INFLUENCE OF INSTITUTIONAL LINKAGES ON SUSTAINABILITY OF DAIRY GOAT PROJECTS IN THARAKA NITHI COUNTY, KENYA

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ABSTRACT

Sustainability of projects remains a sole major focus in all development projects globally. Nevertheless, there is evidence that sustainability is hardly achieved. Probably due to insufficient understanding of its predictors and how to integrate them during the project design stage. The purpose of this study was to investigate the influence of institutional linkages (markets, animal health, and social institutions) on the sustainability of dairy goat projects. Grounded on Herbert Spencer's Structural-Functional Theory Informed by the pragmatism paradigm, this study adopted a descriptive survey and correlational research designs and using a mixed-mode approach to data collection and analysis. A sample size of 196 respondents was generated using a stratified random sampling technique. To enhance data triangulation, 12 key informants were sampled purposively and interviewed as well as focus group discussion involving 4 groups of 8 participants. Results indicate that r= 0.179 and R²=0.0320, t=2.479 at p=0.014<0.05, Therefore, the null hypothesis was rejected. Therefore, institutions such as health, market, and social are key drivers to dairy goat project sustainability. Project designers therefore must integrate them in the design of such projects and ensure that they are properly placed if sustainability is to be achieved.

Keywords: Institutional Linkages, Sustainability, Dairy Goat Projects.

INTRODUCTION

Globally, the dairy goat production system is growing rapidly and its adoption among rural and per urban farming communities gaining momentum. This contributes to the significant role the livestock sector plays in promoting agriculturally based economies. Studies confirm that the role of dairy goat production in the sustainability of community livelihoods cannot be underestimated. Dairy Goat farming in particular assumes critical importance in the advancement of smallholder livelihoods (Boyazoglu et al. 2005, Belachew, Mersso and Yadeta 2020). This is because goats thrive in some unfavorable climatic conditions, mainly found in resource-poor counties thus suited in many low-income economies as livelihood support (Liang and Promote 2019, Narayan 2020). Therefore, there is a need to adopt new and innovative dairy goat production technologies, geared towards increased productivity, value addition, and marketing. On this front, Miller and Lu (2019) express the need to build synergy among dairy goat production stakeholders, policymakers, development practitioners especially in research, promoting new technologies, sharing information, and best practices.

Kavoi et al. (2014) posit that livestock development in Africa experiences severe challenges that have contributed to a downward trend in the improvement of dairy goat production. There is therefore no doubt that urgent interventions are necessary to remedy this situation. Project designs must incorporate sustainability drivers as a precursor to sustainability (Bebbington et al. 2007, Shenhar 2011). Miller and Lu (2019) advocate that the development of livestock production policies must be all inclusive so that the voice and aspirations of all

stakeholders are incorporated because they have a high stake in influencing the markets. Evidently, the role played by the dairy goat production systems cannot be underestimated and especially in supporting livelihoods. This notwithstanding, a study by Adejobi and Kassali (2013) revealed a worrying trend with of downward progression in dairy goat production. Kavoi et al. (2014) identified major gaps as a failure by farmers to keep good records, lack of capacity in dairy goat management coupled with wrong decision making concerning dairy goat production. Other factors identified in Ngongoni (2013) are poor dairy goat market arrangements, lack of skills in financial management, and inadequate enterprise viability assessment as well as challenges associated with breeding practices. Therefore, based on these gaps, this study sought to establish the influence of institutional linkages (linkages to markets, linkages to veterinary services, and linkages to social institutions) on the sustainability of dairy goat projects in Kenya.

OBJECTIVE OF THE STUDY
The objective of this study was to investigate the influence of institutional linkages on the sustainability of dairy goat projects in Kenya

RESEARCH HYPOTHESIS
The following hypothesis was tested:

H_0 Institutional linkages have no significant influence on the sustainability of dairy goat projects in Tharaka Nithi County.

LITERATURE REVIEW
The sustainability of livestock development projects is not a new phenomenon and has taken a center stage in recent times. Many studies around project sustainability show a rather contradicting and or a lack of constancy in its explanation. Project sustainability can be achieved with the meticulous incorporation of sustainability variables into project designs and policy development (Mensah 2019, Nikoli´c et al 2020). As such Mog (2014) observes that it is crucial to support the community's innovativeness, and efforts to gain knowledge and adopt new farming technologies as a pre-requisite to the sustainability of these development programs Gilbert (2014) indicates that sustainability is future-oriented where the implementation of sustainable projects is key. These projects must assure the appropriate use of resources, pursuing the best alternatives, optimization technology, and capacity enhancement. Thomson et al. (2011) observe that projects must be well designed and implemented to fulfill priority community needs that are all aligned within the social, economic, and environmental front. Consequently, Dairy goat project designs should conform to the sustainability criteria as dictated by the local context. Literature indicates that projects need to have a multiplier effect, trickle-down capability, enhanced community, beneficiary project ownership, resilience over unfavorable environmental conditions, and more importantly a progressive social-economic gains.

Studies around the sustainability of dairy goat improvement projects show a mixed reaction on the appropriateness of sustainability drivers incorporated in the project designs. Bett et.al (2013) found that the "pass-on strategy to attaining dairy goat multiplication levels thus project sustainability was not achieved due to the low capacity among dairy goat farmers to link with training agents and farmer groups for peer to peer learning. The study looked at the practices influencing the sustainability of the multiplication of dairy goats. As a result, social-economic gains, key elements in project sustainability were compromised. Chenyambuga and Lekule (2014), indicate that the social-economic usefulness of dairy goat projects is important in assessing the sustainability of such projects and cannot be underestimated. Also,
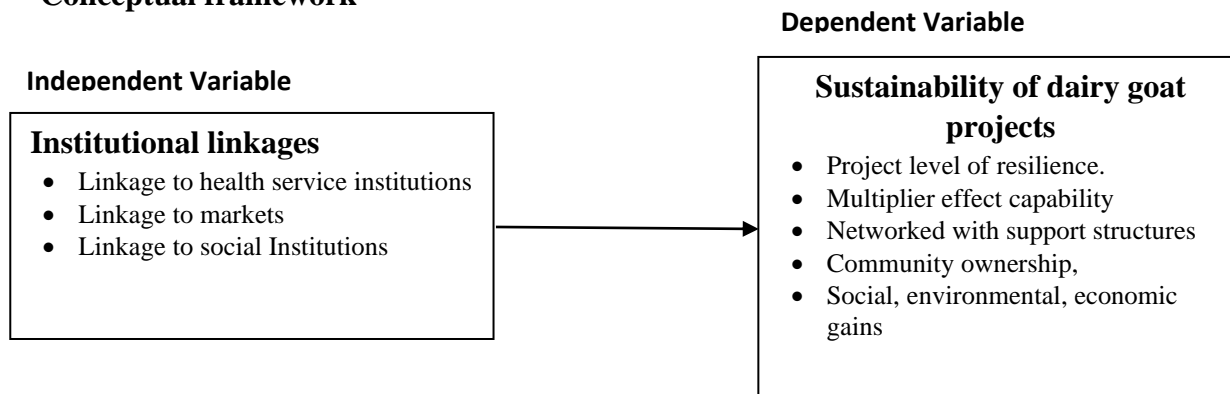
Bossio (2009) posits that dairy goat farming is important in enhancing livestock farming systems as it gives the much-needed absorption to adverse shocks, hazards, risks as well as enabling farm diversification and intensification for improved livelihoods. For this reason, dairy goat farmers and farmer groups need to be properly linked to key service institutions to support the sustainability drive.

Implementation of dairy goat projects requires a supportive institutional arrangement. A study by DFID (2004) found that for dairy goat development projects to succeed, it is important to first build strong institutions and stakeholders who will support the project activities progressively. These institutions directly contribute to the success of such projects and providing enabling environment for sustainability such as good channels for information sharing (Amir (2014, Ahuja 2000). Further, Wymann et al. (2007) point out that dairy goat production requires a credible health service provision system with quality veterinary service to address livestock diseases and conditions. Nevertheless, Ngeiywa & Masake (2009) observes that attaining this feat has been thwarted by a lack of prioritization by governments and less interest by the private sector in supporting dairy goat sector development. Despite the struggle in the production process, another major bottleneck in dairy goat production is access to markets. According to Peacock & Hastings (2011), improvements in livestock production should be coupled with strong linkages to market institutions if success is to be achieved. This provides a chance for attaining sustainable livelihoods among farmer households. However, Alemayu (2011) posits that dairy goat markets are generally unorganized, inaccessible, and many farmers lacking important market information. Therefore, markets must be well organized, information sharing enhanced and farmers are adequately linked to the markets

Similarly, social structures must be well linked to each other for information sharing, peer support, and accountability. Easley & Kleinberg (2010) says that networking among social groups succeeds due to the strong ties that get developed, and synergy in addressing common agenda. For instance, social networks are linkages that groups have and can easily promote transfer and adoption of new farming technologies, acting as conduits for social learning among dairy goat producers thus accelerating the adoption of technology (Tatlonghari et al. 2012, Pali et al 2013, Villanueva et al. 2016). In this sense therefore social networks can be seen as a good strategy for harnessing social capital as a result of linkages among individuals and organizations (White 2002).

Theoretical framework
Structural-Functional theory can be used to explain institutional linkages in the sustainability of projects. Advanced by Theory by Herbert Spencer 1968, the theory postulates that society draws its functionality through interlinkages among different social institutions. The theory compares society to a human body where its performance depends on how the different parts of the body function. Each organ of the body has its function but all contribute to the wellbeing of the entire body in totality. Therefore, in the same way, Spenser argues that societies will thrive based on the vitality of the organ-like institutions that form the society. In this sense, therefore, defects or under performance of one institution may lead to under performance of the entire society.

Conceptual framework

Dependent Variable

Independent Variable

Institutional linkages	Sustainability of dairy goat projects
Institutional linkages • Linkage to health service institutions • Linkage to markets • Linkage to social Institutions	**Sustainability of dairy goat projects** • Project level of resilience. • Multiplier effect capability • Networked with support structures • Community ownership, • Social, environmental, economic gains

Figure 1: Conceptual framework

METHODOLOGY

In this study, both descriptive cross-sectional survey and correlational designs were employed guided by the pragmatic paradigm. A mixed-mode approach allowed the collection and analysis of qualitative and quantitative data. Respondents were dairy goat farmers who were subjected to self-administered questionnaires. Key informants (12) included county officials from the Ministry of Agriculture and livestock development, social services, and project staff. A sample size of 196 respondents was sampled using sequential sampling combined with a stratified random sampling procedure. To enhance triangulation of results, four focus group discussions (FGD) were conducted comprising of 8 participants in each session.

RESULTS

Questionnaires were administered to 188 dairy goat farmers with a return rate of 80%.

Respondents Demographic Profiles

Table 1 shows the frequency and percentage of gender and age composition, the duration respondents have been members of self-help groups, and their experience in dairy goat keeping.

Table 1: Demographic Profile of the respondents

Demographic profile	F	%
Gender	**F**	**%**
Male	107	56.9
Female	81	43.1
Total	**188**	**100**
Age bracket	**F**	**%**
Below 30 years	2	1.1
30-39 years	27	14.4
40-49 years	79	42.0
50 years and above	80	42.6
Total	**188**	**100.0**
Duration in the group	**F**	**%**
1 and below years	14	7.4
1-2 years	2	1.1
2-3 years	11	5.9
3-4 years	17	9.0
4-5 years	12	6.4
5 years and above	132	70.2
Total	**188**	**100.0**

Duration of keeping goats	F	%
1 and below years	16	8.5
1-2 years	5	2.7
2-3 years	19	10.1
3-4 years	8	4.3
4-5 years	10	5.3
5 years and above	130	69.1
Total	**188**	**100.0**

Table 1 shows that out of 196 respondents, 107 representing 56.9% were men while the other 81 being 43.1% were female. This shows that fewer women were involved in dairy goat farming. The findings confirm with Koskey (2008) who found the existence of gender imbalance in dairy goat farming. On the age factor, the majority of the respondents were aged above 50 years representing 42.6% while those between the age of 40 to 49 years were 42%. Youth below 30 years accounted for only I % implying less interest in dairy goat farming. Earlier studies by Chenyambuga and Lekule (2014) found that men and women endowed with factors of production such as land were more involved in dairy goat farming than youth who lacked such.

Descriptive Analysis of sustainability of dairy goat projects
Descriptive analysis of the sustainability of dairy goat projects is presented in Table 2

Table 2: Descriptive analysis for Sustainability of dairy goats projects

	N	Range	Minimum	Maximum	Mean		Std. Deviation	Variance
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic
Sustainability of dairy goats	188	2.50	1.90	4.40	3.2521	.03072	.42116	.177
Valid N (listwise)	188							

Composite mean = 3.25, Composite standard deviation = 0.764, Cronbach Alpha Coefficient = 0.645

The mean score (M) for sustainability was 3.2521 and the standard deviation was 0.764. The measure for sustainability was therefore 3.25 which was tending towards the neutral level in the Likert scale implying that there was moderate sustainability of dairy goat projects.

Health Service Institutions and the Sustainability of Dairy Goat Projects
Descriptive analysis of health service institutions is presented in Table 3
Table 3: Linkages to health service institutions and the Sustainability of Dairy Goat Projects

Statement		SD	D	N	A	SA	Mean	STD V	Total
		F %	F %	F %	F %	F %			F %
A1	Dairy goat health services are readily available	20	108	30	26	4	2.39	.928	100
		10.6	57.4	16.0	13.8	2.1			
A2	Dairy goat health services are of acceptable quality	17	83	51	31	6	2.61	.973	100
		9.0	44.1	27.1	16.5	3.2			
A3	Dairy goat veterinary services are affordable	16	110	42	16	4	2.37	.840	100
		8.5	58.5	22.3	8.5	2.1			
	Composite mean = 2.4574, Composite standard deviation = 0.80843, Cronbach Alpha Coefficient = 0.859								

Table 3 shows a Mean M = 2.4574, Standard Deviation SD = 0.80843. This shows that the majority of the respondents disagreed that there were linkages to animal health service provision institutions. The mean score and standard deviation for item A1 was: (M = 2.39, SD = 0.928). The implication of this result is that availability of health services is important to these projects. FGDs results indicate that health services are available but the cost is high with a low emergency response rate. This is in line with Onono, Wieland, and Rushton (2015) that there was a lack of health services within reach of farmers and they had to travel for a long distance to access drug stockiest. Findings from focus group discussions (FGDs) indicated an inadequate and high cost of veterinary services, slower emergency response rate, and the existence of quacks in service provision as the major obstacles to sustainability. Key informants agree with this finding that there were few qualified health practitioners mainly para-vet professionals who mainly have agro-vet stores and rarely do they do the actual treatment. The current study is of similar findings with a study by Ahuya and Okeyo (2004) that inadequate animal health services contributed to the underperformance of dairy goat projects.

The mean score for item B1 was; (M = 2.61, SD = 0.973). This result infers that this item important in sustainability as the composite mean is lower than the mean for this item. Focus group discussions sighted the presence of unqualified health service providers who charge them cheaper but sometimes their treatment was not successful. The key informant's supported this finding indicating that the number of qualified service providers is limited compared to the demand and expansive area meaning that local animal health service providers (LAHPs) had to travel long distances on rough terrains to offer the services. Focus group discussions revealed that due to this challenge, they resorted to purchasing drugs from Agro-Vet stores to administer themselves; a situation that compromised on the health of their dairy goats. The mean score for item C1 was; (M = 2.37, SD = 0.840). With a mean score above the composite mean, the implication is that affordability of dairy goat health services is important in the sustainability of dairy goat projects. Key informant interviews indicated that due to the privatization of veterinary service provision, the cost of veterinary services is determined by the market forces. Further, livestock farmers need to create proper linkages and working relationships with the private service providers. This agrees with Ngeywa and Masake (2009) that inadequate resources, lack of prioritization by governments, and limited involvement of the private sector impede the progression of dairy goat health service provision.

Dairy goat markets and Sustainability of dairy goat projects

Descriptive analysis of dairy goat market institutions is presented in Table 4

Table 4: **Dairy goat markets and Sustainability of dairy goat projects**

Statement		SD	D	N	A	SA	Mean	STD V	Total
		F %	F %	F %	F %	F %			F %
B1	Dairy goat farmers have ready access to dairy goat markets.	18	114	38	16	2	2.31	.801	100
		9.6	60.6	20.2	8.5	1.1			
B2	Dairy goat farmers have access to the right market information	9	80	57	39	3	2.72	.902	100
		4.8	42.6	30.3	20.7	1.6			
B3	Dairy goat market facilities are favorable to dairy goats needs	24	94	60	9	1	2.30	.773	100
		12.8	50.0	31.9	4.8	0.5			

Composite mean = 2.4433, Composite standard deviation =0.62885, Cronbach Alpha Coefficient = 0.635

Overall, respondents disagreed that there were appropriate institutional linkages with the dairy goat project (M = 2.4433, SDV 0.62885). 128(68%) disagreed that health services are readily available, 30(16%) were neutral while 30(16%) agreed with this statement. The mean and standard deviation for B1 was was (M = 2.31, SD = 0.801) which was less than the composite mean at 2.4433 meaning that there was less influence of access to the market. Focus group discussions (FGDs) confirmed that there is no specific market for dairy goats and their products. For instance, all the milk from dairy goats was being sold or consumed locally for domestic use. Item B2 indicated that the majority 89(47.4%) disagreed, 57(30.3%) were neutral and 42(22.3% agreed. The mean score and standard deviation for this item were; M = 2.72, SD = 0.902 meaning that dairy goat farmers' access to the right market information influenced the sustainability of the dairy goat's project. According to key informants, marketing was coordinated by the dairy goat association. This is in line with Lubungu, Chapoto, and Tembo (2012) who established that families require the right education so that they can tap into the market information and take advantage of the existing opportunities. Item B3 shows that the majority 118(62.8%) disagreed, 60(31.9%) were neutral while 10(5.3%) agreed with this item. The mean score and standard deviation for this item was; (M = 2.30, SD = 0.773). Key informant interviews were for the opinion that just like dairy cows, marketing for dairy goats should be done in a more organized manner.

Social Institutions and Sustainability of Dairy Goat Projects.
Descriptive analysis of linkage to social institutions is presented in table 5

Table 5 **Social Institutions and Sustainability of Dairy Goat Projects.**

Statement		SD	D	N	A	SA	M	SD	Total
		F %	F %	F %	F %	F %			F %
C1	Farmers are linked to the government	126.4	10756.9	5931.4	105.3	00.0	2.36	0.683	100
C2	Farmer groups are linked to leaders	261 3.8	1186 2.8	341 8.1	94.8	10.5	2.15	0.733	100
C3	Self-help groups are linked to each other	115.9	1075 6.9	653 4.6	52.7	00.0	2.34	0.630	100
	Composite mean = 2.2633, Composite standard deviation = 0.45281, Cronbach Alpha Coefficient = 0.5793								

Overall, respondents disagreed that there was an appropriate linkage to community social institutions at (M = 2.4433, SDV 0.62885). Item C1 shows that the majority 119(63.3%) disagreed, 59(31.4%) were neutral while 10(5.3%) agreed with this statement. The mean score and standard deviation for this item was; (M = 2.36, SD = 0.683). This result means that since the composite mean is less than the item's mean, the extent of linkage of dairy goat farmers to the government and market support is important. Item C2 shows that the majority 118(62.8%) disagreed with this item. The mean score for this item was 2.15 with a standard deviation of 0.733. This result implies that the majority of the respondents disagreed that dairy goat farmer groups are linked to community leaders for support. Item C3 indicates the majority of the respondents118(62.8%) disagreed, 65(34.6%) were neutral while 5(2.7) agreed. The mean and standard deviation was; (M = 2.34, SD = 0.630). The mean and composite mean was at the same level meaning that the influence was neutral

Regression Analysis of Institutional Linkages and Sustainability of Dairy Goat Projects
The following hypothesis was tested:

Hypothesis H₀   *Institutional linkages to dairy goat projects have no significant influence on the sustainability of the dairy goat projects in Tharaka Nithi County.*

The regression model for testing this hypothesis is shown below.

Sustainability of dairy goat projects = f (Institutional Linkages)

$$Y = \beta_0 + \beta_1 X_1 + \varepsilon$$

Where

Y = Sustainability of dairy goat projects

X_1 = Institutional Linkages

β_0: = Constant term

ε = Error term

Table 7: Results of linear regression analysis

Model Summary								
Model	R	R Square	Adjusted R Square	Std. The error of the Estimate	Change Statistics			
					R Square Change	F Change	df1	df2	Sig. F Change
1	.179ᵃ	.032	.027	.41548	.032	6.146	1	186	.014

ANOVA					
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.061	1	1.061	6.146	.014ᵇ
	Residual	32.108	186	.173		
	Total	33.169	187			

Coefficients								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	2.896	.147		19.735	.000	2.607	3.186
	Institutional linkages	.150	.060	.179	2.479	.014	.031	.269

Dependent Variable: Sustainability of dairy goats
Independent Variable: Institutional Linkages
t = 2.479 at level of significance p=0.014<0.05, r= 0.179, R2 = 0.0320

Table 7 shows that r = 0.179, indicating that there is a positive slope between the two variables. With R- Squared being 0.032, this implies that institutional linkages accounted for 32% changes in project sustainability while the factors would account for 68%. At F (1.186) = 6.146, the ANOVA results means that the stated model was statistically significant.

Other results show that p-value = 0.014≤0.05, t=2.479, r = 0.179 and R squared = 0.032. Overall F statistics were F (1,186) = 6.146, which shows that there exists a positive correlation and the slope of the population regression line is not zero. Since the p-value of 0.014 is less than 0.05, the null hypothesis was rejected and concluded that there is a significant relationship between institutional linkages and the sustainability of dairy goat projects.

Using the statistical findings, the regression model

$$Y = \beta_0 + \beta_1 X_1 + \varepsilon$$

can then be substituted as follows; Y= 2.896 + 0.179 X1

The beta value implies that for a one-unit increase in institutional linkages, the sustainability of the dairy goat project increases by 0.179. This, therefore, confirms that institutional linkage has a significant influence on the sustainability of dairy goat projects. The null hypothesis was rejected that Institutional linkages to dairy goat projects have no significant

influence on the sustainability of the dairy goat projects in Tharaka Nithi County. This finding confirms that the predictor indicators; linkage to health services, linkage to markets, and social institutions linkages are important in dairy goat project sustainability.

These findings are in line with findings from other studies confirming that institutional linkages are important in dairy goat projects. DFID (2004) found that one of the preconditions for sustainable projects is the existence of credible institutions with the capacity to support project activities. Likewise, the current study agrees with Ahuja (2000) that stakeholders perform the important task of connecting projects with support systems and facilitating information flow among key players. Further, Villanueva et al (2016), Pali et al (2013) found that social networks create the necessary and conducive environment for information exchange and social learning. A situation that promotes efficient and effective technology adoption. Further, the current findings support findings by Peacock and Hastings (2011) who found that market access is a sure ingredient in ensuring the sustainability of dairy goat projects.

CONCLUSIONS

Inferential statistics showed a significant positive influence of institutional linkages indicating that these institutions play a key role. These projects are heavily dependent on credible health services, of high quality, affordable, and accessible to the beneficiaries. The study concludes that the cost of veterinary services was high and services inadequate, slower emergency response rate and the existence of quacks in service provision were the major obstacles to sustainability. Besides, dairy goat projects are commercially based, therefore market information and sound marketing network are important. These fundamental aspects of project design were inadequate in the dairy goat project under study. As such, it can be recommended that stakeholders in the dairy goat sector need to design dairy goat projects that incorporate a mechanism for institutional linkages. This will ensure that reliable, acceptable, and high-quality dairy goat health and extension services are guaranteed, dairy goat market dynamics are addressed, and that dairy goat farmers are properly organized and appropriately linked together for peers to peer support.

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