Impact Assessment Report

Grass into Gains: Promoting Silage Production for Livelihood and Livestock Development

A Project of the Graduate Students of the Department of Animal Science

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Executive Summary

The community engagement project *"Grass into Gains: Promoting Silage Production for Livelihood and Livestock Development"* successfully enhanced the knowledge, skills, and collaborative capacities of 38 participants, including farmers, cooperative members, extension workers, and students. Results showed a **42% increase in knowledge** based on pre- and post-test scores, complemented by hands-on practice that enabled participants to prepare silage from Napier grass with molasses and corn with LAB inoculant. The distribution of training modules further reinforced learning, ensuring continuity of skills application.

The project fostered **institutional networking**, engaging two farmer associations, one state university, and three local government units, thus laying the groundwork for sustained partnerships and technical support. Early signs of **adoption and enterprise development** emerged as the farmers association KARLIFA expressed interest in integrating silage into feed systems and exploring its potential as a community-based business venture. The diverse gender participation (58% male, 42% female) reflected inclusivity, while commitments from students and extension workers to conduct re-echo trainings indicated strong prospects for **sustainability and scalability**. Collectively, the project delivered immediate learning outcomes and set the foundation for long-term improvements in livestock productivity, reduced feed costs, and rural livelihood development.

Part I

NARRATIVE REPORT

This section outlines the background, methods of implementation and actual accomplishments and outputs of the project.

“Grass into Gains: Promoting Silage Production for Livelihood and Livestock Development”

A Project of the Graduate Students and Faculty of the Department of Animal Science

Introduction

The Department of Animal Science, through its graduate students under the mentorship of Dr. Josephine R. Migalbin, together with the core faculty members of the PhD program in Agricultural Sciences major in Animal Science namely Drs. JUrhamid Imland and Geoffray R. Atok implemented the extension project 'Grass into Gains: Promoting Silage Production for Livelihood and Livestock Development.' This initiative was conceptualized in response to persistent challenges in feed availability and quality that constrain livestock productivity in the region. Silage technology, recognized for its capacity to preserve forage crops, improve feed utilization, and stabilize year-round animal nutrition, was introduced as both a livelihood strategy and a sustainable livestock management practice.

The project reflects the Department’s dual commitment: (1) to strengthen the research-extension interface by mobilizing graduate students as frontline facilitators of knowledge transfer, and (2) to enhance the capacities of rural farmers, cooperatives, and extension workers in adopting improved forage conservation practices.

The extension project of graduate students and faculty members of the Department of Animal Science was successfully conducted with 38 participants consisting of farmers, cooperative members, extension workers, and students. The training combined lecture discussions, hands-on silage-making, and cooperative planning workshops. Two sets of training were conducted.

Objectives
The project aimed to:

1. Build awareness and knowledge on the principles, economics, and practical techniques of silage production.
2. Develop technical competencies among farmers, farmers association members, and extension workers in producing high-quality silage.
3. Foster linkages between local institutions (farmer cooperatives, and LGUs) and the University of Southern Mindanao (USM) to ensure sustained dissemination of silage-making practices.
4. Evaluate knowledge acquisition and skill development through structured pre- and post-training assessments.

Participation and Coverage

The training involved 38 participants, composed of farmers association members, farmers, extension workers, and students, ensuring a cross-sectoral learning environment. Gender distribution was relatively balanced, with 69% male and 31% female participation, reflecting inclusive engagement. Institutional representation covered one farmer association, one State University and College (SUC), one research station and three Local Government Units (LGUs), highlighting the multi-level nature of the initiative.

PhD and MS graduate students of the Department of Animal Science with their professor Dr. Josephine R. Migalbin (6th from left)

Participants of another training composed of representatives from farmers' association, LGUs and others with Dr. Migalbin at the middle.

Methodology

1. Orientation of Students as to their involvement in the Extension Project

The involvement of students in extension programs and projects are clearly defined to ensure their meaningful participation, contribution to community development, and attainment of academic learning outcomes. The table below outlines the roles of students across different phases of extension implementation.

Phase	Student Roles and Responsibilities
Preparation Phase	- Needs Assessment Participation: Identify community problems through surveys, interviews, FGDs. - Planning and Design: Draft project proposals, contribute ideas, align activities with course outcomes. - Resource Mobilization: Assist in preparing materials, securing logistics, and coordinating with stakeholders. - Capacity Building: Undergo training to understand extension principles and objectives.
Implementation Phase	- Execution of Activities: Facilitate training, demonstrations, and workshops. - Community Interaction: Engage with beneficiaries, provide technical support, coaching, mentoring. - Documentation and Monitoring: Record attendance, photos, feedback, and progress. - Technical Support: Assist in farm demos, product development, or livelihood activities.
Evaluation and Monitoring	- Data Gathering: Administer surveys and interviews. - Impact Assessment: Analyze adoption of technologies, skills gained, or income changes. - Reporting: Prepare narrative and financial reports with lessons learned.
Sustainability and Follow-Up	- Community Linkages: Connect beneficiaries with agencies, cooperatives, or markets. - Knowledge Transfer: Conduct re-echo training for students or communities. - Continuity Plans: Propose strategies for

	sustaining the project.
Student Learning Outcomes	- Apply classroom theories in real-life situations. - Develop leadership, teamwork, and communication skills. - Gain exposure to research-extension integration. - Strengthen social responsibility and community engagement skills.

2. Stakeholder Assessment

Preliminary consultation was conducted with farmer associations and representatives from FAO-KOICA to establish the relevance of silage-making in the local agricultural context. This participatory needs assessment provided insights into feed resource gaps and guided the project design.

Meeting with representatives of farmers association and FAO-KOICA

3. Lecture sessions on principles and economics of silage.

Academic content was delivered by graduate students, including Dr. Rayan Ysulat, DVM (PhD student), who discussed the technical principles of silage-making. Complementary sessions on the economics of silage production underscored the financial viability of silage as a feed enterprise as presented by a masteral student, Ms Janine dela Cruz.

Rayan Ysulat (DVM), a PhD graduate student delivering a lecture on Silage making

An animal science graduate student, Ms. Janine dela Cruz delivering a lecture on Economics of Silage Production

4. Hands-on Demonstration and Practice

Practical training enabled participants to engage directly in forage chopping, compaction, and silo sealing. Two demonstration batches were prepared: (a) Napier grass with molasses, and (b) corn silage inoculated with lactic acid bacteria

Dr. Migalbin explaining to farmers the benefits of including lactic acid bacteria inoculant in ensiling corn or napier grass

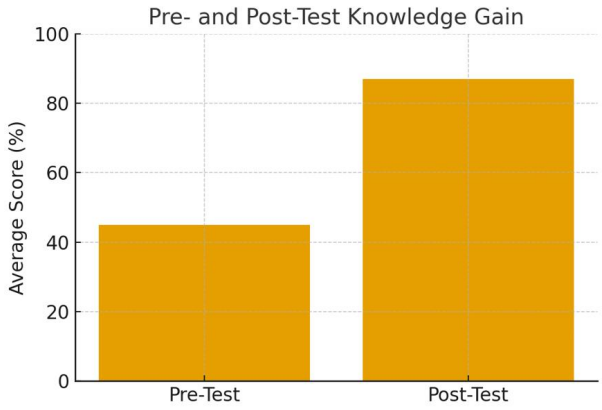
Participants chopping the napier grass using a forage chopper

Another batch trained in silage production

A participant sealing a silo bag during the hands-on activity

5. Knowledge Evaluation

Pre- and post-tests were administered to assess learning gains. Results showed a 42% increase in average scores, signifying substantial improvement in participants' understanding.



Outputs and Immediate Results

- Two prototype silage products were successfully produced and evaluated: Napier + molasses and Corn silage + LAB inoculant.

- Training modules were distributed as learning references for continued practice.

- Networks were established between the farmer associations and USM, creating opportunities for follow-up collaboration and technical support.

- Participants demonstrated heightened knowledge and skills, validated by post-test results and observed competence during demonstrations.

Discussion

The project exemplifies the practical translation of academic knowledge into community-based applications. By combining lectures, demonstrations, and cooperative planning workshops, the initiative created a holistic learning environment that addressed both cognitive and technical aspects of silage-making.

The adoption of both conventional (Napier + molasses) and innovative (Corn + LAB inoculant) silage formulations illustrates the dual emphasis on traditional practicality and scientific advancement. Furthermore, the project reinforced the role of graduate students as extension agents, equipping them with the experience of technology transfer, participatory engagement, and impact assessment.

Implications and Future Directions

The outcomes suggest several broader implications:

1. For Farmers and Cooperatives - Silage adoption can reduce dependence on commercial feeds, lower production costs, and improve livestock performance.

2. For SUCs and LGUs - Collaborative partnerships should be institutionalized to expand silage demonstrations and integrate feed resource management into agricultural extension programs.

3. For Research and Innovation - Further studies on LAB inoculants should be undertaken to refine fermentation quality and optimize livestock nutrition outcomes.

4. For Policy and Program Development - Findings can inform regional strategies that prioritize sustainable forage systems and feed self-sufficiency.

Conclusion

The extension project 'Grass into Gains: Promoting Silage Production for Livelihood and Livestock Development' successfully achieved its objectives of enhancing knowledge, building practical skills, and strengthening institutional linkages. The demonstrated improvement in participants' knowledge (42% increase) and the establishment of cooperative partnerships affirm the project's immediate impact. More importantly, it underscores the pivotal role of academic institutions, through graduate student initiatives, in bridging research, education, and community development.

By fostering a culture of feed innovation and farmer empowerment, the project contributes meaningfully to sustainable livestock development, food security, and rural livelihood enhancement in Mindanao and beyond.

Part II

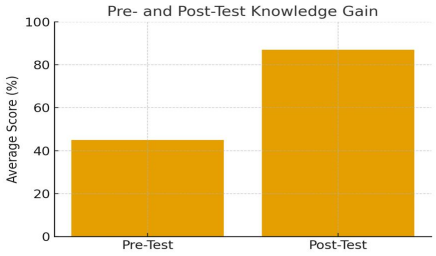
IMPACT ASSESSMENT

This section provides information on the impact of the project.

KRA 1: Knowledge and Skills Development

This emphasizes the immediate learning outcomes of the project. The substantial increase in knowledge measured through pre- and post-tests, combined with participants' ability to demonstrate practical skills, reflects the effectiveness of the training sessions. These outcomes ensure that participants gain the foundational capacity to integrate silage-making into their farming practices.

Pre- and post-tests were administered to assess learning gains. Results showed a 42% increase in average scores, signifying substantial improvement in participants' understanding.



KRA 2: Adoption and Application of Technologies

This highlights the translation of knowledge into practice. The adoption of silage-making techniques by farmers and the planning of farmer associations to integrate silage production are critical for ensuring practical application. The use of distributed modules also demonstrates sustainability in knowledge dissemination. One participant of the program has already practiced silage production and feeding silage to their cattle. Of the 38 participants, one female participant has immediately practiced the learnings in her farm.

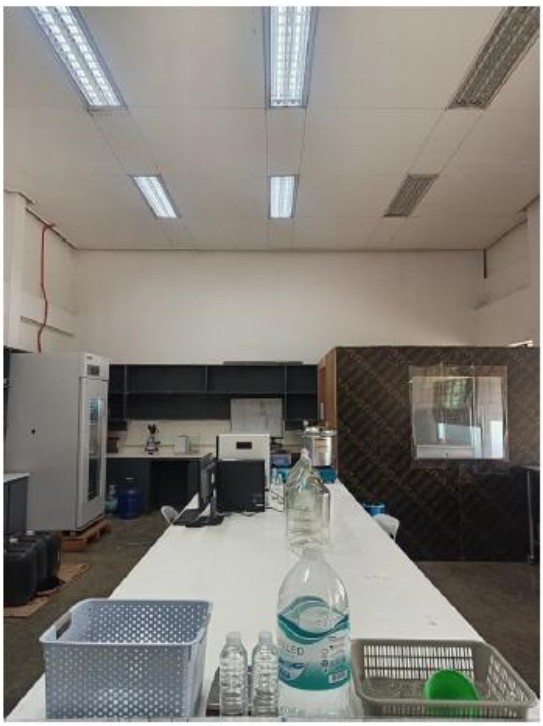
Rayan Ysulat, DVM (center) visiting one beneficiary of the training,
Ms Christine Lapined (extreme right) where silage feeding is practiced

KRA 3: Institutional Linkages and Networking

This focuses on the collaborative networks established through the project. The linkages between farmer associations, universities, and local government units enhance institutional support, foster synergy, and provide long-term sustainability for the initiatives. These networks also ensure continuous technical backstopping for farmers.

The University of Southern Mindanao is a recipient of equipment in the production of lactic acid bacteria inoculant that will be used in silage making. The inoculant when used in silage production hastens pH drop in the silage in the first 3-4 days of ensiling thus other bad microorganisms that might affect the quality of silage to be produced will not overpower the lactic acid bacteria that ferments the ensiling material. Below are pictures of the materials equipment and the USM Lactic Acid Bacteria Production Laboratory.

NEWLY ESTABLISHED RESEARCH FACILITY (LACTIC ACID BACTERIA LABORATORY)



ACQUIRED EQUIPMENT

Pharmaceutical Refrigerator

Analytical Balance

Reagent Bottles (1o Liters)

Vertical Steam Sterilizer

Whirlpool Microwave Oven

Led Biological Microscope

Beaker 30, 50, and 100 ml

Disposable Petri Dishes, Pipettes, and Centrifuge Tube

Digital Weighing Scale

Alcohol Lamp

Laminar Flow Cabinet

Cooler Incubator

Test Tubes

Colony Counter

Pipette

Autoclave

Volumetric Flask 500 ml

Volumetric Flask 250 ml

Glass Desicator

Stainless Steel Loops

MRS Broth

KRA 4:Livelihood and Enterprise Development

This measures the economic impact of silage adoption. Reduced feed costs, improved livestock productivity, and cooperative-based silage enterprises are long-term benefits that directly contribute to the livelihood of farmers. These outcomes also open opportunities for scaling up into agribusiness ventures. One farmer association, the Kabacan Agri Resources and Livestock Farmers Association (KARLIFA) led by its President Mr. Rizaldy Garcia Santos was provided with equipment by the Korea International Cooperation Agency (KOICA) thru the Food and Agriculture Organization of the United Nations and with the guidance of USM and the extension project is already producing silage in silo bags and selling the corn silage at 6.00/kg.

Rizaldy G. Santos of KARLIFA

Silage in silo bags at KARLIFA


Some members of KARLIFA in their daily activity of silage production

KRA 5: Community Participation and Inclusivity

This ensures inclusivity and broad participation across community members. The representation of both genders, multiple sectors, and diverse institutions highlights the project's commitment to equity and collective engagement. Re-echo activities further extend the benefits to other communities.

KRA 6: Sustainability and Continuity

This underscores the capacity of the project to create lasting impact. Through re-echo trainings and integration of silage into farmers association feed management, sustainability is ensured. Commercialization of silage products provides an avenue for long-term income generation and resilience in livestock production systems.

KARLIFA has started selling their silage to livestock cooperatives in Region 12 thus generating income to its members. Since equipment had been provided to the association, the income generating capacity of the association will be sustained.


Turnover of one of the machineries by representatives of the FAO-UN to KARLIFA

Appendix 1. Beneficiaries' Feedback on Silage Production Project

The following testimonials were gathered from participants of the Silage Production Training. These feedback statements reflect the direct experiences and perceived benefits of the training program.

Farmer Association Member (KARLIFA)

"Before this training, we often wasted excess Napier grass during the rainy season. Now we know how to turn it into silage, which we can feed to our cattle during summer. This will really help reduce our feed expenses." (Rizaldy G. Santos)

Individual Farmer (Goat Raiser)

"I used to buy commercial feeds when grass was scarce, but it was too expensive. After trying the silage we made during the training, my goats ate it well. I plan to produce more for the coming dry months." (Melvin T. Tonggal)

Extension Worker (Municipal Agriculture Office)

"This training gave us practical skills that we can now share with other farmers in our municipality. The step-by-step demonstration was very helpful, and we are now planning to replicate this activity at the barangay level." (Johnrey Bade)

Agricultural Student (USM)

"I really appreciated the hands-on practice in making silage. It's different from just reading it in textbooks. I now have the confidence to help my community apply these techniques." (Ar-jay M. Valenzuela)

Dairy Farmer (Smallholder)

"After feeding silage to my cows for a few weeks, I noticed they maintained good body condition even when fresh grass was limited. I am convinced that this practice is worth continuing." (Christine Lapined)

Appendix 2: Attendance Sheet

UNIVERSITY OF SOUTHERN MINDANAO
Kabacan, Cotabato
Philippines

ATTENDANCE SHEET

Date:	July 05, 2024
Venue:	DA-RFO 12 Abaca Research Development Station, Cotabato
Company Name:	
☐Meeting ☑Training	
Participants:	USM-GS student and NDA farmers
Coordinator:	USM-GS & Kabacan, Cot.
Resource Speaker:	Datan Sulat

No.	Name	Agency	Signature
1.	Sammy Silbog	NDA	
2.	Roy Gomez	NDA	
3.	Ariel Alejandro	NDA	
4.	Erik Molina	NDA	
5	Jeffrey Cabanas	NDA	
6.	Bernard Ferraren	NDA	
7.	Carlo Garay	NDA	
8	Mark Malon Perez	NDA	
9.	Jerald V. [illegible]	NDA	
10	Delmar B. Tangcay	NDA	
11.	Marven T. Sorianosos	NDA	
12.	Melvin T. Tolosa	NDA	
13.	Jameson D. Mamaunat	NDA	
14.	Marcial C. Sorianosos	DA ALPC	
15.	Edwin A. Celestial	NDA	
16.	Johnny B. Villanueva	NDA	
17.	Rosario A. Molina	NDA	
18.	Mary Grace J. Hilot	Farmer USM-MSPB-Student	
19.	Rozel Mae F. Dondo	USM-MCAS student	
20	Janane Rose May Dela Cruz	USM-MCAS Student	
19.	Aida Umblan	USM-MCAS Student	
20.	Rica Frantz T. Vinluan	USM	
21.	Gcalina, Eric S.	USM	

USM-SYS-F11

UNIVERSITY OF SOUTHERN MINDANAO
Kabacan, Cotabato
Philippines

ATTENDANCE SHEET

Date:	July 05, 2025
Venue:	DA-ATIES, CARMEN, COTABATO
Company Name:	
☐Meeting ☐ Training	
Participants:	USM GS students / NSTAI / Farmers
Coordinator:	USM-GS
Resource Speaker:	DA / ATI YSVCAT

No.	Name	Agency	Signature
22.	Charmaine Gomintay	USM-MSAS Student	[signature]
23.	VSAP, FLEURMINA EVITA C.	USM-MSAS Student	[signature]
24.	CALCOTANO, CARL JONAS D.	USM-MSAS student	[signature]
25.	MAGSIPOC, ALMA GRACE	USM-MSAS STUDENT	[signature]
26.	Maggay, Carolyn I.	USM-MSAS student	[signature]
27.	Babor [illegible]	farmer	[signature]
28.	Samuel Aligan	farmer	[signature]
29.	Norhasain Sanalangin	PA-ALPC	[signature]
30.	Evamel M Melicor	PA-ALPC	[signature]
31.	[illegible] Padillo	DA-ALPC	[signature]
32.	LAYAN YSVCAT	USM-PAD	[signature]
33.	AR-JAY VALENZUELA	USM GS-Student	[signature]
34.	Hazel Joy Berna		[signature]
35.	Rizaldy G. Santos	Rarlifa FA	[signature]
36.	KARLIFA		
37.	Christine Lapined	Dairy Farmer	[signature]
38.			
39.			
40.			
41.			
42.			
43.			

USM-SYS-F21

Appendix 3. IEC materials developed in English, Filipino and Maguindanaon versions

IEC Material produced by the graduate students on silage making (English version)

IEC Material produced by the graduate students on silage making (Filipino version)