DETERMINANTS OF FARMERS' PARTICIPATION IN THE MILK VALUE CHAIN AND ITS EFFECT ON LIVELIHOODS IN MOUNT ELGON REGION, KENYA

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OUTLINE

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BACKGROUND OF THE STUDY

IMPORTANCE OF THE SECTOR

- Agriculture plays a central role in achieving SDGs on Poverty, Food and Nutritional security, Employment, Gender equality, and Climate.

- The dairy subsector accounts for 14% of AGDP and 6-8% of the country's GDP

- Has a huge potential for poverty alleviation, improving food and nutrition security and employment generation

- However there is a wide gap between demand milk and production,

- Estimated average annual growth rates for the period from 2005/2007 to 2030: milk production -2.1% vs consumption -2.5%

Challenges facing smallholder dairy farmers

- ➤ Climate variability
- ➤ Decreased soil fertility (leading to diminishing pasture resources)
- ➤ Low milk productivity
- ➤ High cost inputs (farmers low cash reserves)
- ➤ Poor market access
- ➤ Poor infrastructure
- ➤ Decreasing land sizes

LIVELIHOODS MOUNT ELGON PROJECT

Key players:

- Livelihood fund
- Brookside dairy
- VI agroforestry an NGO

Intervention

➢ Aim to improve livelihoods in the Mount Elgon region by combining agricultural productivity, environment conservation and dairy value chain business.

➢ Training on sustainable practices, agroforestry, crop diversification, fodder production and livestock management expected to increase yields.

➢ Farmers are involved in the project through cooperatives.

➢ The cooperatives are strengthened to help dairy farmers bulk milk, obtain better supply contracts and to offer more services like AI and veterinary care.

STATEMENT OF THE PROBLEM

- Approximately 1.8 million farmers rely on milk majorly for both household nutrition and income.

- The major issue in dairy production is low production and productivity.

- Most of the smallholder producers lack economies of scale and have low productivity worsened by seasonal fluctuations.

- The lack the necessary resources to modernize and expand their enterprises.

- Previous studies show that the dairy farmers adjacent to Mount Elgon are constrained by several factors for example climate variability, decreased soil fertility (diminishing pasture resources), low milk productivity, high cost inputs (farmers' low cash reserves) huge knowledge gaps and market access which is further constrained by poor infrastructure .

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- The rapid population growth on the slopes of Mount Elgon exerts pressure on agricultural land and natural resources. Farmers are in a vicious cycle; degraded lands due to deforestation, inefficient agricultural practices and uncontrolled grazing leading to low yields. Farmers' weak link to dairy markets make dairy enterprises unprofitable.
- None of the previous empirical studies on dairy value chain assessed the combination of the determinants of farmers' participation in the dairy value chain and the effects on their livelihoods.
- This study will use a gendered approach to address the lack of empirical research on determinants and their effects on livelihoods in dairy subsector.

OBJECTIVES OF THE STUDY

Main objective: To analyze the determinants of participation in the milk value chain and its effects on livelihoods in Mount Elgon area.

specific objectives

➢ To characterize the dairy marketing structure in mount Elgon region.

➢ To analyze determinants of household participation in the dairy markets in mount Elgon region

➢ To analyze the effect of household participation in the dairy markets on household income.

➢ To analyze the effect of household participation in the dairy markets on dietary diversity and food frequency in mount Elgon region.

RESEARCH HYPOTHESIS

➢ Farm and farmer characteristics, gender, culture and institutional factors have no significant effect on participation in the dairy market in the mount Elgon region.

➢ There exists no significant differences in household's total income between those who participate in the dairy markets and those that do not.

➢ There exists no significant differences in dietary diversity and food frequency between those who participate in the dairy markets and those that do not.

JUSTIFICATION FOR THE STUDY

- VI-Agroforestry

- Farmer cooperatives

- Farmers

- Policy makers

- Researchers

- SDG 1 ,2,5 and CAADP 3(increasing food supply and reducing hunger)

THEORETICAL FRAMEWORK

AGRICULTURAL HOUSEHOLD MODEL (AHM)

- Livelihood strategies employed by different households are influenced by challenges that face them (carney, 1998). Households often face simultaneous decision making situations for example whether to consume own-produced or market purchased products. time and existing market wage from itself if they decide to allocate time to leisure or to production activities. The behavior of households in such situations is best explained by agricultural household model (AHM).

- A unique form of decision making, thus, exist among smallholder farmers when consumption and production interact. Households maximize utility through the consumption of all available commodities (home-produced goods, market-purchased goods, and leisure), subject to income constraints. The model posits that markets exist for all goods, prices are exogenous and production decisions are taken independently of consumption decision. However it is noted that markets do not exist in all cases and hence not all goods are tradable. Moreover, it is not possible to separate consumption from production decisions.

- AHM assumes that farm output is consumed by producing households, with the surplus being marketed. However, consumption and production decisions are made simultaneously. Households maximize utility derived from the proceeds of production and family labor subject to a set of constraints.
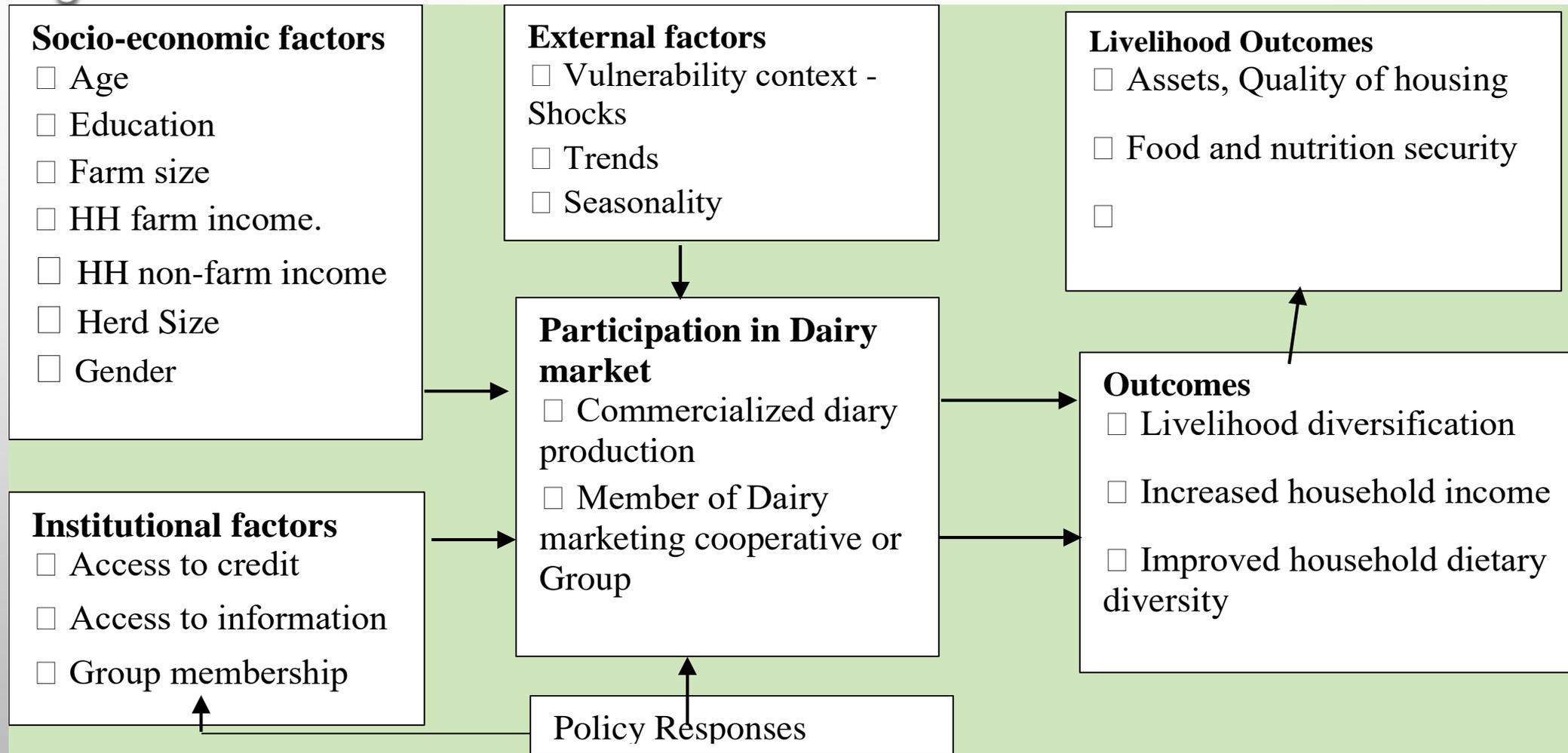
CONCEPTUAL FRAMEWORK

Socio-economic factors
☐ Age
☐ Education
☐ Farm size
☐ HH farm income.
☐ HH non-farm income
☐ Herd Size
☐ Gender

External factors
☐ Vulnerability context - Shocks
☐ Trends
☐ Seasonality

Livelihood Outcomes
☐ Assets, Quality of housing
☐ Food and nutrition security
☐

Participation in Dairy market
☐ Commercialized diary production
☐ Member of Dairy marketing cooperative or Group

Institutional factors
☐ Access to credit
☐ Access to information
☐ Group membership

Outcomes
☐ Livelihood diversification
☐ Increased household income
☐ Improved household dietary diversity

Policy Responses

Figure 1: Conceptual framework of smallholder farmers' market participation
Conceptual framework: Source - Modified from DFID Livelihood, (2002)

STUDY AREA

- Bungoma and Trans Nzoia counties

- Project interventions area

- The two counties border mount Elgon and have a great potential for dairy production.

- The residents of these countries mostly practice mixed farming as a source of livelihood

SAMPLING

Multistage sampling technique

➢First stage Bungoma and Trans Nzoia counties have been purposefully selected as part of the Mount Elgon livelihood project areas and also because the two counties have huge untapped potential for dairy .second stage Two sub counties each will be purposely selected as they border Mount Elgon. Kiminini and Saboti in Trans Nzoia and Tongaren and Elgon in Bungoma county.

➢Two stage stratified sampling will be then used. The target population which is smallholder dairy farmers in the study region will be divided into two strata, participants and non-participants in the milk value chain livelihood project. In the second stage we will randomly choose from the list beneficiaries and then randomly from non-beneficiaries.

SAMPLE SIZE DETERMINATION

- **Sample size determination**

- According to Kothari (2004), the following formula will used to determine sample size.

- N=(pqz^2)/e^2

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- 〚(0.5)(0.5)1.96〛^2/〚0.08〛^2 =150

- Therefore, at least 150 questionnaires will be required, this study will however target 200 households during data collection

ANALYTICAL FRAMEWORK

➢ Objective 1: To characterize the dairy marketing structure in Mount Elgon region.: Descriptive statistics

➢ Objective 2: To analyze determinants of household participation in the dairy markets in Mount Elgon region

- This objective requires a two-step decision making process and thus a double-hurdle model will be used.

- Some previous studies have characterized decision as occurring in two steps; first, making the decision to participate in dairy markets and second the intensity of participation

- Thus, in the case of this study, the two hurdles will be: first, whether the household makes the decision to participate or not, and second is the intensity participation which will measured by the quantity of milk sold.

- The model permits possibility of estimating the first and second equations using different explanatory variables

Description of variables in a double-hurdle model and their hypothesized signs.

Variable	Description	Measurement	Hypothesized sign	
			Hurdle 1	Hurdle 2
Dependent variables				
Y_1	Household decision (Choice to participate or not)	Dummy (Yes=1, No=0) (1 = Participate, 0 = Don't participate)		
Y_2	Quantity of milk sold in litres	Average number of litres of milksold by household in a day		
Independent Variables				
Age	Age of the respondent	Categorical Age bracket of respondent	+/-	+/-
Sex (Gender)	Gender of respondent	Dummy 1=male 0=female	+/-	+/-
Education	Number of years of education attained	Categorical (Incomplete primary=1, Complete primary=2, Incomplete sec=3, Complete sec=4, Incomplete College/University=5, Complete College/University=6	+	+
Farm size	Farm land size in Acres	Continuous variable		
Farm Income	Income from the farm	Continuous variable	+	+
Non-Farm Income	Income from other activities	continuous variable	+/-	+/-
Herd size	Number of animals owned	Count variable	+	+
Access to credit	Whether a farmer is able to access credit or not	Dummy (Yes=1, No=0)	+	+
Access to information	Whether a farmer is able to access information or not	Dummy (Yes=1, No=0)	+	+
Group membership	Whether a farmer is member of a group	Dummy (Yes=1, No=0)	+	+

The Objective 3: To analyze the effect of household participation in the dairy markets on income and dietary diversity in Mount Elgon region livelihoods

➤ This study will use income and food security as proxy for livelihood.

➤ Propensity Score matching (PSM).

➤ PSM is used to match treated individuals with non-treated that have similar observable characteristics as that of the treated and could have benefited from project but did not.

➤ PSM involves the following steps: estimating propensity scores, choosing the best matching algorithm, checking for overlap, assessing the matching quality, estimating the treatment effect and performing sensitivity analysis if significant differences are observed after matching .

➤ Propensity score can be estimated using a logit or probit model where the treatment is regressed against pre-intervention characteristics then we derive the predicted probability of treatment.

Indicators to measure food security	
Dietary diversity & food frequency	**Consumption behavior**
FCS	CSI-Coping Strategy Index
HDDS/IDDS	HFIAS
Spending on food	HHS
Undernourishment	SAES-Self assessed measure of food security

FCS
- The frequency weighted diet diversity score
- Calculated using frequency of consumption of different food groups consumed
- 7 day recall
- Measure of calorie intake and diet quality

HDDS
- Dietary diversity-No of different foods or food groups consumed over a given reference period.
- Usually 24-hour recall
- Proxy measure for food access
- No of food groups 7-16

Activity	Description	Unit Cost (Kshs)	Total Cost (Kshs)
Focus Group Discussions (FGDS) in two areas (Trans Nzoia and Bungoma)	Hire of venue for FGD (2 Regions)	5,000	6,000
	Group lunch for 15 participants for each region	200	3,000
	Local transport refund for 15 participants for each region	300	4,500
	Subsistence and Accommodation of MSc student (3days)	4000	12,000
	Subsistence and Accommodation for 1 supervisor (3days)	8,500	25,500
	Facilitation for the field guide (2 days)	1,000	2,000
	Hire of vehicle for 2 days	5,000	10,000
	Air time for field coordination	2,000	2,000
	Purchase of stationery – pens, flip charts, note books etc	2,000	2,000
	Sub-total for FGD		**76,000**
Household Survey in 2 Regions(Trans Nzoia and Bungoma)	Printing and photocopying of questionnaires (300 copies)	50	15,000
	Hire of vehicle (10 days)	5,000	50,000
	Subsistence and accommodation for 4 enumerators (10 days)	3,000	120,000
	Subsistence and accommodation for Msc Student (10 days)	4,000	40,000
	Air time for field coordination	3,000	3,000
	Payment of field guides for 10 days	1,000	10,000
	Sub-total for household survey		**238,000**
Manuscript and Publication	*Cost of thesis preparation and manuscript publication*	*50,000*	*50,000*
Total field work budget			**362,000**

Work-Plan 2018/2019

Activities	2018								2019						
	March	April	May	June	July	Aug-Oct	Nov	Dec	Jan	Feb	March	April	May	June	Dec
Proposal development & Submission	■	■	■	■	■	■									
Data Collection & cleaning					□	□	■								
Data Analysis							□	■	■	□	□	□	□	□	□
Thesis writing							□	□	■	■	■	□	□	□	□
Journal submission										□	■	■	■	□	□
Thesis submission											□	■	■	■	
Graduation											□	□	□		■