today and tomorrow.” Its pillars—resilient agriculture, quality education, and leveraged talent from John Deere—are grounded in nine years of partnership, collaboration, learning, and adaptation between John Deere and PYXERA Global on the JIVA project, in Rajasthan, India. Rayuwa’s four objectives are to:

- Increase agricultural production, farmer income, and farmer resilience to market and climate shocks
- Commercialize the farm by enhancing farmers’ capability to manage the farm as a business
- Reduce drudgery on the farm by promoting the use of technologies that increase labor efficiency
- Cultivate the next generation of farmers by strengthening access to accountable, high-quality, and equitable education

TABLE OF CONTENTS

03	EXECUTIVE SUMMARY
07	SUSTAINABLE DEVELOPMENT GOAL #2: ZERO HUNGER
09	SUSTAINABLE DEVELOPMENT GOAL #4: QUALITY EDUCATION
12	SUSTAINABLE DEVELOPMENT GOAL #5: GENDER EQUALITY
14	SUSTAINABLE DEVELOPMENT GOAL #8: DECENT WORK & ECONOMIC GROWTH
16	SUSTAINABLE DEVELOPMENT GOAL #13: CLIMATE ACTION
18	SUSTAINABLE DEVELOPMENT GOAL #17: PARTNERSHIPS FOR THE GOALS
20	APPENDIX A: MAP OF PROJECT AREA
21	APPENDIX B: SMALLHOLDER FARMER CLASSIFICATION
22	APPENDIX C: CITATIONS

Amplifying and Sustaining Rayuwa's Impact



RAYUWA: Deeply Rooted – Leaping Forward

The heart and strength of Rayuwa lies in its partnership with the Nigerian smallholder farmers it serves. Together with the farming communities, John Deere and PYXERA Global co-create holistic and durable solutions that respond to farmers' daily realities.

In 2022, following two years of unprecedented shocks to the agriculture, food security, and education systems, John Deere and PYXERA Global, together with the communities, embarked on its second and final expansion of the Rayuwa project area. The trust Rayuwa earned since its inception through proven results and its commitment to the communities during the COVID-19 lockdowns laid the groundwork to effectively expand the program from 11 villages in 2019, to 44 villages in 2021, to 85 villages in 2022. **Today, Rayuwa serves 12,060 farmers.** Simultaneously, the Rayuwa team continues to test the endurance of key interventions in and to sustainably graduate from the pilot project area.

Achieving Rayuwa's objective to reach 12,000 farmers ran parallel with the war in Ukraine and other geopolitical events that drove inflation in Nigeria to 21.47%, the highest rate in over a decade. Compounding supply chain shocks also limited the availability of essential goods during key seasons, such as fertilizer and other inputs, leading prices to rise in northern Nigeria to as high as 150%. Floods throughout the country destroyed crops and up to \$1.7B in value in the agriculture sector. Government teachers also went on strike to protest unpaid salaries.

As a result, food security declined and inequality rose. The World Food Program expected nearly 17 million Nigerians (8% of the population) to experience a food security crises or emergency in 2022 – up from 12.8 million Nigerians (6% of the population) in 2021. Equally concerning, in 2022 UNICEF estimated that over 18.5 million children of primary school age were not in school, the highest out-of-school rate in the world.

The durable food and income security smallholder farmers seek to achieve is not created overnight. It is a long-term endeavor, and Rayuwa takes a long-term, inclusive approach to secure the future for both people and planet.

Despite the pressures and shocks in Nigeria and around the world, smallholder farmers in the Rayuwa project area are penning a different narrative. With the guidance and encouragement from a talented and dedicated team, smallholder farmers continue to apply good agricultural practices, secure access to finance and quality inputs, and boost their productivity. Female farmers and entrepreneurs, particularly, are leading the effort to save and invest their capital in their businesses – and in the talent and potential of their neighbors – for a collectively more prosperous future.

Through the increase in household agricultural production and income, the communities are increasingly beating the hunger season. Community members are also investing in educating their children, to help ensure the value reaped from Rayuwa and their hard work today will leap into the next generation.

As we prepare for what we aim to be another seminal year, this report presents and contextualizes Rayuwa's achievements in relation to the Sustainable Development Goals (SDGs).

*Rayuwa views the SDGs as interwoven. The project's two thematic intervention areas of resilient agriculture and accountable education align directly with **SDG 2, SDG 4, and SDG 8. SDG 5, SDG 13, and SDG 17** cut across all aspects of the project.*

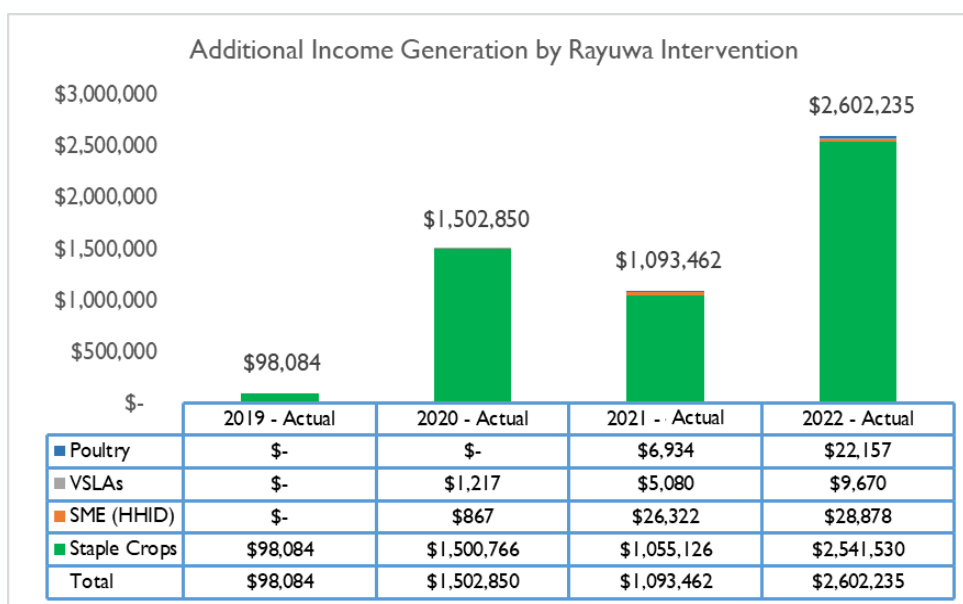


Amplifying Rayuwa's Impact

The value of Rayuwa's holistic, community-based approach to resilient agriculture is most effectively demonstrated by the change in "hunger season," incomes, and farmer classifications—in the context of community environments.

Nigerian smallholder farmers persevered through a myriad of shocks and headwinds in 2022. Despite these challenges, Rayuwa beat its target of reducing the hunger season to 35%. **This year, the percent of households experiencing hunger declined from 63% at the baseline (2019) to 33% in pilot villages.** The reduction in the hunger season was equally remarkable in the first expansion area of 33 villages, which drove the hunger season from 43% in 2021 (baseline) down to 34% in 2022.

As a result of more effective agricultural practices, farmers generated \$2.5 million in income from the staple crops of maize, rice, soybean, sorghum, and cowpea in 2022—equaling a cumulative income increase of \$5.2 million since Rayuwa's inception. In addition to earning higher income from staple crops, farmers also diversified their income sources by investing in small businesses and saving money through Village Savings and Loans Association (VSLA), generating a total additional in income of \$2.6 million in 2022 – a 138% increase from the 2021 total additional income of \$1.09 million. While the expansion of the project area generates a strong tailwind for income generation, a significant portion of the increase additional income is the result of continued improvements in the profitability of pilot villages, which grew by 22% — from \$1.09 million in 2021 to \$1.34 million in 2022.



Note: Additional Income for 2022 is calculated using the income from the 11 pilot villages and the 33 villages of the first expansion area in Katsina State. It does not include income from the second expansion area of 41 villages in Kaduna, which was initiated in May 2022. The 2023 report will include income from all three phases of Rayuwa.

Rayuwa uses a farmer classification model to effectively target interventions and monitor and evaluate farmer's progress towards resilient farming. In 2022, 6% of the 2,507 farmers classified as Hyper-Subsistence Farmers in the pilot villages transitioned to subsistence farming. Similarly, 12% of farmers classified as Subsistence Farmers transitioned to the Beginner Farmer classification. Lastly, 4% of farmers classified as Beginner Farmers graduated to Resilient Farmers.

In the first expansion area, with a total of 7,362 farmers, 15% of the 2,362 Hyper-Subsistent Farmers transitioned to Subsistence Farmers, 16% of the 3,421 Subsistence Farmers transitioned to Beginner Farmers, and 5% of the 1,529 Beginner Farmers graduated to Resilient Farmers. Over the next two years, Rayuwa will continue to drive towards graduating farmers to the Resilient Farmer classification, to help ensure farmers and their farming businesses are tilling on solid ground as Rayuwa sunsets.

Farmer Classification Transitioning - Pilot Villages					
Category	2019 - Baseline	2020	2021	2022	Trend
Hyper-Subsistence	200	175	117	110	
Subsistence	1379	1371	1281	1134	
Beginners	627	653	708	834	
Resilient	301	308	401	429	

Investing in the Potential of Today and Tomorrow

Rayuwa combines two interventions critical to farmers' immediate and long-term success: agricultural initiatives to sustainably increase food security, farm productivity, and farm profitability and youth and adult education to inspire opportunity and equity. Farmers with more education are more productive, profitable, adaptable, and resilient. Therefore, in addition to working with farmers to improve agricultural practices and ultimately profitability, savings, and reinvestment back into the farm, Rayuwa also strategically invests in the potential of the current and next generation of farmers by ensuring sustainable, quality education is available and accessible.

Similar to its resilient agriculture initiative, Rayuwa's accountable education initiative has achieved two expansions. Beginning in 2021 Rayuwa's first expansion broadened its literacy and numeracy activities from six schools serving 2,494 students to a total of 27 schools and 8,590 students. In 2022, Rayuwa scaled a second and final time to a total of 44 schools and 17,394 students, with reporting beginning in 2023



Students at Makera Primary School

Extended school closures due to the COVID-19 pandemic and subsequent closures due to regional insecurity have undoubtedly damaged the Nigerian education system. In 2022, teacher strikes also led to deep teacher shortages at government schools. In response to each shock, Rayuwa adapted its approach to smooth the transition of students back into the education system.

Despite these challenges, learning outcomes in the pilot schools were sustained and marginal gains were made in the first expansion area. **In the six pilot schools, the ratio of students scoring above 80% in numeracy and agriculture science increased between 2021 and 2022** — from 11% to 17% and from 18% to 23%, respectively. Performance in science and technology remained at par (19%) and literacy dropped by 1% (from 14% to 13%). Students' performance in literacy was significantly influenced by a teacher strike that reduced the number of instructional days and potentially the quality of instruction by government school teachers. Rayuwa graduated many of its activities from the pilot villages prior to the start of the school year and strategically chose to support community-led efforts to get their education system back on track. Rayuwa is monitoring the efficacy of community-led efforts to secure a sustainable path for their education system and will support appropriately.

In the first expansion area, **the ratio of students performing poorly (scoring zero) declined marginally during the 2022 academic year – literacy (32% to 30%), numeracy (53% to 52%), agriculture (46% to 40%), and science and technology (51% to 48%)**. In 2023, Rayuwa anticipates substantial increases in learning outcomes as teachers become more practiced with enhanced pedagogic skills and introduce interactive learning approaches in their classrooms and the school-based management committees (SBMCs) play a greater role in improving school governance.

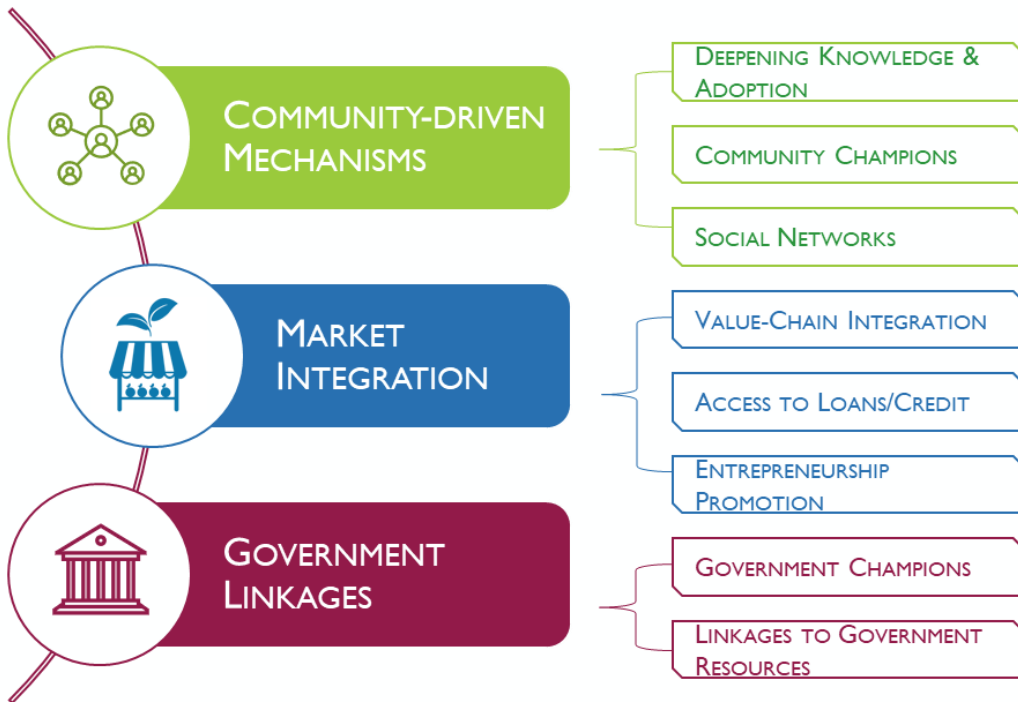


Rayuwa homeschooling class at Shukau

In tandem with the school-based reforms, Rayuwa implemented 16 home-schooling clusters within the communities to improve school enrollment. Managed by Community Education Workers (CEWs), the classes encourage, prepare and equip out-of-school children to enroll in the government schools. In 2022, **166 learners (72 boys and 94 girls) enrolled in their government school from the homeschooling classes**.

Finally, following the pilot in 2021 that resulted in 372 graduates (276 women and 96 men), the adult literacy program is working closely with female VSLA members who continue to be hungry for knowledge and opportunity to excel. **The 2022 adult literacy batch consists of 129 women learners enrolled in the 6 adult education centers established in the first expansion area**. They will graduate in 2023.

Sustaining Rayuwa's Impact



To further deepen the work in newly expanded communities and sustain the achievements across the project area, Rayuwa will embark on the 'Sustainable Graduation' phase over the next two and half years. In 2023 Rayuwa has set an ambitious goal to work with farmers in Kaduna state to reach its target of 12,000 farmers. The Sustainable Graduation strategy relies on three levers: (a) strengthening community-driven mechanisms that can sustain the Rayuwa-promoted practices without direct project support; (b) integrating communities with the market; and (c) fostering the relationship between communities and government agencies and service providers.

Rayuwa's sustainability is rooted in its commitment to delivering training and services that are in demand by and driven from the community - which increases the efficiency, effectiveness, and ownership of changes in agricultural and education practices. Additionally, champions of the Rayuwa initiatives both lead by example and take leadership on continuing to drive change locally. Such champions include the agriculture extension agents (formerly volunteer village extension agents), volunteer village extension agents (VEAs), the Lead Farmers, and the leaders of each of the farmer's cooperatives and unions. The Community Education Workers (CEWs) who are being supported in their transition to drive education income generating activities like private reading clubs, extra home lessons and now SBMC Focal leaders who will engage with schools and can provide induction training to new SBMC members.

The long-term sustainability of Rayuwa's impact also relies on integration of communities with the market. First, Rayuwa has improved farmers' access to credit through its partial loan guarantee scheme with Sterling Bank and farm input suppliers. Farmers cooperatives in the pilot villages are now equipped to independently continue these engagements. In 2023, Rayuwa will support an additional 3,200 farmers in the expansion areas to access loans for farm inputs. The team will organize, strengthen, and link the leaders of the farmer groups with Sterling Bank and Rayuwa's input supply partners. Second, Rayuwa will continue to promote market-based solutions to delivering services currently offered through the project. Fee-for-service providers, formerly volunteer extension agents (VEAs) and village savings and loans associations (VSLAs) field agents, will continue to establish businesses and networks with other value chain actors. The VSLAs, especially the women's groups, have proven to be self-sustaining. Third, to strengthen the value-chain, Rayuwa has worked with the leaders of farmers' cooperative to engage businesses with various agriculture value chain actors and secure off-taker contracts for staple crops like maize.

Rayuwa also strengthens farmers' linkages to relevant government and non-governmental agencies. It will continue to facilitate the identification of 'community patrons' from these agencies to access necessary mentoring support and information about existing or planned programs that could add value to further their socio-economic growth and development. Rayuwa will continue to bridge the gap between communities and local government service providers by acting as a catalyst for systems change.

Sustainable Development Goal #2



ZERO HUNGER

End hunger, achieve food security, improve nutrition, and promote sustainable agriculture.

NIGERIA AT A GLANCE

Nigeria ranks **103rd** out of 116 countries on the 2021 Global Hunger Index. While Nigeria makes up less than 3% of the world's total population, **3.8%** of the world's undernourished people live in Nigeria.

The proportion of the population living under moderate or severe food insecurity has risen from 36.5% in 2014-2016 to 57.7% in 2018-2020. In 2022, **17 million** Nigerians— **8%** of the population— experienced a food security crises or emergency.

In Katsina State, farming employs **75%** of the population. Agriculture is the primary source of income—yet **1.4 million** people (24% of the State's population) are food insecure.

One quarter of Nigerian households have one or more members who have migrated away from their rural homes to urban areas for employment and better living conditions.

“ *I am grateful to the Rayuwa project for helping us realize that farming is a business enterprise and that its processes should be documented to assert profits or losses.* ”

Mallam Garba Surago



Mallam Garba Surago's success continued in 2022 with booming farm yields, savings, and farm-based enterprise. Prior to 2019, 68-years-old Garba Surago and his family struggled against food insecurity. Through Rayuwa's trainings, he diversified his crops, adopted GAPs, and integrated new income-generating activities into to improve farm productivity and household income, food security, and resilience to shocks.

Since participating in Rayuwa activities, **his grain production has grown six times from 15 bags in 2019 to 95 bags in 2022.** He also introduced irrigation techniques for okra, millet, watermelon, pepper, potato, guava, and tiger nuts. To track this growth and expansion, Garba Surago operationalized record-keeping to document sales of farm produce and expenditures. **His household income has increased 10% since 2021.** These efforts continue to improve his family's sustainable food production and ensure access to safe, nutritious, and sufficient food.

Last year, Garba Surago led the organization of the first all-male Village Savings and Loan Association (VLSA) in his community. **This year, the VSLA generated ₦158,530 (\$365) in agricultural finance and inducted two new members.** In August, the VSLA conducted its third circle share-out of ₦290,500 (\$659), and everyone received ₦11,620 (\$26) on average. Most members use their payment to purchase inputs to prepare for the farming season and feed their families.



PROGRAM STRATEGY & IMPACT

Freedom from hunger is a human right. Hunger negatively impacts farmers' productivity, children's full participation in school, and community health. Rayuwa targets the food insecurity of smallholder farmers by transferring knowledge that increases household food supply of staple crops—sustainably.

Key objectives to eliminate the hunger season are:

- Increase agricultural productivity and profitability
- Increase farm-based household income
- Encourage the adoption of practices that build resiliency against climate shocks and are good for health and the environment
- Cultivate the next generation of farmers

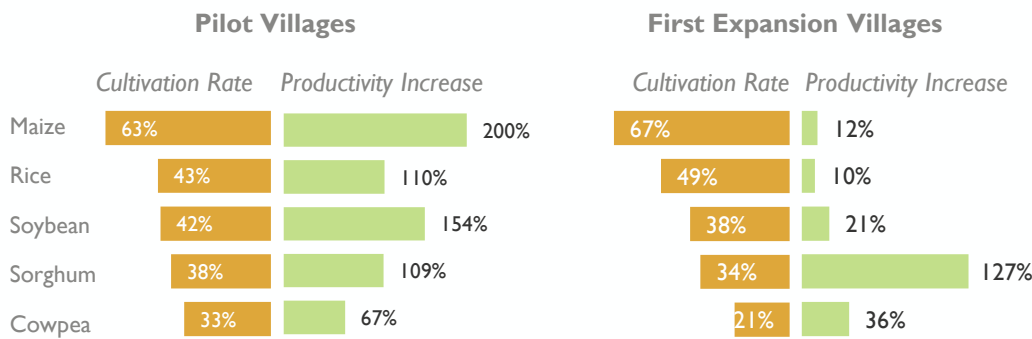
SDG TARGETS

In 2022, 74% of farmers in the pilot project area adopted good agricultural practices (GAP) such as plant spacing, improved fertilizer application methods, use of improved seed varieties, integrated pest and disease management, and crop rotation.



End hunger and ensure consistent access to safe, nutritious, and sufficient food supplies for all

Average Rate of Cultivation and Increase in Crop Productivity



Double smallholder farmers' agricultural productivity and incomes through land access, inputs, knowledge, financial services, markets, value-addition, and non-farm employment opportunities

The average productivity of staple crops has increased by 128% in the pilot villages and by 41% in the first expansion area, compared to baseline.



Ensure sustainable food production and implement good agricultural practices that increase productivity, boost production, maintain ecosystems, strengthen climate change resiliency, and improve land quality

Amidst rising food insecurity, in 2022 Rayuwa reduced the prevalence of the hunger season in the pilot project area to 33% - down from the 63% in 2019 and beating the target of 35%. In just one year, the hunger season reduced from 43% to 34% in the first expansion area.

Additional achievements include the following:

- Increased the combined average agricultural productivity of farmers in the pilot project area and first expansion area by 6% from 2021.
- Agricultural incomes of farmers from staple crops increased by an aggregate of 17% in the pilot project area and 28% in the first expansion area.



Leverage partnerships to increase investment in agriculture infrastructure, research, extension, and technology

Sustainable Development Goal #4



QUALITY EDUCATION

Ensure inclusive, equitable, and high-quality education and promote lifelong learning opportunities for all.



NIGERIA AT A GLANCE

One in five of the world's out-of-school children is in Nigeria.

Nigerian schoolchildren are only enrolled in the primary and secondary school system for **6.7 years**, on average. Boys stay in school for approximately 2 years longer than girls. **Only 38% of girls attend school.**

In 2021, following extended school closures due to the COVID-19 pandemic, school enrollment among Nigerian students aged 5-18 **fell by 6.9%**. For students 15 and older—who are no longer required to be in school—this reduction may be permanent.

The literacy rate in Katsina State is **32.6%**—it is rising, but still one of the lowest rates in the country.



Ahmed Sade

Ten-year-old Ahmed Sade attends Grade 5 and is the second eldest of eight siblings. Ahmed has dreamed of becoming a medical doctor to improve medical services in his community but struggled academically. He did not enjoy STEM and performed poorly in school.

Through its Accountable Education initiative, Rayuwa worked with Ahmed's teachers to enhance the content and delivery of the curriculum. Teachers used smart projectors and interactive methods to encourage fun in the classroom to enhance learning and the development of essential skills in reading and math. By participating in Rayuwa's remedial education program, Ahmed practiced his lessons in workbooks and used alphabet and multiplication charts and vocabulary lists to enhance his learning comprehension and retention.

Throughout the year, Ahmed flourished in the classroom with growing curiosity and academic agency. In 2018, Ahmed placed 8th in his class out of 136 students, scoring 70% in Math. **In 2022, he ranked 1st out of 134 classmates and improved his math score to 100%!**

Ahmed is a member of the school's quiz and debate club. He also loves to read and volunteers to read storybooks aloud to his classmates.

“ Mathematics and Basic Science are my favorite subjects because it makes me think faster. ”

PROGRAM STRATEGY & IMPACT

The education of the next generation of farmers is guided by the positive relationship between education and agricultural productivity and the belief that schools belong to their communities. Rayuwa works with key stakeholders of the local school system to ensure high-quality education is accessible and remains accessible beyond the lifetime of the project.

Rayuwa’s key objectives to enhance human capital are:

- Elevate the literacy and numeracy levels of all children to their assigned class level—including drop-outs
- Strategically reduce barriers to attending school and learning
- Increase the capacity and capability of community-based educators
- Strengthen the capacity and engagement of local governments, parents, teachers, and students to manage their schools effectively
- Support the holistic development of students—especially in critical thinking and through STEM

In 2022, Rayuwa partnered with 27 government schools, serving 44 villages (pilot and first expansion) and 8,590 students—48% of whom are girls. The second expansion are will scale literacy and numeracy activities to 17 new schools, with reporting beginning in 2023.

To sustainably cultivate the next generation of problem-solvers and innovators, Rayuwa worked with the schools to increase the quality of instruction by adopting participatory, engaging teaching approaches.

- Rayuwa equipped schools with teaching, learning materials and teaching aids to support teachers and enhance the effectiveness of instruction.
- 312 teachers were trained in effective class management and pedagogy in numeracy, literacy, and STEM as well as the use of teaching, learning materials.

Rayuwa worked with parents, community leaders, and the local government to increase the communities’ involvement in and accountability for the education system.

- Rayuwa developed a School-Based Management Committees (SBMCs) manual and trained SBMCs with it on the standardized roles and responsibilities of SBMC members as well as on management and coordination.
- To help SBMCs become financially independent, Rayuwa worked with SBMCs to start fruit orchards in each school. SBMC’s provided land for the orchard and Rayuwa contributed 100 fruit saplings.
- The SBMCs are also leading the engagement between Rayuwa, out-of-school-children and community leaders to encourage out-of-school children to participate in remedial education that prepares them to enroll in school.

Finally, the adult literacy and numeracy program launched its second cohort of 129 female learners. The program covers the equivalent of the first 6 years of primary school and equips farmers with the literacy and numeracy skills needed to understand farming concepts and practices—such as maintaining basic farm records, reading agriculture extension services flyers, and handling instructions on farm inputs such as fertilizers, seeds, and agrochemicals. **As with the pilot, women – especially VSLA members – are the most interested in the program and likely to experience the need to upskill in literacy and numeracy.** The 2022 cohort will graduate in 2023.

SDG TARGETS



Ensure that all girls and boys complete free, equitable, and quality primary and secondary education leading to relevant and effective learning outcomes



Ensure that all youth and a substantial proportion of adults, both men and women, achieve literacy and numeracy



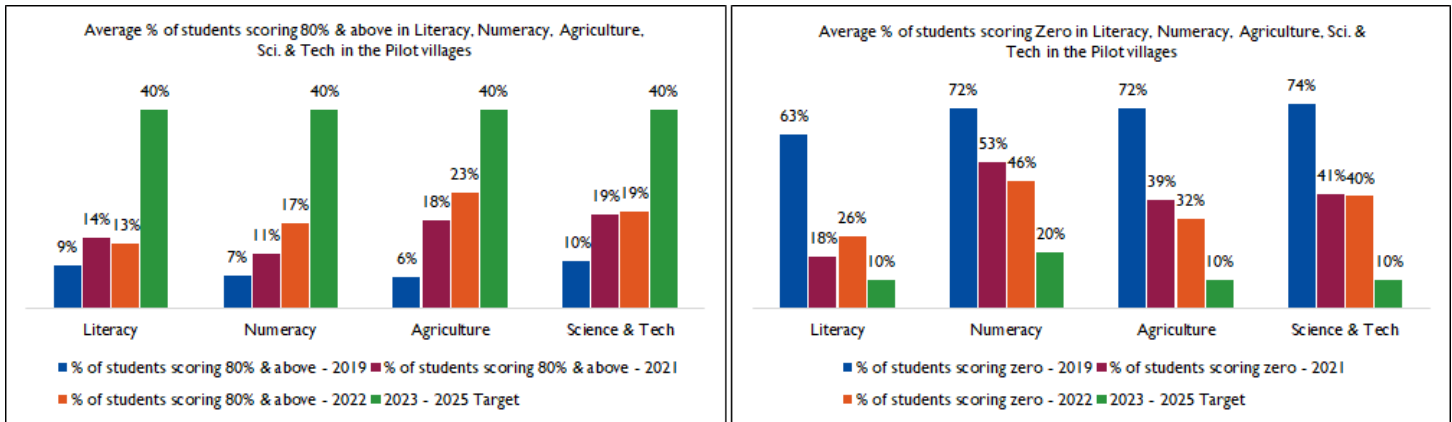
Substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship



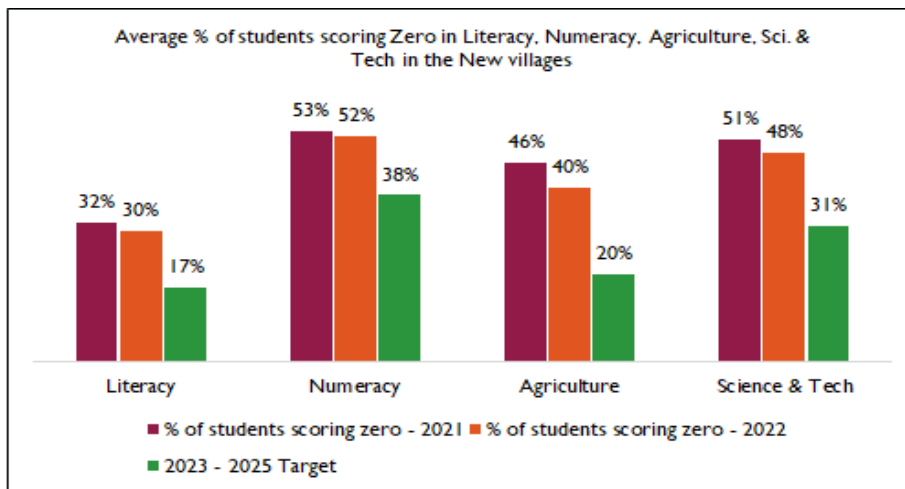
Upgrade education facilities to provide effective learning environments for all

PROGRAM STRATEGY & IMPACT

Amidst an acute shortage of government teachers, in the six pilot schools, the ratio of students scoring above 80% in numeracy and agriculture science increased between 2021 and 2022 — from 11% to 17% and from 18% to 23%, respectively. Performance in science and technology remained at par (19%) and literacy dropped by 1% (from 14% to 13%). Rayuwa is monitoring the efficacy of community-led efforts to secure a sustainable path for their education system and will support appropriately.



Schools in the first expansion area are demonstrating early signs of progress as Rayuwa works with teachers, SBMCs, parents, the government, and students to strengthen the education system. As a result, **the ratio of students performing poorly (scoring zero) declined marginally during the 2022 academic year – literacy (32% to 30%), numeracy (53% to 52%), agriculture (46% to 40%), and science and technology (51% to 48%).** In 2023, Rayuwa is driving for aggressive increases in learning outcomes as teachers become more practiced with enhanced pedagogic skills and introduce interactive learning approaches in their classrooms and the school-based management committees (SBMCs) play a greater role in improving school governance.



Sustainable Development Goal #5



GENDER EQUALITY

Achieve gender equality and empower all women and girls.

NIGERIA AT A GLANCE

Women make up **nearly half** of Nigeria's population, but **7 in 10** individuals living in extreme poverty (less than \$1.90 a day) in Nigeria are women.

Four out of every five workers in Nigeria's agricultural labor force are women, but women own less than **10%** of the country's land.

Only **32.6%** of women in Katsina State are literate, compared to **62.6%** of men.

In Nigeria, **the poverty rate for female-headed households** with less than a primary education was 34.72%, compared to 66.17% for male-headed households.

“I am grateful to the Rayuwa project for engineering my financial liberation and self-reliance. I can comfortably foot the family's bills without necessarily waiting on my husband.”

Martha Matthew



Martha Matthew is a 41-year-old farmer, entrepreneur, and mother of five living in Katsina state. In 2020, Martha participated in Rayuwa's GAP training and implemented the plant spacing and fertilizer application methods. **Martha's rice yield increased from 1.7 to 3.2 t/ha - an 88% increase - in just one year.**

Last year, Martha attended adult education courses in numeracy and literacy and now believes education is an essential right for every child. **Martha recently enrolled her granddaughter in school and pays all expenses**, while two of her daughters attend higher education institutions.

In 2022, Martha received a ₦20,000 (\$70) loan for her fabric business from her Village Savings & Loans Association (VSLA), which was formed through the Rayuwa project. Previously, she could only buy and sell 20 pieces of fabric at a time. With the additional access to capital, **Martha now stocks over 100 pieces of fabric and has since added shoes to her retail shop. She repaid her loan in only four weeks and turns a monthly profit of \$42.** Her increased income has generated enough cash-flow that she no longer requires bank loans facilitated through Rayuwa's Inputs on Credit Scheme (ICS) – demonstrating her sustainable graduation from the ICS intervention of the project.

Martha describes Rayuwa's holistic partnership approach as "the perfect kind of change that we want for the community."



PROGRAM STRATEGY & IMPACT

Integral to improving agricultural resiliency and accountable education systems is the full and equitable participation of women. Rayuwa works with all stakeholders in the project area to identify and implement locally appropriate solutions that ensure men and women have equal access to opportunity.

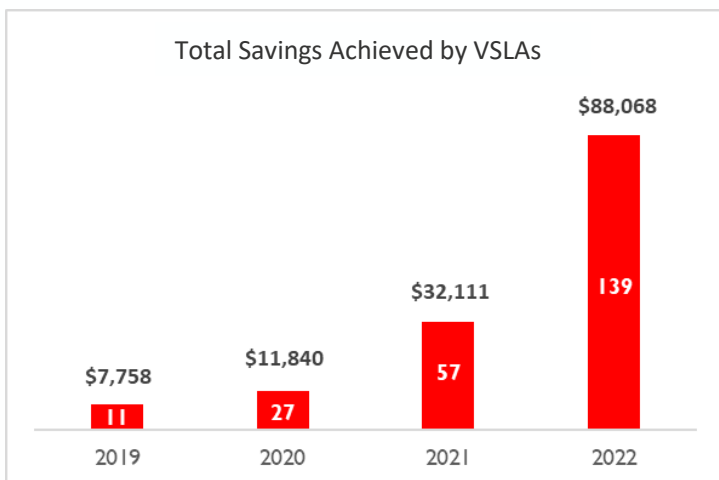
Rayuwa's gender equality strategy is founded on three key principles. The team endeavors to:

- Understand the different knowledge levels, needs, priorities, challenges, and opportunities of various stakeholders
- Consistently employ a participatory and iterative approach to address the root causes of relevant gender-related disparities
- Staff the program appropriately to ensure the project is equipped to integrate gender inclusive practices

Key results of Rayuwa's commitment to narrow the gender gap and consciously target and customize activities that enable full and effective participation in the first expansion area include:

- **37% of women farmers** (1,645) trained in GAP
- **35% of women farmers** (1,131) engaged in a farmer cooperative
- **9% of farmers** (80) who participated in the input-on-credit scheme are women
- **14%, 8.9%, and 15.4% of female students score over 80%** in literacy (Hausa and English), numeracy, and science and technology, respectively

To increase household's access to micro-finance and reduce their vulnerability to shocks, Rayuwa trained women to form and manage VSLAs.



In 2019, 11 VSLAs—with 324 members—saved \$7,758.

In 2020, 27 VSLAs with 661 members saved \$11,840—despite the economic shock of COVID-19.

In 2021, 57 VSLAs in pilot area and 35 in the first expansion area, with total membership of 2,270 saved \$32,111.

In 2022, 139 VSLAs (129 female VSLAs and 10 male VSLAs) with total membership of 5,719 saved \$88,068



Enhance the use of enabling technology, in particular information and communications technology, to promote the empowerment of women



Ensure women's full and effective participation and equal opportunities for leadership at all levels of decision making in political, economic and public life

Women's economic empowerment is known to contribute to the economic development of households and communities. However, women in northern Nigeria often experience barriers to ownership of assets, such as land, and may face cultural barriers, such as restrictions on their mobility outside their homes. To address this inequity, Rayuwa invests in training women to start and manage household- and farm-based micro-enterprises through the Household Income Diversification (HHID) program. This program ensures that women who want to own a business and generate income for themselves and their families, regardless of their culture, are able to pursue their ambition.

Rayuwa recorded a significant increase in household income generation activities among women in 2022:

- **27 new businesses** were started and 60 existing businesses were upgraded in the pilot villages
- **115 new businesses** were started and 35 existing businesses were upgraded in the first expansion area.

SDG TARGETS

Sustainable Development Goal #8



DECENT WORK & ECONOMIC GROWTH

Promote sustained, inclusive, and sustainable economic growth; full and productive employment; and decent work for all.



NIGERIA AT A GLANCE

52% of Nigeria's rural population live below the national poverty line, compared **18%** of the urban population.

8% of Nigerians are unemployed and youth unemployment (aged 15 to 24) is **14%**. The workforce participation rate for adult women is **10%** lower than the rate for adult men.

In Katsina State, unemployment is **25%**.

35% of the Nigerian workforce is employed in the agriculture sector, with crop production making up **94%** of all agriculture-based economic activity.

“We were so happy with the advent of Rayuwa and we accepted the interventions. The program brought us great joy because it came when we were suffering and experiencing hardship in our livelihoods, but through the intervention and support, we were able to ease the hardships and improve our livelihoods. ”

Rahila Abdu

Rahila Abdul, age 26, aspired to become an entrepreneur to support her parents financially, but she lacked mentorship and start-up capital. An entrepreneur's journey can be difficult at any age, but "training a girl-child through school is not advisable in this part of the world," she explained. In 2019, Rahila joined the Rayuwa team as a field agent (FA) to facilitate the formation and expansion of VSLAs.

As a FA, Rahila was trained in household income diversification and how to track VSLA savings and loan records, conduct share-outs, and draft constitutions and bylaws. With her newly acquired knowledge, she helped women in her community start six VSLAs within a year.

Rahila also joined a VSLA and took a ₦50,000 (\$113) loan to start her business. What was initially a local liquid soap and body cream business quickly expanded to include insecticides, air fresheners, and hair creams in neighboring villages. **She has mentored 12 women in micro-business and facilitated Rayuwa training sessions for 60 others.**

Rahila continues to pursue her dream of being an entrepreneur. **In 2022, she earned \$266 in profit and purchased a sewing machine to try and diversify her business. She also rented a 0.0054Ha plot of land for ₦20,000 (\$45) to plant maize, cowpea, and sorghum.** Rahila's feats, regardless of gender, are extraordinary. But in northern Nigeria, where cultural norms often discourage or prohibit women from accessing land or working outside their home, Rahila's accomplishments chart a new course of inclusive and sustainable economic growth for all.



PROGRAM STRATEGY & IMPACT

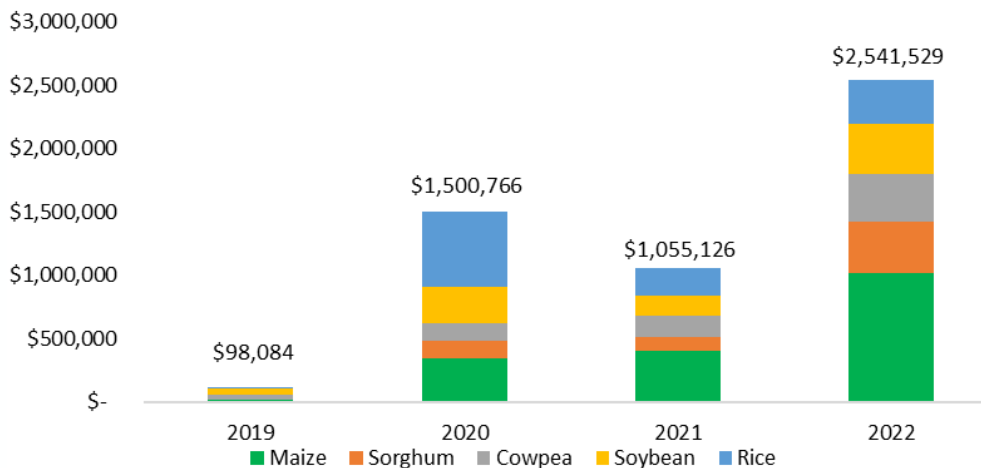
Increasing the profitability, resilience, and efficiency of smallholder farmers is essential to achieving an economically stable, food secure, inclusive, and prosperous Nigeria. Rayuwa builds the capacity of farmers to improve farming methods, increase the yields of their farms, effectively manage their farms as a business, and enhance the resilience of their farms to weather, biological, economic, and other external shocks.

Rayuwa's key objectives to ensuring farming is a pathway to prosperity are:

- Strengthen current sources of agricultural income, reduce income volatility and its vulnerability to shocks, and maximize the productivity of agriculture-based income through enhanced cultivation of irrigated and rainfed crops, crop diversification, and strategic integration of resilient and high-value crops.
- Integrate cross-cutting themes of financial management; market linkages to inputs, agricultural technologies, finance; environment and climate; and collaboration with government.

Amidst market volatility, climate shocks, such as floods, and regional insecurity, farmers from the pilot and first expansion villages generated \$2,541,530 of net income from maize, rice, sorghum, cowpea, and soybean in 2022.

Increase in Income from Staple Crops



Achieve higher levels of economic productivity through diversification, technological upgrading and innovation



Achieve full and productive employment and decent work for all women and men and substantially reduce the proportion of youth not in employment, education or training



A farmer in the Rayuwa project area adopting a power-ridger

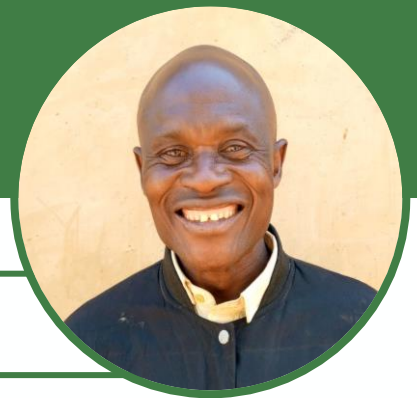
To reduce drudgery on the farm, in late 2019, Rayuwa introduced micro-mechanization equipment including a multipurpose grain thresher, rolling injector hand-powered seed planter, power tiller, and power weeder to farmers in the pilot project area.

- Rayuwa helped 166 youth form groups. Working as a micro-enterprise, the groups supply micro-mechanization services to their communities.
- In 2022, through the smart-subsidy initiative, 12 farmers (8 male and 4 female) obtained farmer drudgery reduction machines and offer services to other farmers for a fee, to generate additional income.
- To further increase farmers' access to technology, the Rayuwa team has established linkage agreement with machine suppliers to guarantee price discounts for farmers from the communities.



CLIMATE ACTION

Take urgent action to combat climate change and its impacts.



NIGERIA AT A GLANCE

Soil degradation and desertification have eroded 35% of Nigeria's landmass and threatened the livelihoods of 40 million Nigerians.

A 2020 study of Katsina State found **70%** of surveyed residents reported losses in the size and quality of agricultural land due to erosion and poor soil fertility. **56%** of respondents suffered reduced livestock productivity, **70%** experienced increased pest and livestock disease incidence, **61%** faced higher crop production costs, and **39%** experienced mounting farmer poverty.

“*The Rayuwa project upgraded my farming system from crude farming methodologies to an improved farming system that has shut out poverty from my family due to yearly improvements in yield.*”

Musa Lawal

Musa Lawal, age 47, continues to make giant strides in his agricultural endeavors with his family. For 30 years, Musa has farmed maize, rice, cowpea, and soybeans on 4 ha of land. Due to poor soil quality, Musa invested heavily in fertilizers while his yields remained low, and his household experienced “hunger season” almost every year.

Since 2020, he has been practicing the good agricultural practices (GAP) introduced by Rayuwa, which has resulted in surplus of food year after year. In 2022, he continued to practice various GAP, including the deep placement fertilizer method, improved seed varieties, efficiency-boosting and drudgery-reducing mechanized farm equipment, and compost from organic kitchen waste. He also utilizes the e-extension weather advisory messages sent by Rayuwa to plan farming operations and specific farming activities.

He has supported and taught other farmers to adopt GAP. He also voluntarily opted out of the input-on-credit scheme (ICS) this year because he has enough money to buy inputs for the farming season and wants other farmers to benefit from the opportunities available through the ICS program. The additional disposable income has enabled him to purchase two motorcycles and send his two children to university.

PROGRAM STRATEGY & IMPACT

The next generation of farmers will inherit dramatically different resources and conditions from their parents. Rayuwa integrates climate-smart agricultural practices into its trainings to ensure smallholder farmers are equipped to mitigate and adapt to climate change while sustainably increasing farm yields and profitability.

Key objectives to safeguard current and future generations of farmers are:

- Increase the adoption of climate-sensitive good agricultural practices such as water and soil management, integrated pest management, efficient land use, intercropping, and diversifying cropping systems to include short- and long-term high-value and resilient crops.
- Increase access to information that assists farmers to anticipate and navigate climate shocks and safety net mechanisms—such as crop insurance—to mitigate the impact of climate shocks.
- Cultivate greater environmental awareness by integrating environmental science into school curricula.

SDG TARGETS

Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters

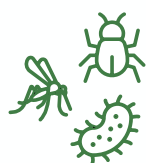
Improve education and awareness-raising on climate change mitigation, adaptation, impact reduction, and early warning

Combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world

Soil degradation and desertification are expected to worsen in Nigeria, increasing food insecurity and demographic displacement in 11 “frontline” states that are dependent on land resources—including Katsina State. To build farmer and community resilience to mounting climate shocks, Rayuwa promotes the adoption of climate-smart agriculture through training, demonstrations, and technological up-skilling.

Through its Inputs-on-Credit Scheme (ICS), in 2022 Rayuwa facilitated access to drought tolerant, high-yield crop seeds for 1200 farmers (80% male and 20% female)—a 62% increase from the 740 farmers who participated in the scheme in 2021. The ICS also includes crop insurance and climate information to mitigate the effect of climate shocks.

Farmers in the pilot villages are increasingly applying climate-smart agricultural practices:



75%

of farmers practice **integrated pest and disease management**



89%

of farmers practice **soil management**



73%

of farmers adopted the use of **early maturing, heat and drought tolerant seed varieties**

Through its partnership with the Nigerian Meteorological Agency, Rayuwa is disseminating climate information to farmers. Rayuwa translates the Agency’s relevant weather information into Hausa and rebroadcasts it to farmers in the Rayuwa project area.



Sustainable Development Goal #17

PARTNERSHIPS FOR THE GOALS

Strengthen the means of implementation and revitalize global partnerships for sustainable development.



TRANSLATING PURPOSE INTO PRACTICE

Farmer Cooperatives

Rayuwa’s strong commitment to partnership lays the foundation of trust, transparency, and community ownership that has been critical to the program’s success to date, and for its expansion into new communities this year.

“While there is certainly a sense of urgency to work with Nigeria’s farmers to secure nourishment and food and growth and all the things that they will need, there’s also an awareness that it will take time, and that John Deere is in it for the long haul.”

—Nate Clark,
President of the John Deere Foundation

“For our cooperative group, the partnership with Basamukh Seed Company, facilitated by Rayuwa, has enabled us to access quality seeds inputs to improve crop yields – thanks to the Rayuwa team!”

—Ibrahim Ishaku,
Apex leader cooperative chairman

Rayuwa aims to catalyze partnerships in service of smallholder farmers. Smallholder farmers are often considered ‘high risk’ clients by key actors in the agricultural value chain, including banks, seed and fertilizer suppliers, and off-take markets. Their remote location, small and fragmented farm operations, and low literacy levels further result in their limited access to information on innovative production practices, agricultural finance, and markets.

Rayuwa views farmer cooperatives as a sustainable platform for partnership – to democratically and effectively organize farmers so that they can collectively access critical services and products that enhance productivity and promote farm commercialization.

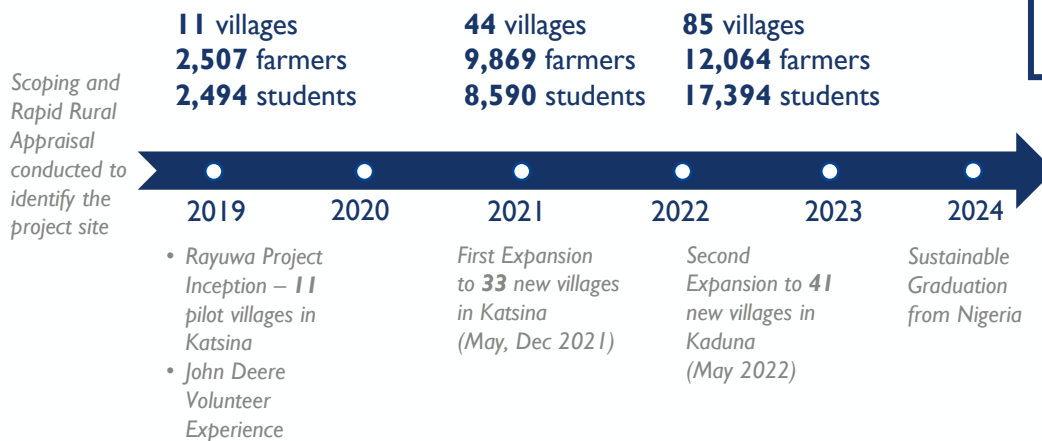
In 2022, Rayuwa helped farmers in the first expansion area form and formalize **167 farmer cooperatives and 3 Farmer’s Unions** and worked with the leaders of the **82 cooperatives and 5 Unions in the pilot villages** to complete their sustainability targets.

Through training and mentoring on group dynamics, leadership and advocacy, negotiation, and marketing skills, cooperatives develop the management structures and skills necessary to negotiate and transact business with banks, input suppliers, and produce off-takers without assistance. The project continues to link these groups with relevant government agencies to receive the support that will help them to continue to thrive.



PROGRAM STRATEGY & IMPACT

Distinct from many philanthropic or development initiatives, Rayuwa embodies equitable and inclusive collaboration between the John Deere Foundation, PYXERA Global, the communities, the Government of Nigeria, and other strategic partners that strengthen the enabling environment. By consciously weaving together these robust partnerships, Rayuwa has grown from 11 villages to 85—and is equipped to support the smallholder farmers of today and tomorrow improve their lives and livelihoods.



SDG TARGETS



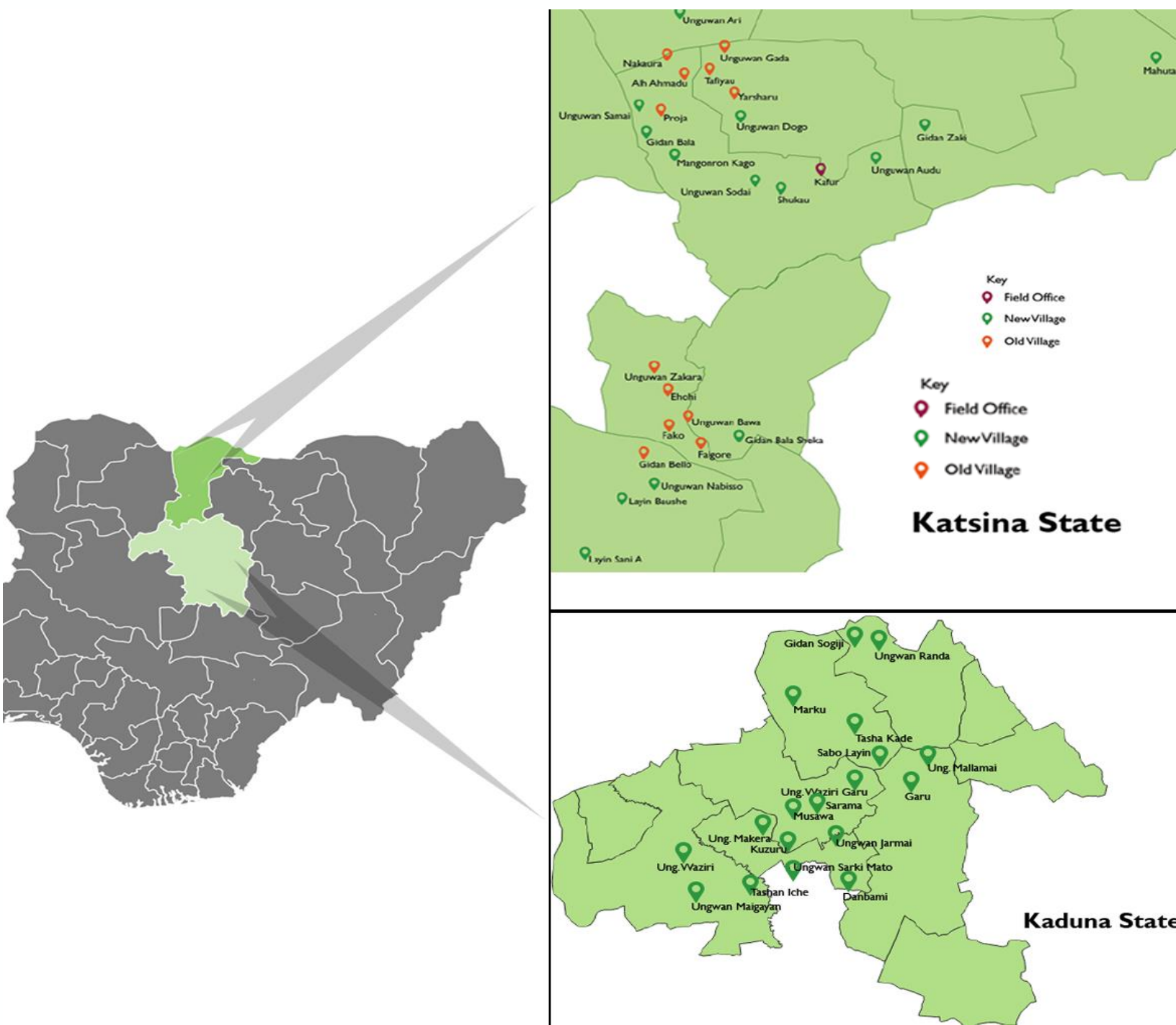
Encourage and promote effective public, public-private, and civil society partnerships, building on the experience and resourcing strategies of cross-sector and multi-stakeholder partnerships to mobilize and share knowledge, expertise, technology and financial resources

- **Continued working with government agricultural agencies** KATARDA and Katsina State Ministry for Agriculture and Rural Development. Partnered with the Kaduna State government for Rayuwa's expansion into Kaduna State.
- **Partnered with Sterling Bank to disburse agricultural loans** valued at N204 million (approximately \$480,000) to 1200 farmers – a more than 50% increase in disbursements in 2021 (\$221,601 to 704 farmers), while achieving a **repayment rate of 95%**.
- **Formed linkages between farmer cooperatives or farmer unions and input suppliers to enhance access to farm inputs:**
 - Established offtake agreements between two farmers' unions and Hybrid Feeds for 250 metric tons of maize.
 - Facilitated the supply of 215 metric tons of NPK fertilizer from Flour Mills Golden Penny amidst supply chain shocks
 - Fostered the relationship between cooperatives and seed suppliers, resulting in the supply of 14.1 metric tons of maize and 16.4 tons of rice seeds from Basamukh Seeds for the 2022 rainy season production.
- **Secured a linkage agreement with machine suppliers** to guarantee price discounts for participating farmers.
- **Strengthened School-based Management Committees**, with 177 SBMC officials (142 males and 37 females) representing 41% of current SBMC leadership across 27 schools participating in the first phase of capacity enhancement training.
- **Partnered with 27 government schools and 405 government teachers** while building a network of 25 community education workers (CEWs) in Katsina State.

Appendix A

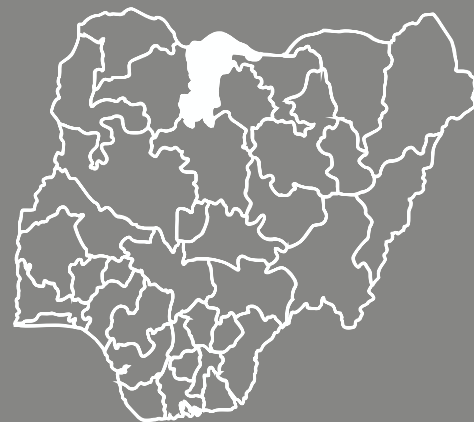
Map of Project Area

Since its inception, Rayuwa has leveraged the lessons and trust cultivated with the communities in the initial 11 villages in Katsina State (“Pilot Area”) to inform and iterate its expansion across 33 new villages in Katsina State (“First Expansion Area”) and 41 new villages in Kaduna State (“Second Expansion Area”).



Appendix B

Smallholder Farmer Classification



The concept of identifying and classifying farmers by economic status is to support the appropriate targeting of Rayuwa’s intervention for farming households as they transition through the pathway to prosperity and resilience.

Class	Hyper-Subsistence Farmer	Subsistence Farmer	Beginner Farmer	Resilient Farmer
Description	<ul style="list-style-type: none"> Manual cultivation. Does not own cattle to cultivate land. Highly vulnerable to fluctuations in weather Hunger season is >1 month/year Hunger season occurs each year Farm does not produce a surplus. The farmer is not connected to the market All family members work the farm. If children are enrolled in school, attendance is low, especially during planting and harvest seasons 	<ul style="list-style-type: none"> Manual cultivation. Owns cattle and uses livestock to cultivate land Moderately vulnerable to climate, bio, and market fluctuations Hunger season is <1 month/year and is <i>not</i> a consistent threat Farm produces a surplus. The farmer has some market connectivity. All family members work the farm. Children likely attend school, with attendance variable during planting and harvest seasons 	<ul style="list-style-type: none"> At least 1 tractor service is financially feasible Low vulnerability to climate, bio, and market fluctuations Hunger season may occur during extreme circumstances fluctuations. Duration is well below 1 month/year Farming family is engaged in some valorization activities Farmer is connected the market Children attend school, with some variability in attendance to support the farm 	<ul style="list-style-type: none"> Farm productivity is stable and robust. Farmer regularly hires at least 1 tractor service per year Resilient to climate, bio, and market fluctuations Strong market connectivity. Farmer buys inputs and sells surplus crops Valorization activities are integrated into post-harvest management Children attend school, with no need to miss classes to help with planting and harvesting
Services	<ul style="list-style-type: none"> Increase production with a focus on food and nutrition security 	<ul style="list-style-type: none"> Increase production Financial literacy and inclusion Basic mechanization services Farmer aggregation and farm clustering Enterprise diversification 	<ul style="list-style-type: none"> Increase production Financial literacy and inclusion Basic mechanization services Farmer aggregation and farm clustering Enterprise diversification Increased market engagement (commercialization) 	<ul style="list-style-type: none"> Increase production Financial literacy and inclusion Basic mechanization services Farmer aggregation and farm clustering Enterprise diversification Full market engagement (commercialization) Post-harvest processing (value addition)

Appendix C

Citations



- Babura, Bashir & Isah, Saheed & Chamo, A. (2017). [Role of Smallholder Farmers in Nigeria's Food Security](#). United Nations Development Program (2020). [Human Development Report 2020 \(The Next Frontier: Human Development and the Anthropocene Briefing Note for Countries on the 2020 Human Development Report—Nigeria\)](#). Global Network Against Food Crises, Food Security Information Network, and United Nations World Food Program (2021). [2021 Global Report on Food Crises: Joint Analysis for Better Decisions](#).
- UNICEF (September 15, 2021). [First day of school 'indefinitely postponed' for at least 1 million Nigerian students: UNICEF joins global call and 'digital freeze' to urge children's access to education](#).
- Toussaint, Kristin for *Fast Company* (May 04, 2021). [How John Deere is teaching small farmers better agricultural techniques to end 'hunger season'](#).
- E.M. Okon, B.M. Falana, S.O. Solaja, S.O. Yakubu, O.O. Alabi, B.T. Okikiola, T.E. Awe, B.T. Adesina, B.E. Tokula, A.K. Kipchumba & A.B. Edeme (2021). [Systematic review of climate change impact research in Nigeria: implication for sustainable development](#), *Heliyon*, Volume 7, Issue 9, 2021, e07941, ISSN 2405-8440. <https://doi.org/10.1016/j.heliyon.2021.e07941>
- Funmilayo F. Ilesanmi, Olayinka S. Ilesanmi & Aanuoluwapo A. Afolabi (2021). [The effects of the COVID-19 pandemic on food losses in the agricultural value chains in Africa: The Nigerian case study](#), *Public Health in Practice*, Volume 2, 2021, 100087, ISSN 2666-5352. <https://doi.org/10.1016/j.puhip.2021.100087>.
- Civil Resource Development and Documentation Centre and The Valyrian Group (2015). [Strengthening Existing and Emerging Women Mobilisation Platforms and Small Holder Women Farmers; Association in Nigeria \(Women Lead Agriculture in Nigeria\)](#)
- Food and Agriculture Organisation of the United Nations (2019). [Gender and Land Rights Database: Gender and Land Statistics](#)
- Munn, E. & Campbell, J. for the Council on Foreign Relations (April 10, 2019). [Ensuring Women's Land Rights in Nigeria Can Mitigate Effects of Climate Change](#).
- Murtala, A. M, Arokoyu, S. B., Weli., V. E. (January 31, 2020). [Perception of Climate Change and Its Effects on Rural Livelihood in Katsina State, Nigeria](#), *Journal of Natural Sciences Research*, Volume 10, No. 2, ISSN 2224-3186 (Paper), ISSN 2225-0921 (Online), DOI: 10.7176/JNSR/10-2-04.
- Global Hunger Index: [Nigeria](#) (2021).
- The Guardian (November 8, 2021). [Nearly 17 mln Nigerians face food insecurity](#).
- World Food Programme (February 2021). [Essential Needs and Nutrition Analysis – Northwest Nigeria \(Zamfara, Sokoto, Katsina\)](#).
- Katsina State Government (2016). [Katsina State Investor's Handbook](#).
- Food and Agriculture Organization of the United Nations (2017). [Evidence on internal and international migration patterns in selected African countries](#).
- UNICEF: Nigeria (2017). [The Challenge: One in every five of the world's out-of-school children is in Nigeria](#).
- MacroTrends. [Nigeria Literacy Rate 1991-2022](#).
- UN Women (2020). [Women Count: Nigeria: Gender data gaps and country performance](#).
- World Economic Forum (March 2021). [Global Gender Gap Report 2021](#).
- Runde, Daniel, Savoy, Conor & Staguhn, Janina. Center for Strategic & International Studies (July 7, 2021). [Supporting Small and Medium Enterprises in Sub-Saharan Africa through Blended Finance](#).
- Feed the Future, ISF, MasterCard Foundation, Rural & Agricultural Finance Learning Lab (November 2019). [Pathways to Prosperity: Rural and Agricultural Finance, State of the Sector Report](#).