



Donor Transfer of Agricultural Knowledge and Self-Reliant Farming Among Smallholder Farmers: Evidence from Yambio County, South Sudan

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Abstract

Indigenous knowledge is still firmly linked to farming among smallholder farmers in Yambio County, even though donor programs offer new practices through training, extension services, and demonstration plots and emphasize knowledge transfer as crucial to shifting smallholder farmers away from outside aid. In this study, the degree and direction of the relationship between donor agricultural knowledge transfer and self-reliant farming were ascertained. A cross-sectional correlational survey with a qualitative component was employed, guided by the theories of diffusion of innovations and collective action. The target population was 1,405 registered smallholder farmers, eight extension officers, 30 leaders of farmer groups, 30 group accountants and 30 group secretaries. From the farmers, 180 members were selected by simple random sampling, and 170 returned usable questionnaires (94.4%). All 98 key informants were purposively included (100% participation), giving a targeted sample of 278 and an analytical sample of 268. Perception items used a five-point Likert scale (1 = strongly disagree to 5 = strongly agree), and reliability was assessed with Cronbach's alpha. Descriptive statistics, multiple linear regression, an inferential method with a single dependent variable, and theme analysis were used to analyze the data. Donor transfer of agricultural knowledge was positively and significantly correlated with self-reliant farming after controlling for financial inflows, technical support, and demographic characteristics ($B = 0.359$, $p < .001$). Respondents scored low on expert knowledge as their only reliable source ($M = 2.188$, $SD = 1.323$, on a five-point scale from 1 = strongly disagree to 5 = strongly agree), while learning from experts (77.1%), group savings (71.8%) and farmer exchange programmes (68.2%) were widely endorsed. Causal claims are precluded by cross-sectional data and a sample below conventional size; clustering within groups was not modeled. Donor programs could combine knowledge transfer with ongoing, peer-led, and participatory learning that builds on indigenous knowledge; this is an interpretation based on qualitative and descriptive data rather than a tested effect.

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Introduction

One of the main resources that donors aim to provide to smallholder farmers in their quest for agricultural self-reliance is knowledge, along with funds and technical know-how. In the past, agricultural extension in developing nations was frequently structured as a one-way transmission of knowledge from outside sources to farmers who lacked knowledge (Becerra-Encinales et al., 2024; Prajapati et al., 2025). This narrative has increasingly given way to a rhetoric of equality, reflected in agreements such as the 2011 Busan Partnership, which stresses knowledge sharing and mutual learning among development partners (El Doukhi, 2025; Sun et al., 2026).

Indigenous or local knowledge, defined as the home-grown expertise unique to a particular community or culture, accumulated through experience and adapted to local ecology (Gbadegesin & Gbadamosi-San, 2024; Onwuegbuzie et al., 2025), remains foundational to how smallholder farmers manage soil fertility, water, pests and planting decisions in much of Sub-Saharan Africa. Yet the relationship between externally introduced, donor-facilitated agricultural knowledge and this pre-existing knowledge base is not always complementary: where formal, donor-driven knowledge systems are imposed without regard for local ecological and cultural context, they risk devaluing indigenous knowledge and displacing, rather than strengthening, farmers' own capacity to adapt (Kita, 2026; Anukwonke & Okonkwo, 2025; van der Puije, 2026; Yanou et al., 2023).

Even as donor programs introduce new techniques through training, extension services, and demonstration plots, farming practices in Yambio County, South Sudan, remain closely linked to indigenous ecological knowledge, communal labor systems, and generational knowledge exchange (Juba, 2023; Libert-Amico & Koloffon, 2025). The empirical issue this study attempts to answer is whether this donor-facilitated knowledge transfer has enhanced farmers' capacity for self-reliance or whether it has been absorbed into, filtered through, or resisted by existing local knowledge networks.

Research hypotheses

H₀₁: There is no significant association between donor transfer of agricultural knowledge and self-reliant farming among smallholder farmers in Yambio County.

H_{a1}: There is a significant association between donor transfer of agricultural knowledge and self-reliant farming among smallholder farmers in Yambio County. Diffusion theory predicts a positive connection, whereas the displacement literature predicts a null or negative one, making the alternative hypothesis non-directional. Thus, the direction is indicated by the coefficient's sign.

Theoretical framework

Diffusion of Innovations Theory

The study drew primarily on Rogers' (2003) Diffusion of Innovations Theory, which holds that innovations are more readily adopted when they are perceived as beneficial, compatible with existing cultural norms, and communicated through trusted channels (Mbatha, 2024; Howaldt et al., 2025). This framework helps explain the selective, filtered manner in which farmers in contexts such as Yambio County take up donor-promoted agricultural techniques, adopting those that align with local ecological and socio-cultural realities while setting aside those that do not. Rogers (2003) himself identifies a pro-innovation bias in diffusion research, so the theory is used here to describe selective uptake by active farmers, not passive adoption. Proposition 1 follows: if uptake is selective, donor knowledge transfer should be positively associated with self-reliant farming where it is adopted, while farmers should not treat expert knowledge as their only reliable source. The first part is tested by the sign of the regression coefficient and the second by the survey item on expert knowledge.



Collective Action Theory

Collective Action Theory (Olson, 1965) complements the diffusion of innovations theory by explaining the relationship between group members' contributions and sharing of their agricultural knowledge and experiences and their collective capacity to become self-reliant. Because farmer groups are internally organized, knowledge and technical information sharing is more efficient among members; strategies are built on members' own knowledge of local conditions, past experience, and decision-making, allowing groups to identify urgent issues and allocate resources faster than centralized, top-down knowledge systems. Proposition 2 follows: if knowledge circulates efficiently within groups, peer-led and locally embedded strategies should be endorsed at least as strongly as expert-led learning. It is examined descriptively through the strategy endorsements in Table 2.

Aid dependency at the micro level

Concern that external aid can weaken recipients' own effort has also been examined at the household level, where studies test empirically whether aid alters farmers' behaviour instead of assuming that it does (Kozicka et al., 2024). In the knowledge domain, the equivalent concern is that donor expertise displaces local knowledge and creates technical dependency (Kita, 2026; van der Puije, 2026). Collectively taken, the theories suggest that donor-facilitated knowledge transfer is most likely to be associated with stronger self-reliant farming where it is diffused through trusted, farmer-to-farmer, collective channels that respect local knowledge, rather than through one-directional, top-down instruction that treats local knowledge as inferior or dispensable.

Empirical literature review

Indigenous knowledge is widely recognised in the literature as the cornerstone of self-sufficiency and self-governance in rural communities. It is rooted in cultural traditions, values, taboos and worldviews, and represents generations of creative thought and action within each community as it confronts an ever-changing set of problems (Yanou et al., 2023; van der Puije, 2026). Compared to externally sourced expertise, which can be expensive and challenging to access in an emergency, indigenous knowledge is usually more accessible and affordable because it is based on locally available resources (Yanou et al., 2023). Separating such knowledge from its socio-cultural context, however, renders it meaningless and even dangerous, since it becomes vulnerable to misuse and misinterpretation (Kita, 2026; Anukwonke & Okonkwo, 2025; van der Puije, 2026).

In coastal Bangladesh, farmers have themselves acted as extension agents for other farmers (Joshi et al., 2024), and experimental evidence indicates that structured peer-to-peer learning among farmers can promote the adoption of beneficial practices (Lasdun et al., 2025). Farmers in Burkina Faso have adopted traditional restoration practices such as Zaï pits to rehabilitate bare, crusted and degraded land (Balma et al., 2026), while farmer-managed natural regeneration in Niger, which spread largely through farmer-to-farmer communication, now covers an estimated five to six million hectares (Suuk et al., 2025).

Farmers are not merely passive recipients of externally generated innovations but are themselves producers and keepers of knowledge. Studies in Ghana and Kenya show that farmers acquire and disseminate agricultural knowledge largely through peer advice networks in which influential farmers act as key sources of information, and that formal extension can build on these networks (Giroux et al., 2023; Yu & Gambrah, 2024). In Vietnam's Mekong Delta, farming households draw on informal groups and collective action to share and spread experience-based knowledge (Hua et al., 2024).

At the same time, the literature cautions against treating donor-facilitated knowledge as a straightforward substitute for local expertise. Koch (2023) documents how epistemic injustice is experienced and practised in development aid, including in the credibility given to local consultants. Where national research and extension capacity is limited, communities may rely



heavily on external expertise (Becerra-Encinales et al., 2024), and participatory approaches that involve farmers in generating and adapting knowledge are advocated as a way of bridging knowledge gaps (Prajapati et al., 2025).

The majority of the evaluated studies were descriptive or case-based, and none of them looked at the relationship between agricultural knowledge transfer from donors and independent farming among Yambio County's smallholder groups while adjusting for other donor-aid factors. That gap is filled by this study.

Conceptual framework

Figure 1 illustrates the relationship between the variables. The dependent variable is self-reliant farming, which includes locally driven farming techniques, own revenue and savings, and the use of both local and modern knowledge. The independent variable is donor transfer of agricultural knowledge, which includes training, extension guidance, and new innovations. Control variables include financial inflows, technical assistance, age, education, gender, and marital status. Conditions that influence how the association is interpreted include compatibility with indigenous knowledge, peer-led channels, and continuity of follow-up support; these were investigated descriptively and qualitatively rather than tested as moderators.

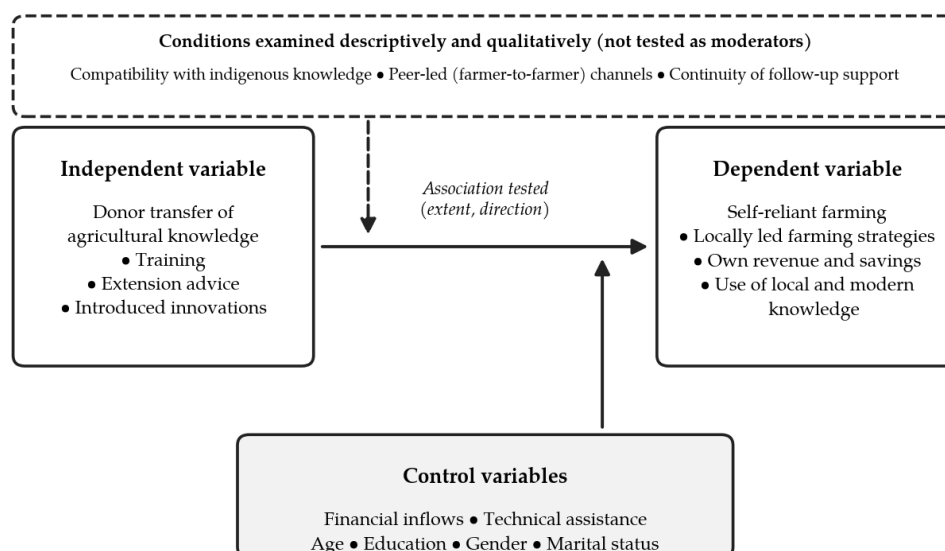


Figure 1. Conceptual framework of the study

Method

Research design

The study used a cross-sectional correlational survey with a qualitative component, which allowed the researcher to analyze the relationship between self-reliant farming and the transfer, adaptation, and application of agricultural knowledge among the sample population. The design indicated association rather than causality since the data were gathered all at once.

Target population and sampling

The target population comprised 1,405 registered individual smallholder farmers in Yambio County's eight sub-counties (Juba, 2023; Libert-Amico & Koloffon, 2025). The sample included eight sub-county agricultural extension officers, and from each farmer group, a leader, secretary and accountant. Translation of this population into the sample is displayed in Table 1.

*Table 1: From target population to sample*

Category	Target population	Sampling technique	Sample selected	Completed	Response rate (%)
Ordinary group members	1,405	Simple random	180	170	94.4
Extension officers	8	Purposive (all eligible)	8	8	100.0
Group leaders	30	Purposive (all eligible)	30	30	100.0
Group secretaries	30	Purposive (all eligible)	30	30	100.0
Group accountants	30	Purposive (all eligible)	30	30	100.0
Total	—		278	268	96.4

Note. Key informants (n = 98) were not part of the survey sample-size calculation.

The list of registered farmers served as the sampling frame for the survey. One-stage simple random selection without stratification was used to choose 180 members of the ordinary group; 170 of them (94.4%) returned completed questionnaires. Standard sample-size tables (Krejcie & Morgan, 1970) recommend roughly 300 respondents at a 95% confidence level and a 5% margin of error for a population of 1,405. With finite population correction, the obtained sample of 170 translates into a margin of error of roughly $\pm 7.1\%$ at the same confidence level. With 170 instances, seven predictors, $\alpha = 0.05$, and power of 0.80, a sensitivity analysis using the noncentral F distribution reveals that the model could detect an overall effect size of around $f^2 = 0.09$ and the contribution of a single predictor of approximately $f^2 = 0.05$ (an R^2 increment of roughly 4.6%). The survey sample-size calculation did not include key informants. The eight extension officers as well as the leader, secretary, and accountant of each of the thirty farmer organizations were among the 98 qualified office holders who were purposefully included because the key-informant population was small and information-rich. They all participated (100%), resulting in a total response of 268 out of 278 targeted respondents (96.4%). The 30 categories of respondents were not modeled, as the Limitations section explains.

Instruments, measurement, validity and reliability

A structured questionnaire was used to get quantitative data, and a semi-structured interview guide including indigenous knowledge, local customs, and knowledge exchange encouraged by donors was used to gather qualitative data. Six items averaged into a composite score were used to quantify the operational definition of donor transfer of agricultural knowledge, which was defined as farmers' exposure to training, extension guidance, and introduced innovations from donor programs. Three criteria averaged into a composite score were used to describe self-reliant farming, which was defined as the ability to farm independently of donor help through locally led initiatives, personal earnings and savings, and the utilization of local and current knowledge. The complete instrument is available as Appendix A. The items were scored on a five-point scale, with 1 denoting strongly disagree and 5 denoting strongly agree. Expert review was used to determine content validity using the content validity ratio. Cronbach's (1951) alpha was used to evaluate reliability through internal consistency; $\alpha \geq 0.70$ was considered acceptable (donor knowledge transfer $\alpha = 0.86$; self-reliant farming $\alpha = 0.82$).



Qualitative procedures and ethics

The interviews lasted roughly 25 minutes, were conducted in English, and field notes and images were collected with permission. Following Braun and Clarke's (2006) methodology, the transcripts were read several times, tagged, and then classified into themes. These themes were then compared with the survey results. Tangaza University gave its ethical approval (reference: TU/ISERC2025/01/0067). Informed agreement was obtained, participation was voluntary, and answers were kept private and reported without identifying specific people or groups.

Data analysis

Multiple linear regression, an inferential method with a single dependent variable (self-reliant farming), and descriptive statistics (frequencies, percentages, means, and standard deviations) were used to code and analyze quantitative data in SPSS version 21. The model's specifications were:

$$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \varepsilon$$

Where Y is self-reliant farming, X_1 is donor transfer of agricultural knowledge, and X_2 to X_7 are financial inflows, technical assistance, age, education, gender and marital status, respectively (X_2 to X_7 are control variables). Hypotheses were tested at the 95% confidence level ($\alpha = 0.05$), with the null hypothesis rejected where $p \leq 0.05$.

Results

Response rate

All 98 key informants were interviewed, and 170 of the 180 questionnaires were entirely completed (94.4%) (Table 1). The 170 completed surveys and the qualitative information from the 98 interviews served as the basis for the results that follow.

Descriptive findings on agricultural knowledge transfer

Respondents were asked about strategies for transitioning from externally initiated to locally led farming (Table 2). Learning from experts was the most frequently cited strategy (77.1%), followed by establishing savings within SACCOs or group schemes (71.8%), farmer exchange and exposure programmes (68.2%), the ability to raise own revenue (61.8%), the use of both local and modern knowledge (60.0%), the use of trained local human resources (57.1%), complementing funds with credit (52.9%), and creating linkages with other farmer groups (45.9%).

Table 2: Strategies for moving from externally initiated to locally led farming

Strategy	n	%
Learning from experts	131	77.1
Savings within SACCOs or group schemes	122	71.8
Farmer exchange and exposure programmes	116	68.2
Ability to raise own revenue	105	61.8
Use of both local and modern knowledge	102	60.0
Use of trained local human resources	97	57.1
Complementing funds with credit	90	52.9
Linkages with other farmer groups	78	45.9

Note. Percentages are of the 170 respondents; counts are the corresponding numbers ($\% \times 170$, rounded).

Notably, respondents scored low on the notion that expert or donor knowledge is their only reliable source of agricultural information ($M = 2.188$, $SD = 1.323$, valid $n = 170$, on the five-point scale where 1 = strongly disagree and 5 = strongly agree; 68.8% disagreed or strongly disagreed and 21.2% agreed or strongly agreed), while statements emphasising collaboration, traditional knowledge sharing and peer-to-peer learning scored above the scale midpoint of 3.0 (means = 3.62 to 4.08, $SD = 1.13$ to 1.37), with 67.6% to 78.8% of respondents agreeing or strongly agreeing, underscoring the continued centrality of indigenous and community-based knowledge systems even amid donor-facilitated knowledge transfer.

**Regression and inferential findings**

Multiple linear regression analysis showed that donor transfer of agricultural knowledge was positively and significantly associated with self-reliant farming ($B = 0.359$, $SE = 0.078$, $p < .001$, 95% CI [0.205, 0.513]), controlling for financial inflows, technical assistance, age, education, gender and marital status. Table 3 reports the coefficients of the full model.

Table 3: Regression coefficients of donor-aid components and control variables on self-reliant farming

Predictor	B	SE	t	p	95% CI
Constant	1.221	0.296	4.13	< .001	[0.636, 1.806]
Donor financial inflows	0.398	0.086	4.63	< .001	[0.228, 0.568]
Transfer of agricultural knowledge	0.359	0.078	4.60	< .001	[0.205, 0.513]
Technical assistance	0.284	0.082	3.46	< .001	[0.122, 0.446]
Age	0.067	0.036	1.86	.065	[-0.004, 0.138]
Education level	0.144	0.051	2.82	.005	[0.043, 0.245]
Gender	0.068	0.047	1.45	.150	[-0.025, 0.161]
Marital status	0.119	0.043	2.77	.006	[0.034, 0.204]

Note. Dependent variable: self-reliant farming ($N = 170$; residual $df = 162$). B = unstandardised regression coefficient; SE = standard error; CI = confidence interval. The model also controlled for age, education, gender and marital status. [Standardised coefficients and VIF were not in the output generated]

A coefficient of 0.359 means that, holding the other variables constant, a one-unit higher score on knowledge transfer was associated with a 0.359-unit higher score on self-reliant farming (95% CI [0.205, 0.513]). The coefficients of the three donor-aid components were similar ($B = 0.398$ for financial inflows, 0.359 for knowledge transfer and 0.284 for technical assistance) and their confidence intervals overlap, so no ranking among them is claimed. Of the control variables, education ($B = 0.144$, $p = .005$) and marital status ($B = 0.119$, $p = .006$) were significant, whereas age ($p = .065$) and gender ($p = .150$) were not. This is an association: it does not show that knowledge transfer produced the difference, because better-organised groups may also attract more donor training.

All three donor-aid components together with age, education, gender, and marital status were included in the overall regression model, which produced a strong fit ($R = 0.788$, $R^2 = 0.621$, adjusted $R^2 = 0.605$, standard error of the estimate = 0.405). This indicates that these predictors jointly explained 62.1% of the variation in self-reliant farming. The model's overall statistical significance ($F(7, 162) = 37.92$, $p < .001$) was verified by analysis of variance, and the regression sum of squares (43.49) significantly exceeded the residual sum of squares (26.54). Based on this, the null hypothesis that there is no significant correlation between donor transfer of agricultural knowledge and self-reliant farming among smallholder farmers in Yambio County, was rejected and the alternative hypothesis accepted; the positive coefficient indicates that the correlation was in the direction of greater self-reliance.

Qualitative findings

Two themes emerged from the 98 key informants' interviews.

Theme 1: Routine blending of indigenous and donor-introduced practices. Farmer groups in Yambio County reported using a wide range of indigenous soil, water and pest management practices alongside donor-introduced innovations, including fallowing, crop-residue incorporation, composting, intercropping with legumes and deep digging for soil aeration, each linked to specific ecological benefits such as nutrient replenishment and improved moisture retention. One group leader explained that farmers "leave some land uncultivated for a season so that it can naturally regain its fertility without using fertilizers," which matches the survey finding that expert knowledge is not regarded as the only reliable source ($M = 2.188$, $SD = 1.323$).



Theme 2: Selective adoption of donor-introduced techniques. Another group leader noted that farmers "mix what our ancestors taught us with new techniques we learn from training, and it works better for our land," illustrating that new techniques were kept where they proved useful locally, in line with the 60.0% of respondents who endorsed using both local and modern knowledge. Overall, the two themes show that donor-introduced knowledge was used alongside, not in place of, local knowledge.

Discussion

According to Rogers' Diffusion of Innovations Theory, there is a positive and strong correlation between knowledge transfer and independent farming (Table 3). According to that notion, innovations are more likely to be accepted if they are communicated through reliable channels, seen as advantageous, and fit with cultural norms (Rogers, 2003). The outcome also supports research showing that farmers rely significantly on informal and peer knowledge networks (Giroux et al., 2023; Hua et al., 2024; Yu & Gambrab, 2024). The trusted channels Rogers identified appear to be mostly local, as farmers in Yambio County embraced donor-promoted techniques when they aligned with local ecological and sociocultural conditions. However, the diffusion theory's linear adoption model is constrained in this case. Local farming practices operate within complex social and cultural networks shaped by indigenous experimentation and collective decision-making. The low reliance on donor expertise as farmers' primary knowledge source ($M = 2.188$ on the five-point scale) indicates that farmers filter externally introduced innovations through these local frameworks rather than adopting them uncritically.

This filtering pattern corresponds with scholarship arguing that externally introduced agricultural knowledge can emphasise technical innovation at the expense of local learning processes. That scholarship advocates participatory approaches grounded in local realities as an alternative (Prajapati et al., 2025; Yanou et al., 2023). Yambio County's agricultural practice is based on communal labor systems, peer-learning networks, and generational knowledge exchange, as evidenced by the continuously high scores for local collaboration and farmer-to-farmer knowledge sharing. The strong endorsement of peer learning and trained local human resources therefore supports the case for participatory extension (Prajapati et al., 2025). It also resembles farmer-led approaches that built on local practice in Bangladesh and the Sahel (Joshi et al., 2024; Suuk et al., 2025).

The significance of these local channels is explained by Collective Action Theory (Olson, 1965; Battaglini & Palfrey, 2024). The effective dissemination of information within closely knit farmer groups is demonstrated by the high support for farmer-to-farmer learning, exchange, and exposure programs as well as for skilled local human resources as pathways to self-reliance. Instead of being imposed from outside, strategies in these groups are based on members' common local knowledge. Viewed collectively, the findings suggest, but do not demonstrate, that donor knowledge programmes work best as a supplement rather than a replacement. External knowledge may support farmers where it reinforces local capacity, yet may foster dependency where it is delivered in a top-down manner that side-lines local expertise. This is a hypothesis for future testing, because no moderator, time dimension or post-withdrawal data were available.

This reading also clarifies how the study relates to work warning that donor knowledge displaces local knowledge (Kita, 2026; van der Puije, 2026; Yanou et al., 2023). The present finding appears to differ from that work, but the difference may be one of focus. Those studies address the legitimacy of knowledge, whereas this study measured association with self-reliance. It also found low reliance on expert knowledge alone, which is the filtering behaviour the displacement literature would predict farmers need in order to protect local expertise. The two bodies of evidence are therefore compatible. Because this study is cross-sectional, however, it cannot show whether displacement occurs over time.



Conclusion

The purpose of this study was to ascertain the degree and direction of the relationship between self-reliant farming and donor transfer of agricultural knowledge among smallholder farmers in Yambio County, South Sudan. The evidence demonstrates that self-reliant farming was positively and strongly correlated with donor transfer of agricultural knowledge ($B = 0.359$, $p < .001$), and the corresponding null hypothesis is rejected. However, the descriptive and qualitative data indicate that farmers are more trusting of knowledge that combines indigenous ecological and cultural knowledge with innovation supplied by donors than they are of expert knowledge given as their only trustworthy source. The findings are therefore consistent with the view that donor-facilitated knowledge transfer is associated with self-reliance mainly where it complements, rather than displaces, farmers' own indigenous knowledge systems and collective learning networks. This reading rests on descriptive and qualitative evidence and on cross-sectional data, not on a statistical test of the conditions involved, and should be treated as a hypothesis for further research.

The cross-sectional approach demonstrates association rather than causality; donor targeting of groups and reverse causation (better-organized organizations drawing greater donor training) cannot be ruled out. Standard errors may be understated because the survey sample of 170 is smaller than the about 300 recommended for a population of 1,405 (a margin of error of about $\pm 7.1\%$). Additionally, respondents were nested in 30 groups, which were not modeled. Self-report was used for the perception items. The circumstances in which local knowledge was enhanced by knowledge transfer (compatibility, peer-led channels and continuity of support) were examined descriptively and qualitatively but not tested statistically.

This study is not terminal. Future studies could (i) test whether knowledge transfer results in self-reliance using longitudinal or quasi-experimental designs; (ii) assess if compatibility with indigenous knowledge, peer-led delivery, and continuity of support condition the association through interaction terms; (iii) employ multilevel models that take into account clustering within farmer groups; (iv) track groups after donor withdrawal to evaluate durability; and (v) compare training, extension advice, and introduced innovations.

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Table 1 A: Use of Local Farmers' Knowledge on Self-Reliant Farming (N=170)

Statements on Consequences	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	Std Dev
The only reliable knowledge at the disposal of local farmer is expert information	71 (41.8%)	46 (27.1%)	17 (10.0%)	22 (12.9%)	14 (8.2%)	2.188	1.323
Local farmers have used local knowledge over the years to successfully create influence among other farmers to work together towards improving their production hence self-reliance	9 (5.3%)	10 (5.9%)	17 (10.0%)	56 (32.9%)	78 (45.9%)	4.082	1.128
Some local farmers have traditional solidarity working groups and sharing information systems	17 (10.0%)	20 (11.8%)	12 (7.1%)	64 (37.6%)	57 (33.5%)	3.729	1.309
Traditional taboos have helped reduce environmental degradation	19 (11.2%)	26 (15.3%)	10 (5.9%)	60 (35.3%)	55 (32.4%)	3.624	1.367
Both local farmers and expatriates can each learn from the experiences of each other	17 (10.0%)	21 (12.4%)	12 (7.1%)	60 (35.3%)	60 (35.3%)	3.735	1.326
Local knowledge is hardly appreciated as beneficial for self-reliant farming	14 (8.2%)	17 (10.0%)	8 (4.7%)	66 (38.8%)	65 (38.2%)	3.888	1.252

Source: Researcher (2026)