INSPIRE

Resilience for Systems (R4S) Study Report

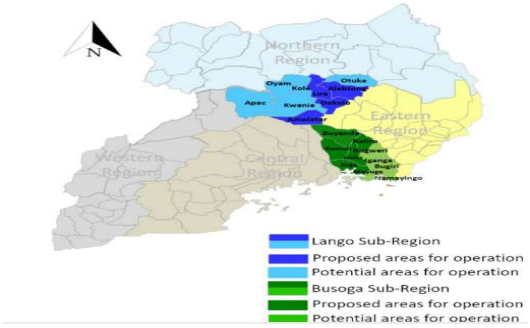
GOAL IN PARTNERSHIP WITH WAGENINGEN ENVIRONMENTAL RESEARCH.

TECHNICAL PARTNERS
AGRITERRA, RESILIENCE BV

IMPLEMENTATION AREA
LANGO AND BUSOGA SUB-REGIONS

BUDGET
30 MILLION EURO

MAP OF UGANDA SHOWING POTENTIAL AND PROPOSED DISTRICTS OF IMPLEMENTATION



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ACRYNOMS

A2N	Africa 2000 Network
ACODE	Advocates Coalition for Development and Environment
FAO	Food for Agricultural Organisation
FINASP	Facilitation for Innovation and Sustainable Productivity
FNS	Food and Nutrition Security
FS	Farming System
GBV	Gender Based Violence
HHs	Households
INSPIRE	Integrated & Sustainable Production for Inclusive and Resilient Economies
ISSD	Integrated Seed Sector Development
MEL	Monitoring, Evaluation, and learning
NEMA	Natural Environmental Management Authority
PPI	Poverty Probability Index
R4S	Resilience for Systems
SHF	Small Holders Farmers
UBOS	Uganda Bureau of Statistics
UN	United Nations
VEDCO	Volunteers Efforts for Development Concerns
VSLA	Village Savings and Loans Association

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EXECUTIVE SUMMARY

According to GOAL, Resilience refers to the ability of communities and households within the complex system to anticipate and adapt to risk, and to absorb, respond and recover from shocks and stresses in a timely and effective manner without compromising their long-term prospects, ultimately improving their well-being. The Resilience for Systems (R4S) assessment under the INSPIRE project evaluated the social, economic, and environmental resilience of smallholder farmers across eight districts in Uganda's Lango and Busoga sub-regions. Using a composite resilience index and the Poverty Probability Index (PPI), the study measured farmers' resilience and poverty status to inform baseline and program focus. A quantitative, cross-sectional approach was used to capture data of household and community resilience scores. To determine the level of HH resilience, the scores were categorized as High Resilience, Medium Resilience, or Low Resilience. A total of 169 HHs were interviewed with 95% confidence level and ±5% margin of error. The findings are summarized below.

Overall findings

- The composite resilience index assessed in all three regions spanning social, economic and environmental resilience reveals that 85% of households are less resilient with an average score of 4.6.
- Among these 69% fall into the medium resilience category and 16% are highly vulnerable ranking in the low resilience category. Only 15% of the households in the region demonstrate high resilience.
- Gender disparities are prevalent across all dimensions, with women consistently underrepresented in the high resilience category.
- The data show that perennial farming systems are more resilient, compared to annual oilseeds/legumes farming systems.

Economic Resilience.

- In terms of the different resilience dimensions, the findings indicate that economic resilience is relatively strong, with 72% of households in the high category while social and environmental resilience lag behind.
- The households (HHs) scored poorly on income levels and access to credit. The data further indicates that these HHs rely on limited and vulnerable income sources, primarily casual labor, informal employment, and subsistence farming.

Social Resilience

- Over half (53%) of the farmers were categorized as having low social resilience, reflecting vulnerability to social support services like health, psychosocial support, child protection and GBV responses especially within Cereals-Oilseeds farming systems.
- Social resilience showed moderate scores, with significant disparities between genders and farming systems, highlighting ongoing issues of exclusion and access to support networks.

Environmental Resilience

- The average environmental resilience score stood at 5.9 with 92% of the households indicating medium or low resilience.
- The main factors contributing to this are the low level of participation in Environmental Groups or Activities (planting trees and riverbank protection), limited training and action on environmental protection and poor waste and water management
- Cereals-Oilseeds perform poorly, with 75% of farmers in the low category, indicating a higher exposure to environmental degradation or limited training and action on environmentally sustainable practices.

Poverty Probability Index (PPI)

Poverty Probability Index (PPI) data showed that 34% of households are likely living below the $1.25/day/person poverty line, and 80.5% below $2.50/day/person, confirming widespread economic vulnerability.

Indicators of interest

Project impact	Indicators	Baseline	Targets
SHFs increased income and developed resilient livelihoods	% of targeted SHF households who progressively realize a living income ***(FNS B.1.1)***	34%	46%
	# and % of SHF households whose livelihoods are more resilient to shocks ***(FNS B.1.4)***	15%	100,000 (50%)

Conclusion

The composite resilience index shows most smallholder farmers fall in the medium resilience category (only 15% achieve high resilience), with Perennial and Cereals-Legumes systems outperforming Cereals-Oilseeds systems, and the Lango region lagging behind Busoga. Gender analysis reveals women disproportionately occupy low/medium resilience categories, reflecting unequal access to economic opportunities, social capital, and environmental resources. Poverty data (PPI) underscores this vulnerability: 34% of households live below $1.25/day and 80% below $2.50/day, with female-headed households and Lango region facing the highest risks, this aligns closely with the resilience trends.

1.0 PROJECT OVERVIEW

The INSPIRE project, funded by the Embassy of the Kingdom of the Netherlands, aims to enhance climate-resilient and market-oriented agriculture for 240,000 smallholder farmers (SHFs) across nine districts in Uganda's Busoga and Lango regions. Implemented by GOAL Uganda with partners (Wageningen University, Resilience Uganda, and Agriterra), the project focuses on four pathways: inclusive decision-making, sustainable farming systems, market participation, and farmer advocacy.

- Pathway 1: Focuses on inclusive household & community decision-making and action.
- Pathway 2: Focuses on ensuring SHF farming systems are more sustainable, productive, and resilient to shocks.
- Pathway 3: Focuses on SHF actively participating and benefiting in inclusive markets.
- Pathway 4: Ensures SHF have enhanced voice and influence to address market system issues.

INSPIRE aims to contribute to "increased income and livelihood resilience of SHF to climate change and market failures". The consortium will implement the program in Alebtong, Lira rural, Amolatar and Dokolo (Lango region) and Kamuli, Buyende, Kaliro, Luuka and Jinja rural (Busoga region), working with, and through, local partners, VEDCO, FINASP and A2N, with ISSD and East West Seed Knowledge Transfer providing technical expertise.

1.1 CONTEXTAUL BACKGROUND

The baseline report highlights existing conditions, gaps and opportunities that informed program delivery and adaptation. It was noted that both Lango and Busoga subregions face significant economic hardships driven by reliance on subsistence agriculture, limited market access, and inadequate infrastructure. In Lango, smallholder farmers experience fluctuating incomes due to low productivity, poor market linkages, and limited diversification opportunities (World Bank, 2020). Busoga similarly struggles with poverty levels above the national average, constrained by limited employment opportunities outside agriculture and weak value chains for staple crops (UBOS, 2021). Seasonal unemployment and income instability exacerbate household vulnerabilities, impacting food security and overall resilience.

Additionally, environmental degradation and climate variability pose serious threats in both regions. Lango is vulnerable to recurrent droughts and erratic rainfall patterns that undermine agricultural productivity and water availability (FAO, 2019). Additionally, soil erosion and deforestation have degraded land quality, further constraining farming activities (NEMA, 2020). Busoga faces frequent flooding, especially around Lake Victoria's shores, leading to loss of crops, livestock, and displacement (Oxfam, 2018). Environmental shocks reduce the capacity of households to cope and recover, directly affecting their resilience.

Nevertheless, social issues such as limited access to quality education and healthcare services persist in both regions, undermining human capital development. Gender disparities remain prominent, with women and youth often marginalized from decision-

making processes and access to resources (UN Women, 2022). In Lango, post-conflict recovery challenges continue to affect social cohesion and community structures (International Alert, 2017). Busoga also experiences challenges related to land tenure insecurity, which fuels conflicts and inhibits investment in productive activities (ACODE, 2019). Social exclusion and weak institutional support further hinder community resilience.

1.2 RATIONALE OF THE STUDY

Building resilient communities is central to the success of the INSPIRE project, which aims to strengthen the ability of households and communities to withstand, adapt to, and recover from a range of shocks and stresses, be economic, environmental, or social. Given the complex and interconnected nature of resilience, it was essential to employ a comprehensive assessment that captures the multiple dimensions influencing resilience capacity across diverse contexts within the project's operational areas.

A robust resilience assessment provides a critical evidence base to understand these dynamics, identify disparities in adaptive capacity, and guide context-specific programming to enhance resilience outcomes. By measuring key resilience indicators across economic, environmental, and social domains, the assessment illuminates both strengths and vulnerabilities at household and community levels.

To complement this analysis, the inclusion of the Poverty Probability Index (PPI) is vital. The PPI offers a statistically validated tool for estimating the likelihood that a household is living below the poverty line, based on simple and cost-effective survey questions. Integrating PPI data with resilience indicators allows for a nuanced understanding of how poverty intersects with resilience capacities and vulnerabilities. This integration enables the INSPIRE project to better identify and prioritize support for the most vulnerable households who may face compounded risks.

Overall, resilience assessment, enriched by PPI insights, served as a foundational tool for adaptive programming, enabling more effective targeting, resource allocation, and evidence-based decision-making. It also enhances the project's monitoring, evaluation, and learning (MEL) framework by providing baseline and longitudinal data to track changes in resilience status over time. This comprehensive approach supports the INSPIRE project's goal of fostering sustainable, inclusive, and resilient communities capable of thriving amid uncertainty.

1.3 OBJECTIVES OF THE STUDY

1.3.1 GENERAL OBJECTIVE

To assess the overall resilience of households and communities within the INSPIRE project implementation areas by measuring their capacity to anticipate, absorb, adapt to, and recover from economic, environmental, and social shocks and stresses.

1.3.2 SPECIFIC OBJECTIVES

- To measure household and community resilience across economic, environmental, and social dimensions using standardized and contextually relevant indicators enabling a comprehensive assessment of adaptive capacities and vulnerabilities.
- To identify gaps and disparities in resilience capacity among different farming systems, thereby informing adaptive programming.
- To support monitoring, evaluation, and learning (MEL) processes by developing a composite Resilience Index that synthesizes multiple dimensions, and by providing reliable resilience assessment data to track changes and project impact over time.
- To incorporate the Poverty Probability Index (PPI) as a complementary tool to assess household poverty levels within the INSPIRE districts, facilitating the integration of poverty data with resilience indicators.

1.4 GEOGRAPHICAL COVERAGE

The Resilience Assessment was carried out among the smallholder farmers across the eight districts where the INSPIRE project is actively implemented. These districts encompass a wide range of agro-ecological zones, farming systems: banana/coffee (Luuka and Kamuli), maize/cassava/legumes (Kaliro, and Buyende) and maize/cassava/oilseeds (Lira, Dokolo, Alebtong and Amolatar), and socio-economic conditions. Although Jinja Rural falls within the banana/coffee farming system, alongside Kamuli and Luuka districts, it was excluded during the assessment. This was due to an error in judgement, as the team assumed that the data collected from Kamuli and Luuka would be sufficient to represent the entire farming system, including Jinja Rural.

2.0 METHODOLOGY

The Resilience Assessment under the INSPIRE project employed a quantitative approach, quantitative data collection techniques to generate a holistic understanding of resilience at the household and community levels. The assessment was conducted using a cross-sectional design, gathering data at a single point in time. By focusing on a single time frame, the study aims to capture a snapshot of current resilience dynamics, including the economic, environmental, and social factors that influence how communities absorb, adapt to, and recover from shocks and stresses.

Primary data was collected from the smallholder offering unique insights into resilience capacities, existing vulnerabilities, and the coping mechanisms. Quantitative data was gathered through structured household surveys to assess indicators such as food security, income diversification, and access to basic services. This method enabled a deep and context-sensitive analysis of resilience, informing future programming and policy interventions under the INSPIRE initiative.

2.1 SAMPLING STRATEGY

To ensure comprehensive and context-sensitive findings, a multi-stage sampling strategy was employed within each district. At the first stage, representative sub-counties and parishes were selected using a combination of purposive and random sampling

techniques. The purposive selection was done to ensure coverage of key contextual variables such as Agro-ecological zones, levels of vulnerability, and degree of access to basic services (e.g., health, education, markets). Random sampling was applied within selected administrative units to identify target households and participants, thereby enhancing representativeness and reducing selection bias.

2.2 SAMPLE SIZE

The sample size for the quantitative component was initially determined using Cochran's formula, which is widely applied in survey research to calculate representative sample sizes for large populations. This method allows for precision in estimating proportions within a population, particularly when the total population is large or unknown. The formula provided a sample of 383 smallholder farmers to be interviewed at a 95% confidence level and a 0.05 (±5%) margin of error. Due to labor constraints and time constraints, the sample was scaled down from the initial sample of 383 farmers determined by Cochran's formula to a sample of 169 smallholder farmers.

Table 1: Number of participants per farming system

Farming system	No. of respondents
Annual Crops (Maize/Cassava/Oil seeds)	63
Annual Crops (Maize/Cassava/Legumes)	55
Perennial Cropping system (banana/coffee)	51
Total	**169**

2.3 TARGET GROUP

The primary target population for the assessment was smallholder farmers within the three farming systems.

2.4 DATA ANALYSIS

The data analysis process for the INSPIRE Resilience Assessment employed a quantitative approach to provide a holistic and nuanced understanding of resilience at the household and community levels. The findings directly informed programmatic decision-making, adaptive management, and contributed to the project's Monitoring, Evaluation, and Learning (MEL) framework.

Before analysis, raw survey data underwent rigorous cleaning to ensure accuracy and completeness. This included checking for outliers, inconsistencies, and missing responses. Missing data assessed patterns, whether random or systematic and addressed accordingly using techniques such as multiple imputation or case-wise deletion, depending on the extent and nature of the gaps. Variables were coded into standardized categories aligned with the resilience indicators framework, facilitating coherent analysis across districts and demographic groups.

The central output of the quantitative analysis was the development of a composite Resilience Index. This index was constructed by selecting a set of validated indicators

representing economic (e.g., income stability, asset diversity), environmental (e.g., access to natural resources, exposure to hazards), and social (e.g., social capital, access to services) dimensions. Indicators were standardized (e.g., normalized scores 0-4) and aggregated using a weighting scheme of 1-10 based on expert consultation to produce an overall resilience score for each household and community. The internal consistency and reliability of the index was tested using statistical measures such as Cronbach's alpha. Sensitivity analyses were conducted to evaluate how changes in indicator weights affect the index, ensuring robustness.

The PPI was employed as a complementary measure to understand poverty dynamics within the sample. Households were scored using PPI tools specific to the local context, generating probabilities of living below national or international poverty lines.

2.5 ETHICAL CONSIDERATIONS

All participants were fully informed about the purpose, procedures, risks, and benefits of the assessment. Verbal or written informed consent was obtained from each respondent prior to data collection, with the option to withdraw at any point without consequence.

Data collected was treated with strict confidentiality. Identifiable information was not disclosed in any reports or outputs. All data was anonymized, securely stored, and accessible only to authorized research personnel.

Cultural Sensitivity and Respect: The research team approached communities with cultural sensitivity, respecting local customs, norms, and languages. Gender-sensitive approaches were employed to ensure inclusive participation, especially of women, youth, and other marginalized groups.

3.0 RESILIENCE FOR SYSTEMS (R4S) STUDY FINDINGS

3.1 Introduction

This section provides a presentation of the Resilience Systems (R4S) study findings in line with the four specific project objectives.

3.2 DEMOGRAPHIC CHARACTERISTICS OF PARTICIPANTS

3.2.1 Sex Of The Household Head

Males were the most participants among the household heads in the R4S study with 127 participants (75%) compared to 42 participants (25%) as illustrated in table 3 below.

Table 2: Number of participants per sex

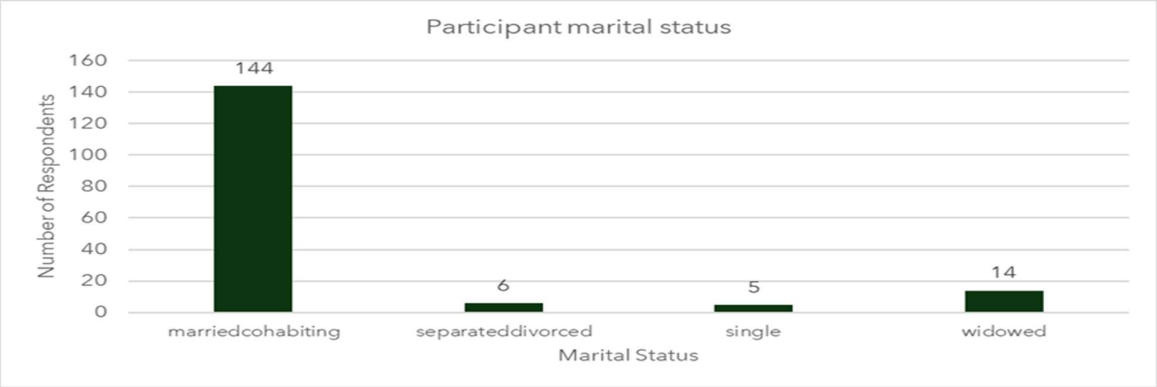
Sex	No. of participants	% of participants
Males	127	75%
Females	42	25%
Total	**169**	**100%**

Lango and North Busoga had an equal number of 45 male household heads participating in the assessment while South Busoga had only 37 male household heads participants. Additionally, Lango and South Busoga had the most female household heads; 18 and 14 female participants respectively with North Busoga only having 10 female household heads participating in the assessment.

3.2.2 Marital Status And Number Of HH Members

144 (85%) of the participants were married/cohabiting with 14 (8%) of the participants being widowed. Only 6 (4%) and 5 (3%) of the participants indicated that they were separated/divorced and single respectively. South Busoga had the highest number of household members with 443 household members followed by North Busoga with 407members. Lango had the least with 358 household members. Overall, the number of the household members is 1,208.

Figure 1: Marital status of participants (N=169)



Data Source 1: Primary Source, 2025

3.2 SOCIAL RESILIENCE

The social resilience assessment employed an 11-indicator index (total score: 44) evaluating multiple dimensions including household support networks, community group participation, access to social services (child protection, GBV response, healthcare), primary caregiver's education level, collective decision-making participation, gender equality in household decisions, inclusion of vulnerable members, conflict resolution methods, trust in community institutions, awareness of rights/services/environmental protection, and engagement in environmental activities. Using a reverse scoring system (0=high resilience to 4=low resilience per indicator), higher aggregate scores reflect lower resilience capacity - meaning households scoring closer to the maximum 44 points demonstrate greater vulnerability while those with lower totals exhibit stronger resilience characteristics. The data was aggregated and presented in terms of average scores to facilitate comparative analysis across groups.

To facilitate a standardized interpretation of social resilience, the average social resilience score originally computed was normalized by multiplying it by 10. This produced a new scale ranging from 0 to 10. Using the adjusted scale, social resilience was classified into three distinct categories to reflect varying levels of vulnerability: Scores from 0 to 3 were categorized as "High Resilience", 4 to 6 were categorized as "Medium Resilience", 7 to 10 were categorized as "Low Resilience".

From the analysis, the overall average social resilience score stood at 5.2, indicating medium social resilience among smallholder household farmers across the farming systems. Access to social support services like health, psychosocial support, child protection and GBV responses and the education level of the main HHs caregivers are contributing factors to medium social resilience. On a positive note, the score likely reflects the regular and active participation of households (HHs) in community groups, which strengthens social resilience by fostering trust in local institutions. This trust facilitates open dialogue, collective problem-solving, and consensus-based conflict resolution, key factors in a community's ability to adapt and thrive amid challenges. Cereals-Oilseeds have the highest average score of 6.3 while perennial and Legume systems have higher average scores of 4.7 and 4.6 respectively.

Table 3: Key determinants of social resilience by farming system.

FS	Household Head Support Network	Participation in Community Groups	Access to Social Support Services	Education Level of Main Household Caregiver	Involvement in Collective Decision-Making	Gender Equality in Household Decision-Making	Inclusion of Vulnerable Members	Conflict Resolution	Trust in Community Institutions	Knowledge of Rights and Services	Leadership and roles
Oilseed	5.8	4.0	8.1	6.5	6.5	7.3	5.8	5.2	5.9	6.0	8.6
Perennial	5.8	3.6	6.0	5.7	4.8	3.3	3.6	2.4	2.7	4.3	8.1
Legumes	5.5	3.5	5.8	6.9	3.8	3.9	3.8	2.6	2.6	3.9	8.1
Total	**5.7**	**3.8**	**6.8**	**6.4**	**5.2**	**5.0**	**4.5**	**3.5**	**3.9**	**4.8**	**8.3**

The findings of the analysis reveal that the Cereals-Oilseeds farming system has the highest concentration of socially vulnerable farmers, with 60% in the low resilience category. In contrast, Perennial and Cereals-Legumes systems show more balanced resilience profiles, suggesting stronger community ties, better social support mechanisms, or more stable living conditions associated with those farming systems.

Table 4:Percentage of SHF households Socially Resilient across farming systems

Farming Systems	High	Medium	Low
Cereals - Oilseeds System	2%	38%	60%
Perennial System	24%	51%	26%
Cereals - Legumes System	24%	53%	23%
Total	**15%**	**47%**	**38%**

The table below disaggregates social resilience data by gender within each farming system, highlighting significant gender disparities within oilseeds farming system. There is little or no different between female and male within the perennial farming system and Legumes System. More female farmers compared the male are in the low resilience group across all the farming systems.

Table 5: Share of households Socially Resilient by farming system and gender

	High Resilience		Medium Resilience		Low Resilience	
Farming System	female	male	female	male	female	male
Cereals - Oilseeds System	0%	2%	17%	47%	83%	51%
Perennial System	14%	27%	50%	51%	36%	22%
Cereals - Legumes System	20%	24%	50%	53%	30%	22%
Total	**10%**	**17%**	**36%**	**50%**	**55%**	**32%**

3.3 ECONOMIC RESILIENCE

The economic resilience assessment used an 8-indicator index (total score: 32) to evaluate four key dimensions: (1) Income from diversified and stable sources (e.g., commercial farming, petty business, formal employment linked to INSPIRE programs) were scored as high resilience, while reliance on remittances, casual labour, or no income indicate low resilience; (2) Financial capacity, including income level, access to credit, and the household head's ability to cover expenses; (3) Asset ownership (e.g., electronics, transport, businesses, VSLA membership, livestock, and agricultural land), with greater asset diversity correlating to higher resilience; and (4) Food security, where households relying on homegrown food, consuming all food groups, and eating ≥3 meals/day were classified as highly resilient. Similar to the social resilience index, higher aggregate scores indicated greater economic vulnerability, with data aggregated into average scores for cross-group comparison. This multidimensional approach captures both immediate

livelihoods (income/food) and long-term buffers (assets/credit), revealing how households withstand shocks.

Based on economic resilience trends across systems, Perennial systems have the highest average score of 2.7, followed closely by Oilseeds (2.6) and Legumes (2.4) validating the stronger performance of across all the three farming systems in supporting farmers' economic well-being. Overall, access to credit and monthly income scored poorly under economic resilience as shown in the table below.

Table 6: Average scores for sources or key determinants of economic resilience by farming system

FS	Payment for HHs expenses	Main source of income	Current monthly HH income	Ownership	Access to credit	Saving Behaviour	Food Access	Type of food	Number of meals	Overall
Oilseed	1.3	3.8	4.4	0.7	5.8	3.0	2.7	0.6	2.8	2.6
Perennial	0.7	4.7	5.1	1.4	6.3	3.2	2.2	0.2	1.9	2.7
Legumes	0.5	4.8	5.9	1.2	3.0	1.4	1.0	0.0	1.6	2.4
Total	**0.8**	**4.4**	**5.1**	**1.1**	**6.0**	**3.0**	**2.0**	**0.3**	**2.2**	**2.5**

The table below assesses the economic resilience of farmers by farming system. Unlike social and environmental resilience, all systems show strong performance with almost no farmer in the low resilience category. Overall, 72% of households are in the high resilience group with cereals-Legumes farmers as the most economically resilient, 80% in the highest category. The absence of low economic resilience across all farming systems indicates that most smallholder farmers have a basic level of economic stability. However, a significant number still falls within the medium resilience group, especially in the Cereals-Oilseeds system.

Table 7: Share of households Economically Resilient across farming systems

Farming System	High Resilience	Medium Resilience	Low Resilience
Cereals - Oilseeds System	70%	30%	0%
Perennial System	67%	31%	2%
Cereals - Legumes System	80%	20%	0%
Grand Total	**72%**	**27%**	**1%**

Males dominate the high resilience category, but females also demonstrate notable participation, especially in the Perennial and legumes system. Female farmers are more present in the medium group, suggesting they are economically active but may face barriers to fully realizing their potential.

Table 8: Share of households Economically Resilient by system and gender

	High Resilience		Medium Resilience		Low Resilience	
Row Labels	**female**	**male**	**female**	**male**	**female**	**Male**
Cereals - Oilseeds System	39%	82%	61%	18%	0%	0%
Perennial System	57%	70%	36%	30%	7%	0%
Cereals - Legumes System	70%	82%	30%	18%	0%	0%
Total	**52%**	**79%**	**45%**	**21%**	**2%**	**0%**

3.4 ENVIRONMENTAL RESILIENCE

The environmental resilience assessment comprises 8 indicators focusing on: (1) access to natural resources, (2) sustainable land use practices, (3) climate risk preparedness, (4) agricultural biodiversity, (5) waste and water management systems, (6) tree planting/vegetative cover, (7) knowledge of environmental protection, and (8) participation in conservation activities. Households demonstrating greater resilience are those with secure access to resources, climate-adaptive practices, diversified farming systems, proper waste disposal, maintained tree cover, environmental knowledge, and actively participate in conservation efforts. Most of these parameters are aligned with INSPIRE's project design and the objective to promote climate resilience through tree planting initiatives. One critical gap is household waste management practice, which currently falls outside of project design.

The average environmental resilience score stood at 5.9. Cereals-Oilseeds show the highest average score of 6.7 compared to Perennial and Legumes systems that remain more consistently resilient at average scores of 5.5 and 5.2 respectively. As shown in Table 9 below, the key factors contributing to medium and low environmental resilience scores include low participation in environmental groups or activities (such as tree planting and riverbank protection), limited training and action on environmental protection, and poor waste and water management practices.

Table 9:Key determinants of environmental resilience by farming system

FS	Access to Natural Resources	Land Use Practices	Climate Risk Preparedness	Biodiversity in Farming	Waste and Water Management Practices	Tree Planting and Vegetation Cover	Knowledge of Environmental Protection	Participation in Environmental Groups or Activities	overall
Oilseed	6.3	4.9	7.0	5.4	7.1	6.6	8.0	8.6	6.7
Perennial	4.6	3.8	6.3	4.6	5.6	5.0	6.0	7.5	5.5
Legumes	5.0	4.0	6.5	4.0	5.9	4.6	5.4	6.4	5.2
Total	5.4	4.3	6.7	4.8	6.3	5.5	6.6	7.6	5.9

The table below assesses farmers' resilience to environmental shocks across farming systems. Cereals-Oilseeds perform poorly, with 75% of farmers in the low category,

indicating a higher exposure to environmental degradation or limited training and action on environmentally sustainable practices. In contrast, Perennial and Cereals-Legumes systems show a more even spread across the categories, suggesting they are more adaptive to environmental risks.

Table 10: Share of households Environmentally Resilient across farming systems

Farming System	High	Medium	Low
Cereals – Oilseeds	5%	21%	75%
Perennial	16%	43%	41%
Cereals – Legumes	9%	51%	40%
Total	**10%**	**37%**	**53%**

The data reveals minimal gender-based disparities in environmental resilience. Notably, males are more likely to be in the high resilience group for perennial farming system compared to female. A greater proportion of female still dominate the low resilience group across systems. This pattern suggests that women have limited access to environmentally sustainable technologies, extension services, and training.

Table 11: Percentage of SHF households Environmentally Resilient by farming system and gender

	High Resilience		Medium Resilience		Low Resilience	
Farming system	female	male	female	male	female	male
Cereals - Oilseeds System	6%	4%	11%	24%	83%	71%
Perennial System	0%	22%	36%	46%	64%	32%
Cereals - Legumes System	10%	9%	40%	53%	50%	38%
Total	**5%**	**11%**	**26%**	**41%**	**69%**	**48%**

3.5 COMPOSITE RESILIENCE

From the analysis, the average composite resilience score across all farming systems of 4.6 showed moderate resilience among smallholder farmers. Cereals-Oilseeds have the highest average score of 5.2, though Perennial and Legumes systems show better average resilience of 4.3 and 4.1, confirming their consistency across dimensions.

Table 12: Score and percentage of SHF households who are Resilient across farming systems and regions.

Farming System	Overall Index	Av. Social	Av, Eco	Av. Env	HIGH (overall)	MEDIUM (overall)	LOW (overall)
Oilseed	5.2	6.3	2.6	6.7	6%	68%	25%
Perennial	4.3	4.7	2.7	5.5	25%	57%	18%
Legumes	4.1	4.6	2.4	5.2	16%	80%	4%
Region							
Busoga	4.2	4.6	2.5	5.4	21%	69%	10%
Lango	5.2	6.3	2.6	6.7	6%	68%	25%
Overall	**4.6**	**5.2**	**2.5**	**5.9**	**15%**	**69%**	**16%**

This table brings together all three dimensions; social, economic, and environmental to offer a complete view of resilience by farming systems. From the analysis, perennial farming systems demonstrated strength, with 25% in the high resilience category and only 18% in the low resilience category. Cereals-Legumes follow closely with 16% in the high resilience category and just 4% in the low resilience category. Cereals-Oilseeds once again show vulnerability, with only 6% in high resilience and 25% in low resilience category. In terms of region, the Busoga region scored better compared to Lango with 21% scoring high in Busoga compared to 6% in Lango. Despite some strengths in economic aspects, their overall balance across dimensions is weaker.

Table 13: Share of households who are Resilient by system and gender.

	High Resilience		Medium Resilience		Low Resilience	
Farming System	female	male	female	male	female	male
Cereals - Oilseeds System	6%	7%	44%	78%	50%	16%
perennial System	14%	30%	64%	54%	21%	16%
Cereals - Legumes System	10%	18%	80%	80%	10%	2%
Total	**10%**	**17%**	**60%**	**72%**	**31%**	**11%**

This table compares overall resilience across genders and systems. Male farmers are more represented in the medium composite resilience category for oilseeds system and in high composite category for perennial system. While females are more likely to be in medium and low categories for oilseeds system. This suggests systemic barriers such as unequal access to services, resources, and decision-making, limiting women's full participation, but their resilience potential is strong.

3.6 POVERTY PROBABILITY INDEX (PPI) ANALYSIS

The Poverty Probability Index (PPI) study was conducted across INSPIRE project districts to evaluate the likelihood of smallholder farmers living below internationally recognized poverty lines. By employing a concise 10-question survey on household characteristics and asset ownership, this assessment provides a standardized metric for comparing poverty levels among participants. The findings serve a dual purpose: first, to establish a baseline

for understanding socioeconomic disparities, and second, to enable the integration of poverty data with resilience indicators, thereby informing targeted program design and policy recommendations.

Farming System Poverty Overview. The analysis reveals that, on average, 34% of smallholder farmers in the three regions (Cereals-Oilseeds, Cereals-Legumes and Perennial) have likelihood or face a high probability of living below the extreme poverty line of $1.25 per day. When applying the higher threshold of $2.50 per day, this figure more than doubles (81%), indicating that a significant majority of households experience moderate to severe economic vulnerability. Notably, regional disparities in poverty distribution are minimal, suggesting that economic hardship is a pervasive challenge across the project areas rather than being confined to specific localities.

Table 13: Percentage of Poverty Probability Index by Farming System

Farming System	Average of $1.25	Average of $2.5
Cereals-Oilseeds	35%	81%
Perennial	32%	79%
Cereals-Legumes	36%	82%
Grand Total	**34%**	**81%**

Gender and Age Disparities. A closer examination of the data highlights pronounced inequalities based on gender and age. Female-headed households demonstrate a 41% likelihood of living below the $1.25/day poverty line, compared to 32% for male-headed households. The gap in gender underscores the compounded barriers women face, including limited access to productive resources and unequal opportunities in labour markets.

Table 14: percentage of Poverty Probability Index disaggregated by gender and age group

Age Group	Average of $1.25		Average of $2.5		Total Average of $1.25	Total Average of $2.5
	Female	Male	Female	Male		
18-35	48%	31%	90%	77%	32%	78%
36-60	40%	34%	82%	82%	36%	82%
Above 60	42%	29%	88%	78%	30%	79%
Total	**41%**	**32%**	**84%**	**79%**	**34%**	**80%**

Age-based analysis further uncovers unexpected trends. Contrary to conventional assumptions, households led by individuals aged 36–60 years exhibit higher poverty rates than those in the 18–35 or 60+ age brackets. While the study did not investigate causal factors, this pattern may reflect the heightened financial pressures faced by middle-aged adults, who often shoulder responsibilities such as childcare, education costs, and healthcare expenses while facing limited stable income opportunities. The lower poverty rates among older age groups could be attributed to factors such as the completed education of dependents or support from extended family networks.

4.0 CONCLUSION:

The composite resilience index indicates that the majority of smallholder farmers fall within the medium resilience category, with only 15% achieving high resilience. Perennial and Cereals-Legumes farming systems lead in overall resilience, while Cereals-Oilseeds systems show the weakest performance. The pattern is consistent with the comparative analysis between areas, where the Lango region trails behind Busoga in resilience outcomes. Gender-based analysis reaffirms that women are more likely to be in the low and medium resilience categories across all farming systems. These findings reflect the cumulative impact of unequal access to economic opportunities, social capital, and environmental resources.

The PPI analysis reveals that 34% of households are likely living below the extreme poverty line of $1.25/day/person, and over 80% live on less than $2.50/day/person, indicating widespread economic vulnerability across all regions. Mirroring the resilience findings, female-headed households and those in the Lango region emerge as the most vulnerable demographic groups, facing the highest poverty risks.