



Government of Nepal
 Ministry of Agriculture and Livestock Development
Nepal Livestock Sector Innovation Project (NLSIP)
 Hariharbhawan, Lalitpur, Nepal

Final Report

Endline Survey for Nepal Livestock Sector Innovation Project (NLSIP)

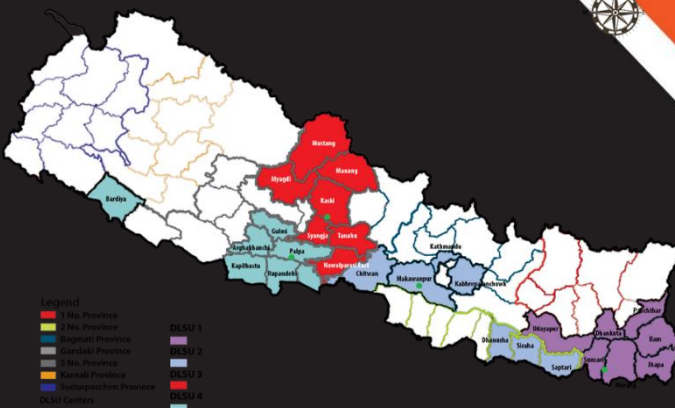
Contract ID No.: NP-MOALD-312961-
 CS-CQS



Nepal- SOUTH ASIA- P156797

Nepal Livestock Sector Innovation Project (NLSIP)

IDA Credit No. 6149-NP



Submitted by:

Bright Future International JV with ERMIC

Contact No. : +977- 01- 5172078; 9851097330; 9851063177
 Address: KMC-10; Mid-Baneshwor, Kathmandu Nepal
 E-mail: bf.international2012@gmail.com
 Website: <http://www.bfi.com.np>

December, 2023

STUDY TEAM

The study team for the project consists of experts from multiple backgrounds as presented below:

Team Leader/ Socio-economist/ GESI Expert:	Ms. Shova Kumari Poudel
Consultant/ Professional Report Writer/ Economist:	Mr. Rajendra Prasad Bhari
Livestock/Veterinary Expert:	Dr. Sudarshan Prasad Regmi
Finance / M&E Expert:	Mr. Krishna Thapa
Statistician/ Data Manager:	Mr. Nagendra Bahadur Amatya
Statistician/ Data Manager:	Mr. Binod Kumar Kachhapati
Consultant	Mr. Deepak Adhikari
Research Assistant:	Ms. Priyanka Gautam
Research Assistant:	Mr. Nirmal Poudel
Project Coordinator/ Logistic Support:	Mr. Suraj Wagle

ACKNOWLEDGEMENT

Bright Future International Pvt Ltd specially thanks to Dr. Ramnandhan Tiwari, the NLSIP Project Director, and PMU team members Dr. Prabesh Sharma, Senior Monitoring and Evaluation Officer, Mr. Ashok Kumar Giri, Deputy Secretary-Account, Mr. Ishwori Khatiwada, Dr. Keshav Bhatta, M&E Officer and Mr. Saumendra Sapkota, Accountant, for their support, comments, and coordination. We also thank Dr. Prabhakar Pathak (Project Team Expert-Lead) and Mr. Yograj Pokharel (Financial Management Specialist). The consulting agency is thankful to the staff of the Technical Support Unit, Hariharbhawan, and District Livestock Service Unit (DLSUs) for their technical feedback during the survey. The consulting firm owes gratitude to Prabhas Prasad Shah (Livestock officer), Mr. Umesh Prasad Yadav (Livestock Officer), Ms. Bandhana Dahal (Information and Communication Assistant) for their technical support. The consulting firm thanks Mr. Joachim Vandecastelen (Economist at Agriculture and Food Practice) of World Bank, Mr. Purna Bahadur Chhetri (Team Leader/Senior Agriculture Specialist) and Ms. Sabina Khatri Karki, an Agriculture Economist at the World Bank's Nepal Country Office for their support during the survey and its analysis.

We would also like to thank Livestock and Veterinary Officers (VHLSEC) Dr. Ram Prakash Pradhan of Lalitpur, Mr. Sambhuraj Pandey of Kaski, Dr. Ajay Kumar Shah of Morang, Mr. Pushpa Raj Dahal of Dhankuta and Ms. Pratima Bista of Rupandehi. We also thank Livestock Development Officers including Mr. Badrinath Poudel of Kathmandu, Mr. Sushil Aryal of Syangja, Ms. Sabitra Kumari Dahal of Jhapa, and Mr. Mingma Rinzi Sherpa of Illam.

ERMC-BFI JV would like to thank Ms. Shova Kumari Poudel, Team Leader, Socio-economist, GESI Expert; Mr. Rajendra Prasad Bhari, Professional Report Writer and Economist; Mr. Sudarshan Prasad Regmi, Livestock and Veterinary Expert; Mr. Krishna Thapa, Finance and M&E Expert, Mr. Nagendra Bahadur Amatya and Mr. Binod Kumar Kachhapati, Statistician and Data Manager; Mr. Deepak Adhikari, Consultant, Mr. Nirmal Poudel, Research Assistant and Ms. Priyanka Gautam as well as Field Supervisors and Enumerators for their hard work.

Bright Future International Pvt. Ltd. (BFI) JV with ERMC
Kathmandu Nepal.

ACRONYMS

ADS	Agriculture Development Strategy
AGDP	Agricultural Gross Domestic Product
ASC	Agriculture Service Centre
BFI	Bright Future International Pvt. Ltd.
BFI	Bank and Financial Institutions
CAPI	Computer-Assisted Personal Interviewing
CBOs	Community-Based Organizations
CBS	Central Bureau of Statistics (of Nepal)
CENA	Capacity Enhancement Needs Assessment
CLESC	Community Livestock Extension Service Center
CSAT	Climate Smart Agriculture Technology
DADO	District Agriculture Development Office
DLS	Department of Livestock Services
DLSUs	Decentralized Level Support Units
DoAD	Department of Agriculture Development
DP	Development Partner
EP	Electronic Protocol
ES	Endline Survey
ESMF	Environmental and Social Management Framework
ESS	Environmental and Social Safeguard
FGD	Focus Group Discussion
FNS	Food and Nutrition Security
FPP	Full Project Proposal
FY	Fiscal Year
GDP	Gross Domestic Product
GESI	Gender Equality and Social Inclusion/ Gender Equity and Social Inclusion
GO	Government Organization
GoN	Government of Nepal
GIS	Geographic Information Systems
GPS	Global Positioning System
GRP	Grievance Redress Procedures
HDI	Human Development Index
HHS	Household Survey
INGO	International Non-Government Organization
KE	Key Experts
KGK	Krishi Gyan Kendra
KII	Key Informant Interviews
KM	Knowledge Management
KPI	Key Performance Indicator
M&E	Monitoring and Evaluation
MDGs	Millennium Development Goals
MGE	Matching Grant Evaluation
MIS	Management Information System

MoLMAC	Ministry of Land Management, Agriculture and Cooperatives
M/RM	Municipality/ Rural Municipality
NAP	National Action Plan
NGO	Non-Governmental Organization
NLBO	National Livestock Breeding Office
NLSIP	Nepal Livestock Sector Innovation Project
NPC	National Planning Commission
NRs	Nepalese Rupees
PAD	Project Appraisal Document
PCN	Project Concept Note
PCU	Project Coordination Unit
PDO	Project Development Objective
PIM	Project Implementation Manual
PLCC	Provincial Level Coordination Committees
PMU	Project Management Unit
POs	Producer Organizations
PRP	Project-Related Personnel
PSC	Project Steering Committee
RA	Research Assistant
REE	Research, Education, and Extension
RFIs	Rural Financial Institutions
SC	Steering Committee
SDGs	Sustainable Development Goals
SDP	Stakeholder Dialogue Platform
SKD	Strategy and Knowledge Department
TCC	Technical Coordination Committees
ToR	Term of Reference
VDCs	Village Development Committees
WB	World Bank
WEAI	Women Empowerment in Agriculture Index
WHO	World Health Organization of the United Nations
ZHC	Zero Hunger Challenge

TABLES OF CONTENT

STUDY TEAM	i
ACKNOWLEDGEMENT	ii
ACRONYMS	iii
TABLES OF CONTENT	v
LIST OF TABLES	ix
LIST OF FIGURES	xiv
EXECUTIVE SUMMARY	1
CHAPTER-1: BACKGROUND	16
1.1. Context and the NLSIP Project	16
1.1.1. Introduction.....	16
1.1.2. Geographic Coverage and Beneficiaries.....	18
1.1.3. The NLSIP Project Implementation Approach.....	18
1.1.4. Project Implementation Arrangement of NLSIP.....	19
1.2. The Present Assignment of NLSIP Endline Survey.....	20
1.2.1. Rationale of the NLSIP Endline Survey	20
1.2.2. Objective of the NLSIP Endline Survey	21
1.2.3. Limitations of the NLSIP Endline Survey	21
CHAPTER-2: ENDLINE SURVEY METHODOLOGY	23
2.1. Survey Design and Methodology	23
2.1.1. Sample Design	23
2.1.2. Sampling of Households	23
2.2. Designed Survey Tools and Data Collection	25
2.2.1. The Survey Tools	25
2.2.2. Developed Online Form.....	25
2.2.3. Organized Training for Supervisors and Enumerators.....	25
2.2.4. Developed Online Data Tracking Mechanism	25
2.2.5. Data Collection Process	26
2.2.5.1. Data Collection at the Household Level (1182 households).....	27
2.2.5.2. Data Collection at the Household Level (1053 households) for Matching Grant Evaluation	27
2.2.5.3. Institutional Survey at Sub-Project Level	27
2.2.5.4. Institutional Survey of Control Sub-Projects	27
2.2.5.5. Key Informant Interviews (KIIs)	28
2.2.5.6. Focus Group Discussions (FGDs).....	28
2.2.5.7. Individual Interviews (IIs)	28
2.2.6. Quality Assurance Mechanism of Data.....	28
2.2.6.1. Translating the Household Questionnaires into Nepali Language.....	28
2.2.6.2. Deployed Qualified Statistician	28
2.2.6.3. Well-Trained Supervisors and Enumerators	28
2.2.6.4. Field Test of the Questionnaires	28
2.2.6.5. Deployment of Monitoring Team	28
2.2.6.6. Online Data Checking and Feedback at Every Moment	28
2.2.6.7. Guidelines to the Enumerators	29
2.2.6.8. Evaluation of Data	29
2.3. Data Analysis and Interpretation.....	29
2.3.1. Analysis of Primary Data and Information	29
2.3.2. Analysis of Secondary Data and Information	31
2.4. Field Activities	31
2.4.1. Team Mobilization for Field Activities.....	31
2.4.2. Post-Field Activities.....	31
2.5. Deliverables.....	32
CHAPTER 3: ENDLINE SURVEY RESULTS AND DISCUSSION	33
3.1. Progress on PDO Indicators (Baseline to Endline Comparison):	33
3.1.1. Productivity of Targeted Livestock Commodities	33
3.1.2. Sales of Value Added Livestock Commodities	34

3.1.3. Farmers Adopting Climate Smart Agricultural (CSA) Technology	35
3.1.4. Farmers' Access to Agriculture Assets and Services	38
3.2. Overall Impact of the Project (Task 1).....	40
3.2.1. Productivity of Targeted Livestock Commodities	40
3.2.2. Sales of Value Added Livestock Commodities	43
3.2.3. Farmers Adopting Climate Smart Agricultural (CSA) Technology	45
3.2.4. Share of Project Beneficiaries with a Livestock Risk Insurance Policy	50
3.2.5. Farmers' Access to Agriculture Assets and Services.....	52
3.2.6. Beneficiary Satisfaction on Project's and PO's Services under Task-1.....	55
3.2.6.1. Beneficiaries' Satisfaction Levels on Project's Services with Relevance, Timeliness and Effectiveness	55
3.2.6.2. Beneficiaries' Satisfaction Levels on PO's Services under Task-1 (HH level).....	56
3.2.7. Cost and Profitability Analysis of Targeted Livestock Commodities.....	57
3.2.7.1. Cost of Production of Milk and Goat Meat at the Household level.....	57
3.2.7.2. Profitability Analysis of Dairy and Goat Enterprises at the Household level.....	57
3.2.8. Employment Generation in 2023 at HH Level	59
3.2.8.1. Employment Generation at HH level in all three Value Chains in 2023	59
3.2.8.2. Employment Generation at HH level in Dairy Value Chain in 2023.....	59
3.2.8.3. Employment Generation at HH level in Goat Value Chain in 2023	60
3.2.8.4. Employment Generation at HH level in Chyangra Pashmina Value Chain in 2023.....	60
3.2.9. Value Chain Linkages and Productive Alliances between Beneficiary HHs / Commercial Producers and Buyers/Traders in 2023	61
3.2.10. Household Income from Targeted Livestock Commodities (Task-1)	63
3.2.11. Food Security at household level by Value Chains (Dairy, Goat and Chyangra Pashmina)...	63
3.2.12. Investment Modality	65
3.2.13. Management of Animal's Feeds	65
3.2.14. Innovation Applied for Scaling up of Agro-Enterprises (Task-1)	66
3.2.15. Quality of Products (Food Safety and Hygiene Procedures)	67
3.2.16. Compliance to Environmental and Social Safeguards Measures.....	67
3.2.17. Access in Market Price Information	68
3.3. Sub-Project (Matching Grant) Impact Evaluation of the Project (Task 2):	70
3.3.1. Productivity of Targeted Livestock Commodities	70
3.3.1.1. Comparison of Productivity of Milk, Goat Meat and Chyangra Pashmina at Sub-Project Level between Baseline (Call-I and II-Individual HH level) and their Endline (2023).....	70
3.3.1.2. Comparison of Productivity of Milk, Goat Meat and Chyangra Pashmina at Sub-Project Level between Baseline (Call-I and II: Collective) and their Endline (2023).....	72
3.3.1.3. Comparison of Productivity of Milk, Goat Meat and Chyangra Pashmina at Sub-Project Level between Baseline (Call-III: Private Farms) and their Endline (2023)	74
3.3.1.4. Comparison of Productivity of Milk, Goat Meat and Chyangra Pashmina at Sub-Project Level between Treatment (2023) and Control (2023) (PO level comparison).....	76
3.3.1.5. Comparison of Productivity of Milk, Goat Meat and Chyangra Pashmina at Sub-Project Level under Call-III Treatment (2023) and Control (2023) (Private Farm level comparison)	80
3.3.2. Sales Value of targeted Livestock Commodities at Sub-Project (SP) level (Task 2)	85
3.3.2.1. Comparison of Sales Value of Targeted Livestock Commodities at Sub-Project (SP-Individual) Level between Baseline (2021) and Endline (2023)	85
3.3.2.2. Comparison of Sales Value of Targeted Livestock Commodities at Sub-Project (SP-Collective/PO level) Level between Baseline (2021) and End-line (2023).....	86
3.3.2.3. Comparison of Sales Value of Targeted Livestock Commodities at Sub-Project (SP-Private Farm) Level between Baseline (2022) and End-line (2023).....	87
3.3.2.4. Comparison of Sales Value of Targeted Livestock Commodities at Sub-Project (SP) Level between Treatment and Control POs in 2023 (PO level comparison)	87
3.3.2.5. Comparison of Sales Value of Targeted Livestock Commodities at Sub-Project (SP) Level between Treatment and Control Private Farms in 2023 (Private Farm level comparison).....	88
3.3.3. Adoption of Climate Smart Agriculture Technology (CSAT) at Sub-project level (Task-2)..	89
3.3.3.1. Climate Smart Agriculture Technology (CSAT) in Call-I and II (Individual HH level)..	89

3.3.3.2. Climate Smart Agriculture Technology (CSAT) Adoption in Call-I and II (Collective/PO level) sub-projects	91
3.3.3.3. Adoption of Climate Smart Agricultural Technologies (CSATs) at Private Farm Level under Call-III	94
3.3.4. Share of Pproject Beneficiaries with a Livestock Risk Insurance Policy	97
3.3.4.1. Insurance applied in Dairy Value Chain (Task -2)	97
3.3.4.2. Insurance applied in Goat Value Chain (Task -2).....	98
3.3.4.3. Insurance applied in Chyangra Pashmina Value Chain (Task -2)	98
3.3.4.4. Number of livestock insured and Compensation received in 2023 at sub-project levels under Task -2	98
3.3.4.5. Livestock Insurance Compensation received at Household level in 2023 under Task -2.	99
3.3.5. Access in Production Assets and Services at Sub-project level (Task-2)	100
3.3.5.1. Comparison of Access in Production Assets and Services at Sub-project level between Baseline (2021) and Endline (2023) (Call-I and II: Individual)	100
3.3.5.2. Comparison of Access in Production Assets and Services at Sub-project level (Call-I and II: Collective / PO levels).....	102
3.3.5.3. Access in Production Assets and Services at Sub-project level under Call-III (Private Farm levels).....	104
3.3.6. Beneficiary Satisfaction Rate with Relevance, Timeliness and Effectiveness of Services Provided by the Project for the Livestock Sector (Task-2).....	107
3.3.6.1. Beneficiaries’ Satisfaction at Sub-project level (Call-I and II: Individual HH level).....	107
3.3.6.2. Beneficiaries’ Satisfaction at Sub-project level (Call-I and II-PO level).....	107
3.3.6.3. Beneficiaries’ Satisfaction at Sub-project level (Call-III-Private Farm level).....	108
3.3.7. Cost and Profitability Analysis of Targeted Livestock Commodities at Sub-project Level (Task-2)	109
3.3.7.1. Cost of Production of Milk and Goat Meat at the Sub-Project level (Task-2) in 2023... ..	109
3.3.7.2. Profitability Analysis of Dairy Enterprises in Task-2 (Sub-Project level) in 2023.....	110
3.3.7.3. Profitability Analysis of Goat Enterprises in Task-2 (Sub-Project level) in 2023	110
3.3.8. Employment Generation at Sub-Project Level	111
3.3.8.1. Employment Generation at Sub-Project (Call-I &II: Individual HH level) level in All Value Chains	111
3.3.8.2. Employment Generation at Sub-Project (Call-I &II: PO level) level in All Value Chains	111
3.3.8.3. Employment Generation at Sub-Project (Call-III: Private Farm level) level in All Value Chains	112
3.3.8.4. Comparison of Employment Generation between Treatment Sub-Projects (Call-I &II: PO level) and Control POs in All Value Chains	113
3.3.8.5. Comparison of Employment Generation between Treatment Sub-Projects (Call-III: Private Farm level) and Control Private Farms in All Value Chains	114
3.3.9. Productive Alliance and Value Chain Linkages between Beneficiary HH/POs and Processer/Trader (Task-2).....	115
3.3.9.1. Productive Alliances and Value Chain Linkages established between Treatment Sub-Projects and their Controls in Dairy Value Chain in 2023.....	115
3.3.9.2. Productive Alliances and Value Chain Linkages established between Treatment Sub-Projects and their Controls in Goat Value Chain in 2023	116
3.3.10. Income Earned at Sub-Project Level (Task-2).....	117
3.3.10.1. Household Income at Sub-Project level (Task-2)	117
3.3.10.2. Income Earned at Institutional Level (Task-2)	117
3.3.11. Investment Modality at Sub-Project Level	119
3.3.12. Management of animal’s feeds at Sub-Project Levels (Task-2)	119
3.3.13. Innovation Applied for Scaling up of Agro-enterprises at Sub-project level (Task-2).....	119
3.3.14. Compliance to environmental and social safeguards measures	120
3.3.15. Access in market price of three value chain commodities under Task-2.....	121
3.3.16. Beneficiaries’ Satisfaction on PO’s Services:.....	122
3.3.17. Beneficiaries’ Satisfaction on Project’s Services at Sub-Project Levels:	122
3.3.17.1. Beneficiaries’ Satisfaction on Project’s Services at Individual Households under Call-I&II	122

3.3.17.2. Beneficiaries' Satisfaction on Project's Services at Subproject level under Call-I&II (PO level)	123
3.3.17.3. Beneficiaries' Satisfaction on Project's Services at Subproject under Call-III (Private Farm level)	123
CHAPTER 4: CONCLUSION, KEY ISSUES, LESSONS LEARNED, AND RECOMMENDATIONS	124
4.1 Conclusion.....	124
4.2 Key Issues and Challenges.....	125
4.2.1. Issues and Challenges During Endline Survey	125
4.2.2. Issues and Challenges in Project Implementation.....	126
4.3 Lessons Learned.....	127
4.4 Recommendations	127
ANNEXES	129
Annex-1: Introduction of NLSIP	130
Annex-2: Insuring Livestock in Task-1 in 2023	131
Annex-3: Cost of Production and Profitability Analysis of Dairy and Goat Enterprises in Task-1 in 2023.....	132
Annex-4: Cost of Production and Profitability Analysis of Dairy Enterprises in Task-2 in 2023	135
Annex-5: Cost of Production and Profitability Analysis of Goat Enterprises in Task-2 in 2023	141
Annex-6: Field Mobilization (Field Researcher/ Supervisors/ Enumerators).....	148
Annex-7: Data Collection Tools	149
Annex-8: Checklist of Key Informants Interview, Focus Group Discussion, and Individual Interview Questionnaires	150
Annex-9: Study Photographs	159

LIST OF TABLES

Table 1: NLSIP Project Coverage Area and Number of Corresponding Municipalities	20
Table 2: Detail Number of Samples POs and HHs	23
Table 3: Detail Number of KIIs, FGDs, and Individual Interviews.....	24
Table 4: Value Chain-wise details of survey completed.....	24
Table 5: Value Chain-wise details of Institutional Survey completed.....	25
Table 6: Definition of Major Indicators and Its Measurement	30
Table 7: Major Deliverables of Endline Survey delivered to the NLSIP.....	32
Table 8: Comparison of Productivity of Targeted Livestock Commodities among from Baseline (2020) to Endline (2023):	33
Table 9: Re-estimated Productivity of Goat in Baseline (2020)	34
Table 10: Comparison of Sales Value of Value-added Products of Targeted Livestock Commodities from Baseline (2020) to Endline (2023).....	35
Table 11: Climate Smart Agricultural Technologies applied at HH level in Targeted Livestock Commodities in in all Value Chains in 2023	36
Table 12: CSAT Applied at HH level in all Targeted Livestock Commodities from Baseline (2020) to Endline (2023)	37
Table 13: Farmers' Access to Agriculture Assets and Services in All value chains from Baseline (2020) to Endline (2023)	39
Table 14: Comparison of Productivity of Targeted Livestock Commodities among from Baseline (2020) to Endline (2023)	40
Table 15: Comparison of Herd Size, Milk Produciton, and Lactation Period of Cow between Baseline (2020) and Endline (2023).....	41
Table 16: Comparison of Herd Size, Milk Produciton, and Lactation Period of Buffalo between Baseline (2020) and Endline (2023).....	41
Table 17: Comparison of Herd Size and Meat Produciton of Goat between Baseline (2020) and Endline (2023).....	42
Table 18: Comparison of Sales Value of Value-added Products of Targeted Livestock Commodities from Baseline (2020) to Endline (2023) (at current price)	43
Table 19: Comparison of Sales Volume and Value of Value-added products of Targeted Livestock Commodities from Baseline (2020) to Endline (2023) (at constant / base year price).....	44
Table 20: Climate Smart Agricultural Technologies applied at HH level in Targeted Livestock Commodities in in all Value Chains in 2023	45
Table 21: Comparison of CSAT Applied at HH level in all Targeted Livestock Commodities between Baseline (2020) and Endline (2023)	46
Table 22: Benefit of CSAT adoption at the Household level (2023).....	46
Table 23: Climate Smart Technologies in Dairy Value Chain and their Adoption Rate in 2023	47
Table 24: Comparison of Adoption of Climate Smart Technologies in Dairy Value Chain between Baseline (2020) and Endline (2023).....	47
Table 25: Climate Smart Technologies in Goat Value Chain and their Adoption Rate in 2023	48
Table 26: Comparison of Adoption of Climate Smart Technologies in Goat Value Chain between Baseline (2020) and Endline (2023).....	48
Table 27: Climate-Smart Technologies in Chyangra Pashmina Value Chain and their Adoption Rate in 2023	49
Table 28: Comparison of Adoption of Climate Smart Technologies in Chyangra Pashmina Value Chain between Baseline (2020) and Endline (2023).....	49
Table 29: Share of Project Beneficiaries with a Livestock Risk Insurance Policy	50
Table 30: Responses of Farmers on receiving Compensations for Claim of Livestock Insurance in 2023.....	51
Table 31: Number of Farmers receiving Compensations for Claim of Livestock Insurance in 2023.....	51
Table 32: Farmers' Access to Agriculture Assets and Services in Dairy value chain	52
Table 33: Farmers' Access to Agriculture Assets and Services in Goat value chain	53

Table 34: Farmers’ Access to Agriculture Assets and Services in Chyangra Pashmina value chain	54
Table 35: Level of Beneficiary Satisfaction in terms of Timeliness, Relevancy and Effectiveness of the Project’ Support	55
Table 36: Level of Beneficiaries’ Satisfactions on PO’s Services at HH level under Task-1	56
Table 37: Cost of Production of Milk and Goat Meat at HH level (Task-1) in 2023	57
Table 38: Profitability Analysis of Dairy and Goat Enterprises in Task-1 (Household level) in 2023	57
Table 39: Employment Generation at HH level in All three Value Chains in 2023	59
Table 40: Employment Generation at HH level in Dairy Value Chain in 2023	59
Table 41: Employment Generation at HH level in Goat Value Chain in 2023	60
Table 42: Employment Generation at HH level in Chyangra Pashmina Value Chain in 2023	60
Table 43: Value Chain Linkages and Productive Alliance between Beneficiary Households (Farmers) and Buyers/Traders under Task-1 in 2023 (All Value Chains)	61
Table 44: Value Chain Wise Business Linkages and Productive Alliance between Beneficiary Households (Farmers) and Buyers/Traders under Task-1 in 2023	61
Table 45: Income earned at Household level (Task-1)	63
Table 46: Food Sufficiency Status in all Three Value Chains	63
Table 47: Food Sufficiency Status in Dairy Value Chain	64
Table 48: Food Sufficiency Status in Goat Value Chain	64
Table 49: Food Sufficiency Status in Chyangra Pashmina Value Chain	65
Table 50: Investment Modalities at Household level (Task-1) (all value chains)	65
Table 51: Management of Animal Feeds by Producer Households in all Value Chains by types of POs (Task-1) in 2023	66
Table 52: Management of Animal Feeds by Producer Households by Value Chains (Task-1) in 2023 ...	66
Table 53: Innovation applied at livestock enterprises (Dairy) in 2023	67
Table 54: Food Safety and Hygiene Procedures applied in Targeted Livestock Commodities in 2023....	67
Table 55: Environmental and Social Safeguards Applying in Structures at HH level in 2023	68
Table 56: Environmental and Social Safeguards Applying for Personal Protection Equipments at HH level in 2023	68
Table 57: Access in market price information in 2023	69
Table 58: Comparison of Productivity of Milk, Goat Meat and Chyangra Pashmina at Sub-Project Level between Baseline (Call-I and II-Individual HH level) and their Endline (2023)	70
Table 59: Comparison of Herd Size, Milk Produciton, and Lactation Period of Cow in Individual Households under Call-I and II Sub-projects between Baseline (2021) and Endline (2023)	71
Table 60: Comparison of Herd Size, Milk Produciton, and Lactation Period of Buffalo in Individual Households under Call-I and II Sub-projects between Baseline (2021) and Endline (2023)	71
Table 61: Comparison of Herd Size and Meat Produciton of Goat in Individual Households under Call-I and II Sub-projects between Baseline (2021) and Endline (2023)	72
Table 62: Comparison of Productivity of Milk, Goat Meat and Chyangra Pashmina at Sub-Project Level between Baseline (Call-I and II: Collective/PO level) and their Endline (2023)	72
Table 63: Comparison of Herd Size, Milk Produciton, and Lactation Period of Cow in POs under Call-I and II Sub-projects between Baseline (2021) and Endline (2023)	73
Table 64: Comparison of Herd Size, Milk Produciton, and Lactation Period of Buffalo in POs under Call-I and II Sub-projects between Baseline (2021) and Endline (2023)	73
Table 65: Comparison of Herd Size and Meat Produciton of Goat in POs under Call-I and II Sub-projects between Baseline (2021) and Endline (2023):	74
Table 66: Comparison of Productivity of Milk, Goat Meat and Chyangra Pashmina at Sub-Project Level between Baseline (Call-III: Private Farms) and their Endline (2023)	74
Table 67: Comparison of Herd Size, Milk Produciton, and Lactation Period of Cow in Private Farms under Call-III Sub-projects between Baseline (2022) and Endline (2023)	75
Table 68: Comparison of Herd Size, Milk Produciton, and Lactation Period of Buffalo in Private Farms under Call-III Sub-projects between Baseline (2022) and Endline (2023)	76
Table 69: Comparison of Herd Size and Meat Produciton of Goat in Private Farms under Call-III Sub-projects between Baseline (2022) and Endline (2023)	76

Table 70: Comparison of Productivity of Targeted Livestock Commodities at Sub-Project (POs) Level between Treatment (2023) and Control (2023).....	77
Table 71: Comparison of Herd Size, Milk Production, and Lactation Period of Cow between Treatment POs under Call-I & II Sub-projects and Control POs in 2023.....	78
Table 72: Comparison of Herd Size, Milk Production, and Lactation Period of Buffalo between Treatment POs under Call-I & II Sub-projects and Control POs in 2023:.....	79
Table 73: Comparison of Herd Size and Meat Production of Goat between Treatment POs under Call-I & II Sub-projects and Control POs in 2023:.....	79
Table 74: Comparison of Productivity of Targeted Livestock Commodities at Sub-Project (Private Farms) Level between Treatment (2023) and Control (2023).....	80
Table 75: Comparison of Herd Size, Milk Production, and Lactation Period of Cow between Treatment Private Farms under Call-III Sub-projects and Control Private Farms in 2023.....	81
Table 76: Comparison of Herd Size, Milk Production, and Lactation Period of Buffalo between Treatment Private Farms under Call-III Sub-projects and Control Private Farms in 2023.....	82
Table 77: Comparison of Herd Size and Meat Production of Goat between Treatment Private Farms under Call-III Sub-projects and Control Private Farms in 2023:.....	83
Table 78: Key Drivers of the Productivity at Sub-projects Level compared between Treatment and Control in 2023.....	83
Table 79: Comparison of Sales Value of targeted Livestock Commodities at Sub-Project (SP) level between Baseline (2021) and Endline (2023) (Individual).....	85
Table 80: Comparison of Number of Households, Total Sales and Per Household Sales Value of targeted Livestock Commodities at Sub-Project (SP) level between Baseline (2021) and Endline (2023) (Individual HH level).....	86
Table 81: Comparison of Sales Value of targeted livestock commodities at Sub-Project (SP) level Between Baseline (2021) and End-line (2023) (Collective/PO level).....	86
Table 82: Comparison of Sales Value of targeted Livestock Commodities at Sub-Project (SP) level between Baseline (2022) and End-line (2023) (Private Farm).....	87
Table 83: Comparison of Sales Value of targeted Livestock Commodities at Sub-Project (SP) level between Treatment POs of Call-I & II and Control POs in 2023.....	88
Table 84: Comparison of Sales Value of targeted Livestock Commodities at Sub-Project (SP) level between Treatment and Control Private Farms in 2023 (Private Farm level comparison).....	88
Table 85: Climate Smart Agriculture Technology Adoption at Household levels in all three Value Chains at Sub-project level (Individual) in 2023.....	89
Table 86: Number of Farmers adopting Climate Smart Agriculture Technology (CSAT) at Sub-project level (Individual) by frequency in 2023, compared with baseline (2021).....	90
Table 87: Climate Smart Agriculture Technology (CSAT) Adoption in Dairy, Goat Meat and Chyangra Pashmina Value Chains at Sub-project level (Individual HHs) in 2023.....	90
Table 88: Number of Farmers adopting Climate Smart Agriculture Technology at Sub-project level (Individual) by Value Chains in 2023.....	91
Table 89: Climate Smart Agriculture Technology Adoption in Baseline (2021) and Endline (2023) in all Value Chains at Sub-project level (Collective/PO level).....	92
Table 90: Comparison of Adoption of Climate Smart Agriculture Technology at Sub-project level (Call-I&II: Collective / PO level) between Baseline (2021) and Endline (2023) in All Value Chains.....	92
Table 91: Comparison of Adoption of Climate Smart Agriculture Technology at Sub-project level (Call-I&II: Institutional / PO level; all value chains) between Treatment and Control in 2023.....	93
Table 92: Comparison of Adoption of Climate Smart Agriculture Technology at Sub-project level (Call-I&II: Collective / PO level) between Treatment and Control in All Value Chains 2023.....	93
Table 93: Climate Smart Agriculture Technology Adoption in Dairy, Goat Meat and Chyangra Pashmina Value Chains at Sub-project level (Private Farm) in 2023.....	94
Table 94: Comparison of Number of Farmers adopting Climate Smart Agriculture Technology at Sub-project level (Private Farm level) between Baseline (2022) and Endline (2023).....	95
Table 95: Comparison of Adoption of Climate Smart Agriculture Technology at Sub-project level (Call-III: Private Farm level) between Treatment and Control in All Value Chains in 2023.....	96

Table 96: Comparison of Adoption of Climate Smart Agriculture Technology at Sub-project level (Call-III: Private Farm level) between Treatment and Control in All Value Chains 2023	96
Table 97: Insurance applied in all Value Chains (Task -2).....	97
Table 98: Insurance applied in Dairy Value Chain (Task -2)	97
Table 99: Insurance applied in Goat Value Chain (Task -2)	98
Table 100: Insurance applied in Chyangra Pashmina Value Chain (Task -2)	98
Table 101: Number of Livestocks insured and compensation received in all value chains at sub-project level in 2023 (Task -2).....	99
Table 102: Compensation received on livestock Insurance in 2023 (Task -2: HH level).....	99
Table 103: Increased Access in Production Assets and Services at Sub-project level (Call-I&II: Individual HH level) during Endline (2023) as compared to Baseline (2021) for All Value Chains	101
Table 104: Access in Production Assets and Services at Sub-project level (Call-I&II: Individual HH level) in all three Value Chains in 2023.....	102
Table 105: Comparison of Increased Access in Production Assets and Services at Sub-project level (Call-I&II: PO level) between Baseline (2021) and Endline (2023) for All Value Chains	103
Table 106: Comparison of Access in Production Assets and Services at Sub-project level (Call-I&II: Collective) in All Value Chains between Treatment and Control in 2023	104
Table 107: Comparison on Increased Access in Production Assets and Services at Sub-project level (Call-III: Private Farm levels) from Baseline (2021) to Endline (2023) for All Value Chains.....	105
Table 108: Comparison of Access in Production Assets and Services at Sub-project level (Call-III: Private Farms) in All Value Chains between Treatment and Control in 2023.....	106
Table 109: Beneficiaries' Satisfaction at Sub-project level (Call-I&II-Individual HH level).....	107
Table 110: Beneficiaries' Satisfaction at Sub-project level (Call-I and II-PO level)	108
Table 111: Beneficiaries' Satisfaction at Sub-project level (Call-III-Private Farm level).....	108
Table 112: Cost of Production, Price and Profit per Unit of Milk and Goat Meat at Sub-Project level (Task-2) in 2023	109
Table 113: Profitability Analysis of Dairy Enterprises at Sub-project level (Task-2) in 2023.....	110
Table 114: Profitability Analysis of Goat Enterprises at Sub-project level (Task-2) in 2023	110
Table 115: Employment Generation at Sub-Project (Call-I &II: Individual HH level) level in All Value Chains	111
Table 116: Employment Generation at Sub-Project (Call-I &II: PO Level) level in All Value Chains..	112
Table 117: Employment Generation at Sub-Project (Call-III: Private Farm Level) level in All Value Chains	113
Table 118: Employment Generation at Sub-Project (Call-I &II) Treatment and Control PO level in All Value Chains	113
Table 119: Comparison of Employment Generation between Treatment Sub-Projects (Call-III: Private Farm Level) and Control Private Farms in All Value Chains.....	114
Table 120: Productive Alliances and Value Chain Linkages established between Treatment Sub-Projects and their Controls in All Value Chains in 2023	115
Table 121: Productive Alliances and Value Chain Linkages established between Treatment Sub-Projects and their Controls in Dairy Value Chain in 2023	116
Table 122: Productive Alliances and Value Chain Linkages established between Treatment Sub-Projects and their Controls in Goat Value Chain in 2023.....	116
Table 123: Individual Household Income at Sub-project level (Task-2).....	117
Table 124: Income earned at Institutional level (Task-2)	118
Table 125: Investment Modality at Sub-project level (Task-2).....	119
Table 126: Management of animal feed at Sub-project level (Task-2).....	119
Table 127: Innovation applied at Sub-project level (Task-2)	120
Table 128: Per cent of HHs and Sub-Projects complied to Environmental and Social Safeguards Measures in all Value Chains in 2023.....	121
Table 129: Access in Market Price Information under Task-2 in 2023.....	121
Table 130: Beneficiaries' Satisfaction Levels on PO's Services under Task-2 in 2023.....	122

Table 131: Beneficiaries' Satisfaction Levels on Project's Services under Task-2 (Individual HH level) in 2023	123
Table 132: Beneficiaries' Satisfaction Levels on Project's Services under Task-2 (Call-I&II: PO level) in 2023	123
Table 133: Beneficiaries' Satisfaction Levels on Project's Services under Task-2 (Call-III: Private Farm level) in 2023	123

LIST OF FIGURES

Figure 1: Introduction of NLSIP.....	17
Figure 2: Overall Coverage Map of NLSIP	18
Figure 3: Online data tracking mechanism applied in NLSIP Endline Survey, 2023.....	26
Figure 4: Productivity of Targeted Livestock Commodities from 2020 to 2023.....	34
Figure 5: Sales Value of Value-added Products of Targeted Livestock Commodities from Baseline (2020) to Endline (2023)	35
Figure 6: CSAT Applied at HH level in all Targeted Livestock Commodities from Baseline (2020) to Endline (2023)	38
Figure 7: Beneficiaries' Satisfaction on Project's Services (Task-1)	56

EXECUTIVE SUMMARY

The NLSIP Project:

Nepal Livestock Sector Innovation Project (NLSIP) is being implemented by the Government of Nepal's Ministry of Agriculture and Livestock Development (MoALD) with support from the World Bank (WB). The NLSIP aims to improve the production and productivity of milk, meat, and pashmina production and productivity in order to raise producer farmers' income. The project, which ran from February 2018 to June 2023, was expected to attract private and public sector investment in livestock-related businesses and services by investing in innovative support programs such as service delivery, access to information, technology, market development, and competitive enterprise development.

The project's objectives were to increase smallholder farms' and agro-enterprises' value addition, productivity and climate resilience in a few chosen livestock value chains in Nepal. The project was expected to support the country's priorities since it was in line with the four strategic pillars of Agriculture Development Strategy (ADS): governance, productivity, commercialization, and competitiveness. The four Key Performance Indicators (KPIs) the project sought to meet were as follows: (i) Increased productivity of targeted livestock commodities, (ii) Increased sales of value-added products in targeted value chains, (iii) Farmers adopting climate-smart agricultural technologies, and (iv) Farmers reaching out with agricultural assets or services.

Four Decentralized Level Support Units (DLSUs), acting as cluster-level offices, carried out the project's implementation. Each cluster comprised local governments (municipalities and rural municipalities), producers' organizations, entrepreneurs, and consumers. These clusters covered 12.4 million people (6.4 million of them were female) and spanned 289 municipalities in 28 districts across five provinces. The project's decentralized approach promoted inclusivity and equity in its execution by enabling it to effectively reach and engage with a broad range of stakeholders in different geographical regions. In order to accomplish the Project, a cluster strategy and value chain development methodology were used. The primary project beneficiaries would be 200,000 livestock producers (at least 45% of whom are women) and 500 small and medium-sized agro-entrepreneurs.

Additionally, 601 agro-enterprises were to receive matching funding from the project for the production and post-production value chain. The agro-enterprises were required to propose the selected business plans had to be proposed by agro-enterprises and these had to be evaluated and funded with a combination of project grants (up to 50% or NRs. 10 million), required bank and financing institutions loans (at least 30%) and cash contribution in the form of equity (at least 20%).

Present Assignment of Endline Survey

The current assignment involved gathering and analyzing primary data to assess the project's impacts, effectiveness and outcomes. An endline survey was required to assess the impact of the project's interventions at the households, POs, and sub-project levels because the project was to be phased out by June 2023. The main objective of the endline survey was to evaluate the impact of project interventions on beneficiary households and sub-projects. The endline survey aimed to achieve three goals: (i) collecting socio-economic data of sampled POs and households that are project beneficiaries, (ii) providing data relevant to the project result framework indicators to measure the project's effectiveness and impact; and (iii) making recommendations to improve the effectiveness of similar future projects. To quantify (i) the impact of the overall project interventions (Task-1) and (ii) the impact of matching grant supports (Task-2), the consulting firm was given two distinct tasks to analyze.

Survey Methodology

This study used a mixed-methods approach, gathering data from primary and secondary sources using both quantitative and qualitative research techniques. Primary data were collected through a household survey of beneficiary households and sub-projects related to the dairy, goat meat, and Chyangra Pashmina value chain commodities. Secondary data were collected by reviewing relevant project documents. The sample plan, designed by the NLSIP project, was used. The project applied a purposive sampling design to select POs and households. As recommended, a sample size of 1505 HHs were selected, which included all POs that were surveyed during the baseline in 2020, as well as those surveyed in both HHS1 (2021) and HHS2 (2022), and POs that were only surveyed in either HHS1 or HHS2, based on the list of farmer groups and cooperatives, as well as sub-projects, provided by the Project.

As such the survey team gathered information from 1182 households under Task-1 and 1053 individual households and 449 sub-projects, which were supported by the project under task 2. As control groups, 179 POs and private farms that submitted a business proposal but were not chosen for the project, were interviewed. In addition, 29 key informant interviews, 8 individual interviews, and 8 focus group discussions were carried out to collect qualitative data and to triangulate the primary data. The KOBO Toolbox was used to create the online survey and the data were stored online at www://kobo.humanitarianresponse.info. The data were cleaned, analyzed, and presented in tables, graphs, and charts in accordance with the indicator requirements.

Findings:

(1) Progress on PDO indicators:

Productivity: The milk productivity per year per standing cow which was 1222 litre in baseline (2020), increased to 1232 liter in 2021, 1498 liter in 2022, and 2239 litre in 2023. Similarly, milk productivity per year per standing buffalo was 720 litres in baseline (2020), increased to 749 liters in 2021, 815 liters in 2022, and 1346 liters in 2023. The productivity of goat, measured in carcass weight, which was 7.8 kilograms per goat per year in 2020, decreased to 3.9 kilograms in 2021, increased to 5.42 in 2022, and increased to 13.48 kilograms in 2023.

Sales value: Sales value of milk and milk products per household per year which was Rs. 396 thousand in 2020 (baseline) increased to Rs. 402000 in 2021, Rs. 484 thousand in 2022, and Rs. 599000 in 2023. Most of the sales income of dairy households were from raw milk sale. The sales value of goat meat per household, which was Rs. 56000 in 2020 (baseline), increased to Rs. 60000 in 2021, Rs. 75000 in 2022, and Rs. 107000 in 2023 (endline). Goat farming households derived the majority of their revenue from the selling of live goats.

Adoption of Climate Smart Agricultural Technologies (CSATs): On the seven-climate smart agricultural technologies (CSATs) promoted by the project, 59% of farmers utilized to use improved shed management technologies, followed by manure management (46%), fodders, forage production, and pasture development (26%). In the livestock farm, the percentage of CSATs adopted rose from 77 to 63 in 2020 and 2021 to 100% in 2022 and 2023, respectively. Women's participation in CSATs went from 56% in 2020 to 96% in 2023, indicating that women are becoming more involved in the usage of CSATs in livestock farms.

Access to productive assets and services: Among the assets received by the farmers in 2023, maximum (41 %) of farmers had access to sheds provided by the project, which was 8.6% in 2020, and 14.7% in

2021. The next important livestock asset was the chaffcutters. Thirty three percent received it in 2023, which was 15.6% in 2020, and none in 2021 and 2022. Of the access to assets, the proportion of women receiving assets were 17.4 % in 2020, 22.1% in 2021, and 66% in 2023. Similarly, among the services, 33.4 % of them received Artificial Insemination (AI) services from the project in 2023, compared to 0% in 2020, and 1.9% in 2021. The vaccination services against FMD and PPR, which accounted for 26.5% of cases in 2023 compared to 5% in 2021, were the second key service. The percentage of women receiving these services were quite low.

(2) Overall Impact of the Project (Task 1):

In 2023, the annual milk yield per standing cow was 2239 liters, an 83% increase from the baseline of 1222 liters in 2020. In a similar vein, the milk productivity of a standing buffalo in 2023 was 1346 liters per year, an 87% increase over the baseline of 2020 (720 liters). Compared to baseline output of 7.8 kg per goat annually, goat productivity grew by 73% in 2023 (13.5 kg per goat annually) as determined by carcass weight. The increased milk productivities were due to increased number of improved cow and buffalo and reduced number of local breeds, increased number of lactating cow and buffalo in the herd, and thereby reducing overall herd size, and increased lactation length.

These encouraging outcomes were made possible by the project's supports, which included component B's use of climate-smart agriculture technology, parasite control, AI services, and vaccination against FMD. When it came to goats, goat farmers used to reduce the size of their herds by adding more exotic and cross-bred breeds. To help them, various programs were put in place, including those that promoted stall feeding, vaccinated against PPR, controlled parasites, and used climate-smart agricultural technologies like better shed management, increased fodder and forage cultivation, manure management, and stall feeding in goat farms.

The annual sales value of milk and milk products per household grew by 51% from NRs. 396000 in 2020 (the baseline) to NRs. 599000 in 2023. In 2023, 93.5% of the milk output was sold; of that, 99% was sold as raw milk, down from 98.5% in 2020. This indicates that there was very little milk value addition in both the baseline and endline years. In 2020, the average selling price of raw milk was recorded at Rs. 62.1 per litre; by 2023, it had risen to Rs. 67.5 per litre. The sales value of goat meat per household climbed by 93% from NRs. 55670 in 2020 (the baseline) to NRs. 107350 in 2023. In 2023, it was reported that 176.49 kg live weight, or around 42% of the entire output of goat meat, was sold for an average price of Rs. 608.27 per kg. In contrast to 2020, when there was 6% value addition in the form of raw meat and buck sales, there was no value addition in goats seen in 2023.

The amount of milk sold per household, which was 6312 liters in 2020 but climbed to 8749 liters out of 9351.77 liters of production in 2023. It showed that the project boosted the sales value of milk at the household level in 2023. In a similar vein, the value of goat meat sold per household grew by 93% in 2023 compared to the baseline, with goat meat sales (on a live weight basis) rising from 92 kg in 2020 to 176 kg in 2023. Due to an increase in selling price, the sales value of live goats in 2023 grew as well; on a live weight basis, the goats' 2020 price of Rs. 569 per kg jumped to Rs. 608 in 2023. Following the inflation adjustment, there was 31.35% increase of milk sale and 67.4% of goat sale from baseline (2020) to endline (2023).

In contrast to 77% in the baseline year (2020), nearly all producer farmers in endline (2023) utilized to implement at least one CSAT on their farms. Women's participation grew from 43.29% in the baseline (2020) to 96% in the endline (2023). This shows how the project-NLSIP assisted women in implementing climate-smart agriculture technology on their livestock farms. The application of CSATs was found to be beneficial to livestock farms, as evidenced by the 86% of farmers who reported

increased production, 65% reporting reduced livestock health issues, 45% reporting increased feed availability, and 40% reporting improved livestock reproduction.

In 2023, 74.3% of project beneficiaries had insurance for dairy livestock, up from 50.5% in 2020 and a 47% increase. Goats saw a 77.64% increase in percentage, from 16.1% in 2020 to 28.6% in 2023. However, in actuality, the insurance coverage in 2023 has been seen to be far less than anticipated in the dairy and goat industries, with no insurance in the Chyangra. Consequently, the aggregate percentage of project beneficiaries applying livestock insurance policies throughout all three value chains has been seen to be 47%, compared to the target of 60% in 2023, with 78.4% of the target achieved. Only 24.5% of women beneficiaries had livestock insurance policies, compared to a target of 45% in 2023—a 54.5% advancement against the target. This lower level of insurance coverage resulted from the failure to implement the mandatory insurance provision for task-1 households, among other factors including the undervaluation of pure and exotic breeds, the slow settlement of compensation claims, the absence of insurance for young livestock, and the extremely complicated administrative processes involved in collecting compensation.

Among the assets received by dairy farmers in 2023, maximum (56 %) of dairy farmers had access to milk cans provided by the project. The shed was the second most valuable livestock asset; in 2023, 33.5% of dairy farms had access to sheds. In 2023, almost 32% of dairy farms have chaff-cutters, while 20.4% possessed live livestock. Among the services dairy farmers obtained from the initiative in 2023, 77% of them got Artificial Insemination (AI) services, compared to 0% in 2020. In a similar vein, the project provided vaccination services to 34% of dairy producers, a percentage that was zero in 2020. Shed access was available to around 45.5% of goat farming households in 2023, up from 18% in 2020.

About 16.5% of goat rearing farmers received live livestock (goats) and 32% received chaff-cutters. Among the services, about 20 % of goat rearing farmers received vaccinations, 21% received medicines for parasite control, and 10 to 12 % received forage seeds from the project. 65% of Chyangra rearing farmers had access to sheds, 53% owned solar panels, 35% owned weighing balance, and 94% of them owned chaff-cutters in 2023. More than 76 % of Chyangra rearing farms had access to vaccination and medicines.

About two third (64 %) of the beneficiaries were “*satisfied*” from the services provided by the project, of them 6% were “*highly satisfied*”. However, around 19% of them were “*unsatisfied*”. This can be because the project did not offer adequate assistance, and a large number of them were not eligible to obtain grant funding (sub-projects) from the project. While goat growing farmers were happier with all services offered by their POs, dairy farmers were more satisfied with technical training, account training, nursery management, and marketing services.

At the household level, the production cost per liter of milk was estimated to be Rs. 45.30, up from Rs. 44.60 in the baseline (2020) and an additional Rs. 0.70 per liter. In 2020, the profit per litre of milk was Rs. 17.5; by 2023, it had risen to Rs. 22.20. Similarly, the cost of producing goat meat on live weight in 2020 was Rs. 178.10; by 2023, that cost had risen to Rs. 249.94, or Rs. 71.84 per kg. Profit per kilogram of goat (based on live weight) was Rs. 391 in 2020 but dropped to Rs. 358 in 2023. Comparing between dairy and goat enterprises under task-1, goat enterprises were found more profitable than the dairy, as the Return on Assets (RoA), Net Profit Margin, and Return on Labour in goat enterprises were estimated to be 126%, 59% and 62% respectively as against 37%, 33% and 40% in dairy enterprises in the year 2023. However, the profitability ratio of dairy enterprise is observed as satisfactory, in principle.

According to data from 2023, a livestock enterprise could, on average, generate 2.6 full-time employees (Rs. 539,760), of which 2.4 were family/self-employed (Rs. 498,240), and very little in the way of paid

labours. It was shown that women contributed more to the rearing of livestock than men did, accounting for 57.5% of all labour hours. Comparing among three value chains, dairy enterprise could generate 2.4 full-time employees (Rs. 498,240) per household/enterprise for full year. Women were found more involved in the dairy enterprises, contributing 56% of their time. In case of goat value chain, 2.65 persons of labour employment (Rs. 550,140) was found to have been generated per goat farm for the whole year, of which 2.39 persons (90% of total employment) is from family labour or self-employed in the goat enterprise. As also in the dairy enterprise, women were found to have been engaged more (55%) than the men (45%) in the goat enterprise. For the entire year (Rs. 635,256), it was discovered that the Chyangra Pashmina value chain employed 3.06 people, of which 2.65 were family workers or self-employed (Rs. 550,140) and 0.41 were hired laborers (Rs. 85,116). In the Chyangra Pashmina enterprise, women labor involvement was found to be much lower than in the other two, accounting for just 38.5% of the total work load.

About 77% farmers were found selling their livestock products to the buyers and sellers in 2023. Of the sellers (farmers), 11% had formal agreement with the buyers and traders. Of sellers and farmers selling livestock products, 8.3% used to sell to NLSIP-supported buyers and traders, 41.5% to other organization supported buyers and traders, and rest 50% to other buyers. Nearly 19% of the sellers and farmers reported that there is compliance of agreement (both formal and informal). Of milk producers, 22% were found to have established formal linkage (formal agreement) with the buyers, and rest 78% used to sell with informal agreement. Of milk sellers, 16.5% used to sell to the NLSIP-supported traders, and 37% of the milk sellers reported that there is compliance of the agreement, irrespective of formal or informal agreement. In case of goat value chain, 68% of households reported that they sold goat during last year (FY 2022/23), and mostly on informal basis.

The average income for a household operating a dairy business under Task-1 was Rs. 746,615.00, of which Rs. 598,960.00 per household was earned from the sale of milk and milk products annually. This income accounted for 80.22% of the total household income in 2023 and increased by 51.25% over the baseline average income of Rs. 396,000.00. The average family income of farmers who rear goats was also assessed to be Rs. 356,203.00; of this, 30% came from the sale of goats, or Rs. 107,351.00 annually, an increase of 93% over the sales value of goats recorded in the baseline (Rs. 55,667.00).

About 91% of the households reported to have food sufficiency in 2023, which in the baseline (2020) was 0.14%. Only 2.4 % of them reported to have food sufficiency with less than 3 months in 2023, which in 2020 it was nearly 25%. These results have clearly indicated that the Project has significant contribution in increasing the food sufficiency level among the beneficiary households. Comparing among value chains, about 85% of dairy households reported to have food sufficiency in 2023, which was only 0.3% in the baseline (2020) and 21% of dairy farmers who had food sufficiency of less than 3 months in 2020, decreased to 3% in 2023. Similarly, in the goat value chain, about 96% of the households reported to have food sufficiency in 2023, where there were no such farm families having food sufficiency in the year 2020 (baseline) and 25% of goat rearing farmers who had food sufficiency of less than 3 months in 2020, decreased to around 2% in 2023. In Chyangra Pashmina value chain, 82% farmers reported to have food sufficiency in the year 2023, for which there were no farmers having food sufficiency in 2020 (baseline), and 53% of them in 2020, who had less than 3 months of food sufficiency, decreased to around 6% in 2023.

It was found that 11% of households had taken out loans for their livestock business; this represents a 104% rise from the baseline of 5.36%. In 2023, 16%, 7.4%, and 5.9% of farm families utilized loans for the dairy, goat, and Chyangra Pashmina value chains, compared to 9%, 2%, and 2% of farm households during the baseline period. This shows farmers were encouraged to take out loans for their livestock businesses following the NLSIP intervention.

Nearly 80% of farm households used to use green forage for their livestock, followed by concentrate feed (57%), dry forage (37.5%). When comparing the three value chains, it was found that dairy and goat farms used to use more concentrates, green forage, and dry forage as feed, whereas chyangra farms used to use more hay/silage, dry forage, and green forage.

The majority of dairy farms were found to be innovating through the use of cow mats (27%) and urine collection (25%). Food safety and hygiene procedures, such as cleaning sheds (73% of farmers), washing livestock (50%), cleaning utensils (41%), using boots, gloves, and aprons (30%), and cleaning udders before milking (27%), are implemented in the majority of livestock farms. It was found that about half of the farmer households (52%) had built compost pits, and 19% of farms had built compound walls and urine pits as social and environmental safety measures. Just 4.5% of farms have built drainage systems, and less than 1% of farms have marble or tile floors and walls. Comparably, around 53% of farmers once used gumboots, 34% gloves, and 17% masks, 3% of farmers used aprons, and less than one per cent farmers used to use helmets for personal protections while working in their livestock farms.

The majority of farmers (70%) and buyers/traders (2.71%) reported having access to market information via their respective groups or cooperatives. Almost 79% of dairy farmers, 63% of goat rearing farmers, and 88% of Chyangra rearing farmers used to receive market information from their groups/cooperatives.

(3) Sub-Project (Matching Grant) Impact Evaluation of the Project (Task 2):

In comparison to its baseline (1174 liters), the cow milk productivity at sub-project level (Call-1 & II, individual household level) rose by 73% to 2029 liters per year per standing cattle by the end of 2023. The production of buffalo milk rose from 758 liters per year per standing buffalo in the baseline (2021) to 1663 liters in the endline (2023), representing a 199% increase. The production of goat meat, measured in carcass weight, for each standing goat in the herd grew by 304% from 3.5 kg in baseline (2021) to 14.14 kg in Endline (2023).

The larger herd sizes of lactating cows and buffaloes in 2023—by 84% and 77%, respectively—as well as the longer lactation periods in both species in 2023 compared to baseline contributed to the higher milk yield. In comparison to the baseline, they helped to raise the amount of milk produced per household by 130% in buffalo milk and 124% in cow milk in 2023. In the case of goats as well, the project's involvement resulted in an average of 14 more goats per household, accounting for 304% of the increase in output. As a result, the herd size per household that received funding for the initiative increased from 11 in the baseline to 25 in 2023—a 128% increase. This substantial increment of herd size had positive impact on the meat production per household, which was 73 Kg (on live weight) in baseline (2021) increased to 553 Kg in the year 2023 (endline), with 659% of increment within two years.

By endline (2023), the productivity of cow milk at sub-project level (Call-1 & II, collective/PO level) was determined to be 2104 liters per year per standing cattle, a 98% increase over its baseline (1063 liters). The production of buffalo milk rose from 587 liters per year per standing buffalo in the baseline (2021) to 1482 liters with a 152% increment in the endline. Measuring in carcass weight, the production of goat meat per standing goat in the herd grew by 322% from 3.56 kg in 2021 to 15.02 kg in 2023.

As compared to baseline, the herd in 2023 had a higher percentage of improved breed and a lower percentage of local breed, which resulted in higher milk output for cows and buffalo at the PO level. With regard to goats, the project's involvement in the goat value chain as grant sub-projects operate jointly resulted in an increase in herd size in 2023 that increased productivity by 15% on average per

PO. The production of milk and meat was positively impacted by the POs' deployment of better and climate-smart technology as well as by their increase in herd size.

In comparison to its baseline (2022) of 1583 liters, the cow milk productivity at the sub-project level (Call-III, private farm) grew by 39% to 2200 liters per year per standing cattle by the end of 2023. The output of buffalo milk rose from 827 liters per year per standing buffalo in baseline (2022) to 1534 liters with an 85% rise in 2023. The private farm's annual carcass weight per standing goat went from 3.81 kg in the baseline (2022) to 17.37 kg in 2023, a 356% increase in goat meat yield.

The herd sizes of improved cows (97%) and buffaloes (54%), as well as lactating cows (181%) and buffaloes (138%), increased in the private farms in 2023 led to an increase in milk productivity of cow and buffalo. This, in turn, contributed to an increase in milk production (cow milk by 186% and buffalo milk by 199%) per private farm in 2023 compared to the baseline (2022). In the case of goats, productivity increases in 2023 were caused by an average 265% rise in herd size, with pure-bred/exotic herds growing by 26% and cross-bred herds growing by 125%. The output of live weight meat per farm grew from 294 kg in the baseline to 3336 kg in the endline.

The productivity of cow milk at PO levels in 2023 (Endline: Treatment) was 7.5% higher than that of its Control POs, indicating productivity of 2050.27 liters per year per standing cattle, as compared to control POs (1918.83 liters). Similarly, the productivity of buffalo milk at PO levels in Endline Treatment in 2023 was 44% higher than that of its Control POs, indicating higher productivity (1358.75 liters per year per standing buffalo) in treatment POs as compared to Control POs (942.72 liters per year per standing buffalo) in 2023. Similarly, the productivity of goat meat, measured in carcass weight, at PO levels in Endline Treatment in 2023 was determined to be 7.5% higher than that of its Control POs, indicating slightly higher productivity (15.76 kg per standing goat annual).

Because the increased cow herd size per PO was 81% larger than that of the control POs, the treatment POs had higher cow milk productivity than the control POs. The treatment POs had a herd size that was 25% larger overall than the control POs, and the lactating cow herd size was also 16% larger in the treatment POs than in the control POs. Furthermore, lactation durations were longer in treatment POs compared to control POs for both local and improved cows. Similarly, a 19% increase in herd size in the treatment relative to the control PO explained the higher buffalo milk output in the treatment over the control POs. Additionally, there were 20% and 90% more improved and lactating buffalo, respectively.

These factors contributed to the increased milk production among the POs, which eventually contributed to the increased milk productivity among the POs. When it came to goats, the introduction of exotic or pure breeds into the herds in the treatment POs and a notable rise in the size of the herds of indigenous and improved goats were the main causes of the increased production in those areas. As a result, the herds at PO level produced more goat meat than the control POs (by more than 500% when comparing live and carcass weight). When compared to the control POs, the goat enterprise's enhanced parameters at the treatment PO level resulted in higher meat production, which in turn contributed to higher goat meat productivity. The project's interventions, such as the introduction of improved livestockss into the herd, the vaccination and treatment program for livestock health, the management of sheds and feeds, the promotion of fodder and forage, the promotion of climate-smart agricultural technologies, and so on, were responsible for the increase in productivity and production of milk and goat meat among the POs.

In 2023 (Endline: Treatment), the annual production of cow milk per standing livestock at private farms was 2199.94 liters, almost 6% more than that of its Control Private Farms (2077.39 liters). In 2023, it was found that the productivity of buffalo milk in the treatment private farms was 7% greater (1534

liters) than in the control private farms (1433 liters). Measuring carcass weight, the productivity of goat meat in 2023 was found to be 108% greater in treatment private farms than in control private farms. Treatment private farms produced 17% more meat per standing goat year (17.37 kg) than the control private farms (16.06 kg).

Because the increased cow herd size per private farm was 129% larger than that of the control private farm, the treatment private farms' cow milk productivity was around 6% higher than that of the control private farms. The treatment private farms had a herd size that was 126% larger overall than the control private farms, and the lactating cow herd size was similarly larger (124% larger) in the treatment private farms than in the control private farms. These details helped to explain why the output of cow milk in the treatment private farms increased significantly to 81,899 liters annually in the same year that it only produced 30,948 liters in the control private farms. Similarly, for buffalo milk productivity, which in treatment Private Farm was 7% more over the control Private Farm, because of the reasons that total herd size of buffalo per treatment Private Farm was 113% higher with respect to control Private Farms. In addition, number of improved buffalo and lactating buffalo were also 116% and 102% higher in treatment Private Farms over the control Private Farms respectively.

These factors led to a 128% increase in buffalo milk output per private farm in the treatment Private Farms as compared to the control Private Farms. These factors played a part in the notable rise in milk output among the private farms, which in turn led to higher milk productivity among the NLSIP-supported private farms. The reason for the 8.16% increase in productivity in treatment private goat farms over control private farms was the introduction of pure/exotic breeds, cross-breeds, and local breeds, which resulted in a significant herd increase (110% higher) in treatment private goat farms compared to control private goat farms.

As a result, there was a notable increase in goat meat production in the Private Farm level herds, measured in both live and carcass weight (118% more than in control POs). increased goat meat production resulted from these parameter increases in the goat herds at the treatment Private Farm levels, and this, in turn, increased goat meat productivity when compared to the control Private Farms. In actuality, the project's interventions in the form of better livestock introduction, the advancement of climate-smart agricultural technologies, vaccination campaigns, disease and parasite control initiatives, shed management, the promotion of fodder and forage to provide livestock with a balanced diet, and numerous other initiatives helped to boost milk and meat productivity at the private farm levels as well.

After adjusting for inflation, the value of milk sales at the sub-project levels (individual HHs) under Call I and II during Endline (2023) was found to be NRs. 750480 (at current price) and Rs. 678000 after increasing by 117% over the baseline, which was NRs. 313000 in baseline (2021). Similar to this, during Baseline (2021) the value of goat sales at the level of individual sub-projects was NRs. 77250; at current prices, this climbed to NRs. 155000, and during Endline (2023), after adjusting for inflation, it increased to Rs. 140000, representing a net rise of 81%.

Under Call-I&II, each individual farmer used to sell 8,380 liters of milk annually on average; in 2023, this figure was 4923 liters. A rise in production and sales volume from baseline to endline has also raised the value of milk sales at the level of individual households. Comparably, the typical household's production of goat meat (based on carcass weight) climbed from 47.35 kg in 2021 to 359.42 kg in 2023; thus, the meat's sales value increased as well.

The value of milk sales under Call I & II at sub-project levels (collective/PO level) during Endline (2023) was found to be NRs. 9.74 million at current prices and Rs. 8.8 million after accounting for inflation. This represents a 30% increase from the baseline, which was NRs. 6.77 million in baseline (2021). Similarly, during baseline (2021) the value of goat sales at collective sub-projects at PO level

was NRs. 817000; at current prices, this climbed to NRs. 3447000, and during Endline (2023), after correcting for inflation, it increased by 281%.

After adjusting for inflation, the value of milk sales at sub-project levels (private farms) under Call III during Endline (2023) was found to be NRs. 10.17 million at current prices and Rs. 9.77 million after increasing by 56% over the baseline sales value of NRs. 6.26 million in baseline (2022). Similar to this, during Baseline (2022) the value of goat sales at the private farm level was NRs. 435000; at current prices, this value has climbed to NRs. 712500, and after correcting for inflation during Endline (2023), it has increased by 57%. The rise in milk and goat meat production at the private farms was the reason for the 56% and 57% value increases in sales of milk and goat meat, respectively.

In Call-I&II, the value of milk sales per treatment PO was reported at NRs. 9.74 million, compared to just 4.12 million in control POs in 2023—a 136% increase over milk sales in control POs. Similarly, it was found that the goat sales values in the treatment POs were NRs. 3447000, whereas the values in the control POs were only NRs. 319000. The increased output of goat meat and milk at the PO level was the reason for the higher values of goat meat sales (1080% of control) and milk sales (236% of control), respectively.

About 95 % of households under Call I&II, found to have adopted improved shed management practices, followed by manure management (83%), fodders, and forage production and pasture development (50%). In 2023, all farmers employed at least one technology, up from 94.19% in the baseline (2021). In contrast, 75% of farmers in 2021 and 57% of farmers in 2023 employed at least two technologies, respectively, while 57% of farmers in 2023 employed at least three technologies.

Of the seven CSATs that the project supported, the majority of farmers under the Call I& II sub-projects were found to be implementing better shed management technologies in 2023; this was the case for 100% of farmers in Chyangra Pashmina, 99% in Goat Meat, and 90% in Dairy Value Chains. Manure management is the second major CSAT, with 88% of dairy farmers, 83% of goat meat farmers, and 47% of Chyangra Pashmina raising farmers using this technique. In all three value chains, about 50% of farmers used to apply methods for pasture development, fodder production, and forage production. When comparing value chains for the adoption of CSATs in 2023, every single family was found to have implemented at least one CSAT in their livestock farms.

Among seven CSATs promoted by the project, most of the farmers under Call I& II sub-projects, were found adopting improved shed management technology, which 100% in Chyangra Pashmina, 99% in Goat Meat, and 90% in Dairy Value Chains in 2023. The second important CSAT is the manure management, for which 88% in Dairy, 83% in Goat Meat, and 47% in Chyangra Pashmina rearing farmers were found adopting this technology. Around 50% of farmers of all three value chains used to adopt fodders, forage production and pasture development technologies. Comparing among value chains on the adoption of the CSATs in 2023, 100% of the individual households used to adopt at least one CSAT in their livestock farms. In the past, 92% of dairy farmers and 91% of goat- and chyangra-producing farmers adopted two or more CSATs. Approximately 60% of farmers who raised goats and dairy used to implement three or more CSATs on their farms.

In a survey of POs working on sub-projects as a group, it was found that 83% of them had implemented better practices for managing sheds; 62% had adopted improved practices for managing manure; 41% had implemented fodders, forage production, and pasture development; and 25% had implemented stall feeding as a climate smart agricultural technology (CSAT) in their livestock farms. It was found that all POs had employed at least one climate smart agricultural technology (CSAT). In 2021, 84% of POs had done so, which represents a 19% increase in 2023 over baseline (2021).

When compared to the control POs that also adopted the same CSATs, which were 84%, 38%, and 34%, respectively, the treatment POs surveyed in 2023 used to adopt improved shed management practices as CSATs in their farms, followed by manure management (62%), fodders, forage production, and pasture development (41%). With the exception of better shed management techniques, the treatment POs adopted all six CSATs in 2023 at a rate higher than the control POs. When POs in treatment and control groups were compared for the adoption of CSATs, it was found that both groups had at least one CSAT in place on their livestock farms. It was found that the treatment POs were more successful than the control POs in implementing more than two technologies on their farms.

The majority of private farms (94.5%) surveyed in 2023 were found to be implementing better shed management, followed by stall feeding (42%), manure management (81%), and fodder, forage production, and pasture development (37%). In the private livestock farms, adoption of CSATs was found to involve about 85% of women. With a 9% rise, the percentage of private farms that adopted at least one CSAT in their livestock farms in 2022—92% of them—rose to 100% in 2023. By 2023, almost 29% of private farms—up from 5.4% in 2022—were employing two CSATs. However, the percentage of private farms that implemented two or more CSATs remained almost unchanged (84%), both at the baseline and endline.

Among the treatment private farms, surveyed in 2023, maximum (94.5%) of private farms were found adopting improved shed management practices, for which in control private farms it was 88%, which is 7% more effective than the control farms. Adoption of manure management was also discovered to be the second most significant CSAT in both treatment and control private farms, accounting for 81% in treatment and 69% in control farms. Treatment farms were found to be approximately 18% more successful than control farms in utilizing the project's facilitated CSATs in the livestock farms. All private farms, including those under treatment and those under supervision, were found to have implemented at least one CSAT. However, it was shown that 83% of treatment private farms used two or more CSATs.

About 98% of beneficiary individual households under Call-I&II sub-projects (of which female 30.21%), which were implemented individually, were found to have insured their livestock (cow, buffalo, goat and Chyangra) during endline survey (2023), which was nearly 27% in the baseline (2021). Likewise, 75% of the beneficiary under collective sub-projects through Call-I&II, were found to have insured their livestock in 2023, as against 31% in the baseline (2021). In case of private farms, 58% of them were insuring their livestock in the year 2022, increased to 84% in 2023.

When comparing value chains, the dairy value chain showed that, when Call-I&II sub-projects were implemented individually, only 30% of households insured their livestock in 2021; by 2023 that number had risen to 97%. Similarly, 59% of POs in 2023 insured their dairy livestock, up from 30% in 2021. There is slightly increment in insurance in dairy private farms, from 72% in 2022 to 82% in 2023. Whereas, the control private farms and POs were found relatively better in insuring their dairy livestock.

In comparison to their baseline, there has been a significant increase in the percentage of households and POs who insure their goat in 2023. It was found that, in 2023, almost 98% of the individual households under Task-2 sub-projects, which were carried out individually through Call-I&II, had insurance for their goats, compared to 14% in the baseline (2021). Comparably, it was shown that 92% of POs had insured goats in 2023 compared to 32% in 2021. In terms of private farms, 49% of farms in 2022 had insurance, compared to 90% of farms in 2023. The treatment POs and private goat farms were found to be superior than the control POs and private farms when compared to the sub-projects under control.

In case of Chyangra Pashmina value chain, 100 % of individual farmers used to insure their Chyangra both in baseline and endline. However, it was not possible to determine the percentage of POs and households that insured their Chyangra on private and collective farms in baselines. It was found that, as of 2023, 75% of POs have insured Chyangra under Call-I&II. In contrast, 75% of control private farms utilized to insure their Chyangra in 2023, but none of the treatment private farms have been found to do so.

Seventy two percent of the livestock in the sub-projects (private farms and POs) were found to be insured in 2023; 68% of the livestock in POs and 78% of the livestock in private farms had insurance. About 11% of the insured livestock died, and only 79% of them were eligible for reimbursement in 2023—83 percent in POs and 76 percent in private farms. The lower proportion of livestock insurance as of 2023 was a result of undervaluing pure and exotic breeds, a lengthy claim settlement process, the absence of insurance for young livestock, and onerous administrative procedures involved in collecting compensation.

In contrast to the relatively small number of households that had access in the baseline (2021), the maximum (85%) of Task-2 households were able to obtain the animal sheds. This was followed by chaff-cutters (68%), live livestock (64%), milk cans and AI services (44%), and so forth. However, compared to the program put in place in 2021, vaccination and parasite control efforts were found to be less in 2023. Comparing the three value chains, all individual households raising Chyangra received sheds; 98% of these households also received solar panels; 92% of dairy farmers received milk; and 90% of Chyangra rearing households received vaccinations and parasite control services from the project—NLSIP.

In 2023, a considerable proportion of POs polled under Call-I&II reported receiving production assets such as milk cans (51%), chaff-cutters (58%), sheds (58%), live livestock (47%), and weighing balances (42%). These values are greater than those of the baseline (2021). However, in the case of services, several endline values—such as vaccination and parasite controls—are seen to be lower than the baseline values, and in 2023, none of them were reported to have gotten AI services. This might be because the NLSIP program will end in 2023. When comparing production assets and services between treatment and control POs, it was discovered that the former had greater access than the latter.

Approximately 54% of private farms obtained milk cans as assets, with sheds coming in second at 38%, chaff cutters at 33%, weighing balances at 31%, and live livestock at 25% of farms. Less than 15% of farmers claimed to have received assistance from the project. This may be due to the closure of the project in 2023. Even though the treatment private farms had far less access to services and production assets in 2023, their numbers are still much greater than those of the control private farms.

Among the beneficiary individual households surveyed under Call-I&II implemented individually, 92% of them reported that they are satisfied (female: 89.5%) with project's supports in terms of timeliness, relevancy and effectiveness, as against the baseline value of 66%. Of them majority of households (38.5%) were highly satisfied, 27% each satisfied and moderately satisfied in 2023. Only 3% of respondents were dissatisfied, compared to 0.72% in the baseline.

Of the total POs surveyed, 89% of the POs reported that they are satisfied by the project's services, which in 2021, 75% of the POs were satisfied. Out of the 89% level of satisfaction in 2023, 32% were highly satisfied, 25% satisfied and 32% were moderately satisfied in terms of timeliness, relevancy and effectiveness of the project's services. However, 4% of them were moderately unsatisfied and about 7% were unsatisfied from the project's services in 2023. The percentage of unsatisfied were high (7.25%) in 2023 as compared to baseline (0.73%).

In case of private farms, in 2023 87% of them said they were satisfied with the services provided by the project, with 36% saying they were highly satisfied, 23% expressing satisfaction, and 28% expressing moderate satisfaction. But in 2023, 5% expressed moderate dissatisfaction and 8% expressed dissatisfaction with the project's services.

The cost of production per liter of milk at individual household, PO and Private farm level under Task-2 in 2023 were estimated to be Rs. 32.83, Rs. 44.83, and Rs. 80.56 respectively. Whereas, the cost of production per liter of milk at control POs and Private farm levels were Rs. 59.68 and 48.51, respectively. Profit per liter of milk in individual household, PO and Private farm level under Task-2 in 2023 were estimated to be Rs. 34.17, Rs. 9.74, and Rs. 2.02 respectively. Whereas in control POs and Private farms, the profit per liter were estimated to be Rs. 16.79 and Rs. 18.28, respectively.

Similarly, the cost of production per Kg of goat meat (on live weight basis) in individual household, PO and Private farm level under Task-2 in 2023 were estimated to be Rs. 216.17, Rs. 157.65 and Rs. 258.78, respectively. Whereas, the cost of production at control POs and Private farm levels were Rs. 434.75 and 245.99 respectively. Profit per kg of goat meat (on live weight basis) in individual household, PO and Private farm level under Task-2 in 2023 were estimated to be Rs. 331.92, Rs. 377.47, and Rs. 363.10 respectively. Where as in control POs and Private farms, the profit per kg of goat meat (on live weight basis) were estimated to be Rs. 88.59 and Rs. 422.66, respectively.

The individual households under Call-I&II's dairy business were determined to be more profitable than the PO level, which is considered to be moderate. On the other hand, the private dairy farms that were put into place under Call-III were found to be inefficient in terms of turning a profit. This is because the larger investments made in buildings, machinery, and other equipment resulted in higher fixed costs, and the same investments were made in feed, fodder, and other working capitals, which increased production costs and reduced profit margins. Since these farms are only being implemented for a year, the expense will primarily exceed the return. On the other hand, the control POs and private farms were found moderately efficient in profit making as they did not invest more capital in their businesses and run as usual.

Goat enterprises managed by private farms, POs, and individual households were shown to be quite profitable. This is as a result of significantly lower spending on concentrate feed and fixed capital investments. While the control POs were shown to be comparatively less efficient than other kinds of sub-projects, the control private farms were also seen to be similarly lucrative.

It was found that the livestock enterprises implemented through the Call-I&II and run individually, could generate 3.96 person years of employment per household, including paid and family labour, compared to 2.4 person years in the baseline year (2021). The individual livestock enterprise employed a total of 2.36 person years for family labor and 1.59 person years for paid labor. The result of employment also showed a decrease in women's drudgery in livestock business from 52.36% in 2021 to 46.17% in 2023.

Together, the livestock enterprises created by PO under the Call-I&II may produce 13.91 person years of employment (Rs. 2.887.716) per PO, comprising both hired and family labor, compared to 14.4 person years per PO in the baseline year (2021). There were 2.36 person years of family labor and 1.59 person years of paid labor engaged by livestock enterprises at the PO level. Between 2021 and 2023, family labor in PO fell from 9.1 to 7.02 person years, while hired labor climbed, going from 1.3 to 6.89 over the same years. This shows that even though there was a decline in total labor employment at the endline, the PO switched from family labor to hired labor, providing hired laborers with additional job options. The employment results also showed that, in the case of family labor, women's drudgery in

livestock businesses has decreased (from 50% in 2021 to 47.33% in 2023), while women's hired labor has increased (from 44% to 51% at the PO level).

The livestock enterprises implemented through the Call-III, implemented by Private Farms, could generate 4.92 person years of employment per Private Farm (Rs. 1,021,392), including both family and hired labour, which was 5.06 person years per Private Farm in the baseline year (2021). The amount of labor required on each farm may have decreased as a result of the adoption of innovations and climate-smart technologies. The number of workers employed by private livestock farms in 2023 was 2.18 for family workers and 2.74 for part-time contracted labor. Between 2022 and 2023, the number of family workers on private farms fell to 2.77 from 2.18, while the number of hired workers climbed from 2.29 to 2.74 in the same years. This shows that although the overall labour employment decreased in endline, the Private Farms shifted the family labour to hired labour, giving more employment opportunities to the hired labours. The result of employment also showed that women's drudgery in livestock business has been reduced from 46% in 2022 to 42.5% in 2023.

The employment generation among the control POs were observed much lesser (4.97) as compared to the treatment POs (13.9) in the year 2023. However, proportion of female employment is lesser in treatment POs (49%) as compared to the control POs (53.5%), showing lesser drudgery on women in treatment POs as compared to the control POs.

In 2023, 4.92 person years of employment could be generated per private farm by the livestock enterprises implemented through Call-III, while only 3.56 person years of employment could be generated in the control private farms. This indicates that the treatment private farms are providing more employment opportunities than the control private farms. The treatment private farms were found giving more employment opportunities for both family and hired labours. The proportion of women employment were seen more or less similar in both treatment (42.5%) and control private farms (43.3%) in 2023.

According to the obligatory provision of the productive alliances that had to be completed for sub-project execution under Task-2, which were extremely low in case of treatment POs and private livestock farms, 100% of individual farmers, POs, and private farms had written agreements with the buyers. Verbal agreement, however, was also evident in the sub-projects, where 51–84% of farmers, POs, and private parties were verbally linked with traders.

It was found that, on average, the individual families under Call-I & II were able to earn Rs. 866,000 annually, with the sale of three key livestock commodities from their livestock farms accounting for the most amount of earnings (Rs. 354,000, or 41% of the overall revenue). The grants that government and non-government institutions received were said to be the second-largest contributing source, accounting for 14% of the total. 20% of the total household income under Task-2 (Call-I&II), when executed individually, came from the sale of FYM and other agricultural commodities.

In 2023, it was projected that the average annual revenue for individual POs, collective POs, and private farms would be 9.4 million, 14.09 million, and 10.1 million, respectively. The income levels of the treatment institutions were found to be considerably greater than those of the control institutions. The individual PO, collective PO, and private farm income levels were found to be Rs. 3.3 million, Rs. 3.99 million, and Rs. 3.97 million, respectively. In treatment and control facilities, the revenue from the sales of three primary livestock commodities accounted for more than 90% of the total. However, the income made from three major livestock commodities by treatment institutions were significantly higher than that of the control institutions.

A little over 39% of the treatment facilities were able to obtain loans, with grants coming in second at 35%, and 26% investing from their equity. In contrast, the private farms and control POs previously

used more equity—88% and 51%, respectively. In the past, 49% of private farms under ownership utilized loans to grow their operations. The grant portion at the control POs and private farms were zero or negligible.

Most dairy farmers under Call-I&II used to use green forage (83%), concentrate feed (78%), and dry forage (74%). Goat rearing farmers were also found using more green forage (86%), followed by concentrate feed (81%), and dry forage (48%). Almost all Chyangra rearing farmers used to use green forage and dry forage, followed by concentrate feed and hay/silage (27%). Milking machines were employed by 4–18% of dairy businesses in the treatment institutions, compared to none or very few in the control institutions. The second invention in dairy farming was the milking parlor, which was utilized by a very small percentage of farms for both treatment and control purposes. The percentage of urine collected in livestock farms was much higher than in treatment farms, ranging from 37 to 59%, and 14 to 50% in control farms. Cow mats were also found commonly used innovation in the dairy farms.

Individual households and private farms operating under treatment facilities were shown to be implementing more social and environmental safeguards than POs. When it came to implementing these safety precautions, the treatment POs were found to be more effective than the control POs. Contrarily, it was found that the control private farms used greater social and environmental safeguards than the treatment private farms.

Most Task-2 households were found receiving market price information from their groups and cooperatives just like Task-1 households did. Specifically, 77% of the households under Task-2 (Call-I&II), used to receive market price information from their groups and cooperatives, which in dairy 77%, goat 74%, and highest was in Chyangra rearing farmers (95%). The second source of market information for individual livestock rearing farms was from the buyers and traders.

Most member farmers were found satisfied with the technical training, business training, nursery management, and marketing services provided by their POs. About 92% of the beneficiary individual households under Call-I&II subprojects (Task-2) were found satisfied with the project (NLSIP)'s services as reported in the year 2023, in terms of timeliness, relevancy and effectiveness of the project's services. However, 4.5% were moderately unsatisfied and 3.2% were unsatisfied. About 89% of the beneficiary POs were found satisfied with the project (NLSIP)'s services as reported in the same year, in terms of timeliness, relevancy and effectiveness of the project's services. However, 4.0% were moderately unsatisfied and 7.2% were unsatisfied. About 87% of the beneficiary Private Farms under Call-III subprojects (Task-2), which were implemented in 2022, were found satisfied with the project (NLSIP)'s services as reported in the year 2023, in terms of timeliness, relevancy and effectiveness of the project's services. However, 4.7% of them were moderately unsatisfied and 8.1% were unsatisfied.

In conclusion, the project has produced remarkable outcomes in terms of reaching families, raising sales values, boosting productivity in three commodities that are part of the value chain, promoting climate-smart technology, and raising the degree of beneficiary satisfaction. It has been successful in achieving its objectives and has benefited the intended recipients. For individuals who are directly impacted by the initiative or the intended receivers, it has resulted in positive improvements or benefits.

The project has successfully reached to 191,665 households, which accounts for 95.8% of the targeted households. The project has established partnerships with financial service providers such as banks and insurance companies, which eventually contributed to success in providing production and processing assets and services to the project beneficiaries. The project has made remarkable achievements in improving the commodity productivity compared to its initial targets. The project has contributed in substantial increment in sales values within the milk and goat meat value chains. The project has

successfully promoted the climate-smart agricultural technologies among beneficiaries which eventually contributed to increased production and productivity. About two third of the project's beneficiary households showed their high levels of satisfaction and even higher percentage with the project grantees. These achievements have shown that the NLSIP project has effectively addressed multiple aspects of livestock and agricultural development, including productivity enhancement, value chain development, technology adoption, and uplifting of overall beneficiaries' well-being. The project's success can be attributed to its strategic partnerships, targeted interventions, and the positive impact it had on the livelihoods of project beneficiaries.

The project did, however, encounter several problems and difficulties during implementation, including the following: (i) it was not possible to invest in the private sector simultaneously; (ii) there was a delay in the release of installments; (iii) only forward linkages were established; (iv) there was very little support provided to POs under Component B; (v) the effects of Covid-19; and (iv) a relatively weak project database and monitoring and tracking system.

Key lessons learnt were how producers may efficiently meet their financial demands through collaboration with financial institutions and how creative interventions can raise production volumes and productivity. Therefore, it is advised that future programs and projects of a similar nature take into account the following factors: a robust M&E system; the creation of forward and backward links among value chain actors; the mobilization of the private sector; the establishment and operation of community livestock extension service centers for service delivery; the development of production pockets and clusters; the emphasis on export-quality production and connections with exporters; the institutionalization of project strategies, lessons learned, and outcomes; and the completion of a social audit of the sub-projects executed.

CHAPTER-1: BACKGROUND

1.1. Context and the NLSIP Project

1.1.1. Introduction

Livestock production is a vital aspect of Nepal's rural economy and livelihoods, providing not only food security but also employment opportunities for the rural population. With the rise of urbanization, increased income levels, and changing food preferences, there has been a growing national demand for milk, meat, and other livestock products, thus creating opportunities for the sector's growth. To enhance the production and productivity of milk, meat, and pashmina and increase the income of producer farmers, Nepal Livestock Sector Innovation Project (NLSIP) is being implemented by the Government of Nepal's Ministry of Agriculture and Livestock Development (MoALD) with support from the World Bank (WB). The project, which was implemented from February 2018 to June 2023, was expected to attract private and public sector investment in livestock-related businesses and services by investing in innovative support programs such as service delivery, access to information, technology, market development, and competitive enterprise development.

Moreover, the NLSIP mobilizes financial resources and promotes safeguard measures through its activities to ensure sustainable livestock production. Overall, the project aims to contribute to the growth of the livestock sector in Nepal by promoting innovation, improving productivity, and increasing incomes for producer farmers.

Feature of the Project: Implementation of Productive Alliance Development, which aims to improve market linkages and making them more effective, is a key aspect of the NLSIP. This feature of the project was expected to help meet the national demand for livestock products and promote the development of value chain linkages. Additionally, the project sought to scale up innovative practices and raise awareness about nutrition and food safety. Another important goal of the project was to reduce greenhouse gas emissions by promoting climate-smart livestock husbandry practices. To this end, the project has designed activities that focus on reducing the environmental impact of livestock production while ensuring its sustainability. The details of the feature of the project is given in **Figure 1**.

Development Objectives: The Nepal Livestock Sector Innovation Project (NLSIP) has set its development objective as to increase productivity, enhance value addition, and improve climate resilience of smallholder farms and agro-enterprises in selected livestock value-chains in Nepal. This project has four components. **1) The first component**, Strengthening Critical Regulatory and Institutional Capacity, aims to focus on strengthening the ability of the Ministry of Livestock Development (MoLD) and its agencies at the regional, Municipality and village levels, to develop/modify and enforce a policy and regulatory framework that strengthens the livestock sector. It has the following three subcomponents: (i) Policies and Regulatory Framework; (ii) Institutional Strengthening; and (iii) Establishing Livestock Management Information System. **2) The second component**, Promoting Sector Innovation and Modernizing Service Delivery, aims to enhance the capacity of key stakeholders along the selected livestock supply chains to develop, disseminate and adopt best practices. It has the following three subcomponents: (i) Support to Producers' Organizations; (ii) Modernizing Service and Input Provision Systems; and (iii) Strengthening Farmers' Training and Extension Services. **3) The third component**, Promoting Inclusive Value Chains for Selected Livestock Commodities, seeks to develop a more commercial-oriented approach for selected livestock subsectors and to contribute to import substitution (for dairy products and goat meat) and export promotion (for Chyangra cashmere) by improving the productivity and value addition within the targeted value chains.

It has the following two subcomponents: (i) Development of Productive Partnerships (PP); and (ii) Financing Livestock Value Chains. **4) The fourth component**, Project Management and Knowledge Generation, aims to support project implementation activities, including operating costs of the Project Management Unit (PMU) mapped to the MoLD Secretary's office and will be responsible for ensuring that project activities are implemented in line with the provisions in the official project documents.

Project Features:

Project Name: Nepal - SOUTH ASIA- P156797- Nepal Livestock Sector Innovation Project (IDA Credit No. 6149-NP)

Implementing Agency: GoN/ Ministry of Agriculture and Livestock Development

Approval Date: December 7, 2017

Total Project Cost: US\$ 115.00 million

Closing Date: June 30, 2024

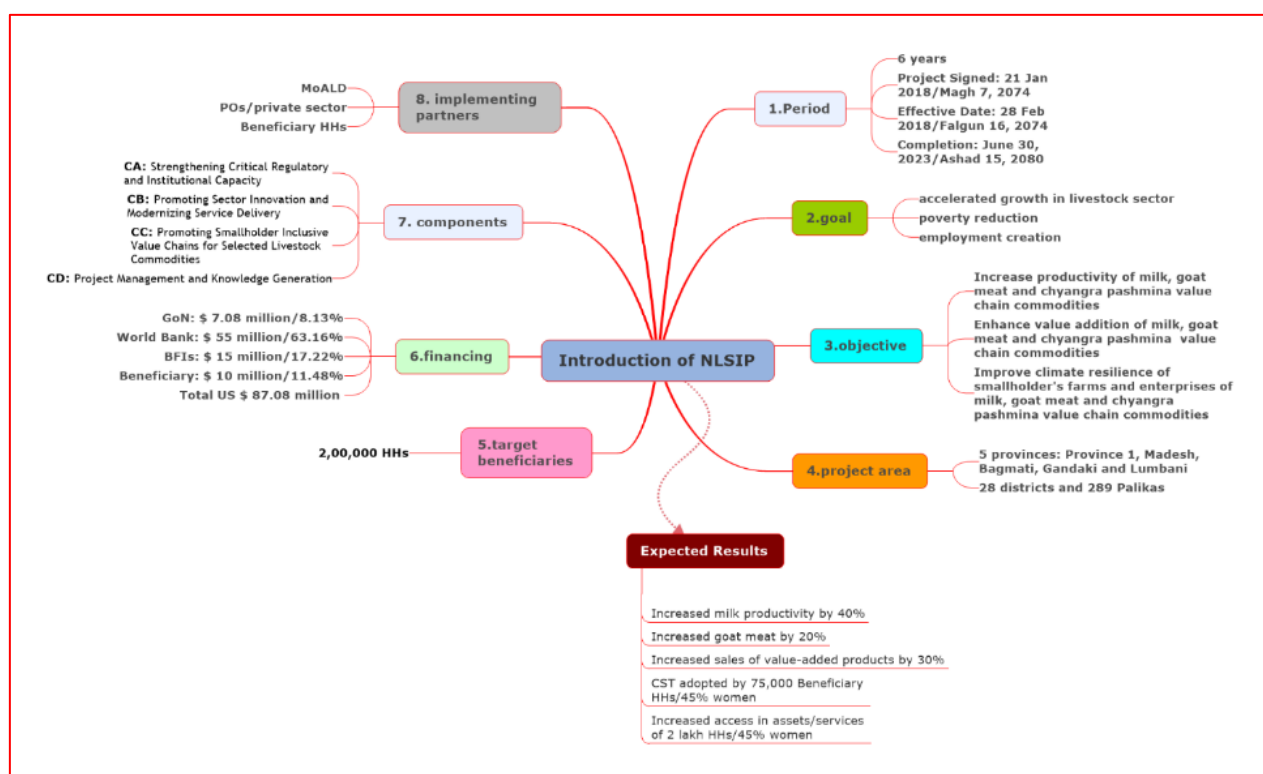


Figure 1: Introduction of NLSIP

The project was expected to support the country's priorities aligned with the four strategic pillars of the Agriculture Development Strategy (ADS): governance, productivity, commercialization, and competitiveness. The project has also taken into account the findings and recommendations from the Performance of Veterinary Services (PVS) pathway reports of Nepal's veterinary sector. The NLSIP's aim is to promote innovation, modernize service delivery, and create inclusive value chains for selected livestock commodities. In doing so, it was expected that the project will support the social and economic development of Nepal and raise the productivity and competitiveness of the livestock sector.

Key Performance Indicators (KPIs): The Project aimed to achieve the following Key Performance Indicators (KPIs):

KPI -1: Productivity of targeted livestock commodities (*milk and milk products, goat meat, Chyangra fiber*) measured through percentage increase of average (i) milk production per cow/buffalo; (ii) off-take rate expressed as carcass weight for goats, and (iii) increase in Chyangra fiber (cashmere) production.

KPI -2: Increased sales of value-added products in targeted value chains, measured through an increase in production output processed and marketed in the dairy, goat meat, and Chyangra Pashmina (cashmere) value chains.

KPI -3: Farmers adopting climate-smart agricultural technology (of which 45% are female). The number of target farmers, including female farmers, adopting improved practices and technologies promoted by the project will be used to measure this indicator. The corporate results indicator will be measured as adopting improved agricultural technology in the livestock sector.

KPI -4: Farmers reached with agricultural assets or services (of which 45% female). The cumulative number of farmers, including the share of women, and small and medium entrepreneurs, who benefit from one or more project activities, will be used to measure this indicator. The corporate results indicator will be measured as farmers reached, agriculture assets, or services.

1.1.2. Geographic Coverage and Beneficiaries

The project's implementation was centered on Nepal's physiographic diversity, which included mountains, hills, and Terai plains. The project was implemented through four Decentralized Level Support Units (DLSUs), which served as cluster-level offices to assist this. Each cluster comprised local governments (municipalities and rural municipalities), producers' organizations, entrepreneurs, and consumers. These clusters covered 289 municipalities in 28 districts across five provinces and were home to a population of 12.4 million (including 6.4 million females). The project's decentralized approach ensured that it could effectively reach and engage with a broad range of stakeholders in different geographical locations, promoting inclusiveness and equity in its implementation.

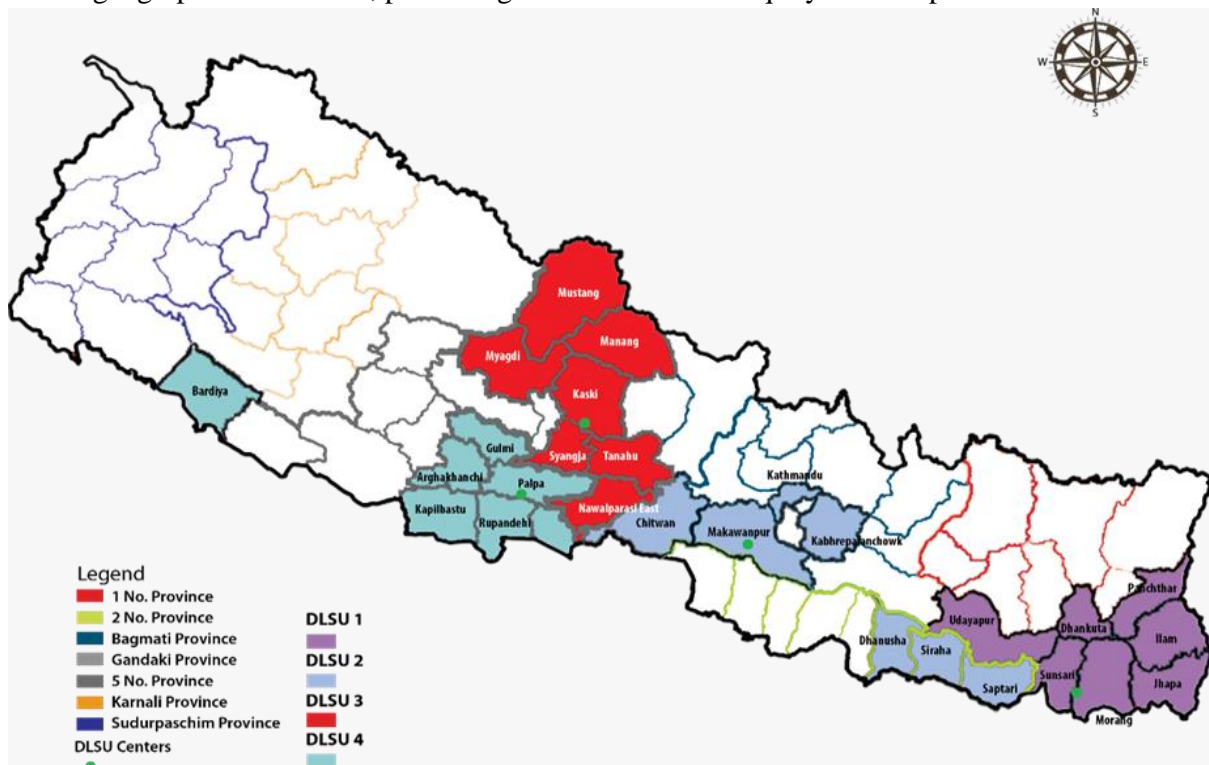


Figure 2: Overall Coverage Map of NLSIP

1.1.3. The NLSIP Project Implementation Approach

The Nepal Livestock Sector Innovation Project (NLSIP) employed a value chain development approach to increase productivity and competitiveness in the livestock sector. Among the livestock commodities, the project targeted three priority livestock value chains: Dairy, Goat Meat, and Chyangra Pashmina. The application of cluster approach in project implementation was applied to enabled stakeholders'

engagement with the aim of maximizing the efficiency of service delivery and to produce the impact at scale by maximizing synergies. The primary project beneficiaries would be 200,000 livestock producers, with at least 45% of them being women, and 500 small and medium-sized agro-entrepreneurs. In addition, the project was supposed to provide matching grants to 601 agro-enterprises as production and post-production value chain support. The Producer's Organizations (POs) were required to propose the selected business plans, which were evaluated and financed through a combination of IDA-financing (maximum 50% or Nepalese Rupees-NRs 10 million), a cash contribution (minimum 20%) from the POs, and a mandatory loan (minimum 30%) from a participating Bank and Financing Institution (BFI).

The NLSIP has applied a rigorous three-step selection process to identify eligible applicants for matching grants. The process included screening of Project Concept Notes (PCNs), field verification, and Full Project Proposal (FPP) evaluation. The project utilized a milestone-based grant payment system, where grant installments were released to grant recipients only after the completion of agreed milestone activities that have been appraised and verified.

1.1.4. Project Implementation Arrangement of NLSIP

The Nepal Livestock Sector Innovation Project (NLSIP) was implemented by the Project Management Unit (PMU) under the Ministry of Agriculture and Livestock Development (MoALD). The PMU was established on July 11, 2018, at the Department of Livestock Services (DLS) complex in Lalitpur, and was headed by a Project Director. The PMU operated through four Decentralized Level Support Units (DLSUs) located in Biratnagar, Hetauda, Pokhara, and Butwal, each led by Senior Livestock/Veterinary Officers. Additionally, the National Livestock Breeding Office (NLBO) in Pokhara, which is the apex organization for livestock breeding in Nepal, had been assigned to lead breeding-related activities and had been included as an additional cost center since fiscal year 2020/21. The Project has established several committees to provide guidance and support at different levels.

The Project Steering Committee (PSC) was established on May 18, 2018, chaired by the Secretary of MoALD, provided overall strategic guidance to the Project. The Technical Coordination Committees (TCC), chaired by the Director General of the Department of Livestock Services (DLS), supported the Project on technical matters. At the field level, Provincial Level Coordination Committees (PLCCs) had been established at the cluster level to ensure coordination and support. These committees were headed by the respective Secretaries of the provincial Ministries of Land Management, Agriculture, and Cooperatives (MoLMAC). The Project Steering Committee (PSC) was composed of representatives from various government line agencies, civil society groups, and farmer organizations. This committee included Joint Secretaries from MoALD, NPC, and MoF, as well as Director Generals from DLS, DFTQC, ED of NARC, and the Department of Cooperatives, among others. The Member Secretary of the PSC was the Project Director of NLSIP. The PSC convened quarterly to endorse the project's annual work plan and budget, monitored the progress of NLSIP, provided oversight and policy direction, and resolved any outstanding issues. In the reporting period, the PSC met twice and made significant decisions, such as approving the Project Implementation Manual (PIM) and establishing DLSUs in four different locations.

The PMU was led by a Project Director (GI level) with a competent team of experienced and qualified staff. The PMU was also supported by experts from various fields. The PMU was responsible for the overall management and implementation of the project, which included fiduciary, environmental, and social safeguards, communication, monitoring and evaluation (M&E), and reporting. It also provided guidance and assistance to the DLSUs to carry out their assigned tasks. The PMU was supported by four additional Decentralized Level Support Units (DLSUs) as separate cost centers that were

established on May 03, 2018. One DLSU was situated in each of the four provinces and covered a total of 289 municipalities in the selected clusters. On an average, each DLSU served about 60-70 municipalities. The National Livestock Breeding Office (NLBO) in Pokhara had been included as a new cost center and was responsible for all breed improvement-related activities. The command districts and municipalities for each of the DLSUs under the NLSIP have been presented below in Table 1.

Table 1: NLSIP Project Coverage Area and Number of Corresponding Municipalities

Geographic coverage	Component A	Component B	Component C	
	Country-wide	Country-wide	All municipalities in project districts/clusters based on agreed criteria	
No. of Districts	77	77	28	
<i>For Component C</i>				
<i>Province</i>	<i>Districts</i>		<i>Total</i>	<i>Location of the DLSUs</i>
Province 1	Panchthar, Ilam, Jhapa, Dhankuta, Udayapur, Morang and Sunsari		77	Biratnagar
Madhesh	Saptari, Dhanusha and Siraha		53	Hetauda
Bagmati	Kavrepalanchowk, Kathmandu, Makawanpur, and Chitwan		41	
Gandaki	Syangja, Kaski, Mustang, Manang, Tanahu, Myagdi and Nawalparasi (East)		49	Pokhara
Lumbini	Rupandehi, Nawalparasi (West), Gulmi, Palpa, Arghakhanchi, Kapilvastu and Bardiya		69	Butwal
	Total		289	

Sounce: NLSIP, Hariharbhawan

1.2. The Present Assignment of NLSIP Endline Survey

The current task involved gathering and analyzing primary data to assess the project's impacts, effectiveness and outcomes. The project aimed to enhance climate-smart livestock production and sales in three value chain commodities -- milk, goat meat, and Chyangra pashmina -- among beneficiary households. The project implemented its interventions through government institutions and provided direct investment to producers, collectors, and processors through sub-projects with a 50% grant support modality. The project conducted a baseline survey in 2020 and annual surveys in 2021 and 2022 to evaluate the progress of the project interventions vis-à-vis the anticipated outcomes as outlined in the Project Appraisal Document (PAD) and the project results framework. The current task involved gathering valid and reliable primary data and generating a detailed endline survey report, which would compare the endline data with the baseline, and intermediate results as well.

1.2.1. Rationale of the NLSIP Endline Survey

Component "A" of the project focused on policy development and the creation of Acts related to livestock. Component "B" aimed to promote innovation in the sector and modernize service delivery. This included activities such as forming and mobilizing producer organizations (POs) such as farmer groups and cooperatives, providing livestock health services, conducting genetic improvement activities, developing feed bases, promoting climate-smart livestock practices, building the capacity of staff and farmers, and implementing infrastructure development civil works. Component "C" dedicated in providing matching grant supports to selected livestock enterprises in the milk, meat, and pashmina sectors. As the project scheduled to be phased out by June 2023, conducting an endline survey was

necessary to assess the impact of the project's interventions at the households, POs, and sub-project levels.

1.2.2. Objective of the NLSIP Endline Survey

The main objective of the endline survey was to evaluate the impact of project interventions on beneficiary households and sub-projects.

The endline survey aimed to achieve three goals:

- a) Collect socio-economic data from sampled POs and project beneficiary household;
- b) Provide data relevant to the project result framework indicators to measure the project's effectiveness and impact; and
- c) Propose recommendations to enhance the effectiveness of similar future projects.

The consulting firm was assigned to evaluate two separate tasks to measure (i) the impact of the overall project interventions, and (ii) the impact of matching grant supports, which are outlined as follows:

Task-1: Overall Project Impact Evaluation: The purpose of the survey was to measure changes in PDO indicators in the Results Framework (productivity and sales of value-added livestock commodities) and attribute those changes to the project.

Task-2: Matching Grant Impact Evaluation: The survey's objective was to measure how the project's matching grant—which is included in component "C"—was affecting the grantees. In particular, the impact on the matching grant recipients—including the productivity and performance of agribusinesses throughout the final four years of the MG Sub-project implementation—was assessed by descriptive analysis of changes in key project indicators.

1.2.3. Limitations of the NLSIP Endline Survey

The consulting firm, as per the contract agreement with the NLSIP, applied its full effort in completing the endline survey 2023. However, the survey had some limitations and the survey team had to face some challenges, which are listed as follows:

1. **Limited time allowed for field data collection:** As much of the time was consumed for finalizing the data collection tools and techniques from the part of the Project, the time for field data collection was limited.
2. **Changed Contact numbers of beneficiary sub-projects:** As the project has not updated the contact mobile number of the beneficiary sub-projects, the study team faced difficulties to find out the sub-projects. As a result, more time consumed for contacting them.
3. **Contact number of sub-projects were not available:** Most of the sub-projects' contact number were not updated by the project, because of this the survey team could not find all the sub-projects.
4. **Reluctancy of sub-projects to provide data:** Even the grant recipients who had poor performance of the sub-project were reluctant to provide data. Because of this, full data/information from such types of sub-projects could not be collected.
5. **Data collection from Control sub-projects:** As the project provided the list of control sub-projects which were not awarded the grant but submitted their business proposals to the project, the survey team had to face much problems to collect data from most of such control sub-projects, and complete data could not be collected.
6. **Data collection from Call-III:** As the sub-projects implemented in later phase of the project (2022/23) under Call-III, these sub-projects were also reluctant to provide the data to the survey team.
7. **Missing Beneficiary Names in the community:** Most of the name list provided by the project under Task-1 were not found in the community.

8. **Coordination during data collection:** It was difficult to collect data from the beneficiaries as their perception regarding project was very high, and most of the beneficiaries were not coordinated with the consulting firm, and hence it was difficult to collect the data.

CHAPTER-2: ENDLINE SURVEY METHODOLOGY

2.1. Survey Design and Methodology

This study employed a mixed-methods approach, collecting data from primary and secondary sources, using both quantitative and qualitative research methods. Primary data were collected through a household survey of beneficiary households and sub-projects related to the dairy, goat meat, and Chyangra Pashmina value chain commodities. Secondary data were collected by reviewing relevant project documents. Specifically, the endline study followed the following methodologies:

- Review of project documents for secondary data collection
- Consultations with NLSIP/PMU/DLSUs and other concerned stakeholders
- Application of quantitative and qualitative data collection tools for primary data collection.

2.1.1. Sample Design

The sampling plan as designed by the NLSIP project was used. The project applied a purposive sampling design to select POs and households. As recommended, a sample size of 1505 HHs were selected, which included all POs that were surveyed during the baseline in 2020, as well as those surveyed in both HHS1 (2021) and HHS2 (2022), and POs that were only surveyed in either HHS1 or HHS2.

2.1.2. Sampling of Households

The NLSIP provided a list of selected farmer groups and cooperatives, as well as sub-projects. Therefore, the survey team selected 1505 households¹ for task 1 and 1064 households² for task 2 using a simple random sampling method from the household list of selected POs' household lists. Additionally, the team selected all 449 sub-projects, which were supported by the project, with a focus on evaluating impacts of the matching grants. To collect qualitative data and information, the team conducted 29 key informant interviews, 8 individual interviews, and 8 focus group discussions. To serve as control sub-projects, an equal number of sub-projects (449), were also planned to be interviewed, but only 179 farms (32 POs and 147 private farms) could be interviewed. Table 2 and 3 below provides the details of the sampling target and achievement, and **Annex 6** provides the list of selected POs and sub-projects.

Table 2: Detail Number of Samples POs and HHs

<i>Tools</i>	Target of POs/ SPs selection	Achievement of POs/SPS selection	Target of Sampling HHs	Progress of Sampling HHs	Purpose of sampling
<i>HH Survey Questionnaires Task 1</i>	74	74	1505	1182	For overall project impact evaluation
<i>HH Survey Questionnaires Task 2</i>	121	121	1064	1053	For matching grant evaluation at the HH level
<i>Institutional Survey (treatment)</i>	449	449	-		For matching grant evaluation at the sub- project level
<i>Institutional Survey (control)</i>	449	179	-		For comparing sub- projects (with NLSIP grant and without NLSIP grant)
Total Sample	1093	883	2569	2235	
Total Sample of 883 SPs/POs and 2235 HHs Selected Total of 628 (449+179) SPs/POs and 2235 HHs interviewed					

¹ Out of 1505, 1182 HHs under Task-1 could be interviewed during the field survey

² Out of 1064, 1053 HHs under Task-2 could be interviewed during the field survey

Source: Endline Survey of NLSIP, 2023

Table 3: Detail Number of KIIs, FGDs, and Individual Interviews

Tools	Numbers	Purpose of Tools
KIIs	29	
Bank and Financial Intuitions	4	To assess the productive partnership (qualitative)
Veterinary Hospital and Livestock Expert Center (VHLEC)	8	To assess the quality of service provided by VHLEC
National Livestock Breeding Office, Pokhara	1	To assess the breeding service to producers
Livestock Service Section (Palika)	8	To assess the livestock service at the Palika level
Stakeholders' Dialogue Platform at the district level	4	To assess the operation of SDP and its support to value chain actors for sectoral development
Grievance Redress Mechanism Committee at the district level	4	To assess the establishment of a functional GRM
FGDs	8	
Livestock Market Centers	3	To assess whether well functioning or not
Chilling Centers	5	To assess its linkage and volume of business
Individual Interview (VHLEC and Livestock Service Section (Palika))	8	To assess the use of enhanced skills of the staff of VHLEC and Livestock Service Section (Palika)
Total KIIs, FGDs, and Individual Interviews	45	

Source: Endline Survey of NLSIP, 2023

A value chain and district level sample distribution was prepared based on the POs and SPs (treatment and control) provided by the project. Under the HH Survey Task 1, a total of 486, 679 and 17 sample households were interviewed for milk, goat meat and Chyangra Pashmina value chains respectively. Similarly, under HH survey Task 2, a total of 503, 486 and 64 households were interviewed for milk, goat meat and Chyangra Pashmina value chains respectively. As a result, a total of 989, 1165, and 81 households were interviewed for HH survey for milk, goat meat and Chyangra Pashmina value chains. Similarly, interviews were conducted with all 449 sub-projects for treatment, while only 179 POs and Private Farms could be interviewed as part of an institutional survey. The reason for the lower number of interviews with the control sub-projects is that the producers' organizations (POs) were reluctant to provide information because they had not received the project's grant. The value chain-specific details of sampling and survey of HHs and Sub-projects/POs completed are provided in **Tables 4 and 5** below.

Table 4: Value Chain-wise details of survey completed

Value Chains	HHs Survey			Institutional Survey			Grand Total
	Task 1	Task 2	Total	Treatment	Control	Total	
<i>Milk</i>	486	503	989	269	117	386	1375
<i>Goat Meat</i>	679	486	1165	164	56	220	1385
<i>Chyangra Pashmina</i>	17	64	81	13	4	17	98
<i>Other (Feed/Fodder/Seed Producers)</i>	-	-	-	3	2	5	5
Grand-Total	1182	1053	2235	449	179	628	2863

Source: Endline Survey of NLSIP, 2023

Table 5: Value Chain-wise details of Institutional Survey completed

Value Chains	Treatment					Control			Grand Total	
	Cooperative (PO)	Group (PO)	Producer Association (PO)	Total POs	Private Farms	Treatment Total	PO	Private Farms		Control Total
<i>Milk</i>	84	31	2	117	152	269	18	99	117	386
<i>Goat Meat</i>	34	30	1	65	101	166	14	42	56	222
<i>Chyangra</i>	0	9	0	9	5	14	0	4	4	18
<i>Pashmina</i>	0	0	0	0	0	0	0	2	2	2
<i>Other (Feed/Fodder/Seed Producers)</i>	0	0	0	0	0	0	0	2	2	2
Grand-Total	118	70	3	191	258	449	32	147	179	628

Source: Endline Survey of NLSIP, 2023

2.2. Designed Survey Tools and Data Collection

2.2.1. The Survey Tools

Three sets of semi-structured questionnaires were employed to collect data, including:

- Structured household survey questionnaires (Task 1 and Task 2) for quantitative survey
- Structured questionnaires for institutional survey of sub-projects, and also for quantitative survey
- Checklist of Key Informants' Interviews (KIIs) for qualitative survey
- Checklist of Focus Group Discussions (FGDs) for qualitative survey
- Questionnaires for Individual Interviews (IIs)

The team worked closely with the project team during the survey instruments development, which included household questionnaires for Task 1 and Task 2, institutional survey questionnaires, key informants' checklists, individual interview questionnaires and focus group discussion checklists. The team also held consultations with project teams and officials and discussed on the survey tools and methodology. Data was collected using the revised household survey checklists and questionnaires, which had been updated to include NLSIP's feedback and recommendations.

2.2.2. Developed Online Form

The questionnaires were designed online form using the KOBO Toolbox and the data were stored online at www://kobo.humanitarianresponse.info.

2.2.3. Organized Training for Supervisors and Enumerators

A training program for eight days (14 June to 20 June 2023) was conducted for supervisors and enumerators to enhance their ability to collect data from beneficiary households and sub-projects. The training covered topics such as tools, computer applications (KOBO), data collection and tracking, guidelines, and knowledge of overall project interventions and progress to date.

2.2.4. Developed Online Data Tracking Mechanism

A mechanism for online tracking of data was designed to ensure high-quality data collection process. The data management expert supervised the overall data tracking process, and two data checkers

reviewed the data daily after the enumerators synchronized them from the field. Project staff, including the Project Management Unit (PMU), Decentralized Level Support Unit (DLSU), and World Bank also had access to view the data collection process. Figure 3 shows the details of the online data collection tracking mechanism, which was applied for quality assurance of data and its collection process.

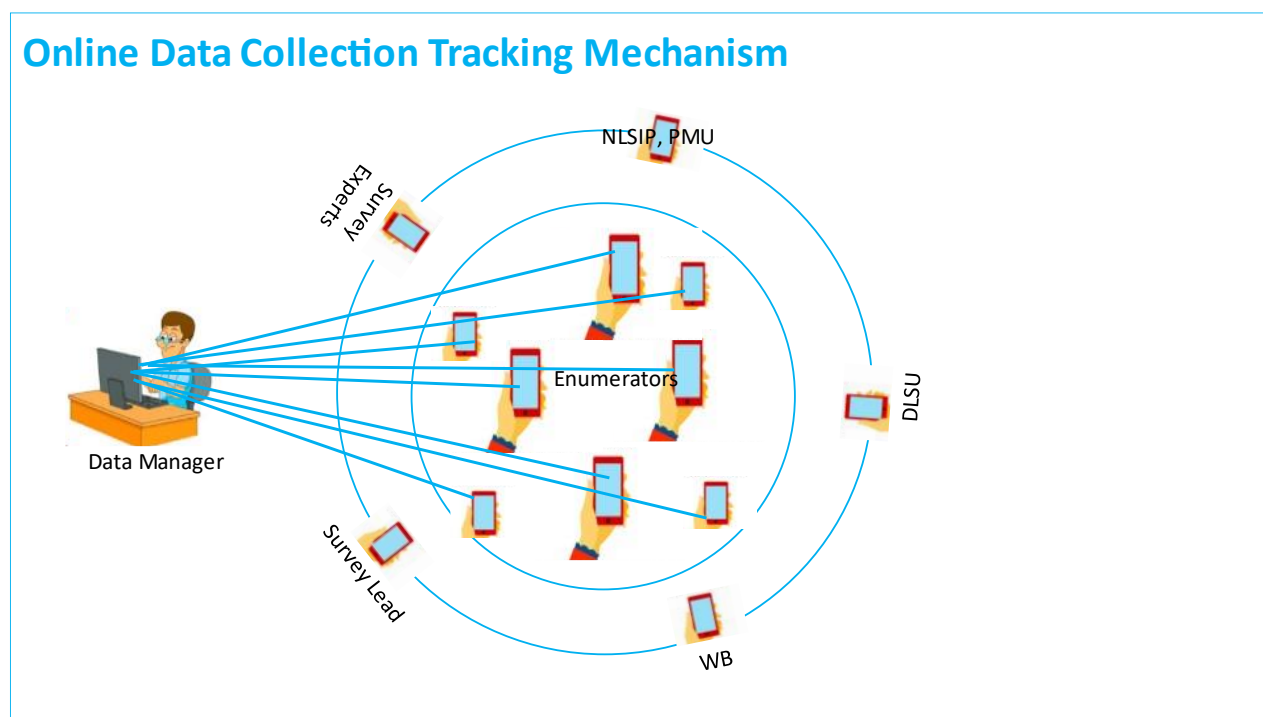


Figure 3: Online data tracking mechanism applied in NLSIP Endline Survey, 2023

2.2.5. Data Collection Process

Proficient staff members (supervisors and enumerators) were deployed to collect initial data from the households and POs. The team leader and other experts conducted key informant interviews. The structured questionnaires were coded in the Open Data Kit (ODK) platform using the KOBO Tool Box software. The survey questionnaires were designed in English, which were then translated to Nepali language in the KOBO. However, the field supervisors and enumerators could also use English version, wherever needed. The following steps were taken to ensure reliable data collection during the endline survey:

- 1) Developed a questionnaire in English and translation to Nepali language;
- 2) The structured questionnaires were uploaded into Android tablets, which were used by enumerators and supervisors;
- 3) The questionnaires were tested in the field;
- 4) Seven-day orientation sessions were conducted to familiarize enumerators with the project objectives and data collection tools;
- 5) Peer practice sessions held to ensure that enumerators are familiar with digital data collection procedures;
- 6) A one-day field practice was conducted to check the survey questionnaires and gain a better understanding of field scenarios under similar conditions;
- 7) The questionnaires were then updated, based on the comments and suggestions received from the field practice session, and used for the final survey;
- 8) The enumerators collected data from the field and uploaded into the system on the same day, whenever possible;

- 9) At the central level, a team supervisor, reviewed each uploaded data daily. If there were any confusion or mistake, the supervisor contacted the enumerator to clarify the issue or correct immediately, or ordered for a resurvey of the households, if necessary;
- 10) An expert team also visited the field during the survey to cross-check the survey process conducted by the enumerators in the sites. They also provided suggestions and instructions to the enumerators;
- 11) The expert team conducted key informant interviews, focus group discussions, and individual interviews.

2.2.5.1. Data Collection at the Household Level (1182 households)

To assess the overall impact of the project, the consulting firm surveyed around 1182 households from the 74 selected POs across 28 NLSIP districts.

- The list of the 74 selected POs were provided by the project. If a selected PO was not available in the community, an alternative PO in the same district and the same value chain commodity were selected after consultation with respective DLSU.
- A total of 856 households were interviewed which overlapped in the baseline survey 2020, AHH survey 2021, and AHH survey 2022. The remaining 667 households were selected by using a simple random sampling method from the selected POs list provided by the project for interview.
- If a sampled household was not available or household head/household respondent was not available in two attempts, that household was replaced by another HH within the same PO and same value chain commodity, in consultation with respective DLSU.

2.2.5.2. Data Collection at the Household Level (1053 households) for Matching Grant Evaluation

The project has implemented a total of **213** sub-projects under Call 1 and 2, out of which **121** were implemented individually with more members in each sub-project handling it independently. The remaining **92** sub-projects were implemented by a group of members working under one umbrella (more than one member in one place). For evaluating the matching grant at the household level, 1053 households were interviewed from the 121 sub-projects of Call I and Call II. The survey team (enumerator) used a simple random sampling method to select 1053 households for interviews from the list of beneficiary households within the 121 sub-projects. The enumerators were trained on about random sampling method and process during the enumerators' training.

2.2.5.3. Institutional Survey at Sub-Project Level

The project has implemented a total of 326 sub-projects under call-3, which are being operated by private firms and companies. As part of the institutional survey, the consulting firm collected the data from a total of 449 sub-projects, including 196 sub-projects from call 1 and 2, and 253 sub-projects from call 3.

2.2.5.4. Institutional Survey of Control Sub-Projects

The survey team compiled the list of sub-projects that were not awarded from the business plan submissions in each of the 28 districts. The survey team interviewed a total of 179 sub-projects, which operated within the same value chain commodity in the project districts. The institutional survey in the control sub-projects was based on only limited questions which are related to production and sales of the targeted value chain commodities for comparing the impacts of the sub-project on treatment sub-projects over the control sub-projects.

2.2.5.5. Key Informant Interviews (KIIs)

To validate the quantitative data, the consulting firm also gathered qualitative information from project key informants during the survey period. The firm conducted interviews with a total of 29 key informants.

2.2.5.6. Focus Group Discussions (FGDs)

During the survey, the consulting firm conducted a total of 8 focus group discussions to gather data and information from three of the livestock marketplaces and five milk chilling centers.

2.2.5.7. Individual Interviews (IIs)

The consulting firm interviewed a total of 8 staff of the GoN (VHLSEC of the MoLMAC and the Livestock Service Section of Palikas) who participated in the capacity-building training during the project implementation for assessing the impact of the training provided by the NLSIP.

2.2.6. Quality Assurance Mechanism of Data

2.2.6.1. Translating the Household Questionnaires into Nepali Language

After the finalization of the English version of the questionnaires that were translated into the Nepali language with its actual meaning to maintain the quality.

2.2.6.2. Deployed Qualified Statistician

A highly qualified statistician was deployed to ascertain the statistical validity of the data.

2.2.6.3. Well-Trained Supervisors and Enumerators

The Supervisors and enumerators were well-trained on both verbally and practically in the field so that they could gather actual field data.

2.2.6.4. Field Test of the Questionnaires

The questionnaire was field tested in the Kathmandu and Lalitpur districts (22 June 2023) during the enumerators' training where representatives of NLSIP was present their feedbacks and comments were well incorporated in the final version.

2.2.6.5. Deployment of Monitoring Team

The experts of the consulting firm collected the qualitative data from the field by using tools: KII, FGDs, and Individual Interviews. During the qualitative data collection, the experts' team simultaneously supervised the enumerators' activities, closely reviewed the filled-up data, and mentored them instantly.

2.2.6.6. Online Data Checking and Feedback at Every Moment

Each of the enumerators were provided with feedback and comments at every moment when they had any confusion or faced any problems during the data collection. The two online data checkers were deployed for online data checking purpose. The online data checkers received the data from the supervisors once the enumerators synchronized the data from the field, and verified by the supervisors. Upon receiving the data from supervisors, the online data checkers instantly reviewed the data and provided the feedback to the supervisors and the enumerators.

2.2.6.7. Guidelines to the Enumerators

The data collection guidelines were developed and the enumerators and supervisors were oriented on the guidelines, which helped to maintain the quality of data collection. The guidelines covered the topics mainly on the importance of data, data collection steps, sampling of households, replacement of households, replacement of POs, consultation with project teams at the field level, some codes of conducts to be followed in the field, etc.

2.2.6.8. Evaluation of Data

During the data collection of a certain number of households, the consulting firm and project sat together and reviewed the status of data collection and their flow of directions so that corrective actions would be taken for the quality data collection, wherever needed.

2.3. Data Analysis and Interpretation

2.3.1. Analysis of Primary Data and Information

The data were cleaned, analyzed, and presented in tables, graphs, and charts by the Statistician as per the indicator requirements instructed by the team leader and other team members. BFI performed exploratory data analysis, such as frequency counts, percentage tabulations, and cross-tabulations, on sub-group statistics and project-level statistics of important survey variables, and provided relevant interpretations.

The consulting firm calculated the sub-group statistics on PDO-level indicators as follows:

- The average of all surveyed households' values within each PO were calculated to measure indicators at the PO level.
- Sub-group statistics were provided for PDO-level indicators based on a household level, PO level, and district level, categorized by value chains.

For Task 1, which focused on overall impact, the firm analyzed the survey results using the result framework indicators for PDO level indicators. Task 1 under project support of component B with the beneficiary type PO members the value chain commodities in this are milk, goat meat, and Chyangra Pashmina. This mainly included the PDO indicators viz. productivity, sales, and adoption of climate-smart technology (CSA). Average productivity (e.g. milk) among households within the same PO was measured and then the average productivity among POs was measured over time to compare with Baseline 2020 in aggregate. By this way goat meat productivity and the Chyangra Pashmina productivity were measured. Similarly, for sales of milk, goat meat and Chyangra Pashmina was measured both within PO and among POs and compared the outputs with Baseline 2020.

The number of farmers who adopted the climate-smart technology (CST) in their farms that were compared with Baseline 2020.

For Task 2, which focused on the Matching Grant Evaluation, for which the firm analyzed the data that included in the project's support under component C, which has three types of beneficiaries: i) Individual Sub-Project (SP) by PO/Group/Cooperative; ii) Collective SP by Group/Cooperative; and iii) Commercial SP by SME.

The individual SP by PO/Group/Cooperative's results were measured (endline) and were compared with Annual Household Survey (AHHS) 2021 and AHHS 2022. The productivity in the individual SP was measured as total output over total standing herd size animal then average productivity among

households within the same PO/Coop and then among the POs/ Coops were measured. This output was compared with AHHS 2021 and for the institutional level, it was also compared with AHHS 2022.

The PDO indicator for collective SPs by Coops could be productivity, sales, CSA-Adoption, income, and insurance done, and were compared between Control and treatment.

Similarly, for Commercial SME the PDO indicators could be productivity, sales, CSA-Adoption, income, and insurance, and were compared between the control and treatment of the commercial SPs by SMEs.

The details definition of the major PDO indicators are given in Table 4 below.

Table 6: Definition of Major Indicators and Its Measurement

Indicators	Definition	Measurement
Milk Productivity	Milk production in liters per livestock per year (cow and buffalo)	Percentage increase of average milk production per cow/buffalo
Goat Meat Productivity	Offtake goat meat production expressed as carcass weight (kg) per goat per year	Percentage increase in offtake rate expressed as carcass weight for goats
Sales	Sales of major raw products and value-added products	Percentage increase of sales value (aggregated over all the targeted value chains)
Income	Household level income, PO level income and commercial producer level income	Incremental income at Household level, PO level and Commercial Producer Level
Adoption	Farmers adopting climate smart agricultural technology as promoted by the project	Percentage of Households and Commercial producers (SME) adopted climate-smart agriculture technology

Source: NLSIP Endline Survey Study, 2023

The consulting firm also compared the end-line results of the surveyed grant recipients with those who applied for the grant but were not selected, ensuring that the same numbers of non-grant recipients are surveyed. The consulting firm also cross-checked and validated the endline results with PO's records and reporting. The calculation of productivity of the milk is given below (for milk as an example).

$$Py_{hh} = \frac{\text{Total Annual milk production, liters}}{\text{Total Standing herd animal, heads}}$$

$$Py_{po} = \frac{\text{Total Annual milk production, liters}}{\text{Total Standing herd animal, heads}}$$

$$Py_{coop} = \frac{\text{Total annual milk production, liters}}{\text{Total Standing herd animal, heads}}$$

$$Py_{comm} = \frac{\text{Total Annual milk production, liters}}{\text{Total Standing herd animal, heads}}$$

Where, Py_{hh} =average productivity among households,

Py_{po} =average productivity among POs,

Py_{coop} =average productivity among coop or collective SP

Py_{comm} =average productivity among commercial SP

The comparison of indicators was done as per below.

$\Delta Py_{(2023-2020)}$ for POs under component B

$\Delta Py_{(2023-2021)}$ for individual SP /POs under component C

$\Delta Py_{(2023-2022)}$ for POs collective SP /Coop/POs under component C

$\Delta Py_{(2023-2022)}$ for POs commercial/SME under component C

For the PDO indicators, Weightage Average (equal weightage) is given for all 4 averages and compared with baselines.

2.3.2. Analysis of Secondary Data and Information

The survey team conducted a desk study and reviewed various project-related documents, including the Project Appraisal Document (PAD), Result Framework, COI Guideline, Project Implementation Manual 2019 (PIM), Environmental and Social Management Framework 2017 (ESMF), Stakeholder Dialogue Platform 2075, NLSP Financing Agreement, Grievance Redress Procedures 2075, Baseline Report, Project Documents, Manuals, Guidelines, Assessment Reports, Study Reports, CENA, Household Survey Report (s) conducted to date, and other relevant policies, frameworks, and reports. The NLSIP-supported project activities were anticipated to bring about changes in the outcome and impact indicators of the targeted beneficiaries in the short and long term. The project's policy formation and capacity development initiatives for regulatory agencies were intended to provide effective livestock services to beneficiary households and POs. The project's services and matching grant support were expected to increase production, productivity, and sales of value-added products in the targeted livestock value chain commodities such as milk, goat meat, and Chyangra Pashmina.

2.4. Field Activities

2.4.1. Team Mobilization for Field Activities

A total of 31 individuals, including enumerators (25) and experts (6), were mobilized to collect primary data from producers, collectors, processors, and service providers in 28 districts across five provinces: Koshi, Madhes, Bagmati, Gandaki, and Lumbini. These 28 districts are Panchthar, Ilam, Jhapa, Dhankuta, Udayapur, Morang, Sunsari, Saptari, Dhanusha, Siraha, Kavrepalanchok, Kathmandu, Makawanpur, Chitwan, Syangja, Kaski, Mustang, Manang, Tanahu, Myagdi, Nawalparasi-East, Rupandehi, Nawalparasi-west, Gulmi, Palpa, Arghakhanchi, Kapilbastu, and Bardiya. The team were mobilized in two phases: first covering 12 districts and second covering 16 districts. A total of 2 to 4 enumerators were deployed in each district as per number of sample sizes. The team of expert were mobilized for collecting data through KIIs, individual interviews and FGDs. The experts' team supervised and mentored the enumerators. A team of 3 persons: 2 online data checkers and 1 data manager were mobilized for day-to-day online data tracking and provided feedback to the enumerators. A total of 146 samples including HHs and SPs were covered by one enumerator, on an average. Thus, the consulting firm had made travel plan of 35 days for one enumerator including travel time. Around 5 interviews per enumerator were taken in a day. The consulting firm was primarily responsible for managing the logistics for the field team before their departure to the field.

2.4.2. Post-Field Activities

The following activities was carried out within the given timeframe after the field survey:

- 1. Preparation and Submission of Draft Report:** The consulting firm completed the assigned tasks and submitted the draft report to the NLSIP on 12 July 2023. The firm also consulted and shared the findings with the relevant stakeholders before finalizing the endline survey report.
- 2. Validation Workshop for Presentation of Draft Report:** The validation workshop was organized on 15 July 2023 to validate the endline survey results of the project.
- 3. Incorporation of comments and suggestions to the draft Report:** The comments and suggestions were collected from the validation workshop and incorporated in the endline survey final report.
- 4. Final Report submitted the (5/5 sets of hard copies along with 1 soft copy) to the NLSIP.** The consulting firm submitted the final report on 20 July 2023.

2.5. Deliverables

The consulting firm submitted the following deliverables within the specified timeline. Additionally, e-copies of the raw data collected during the study were also submitted to the Project before the final payment was made. The firm also attached related photographs in relevant sections of the report.

Table 7: Major Deliverables of Endline Survey delivered to the NLSIP

Tasks	Deliverables	Copies
Inception Report/ Validation Workshop: An Inception Report acceptable to the WB and the project with details of survey design, methodology, sampling techniques, data gathering process, survey management, work plan, and survey questionnaires and checklists. The inception report would also include dummy output tables and an outline of the survey report.	Inception Report	2 copies along with an e-copy.
Revised-Inception Report (final)	Revised Inception Report	5 copies along with e-copy
Draft Report: Prepare and submit a draft report	A draft Report of the survey	5 Copy
Validation Workshop: Organize a workshop and validate the survey findings.	A brief report of the workshop	
Final Report: Final report acceptable to the WB and the Project after incorporating the comments and suggestions received at the validation workshop.	Final Report with all survey datasheets a) raw data sheet and b) the dataset from where the outcomes were calculated. This should be disaggregated by HHs by POs.	5 Copies along with an e-copy.

Source: NLSIP Endline Survey Study, 2023

CHAPTER 3: ENDLINE SURVEY RESULTS AND DISCUSSION

This chapter highlights the endline survey results of the NLSIP, which are discussed in the following sections.

3.1. Progress on PDO Indicators (Baseline to Endline Comparison):

The NLSIP's Result Framework lists four Project Development Objective (PDO) indicators. The following comparison and discussion takes place between the baseline values on the PDO indicators as of 2020, the progress made in 2021 and 2022, and the values obtained on the PDO indicators from the endline survey conducted in 2023:

3.1.1. Productivity of Targeted Livestock Commodities

According to the NSSIP project design report, milk, goat meat and Chyangra Pashmina are the three main commodities targeted in the livestock value chain. Productivity of targeted livestock commodities is one of the important PDO level indicators of the Project-NLSIP. The productivity of milk (cow and buffalo), goat meat, and Chyangra Pashmina as found in the Endline survey, 2023, compared with the baseline (2020) and progress as of 2021 and 2022, and are discussed in the following sub-sections.

The milk productivity per year per standing cow which was 1222 litre in baseline (2020), increased to 1232 liter in 2021, 1498 liter in 2022, and 2239 litre in 2023. Similarly, milk productivity per year per standing buffalo was 720 litre in baseline (2020), increased to 749 liter in 2021, 815 liter in 2022, and 1346 liter in 2023. The productivity of goat, measured in carcass weight, which was 7.8 kg per goat per year in 2020, decreased to 3.9 kg in 2021, increased to 5.42 in 2022, and increased to 13.48 kg in 2023.

The productivities of targeted livestock commodities compared with the baseline (2020), year-2021, 2022, and endline (2023), have been presented in the following table and figure.

Table 8: Comparison of Productivity of Targeted Livestock Commodities among from Baseline (2020) to Endline (2023):

S.N.	PDO Indicators	Units	Baseline Survey, 2020 (N=dairy: 673, goat meat: 627)	HH Survey, 2021 (N=dairy: 803, goat meat: 439)	HH Survey, 2022 (N=dairy: 693, goat meat: 760)	Endline Survey, 2023 (N=dairy: 486 and goat: 679)
1	Cow Milk Productivity	Litres / Year / Standing Cow	1222	1232.00	1498.43	2239.45
2	Buffalo Milk Productivity	Litres / Year / Standing Buffalo	720	749.00	814.94	1346.39
3	Goat Meat Productivity	Kg of Carcass weight / Year / Standing Goat	7.79 ³	3.90	5.42	13.48

Source: Baseline Survey, 2020; HH Survey, 2021 & 2022; and Endline Survey, 2023

³ The productivity of the goat meat has been re-estimated to be 7.79 kg of carcass weight during the baseline year (2020)

Note: The goat meat productivity which has been re-estimated as 7.79 Kg for baseline (2020), which is based on the definition of the PAD, and presented in the following table.

Table 9: Re-estimated Productivity of Goat in Baseline (2020)

<i>Particular</i>	<i>Units</i>	<i>Nos</i>
<i>Total Number of Goat-rearing Household</i>	No	627
<i>Total Number of Goat rearing</i>	No	9142
<i>Total Number of standing Goat including kids, yearlings</i>	No	5847
<i>Total number of carcass castrated Goat/Buck in the firm throughout the year</i>	No	2856
<i>Total Goat Meat Production</i>	Kg	70084.0
<i>Average meat production/goat (live weight)</i>	Kg	12.0
<i>Average meat production/goat (carcas weight)</i>	Kg	7.8
<i>Average Meat Production (HH/per year) live weight</i>	Kg	111.8
<i>Average Meat Production (HH/per year) Carcas weight</i>	Kg	72.7
<i>Total Meat sold/</i>	Kg	47527.0
<i>Offtake in relation to standing goat pop</i>	Kg	8.1
<i>Offtake rate</i>	%	35.3

Source: Baseline Survey, 2020

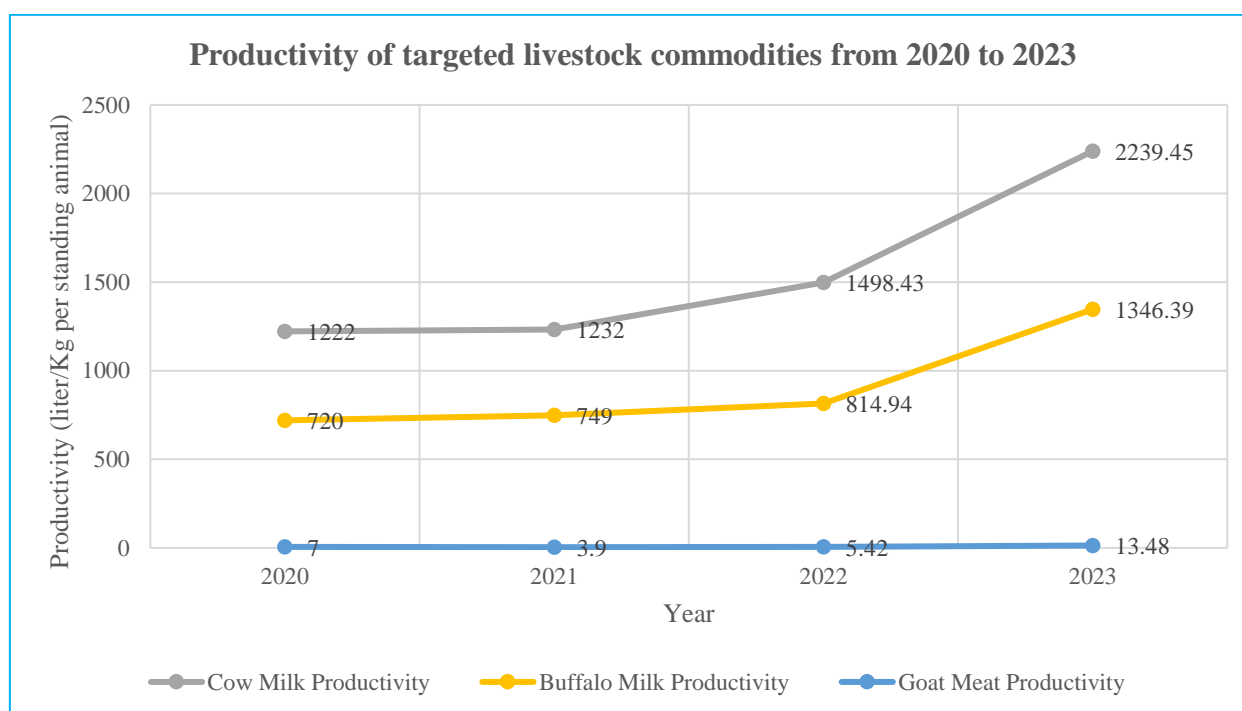


Figure 4: Productivity of Targeted Livestock Commodities from 2020 to 2023

3.1.2. Sales of Value Added Livestock Commodities

According to the NLSIP design report, the sales value of the three main livestock commodities--goat meat, milk, and Chyangra Pashmina--as well as their value-added products, are also the major impact indicators. Based on the endline survey results, these indicators are presented and discussed in the following sections.

Sales value of milk and milk products per household per year which was NRs. 396 thousand in 2020 (baseline) was increased to Rs. 402 thousand in 2021, Rs. 484 thousand in 2022, and NRs. 599 thousand in 2023. Most of the sales income of dairy households were from raw milk sale.

The sales value of goat meat per household, which was NRs. 56 thousand in 2020 (baseline), increased to Rs. 60 thousand in 2021, Rs. 75 thousand in 2022, and NRs. 107 thousand in 2023 (endline). Most of the sales income of goat rearing households were from sale of live goat.

The sales values of the three major livestock commodities recorded during the baseline (2020), 2021, 2022 and endline (2023) have been presented in the following table and figure.

Table 10: Comparison of Sales Value of Value-added Products of Targeted Livestock Commodities from Baseline (2020) to Endline (2023)

S.N	PDO Indicators	Units	Baseline Survey, 2020 (N=dairy: 673, goat meat: 627)	HH Survey, 2021 (N=dairy: 803, goat meat: 439)	HH Survey, 2022 (N=dairy: 693, goat meat: 760)	Endline Survey, 2023 (N=dairy: 486 and goat: 679)
1	Sales Value of Milk and Milk Products	NRs (,000) / HH / Year	396.00	401.50	484.35	598.96
2	Sales Value of Goat & Value-Added Products	NRs (,000) / HH / Year	55.67	60.00	75.38	107.35

Source: Baseline Survey, 2020; HH Survey, 2021 & 2022; and Endline Survey, 2023

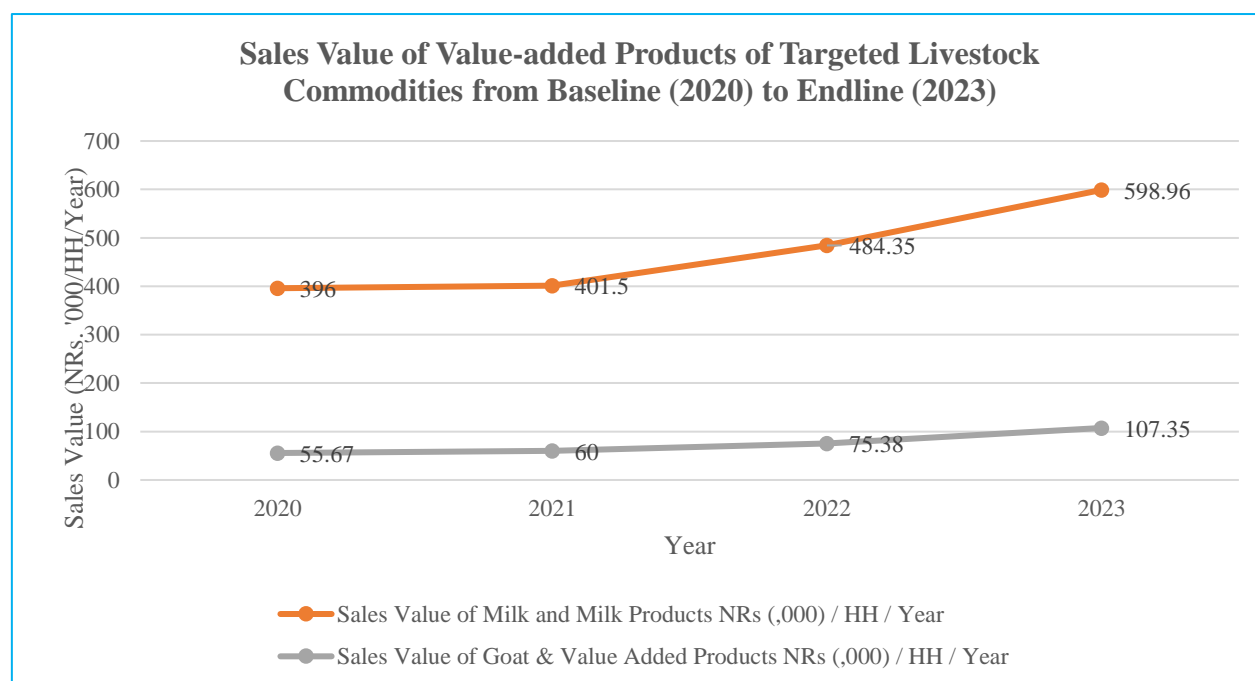


Figure 5: Sales Value of Value-added Products of Targeted Livestock Commodities from Baseline (2020) to Endline (2023)

3.1.3. Farmers Adopting Climate Smart Agricultural (CSA) Technology

The results regarding adoption of Climate Smart Agricultural Technology (CSAT) by farmers for all three value chains under Component B (Task 1) are presented and discussed in the sections below.

The project-NLSIP has been promoting seven types of climate smart agricultural technologies (CSATs), which farmers are using in three targeted livestock commodities. They include: (i) Improved management of the shed, (ii) Management of manure, (iii) Fodders, forage production and pasture development, (iv) Production of hay and silage, (v) Feeding of stall, (vi) Forage seed production, and (vii) Saplings/seedlings production. The CSAT used by producer farmers in all three targeted livestock commodities is highlighted in the next subsections.

Out of the seven-climate smart technologies, maximum (59%) farmers used to adopt improved shed management technologies, followed by manure management (46%), and fodders, forage production and pasture development (26%), and least in saplings/seedlings production (0.3%). This has been presented in the following table. These figures on the use of CSATs have positive impact on the productivity increase in the dairy and goat value chain, as mentioned above in Section 3.1.1.

Table 11: Climate Smart Agricultural Technologies applied at HH level in Targeted Livestock Commodities in in all Value Chains in 2023

Climate Smart Agricultural Technologies	Cooperative (N=295)		Farmer Group (N=887)		Total (N=1182)	
	Number	%	Number	%	Number	%
Improved shed management	137	46.44	556	62.68	693	58.63
Manure management	123	41.69	422	47.58	545	46.11
Fodders, Forage Production and Pasture Development	30	10.17	277	31.23	307	25.97
Hay and Silage making	5	1.69	18	2.03	23	1.95
Stall feeding	41	13.90	194	21.87	235	19.88
Forage seed production	4	1.36	13	1.47	17	1.44
Saplings/seedlings production	0	0.00	3	0.34	3	0.25

Source: Endline Survey of NLSIP, 2023

The above results as obtained from the endline survey could not be compared with the baseline (2020), Household Survey, 2021 and 20222, as there were no numbers in each type of CSAT in those surveys.

However, an attempt has also been made to compare on the number of technologies adoption of Climate Smart Agricultural Technologies (CSATs) in the targeted livestock commodities by the farmers from baseline (2020) to endline (2023), and the results have been presented in the following table.

Table 12: CSAT Applied at HH level in all Targeted Livestock Commodities from Baseline (2020) to Endline (2023)

Number of Climate Smart Technologies	Baseline, 2020 (N=1400 HHs)				HH Survey, 2021 (N=1350 HHs)				HH Survey, 2022 (N=1557 HHs)				Endline, 2023 (N=1182 HHs)			
	No. of HHs adopting	No. of HHs adopting at least	% of HHs adopting at least	Of which Female (%)	No. of HHs adopting	No. of HHs adopting at least	% of HHs adopting at least	Of which Female (%)	No. of HHs adopting	No. of HHs adopting at least	% of HHs adopting at least	Of which Female (%)	No. of HHs adopting	No. of HHs adopting at least	% of HHs adopting at least	Of which Female (%)
One Technology	262	1074	76.71	56.42	98	850	62.96	100	237	1280	100.00	-	699	1182	100.00	96.19
Two Technologies	314	812	58	44.09	207	752	55.70	88.93	243	1043	81.48	-	356	483	40.86	97.31
Three Technologies	228	498	35.57	33.73	253	545	40.37	64.75	333	800	62.50	-	103	127	10.74	92.91
Four Technologies	156	270	19.29	22.22	177	292	21.63	38.11	295	467	36.48	-	17	24	2.03	87.5
Five and More Technologies	114	114	8.14	14.91	115	115	8.52	16.39	172	172	13.44	-	7	7	0.59	100
No Technology used	326	0	23.29	0	500		0.00	0.41			0.00	-		0	0.00	
Total	1400	1074	100	43.29	1350	850	100	18.1	1280	1280		-	1182	1182		96.19

Source: Baseline Survey, 2020; HH Survey, 2021 & 2022; and Endline Survey, 2023

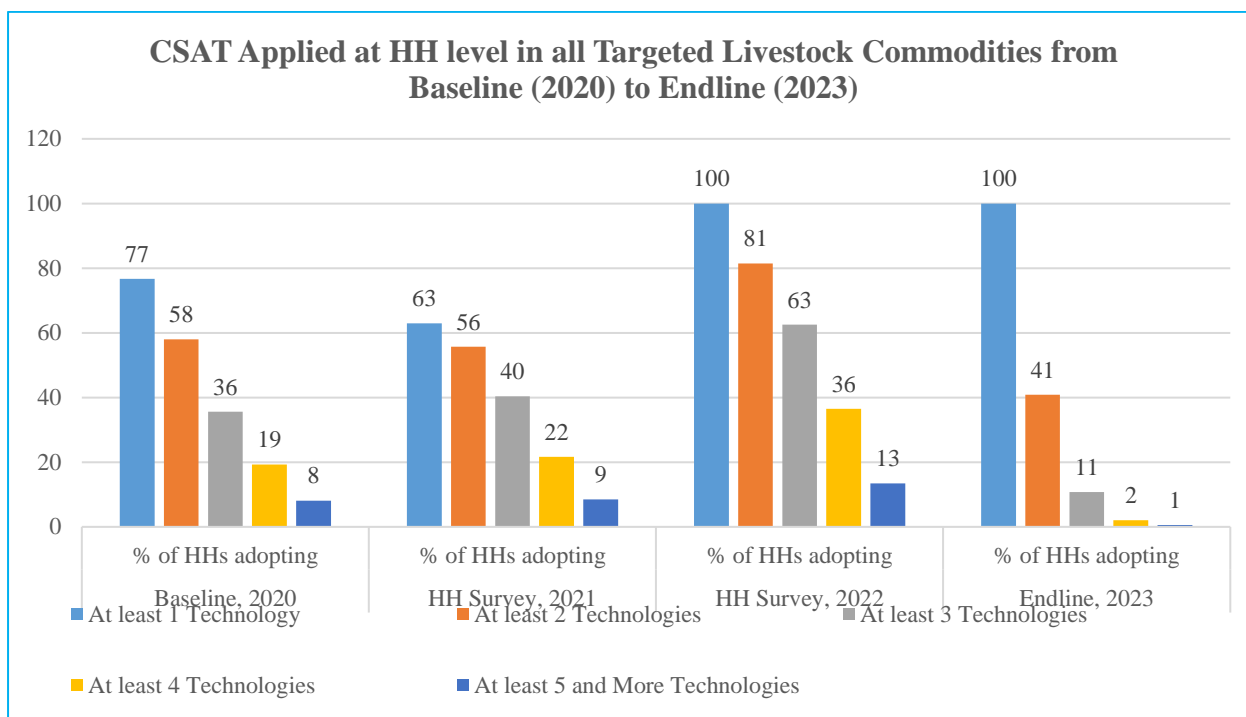


Figure 6: CSAT Applied at HH level in all Targeted Livestock Commodities from Baseline (2020) to Endline (2023)

From the above table and graph, it can be seen that 77 and 63 per cent of farmers used to adopt at least one CSAT in their livestock farms in 2020 (baseline) and in 2021 respectively, which increased to 100% in 2022, and endline (2023). Women’s involvement in the CSATs in the livestock farms, were 96% in 2023, which was 56% in the baseline (2020). This shows that women were encouraged to adopt climate smart technologies in their livestock farms, as supported by the project-NLSIP.

3.1.4. Farmers’ Access to Agriculture Assets and Services

The results regarding farmers’ access to agriculture assets and services for all three targeted value chain commodities from baseline (2020) to endline (2023), are discussed as follows.

Among the assets received by the farmers in 2023, maximum (41 %) of farmers had access to sheds provided by the project, which was 8.6% in 2020, and 14.7% in 2021. The next important livestock asset was the chaffcutters, i.e. 33 % received in 2023, which was 15.6% in 2020, and none in 2021 and 2022. Of the access to assets, the proportion of women receiving assets were 17.4 % in 2020, 22.1% in 2021, and 66% in 2023. No data were found for the year 2022.

Similarly, among the services received by the farmers, 33.4 % of them received Artificial Insemination (AI) services from the project in 2023, which was nil in 2020, and 1.9% in 2021. The second important service was the vaccination services against FMD and PPR, i.e. 26.5% in 2023, and 5% in 2021. The proportion of women receiving services are very less.

The figures on the farmers’ access to agricultural assets and services in endline (2023) compared with the baseline (2020) are presented in the following table.

Table 13: Farmers' Access to Agriculture Assets and Services in All value chains from Baseline (2020) to Endline (2023)

Agriculture Assets	Baseline (2020) (N=1400 HHs)			HH Survey, 2021 (N=1350 HHs)			HH Survey, 2022 (N=1557 HHs)			Endline (2023) (N=1182 HHs)		
	HH Number	% of HH having access	Of which Female %	HH Number	% of HH having access	Of which Female %	HH Number	% of HH having access	Of which Female %	HH Number	% of HH having access	Of which Female %
	(N=1310)			(N=1350)			(N=1557)			(N=1182)		
(A) Assets			17.4			22.1			NA			66
Live livestocks	59	4.50	-	86	6.37	0	-	-	-	213	18.02	
Milk can	402	30.69					-	-	-	272	23.01	
Cream separator	1	0.08					-	-	-	-		
Milking machine	1	0.08					-	-	-	-		
Sheds	113	8.63	-	198	14.67	4.7	-	-	-	482	40.78	
Chaff cutter	204	15.57					-	-	-	390	32.99	
Fork	107	8.17					-	-	-			
Wheel barrow	78	5.95					-	-	-	20	1.69	
Shovel	374	28.55					-	-	-			
Solar panel	2	0.15								11	0.93	
Fork	103	7.86										
Building	-						-	-	-	8	0.68	
Weighing balance	148	11.30					-	-	-	40	3.38	
Burdizzo castrator	8	0.61										
Tent for rotational grazing	3	0.23										
Others assets	46	3.51		96	7.11	1.9	-	-	-	49	4.15	
(B) Services		34.5	12.5			6.22						
Vaccination (FMD/PPR)	-	-		284	21.04	5.2	-	-	-	313	26.48	
Forage seeds (winter)	-	-		943	69.85	22.1	-	-	-	137	11.59	
Forage seeds (summer)	-	-					-	-	-	95	8.04	
Seedlings/saplings/sets	-	-		175	12.96	5.2	-	-	-	31	2.62	
Medicines	-	-		101	7.48	3	-	-	-	164	13.87	
Technical Training	-	-		529	39.19	12.8	-	-	-	61	5.16	
Farmer Field School (FFS)	-	-					-	-	-	15	1.27	
Marketing	-	-		92	6.81	0.9	-	-	-	1	0.08	
AI services	-	-		104	7.70	1.9	-	-	-	395	33.42	
Other services	-	-					-	-	-			

Source: Baseline Survey, 2020, and Endline Survey of NLSIP, 2023

3.2. Overall Impact of the Project (Task 1)

The overall impact of the Project-NLSIP, based on the data collected during the Endline Survey (2023), are discussed as under:

3.2.1. Productivity of Targeted Livestock Commodities

As per the project design report of the NLSIP, there are basically three targeted livestock value chain commodities-milk, goat meat and Chyangra Pashmina. Productivity of targeted livestock commodities is one of the important PDO level indicators of the Project-NLSIP. The productivity of milk (cow and buffalo), goat meat, and Chyangra Pashmina as found in the Endline survey, 2023, compared with the baseline (2020), and are discussed in the following sub-sections.

The milk productivity per year per standing cattle was found out to be 2239 litre in 2023, increased by 83% as compared to baseline 2020 (1222 litre). Similarly, milk productivity per year per standing buffalo was found out to be 1346 litre in 2023, increased by 87% as compared to baseline 2020 (720 litre). The productivity of goat, measured in carcass weight, was increased by 73% in 2023 (13.5 kg per goat per year) as compared to baseline productivity of 7.8 kg per goat per year.

The productivities of targeted livestock commodities compared with the baseline (2020) and endline (2023), have been presented in the following table.

Table 14: Comparison of Productivity of Targeted Livestock Commodities among from Baseline (2020) to Endline (2023)

S.N.	PDO Indicators	Units	Baseline, 2020 (N=dairy: 673, goat meat: 627)	Endline, 2023 (N=dairy: 486 and goat: 679)	Increased %
1	Cow Milk Productivity	Litres/Year/Standing Cow	1222	2239.5	83.3
2	Buffalo Milk Productivity	Litres/Year/Standing Buffalo	720	1346.4	87
3	Goat Meat Productivity	Kg of Carcass weight/Year/Standing Goat	7.8 ⁴	13.5	73.1
4	Chyangra Pashmina	Gm/Chyangra/Year	-		

Source: Baseline Survey, 2020, and Endline Survey of NLSIP, 2023

Reasons for Increment of Productivity

Such increment (83%) of the milk productivity of cow in 2023 as compared to the baseline was due to following reasons, as supported by the following table. The below table depicts that the cattle rearing households used to increase number of improved cow and reduce the local cow, and increased number of lactating cow in their herd, and thereby reducing overall herd size, i.e. from 6.09 to 4.09 from baseline to endline respectively. In addition, the lactation length of cow in 2023 was increased by 13% as compared to the baseline (2020). Such positive results were seen at the household level in Task-1, because of project's supports such as vaccination against FMD, parasite control, AI services, and

⁴ The productivity of the goat meat has been re-estimated to be 7.79 kg of carcass weight during the baseline year (2020)

application of climate smart technologies such as improved shed management, promotion of forage and fodder cultivation etc through the component B of the Project.

Table 15: Comparison of Herd Size, Milk Production, and Lactation Period of Cow between Baseline (2020) and Endline (2023)

S.N.	Indicators	Units	Baseline, 2020 (N=673 HHs)	Endline, 2023 (N=486 HHs)	Increased %
1	Herd size (local cow)	Number / HH	-	2.97	-
2	Herd size (improved cow)	Number / HH	-	4.18	-
3	Herd size (local and improved cow)	Number / HH	6.09	4.09	-32.84
4	Lactating cow (local and improved)	Number / HH	2.96	3.04	2.7
5	Milk Production (local and improved cow)	Liter/HH/Year	7,451	10,160	36.36
6	Milk Sale	Liter/HH/Year	-	9499.6	-
7	Lactation length (local and improved cow)	Days/Lactating cow	256	289	12.89

Source: Baseline Survey, 2020, and Endline Survey of NLSIP, 2023

In the case of buffalo milk productivity, such increment (87%) of the milk productivity of buffalo, as compared to the baseline, was due to the following reasons, as supported by the following table. As in the cow, the table below depicts that the buffalo rearing households used to increase number of improved buffalo and reduce the local buffalo, and increased number of lactating buffalo in their herd, and thereby reducing the overall herd size, i.e. from 4.8 to 4.58 from baseline to endline respectively. In addition, the lactation length of buffalo in 2023 was increased by around 4% as compared to the baseline (2020). These positive results were seen at the household level in Task-1, because of the project's supports as mentioned above for cattle.

Table 16: Comparison of Herd Size, Milk Production, and Lactation Period of Buffalo between Baseline (2020) and Endline (2023)

S.N.	Indicators	Units	Baseline, 2020 (N=673 HHs)	Endline, 2023 (N=486 HHs)	Increased %
1	Herd size (local)	Number / HH	-	2.64	-
2	Herd size (improved)	Number / HH	-	5.24	-
3	Herd size (local and improved)	Number / HH	4.8	4.58	-4.58
4	Lactating buffalo (local and improved)	Number / HH	2.21	3.21	45.24
5	Milk Production	Liter/HH/Year	3554.38	7351.83	106.84
6	Milk Sale	Liter/HH/Year	-	6873.96	-
7	Lactation length	Days/Lactating buffalo	251	261	3.98

Source: Baseline Survey, 2020, and Endline Survey of NLSIP, 2023

In case of goat, the farmers used to decrease the herd size with increased number of cross-bred and exotic breed in their herds. At the same time per household goat meat production was also increased in 2023 as compared to the baseline (2020). Figures regarding per household herd size and production of goat has been presented in the following table. Such increment in goat meat productivity, as mentioned above, at the household level in Task-1, was because of several support programs implemented at the household levels through the component B of the Project, such as, promotion of stall-feeding,

vaccination against PPR, parasite control programs, and use of climate smart technologies such as improved shed management, expanding forage and fodder cultivation, manure management and stall feeding.

Table 17: Comparison of Herd Size and Meat Production of Goat between Baseline (2020) and Endline (2023)

S.N.	INDICATORS	UNITS	BASELINE, 2020 (N=627 HHS)	ENDLINE, 2023 (N=679 HHS)	INCREASED %
1	Herd size (local)	Number / HH	-	9.17	-
2	Herd size (cross-bred)	Number / HH	-	11.14	-
3	Herd size (exotic)	Number / HH	-	7.95	-
4	Herd size (all goat)	Number / HH	9.3	11.36	22.2
5	Meat Production (Live weight basis)	Kg/HH/Year	111.8	239.26	127.5
6	Meat Production (Carcass weight basis)	Kg/HH/Year	72.7	155.52	113.9

Source: Baseline Survey, 2020, and Endline Survey of NLSIP, 2023

3.2.2. Sales of Value Added Livestock Commodities

Sales value of the three major livestock commodities (milk, goat meat and Chyangra Pashmina) and their value-added products are also the major impact indicators, as per the NLSIP design report. Based on the endline survey results, these indicators are presented and discussed in the following sections.

Sales value of milk and milk products per household per year which was NRs. 396 thousand in 2020 (baseline) was increased to NRs. 599 thousand in 2023, with increment of 51%. Most of the sales income of dairy households were from raw milk sale 99% and 98.5% in 2020 and 2023 respectively, showing very less amount of value addition of milk in baseline and endline as well. It was also observed that about 93.5% of the milk production was sold in 2023. The average selling price of raw milk during baseline (2020) was recorded to be Rs. 62.1 per liter, increased to Rs. 67.5 per liter in 2023.

The sales value of goat meat per household, which was NRs. 55,670 in 2020 (baseline), increased to NRs. 107.35 thousand, with increment of 93 %. It was also observed that about 42% of total goat meat production was recorded to have been sold in 2023. As such 176.49 kg live weight of goat per household was recorded to have been sold in 2023 with average price of Rs. 608.27 per kg of live weight. However, there was no value addition in goat observed in 2023, which in 2020 there was 6% of value addition in the form of raw meat and buck sale.

The sales values of the three major livestock commodities compared with the baseline (2020) and endline (2023) have been presented in the following table.

Table 18: Comparison of Sales Value of Value-added Products of Targeted Livestock Commodities from Baseline (2020) to Endline (2023) (at current price)

S.N.	PDO Indicators	Units	Baseline, 2020 (N=dairy: 673, goat meat: 627)	Endline, 2023 (N=dairy : 486 and goat: 679)	Sales value increased (%)
1	Sales Value of Milk and Milk Products	NRs (,000) / HH / Year	396	598.96	51.25
1.1	Sale of Raw Milk	NRs (,000) / HH / Year	392	590.56	50.65
1.2	Sale of Value-Added Products	NRs (,000) / HH / Year	4	8.40	110.00
2	Sales Value of Goat & Value-Added Products	NRs (,000) / HH / Year	55.67	107.35	92.83
2.1	Sales of Live Goat	NRs (,000) / HH / Year	52.32	107.35	105.18
2.2	Sales of Value-Added Products	NRs (,000) / HH / Year	3.35	-	-

Source: Baseline Survey, 2020, and Endline Survey of NLSIP, 2023

Reasons for Increased Sales Value

Sales value of milk was found to be increased at the household level in 2023, due to increase in per household milk production and milk sold. The volume of milk sold per household which was 6312 liter in 2020, increased to 8749 liter in 2023. The average milk production per household in 2023 was estimated to be 9351.77 liter per year, of which 93.55% of household milk production used to be sold in 2023.

Similarly, as goat meat (on live weight basis) sold per household in 2020 was 92 kg, increased to 176 kg in 2023. As such, the value of goat meat sold per household increased by 93% in 2023 as compared to the baseline. The sales value of live goat in 2023 was also increased due to increased sale price of live weight, i.e. Rs. 569 per kg in 2020 increased to Rs. 608 in 2023.

Estimation of Sales Value after Adjusting the Inflation

An attempt has also been made to compare the sales value after adjusting the inflation, which has been presented in the following table.

Table 19: Comparison of Sales Volume and Value of Value-added products of Targeted Livestock Commodities from Baseline (2020) to Endline (2023) (at constant / base year price)

S.N.	PDO Indicators	Units	Baseline, 2020 (N=dairy: 673, goat meat: 627)	Endline, 2023 (N=dairy: 486 and goat: 679)	Sales value increased (%)
1	Sales Value of Milk and Milk Products	NRs (,000) / HH / Year	396	520.15⁵	31.35
1.1	Sale of Raw Milk	NRs (,000) / HH / Year	392	512.85 ⁶	30.83
1.2	Sale of Value-Added Products	NRs (,000) / HH / Year	4	7.30	82.25
2	Sales Value of Goat & Value-Added Products	NRs (,000) / HH / Year	55.67	93.23⁷	67.46
2.1	Sales of Live Goat	NRs (,000) / HH / Year	52.32	93.23 ⁸	78.19
2.2	Sales of Value-Added Products	NRs (,000) / HH / Year	3.35	-	-

Source: Baseline Survey, 2020, and Endline Survey of NLSIP, 2023

From above table, it can be seen, after adjusting the inflation, that there was 31.35% of increment of real value of milk sale, and 67.4% of increment of real value of goat sale from baseline (2020) to endline (2023). Such increments of sale of milk and goat meat were due to 62% increment of per household milk production and 181% increment of per household goat meat production, from baseline (2020) to endline (2023).

⁵ Value after adjustment of inflation (CPI at 2020=198; 2023=228)

⁶ Value after adjustment of inflation (CPI at 2020=198; 2023=228)

⁷ Value after adjustment of inflation (CPI at 2020=198; 2023=228)

⁸ Value after adjustment of inflation (CPI at 2020=198; 2023=228)

3.2.3. Farmers Adopting Climate Smart Agricultural (CSA) Technology

The results regarding adoption of Climate Smart Agricultural Technologies (CSATs) by farmers for all three value chains under Component B (Task-1) are presented and discussed in the successive sections below.

The project-NLSIP has been promoting seven types of climate smart agricultural technologies (CSATs), which farmers are using in three targeted livestock commodities. They include: (i) Improved management of the shed, (ii) Management of manure, (iii) Fodders, forage production and pasture development, (iv) Production of hay and silage, (v) Feeding of stall, (vi) Forage seed production, and (vii) Saplings/seedlings production. The CSAT used by producer farmers in all three targeted livestock commodities is highlighted in the next subsections.

Out of the seven-climate smart technologies, maximum (59%) farmers used to adopt improved shed management technologies, followed by manure management (46%), and fodders, forage production and pasture development (26%), and least in saplings/seedlings production (0.3%) in 2023. This has been presented in the following table. These figures on the use of CSATs have positive impact on the productivity increase in the dairy and goat value chain, as mentioned above in Section 3.1.1.

Table 20: Climate Smart Agricultural Technologies applied at HH level in Targeted Livestock Commodities in in all Value Chains in 2023

Climate Smart Agricultural Technologies	Cooperative (N=295)		Farmer Group (N=887)		Total (N=1182)	
	Number	%	Number	%	Number	%
Improved shed management	137	46.44	556	62.68	693	58.63
Manure management	123	41.69	422	47.58	545	46.11
Fodders, Forage Production and Pasture Development	30	10.17	277	31.23	307	25.97
Hay and Silage making	5	1.69	18	2.03	23	1.95
Stall feeding	41	13.90	194	21.87	235	19.88
Forage seed production	4	1.36	13	1.47	17	1.44
Saplings/seedlings production	0	0.00	3	0.34	3	0.25

Source: Endline Survey of NLSIP, 2023

The above results as obtained from the endline survey could not be compared with the baseline, as there were no numbers in each type of CSATs in the baseline.

However, an attempt has also been made to compare on the number of technologies adoption of Climate Smart Agricultural Technologies (CSATs) in the targeted livestock commodities by the farmers between baseline (2020) and endline (2023), and the results have been presented in the following table.

Table 21: Comparison of CSAT Applied at HH level in all Targeted Livestock Commodities between Baseline (2020) and Endline (2023)

Number of Climate Smart Technologies	Baseline, 2020 (N=1400 HHs)				Endline, 2023 (N=1182 HHs)			
	No. of HHs adopting	No. of HHs adopting at least	% of HHs adopting at least	Of which Female (%)	No. of HHs adopting	No. of HHs adopting at least	% of HHs adopting at least	Of which Female (%)
One Technology	262	1074	76.71	56.42	699	1182	100.00	96.19
Two Technologies	314	812	58.00	44.09	356	483	40.86	97.31
Three Technologies	228	498	35.57	33.73	103	127	10.74	92.91
Four Technologies	156	270	19.29	22.22	17	24	2.03	87.50
Five and More Technologies	114	114	8.14	14.91	7	7	0.59	100.00
No Technology	326	0	23.29	0.00		0	0.00	
Total	1400	1074	100	43.29	1182	1182		96.19

Source: Baseline Survey, 2020, and Endline Survey of NLSIP, 2023

From the above table, it can be seen that 100% of the producer farmers in endline (2023) used to adopt at least one CSAT in their farms, as promoted by the project-NLSIP, as against 77 % farmers who used to adopt at least one CSAT in the baseline year (2020). Out of the total number of households using at least one technology, the involvement of women was 56.4% in the baseline (2020), increased to 96% in 2023. In total, where there was 43.29% of involvement of women in baseline (2020), increased to 96% in endline (2023). This shows that women were encouraged to adopt climate smart technologies in their livestock farms, as supported by the project-NLSIP.

Benefits of CSAT Adoption at the Household Level

Out of 1182 households surveyed under Task-1, 86% of them reported that CSAT applied in their farms increased production, 65% reported that it reduced the health problem of the livestock, 45% reported that it increased in feed availability, and 40% of them reported improved reproduction of livestock. Figures regarding the benefit of CSAT at farm levels as reported by the producer farmers under component B (Task-1) have been presented in the following table.

Table 22: Benefit of CSAT adoption at the Household level (2023)

Benefits of CST	Cooperative (N=295)		Farmer Group (N=887)		Total (N=1182)	
	No. of HH reporting	% of HH reporting	No. of HH reporting	% of HH reporting	No. of HH reporting	% of HH reporting
Increased production	179	60.68	841	94.81	1020	86.29
Reduced health problem	147	49.83	622	70.12	769	65.06
Increased in feed availability	70	23.73	461	51.97	531	44.92
Improved in reproduction	55	18.64	412	46.45	467	39.51

Source: Endline Survey of NLSIP, 2023

Value chain wise adoption of Climate Smart Agricultural Technologies in 2023, compared with the baseline (2020) have been presented in the following sub-sections.

(a) Climate Smart Technologies in Dairy Value Chain and their Adoption Rate in 2023

Among the 7-climate smart agricultural technologies (CSATs), 60 % of dairy farms, out of total 487, were found practicing manure management, followed by improved shed management (55%), and least in saplings/seedlings production (0.21%) in 2023. This has been presented in the following table.

Table 23: Climate Smart Technologies in Dairy Value Chain and their Adoption Rate in 2023

Types of Climate Smart Agricultural Technologies (CSAT)	Number of HH adopting CSAT (N=487)	% of HH responding
Improved shed management	267	54.83
Manure management	291	59.75
Fodders, Forage Production and Pasture Development	113	23.20
Hay and Silage making	12	2.46
Stall feeding	74	15.20
Forage seed production	4	0.82
Saplings/seedlings production	1	0.21

Source: Endline Survey of NLSIP, 2023

From the below table for Dairy Value Chain, it can be seen that 100% of the milk producer farmers in endline (2023) used to adopt at least one CSAT in their dairy farms, as promoted by the project-NLSIP, as against 87.5 % dairy farmers who used to adopt at least one CSAT in the baseline year (2020). Out of the total number of dairy households using at least one technology, the involvement of women using CSATs, which was 50% in the baseline (2020), increased to 97% in 2023. In total, where there was 44% of involvement of women in dairy farms in baseline (2020), increased to 97% in endline (2023). This shows that women were encouraged to adopt climate smart technologies in the dairy farms, as supported by the project-NLSIP.

Table 24: Comparison of Adoption of Climate Smart Technologies in Dairy Value Chain between Baseline (2020) and Endline (2023)

Number of Climate Smart Technologies	Baseline, 2020 (N= 673 HHs)				Endline, 2023 (N=487 HHs)			
	No. of HHs adopting	No. of HHs adopting at least	% of HHs adopting at least	Of which Female (%)	No. of HHs adopting	No. of HHs adopting at least	% of HHs adopting at least	Of which Female (%)
One Technology	126	589	87.52	49.75	268	487	100.00	96.92
Two Technologies	167	463	68.80	36.72	171	219	44.97	99.09
Three Technologies	122	296	43.98	27.70	41	48	9.86	93.75
Four Technologies	103	174	25.85	16.09	6	7	1.44	85.71
Five and More Technologies	71	71	10.55	9.86	1	1	0.21	100.00
No Technology	84	-	-	-			0.00	-
Total	673	589		43.54	487		100	96.92

Source: Baseline Survey, 2020, and Endline Survey of NLSIP, 2023

(b) Climate Smart Technologies in Goat Value Chain and their Adoption Rate in 2023

Among the 7-climate smart agricultural technologies (CSATs) promoted by the NLSIP, nearly 62 % of goat farms, out of 678, were found practicing improved shed management, followed by manure management (36%), fodders, forage production and pasture development (28%), and least in saplings/seedling production (0.29%) in 2023. This has been presented in following table.

Table 25: Climate Smart Technologies in Goat Value Chain and their Adoption Rate in 2023

Types of Climate Smart Agricultural Technologies (CSAT)	Number of HH adopting CSAT (N=678)	% of HH responding
Improved shed management	418	61.65
Manure management	244	35.99
Fodders, Forage Production and Pasture Development	191	28.17
Hay and Silage making	6	0.88
Stall feeding	161	23.75
Forage seed production	13	1.92
Saplings/seedlings production	2	0.29

Source: Endline Survey of NLSIP, 2023

From the below table for Goat Value Chain, it can be seen that 100% of the goat producer farmers in endline (2023) used to adopt at least one CSAT in their goat farms, as promoted by the project-NLSIP, as against 76 % goat farmers who used to adopt at least one CSAT in the baseline year (2020). Out of the total number of goat rearing households using at least one technology, the involvement of women was 64% in the baseline (2020), increased to 96% in 2023. In total, where there was 49% of involvement of women in use of CSATs in goat farms in baseline (2020), increased to 96% in endline (2023). This shows that, as also in the dairy farms, women were encouraged to adopt climate smart agricultural technologies in their goat farms, as supported by the project-NLSIP.

Table 26: Comparison of Adoption of Climate Smart Technologies in Goat Value Chain between Baseline (2020) and Endline (2023)

Number of Climate Smart Technologies	Baseline, 2020 (N= 627 HHs)				Endline, 2023 (N=678 HHs)			
	No. of HHs adopting	No. of HHs adopting at least	% of HHs adopting at least	Of which Female (%)	No. of HHs adopting	No. of HHs adopting at least	% of HHs adopting at least	Of which Female (%)
One Technology	134	477	76.08	64.36	418	678	100.00	95.72
Two Technologies	142	343	54.70	53.64	185	260	38.35	95.77
Three Technologies	105	201	32.06	42.79	59	75	11.06	92.00
Four Technologies	53	96	15.31	33.33	10	16	2.36	87.50
Five and More Technologies	43	43	6.86	23.26	6	6	0.88	100.00
No Technology used	150	-	23.92	-			0.00	-
Total	627	477	100.00	48.96	678	678	100	95.72

Source: Baseline Survey, 2020, and Endline Survey of NLSIP, 2023

(c) Climate-Smart Technologies in Chyangra Pashmina Value Chain and their Adoption Rate in 2023

Among the 7 climate-smart agricultural technologies (CSATs), nearly 59 % of Chyangra farms, out of 17, were found practicing manure management, followed by improved shed management (47%), hay and silage making (29.4%) in 2023. There were no stall feeding, forage seed production, and saplings/seedlings production technologies practiced in Chyangra Pashmina value chains. This has been presented in following table.

Table 27: Climate-Smart Technologies in Chyangra Pashmina Value Chain and their Adoption Rate in 2023

Types of Climate-Smart Agricultural Technologies (CSAT)	Number of HH adopting CSAT (N=17)	% of HH responding
Improved shed management	8	47.06
Manure management	10	58.82
Fodders, Forage Production and Pasture Development	3	17.65
Hay and Silage making	5	29.41
Stall feeding	0	0.00
Forage seed production	0	0.00
Saplings/seedlings production	0	0.00

Source: Endline Survey of NLSIP, 2023

From the below table for Chyangra Pashmina Value Chain, it can be seen that 100% of the Chyangra producer farmers in endline (2023) used to adopt at least one CSAT in their farms, as promoted by the project-NLSIP, as against 8 % Chyangra farmers who used to adopt at least one CSAT in the baseline year (2020). Out of the total number of Chyangra rearing households using at least one technology, the involvement of women using CSATs, which was 75% in the baseline (2020) which increased to 94% in 2023. In total, where there was 6% of involvement of women in adopting CSAT in Chyangra farms in baseline (2020), increased to 94% in endline (2023). This shows that, as also in the dairy and goat farms, women were encouraged to adopt climate smart technologies in the Chyangra farms, as supported by the project-NLSIP.

Table 28: Comparison of Adoption of Climate Smart Technologies in Chyangra Pashmina Value Chain between Baseline (2020) and Endline (2023)

Number of Climate Smart Technologies	Baseline, 2020 (N=100 HHs)				Endline, 2023 (N=17 HHs)			
	No. of HHs adopting	No. of HHs adopting at least	% of HHs adopting at least	Of which Female (%)	No. of HHs adopting	No. of HHs adopting at least	% of HHs adopting at least	Of which Female (%)
1-Technology	2	8	8.00	75.00	13	17	100.00	94.12
2-Technologies	5	6	6.00	66.67	0	4	23.53	100.00
3-Technologies	1	1	1.00	0.00	3	4	23.53	100.00
4-Technologies			0	-	1	1	5.88	100.00
5 and More Technologies			0	-	0	0	0.00	-
No Technology used	92		92	-			0.00	-
Total	100	8	100	6.00	17	17	100	94.12

Source: Baseline Survey, 2020, and Endline Survey of NLSIP, 2023

3.2.4. Share of Project Beneficiaries with a Livestock Risk Insurance Policy

There is significant increment (47%) can be seen in the share of project beneficiaries in insurance in the dairy value chain in the year 2023 (74.3%), as compared to the baseline value (50.5%). At the same time, highly significant increment (77.64%) in the share of project beneficiaries in insurance in the goat value chain has been observed in the endline (28.6%) as compared to the baseline value (16.1%). But the insurance coverage in 2023, in real sense has been seen much lesser than that of expected both in dairy and goat value chain, i.e. 74% and 29% respectively, and no insurance coverage was observed in the Chyangra Pashmina value chain. Such lesser insurance coverage in dairy and goat value chains was due to non application of mandatory insurance provision made by the project for Component B (Task 1) households.

As a result, in overall, the share of project beneficiaries with livestock insurance policy applied in the dairy, goat and Chyngra farms has been observed as 47% as compared to the target of 60% in the year 2023, with achievement of 78.4% of the target. The percent share of women beneficiaries with livestock insurance policy in 2023 was recorded to be 24.5%, which is 54.5% achievement against the target of 45%. This figure, however, could not be compared with the baseline, as there were no data on the achievement. Such lesser achievement in all value chains as a whole (47%) was observed due to none insurance (zero) in the Chyangra farms and lesser (29%) insurance in goat value chain, and also due to non-application of mandatory insurance provision for the Component B supported livestock farms, also as mentioned above.

The figures on the share of project beneficiaries with livestock risk insurance policy, compared between baseline and endline, have been presented in the following table.

Table 29: Share of Project Beneficiaries with a Livestock Risk Insurance Policy

Value Chains	Target / Achievement	Unit	Baseline (2020) / Appraisal (N=1400 HHs)	Endline (2023) (N=1182 HHs)	Increased by (%)
Dairy	Target	%	-		
	Achievement	%	50.5	74.3	47.13
Goat	Target	%	-		
	Achievement	%	16.1	28.6	77.64
Chyangra Pashmina	Target	%	-	-	
	Achievement	%	0	0	-
All Value chains	Target	%	50	60	78.4% Achievement of Target (60%)
	Achievement	%	-	47.04 (47.73 excluding Chyangra)	
Of which female	Target	%	30	45	54.5% achievement of target (45%)
	Achievement	%	-	24.46	

Source: Baseline Survey, 2020, and Endline Survey of NLSIP, 2023

*Detail on *Livestock Insurance, 2023* given in **Annex-1**.

3.2.4.1. Reasons for lesser livestock insurance

According to the farmers, the low percentage of livestock insurance observed in 2023 was caused by under-valuation of exotic and pure breeds, delayed settlement of claims for compensation, absence of

insurance for young livestock, and very complex administrative processes involved in receiving compensations.

The farmers' answers regarding how easy the compensation procedure was are shown in the following table. Of the farmers who got compensation for their dairy cows, the majority (77%) said the process was not easy, 21% said it was easy, and 2.2% said it was very easy. Similarly, of the farmers in the goat operation who received remuneration, 58% said it was not easy to be paid, 38% said it was easy, and 3.6% said it was really easy. This has been presented in the following table.

Table 30: Responses of Farmers on receiving Compensations for Claim of Livestock Insurance in 2023

Responses of Farmers	% of HHs reporting	
	Dairy Enterprise	Goat Enterprise
Very Easy	2.2	3.6
Easy	20.7	38.1
Not Easy	77.1	58.2

Source: Endline Survey of NLSIP, 2023

3.2.4.2. Compensation received by Households for Dead and Disabled livestock in Task 1 in 2023

From the below table we can see that only 64% of households under Task 1, could receive compensation against their claims for the dead livestock and disabled productive livestock, for which they had insured. Among the value chains, only 67% of cow, 50% of buffalo, and 64% of goat rearing households of Task 1 were able to receive compensation of their dead livestock. The figures on the number of households applied and received compensation against their claims for livestock insurance as observed in 2023 under Task 1, have been presented in the following table.

Table 31: Number of Farmers receiving Compensations for Claim of Livestock Insurance in 2023

Species	Compensation			
	Applied for	No. of HHs applied	No. of HHs received	% of HHs received
Cow	Dead livestock	27	18	66.67
	Production disability livestock	2	1	50.00
Buffalo	Dead livestock	6	3	50.00
	Production disability livestock	0	0	-
Goat	Dead livestock	61	39	63.93
Total		95	61	64.21

Source: Endline Survey of NLSIP, 2023

3.2.5. Farmers' Access to Agriculture Assets and Services

The results regarding farmers' access to agriculture assets and services for all three targeted value chain commodities during baseline and endline period are discussed in the following sub-sections.

(a) Farmers' Access to Agriculture Assets and Services in Dairy Value Chain

Among the assets received by dairy farmers in 2023, maximum (56 %) of dairy farmers had access to milk cans provided by the project. The next important livestock asset is the shed, i.e. 33.5 % farms had access to sheds in their dairy farms in 2023, provided by the project. About 32 % of dairy farms had access to chaff-cutters and 20.4% in livelivestockin 2023, which were provided by the project.

Among the services received by dairy farmers, 77 % of them received Artificial Insemination (AI) services from the project in 2023, which was nil in 2020. Similarly, 34% of dairy farmers received vaccination services from the project, which was nil in 2020. In overall, 65 % of women had access to productive assets and services in 2023 in dairy value chain, which could not be compared with the baseline.

The figures on the farmers' access to agricultural assets and services in endline (2023) compared with the baseline (2020) are presented in the following table.

Table 32: Farmers' Access to Agriculture Assets and Services in Dairy value chain

Agriculture Assets	Baseline (2020) (N=673 HHs)			Endline (2023) (N=487 HHs)		
	HH Number (N=673)	% of HH having access	Of which Female %	HH Number (N=487)	% of HH having access	Of which Female %
(A) Assets						65.22
Live livestocks	-	-	-	99	20.33	
Milk can	402	59.73		272	55.85	
Cream separator	1	0.15		-	-	
Milking machine	1	0.15		-	-	
Sheds	-	-	-	163	33.47	
Chaff cutter	204	30.31		154	31.62	
Fork	107	15.90			0.00	
Wheel barrow	72	10.70		12	2.46	
Shovel	253	37.59			0.00	
Building	-	-		1	0.21	
Weighing balance	74	11.00		5	1.03	
Other's assets	32	4.75		49	10.06	
(B) Services						
Vaccination (FMD)	-	-		166	34.09	
Forage seeds (winter)	-	-		67	13.76	
Forage seeds (summer)	-	-		13	2.67	
Seedlings/saplings/sets	-	-		15	3.08	
Medicines	-	-		11	2.26	
Technical Training	-	-		24	4.93	
Farmer Field School (FFS)	-	-		3	0.62	
Marketing	-	-		1	0.21	
AI services	-	-		373	76.59	
Other services	-	-				

Source: Baseline Survey, 2020, and Endline Survey of NLSIP, 2023

(b) Farmers' Access to Agriculture Assets and Services in Goat Value Chain

Among the assets received by goat rearing farmers, maximum (45.4%) farm household had access to sheds in 2023, which were provided by the project, which was 18% in 2020. About 16.5% of goat rearing farmers received live livestock (goats) and 32% of them received chaff-cutters from the project in 2023.

Among the services received by goat-rearing farmers from the project, about 20 % of farmers received vaccinations, 21% received medicines for parasite control, and 10 to 12 % of farmers received forage seeds (winter and summer) from the project. In overall, 45 % of women had access to productive assets and services in 2023, which could not be compared with the baseline.

The figures regarding access to agricultural assets and services in goat value chain are presented in the following table.

Table 33: Farmers' Access to Agriculture Assets and Services in Goat value chain

Agriculture Assets	Baseline (2020) (N=627 HHs)			Endline (2023) (N=678 HHs)		
	HH Number (N=627)	% of HH having access	Of which Female %	HH Number (N=678)	% of HH having access	Of which Female %
(A) Assets						45.21
Live livestocks	-	-		112	16.52	
Building	-	-		7	1.03	
Sheds	113	18.02		308	45.43	
Chaff cutter	-	-		220	32.45	
Weighing balance	74	11.80		29	4.28	
Burdizzo castrator	7	1.12			0.00	
Breeding buck	59	9.41			0.00	
Fork	93	14.83			0.00	
Shovel	110	17.54			0.00	
Solar panel	-	-		2	0.29	
Wheel barrow	6	0.96		8	1.18	
Other assets	14	2.23			0.00	
(B) Services					-	
Vaccination (PPR)	-	-		134	19.76	
Medicines	-	-		140	20.65	
Forage seeds (winter)	-	-		70	10.32	
Forage seeds (summer)	-	-		82	12.09	
Seedlings/saplings/sets	-	-		16	2.36	
Training	-	-		35	5.16	
Farmers' Field Schools (FFS)	-	-		12	1.77	
AI services	-	-		22	3.24	
Other services	-	-				

Source: Baseline Survey, 2020, and Endline Survey of NLSIP, 2023

(c) Farmers' Access to Agriculture Assets and Services in Chyangra Pashmina Value Chain

About 65% of Chyangra rearing farmers had access to sheds, 53% owned solar panels, 35% owned weighing balance, and 94% of them owned chaff-cutters in 2023, as provided by the project. At the same time, more than 76 % of Chyangra rearing farms had access to vaccination and medicines provided

by the project in 2023. There was 88 % of women who had access to productive assets and services in Chyangra Pashmina value chain in 2023, which could not be compared with the baseline. The figures on the access to agricultural assets and services in Chyangra farms during baseline and endline are presented in the following table.

Table 34: Farmers' Access to Agriculture Assets and Services in Chyangra Pashmina value chain

Agriculture Assets	Baseline (2020) (N=100 HHs)			Endline (2023) (N=17 HHs)		
	HH Number (N=100)	% of HH having access to	Of which Female %	HH Number (N=17)	% of HH having access to	Of which Female %
(A) Assets						88.24
Chaff cutter	-	-			16	94.12
Weighing balance	-	-			6	35.29
Solar panel	-	-			9	52.94
Live livestock (Breeding Buck)	13	13.00			2	11.76
Sheds	-	-			11	64.71
Burdizzo Castrator	1	1.00				0.00
Fork	10	10.00				0.00
Shovel	11	11.00				0.00
Tent for rotational grazing	3	3.00				0.00
(B) Services						0.00
Vaccination (PPR)	-	-			13	76.47
Medicines	-	-			13	76.47
Technical Training	-	-			2	11.76

Source: Baseline Survey, 2020, and Endline Survey of NLSIP, 2023

3.2.6. Beneficiary Satisfaction on Project's and PO's Services under Task-1

The project-NLSIP has provided various types of services to producer farmers under component B (Task 1) through the farmers' groups and cooperatives, termed as Producers' Organizations (POs). The POs were also providing various kinds of services to their member farmers. In this section, the responses of the beneficiary households on their satisfaction level towards the project's services and PO's services they had received during the project implementation phase, have been presented and discussed in the following sub-sections.

3.2.6.1. Beneficiaries' Satisfaction Levels on Project's Services with Relevance, Timeliness and Effectiveness

The reflection of the majority (nearly half of them or 43 %) of beneficiaries on the project's supports was on the "moderately satisfied". Among all 1182 surveyed households, 6 per cent of beneficiaries reported that they were "highly satisfied", and around 15 per cent of the beneficiaries were "satisfied" from the Project's services. If we sum the positive satisfaction only, this comes to around two third, indicating about 64 % of the beneficiaries were "satisfied" from the services provided by the project. There were 66.5 % of women satisfied on the project's supports in total, of which 9% were highly satisfied, 18% satisfied, and 40% moderately satisfied. However, around 19% of them were "unsatisfied" in total. This may be due to not enough supports provided by the project and many of them could not receive the grant supports (sub-projects) from the project. The figures of beneficiaries' satisfaction on timeliness, relevancy and effectiveness of the project's services, and also their average values, have been presented in the following table and figure.

Table 35: Level of Beneficiary Satisfaction in terms of Timeliness, Relevancy and Effectiveness of the Project' Support

	Component B (Task 1)						
	Surveyed HHs	Number of HHs Rated Satisfaction on PO service					Total
		Highly Satisfied	Satisfied	Moderately Satisfied	Moderately Unsatisfied	Unsatisfied	
Timeliness	1182	6.7	17.8	40.6	16.5	18.4	100
Relevancy	1182	5.8	14	44.4	17.4	18.4	100
Effectiveness	1182	5.7	13.5	43.1	17.6	20.1	100
Average	1182	6.07	15.1	42.7	17.16	18.97	100
		63.87					
Of which female (%)		8.86	17.72	39.88	15.41	18.13	100
		66.46					

Source: Endline Survey, 2023

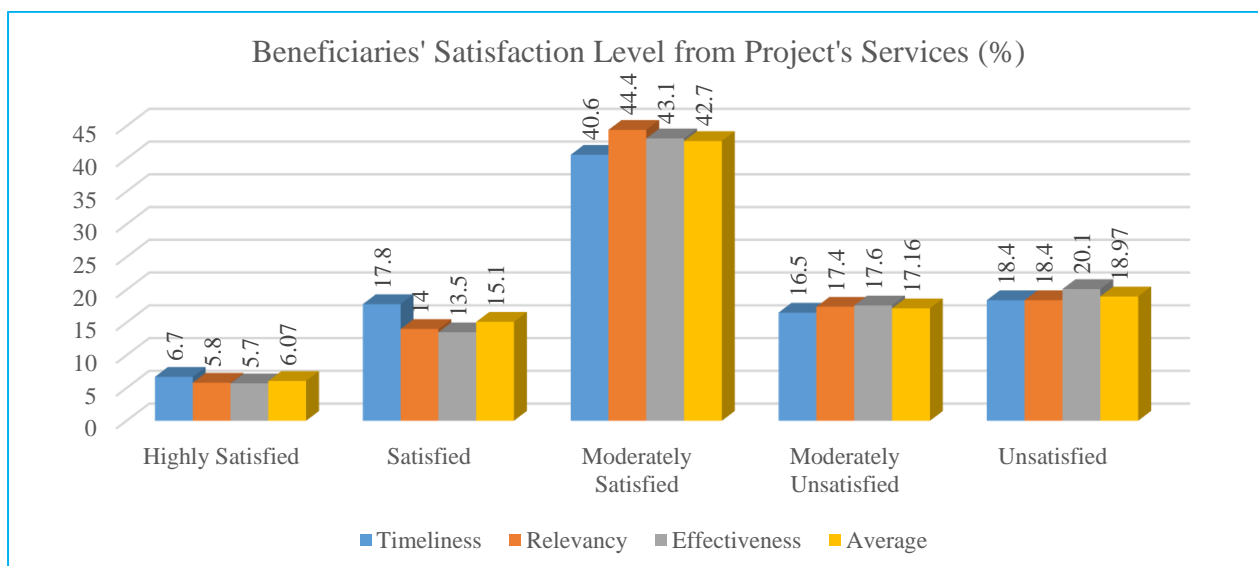


Figure 7: Beneficiaries' Satisfaction on Project's Services (Task-1)

3.2.6.2. Beneficiaries' Satisfaction Levels on PO's Services under Task-1 (HH level)

The farmers' groups and cooperatives used to provide services like training on technical aspects, business aspects, account and book-keeping, and nursery management to their members. It was found from the household survey under Task-1, that dairy farmers were satisfied more from technical training, account training and nursery management. Whereas, goat rearing farmers were satisfied most from all types of services as the account training, technical training, nursery management and business training. In case of marketing services rendered by the POs to their member farmers, dissemination of market price information was the major service, for which 79 % of dairy farmers and 63% of goat rearing farmers were satisfied from the POs' services. The per cent of households reported on their satisfaction level for different types of services provided by their POs have been presented in the following table.

Table 36: Level of Beneficiaries' Satisfactions on PO's Services at HH level under Task-1

Services provided by POs	Satisfaction Level reported by Beneficiaries	% of HHs reporting	
		Dairy (N=487)	Goat Meat (N=678)
Technical Training	High	45.8	74.2
	Moderate	54.2	25.8
	Less	0	0
Business Training	High	0	66.7
	Moderate	0	33.3
	Less	0	0
Account training	High	66.7	100
	Moderate	33.3	0
	Less	0	0
Nursery Management	High	41.4	74.1
	Moderate	55.6	18.8
	Less	3	7.1
Marketing services (Dissemination of price information)	Satisfied	78.64	62.68
	Less satisfied	21.36	37.32

Source: Endline Survey, 2023

3.2.7. Cost and Profitability Analysis of Targeted Livestock Commodities

The cost of production of targeted livestock commodities, particularly of milk and goat meat, as estimated based on the interview held with 1182 Task-1 households, are discussed in the successive sections below.

3.2.7.1. Cost of Production of Milk and Goat Meat at the Household level

Table 37: Cost of Production of Milk and Goat Meat at HH level (Task-1) in 2023

Value Chain	Particulars	Unit	Baseline (2020) (N=Milk: 673; Goat: 627)	Endline (2023) (N=Milk: 486; Goat: 679)	Increased / Decreased by
Milk	Cost of production per unit	Rs. /Litre	44.60	45.30	+0.70
	Price of milk per unit	„	62.10	67.50	+5.4
	Profit per unit	„	17.50	22.20	+4.70
Goat	Cost of production per unit (Live weight)	Rs. / Kg	178.10	249.94	+71.84
	Price of Goat per unit	„	569	608	+39
	Profit per unit	„	390.9	358.06	-32.84

Source: Baseline, 2020, and Endline Survey of NLSIP, 2023

The cost of production per liter of milk at household level was estimated to be Rs. 45.30, which was Rs. 44.60 in baseline (2020), increased by Rs. 0.70 per liter. Profit per liter of milk was Rs. 17.5 in 2020, increased to 22.20 in 2023.

Similarly, the cost of production of goat meat on live weight in 2020 was Rs. 178.10, increased to Rs. 249.94 in 2023, increased by Rs. 71.84 per kg. Profit per kg of goat (on live weight) in 2020 was Rs. 391, which decreased to Rs. 358 in 2023.

3.2.7.2. Profitability Analysis of Dairy and Goat Enterprises at the Household level

Table 38: Profitability Analysis of Dairy and Goat Enterprises in Task-1 (Household level) in 2023

Particulars	Units	Dairy enterprise (N=487)	Goat enterprise (N=678)
Investment / Assets per enterprise	Rs.	559039.81	100639.5
Fixed Cost per enterprise	Rs.	28774.32	5031.98
Variable Cost per enterprise	Rs.	394884.14	83732.00
Total cost per year per enterprise	Rs.	423658.46	88763.98
Production per year per enterprise ⁹	Liter/Kg	9351.77	355.14
Cost of Production per unit	Rs. Per Liter or Kg	45.30	249.94
Price of product per unit	Rs per Liter/Kg	67.50	608.00
Total Income/Revenue per enterprise per year	Rs.	631244.80	215922.48
Net Profit per enterprise	Rs.	207586.34	127158.50
Gross Margin per enterprise (Total Revenue- Total Variable cost)	Rs.	236360.67	132190.48

⁹ In case of goat, the production of goat meat (live weight) was calculated by adding weight gain of stock of standing livestock and weight of sold-out goat during the accounting year

Particulars	Units	Dairy enterprise (N=487)	Goat enterprise (N=678)
Return on Asset (ROA) = (Net Profit/Total Assets)*100	%	37.13	126.35
Net Profit Margin = (Net Profit/Total Revenue) *100	%	32.89	58.89
Return on Labour (%) = [(Net Profit+Family Labour Cost)/Total Revenue]	%	39.80	62.03

Source: Endline Survey of NLSIP, 2023

**Detail on Cost of Production and Profitability Analysis of Dairy and Goat enterprises in Task-1 in 2023 is given in Annex-2.*

3.2.8. Employment Generation in 2023 at HH Level

The employment generated by the targeted livestock (dairy and goat) value chains at the farm levels as supported by the Project-NLSIP, has been presented and discussed in the below sub-sections. As there were no results on the employment generated at the household levels during the baseline survey, the results on the employment generated during endline (2023) could not be compared with the baseline.

3.2.8.1. Employment Generation at HH level in all three Value Chains in 2023

It was found that, on an average, a livestock enterprise could generate 2.6 persons of full employment, as recorded in 2023, for all value chains in total, of which 2.4 persons for family/self-employed, and very less in hired labours. Women were found to be engaged more in the livestock rearing, i.e. 57.5% of the total labour hours than the men (42.5%). The results on the employment generation in all value chains (dairy, goat meat, and chyngra pashmina), as obtained from the household survey conducted in 2023, have been presented in the following table.

Table 39: Employment Generation at HH level in All three Value Chains in 2023

Employment	Endline 2023 (N=1182 HHs)				
	Male	Female	Total	% of Female	Employee Per HH (No.)
Full time family	1215	1613	2828	57.04	2.39
Part time family	-	-	-	-	0.00
Full time Hired	14	3	17	17.65	0.01
Part time Hired	81.98	160.91	243	66.25	0.21
Overall	1310.98	1776.91	3087.89	57.54	2.61
Total HHs	1182				

Source: Endline Survey of NLSIP, 2023

As per the minimum wage rate of Rs. 17,300 per month, as fixed by the GoN, a household is providing Rs. 541,836 of employment from the livestock enterprises, of which Rs. 45,672 for hired labour and rest Rs. 496,164 as family labour.

3.2.8.2. Employment Generation at HH level in Dairy Value Chain in 2023

It was found that the dairy enterprise run by the farmers in the NLSIP Project area could generate 2.4 persons of full employment per household/Enterprise for full year, which is almost of family self-employed, as recorded in the year 2023. Of the total labour hours, women were found to have been more engaged in the dairy enterprises, i.e. 56% of time given by the women. No any seasonal (part-time) labours were found to have worked in the dairy businesses in the Project area. The figures on the employment generation in dairy business in the NLSIP Project area, as recorded in the year-2023, have been presented in the following table.

Table 40: Employment Generation at HH level in Dairy Value Chain in 2023

Employment	Endline 2023 (N=487 HHs)				
	Male	Female	Total	% of Female	Employee Per HH (No.)
Full time family	508	652	1160	56.21	2.38
Part time family	-	-	-	-	-
Full time Hired	3	3	6	50.00	0.01
Part time Hired	-	-	-	-	-
Overall	511	655	1166	56.17	2.39
Total HHs	487				

Source: Endline Survey of NLSIP, 2023

A dairy household is providing Rs. 496,164 of employment from the dairy enterprises and mostly retained with the family labour (Rs. 494,088).

3.2.8.3. Employment Generation at HH level in Goat Value Chain in 2023

In case of goat value chain, 2.65 persons of labour employment was found to have been generated per goat farm for the whole year, of which 2.39 persons (90% of total employment) is from family labour or self-employed in the goat enterprise in the NLSIP Project area. As also in the dairy enterprise, women were found to have been engaged more (55%) than the men (45%) in the goat enterprise. The figures on the employment generation by the goat enterprise in the NLSIP Project area, obtained from the survey-2023, have been presented in the following table.

Table 41: Employment Generation at HH level in Goat Value Chain in 2023

Enterprise	Employment	Endline 2023 (N=678 HHs)				
		Male	Female	Total	% of Female	Employee Per HH (No.)
Goat Enterprise	Full time family	682	941	1623	57.98	2.39
	Part time family	-	-	-	-	-
	Full time Hired	4	0	4	0.00	0.01
	Part time Hired	118.41	51.62	170.03	30.36	0.25
	Overall	804.41	992.62	1797.03	55.24	2.65
Total HHs		678				

Source: Endline Survey of NLSIP, 2023

A goat rearing household is providing Rs. 550,140 of employment from the goat enterprises, of which Rs. 496,164 as family labour.

3.2.8.4. Employment Generation at HH level in Chyangra Pashmina Value Chain in 2023

Among the three targeted livestock commodities, Dairy, Goat meat and Chyangra Pashmina, the Chyangra Pashmina value chain was found generating more labour employment (3.06 persons) for whole year, of which 2.65 persons of family labour or self-employed and 0.41 persons of hired labour. Unlike in other two enterprises, engagement of female labour was found much lesser, i.e. 38.5% of the total work load in the Chyangra Pashmina enterprise. As Chyangra are reared in high mountain areas and mostly reared on the rangeland for grazing, mostly men are engaged for Chyangra rearing, because of this, women are employed less in the Chyangra rearing. The figures on the employment generation by the Chyangra Pashmina enterprises in the NLSIP Project area, obtained from the survey- 2023, have been presented in the following table. A Chyangra rearing household is providing Rs. 635,256 of employment from the Chyangra enterprises, of which Rs. 550,140 as family labour wage.

Table 42: Employment Generation at HH level in Chyangra Pashmina Value Chain in 2023

Enterprise	Employment	Endline 2023 (N=17 HHs)				
		Male	Female	Total	% of Female	Employee Per HH (No.)
Chyangra Pashmina Enterprise	Full time family	25	20	45	44.44	2.65
	Part time family	-	-	-	-	-
	Full time Hired	7	0	7	0.00	0.41
	Part time Hired	-	-	-	-	-
	Overall	32	20	52	38.46	3.06
Total HHs		17				

Source: Endline Survey of NLSIP, 2023

3.2.9. Value Chain Linkages and Productive Alliances between Beneficiary HHs / Commercial Producers and Buyers/Traders in 2023

It was found that 77% out of 1182 surveyed households (farmers) used to sell their livestock products to the buyers/sellers, with 73% among cooperatives, and 79% among group led farmers. Out of the total sellers (farmers), 11% had formal agreement with the buyers/traders, with 24% in cooperatives, and 7% in group led farmers. Out of total sellers/farmers selling livestock products, 8.3% of them used to sell to NLSIP supported buyers/traders, 41.5% selling to other organization supported buyers/traders, and rest 50% used to sell to other buyers. While comparing between the cooperatives and group led farmers, 15% and 6.3% of the respective farmers used to sell to NLSIP supported buyers/traders, respectively. Nearly 19% of the sellers/farmers, reported that there is compliance of agreement (both formal and informal), 31% reported non-compliance of the agreement they had made, and rest 50% of them did not respond to the questions. The agreement made between cooperative-led farmers and buyers/traders was found more effective (48% reporting complied) than that with the group-led famers (9.4% reporting complied). This has been presented in the following table.

Table 43: Value Chain Linkages and Productive Alliance between Beneficiary Households (Farmers) and Buyers/Traders under Task-1 in 2023 (All Value Chains)

Productive alliance between Beneficiary HH and Buyer/Processor/Trader		Cooperative (N=295)		Farmer Group (N=887)		Total (N=1182)	
		No. of HH reporting	% of HH reporting	No. of HH reporting	% of HH reporting	No. of HH reporting	% of HH reporting
No of Sellers (Farmers) selling		215	72.88	699	78.8	914	77.33
Agreement Type with Buyers / Traders	Formal	51	23.72	51	7.30	102	11.16
	Informal	164	76.28	648	92.70	812	88.84
Buyers / Traders	NLSIP supported	32	14.88	44	6.29	76	8.32
	Other Organizations Supported	153	71.16	226	32.33	379	41.47
	Other Buyers	30	13.95	429	61.37	459	50.22
Compliance of Agreement	Yes	104	48.37	66	9.44	170	18.60
	No	81	37.67	204	29.18	285	31.18
	No response	30	13.95	429	61.37	459	50.22

Source: Endline Survey of NLSIP, 2023

An attempt has also been made to see how business linkages had been established between producer farmers and buyers (traders) value chain wise, and the results have been presented in the following table.

Table 44: Value Chain Wise Business Linkages and Productive Alliance between Beneficiary Households (Farmers) and Buyers/Traders under Task-1 in 2023

Productive alliance between Beneficiary HH and Buyer/Processor/Trader		Dairy (N=487)		Goat (N=678)		Chyangra Pashmina (N=17)	
		No. of HH reporting	% of HH reporting	No. of HH reporting	% of HH reporting	No. of HH reporting	% of HH reporting
No of Sellers (Farmers) selling		453	93.02	460	67.85	1	5.88
Agreement Type with	Formal	100	22.08	2	0.43	0	0.00
	Informal	353	77.92	458	99.57	1	100.00

Productive alliance between Beneficiary HH and Buyer/Processor/Trader		Dairy (N=487)		Goat (N=678)		Chyangra Pashmina (N=17)	
		No. of HH reporting	% of HH reporting	No. of HH reporting	% of HH reporting	No. of HH reporting	% of HH reporting
Buyers / Traders							
Buyers / Traders	NLSIP supported	75	16.56	1	0.22	0	0.00
	Other Organizations Supported	378	83.44	1	0.22	0	0.00
	Other Buyers	0	0.00	458	99.57	1	100.00
Compliance of Agreement	Yes	169	37.31	1	0.22	0	0.00
	No	284	62.69	1	0.22	0	0.00
	No response	0	0.00	458	99.57	0	0.00

Source: Endline Survey of NLSIP, 2023

It can be seen from the above table that 93% of the dairy farmers used to sell their products (mostly raw milk) to the various types of buyers. Out of the total sellers (milk producers), 22% of them were found to have established formal linkage (formal agreement) with the buyers, and rest 78% of them used to sell with informal agreement. Out of the total milk sellers, 16.5% used to sell to the NLSIP supported traders. The beneficiary households had made formal agreement with buyers at household level. 37% of the milk sellers reported that there is compliance of the agreement, irrespective of formal or informal agreement.

In case of goat value chain, 68% of total 678 household surveyed, reported that they sold goat during last year (FY 2022/23), and mostly on the informal basis, that only two of them found to have made formal agreement with the buyers. Whereas, in Chyangra Pashmina value chain, only one producer could sell his/her livestock products during last fiscal year, on informal basis.

3.2.10. Household Income from Targeted Livestock Commodities (Task-1)

Among the 487 households who were doing dairy business under Task-1, total household income per year was estimated to be Rs. 746,615.00, of which income from sale of milk and milk products was found out to be Rs. 598,960.00 per household per year, accounting for 80.22% of the total household income in 2023, and which increased by 51.25% as compared to baseline average income of Rs. 396,000.00 from sale of milk and milk products in 2020.

Similarly, goat rearing farmers' average household income was estimated to be Rs. 356,203.00, of which 30% of total household income came from sale of goat, i.e. Rs. 107,351.00 per year, which increased by 93% from the sales value of goat recorded in baseline (Rs.55,667.00).

The figures regarding the average income earned by the households, under Task-1 in the NLSIP project areas, have been presented in the following table.

Table 45: Income earned at Household level (Task-1)

Sources	Baseline (2020) (N=Dairy: 673; Goat: 627)	Endline (2023) (N=Dairy: 486; Goat: 679)	Increased %
Dairy	396,000	746,615	88.06
Income from sale of milk and milk products	396,000	598,960	51.25
Income from other sources	-	147,655	-
Goat Meat	55,667	356,203	539.88
Income from sale of Goat	55,667	107,351	92.84
Income from other sources	-	248,852	-

Source: Baseline Survey, 2020, and Endline Survey of NLSIP, 2023

3.2.11. Food Security at household level by Value Chains (Dairy, Goat and Chyangra Pashmina)

Out of the 1182 households interviewed under Task-1 for all three value chains, about 91% of the households reported to have food sufficiency at the household level in 2023, which in the baseline (2020) was 0.14%. Only 2.4 % of them reported to have food sufficiency with less than 3 months in 2023, which in 2020 it was nearly 25% of the households who had food sufficiency of less than 3 months. The results regarding the food sufficiency status at the household level as supported by the Component B of the Project has clearly indicated that the Project has significant contribution in increasing the food sufficiency level among the beneficiary households. The figures on the food sufficiency at the household level, compared between baseline (2020) and endline (2023) have been presented in the following table.

Table 46: Food Sufficiency Status in all Three Value Chains

Months	Baseline (2020)		Endline (2023)	
	No. HHs	%	No. HHs	%
Less than 3 Month	346	24.71	28	2.40
3-6 Months	162	11.57	54	4.60
6-9 Months	78	5.57	20	1.70
9-12 Months	812	58.00	5	0.40
More than 12 months	2	0.14	1075	90.90
Total	1400	100.00	1182	100.00

Source: Baseline Survey, 2020, and Endline Survey of NLSIP, 2023

In case of dairy value chain, about 85% of the 487 households interviewed reported to have food sufficiency at household level in 2023, which was only 0.3% in the baseline (2020). This significant increment on the food sufficiency status at the dairy household shows that the Project had significant impact on the food sufficiency among the dairy farmers due to significant increase in the milk production, productivity and their sales. The 21% of dairy farmers who had food sufficiency of less than 3 months in 2020, decreased to 3% in 2023, also shows the positive impact of the project's intervention. The details regarding the food sufficiency status among the dairy farmers compared between the baseline (2020) and the endline (2023) have been presented in the following table.

Table 47: Food Sufficiency Status in Dairy Value Chain

Months	Baseline (2020)		Endline (2023)	
	No. HHs	%	No. HHs	%
Less than 3 Month	139	20.7	15	3.10
3-6 Months	41	6.1	40	8.20
6-9 Months	42	6.2	17	0.50
9-12 Months	449	66.7	3	0.60
More than 12 months	2	0.3	412	84.60
Total	673	100.0	487	100.00

Source: Baseline Survey, 2020, and Endline Survey of NLSIP, 2023

Similarlry in the Goat value chain, about 96% of the 678 households interviewed reported to have food sufficiency at household level in 2023, where there were no such farm families having food sufficiency in the year 2020 (baseline). This significant increment on the food sufficiency status at the goat rearing households, as also in the dairy households, shows that the Project had significant impact on the food sufficiency among the goat rearing farmers due to significant increase in the goat meat production, productivity and their sales, both in quantity and value. The 25% of goat rearing farmers who had food sufficiency of less than 3 months in 2020, decreased to around 2% in 2023, also shows the positive impact of the project's intervention in the goat value chain. The details regarding the food sufficiency status of goat rearing farmers compared between the baseline (2020) and the endline (2023) have been presented in the following table.

Table 48: Food Sufficiency Status in Goat Value Chain

Months	Baseline (2020)		Endline (2023)	
	No. HHs	%	No. HHs	%
Less than 3 Month	154	24.6	12	1.80
3-6 Months	83	13.2	14	2.10
6-9 Months	33	5.3	3	0.40
9-12 Months	357	56.9	0	0.00
More than 12 months	-	-	649	95.70
Total	627	100.0	678	100.00

Source: Baseline Survey, 2020, and Endline Survey of NLSIP, 2023

In case of Chyangra Pashmina value chain, 82% of the 17 Chyangra rearing farmers, who were interviewed under Task-1, reported to have food sufficiency in the year 2023, for which there were no farmers having food sufficiency in 2020 (baseline). Also, 53% of Chyangra rearing farmers in 2020, who had less than 3 months of food sufficiency, decreased to around 6% in 2023. This also shows that the Project had good impact also in the Chyangra Pashmina value chain. The figures regarding the food sufficiency status in the Chyangra Pashmina value chain compared between the baseline and endline have been presented in the following table.

Table 49: Food Sufficiency Status in Chyangra Pashmina Value Chain

Months	Baseline (2020)		Endline (2023)	
	No. HHs	%	No. HHs	%
Less than 3 Month	53	53.0	1	5.90
3-6 Months	38	38.0	0	0.00
6-9 Months	3	3.0	0	0.00
9-12 Months	6	6.0	2	11.80
More than 12 months	-	-	14	82.40
Total	100	100	17	100.00

Source: Baseline Survey, 2020, and Endline Survey of NLSIP, 2023

3.2.12. Investment Modality

Among the 1182 households surveyed under Task-1 in 2023, about 11% of households out of 1182 households, were found to have taken loan for their livestock business, which in the baseline there were 5.36% of farm households used to take loan for livestock business, which increased by 104% in the endline. Comparing among the value chains, there were 16%, 7.4%, and 5.9% of farm households used to take loan for dairy, goat, and Chyangra Pashmina value chains, which in the baseline there were only 9%, 2%, and 2% of farm households used to take loan respectively. This shows that after the NLSIP intervention, farmers are encouraged to take loan for their livestock businesses. These results have also shown that majority of farmers (89%) used to invest in their livestock business from their own equity capital. The figures regarding investment modality has been presented in the following table.

Table 50: Investment Modalities at Household level (Task-1) (all value chains)

Value Chains	Baseline (2020)			Endline (2023)			% Increase in taking loan
	Number of HHs	Number of HH taking Loan	% of HH taking Loan	Number of HHs	Number of HH taking Loan	% of HH taking Loan	
Dairy	673	61	9.1	486	78	16.05	76.37
Goat Meat	627	12	1.9	679	50	7.36	287.37
Chyangra Pashmina	100	2	2	17	1	5.88	194
Total	1400	75	5.36	1182	129	10.91	103.54

Source: Baseline, 2020, and Endline Survey of NLSIP, 2023

3.2.13. Management of Animal's Feeds

It was found that nearly 80% of farm households out of the 1182 surveyed households used to use green forage for their livestock, followed by concentrate feed (57%), dry forage (37.5%). Comparing among groups and cooperatives, more number of farmers of groups (86%) used to use green forage, as compared to farmers of cooperatives (60%). 59% of farmers among groups, and 49.5% of farmers among cooperatives were found using dry forage for their livestock. The results regarding the feed management for livestock at the farm levels have been presented in the following table.

Table 51: Management of Animal Feeds by Producer Households in all Value Chains by types of POs (Task-1) in 2023

Types of Animal Feeds used	Cooperative (N=295)		Farmer group (N=887)		Total (N=1182)	
	Number of HH	%	Number of HH	%	Number of HH	%
Hay/silage	15	5.08	25	2.82	40	3.38
Green forage	177	60.00	763	86.02	940	79.53
Dry forage	102	34.58	341	38.44	443	37.48
Concentrated feeds	146	49.49	526	59.30	672	56.85
Mineral block	17	5.76	57	6.43	74	6.26
Other	44	14.92	124	13.98	168	14.21

Source: Endline Survey of NLSIP, 2023

An attempt has also been made to compare the feed management at three different value chains (dairy, goat meat and Chyangra Pashmina) and the results have been presented in the following table.

Table 52: Management of Animal Feeds by Producer Households by Value Chains (Task-1) in 2023

Types of Animal Feeds used	Dairy (N=487)		Goat Meat (N=678)		Chyangra Pashmina (N=17)	
	Number of HH	%	Number of HH	%	Number of HH	%
Hay/silage	15	3.08	9	1.33	16	94.12
Green forage	424	87.06	500	73.75	16	94.12
Dry forage	263	54.00	163	24.04	17	100.00
Concentrated feeds	306	62.83	366	53.98	0	0.00
Mineral block	50	10.27	23	3.39	1	5.88
Other	46	9.45	122	17.99	0	0.00

Source: Endline Survey of NLSIP, 2023

While comparing among the three value chains, Chyangra farms used to use more dry forage, hay/silage and green forage for feed, whereas, dairy and goat farms used to use more green forage, concentrates and dry forage as feed. The results regarding the feed management by value chains have been presented in the following table.

3.2.14. Innovation Applied for Scaling up of Agro-Enterprises (Task-1)

The NLSIP has supported the producers' farmers and agro-enterprises through the sub-projects for scaling up of their agribusinesses by promoting the use of new technologies and innovations. The frequency of innovation applied in the agro/livestock farms, particularly in dairy enterprise, have been illustrated in the following table below:

Table 53: Innovation applied at livestock enterprises (Dairy) in 2023

Innovation applied	Baseline (2020) (N=673 HHs)		Endline (2023) (N= 487 HHs)	
	No. of HHs	% of HHs	No. of HHs	% of HHs
Milking machine	-	-	1	0.2
Milking parlor	-	-	4	0.8
Urea Molasses Mineral Block	-	-	0	0.0
Silage feeding	-	-	1	0.2
Open stall feeding	-	-	25	5.1
Manure dewatering	-	-	4	0.8
Total mixed Ration (TMR)	-	-	10	2.1
Urine collection	-	-	121	24.8
Cow mat	-	-	132	27.1
Other	-	-	295	60.6
Total			487	

Source: Endline Survey of NLSIP, 2023

3.2.15. Quality of Products (Food Safety and Hygiene Procedures)

It has been found that majority of livestock farms, as supported by the project-NLSIP, through the component B (Task-1), were applying food safety and hygiene procedures such as, shed cleaning applied by 73% farmers, followed by livestock cleaning (50%), cleaning of utensils (41%), using boots, gloves, and aprons (30%), and cleaning of udders before milking (27%). Such results have shown that most of the farmers are aware of production of quality products in their farms. The figures regarding the food safety and hygiene procedures applied in the targeted livestock commodities in 2023 have been presented in the following table.

Table 54: Food Safety and Hygiene Procedures applied in Targeted Livestock Commodities in 2023

Food and safety and hygiene procedures adapted	Cooperative (N=295)		Farmer group (N=887)		Total (N=1182)	Food and safety and hygiene procedures adapted
	Number of HH	%	Number of HH	%	Number of HH	
Livestock cleaning	189	64.07	406	45.77	595	50.34
Shed cleaning	183	62.03	688	77.56	871	73.69
Utensil cleaning	135	45.76	351	39.57	486	41.12
Boot, gloves and apron use	108	36.61	248	27.96	356	30.12
Cleaning of udders before milking	128	43.39	192	21.65	320	27.07
Use of milking machine	0	0.00	1	0.11	1	0.08

Source: Endline Survey of NLSIP, 2023

3.2.16. Compliance to Environmental and Social Safeguards Measures

Around half of the farmers (52%) out of total 1182 surveyed households under Task-1, were found to have constructed compost pits, 19% each farm has constructed urine pits and fencing (compound walls) as environmental and social safeguards measures. Very few farms (4.5%) have constructed drainage, and negligible number of farms (<1%) used tiles/marbles in the floor and walls. The results of the

environmental and social safeguards applied by the livestock farms, have been presented in the following table.

Table 55: Environmental and Social Safeguards Applying in Structures at HH level in 2023

Environmental and social safeguards applying in structures	Cooperative (N=295)		Farmer group (N=887)		Total (N=1182)	
	Number of HH	%	Number of HH	%	Number of HH	%
Compost Pit	144	48.81	476	53.66	620	52.45
Urine Pit	35	11.86	186	20.97	221	18.70
Peripheral Drainage	1	0.34	52	5.86	53	4.48
Soak /dumping Pit	1	0.34	12	1.35	13	1.10
Tiles/Marbles on Floor/wall (as per GoN Rules)	2	0.68	7	0.79	9	0.76
Fencing/Compound Wall (for biosecurity)	29	9.83	191	21.53	220	18.61
Building	6	2.03	70	7.89	76	6.43
Others	92	31.19	344	38.78	436	36.89

Source: Endline Survey of NLSIP, 2023

Similarly, about 53% of farmers used to use gum-boots, 34% used gloves, 17% used masks, 3% of farmers used aprons, and less than one per cent farmers used to use helmets for personal protections while working in their livestock farms. The figures on the use of environmental and social safeguards related equipment using for personal protection while working in the livestock farms have been presented in the following table.

Table 56: Environmental and Social Safeguards Applying for Personal Protection Equipments at HH level in 2023

Environmental and Social Safeguards Applying for Personal Protection Equipments	Cooperative (N=295)		Farmer group (N=887)		Total (N=1182)	
	Number of HH	%	Number of HH	%	Number of HH	%
Gloves	80	27.12	323	36.41	403	34.09
Masks	28	9.49	168	18.94	196	16.58
Gum Boots	145	49.15	478	53.89	623	52.71
Aprons	3	1.02	32	3.61	35	2.96
Helmet	1	0.34	5	0.56	6	0.51
Other	91	30.85	424	47.80	515	43.57

Source: Endline Survey of NLSIP, 2023

3.2.17. Access in Market Price Information

Out of total 1182 households surveyed under Task-1, maximum of farmers (70%) were found to have access to market information through their groups/cooperatives, followed by buyers/traders (2.71%). Almost 79% of dairy farmers, 63% of goat rearing farmers, and 88% of Chyangra rearing farmers used to receive market information from their groups/cooperatives. The results on the access in market price information among the three value chains as obtained from the household survey (2023), have been presented in the following table.

Table 57: Access in market price information in 2023

Source of Market Price Information	Dairy (N=487 HHs)		Goat Meat (N=678 HHs)		Chyangra Pashmina (N=17 HHs)		Total (N=1182 HHs)	
	Number of HH	%	Number of HH	%	Number of HH	%	Number of HH	%
Cooperative or group	383	78.64	425	62.68	15	88.24	823	69.63
Radio/FM	13	2.67	14	2.06	1	5.88	28	2.37
SMS	5	1.03	0	0.00	0	0.00	5	0.42
TV broadcasting	2	0.41	2	0.29	0	0.00	4	0.34
Newspaper	5	1.03	10	1.47	1	5.88	16	1.35
Buyer	12	2.46	19	2.80	1	5.88	32	2.71
Other sources	1	0.21	2	0.29	0	0.00	3	0.25

Source: Endline Survey of NLSIP, 2023

3.3. Sub-Project (Matching Grant) Impact Evaluation of the Project (Task 2):

The project had provided its grant support to 449 sub-projects during the period of implementation in three value chain commodities-dairy, goat meat and Chyangra Pashmina. Under the Call I and Call II, the project had provided grant to 213 sub-projects which were implemented individually (121 sub-projects) and collectively (93 sub-projects). Under Call III, the projects had implemented 235 sub-projects as commercial producers, especially private farms in production and processing of value chain commodities (milk, goat meat and Chyangra pashmina) and feed productions. The impact evaluation at the Sub-Project (SP) level of the Project-NLSIP, based on the data collected during the Endline Survey (2023), compared with the baseline and control sub-projects are discussed as under:

3.3.1. Productivity of Targeted Livestock Commodities

The productivity of targeted livestock commodities (milk, goat meat and Chyangra Pashmina) at the sub-project levels in 2023, and compared with the baseline and the control sub-projects, are presented and discussed as under.

3.3.1.1. Comparison of Productivity of Milk, Goat Meat and Chyangra Pashmina at Sub-Project Level between Baseline (Call-I and II-Individual HH level) and their Endline (2023)

The cow milk productivity at sub-project level (Call-I &II, individual household level) during endline (2023) was found out to be 2029 litre per year per standing cattle, which increased by 73% as compared to its baseline (Call-I& II) conducted in 2021 (1174 litres) at individual households within the POs (groups/cooperatives). Similarly, the buffalo milk productivity, which was 758 litres per year per standing buffalo in baseline (2021) for Call-I and II (individual), increased to 1663 litre with increment of 119 % in Endline (2023). The goat meat productivity, measured in carcass weight, per year per standing goat in the herd at sub-project level (Call-I &II, individual) increased to 14.14 kg in Endline (2023) from 3.5 kg in baseline (2021), with 304 % increment as compared to the baseline. The figures related to these indicators are presented in the following table.

Table 58: Comparison of Productivity of Milk, Goat Meat and Chyangra Pashmina at Sub-Project Level between Baseline (Call-I and II-Individual HH level) and their Endline (2023)

Value Chain Commodities	Units	Baseline (Call-I and II: Individual-HH level) (2021) (N=Milk:1265; Goat: 563)	Endline (Call-I and II: Individual-HH level) (2023) (N=Milk: 503; Goat: 486)	Changed %
Milk Productivity Cattle	Liter / Year/ Standing Cattle	1174	2029	72.79
Milk Productivity Buffalo	Liter / Year / Standing Buffalo	758	1663	119.34
Goat Meat Productivity	Carcass weight in Kg / Standing goat / Year	3.5 ¹⁰	14.14	304.00

Source: Baseline Survey, 2021, and Endline Survey, 2023

¹⁰ The survey team tried to verify this figure as in the case of baseline survey of 2020, but not yet be able to find out. As soon as the baseline data for Call-I&II found, it will be updated accordingly.

Reasons for increased productivity in Call-I&II at Individual Household level:

The causes for the almost 73% rise in cow milk productivity, as seen in the above table, are that the herd size of cows—both local and improved—grew by 22% in 2023, as compared to baseline. Furthermore, in the same year, the number of lactating cows in the herd grew by 84%. Additionally, longer lactation periods (3.8% for local cows and 3.3% for improved cows) were linked to the high milk productivity, which raised milk production per household by 124% in 2023 compared to the baseline (2021). The accompanying table displays the supporting figures of survey results.

Table 59: Comparison of Herd Size, Milk Production, and Lactation Period of Cow in Individual Households under Call-I and II Sub-projects between Baseline (2021) and Endline (2023)

S.N.	Indicators	Units	Baseline, 2021 (N=1265 HHs)	Endline, 2023 (N=503 HHs)	Increased %
1	Herd size (local cow)	Number / HH	-	7.57	-
2	Herd size (improved cow)	Number / HH	-	5.96	-
3	Herd size (local and improved cow)	Number / HH	5.01	6.12	22.15
4	Lactating cow (local and improved)	Number / HH	2.27	4.18	84.14
5	Milk Production (local and improved cow)	Liter/HH/Year	5,891	13,176	123.66
6	Lactation length (local cow)	Days/Lactating cow	285	295.71	3.76
7	Lactation length (improved cow)	Days/Lactating cow		294.31	3.27

Source: Baseline Survey, 2021, and Endline Survey of NLSIP, 2023

Similarly, the herd size of lactating buffalo increased by 77%, lactation length increased by approximately 3%, and the overall herd size increased by 2%, with a greater proportion of improved to local buffalo (i.e., 4.7:1.5). These factors contributed to the 119% increase in buffalo milk productivity, which increased the amount of milk produced per household from 3482 liters to 8005 liters from baseline (2021) to endline (2023). The following table compares the herd size, milk output, lactation period, and other parameters of buffalo milk production between the baseline and endline.

Table 60: Comparison of Herd Size, Milk Production, and Lactation Period of Buffalo in Individual Households under Call-I and II Sub-projects between Baseline (2021) and Endline (2023)

S.N.	Indicators	Units	Baseline, 2021 (N=1265 HHs)	Endline, 2023 (N=503 HHs)	Increased %
1	Herd size (local)	Number / HH	-	1.56	-
2	Herd size (improved)	Number / HH	-	4.69	-
3	Herd size (local and improved)	Number / HH	4.59	4.67	1.74
4	Lactating buffalo (local and improved)	Number / HH	1.77	3.14	77.40
5	Milk Production	Liter/HH/Year	3482.01	8005.55	129.9
6	Lactation length (Local)	Days/Lactating buffalo	252	260	3.17
7	Lactation length (Improved)	Days/Lactating buffalo		259.46	2.96

Source: Baseline Survey, 2020, and Endline Survey of NLSIP, 2023

In the case of goats as well, individual sub-projects of the project that intervened in the goat value chain contributed 304% of the increase in production, with an average of 14 more goats added to the herd per household. As a result, with a 128% increase, the herd size per household that received project funding increased to 25 in 2023 from just 11 in the baseline (2021). This substantial increment of herd size had positive impact on the meat production per household, which was 73 Kg (on live weight) in baseline (2021) increased to 553 Kg in the year 2023 (endline), with 659% of increment within two years. The results on the herd size and meat production per household, who received grant under Call-I and II, and implemented individually, compared between baseline and endline, have been presented in the following table.

Table 61: Comparison of Herd Size and Meat Production of Goat in Individual Households under Call-I and II Sub-projects between Baseline (2021) and Endline (2023)

S.N.	Indicators	Units	Baseline, 2021 (N= 563)	Endline, 2023 (N=486)	Increased %
1	Herd size (local)	Number / HH	-	20.2	-
2	Herd size (cross-bred)	Number / HH	-	19.77	-
3	Herd size (exotic)	Number / HH	-	5.79	-
4	Herd size (all goat)	Number / HH	11.00	25.03	127.55
5	Meat Production (Live weight basis)	Kg/HH/Year	72.84	552.96	659.14
6	Meat Production (Carcass weight basis)	Kg/HH/Year	47.35	359.42	659.07

Source: Baseline Survey, 2021, and Endline Survey of NLSIP, 2023

3.3.1.2. Comparison of Productivity of Milk, Goat Meat and Chyangra Pashmina at Sub-Project Level between Baseline (Call-I and II: Collective) and their Endline (2023)

The cow milk productivity at sub-project level (Call-I &II, collective/PO level) during endline (2023) was found out to be 2104 litre per year per standing cattle, which increased by 98% as compared to its baseline (Call-I & II) conducted in 2021 (1063 litres). Similarly, the buffalo milk productivity, which was 587 litres per year per standing buffalo in baseline (2021) for Call-I and II (collective/PO level), increased to 1482 litre with increment of 152 per cent in Endline (2023). The goat meat productivity, measured in carcass weight, per year per standing goat in the herd at sub-project level (Call-I &II, collective/PO level) increased to 15.02 kg in Endline (2023) from 3.56 kg in baseline (2021), with 322 % of increment as compared to the baseline. The figures related to these indicators are presented in the following table.

Table 62: Comparison of Productivity of Milk, Goat Meat and Chyangra Pashmina at Sub-Project Level between Baseline (Call-I and II: Collective/PO level) and their Endline (2023)

Value Chain Commodities	Units	Baseline (Call I and II: Collective) (2021) (N=Milk:124; Goat:73)	Endline (Call-I and II: Collective) (2023) (N=Milk:117; Goat: 65)	Changed %
Milk Productivity Cattle	Liter / Year / Standing Cattle	1063	2104	97.89
Milk Productivity Buffalo	Liter / Year / Standing Buffalo	587	1482	152.47
Goat Meat Productivity	Carcass weight in Kg / Standing goat / Year	3.56	15.02	321.91

Source: Baseline Survey, 2021, Endline Survey, 2023

Reasons for increased productivity in Call-I&II (Collective SP) level:

The causes for the about 98% rise in cow milk productivity, as indicated in the above table, are that the herd size of cows, both locally and improved per PO to around 51, rose by 52% in 2023 compared to baseline (33). Furthermore, with a 107% increase, the herd number of nursing cows per PO—which was around 16 at baseline—rose to approximately 33 in 2023. Moreover, a 10% increase in the enhanced cow's lactation time was linked to the high milk productivity of the POs, which raised milk output per PO by 93% in 2023 compared to the baseline (2021). These supporting figures, which helped to explain the higher cow milk productivity, provided by the PO, have been presented in the table below.

Table 63: Comparison of Herd Size, Milk Production, and Lactation Period of Cow in POs under Call-I and II Sub-projects between Baseline (2021) and Endline (2023)

S.N.	Indicators	Units	Baseline, 2021 (N=124)	Endline, 2023 (N=117)	Increased %
1	Herd size (local cow)	Number / PO	-	6.0	-
2	Herd size (improved cow)	Number / PO	-	52.5	-
3	Herd size (local and improved cow)	Number / PO	33.4	50.78	52.04
4	Lactating cow (local and improved)	Number / PO	15.81	32.67	106.64
5	Milk Production (local and improved cow)	Liter / PO / Year	53068.4	102,258.89	92.69
6	Lactation length (local cow)	Days / Lactating cow	262	240	-8.39
7	Lactation length (improved cow)	Days / Lactating cow		288.46	10.1

Source: Baseline Survey, 2021, and Endline Survey of NLSIP, 2023

The herd size of improved buffalo was around 32, and the ratio of improved to local buffalo was high (32:7), meaning that there were more improved buffalo and fewer local buffalo in the herd. These factors contributed to the 152% rise in buffalo milk yield in 2023. High productivity was seen as a result of reduced herd size and greater milk output per PO. This was made possible by the introduction of novel technology into the dairy industry through the implementation of sub-projects.

The comparison of herd size, milk production, lactation period and other indicators regarding buffalo milk production at PO level under Call-I and II, between baseline and endline has been presented in the following table.

Table 64: Comparison of Herd Size, Milk Production, and Lactation Period of Buffalo in POs under Call-I and II Sub-projects between Baseline (2021) and Endline (2023)

S.N.	Indicators	Units	Baseline, 2021 (N=124)	Endline, 2023 (N=117)	Increased %
1	Herd size (local)	Number / PO	-	7.00	-
2	Herd size (improved)	Number / PO	-	31.64	-
3	Herd size (local and improved)	Number / PO	58.67	30.47	-48.06
4	Lactating buffalo (local and improved)	Number / PO	25.41	19.8	-22.08
5	Milk Production	Liter/ PO/ Year	34451	41962	21.8
6	Lactation length (Local)	Days/ Lactating buffalo	263	270	2.66
7	Lactation length (Improved)	Days/ Lactating buffalo		257.14	-2.23

Source: Baseline Survey, 2020, and Endline Survey of NLSIP, 2023

In the case of goats, too, the project's involvement in the goat value chain as grant sub-projects run cumulatively resulted in a 322% increase in productivity in 2023, with an average 15% increase each PO. Meat production was positively impacted by the POs' adoption of improved and climate-smart technology as well as by increasing the number of their herds. The average meat production per PO jumped by 330% in just two years, from 995 kg (on live weight) in the baseline (2021) to 4281 kg (endline) in 2023. The results on the herd size and meat production per PO, which received grant under Call-I and II, and implemented collectively, compared between baseline and endline, have been presented in the following table.

Table 65: Comparison of Herd Size and Meat Production of Goat in POs under Call-I and II Sub-projects between Baseline (2021) and Endline (2023):

S.N.	Indicators	Units	Baseline, 2021 (N=73)	Endline, 2023 (N=65)	Increased %
1	Herd size (local)	Number / PO	-	166.22	-
2	Herd size (cross-bred)	Number / PO	-	152	-
3	Herd size (exotic)	Number / PO	-	18.67	-
4	Herd size (all goat)	Number / PO	181.84	208.73	14.79
5	Meat Production (Live weight basis)	Kg/PO/Year	994.9	4280.68	330.26
6	Meat Production (Carcass weight basis)	Kg/PO/Year	646.69	2782.44	330.26

Source: Baseline Survey, 2021, and Endline Survey of NLSIP, 2023

3.3.1.3. Comparison of Productivity of Milk, Goat Meat and Chyangra Pashmina at Sub-Project Level between Baseline (Call-III: Private Farms) and their Endline (2023)

The cow milk productivity at sub-project level (Call-III, private farm) during endline (2023) was found out to be 2200 litre per year per standing cattle, which increased by 39% as compared to its baseline (Call-III, private farm) conducted in 2022 (1583 litres) at private farms. Similarly, the buffalo milk productivity, which was 827 litres per year per standing buffalo in baseline (2022) for Call-III (private farms), increased to 1534 litres with increment of 85 per cent in Endline (2023). The goat meat productivity, measured in carcass weight, per year per standing goat in the herd at sub-project level (Call-III, private farms) increased to 17.37 kg in Endline (2023) from 3.81 kg in baseline (2022), with 356 % of increment as compared to the baseline. The figures related to these indicators are presented in the following table.

Table 66: Comparison of Productivity of Milk, Goat Meat and Chyangra Pashmina at Sub-Project Level between Baseline (Call-III: Private Farms) and their Endline (2023)

Value Chain Commodities	Units	Baseline Call- III (Private Farm) (2022) (N=Milk: 189; Goat: 163))	Endline Call-III (Private Farm) (2023) (N=Milk: 152; Goat: 101)	Changed %
Milk Productivity Cattle	Liter / Year / Standing Cattle	1583	2200	38.99
Milk Productivity Buffalo	Liter / Year / Standing Buffalo	827	1533.8	85.46
Goat Meat Productivity	Carcass weight in Kg / Standing goat / Year	3.81 ¹¹	17.37	355.91

Source: Baseline Survey, 2022, and Endline Survey, 2023

¹¹ The survey team tried to verify this figure of the baseline survey of 2022 for Private farms, but not yet be able to find out.

Reasons for increased productivity in Call-III at Private Farm level:

The herd size of improved cow per private farm grew by 97% in the year 2023 compared to baseline (19), which is the explanation for the approximately 39% rise in milk output of cows given in the above table. Furthermore, the herd size of nursing cows per private farm grew by 181% from 8.64 in the baseline (2022) to 24.27 in 2023. These circumstances led to a high level of cow milk output among private farms, which rose by 186% in 2023 compared to the baseline and therefore increased cow milk productivity. The supporting figures that helped explain the increased cow milk productivity at the private farm level, as obtained from the institutional survey, 2023, have been presented in the following table.

Table 67: Comparison of Herd Size, Milk Production, and Lactation Period of Cow in Private Farms under Call-III Sub-projects between Baseline (2022) and Endline (2023)

S.N.	Indicators	Units	Baseline, 2021 (N=189)	Endline, 2023 (N=152)	Increased %
1	Herd size (local cow)	Number / Farm	6	6.0	0.00
2	Herd size (improved cow)	Number / Farm	19	37.37	96.68
3	Herd size (local and improved cow)	Number / Farm	18	36.33	101.83
4	Lactating cow (local and improved)	Number / Farm	8.64	24.27	181.23
5	Milk Production (local and improved cow)	Liter/Farm/Year	28,649.8	81,899.19	185.86
6	Lactation length (local cow)	Days/Lactating cow	280	290	3.57
7	Lactation length (improved cow)	Days/Lactating cow	305	290.06	-4.90

Source: Baseline Survey, 2022, and Endline Survey of NLSIP, 2023

Similarly, for buffalo milk productivity, which increased by 85%, because of the reasons that total herd size of buffalo per private farm, which was 19 in the baseline, increased to around 31 in 2023, with increment of 61%. At the same time, herd size of improved buffalo increased by 54% in endline as compared to the baseline. Furthermore, the herd size of lactating buffalo increased from 8 in baseline to 19 in the endline with increment of 138%. These facts contributed to the increased milk production per private farm by 199%, eventually contributed to the increased buffalo milk productivity among the private farms. Such increment of milk production among the private farms was due to the project's interventions such as livestock health, management of sheds, feeds, promotion of forage and fodders, adoption of climate smart agricultural technologies at the farm levels, and so on.

The comparison of herd size, milk production, lactation period and other indicators regarding buffalo milk production at Private Farm level under Call-III, between baseline and endline has been presented in the following table.

Table 68: Comparison of Herd Size, Milk Production, and Lactation Period of Buffalo in Private Farms under Call-III Sub-projects between Baseline (2022) and Endline (2023)

S.N.	Indicators	Units	Baseline, 2021 (N=189)	Endline, 2023 (N=152)	Increased %
1	Herd size (local)	Number / Farm	9.25	10.6	14.59
2	Herd size (improved)	Number / Farm	20.68	31.91	54.30
3	Herd size (local and improved)	Number / Farm	19.13	30.88	61.42
4	Lactating buffalo (local and improved)	Number / Farm	7.90	18.77	137.59
5	Milk Production	Liter / Farm / Year	15814.83	47363.63	199.49
6	Lactation length (Local)	Days / Lactating buffalo	300	286.67	-4.44
7	Lactation length (Improved)	Days / Lactating buffalo	305	256.8	-15.80

Source: Baseline Survey, 2022, and Endline Survey of NLSIP, 2023

In case of goat also, 356% of increment of productivity was due to increase in herd size in 2023, with 265% increment, on an average per Private Farm, where herd size of cross-bred increased by 125% and purebred/exotic by 26%. The live weight meat production per farm, which was 294 kg in the baseline, increased to 3336 kg in the endline. Such significant increment in the herd size gave rise to meat production, which ultimately contributed to the increased goat meat productivity. The increased goat meat production per farm and productivity of goat were due to project's intervention in the goat value chain as grant sub-projects under call-III run by the private farms.

The results on the herd size and meat production per private farm, which received grant under Call-III, compared between baseline (2022) and endline (2023), have been presented in the following table.

Table 69: Comparison of Herd Size and Meat Production of Goat in Private Farms under Call-III Sub-projects between Baseline (2022) and Endline (2023)

S.N.	Indicators	Units	Baseline, 2021 (N=163)	Endline, 2023 (N=101)	Increased %
1	Herd size (local)	Number / Farm	32.43	66.13	103.92
2	Herd size (cross-bred)	Number / Farm	41.79	94.21	125.44
3	Herd size (exotic/pure breed)	Number / Farm	19.59	24.65	25.83
4	Herd size (all goat)	Number / Farm	35.08	127.95	264.74
5	Meat Production (Live weight basis)	Kg/Farm/Year	294.24	3336.18	1033.83
6	Meat Production (Carcass weight basis)	Kg/Farm/Year	191.26	2168.51	1033.80

Source: Baseline Survey, 2022, and Endline Survey of NLSIP, 2023

3.3.1.4. Comparison of Productivity of Milk, Goat Meat and Chyangra Pashmina at Sub-Project Level between Treatment (2023) and Control (2023) (PO level comparison)

In this section, an attempt has been made to compare the productivity of milk and goat meat between PO levels Endline (2023) with PO levels Control (2023).

The cow milk productivity at PO levels in 2023 (Endline: Treatment) is 7 % more than that of its Control POs, showing productivity of 2050.27 litres per year per standing cattle, as compared to control POs (1918.83 litres).

The buffalo milk productivity at PO levels in Endline Treatment in 2023, was found out to be 44 % more than that of its Control POs, showing higher productivity (1358.75 litres per year per standing buffalo) in treatment POs as compared to Control POs (942.72 litres per year per standing buffalo) in 2023.

Similarly, Goat meat productivity, measured in carcass weight, at PO levels in Endline Treatment in 2023 was found out to be 7.5 % more than that of its Control POs, showing slightly higher productivity (15.76 Kg per standing goat per year) in treatment POs as compared to Control POs (14.66 Kg per standing goat per year).

Details of productivity of targeted livestock commodities at PO levels in 2023, compared between treatment and control, and has been presented in the following table.

Table 70: Comparison of Productivity of Targeted Livestock Commodities at Sub-Project (POs) Level between Treatment (2023) and Control (2023)

Value Chain Commodities	Units	Treatment (PO level) (2023) (N=Milk: 117; Goat: 65)	Control (PO level) (2023) (N=Milk: 18; Goat: 14)	% of Treatment over Control	P-Value
Milk Productivity Cattle	Liter/Year/Standing Cattle	2050.27	1918.83	106.85	0.42
Milk Productivity Buffalo	Liter/Year/Standing Buffalo	1358.75	942.72	144.13	0.965
Goat Meat Productivity	Carcass weight in Kg/Standing goat/Year	15.76	14.66	107.50	0.317

Source: Endline Survey, 2023

Reasons for increased productivity in Treatment POs over Control POs:

As shown in table above, the cow milk productivity was around 7% more in treatment POs over the control POs was because of the reasons that herd size of improved cow per PO was 81% more than that in the control POs. Total herd size in treatment POs was 25% more than that in the control POs and herd size of lactating cow was also higher (16%) in treatment POs over the control POs. In addition, lactation lengths of both local and improved cow were higher in treatment POs than in the control POs. Because of these, the milk production and productivity in treatment POs were found to be higher than in the control POs. Such increment of production and productivity of cow milk in the treatment POs was recorded to be higher due to project's interventions such as distribution of improved cattle, promotion of climate smart agricultural technologies, vaccination against FMD, disease and parasite control programs, management of sheds, promotion of forage and fodder for balance feed to the livestock and so on. The figures contributed to the increased cow milk production and productivity at the PO level, as obtained from the institutional survey, 2023, both for treatment and control POs, have been presented in the following table.

Table 71: Comparison of Herd Size, Milk Production, and Lactation Period of Cow between Treatment POs under Call-I & II Sub-projects and Control POs in 2023

S.N.	Indicators	Units	Treatment, 2023 (N=117)	Control, 2023 (N=18)	Treatment % over Control	P-Value
1	Herd size (local cow)	Number / PO	4.00	15.00	26.67	0.394
2	Herd size (improved cow)	Number / PO	47.13	26.00	181.26	0.665
3	Herd size (local and improved cow)	Number / PO	45.03	36.00	125.07	0.850
4	Lactating cow (local and improved)	Number / PO	30.83	26.67	115.62	0.876
5	Milk Production (local and improved cow)	Liter/PO/Year	89152.68	86370.00	103.22	0.403
6	Lactation length (local cow)	Days/Lactating cow	270.00	255.00	105.88	0.066
7	Lactation length (improved cow)	Days/Lactating cow	286.15	280.00	102.20	0.165

Source: Endline Survey of NLSIP, 2023

Similarly, the overall herd size of buffalo per treatment PO was 19% larger than that of the control PO, which contributed to the 44% increase in buffalo milk productivity in treatment POs compared to control POs. However, there were 90% and 20% more and lactating buffalo in treatment POs than in control POs, respectively. Due to these factors, the treatment POs' milk output per buffalo was 84% higher than that of the control POs. These factors played a part in the POs' higher milk production, which in turn helped the POs' greater productivity with regard to buffalo milk. The adoption of upgraded livestock and other project interventions were the reason for the increase in milk output among the POs.

Similarly, for buffalo milk productivity, which in treatment PO was 44% more over the control POs, because of the reasons that total herd size of buffalo per treatment PO was 19% more with respect to control PO. Whereas number of improved buffalo and lactating buffalo were 90% and 20% more in treatment POs over the control POs respectively. Because of these factors, the milk production of buffalo per PO was 84% more in the treatment POs as compared to the control POs. These factors contributed to the increased milk production among the POs, which eventually contributed to the increased buffalo milk productivity among the POs. The project's interventions, such as the addition of better livestock to the herd, the vaccination and treatment program for livestock health, the management of sheds and feeds, the promotion of climate-smart agricultural technologies, and the promotion of forage and fodders, are all responsible for the increase in milk production among the POs.

The comparison of herd size, milk production, lactation period and other parameters regarding buffalo milk production at PO level under Call-I & II, between treatment and control have been presented in the following table.

Table 72: Comparison of Herd Size, Milk Production, and Lactation Period of Buffalo between Treatment POs under Call-I & II Sub-projects and Control POs in 2023:

S.N.	Indicators	Unit	Treatment, 2023 (N=117)	Control, 2023 (N=18)	Treatment % over Control	P-Value
1	Herd size (local)	Number / PO	6.00	65.00	9.23	0.511
2	Herd size (improved)	Number / PO	43.22	22.78	189.73	0.027
3	Herd size (local and improved)	Number / PO	39.81	33.50	118.82	0.654
4	Lactating buffalo (local and improved)	Number / PO	24.78	20.60	120.27	0.638
5	Milk Production	Liter/PO/Year	50112.93	27174.00	184.41	0.965
6	Lactation length (Local)	Days/Lactating buffalo	280.00	255.00	109.80	0.165
7	Lactation length (Improved)	Days/Lactating buffalo	256.07	260.00	98.49	0.093

Source: Endline Survey of NLSIP, 2023

The aforementioned table illustrates that, at the five percent probability level, the herd size of enhanced buffalo in treatment households was much larger than that of control families. On the other hand, treated households produced much more milk buffalo milk per PO annually than did control households. The introduction of exotic or pure breed goats into the herds in the treatment POs, together with a notable rise in the size of local and improved goat herds, contributed to the 7.5% improvement in production in goat cases compared to control POs. As a result, the herds at PO level saw a considerable reduction in goat meat, both in terms of live and carcass weight (more than 500% as opposed to productivity).

Meat production resulted from these parameter increases in the goat herds at the treatment PO level, and this ultimately helped to raise goat meat productivity in comparison to the control POs. The project's intervention in the goat value chain as grant sub-projects under call-I & II conducted by producers organizations (POs) was the cause of the improved productivity of goats and the amount of meat produced per farm.

The following table compares the outcomes of treatment and control groups for the herd size and meat output per PO that was awarded grants under Calls I and II.

Table 73: Comparison of Herd Size and Meat Production of Goat between Treatment POs under Call-I & II Sub-projects and Control POs in 2023:

S.N.	Indicators	Unit	Treatment, 2023 (N=65)	Control, 2023 (N=14)	Treatment % over Control	P-Value
1	Herd size (local)	Number / PO	192.75	12.40	1554.45	0.004
2	Herd size (cross-bred)	Number / PO	232.76	55.60	418.63	0.000
3	Herd size (exotic/pure breed)	Number / PO	80.00	-	-	0.000
4	Herd size (all goat)	Number / PO	301.66	51.50	585.74	0.000
5	Meat Production (Live weight basis)	Kg/PO/Year	7052.33	1124.33	627.25	0.000
6	Meat Production (Carcass weight basis)	Kg/PO/Year	4584.01	730.82	627.25	0.001

Source: Endline Survey of NLSIP, 2023

As can be seen from the above table, at the one percent probability level, every parameter in the treatment households for goat rearing was considerably higher in 2023 than in the control households.

3.3.1.5. Comparison of Productivity of Milk, Goat Meat and Chyangra Pashmina at Sub-Project Level under Call-III Treatment (2023) and Control (2023) (Private Farm level comparison)

In this section, an attempt has been made to compare the productivity of milk and goat meat at sub-projects levels between Treatment Private Farms with Control Private Farms in 2023.

The cow milk productivity per standing livestock per year at Private farms in 2023 (Endline: Treatment) is 2199.94 liters, which is about 6 % more than that of its Control Private farms (2077.39 litres).

The buffalo milk productivity per standing livestock per year in the treatment private farms was found 7% higher (1534 litres) over the control private farms (1433 litres) in year 2023.

Goat meat productivity, measured in carcass weight, at treatment private farms in 2023 was found out to be 108 % over its control private farms, showing 8 % higher productivity (17.37 Kg per standing goat per year) in treatment private farms as compared to control private farms (16.06 Kg per standing goat per year).

Details of productivity of targeted livestock commodities at private farm levels in 2023, compared between treatment and control, and has been presented in the following table.

Table 74: Comparison of Productivity of Targeted Livestock Commodities at Sub-Project (Private Farms) Level between Treatment (2023) and Control (2023)

Value Chain Commodities	Units	Treatment (Private Farm level) (2023) (N=Milk: 152; Goat: 101)	Control (Private Farm level) (2023) (N=Milk: 99; Goat: 42)	% of Treatment over Control	P-Value
Milk Productivity Cattle	Liter/Year/Standing Cattle	2199.94	2077.39	105.90	0.606
Milk Productivity Buffalo	Liter/Year/Standing Buffalo	1533.80	1433.28	107.01	0.031
Goat Meat Productivity	Carcass weight in Kg/Standing goat/Year	17.37	16.06	108.16	0.213
Chyangra Pashmina Productivity	Gram/Chyangra/Year	-	-	-	

Source: Endline Survey, 2023

From above table it can be seen that the buffalo milk productivity in treatment private farms in 2023 was significantly higher than that of the control private farms in the same year at 5 per cent level of probability.

Reasons for increased productivity in Treatment Private Farms over Control Private Farms:

As shown in above table, the cow milk productivity was around 6% more in treatment Private farms over the control Private farms was because of the reasons that herd size of improved cow per Private Farm was 129% more than that in the control Private Farm. Total herd size in treatment Private Farms was 126% more than that in the control Private Farms, and herd size of lactating cow was also higher (124% more) in treatment Private Farms over the control Private Farms. These facts contributed to the increased cow milk production in the treatment private farms (81,899 liter per year), where in the control private farms, it was only 30,948 liter per year, recorded in the same year 2023. Such increment in the parameters of the milk production in the private cattle farms significantly contributed to the productivity in treatment private farms, which received grant sub-projects under call-III. In fact, the project's intervention on introduction of improved cattle, promotion of climate smart agricultural technologies, vaccination, disease and parasite control programs, management of sheds, promotion of forage and fodder for balance feed to the livestock and many more activities contributed to the increased cow milk productivity at the private farm level as well. The figures contributed to the increased cow milk production and productivity at the Private Farm level, as obtained from the institutional survey, 2023, both for treatment and control farms, have been presented in the following table.

Table 75: Comparison of Herd Size, Milk Production, and Lactation Period of Cow between Treatment Private Farms under Call-III Sub-projects and Control Private Farms in 2023

S.N.	Indicators	Units	Treatment, 2023 (N=152)	Control, 2023 (N=99)	Treatment % over Control	P-Value
1	Herd size (local cow)	Number / Private Farm	6	5	120.00	0.835
2	Herd size (improved cow)	Number / Private Farm	37.37	16.34	228.70	0.000
3	Herd size (local and improved cow)	Number / Private Farm	36.33	16.1	225.65	0.000
4	Lactating cow (local and improved)	Number / Private Farm	24.27	10.84	223.89	0.000
5	Milk Production (local and improved cow)	Liter/Private Farm/Year	81899.19	30948.48	264.63	0.042
6	Lactation length (local cow)	Days/ Lactating cow	290	285	101.75	0.920
7	Lactation length (improved cow)	Days/ Lactating cow	290.06	287.65	100.84	0.232

Source: Endline Survey of NLSIP, 2023

From above table, it can be seen that the herd size of improved cow, herd size of local and improved cow in aggregate, and herd size of lactating cow (local and improved) in the treatment households were significantly higher than that of the control households at 1 per cent level of probability. The per household cow milk production in the treatment households was also significantly higher than that in the control households at 5 per cent level of probability in the year 2023.

Similarly, the overall herd size of buffalo per treatment private farm was 113% larger than that of control private farms, which accounted for the 7% increase in buffalo milk productivity in the treatment private farm compared to the control private farm.

Because of these factors, the milk production of buffalo per Private Farm was recorded to be 128% more in the treatment Private Farms as compared to the control Private Farms. These facts contributed to the increased milk production among the Private farms, which eventually contributed to the increased buffalo milk productivity among the Private farms, those supported by the NLSIP. Such increment of buffalo milk production and productivity among the Private Farms were due to the project's interventions such as introduction of improved livestock in the herd, livestock health care program through vaccination and treatment, management of sheds, feeds, promotion of forage and fodders, promotion of climate smart agricultural technologies, and so on.

The comparison of herd size, milk production, lactation period and other parameters regarding buffalo milk production at Private Farm levels under Call-III, between treatment and control have been presented in the following table.

Table 76: Comparison of Herd Size, Milk Production, and Lactation Period of Buffalo between Treatment Private Farms under Call-III Sub-projects and Control Private Farms in 2023

S.N.	Indicators	Unit	Treatment, 2023 (N=152)	Control, 2023 (N=99)	Treatment % over Control	P-Value
1	Herd size (local buffalo)	Number / Private Farm	10.6	8.9	119.10	0.208
2	Herd size (improved buffalo)	Number / Private Farm	31.91	14.77	216.05	0.003
3	Herd size (local and improved buffalo)	Number / Private Farm	30.88	14.49	213.11	0.002
4	Lactating buffalo (local and improved)	Number / Private Farm	18.77	9.27	202.48	0.009
5	Milk Production	Liter/Private Farm/Year	47,363.63	20,783.12	227.89	0.009
6	Lactation length (Local)	Days/Lactating buffalo	286.67	270	106.17	0.260
7	Lactation length (Improved)	Days/Lactating buffalo	256.8	257.05	99.90	0.900

Source: Endline Survey of NLSIP, 2023

It can be seen from the above table that the herd size of improved buffalo, herd size of local and improved buffalo in aggregate, herd size of lactating buffalo (local and improved) and milk production per private farm were significantly higher than that of the control households at 1 per cent level of probability in the year 2023.

In case of goat also, 8.16% more productivity in treatment Private Farms with respect to control Private Farms, was due to significant increase (110% more) of herd in treatment private goat farms as compared to the control private farms, with introduction of pure/exotic breed, cross breed, and the local breed also. As such, there was significant increment of goat meat, both in terms of live and carcass weight, in the herds at Private Farm level (118% more as compared to production at control POs). These increment of parameters in the herds of goat at the treatment Private Farm levels gave rise to goat meat production, which ultimately contributed to increased goat meat productivity as compared to the control Private Farms. The increased goat meat production per farm and productivity of goat were due to project's

interventions in the goat value chain as grant sub-projects under call-III run by the private goat entrepreneurs.

The results on the herd size of goat and meat production at Private Farms, which received grant under Call-III, compared between treatment and control, have been presented in the following table.

Table 77: Comparison of Herd Size and Meat Production of Goat between Treatment Private Farms under Call-III Sub-projects and Control Private Farms in 2023:

S.N.	Indicators	Unit	Treatment, 2023 (N=101)	Control, 2023 (N=42)	Treatment % over Control	P-Value
1	Herd size (local)	Number / Private Farm	66.13	15.7	421.21	0.001
2	Herd size (cross-bred)	Number / Private Farm	94.21	58.3	161.60	0.004
3	Herd size (exotic/pure breed)	Number / Private Farm	24.65	9.57	257.58	0.000
4	Herd size (all goat)	Number / Private Farm	127.95	61.05	209.58	0.000
5	Meat Production (Live weight basis)	Kg/Private Farm/Year	3336.18	1530.97	217.91	0.000
6	Meat Production (Carcass weight basis)	Kg/Private Farm/Year	2168.51	995.13	217.91	0.131

Source: Endline Survey of NLSIP, 2023

In case of goat meat, the herd size of local goat, herd size of cross-bred goat, herd size of exotic/pure breed of goat, herd size of all types of goat and meat production (on live weight basis) per private farm in the treatment private goat farms were significantly higher than that of the control goat farms during the endline year (2023) at 1 per cent level of probability. Average goat meat on carcass weight in treatment private farms was substantially higher than that in the control private farms in 2023.

Key Drivers of the Productivity

In summary, and in nutshell, key drivers of the productivity with figures, compared between treatment and control sub-projects in 2023, along with the P-values, have been presented in the following table.

Table 78: Key Drivers of the Productivity at Sub-projects Level compared between Treatment and Control in 2023

SN	Key Drivers of Productivity	Treatment		Control		P- Value	
		POs	Private Farm	POs	Private Farm	Among POs	Among Private Farms
A	Dairy						
A 1	Cattle						
A.1.1	Herd size (local cow)	4.00	6	15.00	5	0.394	0.835
A.1.2	Herd size (improved cow)	47.13	37.37	26.00	16.34	0.665	0.000
A.1.3	Herd size (local and improved cow)	45.03	36.33	36.00	16.1	0.850	0.000
A.1.4	Lactating cow (local and improved)	30.83	24.27	26.67	10.84	0.876	0.000

SN	Key Drivers of Productivity	Treatment		Control		P- Value	
		POs	Private Farm	POs	Private Farm	Among POs	Among Private Farms
A.1.5	Lactating livestock % against herd size (Local)	50	55	63.33	66	-	-
A.1.6	Lactating livestock % against herd size (Improved)	71.01	66.84	78.75	67.48	-	-
A.1.7	Lactation length (local cow)	270.00	290	255.00	285	0.066	0.920
A.1.8	Lactation length (improved cow)	286.15	290.06	280.00	287.65	0.165	0.232
A2	Buffalo						
A.2.1	Herd size (local)	6.00	10.6	65.00	8.9	0.511	0.208
A.2.2	Herd size (improved)	43.22	31.91	22.78	14.77	0.027	0.003
A.2.3	Herd size (local and improved)	39.81	30.88	33.50	14.49	0.654	0.002
A.2.4	Lactating buffalo (local and improved)	24.78	18.77	20.60	9.27	0.638	0.009
A.2.5	Lactating livestock % against herd size (Local)	61.67	62.26	66.92	59.55	-	-
A.2.6	Lactating livestock % against herd size (Improved)	62.04	60.81	57.38	64.18	-	-
A.2.7	Lactation length (Local)	280.00	286.67	255.00	270	0.165	0.260
A.2.8	Lactation length (Improved)	256.07	256.8	260.00	257.05	0.093	0.900
B	Goat						
B.1	Herd Size (Local)	192.75	66.13	12.40	15.7	0.004	0.001
B.2	Herd Size (Improved)	232.76	94.21	55.60	58.3	0.000	0.004
B.3	Herd Size (Pure/Exotic)	80.00	24.65	-	9.57	0.000	0.000
B.4	Total Herd Size	301.66	127.95	51.50	61.05	0.000	0.000

Source: Endline Survey of NLSIP, 2023

Note: The above parameters have already been discussed in the earlier sub-sections.

3.3.2. Sales Value of targeted Livestock Commodities at Sub-Project (SP) level (Task 2)

In this section, results of sales value of targeted livestock commodities at sub-project (SP) level (Task-2) are presented and discussed.

3.3.2.1. Comparison of Sales Value of Targeted Livestock Commodities at Sub-Project (SP-Individual) Level between Baseline (2021) and Endline (2023)

The value of milk sale at sub-projects levels (individual HHs) of Call I and II during Endline (2023) was found out to be NRs. 750480 (at current price) and Rs. 678000 after adjusting the inflation, which was NRs. 313000 in baseline (2021), increased by 117 %, as compared to the baseline sales value.

Similarly, the value of goat sale at individual sub-projects level during Baseline (2021) which was NRs. 77250, increased to NRs. 155000 at current price, and Rs. 140000 after adjusting the inflation, during Endline (2023), with net increment of 81 %. The results on the sales value of targeted livestock commodities at individual sub-project levels obtained in 2023, compared with the baseline (2021) have been presented in the following table.

Table 79: Comparison of Sales Value of targeted Livestock Commodities at Sub-Project (SP) level between Baseline (2021) and Endline (2023) (Individual)

Value Chain Commodities	Call I & Call II Sub-Project (Individual) (Baseline, 2021) (N=Milk: 1265; Goat: 563)	Call I & Call II Sub-Project (Individual) (Endline, 2023) (N=Milk: 503; Goat: 486)		Increased % ¹²
		At current price	After adjusting inflation ¹³	
Milk Sales (Rs., 000) per HH	312.8	750.48	678.06	116.77
Goat Sales (Rs., 000) per HH	77.25	154.93	139.98	81.20

Source: Baseline Survey, 2021, and Endline Survey, 2023

The significant increase in the sales value of milk and goat were due to increase in household level production and sales quantity. On an average, an individual farmer used to sell 8,380 liters of milk per year, recorded in 2023, which was 4923 liters in 2021. Due to such increase in production and quantity of sales from baseline to endline, the value of sales of milk has also been increased. Similarly for goat meat, there was an average household goat meat production (on carcass weight) of 47.35 kg in 2021, increased to 359.42 kg in 2023. Because of this the sales value of goat meat has also been increased. The figures on household (individual) level sales of milk and goat meat in 2023, and compared with baseline (2021) have been presented in the following table.

¹² % Increased has been computed by comparing the baseline values with endline values after adjusting the inflation

¹³ The inflation adjustment was done based on the consumer price index (CPI) of 2021@ 206, and 2023@228

Table 80: Comparison of Number of Households, Total Sales and Per Household Sales Value of targeted Livestock Commodities at Sub-Project (SP) level between Baseline (2021) and Endline (2023) (Individual HH level)

S.No.	Commodity sales	Baseline (2021)			Endline (2023)		
		No of HH	Total sales amount in NRs'000	Average income from sales/ HH in NRs'000	No of HHs	Total sales amount in NRs'000	Average income from sales /HH in NRs'000
1	Milk and milk products	143	44699.24	312.80	377	257424.69	682.8
2	Live goat, goat meat and meat products	361	27886.18	77.25	394	61,043.81	154.93

Source: Baseline Survey, 2021, and Endline Survey, 2023

3.3.2.2. Comparison of Sales Value of Targeted Livestock Commodities at Sub-Project (SP-Collective/PO level) Level between Baseline (2021) and End-line (2023)

The value of milk sale at sub-projects levels (collective/PO level) of Call I and II during Endline (2023) was found out to be NRs. 9.74 million at current price and Rs. 8.8 million after adjusting the inflation, which was NRs. 6.77 million in baseline (2021), increased by 30 %, as compared to the baseline sales value.

Similarly, the value of goat sale at collective sub-projects at PO level during Baseline (2021) which was NRs. 817 thousand, increased to NRs. 3447 thousand at current price and Rs. 3114 thousand during Endline (2023) after adjusting the inflation, with increment of 281%. This has been presented in the following table.

Table 81: Comparison of Sales Value of targeted livestock commodities at Sub-Project (SP) level Between Baseline (2021) and End-line (2023) (Collective/PO level)

Value Chain Commodities	Call I & Call II Sub-Project (Collective/PO level) (Baseline, 2021) (N=Milk: 124; Goat: 73)	Call I & Call II Sub-Project (Collective/PO level) (Endline, 2023) (N=Milk: 117; Goat: 65)		Increased % ¹⁴
		At current price	After adjusting inflation ¹⁵	
Milk Sales (Rs., 000) Per PO	6770	9741	8801	30.00
Goat Sales (Rs.,000) Per PO	816.69	3447	3114.39	281.34

Source: Baseline Survey, 2021, and Endline Survey, 2023

¹⁴ % Increased has been computed by comparing the baseline values with endline values after adjusting the inflation

¹⁵ The inflation adjustment was done based on the consumer price index (CPI) of 2021@ 206, and 2023@228

Such increment of value of milk sale and goat meat sale was due to increased in milk and goat meat production respectively at the sub-project level implemented collectively, which has been mentioned and discussed above.

3.3.2.3. Comparison of Sales Value of Targeted Livestock Commodities at Sub-Project (SP-Private Farm) Level between Baseline (2022) and End-line (2023)

The value of milk sale at sub-projects levels (private farms) of Call III during Endline (2023) was found out to be NRs. 10.17 million at current price and Rs. 9.77 million after adjusting the inflation, which was NRs. 6.26 million in baseline (2022), increased by 56 %, as compared to the baseline sales value.

Similarly, the value of goat sale at individual sub-projects level during Baseline (2022) which was NRs. 435 thousand, increased to NRs. 712.5 thousand at current price and Rs. 684.3 thousand after adjusting the inflation during Endline (2023), with increment of 57 %. This has been presented in the following table.

Table 82: Comparison of Sales Value of targeted Livestock Commodities at Sub-Project (SP) level between Baseline (2022) and End-line (2023) (Private Farm)

Value Chain Commodities	Call-III Sub-Project (Private Farm) (Baseline, 2022) (N=Milk: 189; Goat: 163)	Call-III Sub-Project (Private Farm) (Endline, 2023) (N=Milk: 152; Goat: 101)		Increased % ¹⁶
		At current price	After adjusting inflation ¹⁷	
Milk Sales (Rs., 000) per Farm	6264.6	10,172.92	9771.36	55.98
Goat Sales (Rs.,000) per Farm	434.9	712.46	684.34	57.35

Source: Baseline Survey, 2022, and Endline Survey, 2023

Such increment of value of milk sale and goat meat sale was due to increased in milk and goat meat production respectively at the sub-project level implemented by private farms. which has been mentioned and discussed above.

3.3.2.4. Comparison of Sales Value of Targeted Livestock Commodities at Sub-Project (SP) Level between Treatment and Control POs in 2023 (PO level comparison)

The value of milk sales per treatment POs under Call-I and II was recorded to be NRs. 9.74 million, which was only 4.12 million in control POs during 2023, which is 136% more of the milk sale at control POs measured as 100.

Similarly, the goat sales values in treatment POs under the Call-I and II, was found out to be NRs. 3447 thousand, as compared to only NRs. 319 thousand in the control POs.

The figures of comparison between treatment POs of Call-I and II, and control POs have been presented in the following table.

¹⁶ % Increased has been computed by comparing the baseline values with endline values after adjusting the inflation

¹⁷ The inflation adjustment was done based on the consumer price index (CPI) of 2022@ 219, and 2023@228

Table 83: Comparison of Sales Value of targeted Livestock Commodities at Sub-Project (SP) level between Treatment POs of Call-I & II and Control POs in 2023

Value Chain Commodities	Call-I&II Sub-Projects (Treatment POs) (2023) (N=Milk: 117; Goat: 65)	Control POs (2023) (N=Milk: 18; Goat: 14)	% of Treatment over Control	P-Value
Milk Sales (Rs., 000) per PO	9741	4121	236.37	0.085
Goat Sales (Rs.,000) per PO	3447	319	1080.56	0.033

Source: Endline Survey, 2023

Such higher value of milk sale and goat meat sale in treatment POs over the control POs was due to increased in milk and goat meat production respectively at the PO level, which has been mentioned and discussed above. The average sales value of goat in the treatment POs during 2023 was significantly higher than in the control POs at 5 per cent level of probability in the same year. Similarly the average sales value of milk in treatment POs was substantially higher than in the control POs during the endline period.

3.3.2.5. Comparison of Sales Value of Targeted Livestock Commodities at Sub-Project (SP) Level between Treatment and Control Private Farms in 2023 (Private Farm level comparison)

The value of milk sales per treatment private farm under Call-III was recorded to be NRs. 10.17 million, which was 286 % of the value of milk sales per control private farm (measured as 100) during 2023. This was because of increased milk production at treatment private farms as compared to the control private farms i.e. 164% more in cow milk and 128% more in buffalo milk production than that in control private farms.

But, the goat sale values in treatment private farms under the Call-III, was found out to be 712.4 thousand which is only 77 % of the goat sale values at control private farms in 2023. This is because the goat producing private farms (treatment) could sell only 1145.66 kg live weight out of total production of 3336.18 kg per farm, which is only 34% of the production, whereas in control private farm, they could sell about 91% (1387 kg out of 1531 kg) of the production in the year 2023.

The figures of comparison between treatment private farms of Call-III, and their control private farms have been presented in the following table. The below table depicts that the sales values of milk in the treatment private farms were substantially higher than in the control private farms during the endline period.

Table 84: Comparison of Sales Value of targeted Livestock Commodities at Sub-Project (SP) level between Treatment and Control Private Farms in 2023 (Private Farm level comparison)

Value Chain Commodities	Call-III Sub-Projects (Treatment Private Farms) (2023) (N=Milk: 152; Goat: 101)	Control Private Farms (2023) (N=Milk: 99; Goat: 42)	% of Treatment over Control	P-Value
Milk Sales (Rs., 000) per Farm	10,172.92	3,558.12	285.91	0.059
Goat Sales (Rs.,000) per Farm	712.46	927.8	76.79	0.432

Source: Endline Survey, 2023

3.3.3. Adoption of Climate Smart Agriculture Technology (CSAT) at Sub-project level (Task-2)

The Project has promoted seven types of climate smart agricultural technologies (CSATs) in the Project command areas, through various types of sub-projects under Call-I, II and III, and the results obtained from the endline survey, compared with the baselines and controls have been presented and discussed in the following sections.

3.3.3.1. Climate Smart Agriculture Technology (CSAT) in Call-I and II (Individual HH level)

The adoption of climate smart agricultural technologies (CSATs) in Call-I and II sub-projects, which were implemented by individual households are presented and discussed in the following sub-sections.

3.3.3.1.1. Climate Smart Agriculture Technology (CSAT) Adoption in at Individual HH level compared between cooperatives and farmers' groups in all three value chains in 2023

About 95 % of households out of 1053 sampled households within cooperatives and farmers' groups, in Call I and II, found to have adopted improved shed management practices, followed by manure management (83%), fodders, forage production and pasture development (50%), and least in saplings/seedlings production (0.38%). Similar scenario could be seen among cooperatives and farmers' groups, showing very little variations between cooperatives.

Table 85: Climate Smart Agriculture Technology Adoption at Household levels in all three Value Chains at Sub-project level (Individual) in 2023

CSAT applied at HH level in Call-I & II	Cooperatives (N=610 HHs)		Farmer Groups (N=443 HHs)		Total (1053 HHs)	
	Number of HH adopting	%	Number of HH adopting	%	Number of HH adopting	%
Improved shed management	577	94.59	425	95.94	1002	95.16
Manure management	516	84.59	362	81.72	878	83.38
Fodders, Forage Production and Pasture Development	345	56.56	185	41.76	530	50.33
Hay and Silage making	42	6.89	49	11.06	91	8.64
Stall feeding	217	35.57	130	29.35	347	32.95
Forage seed production	24	3.93	2	0.45	26	2.47
Saplings/seedlings production	3	0.49	1	0.23	4	0.38

Source: Endline Survey, 2023

3.3.3.1.2. Number of Farmers adopting Climate Smart Agriculture Technology (CSAT) in all three Value Chains at Sub-project level (Individual Households) in 2023

There are 100 % farmers in Call-I and II (individual sub-projects) who used at least one technology, which was 94.19% in the baseline (2021). Whereas, 89% of farmers in 2023 used at least two technologies, which was 75% in 2021, and 57 % used at least three technologies in 2023 which was 52% in 2021. These figures are more or less same in case of households within cooperatives and farmers' groups in 2023. The figures on the number of farmers adopting CSAT in all three value chains in cooperatives and farmers' groups in 2023, which are compared with the baseline value irrespective of types of POs, have been presented in the following table.

Table 86: Number of Farmers adopting Climate Smart Agriculture Technology (CSAT) at Sub-project level (Individual) by frequency in 2023, compared with baseline (2021)

Frequency of CSAT	Cooperatives (N=610 HHs)			Farmers' Groups (N=443 HHs)			Total (1053 HHs)			Baseline (2021)
	HH number using	HH number at least using	% of HHs at least using	HH number using	HH number at least using	% of HHs at least using	HH number using	HH number at least using	% of HHs at least using	% of HHs at least using
1 Technology	55	610	100	60	443	100	115	1053	100	94.2
2 Technology	177	555	90.98	161	383	86.46	338	938	89.08	74.91
3 Technology	231	378	61.97	134	222	50.11	365	600	56.98	51.73
4 Technology	118	147	24.10	65	88	19.86	183	235	22.32	24.71
5 & more Technology	29	29	4.75	23	23	5.19	52	52	4.94	7.93
Total	610			443			1053			

Source: Baseline Survey, 2021 and Endline Survey, 2023

3.3.3.1.3. Climate Smart Agriculture Technology (CSAT) Adoption in Targeted Livestock Commodities at Sub-project level (Individual HH level) in 2023

Among seven CSATs promoted by the project, most of the farmers of Call I and II sub-projects, were found adopting improved shed management technology, which 100% in Chyangra Pashmina, 99% in Goat Meat, and 90% in Dairy Value Chains in 2023. The second important CSAT is the manure management, for which 88% in Dairy, 83% in Goat Meat, and 47% in Chyangra Pashmina rearing farmers were found adopting this technology. Around 50% of farmers of all three value chains used to adopt fodders, forage production and pasture development technologies. The figures on the CSAT adoption by the farmers in all three value chains in 2023 have been presented in the following table.

Table 87: Climate Smart Agriculture Technology (CSAT) Adoption in Dairy, Goat Meat and Chyangra Pashmina Value Chains at Sub-project level (Individual HHs) in 2023

CSAT	Dairy (N=503 HHs)		Goat Meat (N=486 HHs)		Chyangra Pashmina (N=64 HHs)		Total (N=1053 HHs)	
	HH number	%	HH number	%	HH number	%	HH number	%
Improved shed management	455	90.46	483	99.38	64	100.00	1002	95.16
Manure management	445	88.47	403	82.92	30	46.88	878	83.38
Fodders, Forage Production and Pasture Development	282	56.06	245	50.41	3	4.69	530	50.33
Hay and Silage making	50	9.94	33	6.79	8	12.50	91	8.64
Stall feeding	186	36.98	161	33.13	0	0.00	347	32.95
Forage seed production	15	2.98	11	2.26	0	0.00	26	2.47
Saplings/seedlings production	3	0.60	1	0.21	0	0.00	4	0.38

Source: Endline Survey of NLSIP, 2023

3.3.3.1.4. Number of Farmers adopting Climate Smart Agriculture Technology at Sub-project level (Individual Households) by Value Chains in 2023

Comparing among value chains on the adoption of the CSATs in 2023, 100% of the individual households used to adopt at least one CSAT in their livestock farms. 92% of dairy farmers used to adopt at least two CSATs, followed by Goat producing farmers (91%), and Chyangra producers (48%). Around 60% of dairy and goat producing farmers used to adopt at least three CSATs in their farms. The number of farmers adopting CSATs under Call-I&II sub-projects, implemented individually, by number of CSATs in all three value chains have been presented in the following table. Such types of value chain wise use of CSATs in 2023 could not be compared with the baseline, as there were no value chain wise results on the CSATs in the baseline.

Table 88: Number of Farmers adopting Climate Smart Agriculture Technology at Sub-project level (Individual) by Value Chains in 2023

Frequency of CSAT	Dairy (N=503 HHs)			Goat Meat (N=486 HHs)			Chyangra Pashmina (N=64 HHs)		
	HH number using	HH number at least using	%	HH number using	HH number at least using	%	HH number using	HH number at least using	%
1 Technology	39	503	100.00	43	486	100.00	33	64	100.00
2 Technology	166	464	92.25	148	443	91.15	24	31	48.44
3 Technology	165	298	59.24	196	295	60.70	4	7	10.94
4 Technology	95	133	26.44	85	99	20.37	3	3	4.69
5 Technology	38	38	7.55	14	14	2.88	0	0	0.00
Total	503			486			64		

Source: Endline Survey of NLSIP, 2023

3.3.3.2. Climate Smart Agriculture Technology (CSAT) Adoption in Call-I and II (Collective/PO level) sub-projects

The adoption of climate smart agricultural technologies (CSATs) in Call-I and II sub-projects, which were implemented collectively are presented and discussed in the following sub-sections.

3.3.3.2.1. Climate Smart Agriculture Technology Adoption in Targeted Livestock Commodities at Sub-project level (Collective/PO level) in 2023

Out of total 195 POs surveyed, who were implementing sub-projects collectively, 83% of them found to have adopted improved shed management practices, followed by manure management by 62%, whereas, 41% of them used fodders, forage production and pasture development, 25% adopted stall feeding as climate smart agricultural technologies (CSATs) in their livestock farms. The figures on the adoption of CSATs at the PO level (collective SPs) in 2023 have been presented in the following table. As there were no data/information on the types of CSATs in baseline, the endline results could not be compared with the baseline.

Table 89: Climate Smart Agriculture Technology Adoption in Baseline (2021) and Endline (2023) in all Value Chains at Sub-project level (Collective/PO level)

CSAT	Baseline (2021)		Endline (2023) (N=195 POs)	
	PO number using	%	PO number using	%
Improved shed management	NA	-	161	82.56
Manure management	NA	-	120	61.54
Fodders, Forage Production and Pasture Development	NA	-	80	41.03
Hay and Silage making	NA	-	24	12.31
Stall feeding	NA	-	48	24.62
Forage seed production	NA	-	13	6.67
Saplings/seedlings production	NA	-	11	5.64
Total			195	

Source: Endline Survey of NLSIP, 2023

3.3.3.2.2. Comparison of Adoption of Climate Smart Agriculture Technology at Sub-project level (Call-I&II: Collective / PO level) between Baseline (2021) and Endline (2023) in All Value Chains

Out of the 195 POs surveyed, 100% of them were found to have used at least one climate smart agricultural technology (CSAT), which in 2021 there were 84% POs using at least one technology, which is about 19% more in 2023 as compared to baseline (2021). The figures on the adoption of CSATs at PO level and compared between baseline (2021) and endline (2023) have been presented in the following table.

Table 90: Comparison of Adoption of Climate Smart Agriculture Technology at Sub-project level (Call-I&II: Collective / PO level) between Baseline (2021) and Endline (2023) in All Value Chains

Frequency of CSAT	Baseline (2021) (N=226 POs)			Endline (2023) (N=195 POs)			Increased %	
	PO number using	% of PO using	% of PO at least using	PO number using	% of PO using	% of PO at least using	% of PO using	% of PO at least using
1 Technology	38	16.81	84.07	67	34.36	100.00	104.40	18.95
2 Technology	43	19.03	67.26	44	22.56	65.64	18.57	-2.41
3 Technology	52	23.01	48.23	49	25.13	43.08	9.21	-10.68
4 Technology	26	11.5	25.22	24	12.31	17.95	7.02	-28.83
5 and More Technology	31	13.72	13.72	11	5.64	5.64	-58.88	-58.88
No Technology	36	15.93	-					
Total	226	100	-	195				

Source: Baseline (2021) and Endline Survey (2023)

3.3.3.2.3. Comparison of Adoption of Climate Smart Agriculture Technology at Sub-project level (Call-I&II: Institutional / PO level) between Treatment and Control in all Value Chains in 2023

Of the total 195 treatment POs surveyed in 2023, 83% of them used to adopt improved shed management practices, as CSATs in their farms, followed by manure management (62%), and fodders, forage production and pasture development (41%), as compared to the control POs which adopted the same CSATs, were 84%, 38%, and 34% respectively. Except for improved shed management practices, the treatment POs used to adopt all other six CSATs more than that of control POs in 2023. The figures on the adoption of CSATs in both treatment and control POs in 2023, have been presented in the following table.

Table 91: Comparison of Adoption of Climate Smart Agriculture Technology at Sub-project level (Call-I&II: Institutional / PO level; all value chains) between Treatment and Control in 2023

CSAT	Treatment Call-I&II (N=195 POs)		Control (N=32 POs)		Treatment over Control (%)
	PO number using	%	HH number	%	
Improved shed management	161	82.56	27	84.38	97.85
Manure management	120	61.54	12	37.50	164.10
Fodders, Forage Production and Pasture Development	80	41.03	11	34.38	119.35
Hay and Silage making	24	12.31	0	0.00	-
Stall feeding	48	24.62	4	12.50	196.92
Forage seed production	13	6.67	1	3.13	213.33
Saplings/seedlings production	11	5.64	1	3.13	180.51

Source: Endline Survey (2023)

3.3.3.2.4. Comparison of Adoption of Climate Smart Agriculture Technology at Sub-project level (Call-I&II: Collective / PO level) between Treatment and Control in All Value Chains 2023

While comparing between treatment and control POs adopting CSATs, both types of POs were found adopting at least one CSAT in their livestock farms. The treatment POs were found more effective in adopting more than two technologies in their farms than the control POs. The figures on the adoption of CSATs in treatment and control POs obtained in 2023, have been presented in the following table.

Table 92: Comparison of Adoption of Climate Smart Agriculture Technology at Sub-project level (Call-I&II: Collective / PO level) between Treatment and Control in All Value Chains 2023

Frequency of CSAT	Treatment (N=195 POs)			Control (32 POs)			% of Treatment over Control	
	HH number using	% of HH number using	% of HH at least using	HH number using	% of HH number using	% of HH at least using	% of HH number using	% of HH at least using
1 Technology	67	34.36	100.00	15	46.88	100.00	73.30	100.00
2 Technology	44	22.56	65.64	10	31.25	53.13	72.21	123.56

Frequency of CSAT	Treatment (N=195 POs)			Control (32 POs)			% of Treatment over Control	
	HH number using	% of HH number using	% of HH at least using	HH number using	% of HH number using	% of HH at least using	% of HH number using	% of HH at least using
3 Technology	49	25.13	43.08	7	21.88	21.88	114.87	196.92
4 Technology	24	12.31	17.95	0	0.00	0.00	-	-
5 Technology	11	5.64	5.64	0	0.00	0.00	-	-
Total	195			32				

Source: Endline Survey of NLSIP, 2023

3.3.3.3. Adoption of Climate Smart Agricultural Technologies (CSATs) at Private Farm Level under Call-III

The adoption of climate smart agricultural technologies (CSATs) in Call-III sub-projects, which were implemented by private farms are presented and discussed in the following sub-sections.

3.3.3.3.1. Climate Smart Agriculture Technology Adoption in all three targeted Livestock Commodities at Private Farm level in 2023

Out of total 254 private farms surveyed in 2023, maximum (94.5%) of private farms were found adopting improved shed management, followed by manure management (81%), stall feeding (42%), and fodders, forage production and pasture development (37%). About 85% women were found involved in the adoption of CSATs in the livestock farms.

Table 93: Climate Smart Agriculture Technology Adoption in Dairy, Goat Meat and Chyangra Pashmina Value Chains at Sub-project level (Private Farm) in 2023

CSAT	Baseline (N=355 Farms)		Total (N=254 Farms)	
	Number of Farms	%	Number of Farms	%
Improved shed management	-	-	240	94.49
Manure management	-	-	206	81.10
Fodders, Forage Production and Pasture Development	-	-	95	37.40
Hay and Silage making	-	-	46	18.11
Stall feeding	-	-	107	42.13
Forage seed production	-	-	14	5.51
Saplings/seedlings production	-	-	6	2.36
Total	-	-	254	
Involvement of Women				84.6

Source: Endline Survey of NLSIP, 2023

3.3.3.3.2. Comparison of Number of Farmers adopting Climate Smart Agriculture Technology at Sub-project level (Private Farm level) during Baseline (2022) and Endline (2023)

In private farms, 92% of them who were adopting at least one CSAT in their livestock farms in 2022, increased to 100% in 2023, with increment of 9%. The 5.4% of private farms who were using two CSATs in 2022, increased to about 29% in 2023. However, per cent of private farms adopting at least two CSATs were more or less same (84%) in both baseline and endline. The adoption of CSATs compared between baseline (2022) and endline (2023) have been presented in the following table.

Table 94: Comparison of Number of Farmers adopting Climate Smart Agriculture Technology at Sub-project level (Private Farm level) between Baseline (2022) and Endline (2023)

Frequency of CSAT	Baseline (2022) (N=355 Farms)			Endline (2023) (N=254 Farms)			Increased %	
	Number of Farms using	% of Farms using	% of Farms using at least	Number of Farms using	% of Farms using	% of Farms using at least	% of Farms using	% of Farms using at least
1 Technology	24	6.8	91.6	42	16.54	100	143.24	9.17
2 Technology	19	5.4	84.8	73	28.74	83.46	432.22	-1.58
3 Technology	60	16.9	79.4	67	26.38	54.72	56.09	-31.08
4 Technology	82	23.1	62.5	39	15.35	28.35	-33.55	-54.64
5 and More Technology	140	39.4	39.4	33	12.99	12.99	-67.03	-67.03
No Technology	30	8.5	-	-	-	-	-	-
Total	355	100		254	100			

Source: Endline Survey of NLSIP, 2023

3.3.3.3.3. Comparison of Adoption of Climate Smart Agriculture Technology at Sub-project level (Call-III: Private Farm level) between Treatment and Control in All Value Chains in 2023

Out of the 254 treatment private farms, surveyed in 2023, maximum (94.5%) of private farms were found adopting improved shed management practices, for which in control private farms it was 88%, which is 7% more effective than the control farms. Similarly, adoption of manure management was found as second important CSAT, both in treatment and control private farms, i.e. 81% in treatment and 69% in control private farms, which the treatment farms were about 18% more effective than that of control farms in using project's facilitated CSATs in the livestock farms. The results on the adoption of CSATs in treatment and control private farms, as obtained from survey held in 2023, have been presented in the following table.

Table 95: Comparison of Adoption of Climate Smart Agriculture Technology at Sub-project level (Call-III: Private Farm level) between Treatment and Control in All Value Chains in 2023

CSAT	Call-III Treatment (Private Farm level) (N=254 Farms)		Control (Private Farm level) (N=147 Farms)		Treatment over Control (%)
	HH number	%	HH number	%	
Improved shed management	240	94.49	130	88.44	106.84
Manure management	206	81.10	101	68.71	118.03
Fodders, Forage Production and Pasture Development	95	37.40	47	31.97	116.98
Hay and Silage making	46	18.11	8	5.44	332.90
Stall feeding	107	42.13	40	27.21	154.83
Forage seed production	14	5.51	2	1.36	405.15
Saplings/seedlings production	6	2.36	4	2.72	86.76
Total	254	100	147	100	

Source: Endline Survey of NLSIP, 2023

3.3.3.3.4. Comparison of Adoption of Climate Smart Agriculture Technology at Sub-project level (Call-III: Private Farm level) between Treatment and Control in All Value Chains 2023

From the below table, it can be seen that 100 per cent of private farms both in treatment and control were found adopting at least one CSAT in their farms. However, 83% of treatment private farms were found using at least two CSATs, as against 70% in the control private farms. Similarly, treatment private farms were found more effective in using three and more CSATs in their farms as compared to the control private farms. The adoption of CSATs at sub-project level in the private farms compared between treatment and control, as obtained in 2023, have been presented in the following table.

Table 96: Comparison of Adoption of Climate Smart Agriculture Technology at Sub-project level (Call-III: Private Farm level) between Treatment and Control in All Value Chains 2023

Frequency of CSAT	Treatment (N=254 Farms)			Control (147 Farms)			% of Treatment over Control	
	HH number using	% of HH number using	% of HH at least using	HH number using	% of HH number using	% of HH at least using	% of HH number using	% of HH at least using
1 Technology	42	16.54	100.00	44	29.93	100.00	55.24	100.00
2 Technology	73	28.74	83.46	49	33.33	70.07	86.22	119.12
3 Technology	67	26.38	54.72	32	21.77	36.73	121.17	148.97
4 Technology	39	15.35	28.35	16	10.88	14.97	141.07	189.41
5 Technology and more	33	12.99	12.99	6	4.08	4.08	318.31	318.31
Total	254	100		147	100			

Source: Endline Survey of NLSIP, 2023

3.3.4. Share of Pproject Beneficiaries with a Livestock Risk Insurance Policy

In overall, about 98% of beneficiary individual households under Call-I&II subprojects, which were implemented individually, were found to have insured their livestock (cow, buffalo, goat and Chyangra) during endline survey (2023), which was nearly 27% in the baseline (2021).

Likewise, 75% of the beneficiary under collective sub-projects through Call-I&II, were found to have insured their livestock in 2023, as against 31% in the baseline (2021).

In case of private farms which were being implemented through the Call-III in 2022, 58% of them were ensuring their livestock in the year 2022, increased to 84% after one year of implementation, i.e. in 2023.

An attempt has also been made to compare the insurance coverage, in terms of project's beneficiaries, between the treatment and control sub-projects. The treatment POs and private farms were found relatively better than their controls during the survey year-2023.

The share of project beneficiaries insuring their three targeted livestock commodities under Task-2 (Call-I&II, Call-III, and Controls) have been presented in the following table.

Table 97: Insurance applied in all Value Chains (Task -2)

Insurance Applied	Call I & Call II Sub-Project (Individual) (N=Baseline: 2032; Endline: 1053)	Call I & Call II Sub-Project (Collective / PO level) (N=Baseline: 226; Endline: 191)	Call III Sub-projects (Private Farm) (N=Baseline: 355; Endline: 258)	Sub-Projects Private Farm (Control)	
				Private Farm (N=147 in Endline)	POs (N=32 in Endline)
Baseline	26.74%	30.80%	57.70%	-	-
Endline	97.63%	75.00%	84.25%	81.38%	65.63%

Source: Baseline Survey (2021 & 2022) and Endline Survey of NLSIP, 2023

3.3.4.1. Insurance applied in Dairy Value Chain (Task -2)

In dairy value chain under Task-2, there have been a significant increment in the beneficiaries insuring their dairy livestock. Where there were only 30% households used to ensure their livestock in 2021 under Call-I and II subprojects, implemented individually, increased to 97% in 2023. Similarly at the PO level, 30% of POs used to ensure livestock in 2021, increased to 59% in 2023. There is slightly increment, from 72% to 82%, in case of private farms, implemented under Call-III. Whereas, the control private farms and POs were found relatively better in insuring their livestock. The figures on the insurance applied in dairy value chain under Task-2, have been presented in the following table.

Table 98: Insurance applied in Dairy Value Chain (Task -2)

Insurance Applied	Call I & Call II Sub-Project (Individual) (N=Baseline: 1265; Endline: 503)	Call I & Call II Sub-Projects (Collective/PO level) (N=Baseline: 124; Endline: 117)	Call III Sub-projects (Private Farm) (N=Baseline: 189; Endline: 152)	Sub-Projects (Control)	
				Private Farm (N=99 in Endline)	POs (N=18 in Endline)
Baseline	30.19%	30.38%	72.04	-	-
Endline	97.2 %	58.97%	82.2	82.8	61.11

Source: Baseline Survey (2021 & 2022) and Endline Survey of NLSIP, 2023

3.3.4.2. Insurance applied in Goat Value Chain (Task -2)

There has been a significant increment in the share of households and POs insuring their goat in 2023, as compared to their baseline. About 98% of the individual households under Task-2 sub-projects, implemented individually through the Call-II&II, were found to have insured their goats in 2023, as against 14% in the baseline (2021). Similarly, 92% of POs were found to have insured goat in their groups and cooperatives in 2023, as against 32% in 2021. In case of private farms, about 90% of farms have insured their goats in 2023, which was 49% in the year 2021. While comparing with the control sub-projects, the treatment POs and Private Farms were found better than that of the control POs and private farms. The figures obtained from the Task-2 and Institutional Survey, and compared with their baseline figures and also with the control sub-projects, have been presented in the following table.

Table 99: Insurance applied in Goat Value Chain (Task -2)

Insurance Applied	Call I & Call II Sub-Project (Individual) (N=Baseline: 563; Endline: 486)	Call I & Call II Sub-Project (Collective / PO level) (N=Baseline: 73; Endline: 65)	Call III Sub-projects (Private Firm) (N=Baseline: 163; Endline: 101)	Sub-Projects (Control)	
				Private Firm (N=42 in Endline)	POs (N=14 in Endline)
Baseline	13.61%	32%	49.4%	-	-
Endline	97.7%	91.7%	89.9%	78.6%	71.43%

Source: Baseline Survey (2021 & 2022) and Endline Survey of NLSIP, 2023

3.3.4.3. Insurance applied in Chyangra Pashmina Value Chain (Task -2)

In case of Chyangra Pashmina value chain, 100 % of individual farmers used to insure their Chyangra both in baseline and endline. However, the figures on the share of households and POs insuring their Chyangra in collective and private farms in baselines could not be found out. About 75% of POs were found to have insured Chyangra under Call-I and II, implemented collectively in 2023. Whereas, none of the private farms out of three, have been found ensuring their livestock, as against 75% of control private farms used to insure their Chyangra in 2023. As there were no any POs under control in Chyangra Pashmina value chain, the treatment POs (75%) could not be compared. The figures on the insurance coverage in Chyangra Pashmina value chain, have been presented in the following table.

Table 100: Insurance applied in Chyangra Pashmina Value Chain (Task -2)

Insurance Applied	Call I & Call II Sub-Project (Individual) (N=Baseline: 18; Endline: 64)	Call I & Call II Sub-Project (Collective / PO level) (N=Baseline: 2; Endline: 9)	Call III Sub-projects (Private Farm) (N=Baseline: 3; Endline: 5)	Sub-Projects (Control)	
				Private Farm (N=4 in Endline)	POs (N=0)
Baseline	100%	NA	NA	-	-
Endline	100%	75%	0%	75%	-

Source: Baseline Survey (2021 & 2022) and Endline Survey of NLSIP, 2023

3.3.4.4. Number of livestock insured and Compensation received in 2023 at sub-project levels under Task -2

It can be seen from below table that 72% of the livestock in the sub-projects (POs and private farms) were insured in 2023, which was 68% in POs and 78% in private farms. Out of insured livestock, around 11% of them were died, of which only 79% of them could receive compensation, which was

83% in POs, and 76% in private farms in 2023. The figures on the number of livestock insured and compensation received during the year 2023 at sub-project levels, have been presented in the following table.

Table 101: Number of Livestocks insured and compensation received in all value chains at sub-project level in 2023 (Task -2)

Particulars	Subprojects		
	POs	Private Farm	Total
Total livestock	28868	17265	46133
No. of Insured livestock	19559	13518	33077
% of Insured livestock	67.75	78.30	71.70
No. of Dead livestock	2446	1264	3710
% of Dead livestock	12.51	9.35	11.22
% of Compensation received	83.21	75.70	78.63

Source: Endline Survey of NLSIP, 2023

Such lesser percentage of livestock insurance as observed in 2023, were due to under-valuation of exotic and pure breeds, delayed settlement of claims for compensation, no insurance provision for young livestock, and there have been very complex administrative procedures for receiving compensations.

The endline survey also revealed that a total of 137 POs and 214 private firms have continued the livestock insurance. Of which 83% POs and 76% of Private Farms received the compensation of dead livestock in 2023.

3.3.4.5. Livestock Insurance Compensation received at Household level in 2023 under Task -2

An attempt has also been made to assess the rate of compensation received by households under Task-2 for dead and disabled productive livestock during 2023, and the figures have been presented in the following table. It can be seen that only 54% of household who applied for compensation for their dead and disabled productive livestock, could receive the compensation against their claims. Among the value chains, 58% of cow, 47% of buffalo and 60% of goat rearing farmers could receive the compensation for the dead livestock against their claims.

Table 102: Compensation received on livestock Insurance in 2023 (Task -2: HH level)

Species	Compensation			
	Applied for	No. of HHs applied	No. of HHs received	% of HHs received
Cow	Dead livestock	62	36	58.06
	Production disability livestock	24	0	0.00
Buffalo	Dead livestock	15	7	46.67
	Production disability livestock	9	0	0.00
Goat	Dead livestock	232	140	60.34
Total		342	183	53.51

Source: Endline Survey of NLSIP, 2023

3.3.5. Access in Production Assets and Services at Sub-project level (Task-2)

An attempt has been made to compare the Access in production assets and services at the sub-project level under Task-2, implemented at individual level, collectively and by private farms through the Call-I, II and III respectively between baseline and endline. It has also been tried to compare the accessibilities between treatment and control POs and private farms. The results obtained from the endline survey and compared with their baselines, and controls, have been presented and discussed in the following sections.

3.3.5.1. Comparison of Access in Production Assets and Services at Sub-project level between Baseline (2021) and Endline (2023) (Call-I and II: Individual)

Comparison of access in production assets and services at sub-project level implemented individually, under Call-I and II, between baseline and endline for all value chains, and results of obtained from endline survey (2023) for each value chain are presented and discussed in the sections below.

3.3.5.1.1. Comparison of Increased Access in Production Assets and Services at Sub-project level (Call-I and II: Individual) from Baseline (2021) to Endline (2023) for All Value Chains

It can be seen in the table below that among the assets, maximum (85%) of Task-2 households could receive the livestock sheds, followed by chaff-cutters (68%), live livestock (64%), milk can by 45%, as of 2023. Among the services, additional 34% of households received vaccination services in 2023, reaching 94% as of 2023. Similarly, AI and livestock treatment services reached to 75% and 61% of households as of 2023 with. The results on the access in production assets and services at sub-project level under Call-I and II recorded in baseline, additional figures as obtained in endline and cumulative percentage of households having access, have been presented in the following table.

Table 103: Increased Access in Production Assets and Services at Sub-project level (Call-I&II: Individual HH level) during Endline (2023) as compared to Baseline (2021) for All Value Chains

Production Assets and Services	Baseline (N=2032 HHs)		Additional HHs in Endline (N=1053 HHs)		Total % of HHs having Access to
	Count	%	Count	%	
(a) Assets					
Milk can	10	1.03	462	43.87	44.90
Cream Separator	-	-	10	0.95	0.95
Milking Machine	-	-	19	1.8	1.80
Pasteurizer	-	-	1	0.09	0.09
Chaff cutter	7	0.72	713	67.71	68.43
Weighing balance	16	1.64	159	15.10	16.74
Solar panel	2	0.21	75	7.12	7.33
Silage making machine	-	-	4	0.38	0.38
Wheel barrow	-	-	252	23.93	23.93
Fork	4	0.41		0.00	0.41
Dehairing machine/comb	4	0.41		0.00	0.41
Live livestocks	7	0.72	669	63.53	64.25
Building	-	-	53	5.03	5.03
Sheds	-	-	895	85.00	85.00
Others	156	16	36	3.42	19.42
(b) Services					0.00
Forage seeds (winter)	-	-	191	18.14	18.14
Forage seeds (summer)	-	-	224	21.27	21.27
Seedlings/saplings/sets	-	-	28	2.66	2.66
Vaccination (FMD/PPR)	585	60.00	359	34.09	94.09
Medicines/Parasite control	388	39.79	223	21.18	60.97
Technical Training	-	-	104	9.88	9.88
Business Training	-	-	15	1.42	1.42
Account training	-	-	6	0.57	0.57
AI services	293	30.50	466	44.25	74.75
Farmer Field School (FFS)	-	-	98	9.31	9.31

Source: Baseline Survey (2021) and Endline Survey of NLSIP, 2023

3.3.5.1.2. Access in Production Assets and Services at Sub-project level (Call-I&II: Individual HH level) in all three Value Chains in 2023

Comparing among the three value chains, all the Chyangra rearing individual households received sheds, followed by solar panels received by 98% of Chyangra rearing households, then milk can received by dairy farmers (92%), and 90% of Chyangra rearing households received vaccination and parasite control services from the project-NLSIP. These figures on the access in production assets and services in all three targeted livestock commodities in 2023, have been presented in the following table.

Table 104: Access in Production Assets and Services at Sub-project level (Call-I&II: Individual HH level) in all three Value Chains in 2023

Assets and Services received	Dairy Value Chain (N=503)		Goat Value Chain (N=486)		Chyangra Pashmina Value Chain (N=64)		Total (N=1053)	
	HH number	%	HH number	%	HH number	%	HH number	%
A) Assets								
Milk can	462	91.85	0	0.00	0	0.00	462	43.87
Cream separator	10	1.99	0	0.00	0	0.00	10	0.95
Milking machine	19	3.77	0	0.00	0	0.00	19	1.8
Pasteurizer	1	0.20	0	0.00	0	0.00	1	0.09
Building	48	9.54	5	1.03	0	0.00	53	5.03
Sheds	396	78.73	435	89.51	64	100.00	895	85.00
Live livestock	285	56.66	334	68.72	50	78.13	669	63.53
Chaff cutter	394	78.33	315	64.81	4	6.25	713	67.71
Weighing balance	14	2.78	91	18.72	54	84.38	159	15.10
Solar panel	12	2.39	0	0.00	63	98.44	75	7.12
Silage making machine	2	0.40	2	0.41	0	0.00	4	0.38
Wheel barrow	165	32.80	87	17.90	0	0.00	252	23.93
Others	36	7.16	0	0.00	0	0.00	36	3.42
B) Services		0.00		0.00		0.00	0	0.00
Vaccination (FMD/PPR)	123	24.45	178	36.63	58	90.63	359	34.09
Medicines	99	19.68	66	13.58	58	90.63	223	21.18
AI service	414	82.31	52	10.70	0	0.00	466	44.25
Forage seeds (winter)	69	13.72	122	25.10	0	0.00	191	18.14
Forage seeds (summer)	63	12.52	161	33.13	0	0.00	224	21.27
Seedlings/saplings/sets	13	2.58	15	3.09	0	0.00	28	2.66
Technical Training	39	7.75	55	11.32	10	15.63	104	9.88
Business Training	4	0.80	11	2.26	0	0.00	15	1.42
Account training	2	0.40	4	0.82	0	0.00	6	0.57
Farmer Field School (FFS)	21	4.17	77	15.84	0	0.00	98	9.31

Source: Endline Survey of NLSIP, 2023

3.3.5.2. Comparison of Access in Production Assets and Services at Sub-project level (Call-I and II: Collective / PO levels)

In this section, access in production assets and services at the sub-project (PO) level, implemented collectively under Call-I and II, compared between baseline (2021) and endline (2023), and also with control sub-projects, are presented and discussed.

3.3.5.2.1. Increased Access in Production Assets and Services at Sub-project level (Call-I and II: PO levels) from Baseline (2021) to Endline (2023) for All Value Chains

Out of total 195 POs surveyed under Call-I and II, 51% of them reported that they have received milk cans, 58% chaff-cutters, 58% sheds, 47% live livestock, and 42% received weighing balance as production assets in 2023, and these figures are significantly higher than that of the baseline (2021). But, in case of services, some endline values are seen lesser than the baseline values, such as in vaccination, and parasitic controls, and none of them reported to have received the AI services in 2023.

This may be due to the closure of the NLSIP program in 2023. The comparison between the access in production assets and services at the PO level between baseline (2021) and endline (2023), have been presented in the following table.

Table 105: Comparison of Increased Access in Production Assets and Services at Sub-project level (Call-I&II: PO level) between Baseline (2021) and Endline (2023) for All Value Chains

Production Assets and Services	Baseline (N=137 POs)		Additional POs in Endline (N=195 POs)	
	Count	%	Count	%
(a) Assets				
Milk can	10	7.30	100	51.28
Cream Separator	-	-	27	13.85
Milking Machine	1	0.73	13	6.67
Pasteurizer	-	-	29	14.87
Chaff cutter	2	1.46	113	57.95
Weighing balance	7	5.11	81	41.54
Solar panel	1	0.73	14	7.18
Silage making machine	-	-	5	2.56
Wheel barrow	1	0.73	42	21.54
Fork	2	1.46	-	-
Dehairing machine/comb	1	0.73	-	-
Live livestock	1	0.73	91	46.67
Building	-	-	20	10.26
Sheds	-	-	113	57.95
Others	-	-	35	17.95
(b) Services				
Forage seeds (winter)	-	-	47	24.10
Forage seeds (summer)	-	-	46	23.59
Seedlings/saplings/sets	-	-	5	2.56
Vaccination (FMD/PPR)	83	60.58	44	22.56
Medicines/Parasite control	48	35.04	33	16.92
Technical Training	-	-	47	24.10
Business Training	-	-	26	13.33
Account training	-	-	19	9.74
Marketing	-	-	3	1.54
Contract Farming	-	-	3	1.54
AI services	25	18.25	-	0.00
Farmer Field School (FFS)	-	-	10	5.13
Other services	77	56.20	53	27.18

Source: Baseline Survey (2021) and Endline Survey of NLSIP, 2023

3.3.5.2.2. Comparison in Access in Production Assets and Services at Sub-project level (Call-I&II: Collective) in All Value Chains between Treatment and Control in 2023

While comparing between treatment and control POs under Call-I and II sub-projects, the treatment POs were found to have more access to production assets and services, as compared to the control POs, as per results of the institutional survey conducted in 2023, and such figures as obtained for treatment and control POs, have been presented in the following table.

Table 106: Comparison of Access in Production Assets and Services at Sub-project level (Call-I&II: Collective) in All Value Chains between Treatment and Control in 2023

Production Assets and Services	Treatment (2023) (N=195 POs)		Control (2023) (N= 32 POs)	
	Count	%	Count	%
(c) Assets				
Milk can	100	51.28	8	25.00
Cream Separator	27	13.85	1	3.13
Milking Machine	13	6.67	0	0.00
Pasteurizer	29	14.87	2	6.25
Chaff cutter	113	57.95	4	12.50
Weighing balance	81	41.54	3	9.38
Solar panel	14	7.18	-	-
Silage making machine	5	2.56	-	-
Wheel barrow	42	21.54	3	9.38
Fork	-	-	-	-
Dehairing machine/comb	-	-	-	-
Live livestock	91	46.67	2	6.25
Building	20	10.26	1	3.13
Sheds	113	57.95	6	18.75
Others	35	17.95	5	15.63
(d) Services	-	-	-	-
Forage seeds (winter)	47	24.10	2	6.25
Forage seeds (summer)	46	23.59	1	3.13
Seedlings/saplings/sets	5	2.56	1	3.13
Vaccination (FMD/PPR)	44	22.56	1	3.13
Medicines/Parasite control	33	16.92	-	-
Technical Training	47	24.10	2	6.25
Business Training	26	13.33	-	-
Account training	19	9.74	-	-
Marketing	3	1.54	-	-
Contract Farming	3	1.54	-	-
AI services	-	0.00	-	-
Farmer Field School (FFS)	10	5.13	-	-
Other services	53	27.18	-	-

Source: Endline Survey of NLSIP, 2023

3.3.5.3. Access in Production Assets and Services at Sub-project level under Call-III (Private Farm levels)

An attempt has also been made to assess the access in production assets and services at sub-project level under Call-III, which were implemented by private farms, the results as obtained from the institutional survey conducted in 2023, have been presented and discussed as under.

3.3.5.3.1. Comparison on Increased Access in Production Assets and Services at Sub-project level (Call-III: Private Farm levels) from Baseline (2021) to Endline (2023) for All Value Chains

As there were no baseline information regarding the access in production assets and services at the private farm level, the following table highlights only the endline results on the access in production assets and services at the private farm level, implemented in 2022 under Call-III. Among the assets, about 54% of private farms received milk can, followed by sheds (38%), chaff-cutter (33%), weighing balance (31%), and live livestock by 25% farms. There are very less number of farms (less than 15%) who reported to have received services from the project. This may be due to the closure of the project

in 2023, and they might not have received the project's services. The figures on the access of production assets and services at the private farm level, under Call-III in 2023, have been presented in the following table.

Table 107: Comparison on Increased Access in Production Assets and Services at Sub-project level (Call-III: Private Farm levels) from Baseline (2021) to Endline (2023) for All Value Chains

Production Assets and Services	Baseline (N= No Farms)		Additional Farms in Endline (N=254 Farms)	
	Count	%	Count	%
(a) Assets				
Milk can	-	-	136	53.54
Cream Separator	-	-	15	5.91
Milking Machine	-	-	30	11.81
Pasteurizer	-	-	11	4.33
Chaff cutter	-	-	83	32.68
Weighing balance	-	-	79	31.10
Solar panel	-	-	15	5.91
Silage making machine	-	-	6	2.36
Wheel barrow	-	-	27	10.63
Fork	-	-	-	-
Dehairing machine/comb	-	-	-	-
Live livestocks	-	-	64	25.20
Building	-	-	31	12.20
Sheds	-	-	97	38.19
Others	-	-	42	16.54
(b) Services				
Forage seeds (winter)	-	-	14	5.51
Forage seeds (summer)	-	-	13	5.12
Seedlings/saplings/sets	-	-	5	1.97
Vaccination (FMD/PPR)	-	-	38	14.96
Medicines/Parasite control	-	-	27	10.63
Technical Training	-	-	34	13.39
Busniness Training	-	-	12	4.72
Account training	-	-	3	1.18
AI services	-	-	-	-
Farmer Field School (FFS)	-	-	1	0.39
Marketing	-	-	1	0.39
Contract Farming	-	-	-	-
Other services	-	-	25	9.84

Source: Endline Survey of NLSIP, 2023

3.3.5.3.2. Comparison of Access in Production Assets and Services at Sub-project level (Call-III: Private Farms) in All Value Chains between Treatment and Control in 2023

It has been found that, though there were very less access to production assets and services at the treatment private farm level in 2023, these figures are significantly higher than that of the control private farms, which can be seen in the following table.

Table 108: Comparison of Access in Production Assets and Services at Sub-project level (Call-III: Private Farms) in All Value Chains between Treatment and Control in 2023

Production Assets and Services	Treatment (N= 254 Farms)		Control (N=147 Farms)	
	Count	%	Count	%
(a) Assets				
Milk can	136	53.54	71	48.3
Cream Separator	15	5.91	5	3.4
Milking Machine	30	11.81	3	2.0
Pasteurizer	11	4.33	2	1.4
Chaff cutter	83	32.68	32	21.8
Weighing balance	79	31.10	18	12.2
Solar panel	15	5.91	4	2.7
Silage making machine	6	2.36	0	0.0
Wheel barrow	27	10.63	11	7.5
Fork	-	-	-	-
Dehairing machine/comb	-	-	-	-
Live livestocks	64	25.20	13	8.8
Building	31	12.20	6	4.1
Sheds	97	38.19	33	22.4
Others	42	16.54	14	9.5
(b) Services				
Forage seeds (winter)	14	5.51	6	4.1
Forage seeds (summer)	13	5.12	7	4.8
Seedlings/saplings/sets	5	1.97	1	0.7
Vaccination (FMD/PPR)	38	14.96	14	9.5
Medicines/Parasite control	27	10.63	12	8.2
Technical Training	34	13.39	3	2.0
Busniness Training	12	4.72	-	-
Account training	3	1.18	-	-
AI services	-	-	-	-
Farmer Field School (FFS)	1	0.39	-	-
Marketing	1	0.39	-	-
Contract Farming	-	-	-	-
Other services	25	9.84	3	2.0

Source: Endline Survey of NLSIP, 2023

3.3.6. Beneficiary Satisfaction Rate with Relevance, Timeliness and Effectiveness of Services Provided by the Project for the Livestock Sector (Task-2)

3.3.6.1. Beneficiaries' Satisfaction at Sub-project level (Call-I and II: Individual HH level)

Among 1053 beneficiary individual households surveyed under Task-2 Call-I and II implemented individually, 92% of them reported that they are satisfied with project's supports in terms of timeliness, relevancy and effectiveness, as against the baseline value of 66%. Of them majority of households (38.5%) were highly satisfied, 27% each satisfied and moderately satisfied in 2023. There were 89.5 % of women in overall satisfied with the project's services provided by the NLSIP, of which 34.4% were highly satisfied in 2023. However, very less (3%) were unsatisfied in overall in 2023, which in the baseline was 0.72%. The responses of the individual households under Call-I and II sub-projects on the satisfaction levels as obtained from the survey, and compared with the baseline value, have been presented in the following table.

Table 109: Beneficiaries' Satisfaction at Sub-project level (Call-I&II-Individual HH level)

	Number of Surveyed HHs	Number of HHs Rated Satisfaction on Project's Services				
		Highly Satisfied	Satisfied	Moderately Satisfied	Moderately Unsatisfied	Unsatisfied
Timeliness	1053	43.9	25.7	23.4	4.2	2.8
Relevancy		34.7	29.4	28.6	4.6	2.8
Effectiveness		36.9	25	29.2	4.7	4.1
Average % in 2023		38.50	26.70	27.07	4.50	3.23
		92.27 %			4.50	3.23
Of which female (%) in 2023		34.38	28.92	26.18	6.73	3.79
		89.48%				
Baseline (2021)	975	65.64 %			33.64	0.72

Source: Endline Survey of NLSIP, 2023

3.3.6.2. Beneficiaries' Satisfaction at Sub-project level (Call-I and II-PO level)

Of the total 195 POs surveyed, 89% of the POs reported that they are satisfied by the project's services, which in 2021, 75% of the POs, were satisfied, based on the survey of 137 POs. Out of the 89% level of satisfaction in 2023, 32% were highly satisfied, 25% satisfied and 32% were moderately satisfied in terms of timeliness, relevancy and effectiveness of the project's services. However, 4% of them were moderately unsatisfied and about 7% were unsatisfied from the project's services in 2023. The percentage of unsatisfied were high (7.25%) in 2023 as compared to baseline (0.73%). The results of the responses received from the POs under Call-I and II subprojects in 2023, and compared with the baseline values, regarding the satisfaction levels from the project's services, have been presented in the following table.

Table 110: Beneficiaries' Satisfaction at Sub-project level (Call-I and II-PO level)

	Number of Surveyed POs	Number of HHs Rated Satisfaction on Project's Services				
		Highly Satisfied	Satisfied	Moderately Satisfied	Moderately Unsatisfied	Unsatisfied
Timeliness	195	32.61	23.91	31.52	5.43	6.52
Relevancy		28.26	29.35	33.70	3.26	5.43
Effectiveness		34.78	21.74	30.43	3.26	9.78
Average		31.88	25.00	31.88	3.99	7.25
Total (2023)		88.68			3.99	7.25
Baseline (2021)	137	75.18			24.09	0.73

Source: Endline Survey of NLSIP, 2023

3.3.6.3. Beneficiaries' Satisfaction at Sub-project level (Call-III-Private Farm level)

In case of private farms, out of 254 farms 87% of them reported that they were satisfied by the project's services, of which 36% were highly satisfied, 23% satisfied, and 28% moderately satisfied in 2023. However, 5 % were moderately unsatisfied, and 8% were unsatisfied from the project's services in 2023. These figures on satisfaction, as obtained in 2023 could not be compared with the baseline, as there were no figures on satisfaction in baseline (2021). The figures on the satisfaction levels as obtained in 2023 for private farms, have been presented in the following table.

Table 111: Beneficiaries' Satisfaction at Sub-project level (Call-III-Private Farm level)

	Number of Surveyed Farms	Number of HHs Rated Satisfaction on Project's Services					Remarks
		Highly Satisfied	Satisfied	Moderately Satisfied	Moderately Unsatisfied	Unsatisfied	
Timeliness	254	35.04	23.23	28.35	4.72	8.66	
Relevancy		33.86	25.20	27.95	5.12	7.87	
Effectiveness		38.58	21.26	27.95	4.33	7.87	
Average		35.83	23.23	28.08	4.72	8.14	
Total (2023)		87.14			4.72	8.14	
Baseline (2022)	NA	NA	NA	NA	NA	NA	

Source: Endline Survey of NLSIP, 2023

3.3.7. Cost and Profitability Analysis of Targeted Livestock Commodities at Sub-project Level (Task-2)

The cost of production of targeted livestock commodities at sub-project levels, particularly of milk and goat meat, as estimated based on the endline survey results of Task-2 households, POs and Private Farms, which were implemented under Call-I, II and III of the project-NLSIP, and their profitability are discussed in the successive sections below.

3.3.7.1. Cost of Production of Milk and Goat Meat at the Sub-Project level (Task-2) in 2023

The cost of production per liter of milk at individual household, PO and Private farm level under Task-2 in 2023 was estimated to be Rs. 32.83, Rs. 44.83, and Rs. 80.56 respectively. Whereas, the cost of production per liter of milk at control POs and Private farm levels were Rs. 59.68 and 48.51 respectively. Profit per liter of milk in individual household, PO and Private farm level under Task-2 in 2023 were estimated to be Rs. 34.17, Rs. 9.74, and Rs. 2.02 respectively. Where as in control POs and Private farms, the profit per liter were estimated to be Rs. 16.79 and Rs. 18.28 respectively. These cost of production and profit per liter of milk could not be compared with the baseline as there were no information on these parameters.

Similarly, the cost of production per Kg of goat meat (on live weight basis) in individual household, PO and Private farm level under Task-2 in 2023 was estimated to be Rs. 216.17, Rs. 157.65 and Rs. 258.78 respectively. Whereas, the cost of production at control POs and Private farm levels were Rs. 434.75 and 245.99 respectively. Profit per Kg of goat meat (on live weight basis) in individual household, PO and Private farm level under Task-2 in 2023 were estimated to be Rs. 331.92, Rs. 377.47, and Rs. 363.10 respectively. Where as in control POs and Private farms, the profit per kg of goat meat (on live weight basis) were estimated to be Rs. 88.59 and Rs. 422.66 respectively. These cost of production and profit per Kg of goat meat could not be compared with the baseline as there were no information on these parameters,

The figures on the cost of production per unit and profit per unit of milk and goat meat in individual household, PO and Private farm level, and compared with the control PO and Private farm level have been presented in the following table.

Table 112: Cost of Production, Price and Profit per Unit of Milk and Goat Meat at Sub-Project level (Task-2) in 2023

Value Chain	Particulars	Unit	Individual HH level (N=Milk: 503; Goat: 486)	PO level (N=Milk: 117; Goat: 65)	Private Farm level (N=Milk: 152; Goat: 101)	Control	
						PO level (N=Milk: 18; Goat: 14)	Private Farm level (N=Milk: 99; Goat: 42)
Milk	Cost of production per unit	Rs. / Litre	32.83	44.83	80.56	59.68	48.51
	Price of milk per unit	„	67.00	54.19	82.58	76.47	66.79
	Profit per unit	„	34.17	9.74	2.02	16.79	18.28
Goat	Cost of production per unit (Live weight)	Rs. / Kg	216.17	157.65	258.78	434.75	245.99
	Price of Goat per unit	„	548.09	535.12	621.88	523.34	668.65
	Profit per unit	„	331.92	377.47	363.10	88.59	422.66

Source: Endline Survey of NLSIP, 2023

3.3.7.2. Profitability Analysis of Dairy Enterprises in Task-2 (Sub-Project level) in 2023

The dairy business implemented by the individual households under Call-I and II, were found efficient in profit making than the PO level, which is observed as moderate. Whereas, the Private dairy farms implemented under Call-III, were found in-efficient in profit making, which is due to the larger investment on building, machinery and equipment incurring more fixed costs, and equally incurring more cost on the feed, fodder and other working capitals, causing high cost of production and less profit margin. As these farms are in the first year of implementation, principally the cost will be higher than the return. On the other hand, the control POs and private farms were found moderately efficient in profit making as they did not invest more capital in their businesses and run as usual. The Return on Asset (RoA), Net-Profit Margin, and Return on Labour of the Dairy enterprises analyzed at sub-project level in 2023, have been presented in the following table.

Table 113: Profitability Analysis of Dairy Enterprises at Sub-project level (Task-2) in 2023

Indicators	Units	Individual HH level (N=503)	PO level (N=117)	Private Farm level (N=152)	Control	
					PO level (N=18)	Private Farm level (N=99)
Return on Asset (ROA) ¹⁸	%	73.99	7.85	2.05	21.01	19.63
Net Profit Margin ¹⁹	%	51.00	17.26	2.45	21.95	27.37
Return on Labour ²⁰	%	57.85	20.19	4.28	22.70	29.71

Source: Endline Survey of NLSIP, 2023

3.3.7.3. Profitability Analysis of Goat Enterprises in Task-2 (Sub-Project level) in 2023

In goat enterprises, run by individual households, POs and private farms, were found highly efficient in profit making. This is because of lesser investment in fixed capital and very less expenditure on concentrate feed for goat. The control private farms were also observed as equally profitable, whereas, the control POs were found relatively lesser efficient than other types of sub-projects. The Return on Asset (RoA), Net-Profit Margin, and Return on Labour of the Goat enterprises analyzed at sub-project level in 2023, have been presented in the following table.

Table 114: Profitability Analysis of Goat Enterprises at Sub-project level (Task-2) in 2023

Indicators	Units	Individual HH level (N=486)	PO level (N=65)	Private Farm level (N=101)	Control	
					PO level (N=14)	Private Farm level (N=42)
Return on Asset (ROA)	%	51.65	154.09	83.16	17.83	72.39
Net Profit Margin	%	60.55	70.54	58.39	16.93	63.21
Return on Labour	%	61.28	71.81	61.16	27.45	65.60

Source: Endline Survey of NLSIP, 2023

*Detail on the *analysis on the cost, return and profitability of milk and goat meat* at sub-project levels are presented in the **Annex-3 & 4**.

¹⁸ Return on Asset (ROA) = (Net Profit/Total Assets)*100

¹⁹ Net Profit Margin = (Net Profit/Total Revenue)*100

²⁰ Return on Labour = [(Net Profit+Family Labour Cost)/Total Revenue]*100

3.3.8. Employment Generation at Sub-Project Level

The livestock enterprises in Nepal are labour-intensive in nature, give opportunity for self-employment for livestock owner, and employment for hired labours. In this section, an attempt has been made to analyse the employment generated at sub-project level implemented through Call-I, II and III of the NLSIP Project.

3.3.8.1. Employment Generation at Sub-Project (Call-I &II: Individual HH level) level in All Value Chains

It can be seen in the following table that the livestock enterprises implemented through the Call-I and II, could generate 3.96 person years of employment per household, including both family and hired labour, which was 2.4 person years during the baseline year (2021). Out of total labour force employed by livestock enterprise, 2.36 person years for family, and 1.59 person years for hired labour were employed. The result of employment also showed that women drudgery in livestock business has been reduced, i.e. from 52.36% in 2021 to 46.17% in 2023. The results of the employment generation in livestock enterprises implemented individually under Call-I and II obtained in 2023 and compared with the baseline (2021), have been presented in the following table.

Table 115: Employment Generation at Sub-Project (Call-I &II: Individual HH level) level in All Value Chains

Employment	Baseline, 2021					Endline 2023				
	Male	Female	Total	% of Female	Employee per HH (No.)	Male	Female	Total	% of Female	Employee Per HH (No.)
Full time family	1455	1780	3235	55.02	1.6	1084	1401	2485	56.38	2.36
Part time family	599	566	1165	48.58	0.6	-	--	-	-	-
Full time Hired	180	81	261	31.03	0.1	256	137	393	34.86	0.37
Part time Hired	86	123	209	58.85	0.1	903	386	1289	29.92	1.22
Overall	2320	2550	4870	52.36	2.4	2243	1924	4167	46.17	3.96
Total HHs	2032					1053				

Source: Baseline, 2021, and Endline Survey of NLSIP, 2023

As per the minimum wage rate of Rs. 17,300 per month as fixed by the GoN, a livestock enterprise run by individual household can provide Rs. 822,096 of employment from a livestock enterprise, of which Rs. 489,936 is retained within the family as family labour and rest Rs. 332,160 is going for hired labour.

3.3.8.2. Employment Generation at Sub-Project (Call-I &II: PO level) level in All Value Chains

It can be seen in the following table that the livestock enterprises implemented through the Call-I and II, implemented by PO, could generate 13.91 person years of employment per PO, including both family and hired labour, which was 14.4 person years per PO during the baseline year (2021). Out of total

labour force employed by livestock enterprise, 2.36 person years for family, and 1.59 person years for hired labour were employed. Family labour in PO decreased from 9.1 to 7.02 person years from 2021 to 2023, and increased hired labour, i.e. from 1.3 to 6.89 during the respective years. This shows that although the overall labour employment decreased in endline, the PO shifted the family labour to hired labour, giving more employment opportunities to the hired labours. The result of employment also showed that women drudgery in livestock business has been reduced in case of family labour, i.e. from 50% in 2021 to 47.33% in 2023, increasing women hired labour, i.e. from 44% to 51%. The results of the employment generation in livestock enterprises implemented by PO, under Call-I and II, obtained in 2023 and compared with the baseline (2021), have been presented in the following table.

Table 116: Employment Generation at Sub-Project (Call-I &II: PO Level) level in All Value Chains

Employment	Baseline, 2021					Endline 2023				
	Male	Female	Total	% of Female	Employee per PO (No.)	Male	Female	Total	% of Female	Employee Per PO (No.)
Full time family	771	1027	2054	50	9.1	721	648	1369	47.33	7.02
Part time family	328	188	516	36.4	2.3	-	-	-	-	-
Full time Hired	255	142	397	35.7	1.8	-	-	-	-	-
Part time Hired	253	126	288	43.8	1.3	664	680	1344	50.60	6.89
Overall	1607	1483	3255	45.56	14.4	1385	1328	2711	48.95	13.91
Total POs	226					195				

Source: Baseline, 2021, and Endline Survey of NLSIP, 2023

At the PO level, Rs. 2,887,716 of employment is generated per PO, as recorded in 2023, of which Rs. 1,430,364 goes for hired labour.

3.3.8.3. Employment Generation at Sub-Project (Call-III: Private Farm level) level in All Value Chains

It can be seen in the following table that the livestock enterprises implemented through the Call-III, implemented by Private Farms, could generate 4.92 person years of employment per Private Farm, including both family and hired labour, which was 5.06 person years per Private Farm during the baseline year (2021). Due to introduction of innovations and climate smart technologies in the farms, the human labour per farm, might have been reduced. Out of total labour force employed by private livestock farms, 2.18 persons for family, and 2.74 person for part-time hired labour in 2023 have been observed. Family labour in Private Farms decreased from 2.77 to 2.18 person from 2022 to 2023, and increased hired labour, i.e. from 2.29 to 2.74 during the respective years. This shows that although the overall labour employment decreased in endline, the Private Farms shifted the family labour to hired labour, giving more employment opportunities to the hired labours. The result of employment also showed that women drudgery in livestock business has been reduced, i.e. from 46% in 2022 to 42.5% in 2023. The results of the employment generation in livestock enterprises implemented by Private Farms, under Call-III, obtained in 2023 and compared with the baseline (2022), have been presented in the following table.

Table 117: Employment Generation at Sub-Project (Call-III: Private Farm Level) level in All Value Chains

Employment	Baseline, 2022					Endline 2023				
	Male	Female	Total	% of Female	Employee per Farm (No.)	Male	Female	Total	% of Female	Employee Per Farm (No.)
Full time family	582	403	985	40.91	2.77	304.00	249.00	553.00	45.03	2.18
Part time family	-	-	-	-	-	-	-	-	-	-
Full time Hired	-	-	-	-	-	-	-	-	-	-
Part time Hired	387	425	812	52.34	2.29	413.20	282.42	695.61	40.60	2.74
Overall	969	828	1797	46.08	5.06	717.20	531.42	1248.61	42.56	4.92
Total Private Farms	355					254				

Source: Baseline, 2021, and Endline Survey of NLSIP, 2023

At the Private Farm level, Rs. 1,021,392 of employment is generated per Private Farm, as recorded in 2023, of which Rs. 568,824 goes for hired labour.

3.3.8.4. Comparison of Employment Generation between Treatment Sub-Projects (Call-I & II: PO level) and Control POs in All Value Chains

The employment generation among the control POs were observed much lesser (4.97) as compared to the treatment POs (13.9) in the year 2023. However, proportion of female employment is lesser in treatment POs (49%) as compared to the control POs (53.5%), showing lesser drudgery on women in treatment POs as compared to the control ones. The results of the employment generation in livestock enterprises implemented by PO, under Call-I and II, and compared with their control POs, so obtained in 2023, have been presented in the following table.

Table 118: Employment Generation at Sub-Project (Call-I & II) Treatment and Control PO level in All Value Chains

Employment	Control 2023					Treatment, 2023				
	Male	Female	Total	% of Female	Employee per PO (No.)	Male	Female	Total	% of Female	Employee Per PO (No.)
Full time family	74	85	159	53.46	4.97	721	648	1369	47.33	7.02
Part time family						-	-	-	-	-
Full time Hired						-	-	-	-	-
Part time Hired						664	680	1344	50.60	6.89
Overall	74	85	159	53.46	4.97	1385	1328	2713	48.95	13.91
Total POs	32					195				

Source: Endline Survey of NLSIP, 2023

Comparing labour employment in terms of wage earned between treatment and control POs, the treatment POs are giving Rs. 1,855,944 of more employment than the control POs as recorded in 2023.

3.3.8.5. Comparison of Employment Generation between Treatment Sub-Projects (Call-III: Private Farm level) and Control Private Farms in All Value Chains

The employment generation from livestock enterprises implemented through the Call-III, implemented by Private Farms, could generate 4.92 person years of employment per Private Farm, whereas in the control private farms, only 3.56 person years of employment could be generated in the year 2023, showing the treatment private farms are giving more employment opportunities than the control private farms. The treatment private farms were found giving more employment opportunities for both family and hired labours. The proportion of women employment were seen more or less similar in both treatment (42.5%) and control private farms (43.3%) in 2023. The results of the employment generation in livestock enterprises implemented by Private Farms, under Call-III, and compared with their control private farms in the year 2023, have been presented in the following table.

Table 119: Comparison of Employment Generation between Treatment Sub-Projects (Call-III: Private Farm Level) and Control Private Farms in All Value Chains

Employment	Control, 2023					Treatment, 2023				
	Male	Female	Total	% of Female	Employee per Farm (No.)	Male	Female	Total	% of Female	Employee Per Farm (No.)
Full time family	171	112	283	39.58	1.93	304.00	249.00	553.00	45.03	2.18
Part time family	-	-	-	-	-	-	-	-	-	-
Full time Hired	-	-	-	-	-	-	-	-	-	-
Part time Hired	125.75	114.5	240.25	47.66	1.63	413.20	282.42	695.61	40.60	2.74
Overall	296.75	226.5	523.25	43.29	3.56	717.20	531.42	1248.61	42.56	4.92
Total Private Farms	147					254				

Source: Endline Survey of NLSIP, 2023

Comparing labour employment in terms of wage earned between treatment and control Private Farms, the treatment Private Farms are giving Rs. 282,336 of more employment than the control Private Farms as recorded in 2023.

3.3.9. Productive Alliance and Value Chain Linkages between Beneficiary HH/POs and Processer/Trader (Task-2)

There was 100 % individual farmers, POs and private farms, who had written agreement with the buyers, as per the mandatory provision of the productive alliances had to be done for sub-project implementation under Task-2, which were very low in case of control POs and control Private farms. However, verbal agreement could also be seen in the sub-projects, i.e. from 51 to 84% of farmers, POs and private linked with the traders on verbal agreement both in treatment and control groups. The individual farmers do not make agreement with traders but generally such agreements were done by the POs for all the farmers associated with their POs. The figures on the productive alliances made and value chain linkages established between producer farmers, POs, and private farms with the traders/buyers and compared with the control POs and private farms, for all value chains collectively, have been presented in the following table.

Table 120: Productive Alliances and Value Chain Linkages established between Treatment Sub-Projects and their Controls in All Value Chains in 2023

Productive alliance & Value chain linkages	Endline 2023 (Treatment) (N=449)				Endline 2023 (Control) (N=179)		
	Call I and II (Individual) HHs	Call I and II (Individual) POs	Call I and II (Collective) POs	Call III (Private Farm)	Call I and II (Individual) POs	Call I and II (Collective) POs	Private Farm
Written Agreement with Buyers	100.0	100.0	100.0	100.0	14.0	14.0	17.7
Verbal Agreement with Buyers	51.9	84.0	82.6	71.7	86.0	86.0	82.3
NLSIP supported buyers	57.4	41.2	62.5	31.9	0.0	0.0	46.2
Other Supported buyers	42.6	58.8	37.5	68.1	100.0	100.0	53.8
Compliance of Agreement (yes)	60.4	100.0	100.0	94.4	100.0	100.0	100.0
Compliance of Agreement (no)	40.6	0.0	0.0	5.6	0.0	0.0	0.0

Source: Endline Survey of NLSIP, 2023

3.3.9.1. Productive Alliances and Value Chain Linkages established between Treatment Sub-Projects and their Controls in Dairy Value Chain in 2023

It can be seen from below table that 100% of written agreement between sellers and buyers in dairy value chain were used to be done for all types of treatment sub-projects in 2023, as against 25% for individual POs, 21% in private farms, and no formal agreement from collective POs at control institutions. In case of dairy farmers, the individual dairy farmers do not make agreement with traders but generally such agreements were done by the POs for all the dairy farmers associated with their POs. Majority of individual households, and treatment POs were found selling their products to NLSIP supported buyers. Those agreement made between sellers and buyers, most of them were found complied, except in individual household level in 2023. The productive alliances and value chain linkages established in 2023 between treatment sub-projects and their control in dairy value chain have been presented in the following table.

Table 121: Productive Alliances and Value Chain Linkages established between Treatment Sub-Projects and their Controls in Dairy Value Chain in 2023

Productive alliance & Value chain linkages	Endline 2023 (Treatment) (N=269)				Endline 2023 (Control) (N=117)		
	Call I and II (Individual) HHs	Call I and II (Individual) POs	Call I and II (Collective) POs	Call III (Private Farm)	Call I and II (Individual) POs	Call I and II (Collective) POs	Private Farm
Written Agreement with Buyers	100	100	100	100	25	0	20.8
Verbal Agreement with Buyers	0	0	0	0	75	0	79.2
NLSIP supported buyers	51.3	53.8	62.5	32.1	0	0	52.4
Other Supported buyers	48.1	46.2	37.5	67.9	100	0	47.6
Compliance of Agreement (yes)	47.1	100	100	94.6	100	0	100
Compliance of Agreement (no)	52.3	0	0	5.4	0	0	0

Source: Endline Survey of NLSIP, 2023

3.3.9.2. Productive Alliances and Value Chain Linkages established between Treatment Sub-Projects and their Controls in Goat Value Chain in 2023

Its case of goat value chain also 100% of sub-projects (all institutions including individual households) were found having written agreement with the buyers, as observed in 2023. Whereas, only 12% of control private farms were able to make written agreement with buyers in the same year. In case of goat also, the individual goat rearing farmers do not make agreement with traders but generally such agreements were done by the POs for all the goat rearing farmers associated with their POs. Out of the total sellers, most of them used to sell to other organization supported buyers both in treatment and control sub-projects. Those agreement made between sellers and buyers in goat value chain most of them, both in treatment and control sub-projects, were found complied. The productive alliances and value chain linkages established in 2023 between treatment sub-projects and their control in goat value chain have been presented in the following table.

Table 122: Productive Alliances and Value Chain Linkages established between Treatment Sub-Projects and their Controls in Goat Value Chain in 2023

Productive alliance & Value chain linkages	Endline 2023 (Treatment) (N=166)				Endline 2023 (Control) (N=56)		
	Call I and II (Individual) HHs	Call I and II (Individual) POs	Call I and II (Collective) POs	Call III (Private Farm)	Call I and II (Individual) POs	Call I and II (Collective) POs	Private Farm
Written Agreement with Buyers	100	100	100	100	0	0	11.9
Verbal Agreement with Buyers	0	0	0	0	0	0	88.1
NLSIP supported buyers	13.5	9.8	0	31.3	0	0	20
Other Supported buyers	86.5	90.2	0	68.7	0	0	80
Compliance of Agreement (yes)	72.9	100	100	93.8	0	0	100
Compliance of Agreement (no)	27.1	0	0	6.3	0	0	0

Source: Endline Survey of NLSIP, 2023

3.3.10. Income Earned at Sub-Project Level (Task-2)

An attempt has been made in this section to demonstrate the income earned by the individual households under Call-I&II, and institution level income earned (PO and Private Farms) under Call-I&II and III, respectively, and have been presented and discussed in the following sub-sections.

3.3.10.1. Household Income at Sub-Project level (Task-2)

It can be seen from the below table that, the individual households under Call-I&II, were able to earn Rs. 866 thousand in a year, on an average, of which maximum of earning used to come from sale of three major livestock commodities (Rs. 354 thousands, i.e. 41% of the total income) from their livestock farms. The second most contributing source was reported to be the grant received from government and non-government institutions, which accounted for 14%. Sale of FYM and other agricultural commodities collectively contributed to 20% of the total household income under the Task-2 (Call-I&II), implemented individually. The income earned from different sources by individual households under Call-I&II sub-projects have been presented in the following table.

Table 123: Individual Household Income at Sub-project level (Task-2)

S. N.	Sources of Income	Income per household (Rs.) (N=1053)	% of Total
1	Sale of three value chain commodities	353,843.84	40.84
2	Sale of by-products (farm yard manure)	14,494.46	1.67
3	Sale of other livestock	62,912.89	7.26
4	Sale of oil seed crops/products	5,174.57	0.60
5	Sale of cereal crops/products	33,658.84	3.89
6	Sale of vegetables	60,159.61	6.94
7	Off-farm Income	38,727.90	4.47
8	Rental income	5,700.86	0.66
9	Sale of assets	16,049.38	1.85
10	Pension	11,417.45	1.32
11	Salary	77,846.34	8.99
12	Allowances	6,343.79	0.73
13	Gifts	387.96	0.04
14	Interest earned	607.24	0.07
15	Service charges	484.34	0.06
16	Regular Savings	25,278.06	2.92
17	Grants	123,434.61	14.25
18	Other Income	29,793.56	3.44
	Total household income	866,315.69	100.00

Source: Endline Survey of NLSIP, 2023

3.3.10.2. Income Earned at Institutional Level (Task-2)

The average income per year per PO (individual), PO (collective) and private farm in 2023 were estimated to be Rs. 9.4 million, Rs. 14.09 million, and Rs. 10.1 million respectively. These income levels at the treatment institutions were found significantly higher than that of the control institutions, i.e. Rs. 3.3 million, Rs. 3.99 million, and Rs. 3.97 million in individual PO, collective PO, and private farms respectively. The income from sale of three major livestock commodities out of the total both in treatment and control institutions were more than 90%. However, the income earned from three major livestock commodities by treatment institutions were significantly higher than that of the control

institutions. These figures on the income earned by the treatment and control institutions recorded in 2023, have been presented in the following table.

Table 124: Income earned at Institutional level (Task-2)

Sources of Income	Endline Treatment (2023) (N=449)			Endline Control (2023) (N=179)		
	Call I and II (PO) Individual	Call I and II (PO) Collective	Call III (private Farm)	PO (Individual)	PO (Collective)	Private Farm
Sale of three value chain commodities	8,850,641 (94.09%)	13,888,395 (98.56%)	9,453,092 (93.46%)	3,311,246 (99.93%)	3,983,925 (99.59%)	3,895,663 (97.98%)
Sale of by-products (FYM)	15,055	10,778	23,312	625	716	11,292
Sale of other livestock	29,171	8,005	127,231	645	535	8,366
Sale of oil seeds	162,552	31,578	49,118	0	805	13,255
Sale of cereals	700	927	6,872	0	36	761
Sale of vegetables	-	-	26,800	0	4,200	6,775
Off-farm income	300	2,312	3,649	0	-	828
Rental income	3,052	4,520	36,441	800	2,670	4,705
Sale of assets	-	48	818	0	-	192
Pension	875	-	50	0	-	
Salary	75,857	10,130	2,817	0	800	
Allowances	1,113	1,320	625	25	-	50
Gift	16,115	12,378	23,956	100	990	6,143
Interest earned	227,180	92,640	298,096	145	800	1,890
Service charges	12,970	9,310	15,066	0	1,600	5,172
Regular savings	955	8	1,058	0	595	822
Grant	3,102	12,180	15,298	0	885	4,622
Other income	6,957	6,499	30,657	0	1,368	15,340
Average Income per Institution	9,406,593	14,091,029	10,114,955	3,313,586	3,999,925	3,975,876

Source: Endline Survey of NLSIP, 2023

3.3.11. Investment Modality at Sub-Project Level

In overall, 39 per cent of the treatment institutions were able to receive loan, followed by grant (35%), and 26% of them invested from their equity. Whereas the control POs and private farms used to use more equity i.e. 88% and 51% respectively. About 49% of control private farms used to take loan for their business. The grant portion at the control POs and private farms were zero or negligible. The investment modality as observed in the treatment and control institutions in 2023, have been presented in the following table.

Table 125: Investment Modality at Sub-project level (Task-2)

Source of Fundings	Endline 2023 (Treatment) (N=449)				Endline 2023 (Control) (N=179)	
	Call I and II (Individual)	Call I and II (Collective)	Call III (Private Farm)	Overall	POs	Private Farm
Equity (%)	20.7	25.3	30.7	26	88.3	50.9
Loan (%)	38.7	37.8	41.2	39	11.7	48.9
Grant (%)	40.6	36.9	28.1	35	0.0	0.2

Source: Endline Survey of NLSIP, 2023

3.3.12. Management of animal's feeds at Sub-Project Levels (Task-2)

Maximum of individual dairy farmers under Call-I&II used to use green forage (83%), concentrate feed (78%), and dry forage (74%). Goat rearing farmers were also found using more green forage (86%), followed by concentrate feed (81%), and dry forage (48%). Almost all Chyangra rearing farmers used to use gree forage and dry forage, followed by concentrate feed and hay/silage (27%) under the Call-I&II sub-projects, implemented individually. The figures on the use of animal feed by the individual farmers under Call-I&II, under Task-2, have been presented in the following table.

Table 126: Management of animal feed at Sub-project level (Task-2)

Types of Feed	Dairy (N=503)		Goat (N=486)		Chyangra Pashmina (N=64)	
Hay/silage	69	13.72	44	9.05	17	26.56
Green forage	417	82.90	420	86.42	64	100.00
Dry forage	372	73.96	234	48.15	64	100.00
Concentrated feeds	390	77.53	396	81.48	46	71.88
Mineral block	79	15.71	64	13.17	1	1.56
Other	40	7.95	40	8.23	0	0.00

Source: Endline Survey of NLSIP, 2023

3.3.13. Innovation Applied for Scaling up of Agro-enterprises at Sub-project level (Task-2)

The NLSIP has supported to the producers' farmers and agro-enterprises through the sub-projects for scaling up of their agribusinesses by promoting the use of new technologies and innovations. The frequency of innovation applied in the agro/livesock farms (sub-project level) have been presented in the following table. It can be seen from the below table that, 4-18% of dairy enterprises in the treatment institutions, used milking machines, which were none or very less in the control institutions. The second innovation was the milking parlour in the dairy farms, which very less number of farms used both in treatment and control farms. Urine collection in the farms were significantly high in the livestock farms i.e. 37-59% in treatment farms and 14 to 50% in control farms. Cow mats were also found commonly

used innovation in the dairy farms. The types of innovation used by different institutions and compared with the control institutions have been presented in the following table.

Table 127: Innovation applied at Sub-project level (Task-2)

Types of Innovation applied	Endline 2023 (Treatment) (N=449)				Endline 2023 (Control) (N=179)		
	Call I and II (Individual) HHs	Call I and II (Individual) POs	Call I and II (Collective) POs	Call III (Private Farms)	Call I and II (Individual) POs	Call I and II (Collective) POs	Private Farms
Milking machine	3.8%	5.6%	16.1%	17.8%	0.0%	0.0%	9.1%
Milking parlor	1.2%	0.0%	3.2%	5.9%	0.0%	0.0%	4.0%
Urea Molasses Mineral Block	0.2%	0.0%	0.0%	1.3%	0.0%	0.0%	0.0%
Silage feeding	10.1%	11.1%	14.5%	19.7%	25.0%	7.1%	5.1%
Open stall feeding	11.5%	7.4%	8.1%	12.5%	0.0%	21.4%	10.1%
Manure dewatering	4.2%	9.3%	9.7%	13.2%	0.0%	28.6%	0.0%
Total mixed Ration (TMR)	2.1%	3.7%	4.8%	5.9%	0.0%	0.0%	5.1%
Urine collection	50.7%	40.7%	37.1%	59.2%	50.0%	14.3%	38.4%
Cow mat	43.9%	38.9%	35.5%	50.7%	25.0%	0.0%	42.4%
Others	25.4%	46.3%	45.2%	25.0%	75.0%	50.0%	42.4%

Source: Endline Survey of NLSIP, 2023

3.3.14. Compliance to environmental and social safeguards measures

The individual households, POs and private farms implemented under Call-I&II, and Call-III, used to use various environmental and social safeguard measures in their livestock farms. The following table highlights about various environmental and social safeguards measures applied in the sub-projects implemented under Call-I&II and Call-III. It can be seen from the following table that individual households and private farms under treatment institutions were found applying most environmental and social safeguard measures than the POs. However, the treatment POs were found more efficient than the control POs in applying such safeguard measures. On the contrary, the control private farms were found applying more environmental and social safeguard measures than the treatment private farms. The figures on the environmental and social safeguard measures, which were applied in the livestock farms at the sub-project level in 2023, and compared with the control farms, have been presented in the following table.

Table 128: Per cent of HHs and Sub-Projects complied to Environmental and Social Safeguards Measures in all Value Chains in 2023

Environmental and Social Safeguards Measures applied	Treatment (2023) (N=449)				Control (2023) (N=179)		
	Task 2 (% HHs)	Task 2 Individual (% POs)	Task 2 Collective (% POs)	Task 2 Private Farm (%)	POs Individual (%)	POs Collective (%)	Private Farm (%)
Compost Pit	87.4	17.6	20.5	61.9	11.6	2.2	86.2
Urine Pit	56.3	16.5	19.8	63.7	9.0	3.0	88.0
Peripheral Drainage	23.6	12.6	17.6	69.9	10.4	7.5	82.1
Soak /dumping Pit	7.7	13.0	19.1	67.9	17.6	5.9	76.5
Tiles/Marbles on Floor/wall (as per GoN Rules)	6.7	21.6	14.7	63.7	12.5	6.3	81.3
Fencing/Compound Wall (for biosecurity)	30.4	17.2	16.1	66.8	10.1	2.2	87.6
Building	24.8	19.5	17.8	62.7	11.0	4.1	84.9
Gloves	67.0	20.8	21.1	58.1	17.0	1.1	81.8
Masks	43.2	22.0	22.7	55.3	16.4	1.8	81.8
Gum Boots	83.0	20.2	21.8	58.0	13.4	2.2	84.3
Aprons	34.7	20.1	27.7	52.2	20.8	0.0	79.2
Helmet	2.4	24.1	24.1	51.7	37.5	0.0	62.5

Source: Endline Survey of NLSIP, 2023

3.3.15. Access in market price of three value chain commodities under Task-2

As in the Task-1 households, most of the Task-2 households were found receiving market price information from their groups and cooperatives. It can be seen from the below table that 77% of the households under Task-2 (Call-I&II), used to receive market price information from their groups and cooperatives, which in dairy 77%, goat 74%, and highest was in Chyangra rearing farmers (95%). The second source of market information for individual livestock rearing farms was from the Buyers/Traders. The various sources of market price information for individual farmers under Task-2, recorded in 2023, have been presented in the following table.

Table 129: Access in Market Price Information under Task-2 in 2023

Sources of Market Price Information	Dairy (N=503)		Goat (N=486)		Chyangra Pashmina (N=64)		Total (N=1053)	
	Number of HH	% of HH	Number of HH	% of HH	Number of HH	% of HH	Number of HH	% of HH
Cooperative or group	389	77.34	362	74.49	61	95.31	812	77.11
Radio/FM	12	2.39	16	3.29	1	1.56	29	2.75
SMS	5	0.99	6	1.23	0	0.00	11	1.04
TV broadcasting	2	0.40	6	1.23	1	1.56	9	0.85
Newspaper	9	1.79	10	2.06	4	6.25	23	2.18
Buyer	17	3.38	24	4.94	4	6.25	45	4.27
Other	1	0.20	4	0.82	0	0.00	5	0.47

Source: Endline Survey of NLSIP, 2023

3.3.16. Beneficiaries' Satisfaction on PO's Services:

The Producers' Organizations (POs) used to provide various services to their member farmers, and the responses of the member farmers on their satisfaction levels towards the PO's services, have been presented in the following table. It can be seen from the below table that most of the member farmers were found most satisfied from the technical training, business training and nursery management services provided by their POs. In case of marketing services rendered by the POs to their beneficiary members, 77% of dairy farmers and 74.5% of goat rearing farmers were satisfied with the marketing services in receiving market price information from their POs. The figures of the farmers' responses on their satisfaction levels towards the services provided by their POs, as obtained in 2023, have been presented in the following table.

Table 130: Beneficiaries' Satisfaction Levels on PO's Services under Task-2 in 2023

Services provided by POs	Satisfaction Level as reported by the Beneficiaries	% of Households (Task-2) Reporting	
		Dairy (N=503)	Goat Meat (N=486)
Technical Training	High	74.4	89.1
	Moderate	20.5	10.9
	Less	5.1	0
Business Training	High	100	90.9
	Moderate	0	9.1
	Less	0	0
Account training	High	47.6	57.1
	Moderate	42.9	39
	Less	9.5	3.9
Nursery Management	High	85.4	85.6
	Moderate	11.2	14.4
	Less	3.4	0
Marketing Service (Price dissemination)	Satisfied	77.34	74.49
	Less satisfied	22.66	25.51

Source: Endline Survey of NLSIP, 2023

3.3.17. Beneficiaries' Satisfaction on Project's Services at Sub-Project Levels:

An attempt has been made to demonstrate the satisfaction levels of the beneficiaries as responded during the endline survey conducted in 2023, have been presented and discussed in the following sub-sections.

3.3.17.1. Beneficiaries' Satisfaction on Project's Services at Individual Households under Call-I&II

About 92% of the beneficiary individual households under Call-I&II subprojects (Task-2) were found satisfied from the project (NLSIP)'s services as reported in the year 2023, in terms of timeliness, relevancy and effectiveness of the project's services. However, 4.5% of the beneficiaries were moderately unsatisfied and 3.2% of them were unsatisfied. The figures on the level of satisfactions as rated by the individual sample households of sub-projects under Call-I&II, implemented individually in 2021, have been presented in the following table.

Table 131: Beneficiaries' Satisfaction Levels on Project's Services under Task-2 (Individual HH level) in 2023

Aspects/degree of satisfactions (N=1053)	Highly Satisfied	Moderately Satisfied	Satisfied	Moderately Unsatisfied	Unsatisfied
Timeliness	43.9	25.7	23.4	4.2	2.8
Relevancy	34.7	29.4	28.6	4.6	2.8
Effectiveness	36.9	25	29.2	4.7	4.1
Average	38.5	26.7	27.1	4.5	3.2
Overall Satisfied	92.3%				

Source: Endline Survey of NLSIP, 2023

3.3.17.2. Beneficiaries' Satisfaction on Project's Services at Subproject level under Call-I&II (PO level)

About 89% of the beneficiary POs under Call-I&II subprojects (Task-2), which were implemented in 2021, were found satisfied from the project (NLSIP)'s services as reported in the year 2023, in terms of timeliness, relevancy and effectiveness of the project's services. However, 4.0% of the beneficiary POs were moderately unsatisfied and 7.2% of the POs were unsatisfied. The figures on the level of satisfactions as rated by the sample POs of the sub-projects implemented under Call-I&II in 2021, have been presented in the following table.

Table 132: Beneficiaries' Satisfaction Levels on Project's Services under Task-2 (Call-I&II: PO level) in 2023

Aspects/degree of satisfactions (N=191)	Highly Satisfied	Moderately Satisfied	Satisfied	Moderately Unsatisfied	Unsatisfied
Timeliness	32.6	23.9	31.5	5.4	6.5
Relevancy	28.3	29.3	33.7	3.3	5.4
Effectiveness	34.8	21.7	30.4	3.3	9.8
Average	31.9	25.0	31.9	4.0	7.2
Overall Satisfied	88.8				

Source: Endline Survey of NLSIP, 2023

3.3.17.3. Beneficiaries' Satisfaction on Project's Services at Subproject under Call-III (Private Farm level)

About 87% of the beneficiary Private Farms under Call-III subprojects (Task-2), which were implemented in 2022, were found satisfied from the project (NLSIP)'s services as reported in the year 2023, in terms of timeliness, relevancy and effectiveness of the project's services. However, 4.7% of the beneficiary Private Farms were moderately unsatisfied and 8.1% of them were unsatisfied. The figures on the level of satisfactions as rated by the sample Private Farms of the sub-projects implemented under Call-III in 2022, have been presented in the following table.

Table 133: Beneficiaries' Satisfaction Levels on Project's Services under Task-2 (Call-III: Private Farm level) in 2023

Aspects / degree of satisfactions (N=258)	Highly Satisfied	Moderately Satisfied	Satisfied	Moderately Unsatisfied	Unsatisfied
Timeliness	35.0	23.2	28.3	4.7	8.7
Relevancy	33.9	25.2	28.0	5.1	7.9
Effectiveness	38.6	21.3	28.0	4.3	7.9
Average	35.8	23.2	28.1	4.7	8.1
Overall Satisfied	87.1%				

Source: Endline Survey of NLSIP, 2023

CHAPTER 4: CONCLUSION, KEY ISSUES, LESSONS LEARNED, AND RECOMMENDATIONS

4.1 Conclusion

The project has achieved impressive results in terms of reaching households, improving productivity in three value chain commodities, increasing sales values, promoting climate-smart technologies, and increasing high level of beneficiaries' satisfaction.

Key achievements of the Project:

Impact:

The project has been successful in meeting its goals and has had a positive impact on the intended beneficiaries. The project has brought about favorable changes or benefits for the intended recipients or those directly affected by the project. The major results of the project are given below:

1. **Household Reach:** The project has successfully reached 191,665 households, which accounts for 95.8% of the targeted households, showing impressive results.
2. **Productive Partnership Alliances:** The project has established partnerships with financial service providers such as banks and insurance companies, which has eventually helped to make it possible to successfully produce and process assets and services for the project beneficiaries.
3. **Commodity Productivity:** In comparison to its initial targets, the project has improved commodities productivity with remarkable results. Goat meat production exceeded the goal by 72.8%, buffalo milk by 66.2%, and cattle milk productivity by 97.5%.
4. **Increased Sales Value:** The project led to substantial increment in sales values within the milk and goat meat value chains. In comparison to baseline values, the value of milk sales climbed by 67.6%, while the value of goat meat value chain sales significantly grew by 103%.
5. **Climate-Smart Technologies:** The project has successfully promoted the adoption of climate-smart technologies among beneficiaries. Compared to a baseline adoption rate of 18.7%, a significant proportion (62.2%) of project beneficiaries have adopted at least one climate-smart technology.
6. **Beneficiary Satisfaction:** About two third of the project's beneficiaries showed their high levels of satisfaction. About 66% of beneficiaries expressed satisfaction with Component B services, and an even higher percentage (97%) were satisfied with the project grant supports.

These achievements suggest that the NLSIP project has effectively addressed multiple aspects of livestock and agricultural development, including productivity enhancement, value chain development, technology adoption, and uplifting of overall beneficiary well-being. The project's success can be attributed to its strategic partnerships, targeted interventions, and the positive impact it had on the livelihoods of project beneficiaries.

Relevancy

The project has provided the services and resources the enterprises needed in relation to value chain commodities. During project execution, the project's modality was adjusted to accommodate local needs, which included changing to private sector investment for the overall growth of the livestock sector. In order to carry out the project, four Decentralized Local Support Units (DLSUs) were established in four provinces, with efficient connections created at the local and district levels. The

project also established productive alliance with financial institutions to implement the 20:30:50 (equity/loan/grant) investment modality.

The value chain actors were also linked by developing forward and backward linkages as well as horizontal linkages among the actors. The survey showed that 83% beneficiaries were satisfied on services and assets provided by the project, which shows the project's interventions as relevant.

Effectiveness

Two levels of help have been offered by the project: institutional and individual household levels. Additionally, the project has strengthened the institutions' capacity building (POs and Private Farms). The project's support has raised the beneficiary households' and institutions' incomes. Likewise, the project has increased the access of beneficiaries in loan and insurance where the women's access has also increased.

Sustainability

Even when the project is phased out, the value chain's commodity-based businesses will continue to sustain. The following interventions made by the project would contribute to the sustainability of the enterprises:

Productive Partnership Alliances Established: The project has established partnerships with financial service providers such as banks and insurance companies, which has eventually helped to make it possible to successfully produce and process assets and services for the project beneficiaries

Horizontal and Vertical Business Linkages Established: The project has supported to value chain actors to establish horizontal and vertical business linkages among the value chain actors for scaling up their enterprises for a longer time.

Developed Infrastructures: In order to provide the beneficiaries with the necessary services for an extended period of time, the project has constructed several infrastructures, including livestock markets, storage facilities, breeding centers, service centers, livestock sheds, etc.

Tools and Equipment Supported: The project has equipped market centers, veterinary hospitals, chilling centers, service centers, etc from which the beneficiaries would benefit.

Breeding Centers Strengthened: The project strengthened cattle and buffalo breeding centers, from which the beneficiaries would receive breeding services for their livestock as per their needs.

Increased Income: Value chain commodities are the primary source of household income, which means the business will be in operation for a longer period of time.

4.2 Key Issues and Challenges

4.2.1. Issues and Challenges During Endline Survey

During the NLSIP endline survey, the consulting firm faced a number of key issues and challenges that might have an impact on the survey's efficacy and the project's overall evaluation. Below is a breakdown of the main issues and challenges encountered throughout the endline survey:

Changed Contact numbers of beneficiary sub-projects: The survey team had trouble locating the sub-projects since the project had not updated the contact mobile number. It took more time to contact them.

Contact number of sub-projects were not available: The survey team was unable to locate 350 sub-projects in total (50 from the treatment group and 300 from the control group) due to the lack of contact numbers.

Subprojects' reluctance to submit data: The grant recipients whose subprojects performed poorly were reluctant to provide data.

Difficulty in collecting data from Control sub-projects: The survey team had several challenges in gathering data from the majority of these control sub-projects, since the project furnished a list of sub-projects that were not granted the funding but yet submitted their business plans to the project.

Limited Support to POs (institutional support only): Due to limited support (only institutional, not in production), a small number of PO members are sustaining their businesses.

Delayed release of sub-projects grant installment: The project has started to release first installment to Call 3 sub-projects from July 2023. The study team collected the data during the period of June 2022 to June 2023. These sub-projects showed very little progress. These sub-projects were also reluctant to provide the data.

Missing beneficiary names in the community: Most of the name list provided by the project under Task-1 were not found in the community.

Sub-projects not implemented on time: Due to non-release of the grant installment on time, many sub-projects are delayed in implementation and have low progress, and had to pay the bank interest without production.

Coordination with beneficiaries during data collection: It was challenging to get data from the beneficiaries because they had very high perception of the project and the fact that the majority of them did not coordinate with the consulting firm.

4.2.2. Issues and Challenges in Project Implementation

The following is a list of the implementation level issues and challenges that the NLSIP endline survey identified and that have impacted the project's outcomes and efficacy.

Investment to private sector is not parallelly done: Effectiveness of the grant sub-projects has been low because of delay in investing in private sectors.

Delay in installment release: Effectiveness of the grant sub-projects has been low because of delayed installment release.

Forward linkage with value chain actors only: Only forward linkage of value chain actors has been established. To establish strong value chain at community level, the project has to focus on backward linkage of value chain actors as well as for sustainability of the value chain and sector growth.

Less supports to POs under Component B: The beneficiaries under component B received very minimum supports for the production of value chain commodities. Value chain linkages have not been established among the value chain actors, despite the project's support in the construction of buildings and providing equipment to government agencies, including Veterinary Hospital and Livestock Expert Centers (VHLECs), Livestock Sections of Palikas, and Livestock Market Centers (Palika).

Effects of Covid 19: The Covid-19 had a significant impact on the project's ability to offer services to the beneficiaries.

Weak Project Database and Monitoring System: A well-designed and effective project monitoring system helps the beneficiaries make the most use of grant funding while guiding them to scale up and maintain their enterprises. It was found that the project is not able to track their beneficiaries who left the enterprise due to non-release of grant installment in time. Some beneficiaries were found to have sold out their livestock after receiving grant to pay the loan, which was taken under the project financial partnership provision.

4.3 Lessons Learned

During the implementation of the project, several lessons were learnt. Here is a summary of the lessons that were discovered during the endline survey, which could help future projects of a similar nature be implemented more effectively.

1. ***Collaboration with financial institutions effectively fulfills the financial needs of producers:*** They established strong partnerships with financial entities to provide producers with funds they need to grow their enterprise.
2. ***Innovative interventions increase the volume of production:*** innovations as a means to enhance production and productivity in the agricultural and livestock sectors including Silage Making Machine, Milking Machine, AI, Milking Parlor, among others. Investing in modern technologies and practices can drive efficiency, boost yields, and improve the overall quality of products.

4.4 Recommendations

The following are some key recommendations for future project development and implementation.

1. ***A Strong M&E System:*** A robust M&E system ensures effective tracking of project progress, identifies challenges, and allows for timely adjustments. It allows improved accountability, better decision-making, and the ability to measure and showcase project outcomes.
2. ***Establishment of Forward and Backward Linkages:*** By connecting producers with both suppliers (backward linkage) and buyers (forward linkage), a comprehensive value chain is created, enhancing market access and sustainability. It strengthens market connections, increases efficiency, helping build a more integrated and resilient sector.
3. ***Private Sector Mobilization:*** Involvement of the private sector across the value chain stimulates investment, innovation, and growth. It enhances sector development, increases investment, and improves access to resources and expertise, helping the private sectors play vital roles.
4. ***Establishment and Operation of Community Livestock Extension Service Center (CLESC):*** Local community-based livestock extension centers provide direct support and knowledge transfer to producers, leading to improved practices and outcomes. Enhanced technical assistance, better adoption of best practices, and increased productivity at the community level through the CLESC.
5. ***Development of Production Pockets/Clusters:*** Concentrating efforts on specific geographic areas can lead to efficient resource allocation and targeted developmental impact. Enhanced focus, better resource management, and localized impact within chosen production pockets or clusters support the sustainable growth of the rural economy at the sectoral level.
6. ***Project's focus on export quality production and link with exporters:*** Prioritizing export-quality production and creating linkages with exporters taps into higher-value markets and boosts economic returns, which in turn helps increase income for producers, expand market

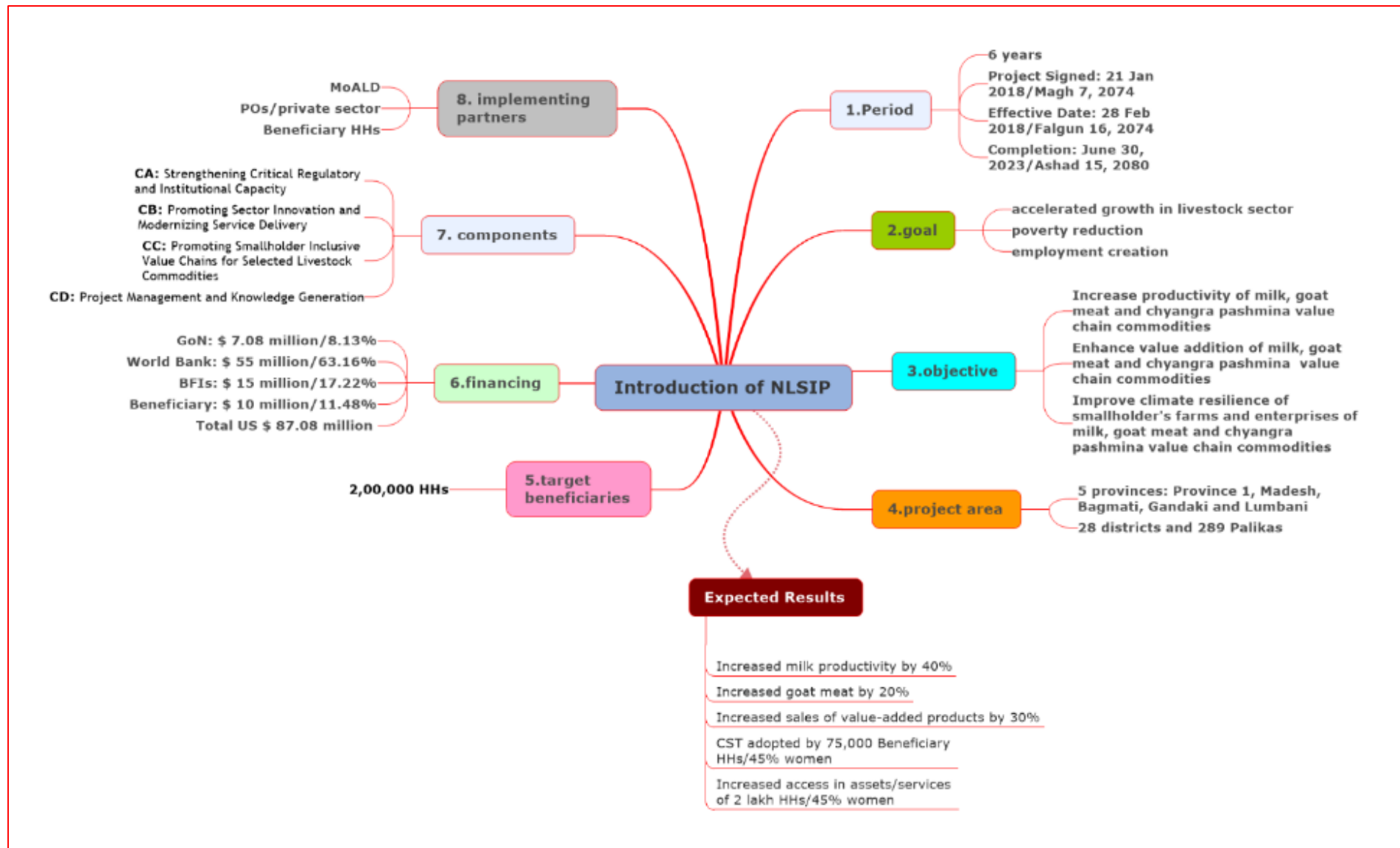
opportunities, and improve overall competitiveness and assist the country in obtaining foreign exchanges.

7. ***Institutionalization of strategies, learnings and results:*** *The government has to institutionalize the project's strategies: productive alliance, modality of investment, innovation, business plan, stakeholders' dialogue platform (private sector leadership), grievance redress committee, high productivity, value addition to promote overall sector development and make them applicable to the districts and remaining value chain commodities.*
8. ***Carry out Social Audit of the Sub-projects:*** *The survey team strongly recommend to the NLSIP, Ministry of Agriculture and Livestock Development (MoALD) and the World Bank to conduct a social audit of the 449 sub-projects that have been implemented thus far. This audit should involve direct beneficiaries, representatives of local and provincial governments, the project, and other GoN institutions.*

ANNEXES

- Annex-1: Insuring Livestock in Task-1 in 2023
- Annex-2: Cost of Production and Profitability Analysis of Dairy and Goat Enterprises in Task-1 in 2023
- Annex-3: Cost of Production and Profitability Analysis of Dairy Enterprises in Task-2 in 2023
- Annex-4: Cost of Production and Profitability Analysis of Goat Enterprises in Task-2 in 2023
- Annex-5: Field Mobilization (Field Researcher/ Supervisors/ Enumerators)
- Annex-6: Data Collection Tools
- Annex-7: Checklist of Key Informants Interview, Focus Group Discussion, and Individual Interview Questionnaires
- Annex-8: Study Photographs

Annex-1: Introduction of NLSIP



Annex-2: Insuring Livestock in Task-1 in 2023

Number and Per cent of Project Beneficiaries insuring livestock in Task-1 in 2023

Value Chains	Yes/No	Cooperative		Farmer Group		Total	
		HH number	%	HH number	%	HH number	%
Dairy	No	52	27.20	73	24.70	125	25.70
	Yes	139	72.80	223	75.30	362	74.30
	Total	191	100.00	296	100.00	487	100.00
Goat Meat	No	32	65.30	452	71.90	484	71.40
	Yes	17	34.70	177	28.10	194	28.60
	Total	49	100.00	629	100.00	678	100.00
Chyangra Pashmina	No	1	100.00	16	100.00	17	100.00
	Yes	0	0.00	0	0.00	0	0.00
	Total	1	100.00	16	100.00	17	100.00
All VCs	No	85	35.27	541	57.49	626	52.96
	Yes	156	64.73	400	42.51	556	47.04
	Total	241	100.00	941	100.00	1182	100.00

Annex-3: Cost of Production and Profitability Analysis of Dairy and Goat Enterprises in Task-1 in 2023

2.1. Cost of Production and Profitability Analysis of Dairy enterprises in Task-1 in 2023 (N=487)

Cost Heads	Investment / Assets per HH (Rs.)	Cost per HH (Rs.)	Cost (Rs.) per Liter of Milk
A. Investment / Fixed Assets			
Sheds	422083.37	21104.17	2.26
Building	48842.51	2442.126	0.26
Vehicle	18806.80	940.3402	0.10
Machinery	44616.54	2230.827	0.24
Tool and equipment	16487.86	1236.59	0.13
Furniture and fixture	6795.89	679.5893	0.07
Other assets	1406.83	140.683	0.02
Total of A	559039.81	28774.32	3.08
B. Variable Cost			
B.1. Fixed operating cost			
Utilities (Water, Electricity, etc.)		15805.56	1.69
Staff cost (salary)		42290.78	4.52
Land rental/ lease		12495.89	1.34
Permanent labour cost		815.4497	0.09
Other fixed operational cost		1750.984	0.19
Total of B1		73158.66	7.82
B.2. Variable operating cost			
Labor (hired)/Year		15991.79	1.71
Labor (family)/Year		43645.93	4.67
AI services		4194.979	0.45
Interest		26017.21	2.78
Insurance premium		4881.187	0.52
Medicine, etc.		11093.86	1.19
Transport charges		5016.125	0.54
Production material		5271.158	0.56
Packaging materials		706.9076	0.08
Service (vet Medicine, vaccine, drenching etc)		8991.172	0.96
Repair and maintenance		5500.78	0.59
Concentrated feeds		94810.74	10.14
Green forage (including silage)		45627.2	4.88
Dry forage		48194.06	5.15
Others Operation cost- variable/Year		1782.366	0.19
Total of B.2.		321725.5	34.40
Total of B (Total Variable Cost: B1+B2)		394884.1	42.23
Total Cost (Fixed Cost + Variable Cost) (A+B)		423658.5	45.30
Per HH total cost (Rs.)		423658.46	
Per HH Milk Production (liter)		9351.77	
Cost of Production (Rs/Liter)		45.30	
Total Income per HH (Rs.)		631244.80	
Net Profit per HH (Rs.)		207586.34	
Gross Margin per HH (Total Revenue-Total Variable cost) (Rs.)		236360.67	

Cost Heads	Investment / Assets per HH (Rs.)	Cost per HH (Rs.)	Cost (Rs.) per Liter of Milk
Return on Asset (ROA) = (Net Profit/Total Assets) *100		37.13	
Net Profit Margin (%) = (Net Profit/Total Revenue) *100		32.89	
Return on Labour (%) = [(Net Profit+Family Labour Cost)/Total Revenue] *100		39.80	

Source: NLSIP Endline Survey, 2023

Annex 2: Cost of Production and Profitability Analysis of Goat enterprises in Task-1 in 2023 (N=678)

Cost Heads	Investment / Assets per HH (Rs.)	Cost per HH (Rs.)	Cost (Rs.) per Kg of Live weight
C. Investment / Fixed Assets			
Sheds	94688.79	4734.43953	13.33
Building	221.24	11.0619469	0.03
Vehicle	0.00	0	0.00
Machinery	3441.30	172.064897	0.48
Tool and equipment	1579.79	78.9896755	0.22
Furniture and fixture	27.73	1.38643068	0.00
Other assets	680.68	34.0339233	0.10
Total of A	100639.53	5031.9764	14.17
D. Variable Cost			
B.1. Fixed operating cost			
Utilities (Water, Electricity, etc.)		7449.71	20.98
Staff cost (salary)		5299.41	14.92
Land rental/ lease		884.07	2.49
Permanent labour cost		35.40	0.10
Other fixed operational cost		194.69	0.55
Total of B1		13863.27	39.04
B.2. Variable operating cost			
Feeds/year		38117.40	107.33
Labor (hired)/Year		9471.98	26.67
Labor (family)/Year		6781.71	19.10
AI services		88.50	0.25
Interest		3407.96	9.60
Insurance premium		311.21	0.88
Medicine, etc.		1859.00	5.23
Transport charges		3486.21	9.82
Production material		147.49	0.42
Packaging materials		0.00	0.00
Service (vet Medicine, vaccine, drenching etc)		4603.69	12.96
Repair and maintenance		1593.58	4.49
Concentrated feeds		0.00	0.00
Green forage (including silage)		0.00	0.00
Dry forage		0.00	0.00
Others Operation cost- variable/Year		0.00	0.00
Total of B.2.		69868.73	196.74
Total of B (Total Variable Cost: B1+B2)		83732.01	235.77
Total Cost (Fixed Cost + Variable Cost) (A+B)		88763.98	249.94

Cost Heads	Investment / Assets per HH (Rs.)	Cost per HH (Rs.)	Cost (Rs.) per Kg of Live weight
Per HH total cost (Rs.)		88763.98	
Per HH Goat Meat Production (Kg on live weight) per Year ²¹		355.14	
Cost of Production (Rs/Kg) (on live weight basis)		249.94	
Total Income per HH (Rs.)		215922.48	
Net Profit per HH (Rs.)		127158.50	
Gross Margin per HH (Total Revenue-Total Variable cost) (Rs.)		132190.48	
Return on Asset (ROA) = (Net Profit/Total Assets) *100		126.35	
Net Profit Margin (%) = (Net Profit/Total Revenue) *100		58.89	
Return on Labour (%) = [(Net Profit+Family Labour Cost)/Total Revenue] *100		62.03	

Source: NLSIP Endline Survey, 2023

²¹ Weight gain of standing goat= 236.44 kg, and weight of sold-out goat in the accounting year= 118.70 kg

Annex-4: Cost of Production and Profitability Analysis of Dairy Enterprises in Task-2 in 2023

3.1. Cost and Profitability Analysis of Dairy Enterprise at Task-2: Individual HH level in 2023 (N=503)

Cost Heads	Investment / Assets per HH (Rs.)	Cost per HH (Rs.)	Cost (Rs.) per Liter of Milk
E. Investment / Fixed Assets			
Sheds	409248.25	20462.41	1.65
Building	56448.64	2822.432	0.23
Vehicle	31381.54	1569.077	0.13
Machinery	49199.91	2459.995	0.20
Tool and equipment	17704.19	1327.815	0.11
Furniture and fixture	6351.07	635.107	0.05
Other assets	1607.21	160.7209	0.01
Total of A	571940.81	29437.56	2.38
F. Variable Cost			
B.1. Fixed operating cost			
Utilities (Water, Electricity, etc.)		11082.42	0.89
Staff cost (salary)		16864.23	1.36
Land rental/ lease		4072.366	0.33
Permanent labour cost		400.8588	0.03
Other fixed operational cost		1623.915	0.13
Total of B1		34043.79	2.75
B.2. Variable operating cost			
Labor (hired)/Year		13614.32	1.10
Labor (family)/Year		56781.15	4.59
AI services		4418.396	0.36
Interest		24019.15	1.94
Insurance premium		4880.095	0.39
Medicine, etc.		11303.24	0.91
Transport charges		5744.638	0.46
Production material		4503.089	0.36
Packaging materials		700.326	0.06
Service (vet Medicine, vaccine, drenching etc)		9938.133	0.80
Repair and maintenance		4738.012	0.38
Concentrated feeds		100587.1	8.12
Green forage (including silage)		44780.41	3.62
Dry forage		54674.17	4.42
Others Operation cost- variable/Year		2365.431	0.19
Total of B.2.		343047.7	27.70
Total of B (Total Variable Cost: B1+B2)		377091.5	30.45
Total Cost (Fixed Cost + Variable Cost) (A+B)		406529.1	32.83
Per HH total cost (Rs.)		406529.05	
Per HH Milk Production (liter)		12383.33	
Cost of Production (Rs/Liter)		32.83	
Total Income per HH (Rs.)		829683.19	
Net Profit per HH (Rs.)		423154.14	
Gross Margin per HH (Total Revenue- Total Variable cost) (Rs.)		452591.70	

Cost Heads	Investment / Assets per HH (Rs.)	Cost per HH (Rs.)	Cost (Rs.) per Liter of Milk
Return on Asset (ROA) = (Net Profit/Total Assets) *100		73.99	
Net Profit Margin (%) = (Net Profit/Total Revenue) *100		51.00	
Return on Labour (%) = [(Net Profit+Family Labour Cost)/Total Revenue] *100		57.85	

Source: NLSIP Endline Survey, 2023

3.2. Cost and Profitability Analysis of Dairy Enterprise at Task-2: Treatment PO level in 2023 (N=117)

Cost Heads	Investment / Assets per PO (Rs.)	Cost per PO (Rs.)	Cost (Rs.) per Liter of Milk
A. Investment / Fixed Assets			
Sheds	3447073.36	172353.67	2.36
Building	2015608.09	100780.40	1.38
Vehicle	613299.15	30664.96	0.42
Machinery	2141998.44	107099.92	1.47
Tool and equipment	358737.48	26905.31	0.37
Furniture and fixture	79735.04	7973.50	0.11
Other assets	43064.69	4306.47	0.06
Total of A	8699516.26	450084.24	6.17
B. Variable Cost			
B.1. Fixed operating cost			
Utilities (Water, Electricity, etc.)		131343.46	1.80
Staff cost (salary)		793590.22	10.87
Land rental/ lease		85094.43	1.17
Permanent labour cost		20431.62	0.28
Other fixed operational cost		90999.18	1.25
Total of B1		1121458.91	15.37
B.2. Variable operating cost			
Labor (hired)/Year		74809.59	1.03
Labor (family)/Year		115557.75	1.58
AI services		7857.26	0.11
Interest		290936.79	3.99
Insurance premium		28933.55	0.40
Medicine, etc.		34245.30	0.47
Transport charges		80975.56	1.11
Production material		262334.44	3.59
Packaging materials		85270.55	1.17
Service (vet Medicine, vaccine, drenching etc)		20730.42	0.28
Repair and maintenance		32391.91	0.44
Concentrated feeds		366825.21	5.03
Green forage (including silage)		95711.24	1.31
Dry forage		195439.80	2.68
Others Operation cost- variable/Year		8411.15	0.12
Total of B.2.		1700430.52	23.30
Total of B (Total Variable Cost: B1+B2)		2821889.44	38.67
Total Cost (Fixed Cost + Variable Cost) (A+B)		3271973.67	44.83

Cost Heads	Investment / Assets per PO (Rs.)	Cost per PO (Rs.)	Cost (Rs.) per Liter of Milk
Per PO total cost (Rs.)		3271973.67	
Per PO Milk Production (liter)		72979.07	
Cost of Production (Rs/Liter)		44.83	
Total Income per PO (Rs.)		3954735.90	
Net Profit per PO (Rs.)		682762.23	
Gross Margin per PO (Total Revenue- Total Variable cost) (Rs.)		1132846.47	
Return on Asset (ROA) = (Net Profit/Total Assets) *100		7.85	
Net Profit Margin (%) = (Net Profit/Total Revenue) *100		17.26	
Return on Labour (%) = [(Net Profit+Family Labour Cost)/Total Revenue] *100		20.19	

Source: NLSIP Endline Survey, 2023

3.3. Cost and Profitability Analysis of Dairy Enterprise at Task-2: Control PO level in 2023 (N=18)

Cost Heads	Investment / Assets per PO (Rs.)	Cost per PO (Rs.)	Cost (Rs.) per Liter of Milk
A. Investment / Fixed Assets			
Sheds	1196111.17	59805.56	1.46
Building	371666.72	18583.34	0.46
Vehicle	348333.33	17416.67	0.43
Machinery	1009583.33	50479.17	1.24
Tool and equipment	206888.89	15516.67	0.38
Furniture and fixture	63333.33	6333.33	0.16
Other assets	67222.22	6722.22	0.16
Total of A	3263139.00	174856.95	4.28
B. Variable Cost			
B.1. Fixed operating cost			
Utilities (Water, Electricity, etc.)		41905.56	1.03
Staff cost (salary)		421444.44	10.32
Land rental/ lease		35833.33	0.88
Permanent labour cost		0.00	0.00
Other fixed operational cost		33333.33	0.82
Total of B1		532516.667	13.04
B.2. Variable operating cost			
Labor (hired)/Year		258333.33	6.33
Labor (family)/Year		23333.33	0.57
AI services		6777.78	0.17
Interest		39222.22	0.96
Insurance premium		16722.22	0.41
Medicine, etc.		9277.78	0.23
Transport charges		41278.22	1.01
Production material		55555.56	13.61
Packaging materials		27777.78	6.80
Service (vet Medicine, vaccine, drenching etc)		19472.22	0.48
Repair and maintenance		45000.00	1.10
Concentrated feeds		35888.89	8.79

Cost Heads	Investment / Assets per PO (Rs.)	Cost per PO (Rs.)	Cost (Rs.) per Liter of Milk
Green forage (including silage)		1388.89	0.03
Dry forage		4166.67	0.10
Others Operation cost- variable/Year		72500.00	1.78
Total of B.2.		1729694.89	42.36
Total of B (Total Variable Cost: B1+B2)		2262211.56	55.40
Total Cost (Fixed Cost + Variable Cost) (A+B)		2437068.51	59.68
Per PO total cost (Rs.)		2437068.51	
Per PO Milk Production (liter)		40834.62	
Cost of Production (Rs/Liter)		59.68	
Total Income per PO (Rs.)		3122623.21	
Net Profit per PO (Rs.)		685554.71	
Gross Margin per PO (Total Revenue-Total Variable cost) (Rs.)		860411.66	
Return on Asset (ROA) = (Net Profit/Total Assets) *100		21.01	
Net Profit Margin (%) = (Net Profit/Total Revenue) *100		21.95	
Return on Labour (%) = [(Net Profit+Family Labour Cost)/Total Revenue] *100		22.70	

Source: NLSIP Endline Survey, 2023

3.4. Cost and Profitability Analysis of Dairy Enterprise at Task-2: Treatment Private Farm level in 2023 (N=152)

Cost Heads	Investment / Assets per Private Farm (Rs.)	Cost per Private Farm (Rs.)	Cost (Rs.) per Liter of Milk
A. Investment / Fixed Assets			
Sheds	2495467.08	124773.35	1.92
Building	1018085.07	50904.25	0.79
Vehicle	674065.79	33703.29	0.52
Machinery	1873032.38	93651.62	1.44
Tool and equipment	246652.26	18498.92	0.29
Furniture and fixture	35796.05	3579.61	0.06
Other assets	43694.03	4369.40	0.07
Total of A	6386792.66	329480.44	5.08
B. Variable Cost			
B.1. Fixed operating cost			
Utilities (Water, Electricity, etc.)		74310.53	1.15
Staff cost (salary)		668886.97	10.32
Land rental/ lease		151210.53	2.33
Permanent labour cost		8523.03	0.13
Other fixed operational cost		22617.08	0.35
Total of B1		925548.132	14.27
B.2. Variable operating cost			
Labor (hired)/Year		192046.29	2.96
Labor (family)/Year		97829.16	1.51
AI services		27597.37	0.43
Interest		589542.42	9.09
Insurance premium		43062.14	0.66
Medicine, etc.		53920.39	0.83

Cost Heads	Investment / Assets per Private Farm (Rs.)	Cost per Private Farm (Rs.)	Cost (Rs.) per Liter of Milk
Transport charges		114017.16	1.76
Production material		1298587.99	20.03
Packaging materials		44227.63	0.68
Service (vet Medicine, vaccine, drenching etc)		36072.37	0.56
Repair and maintenance		32793.76	0.51
Concentrated feeds		764913.17	11.80
Green forage (including silage)		270940.82	4.18
Dry forage		385125.00	5.94
Others Operation cost- variable/Year		17861.84	0.28
Total of B.2.		3968537.51	61.20
Total of B (Total Variable Cost: B1+B2)		4894085.64	75.48
Total Cost (Fixed Cost + Variable Cost) (A+B)		5223566.09	80.56
Per Private Farm total cost (Rs.)		5223566.09	
Per Private Farm Milk Production (Liter)		64841.99	
Cost of Production (Rs/Liter)		80.56	
Total Income per Private Farm (Rs.)		5354651.76	
Net Profit per Private Farm (Rs.)		131085.67	
Gross Margin per Private Farm (Total Revenue-Total Variable cost) (Rs.)		460566.11	
Return on Asset (ROA) = (Net Profit/Total Assets) *100		2.05	
Net Profit Margin (%) = (Net Profit/Total Revenue) *100		2.45	
Return on Labour (%) = [(Net Profit+Family Labour Cost)/Total Revenue] *100		4.28	

Source: NLSIP Endline Survey, 2023

3.5. Cost and Profitability Analysis of Dairy Enterprise at Task-2: Control Private Farm level in 2023 (N=99)

Cost Heads	Investment / Assets per Private Farm (Rs.)	Cost per Private Farm (Rs.)	Cost (Rs.) per Liter of Milk
A. Investment / Fixed Assets			
Sheds	1306238.38	65311.92	2.43
Building	356727.27	17836.36	0.66
Vehicle	304777.78	15238.89	0.57
Machinery	464810.17	23240.51	0.87
Tool and equipment	47627.27	3572.05	0.13
Furniture and fixture	16197.26	1619.73	0.06
Other assets	4095.96	409.60	0.02
Total of A	2500474.10	127229.05	4.74
B. Variable Cost			
B.1. Fixed operating cost			
Utilities (Water, Electricity, etc.)		41153.03	1.53
Staff cost (salary)		230868.69	8.60
Land rental/ lease		50080.81	1.87
Permanent labour cost		1295.96	0.05
Other fixed operational cost		3626.26	0.14

Cost Heads	Investment / Assets per Private Farm (Rs.)	Cost per Private Farm (Rs.)	Cost (Rs.) per Liter of Milk
Total of B1		327024.747	12.18
B.2. Variable operating cost			
Labor (hired)/Year		55868.77	2.08
Labor (family)/Year		42040.40	1.57
AI services		7614.14	0.28
Interest		255988.32	9.53
Insurance premium		16837.37	0.63
Medicine, etc.		23664.65	0.88
Transport charges		26917.17	1.00
Production material		27515.15	1.02
Packaging materials		4717.25	0.18
Service (vet Medicine, vaccine, drenching etc)		10041.43	0.37
Repair and maintenance		4691.92	0.17
Concentrated feeds		172507.07	6.43
Green forage (including silage)		10909.09	0.41
Dry forage		185338.40	6.90
Others Operation cost- variable/Year		3548.57	0.13
Total of B.2.		848199.717	31.59
Total of B (Total Variable Cost: B1+B2)		1175224.46	43.77
Total Cost (Fixed Cost + Variable Cost) (A+B)		1302453.51	48.51
Per Private Farm total cost (Rs.)		1302453.51	
Per Private Farm Milk Production (Liter)		26848.17	
Cost of Production (Rs/Liter)		48.51	
Total Income per Private Farm (Rs.)		1793189.06	
Net Profit per Private Farm (Rs.)		490735.54	
Gross Margin per Private Farm (Total Revenue- Total Variable cost) (Rs.)		617964.59	
Return on Asset (ROA) = (Net Profit/Total Assets) *100		19.63	
Net Profit Margin (%) = (Net Profit/Total Revenue) *100		27.37	
Return on Labour (%) = [(Net Profit+Family Labour Cost)/Total Revenue] *100		29.71	

Source: NLSIP Endline Survey, 2023

Annex-5: Cost of Production and Profitability Analysis of Goat Enterprises in Task-2 in 2023

4.1. Cost and Profitability Analysis of Goat Enterprise at Task-2: Individual HH level in 2023 (N=486)

Cost Heads	Investment / Assets per HH (Rs.)	Cost per HH (Rs.)	Cost (Rs.) per Kg of Live weight
G. Investment / Fixed Assets			
Sheds	406366.99	20318.35	26.09
Building	17634.49	881.72	1.13
Vehicle	34167.30	1708.36	2.19
Machinery	28368.42	1418.42	1.82
Tool and equipment	8747.24	437.36	0.56
Furniture and fixture	3709.47	185.47	0.24
Other assets	1281.27	64.06	0.08
Total of A	500275.16	25013.76	32.12
H. Variable Cost			
B.1. Fixed operating cost			
Utilities (Water, Electricity, etc.)		5385.10	6.92
Staff cost (salary)		17141.98	22.01
Land rental/ lease		1223.25	1.57
Permanent labour cost		324.72	0.42
Other fixed operational cost		622.20	0.80
Total of B1		24697.249	31.72
B.2. Variable operating cost			
Feeds/year		57789.94	74.21
Labor (hired)/Year		168.72	0.22
Labor (family)/Year		3111.11	4.00
AI services		72.02	0.09
Interest		30679.50	39.40
Insurance premium		3258.44	4.18
Medicine, etc.		6487.53	8.33
Transport charges		1914.61	2.46
Production material		3199.18	4.11
Packaging materials		0.02	0.00
Service (vet Medicine, vaccine, drenching etc)		5401.40	6.94
Repair and maintenance		904.44	1.16
Concentrated feeds		0.00	0.00
Green forage (including silage)		1166.67	1.50
Dry forage		3432.51	4.41
Others Operation cost- variable/Year		1034.03	1.33
Total of B.2.		118620.11	152.33
Total of B (Total Variable Cost: B1+B2)		143317.36	184.05
Total Cost (Fixed Cost + Variable Cost) (A+B)		168331.12	216.17
Per HH total cost (Rs.)		168331.12	
Per HH Goat Meat Production (Kg on live weight) per Year ²²		778.69	

²² Weight gain of standing goat=550.68 kg, and weight of sold-out goat in the accounting year=228 kg

Cost Heads	Investment / Assets per HH (Rs.)	Cost per HH (Rs.)	Cost (Rs.) per Kg of Live weight
Cost of Production (Rs/Kg) (on live weight basis)		216.17	
Total Income per HH (Rs.)		426722.06	
Net Profit per HH (Rs.)		258390.94	
Gross Margin per HH (Total Revenue- Total Variable cost) (Rs.)		283404.70	
Return on Asset (ROA) = (Net Profit/Total Assets) *100		51.65	
Net Profit Margin (%) = (Net Profit/Total Revenue) *100		60.55	
Return on Labour (%) = [(Net Profit+Family Labour Cost)/Total Revenue] *100		61.28	

Source: NLSIP Endline Survey, 2023

4.2. Cost and Profitability Analysis of Goat Enterprise at Task-2: Treatment PO level in 2023 (N=65)

Cost Heads	Investment / Assets per PO (Rs.)	Cost per PO (Rs.)	Cost (Rs.) per Kg of Live weight
C. Investment / Fixed Assets			
Sheds	1909172.63	95458.63	10.51
Building	104522.46	5226.12	0.58
Vehicle	32661.54	1633.08	0.18
Machinery	34923.08	1746.15	0.19
Tool and equipment	83271.23	4163.56	0.46
Furniture and fixture	35161.54	1758.08	0.19
Other assets	25453.85	1272.69	0.14
Total of A	2225166.32	111258.32	12.25
D. Variable Cost			
B.1. Fixed operating cost			
Utilities (Water, Electricity, etc.)		48449.12	5.33
Staff cost (salary)		113523.09	12.50
Land rental/ lease		115215.38	12.68
Permanent labour cost		5461.54	0.60
Other fixed operational cost		153.85	0.02
Total of B1		282802.98	31.13
B.2. Variable operating cost			
Feeds/year		153168.15	16.86
Labor (hired)/Year		20846.15	2.30
Labor (family)/Year		61692.35	6.79
AI services		1276.92	0.14
Interest		101587.69	11.18
Insurance premium		14294.62	1.57
Medicine, etc.		10100.00	1.11
Transport charges		13661.54	1.50
Production material		14307.69	1.58
Packaging materials		0.00	0.00
Service (vet Medicine, vaccine, drenching etc)		31721.54	3.49
Repair and maintenance		3921.54	0.43
Concentrated feeds		469208.62	51.66
Green forage (including silage)		64923.08	7.15

Cost Heads	Investment / Assets per PO (Rs.)	Cost per PO (Rs.)	Cost (Rs.) per Kg of Live weight
Dry forage		67569.23	7.44
Others Operation cost- variable/Year		9615.38	1.06
Total of B.2.		1037894.51	114.27
Total of B (Total Variable Cost: B1+B2)		1320697.49	145.40
Total Cost (Fixed Cost + Variable Cost) (A+B)		1431955.81	157.65
Per PO total cost (Rs.)		1431955.81	
Per PO Goat Meat Production (Kg on live weight) per Year ²³		9083.21	
Cost of Production (Rs/Kg) (on live weight basis)		157.65	
Total Income per PO (Rs.)		4860606.35	
Net Profit per PO (Rs.)		3428650.54	
Gross Margin per PO (Total Revenue- Total Variable cost) (Rs.)		3539908.86	
Return on Asset (ROA) = (Net Profit/Total Assets) *100		154.09	
Net Profit Margin (%) = (Net Profit/Total Revenue) *100		70.54	
Return on Labour (%) = [(Net Profit+Family Labour Cost)/Total Revenue] *100		71.81	

Source: NLSIP Endline Survey, 2023

4.3. Cost and Profitability Analysis of Goat Enterprise at Task-2: Control PO level in 2023 (N=14)

Cost Heads	Investment / Assets per PO (Rs.)	Cost per PO (Rs.)	Cost (Rs.) per Kg of Live weight
C. Investment / Fixed Assets			
Sheds	481785.71	24089.29	16.89
Building	135714.29	6785.71	4.76
Vehicle	714.86	35.74	0.03
Machinery	52071.43	2603.57	1.83
Tool and equipment	27572.00	1378.60	0.97
Furniture and fixture	8571.43	428.57	0.30
Other assets	2357.14	117.86	0.08
Total of A	708786.86	35439.34	24.85
D. Variable Cost			
B.1. Fixed operating cost			
Utilities (Water, Electricity, etc.)		22100.00	15.50
Staff cost (salary)		42857.14	30.05
Land rental/ lease		28571.43	20.03
Permanent labour cost		0.00	0.00
Other fixed operational cost		0.00	0.00
Total of B1		93528.57	65.58
B.2. Variable operating cost			
Feeds/year		96142.86	67.41
Labor (hired)/Year		20000.00	14.02
Labor (family)/Year		78571.43	55.09

²³ Weight gain of standing goat=5967.35 kg, and weight of sold-out goat in the accounting year=3115.86 kg

Cost Heads	Investment / Assets per PO (Rs.)	Cost per PO (Rs.)	Cost (Rs.) per Kg of Live weight
AI services		71428.57	50.08
Interest		28750.00	20.16
Insurance premium		5010.71	3.51
Medicine, etc.		5928.57	4.16
Transport charges		214.29	0.15
Production material		0.57	0.00
Packaging materials		0.57	0.00
Service (vet Medicine, vaccine, drenching etc)		13928.57	9.77
Repair and maintenance		0.00	0.00
Concentrated feeds		171105.00	119.97
Green forage (including silage)		0.00	0.00
Dry forage		0.00	0.00
Others Operation cost- variable/Year		0.00	0.00
Total of B.2.		491081.14	344.32
Total of B (Total Variable Cost: B1+B2)		584609.71	409.90
Total Cost (Fixed Cost + Variable Cost) (A+B)		620049.06	434.75
Per PO total cost (Rs.)		620049.06	
Per PO Goat Meat Production (Kg of live weight) per Year ²⁴		1426.21	
Cost of Production (Rs/Kg) (on live weight basis)		434.75	
Total Income per PO (Rs.)		746394.98	
Net Profit per PO (Rs.)		126345.93	
Gross Margin per PO (Total Revenue- Total Variable cost) (Rs.)		161785.27	
Return on Asset (ROA) = (Net Profit/Total Assets) *100		17.83	
Net Profit Margin (%) = (Net Profit/Total Revenue) *100		16.93	
Return on Labour (%) = [(Net Profit+Family Labour Cost)/Total Revenue] *100		27.45	

Source: NLSIP Endline Survey, 2023

4.4. Cost and Profitability Analysis of Goat Enterprise at Task-2: Treatment Private Farm level in 2023 (N=101)

Cost Heads	Investment / Assets per Private Farm (Rs.)	Cost per Private Farm (Rs.)	Cost (Rs.) per Kg of Live weight
C. Investment / Fixed Assets			
Sheds	1291661.44	64583.07	15.84
Building	289990.10	14499.50	3.56
Vehicle	46717.82	2335.89	0.57
Machinery	25432.67	1271.63	0.31
Tool and equipment	78603.96	3930.20	0.96
Furniture and fixture	25894.06	1294.70	0.32

²⁴ Weight gain of standing goat=963.71 kg, and weight of sold-out goat in the accounting year=462.5 kg

Cost Heads	Investment / Assets per Private Farm (Rs.)	Cost per Private Farm (Rs.)	Cost (Rs.) per Kg of Live weight
Other assets	22029.70	1101.49	0.27
Total of A	1780329.75	89016.49	21.83
D. Variable Cost			
B.1. Fixed operating cost			
Utilities (Water, Electricity, etc.)		35743.56	8.77
Staff cost (salary)		76128.71	18.67
Land rental/ lease		38049.50	9.33
Permanent labour cost		2386.14	0.59
Other fixed operational cost		676.24	0.17
Total of B1		152984.16	37.52
B.2. Variable operating cost			
Feeds/year		162981.58	39.97
Labor (hired)/Year		14794.06	3.63
Labor (family)/Year		70307.01	17.24
AI services		193.07	0.05
Interest		87626.96	21.49
Insurance premium		14201.98	3.48
Medicine, etc.		10824.75	2.65
Transport charges		31343.34	7.69
Production material		16425.74	4.03
Packaging materials		613.94	0.15
Service (vet Medicine, vaccine, drenching etc)		31366.42	7.69
Repair and maintenance		12396.09	3.04
Concentrated feeds		285755.52	70.08
Green forage (including silage)		22341.58	5.48
Dry forage		47683.17	11.69
Others Operation cost- variable/Year		4301.93	1.06
Total of B.2.		813157.15	199.43
Total of B (Total Variable Cost: B1+B2)		966141.31	236.95
Total Cost (Fixed Cost + Variable Cost) (A+B)		1055157.80	258.78
Per Private Farm total cost (Rs.)		1055157.80	
Per Private Farm Goat Meat Production (Kg in Live weight) per Year ²⁵		4077.48	
Cost of Production (Rs/Kg) (on live weight basis)		258.78	
Total Income per Private Farm (Rs.)		2535700.92	
Net Profit per Private Farm (Rs.)		1480543.13	
Gross Margin per Private Farm (Total Revenue-Total Variable cost) (Rs.)		1569559.62	
Return on Asset (ROA) = (Net Profit/Total Assets) *100		83.16	
Net Profit Margin (%) = (Net Profit/Total Revenue) *100		58.39	
Return on Labour (%) = [(Net Profit+Family Labour Cost)/Total Revenue] *100		61.16	

Source: NLSIP Endline Survey, 2023

²⁵ Weight gain of standing goat=3204.05 kg, and weight of sold-out goat in the accounting year=873.42 kg

4.5. Cost and Profitability Analysis of Goat Enterprise at Task-2: Control Private Farm level in 2023 (N=42)

Cost Heads	Investment / Assets per Private Farm (Rs.)	Cost per Private Farm (Rs.)	Cost (Rs.) per Kg of Live weight
C. Investment / Fixed Assets			
Sheds	1119678.62	55983.93	21.72
Building	93452.38	4672.62	1.81
Vehicle	32976.19	1648.81	0.64
Machinery	24232.14	1211.61	0.47
Tool and equipment	195100.00	9755.00	3.78
Furniture and fixture	35928.57	1796.43	0.70
Other assets	3785.71	189.29	0.07
Total of A	1505153.62	75257.68	29.19
D. Variable Cost			
B.1. Fixed operating cost			
Utilities (Water, Electricity, etc.)		39762.02	15.42
Staff cost (salary)		53023.81	20.57
Land rental/ lease		18952.38	7.35
Permanent labour cost		1333.33	0.52
Other fixed operational cost		0.00	0.00
Total of B1		113071.55	43.86
B.2. Variable operating cost			
Feeds/year		126833.33	49.20
Labor (hired)/Year		21154.83	8.21
Labor (family)/Year		41190.52	15.98
AI services		0.00	0.00
Interest		51273.81	19.89
Insurance premium		7414.52	2.88
Medicine, etc.		10000.00	3.88
Transport charges		7916.67	3.07
Production material		976.19	0.38
Packaging materials		0.00	0.00
Service (vet Medicine, vaccine, drenching etc)		14238.10	5.52
Repair and maintenance		3000.00	1.16
Concentrated feeds		118049.05	45.80
Green forage (including silage)		16238.10	6.30
Dry forage		23214.29	9.01
Others Operation cost- variable/Year		4285.71	1.66
Total of B.2.		445785.12	172.93
Total of B (Total Variable Cost: B1+B2)		558856.67	216.80
Total Cost (Fixed Cost + Variable Cost) (A+B)		634114.35	245.99
Per Private Farm total cost (Rs.)		634114.35	
Per Private Farm Goat Meat Production (Kg on live weight) per Year ²⁶		2577.77	

²⁶ Weight gain of standing goat=1421.62 kg, and weight of sold-out goat in the accounting year=1156.15 kg

Cost Heads	Investment / Assets per Private Farm (Rs.)	Cost per Private Farm (Rs.)	Cost (Rs.) per Kg of Live weight
Cost of Production (Rs/Kg) (on live weight basis)		245.99	
Total Income per Private Farm (Rs.)		1723624.48	
Net Profit per Private Farm (Rs.)		1089510.13	
Gross Margin per Private Farm (Total Revenue-Total Variable cost) (Rs.)		1164767.81	
Return on Asset (ROA) = (Net Profit/Total Assets) *100		72.39	
Net Profit Margin (%) = (Net Profit/Total Revenue) *100		63.21	
Return on Labour (%) = [(Net Profit+Family Labour Cost)/Total Revenue] *100		65.60	

Source: NLSIP Endline Survey, 2023

Annex-6: Field Mobilization (Field Researcher/ Supervisors/ Enumerators)

S. No.	Name	Contact	Email
1.	Krishus Shrestha	9861296914	sthakrishus@gmail.com
2.	Kishwor Shrestha	9803651197	kishworshrestha10@gmail.com
3.	Shubham Shah	9860059203	45.shubh@gmail.com
4.	Baburam Roka	9841411063	rokababuram41@gmail.com
5.	Manoj Kumar Shah	9841801773	sahm9204@gmail.com
6.	Prabesh Kasula	9860366136	Prabeshkasula@gmail.com
7.	Mohan Krishna Neupane	9860799289	mohankis@gmail.com
8.	Subesh Bista	9841113804	bistasubesh@gmail.com
9.	Dhurba Chandra Joshi	9868773731	dhrubjoshi2016@gmail.com
10.	Santosh Nath	9869078208	santoshnath983@gmail.com
11.	Akash Chand	9868270152	chandakash159@gmail.com
12.	Nirmal Poudel	9869671567	nirmalsharmapoudel@gmail.com
13.	Abhishek Rawal	9865903715	abishekrawal435@gmail.com
14.	Nabin Kumar Mehta	9817399168	mehtanabin66@gmail.com
15.	Amrita Yadav	9803568591	
16.	Prabin Gouli	9861822291	prabingouli1@gmail.com
17.	Pradip Rana	9822515220	
18.	Shreeti Shrestha	9860675476	shtshriti76@gmail.com
19.	Nikita Neupane	9867220755	nikitaneupane.xz@gmail.com
20.	Sudip Roka	9841857195	sudiproka71@gmail.com
21.	Shishir Kc	9813772467	manjum836@gmail.com
22.	Manju KC	9849575579	manjum836@gmail.com
23.	Rashmi Sen	9803790150	senrasmi8@gmail.com
24.	Sagar Prasad Acharya	9745328902	acharyasagarprd725@gmail.com
25.	Radha Krishna Neupane	9843331285	bogatiusha536@gmail.com
26.	Umesh Dhakal	9848614687	umeshdhakal99921@gmail.com
27.	Hema Puri (Harikala)	9868727575	hemapuri85@gmail.com
28.	Laxmi Acharya	9841384266	laxmiacharya6575@gmail.com

Annex-7: Data Collection Tools

Annex-8: Checklist of Key Informants Interview, Focus Group Discussion, and Individual Interview Questionnaires

**Nepal Livestock Sector Innovation Project (NLSIP)
End line Survey 2023
Key Informant Interview
Bank and Financial Institutions**

Checklist 1

1. Name of BFI:Branch:
2. Name of Key Informant.....
Position:Gender.....Telephone:
3. Address: Province.....District..... Rural/Municipality.....
Ward

4. Investment trends on overall agriculture and livestock sector (last 3 years)

Sectors	2077/78	2078/79	2079/80
Overall Agriculture (NRs. million)			
Livestock (NRs. million)			
Other Sector (NRs. million)			
Total (NRs million)			

5. Number of Clients (last 3 years)

Category	2077/78	2078/79	2079/80
Co-operatives			
Farmers' Groups			
Federations/producers' association			
A private company (Milk and meat processors)			

6. Total number of loan applications and approval

Category	Agriculture	Livestock (3 VCs)	Other
Loan applications			
Loan approval			

7. Lending process

Farmers' Organizations	Process (easy or difficult)	If difficult why
Farmer Group		
Cooperative		
Producer Association		
Private entrepreneur		

8. Lending secure sectors

Value chains	Secure (Yes or No)	If no why
Dairy		
Dairy processing		
Goat meat		
Chyangra Pashmina		

9. Opinion on funding modality (50% grant, 30% loan, and 20% equity)
10. Major elements that attract you to further lending.....
11. Additional loan to the same enterprise in the future for scale-up.....
12. Best suggestions to improve lending for commercialization of the livestock sector.....

Photograph

GPS

Name of Interviewer

Date

Key Informant Interview
Veterinary Hospital and Livestock Expert Center (VHLEC)

Checklists-2

1. Name of Key Informant.....
Position:Gender.....Telephone:
2. Address: Province.....District.....Rural/Municipality.....
Ward ...
3. Capacity Building and support to VHLEC (NLSIP)
.....
4. Support to farmers for livestock sector development (intervention of VHLEC)
.....
5. Changes in service delivery to farmers and its effectiveness
.....

6. Infrastructure developed and status of its utilization (NLSIP)

List of Infrastructure/ equipment	Quantity	Actively Utilized	Moderately Utilized	Not Utilized

7. Changes in the number of beneficiaries, range of service, quality service, and types of benefits after NLSIP support.
.....

8. Operational status of equipment

	Yes or no
Was the supplied equipment relevant to the type of services provided?	
Was the supplied equipment helpful in providing effective vet services?	
Was the provided operational training sufficient in its effective use?	
Arrangement on its operation/maintenance/repair.	

9. Requirement area for future quality veterinary and livestock services.

- a. Infrastructure development (livestock service center, market)
.....

- b. Capacity building / technical training
.....

- c. Modern equipment supports
.....

- d. Knowledge dissemination / good practices
.....

- e. Extension services (more frontline technicians)
.....

- f. LMIS and it's useful for data and information
.....

- g. Any other (please specify)
.....

- h. Suggestions for the project
.....

Photograph

GPS

Name of Interviewer

Date

Key Informant Interview
Livestock Department of Rural/Municipality
Livestock Service Section (Palika)

Checklist 3

1. Name of Key Informant.....
Position:Gender.....Telephone:.....
2. Address: Province.....District.....Rural/Municipality.....Ward
3. Supported the Capacity Building of this livestock Service Section and helps it to support farmers in livestock sector development (Knowledge Gain and Skill improvement).

.....
4. Changes in service delivery to farmers and its effectiveness

.....
5. Infrastructure developed and status of its utilization (NLSIP)

List of Infrastructure/ equipment	Quantity	Actively Utilized	Moderately Utilized	Not Utilized

6. Operational and maintenance arrangement

.....
7. Sustainability of the service delivery system

.....
8. Use of LMIS and its Effectiveness

.....
9. Suggestions for the project

.....
Photograph
GPS
Name of Interviewer
Date

Key Informant Interview National Livestock Breeding Office, Pokhara

Checklists-4

1. Name of Key Informant.....
Position:Gender.....Telephone:
2. Address: Province.....District.....Rural/Municipality.....
Ward ...
3. Capacity Building of NLBO, Pokhara (NLSIP)
.....
4. Support to farmers for breed improvement
.....
5. Changes in breeding service delivery to farmers and its effectiveness
.....
6. Infrastructure developed and status of its utilization (NLSIP)

List of Infrastructure/ equipment/ bulls/ bucks	Quantity	Actively Utilized	Moderately Utilized	Not Utilized

7. Operational status of equipment

	Yes or no
Was the supplied equipment relevant to the type of services provided?	
Was the supplied equipment helpful in providing effective vet services?	
Was the provided operational training sufficient in its effective use?	
Arrangement on its operation/maintenance/repair.	

8. Requirement area for future quality breed improvement services.
 - a. Infrastructure development
.....
 - b. Capacity building / technical training
.....
 - c. Modern equipment supports
.....
 - d. Knowledge dissemination / good practices
.....
 - e. Any other (please specify)
.....
9. Your valuable suggestions for breed improvement
.....

Photograph
GPS
Name of Interviewer
Date

Key Informants Interview Stakeholders' Dialogue Platform

Checklist-5

1. Address:.....Province.....District.....Rural/Municipality....Ward
 2. Name of Key Person:..... Gender..... Designation.....
Phone.....
 3. Level of SDP.....
 4. Topics of discussion during the SDP meeting
 - a. Involvement of value chain actors in the establishment of value chain development in cluster
.....
 - b. Scale-up of particular value chain commodities
.....
 - c. Institutional linkage of the value chain actors and enablers: forward and backward linkage for the overall growth of value chain commodities
.....
 - d. Productive alliance especially producers and buyers
.....
 - e. Funding arrangement for value chain growth
.....
 - f. Processing facilities and market infrastructure development
.....
 - g. If any
 5. SDP fulfillment of its role and responsibility in this project.
.....
 6. Meetings organized till the date
.....
 7. Types of roles played by the NLSIP to strengthen the SDP
.....
 8. Percentage of SDP decisions implemented during the project.
 - a. Which decisions were implemented and how?
.....
 - b. Which decisions were not implemented and why?
.....
 - c. Did SDP follow up on their decision and how?
.....
 9. Your perception of SDP and its role in the commercialization of the livestock sector.
.....
 10. Arrangements for the continuation of such SDP (sustainability)
.....
 11. Suggestions for the project
.....
- Photograph
GPS
Group Discussion Lead
Date

**Key Informants Interview
Grievance Redress Committee**

Checklist-6

1. Address:.....Province.....District.....Rural/Municipality.....
Ward.....
2. Level or Types of GHC:
3. Name of Key person:Gender.....Designation.....Contact Number.....
4. Most common types of grievances the committee receives, and how does the committee typically address them?
.....
5. Timely handling of grievances and information flow to grievance
.....
6. Example of challenges in grievance handling
.....
7. Any suggestions for future improvement of this committee
.....

Photographs
GPS
Group discussion lead
Date

**Focus Group Discussion
Livestock Market Place
Market Management Committee**

Checklist -7

1. Name of Market: Types of Market:
Cluster/district/regional/national
2. Address:.....Province.....District.....Rural/
Municipality.....Ward
3. List of participants

Name	Gender	Post	Phone Number	Value Chain Commodity	Address (rural/municipality/ward)

4. Infrastructure developed and status of its utilization (NLSIP)

List of Infrastructure/ equipment	Quantity	Actively Utilized	Moderately Utilized	Not Utilized

5. Effectiveness in terms of:
 - a. Beneficiaries number and is it increasing, decreasing, or constant after NLSIP support
.....
.....
 - b. Changes in operation modality.
.....
.....
 - c. Role of the management committee.
.....
.....
 - d. Arrangement of livestock, sellers, buyers, etc.
.....
6. Application of safety measures, transparency, and GRM
.....
7. Maintenance plan of infrastructure and equipment
.....
8. Sustainability of livestock market center
.....
9. Do you have any suggestions for the project?
.....

Photograph
GPS
Group Discussion Lead
Date

Focus Group Discussion Chilling Center

Checklist -8

1. Name of Chilling Vat center: Operation by:
Group/Cooperative/private sector
2. Address:.....Province.....District.....Rural/Municipa
lity.....Ward

3. List of participants

Name	Gender	Post	Phone Number	Value Chain Commodity	Address (rural/municipality/ward)

4. Infrastructure developed and status of its utilization (NLSIP)

List of Infrastructure/ equipment	Quantity	Actively Utilized	Moderately Utilized	Not Utilized

5. Effectiveness in terms of:
 - a. Beneficiaries number and is it increasing, decreasing, or constant after NLSIP support?
.....
 - b. The volume of transactions before and after
.....
 - c. Changes in the operation modality
.....
 - d. Capacity used (total capacity and used capacity)
.....
6. Maintenance plan of chilling vat
.....
7. Do any suggestions for to project?
.....
 - Photograph
 - GPS
 - Group discussion lead
 - Date

**Individual Interview
Training Participants (Staff)**

Checklist-9

1. Name of Staff:.....Gender.....
2. Office Name:.....Position.....
3. Office Address: Province.....District.....Municipality/ Rural
Municipality.....
4. Topics of training
 - a. Topic 1.....Date.....Days.....
 - b. Topic 2.....Date.....Days
5. Quality of training
.....
6. Training on need-based (Relevancy)
.....
7. Skills and knowledge enhancement (effectiveness)
.....
8. Application of training knowledge (change in behavior)
.....
9. Change in service delivery mechanism (impact)
.....
10. Area of future training to enhance the capacity of local agencies and staff
.....

Photograph
GPS
Interviewer
Date

Annex-9: Study Photographs

1. Supervisors and Enumerators Training Photographs



Introduction of project background by Shova Poudel (MD, BFI)



Calculation of Cost of production by the participant



Explaining the pattern of Questionnaire



Open discussion among the participants



Discussion on Different sets of Questions



Participants attending class

Supervisors and Enumerators Training Conducted in Kathmandu

2. Pre-Test Photographs

Pre testing conducted in Shree Deurali Dudh Utpadak Sahakari Sanstha Limited, Dhulikhel-2, Rabi Deurali of Kavre district in Ashar 7, 2080 (22nd June 2023).



Cow shed managed by NLSIP through cooperative



Household survey Task 2 (Matching grant)



Interviewing Shiv Pd Koirala chairperson of the cooperative



Household survey Task 2 (Matching grant)



Chaff cutter provided by NLSIP through Cooperative

Field Test of the Questionnaires and NLSIP Intervantion

3. Photographs During the Field Visit and Data Collection



Ashis krishi tatha Pasupanchhi Farm, Rautamai Rural Municipality, Udaypur Private Firm



Saptakoshi Bahuudeshya Krishi Farm, Kanchanrup Municipality Saptari, Private Farm



Farmer, Bagnaskali Bahudesiya Sahakari Sanstha Ltd, Rampur Municipality, Palpa



Laliguras Bahuudasya Sahakari Sanstha, Ratnanagar Municipality, Chitwan



Maharanihoda Sana Kisan Sahakari Sanstha ltd., Damak Municipality, Jhapa



Mukundasen Dugdha Utpadan Samuha, Nawalparashi



Shrutika Pashu Farm, Madhyabindu Municipality, Nawalparashi



Chilling vat, Bahundagi Krishi tatha pasupalan pvt ltd, Mechinagar, Jhapa



Bindrabasani Krishi Firm, Shibasatashi, Jhapa



Chulachuli krishi sahakari sanstha ltd, Silage making machine, chulachuli-Ilam



Chulachuli krishi sahakari sanstha ltd, home-made silage, chulachuli-Ilam



Shubhaagan Krishi Sahakari Sanstha Limited, Damak, Jhapa, Compost Pit



Milking machine, Bhardhowaj Krishi Tatha Pasupalan Pvt Ltd, Mechinagar, Jhapa



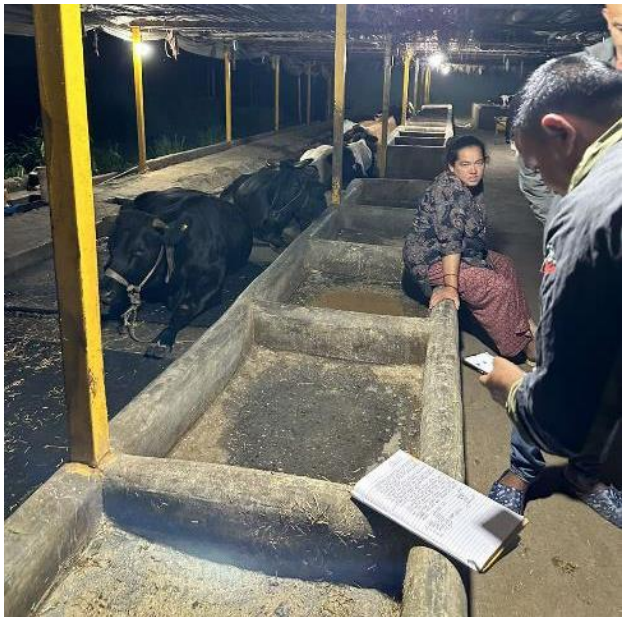
Shree Gaubesi Dugdh utpadak Sahakari Ltd, chaff cutter Cage System, Hiliang Pachthar



Shree Trishakti Dugdh Utpadak Sahakari Sanstha Ltd, Gai farm, Phidim, Pachthar



Field Observation and discussion



Field Observation and Data Collection

