

Pre Extension Demonstration of Improved Milk Churner at Sidama Region and Gedio Zone SNNPR

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To cite this article:

Mekonen Debara, Merkine Bekele. Pre Extension Demonstration of Improved Milk Churner at Sidama Region and Gedio Zone SNNPR. *American Journal of Mechanical and Materials Engineering*. Vol. 5, No. 4, 2021, pp. 55-59. doi: 10.11648/j.ajmme.20210504.11

Received: October 16, 2021; **Accepted:** November 17, 2021; **Published:** November 24, 2021

Abstract: Dairy industry is one of the major industries in Ethiopia which can improve the livelihood of the farmer. Butter making process is the one and the most tedious and time consuming operations in dairy industry especially for small holder farmers. It can be made by churning either cream or soar milk. The research activity carried out support of AGP2 Sidama region in Burisa district and SNNPR in Gedio zone Bule district with objectives of to demonstration and popularization of improved milk churners, to evaluate the efficiency both milk churner in time consuming and better yield and to collect farmers' preference. From these districts two peasant associations were purposively selected from list of peasant associations based on their potential of dairy production. Then, two groups which have fifteen members in each of women farmers were organized in the selected peasant associations to undertake demonstration and popularization of plastic milk churner. The training was given to farmers, DAs and districts' dairy experts focusing on how to use the technology, advantages of technology over the traditional ones. A total of 2 FREGs (30 women farmers in two district) member farmers of which around 100% females have been participated on training and demonstration activities. The result reveals that use of plastic milk-churner reduces time of milk churning by half in relative to traditional one i.e. from 60 minutes to 30 minutes, significantly higher quantity of butter (0.39kg/5liter) was obtained from improved churner than traditional clay pot (0.27kg/5liter) and highly reduces work load in women so that, improved milk churner was preferred by two FREG members. Thus, Promotion of this technology should be expanded in other dairy cattle populated areas. Also, sealing of improved milk churner is not tight well, so there was continues dropping of milk, thus sealing part needs further improvement.

Keywords: Butter, Demonstration, Milk-churner, Plastic, Quality

1. Introduction

1.1. Background Justification

The milk sector in Ethiopia is expected to continue contributing to the local and national economy due to large potential for milk development in the country, overall economic growth in the country, increased urbanization and improved policy environment [12]. However, postharvest loss is one of the major problems on the milk of the dairy sector in the country. Lack of processing equipment particularly butter churner which save time and enhance butter recovery is the major challenge for small holders in Ethiopia in general and in Sidama Region in particular [15].

Researches indicate that, in 2015/16 Ethiopia had around 11.33 million heads milking cows [6]. And in 2014/2015 fiscal year, 3.07 billion liters of cow milk were [7].

The study of ILRI revealed that about 97% of the total milk produced comes from the rural parts of the country where it is difficult to transport the raw milk to the market areas or to the processing plants due to poor infrastructure [3]. Only 5% of the milk produced reaches the terminal market area and the rest is processed at the farm gate into different dairy products [4]. Additionally the study conducted [2] indicated that processing time of traditional butter-making varies between 2 to 5 hours depending on the

technical devices used. Such time-consuming and labor intensive activities further hinder women's ability to improve their income-earning potential [14].

The SNNP is the second highest region in milk production potential next to Oromia region in Ethiopia. It is not only becoming the second milk producer region but also 54% of it is converted to other products rather than consuming it in the form of fresh milk. Although the types of materials used for milking, storage and processing vary from place to place, 50% of milk producers used clay pot for churning, 25% plastic containers, 6.3% aluminum cans and 18.3% used Oil (calabash) in southern Ethiopia [15]. Moreover, clay pot or bottle gourd (calabash) is used as a churner to make butter in Gurage zone, Southern Ethiopia [1] and the clay pot was used for churning fermented milk (100%) in West Shewa Zone, Oromia Region [8].

Milk contains many different components like water, fat, protein, lactose and ash. Butterfat is one of the most valued components of milk. The primary use of fresh whole milk is for home consumption followed by sale to urban centers and for fermentation to process it into butter [10]. The demand of butter is increases day by day though out the world. In 2018, annual butter production of the world was estimated to be 843 thousand tones [9].

The efficiency of both churners was evaluated by using five-liter milk obtained from local breeds. The volume of both of churning equipment is 20 liter. The current finding revealed that improved butter churner reduced churning time, provides better amounts of butter yield and improves butter making efficiency than the traditional churning equipment (Clay spot). Significantly, higher quantity of butter (0.41kg/5liter) was obtained from improved churner than traditional clay pot (0.26kg/5liter). Furthermore, traditional mechanisms of butter processing took significantly longer churning time (59 minute) than improved churner (26 minute).

Therefore, the finding will be demonstrated for women to improve productivity of butter and thereby to increase their income that comes from selling of butter.

1.2. Objectives

- a) To demonstration and popularization of improved milk churners;
- b) To evaluate the efficiency both milk churner in time consuming and better yield;
- c) To collect farmers' preference.

2. Material and Method

2.1. Materials

Materials needed for the production of plastic milk churner such as plastic jar, bronze, round bar and other necessary materials purchased from market in the scheduled/planned

time period. Then production of plastic milk churner was done. Then we purchased from wolita sodo southern region Agriculture technology production center.

2.2. Methods

To undertake the demonstration and popularization of plastic milk churner two districts namely Bursa from sidama region and Bule from SNNPR region were purposively selected from six AGP-II districts from sidama and SNNPR region based on their accessibility and potentials for dairy production. From these districts two peasant associations were again selected purposively based on accessibility and dairy production potential from the list of peasant association. Then, at each PA a group of FREG was established and total of two group which have fifteen member women farmers from each districts were organized in the selected peasant associations to undertake demonstration and popularization of plastic milk churner. Totally, 30 improved plastic milk churners were provide for two districts which one for each farmers.

2.2.1. Selection of Participant Farmers

Discussion was held with respective districts' livestock and fishery resources development agency to set criteria for the selection of PAs and participating farmers. Accordingly, selection criteria for the member farmers includes those who owned at least one lactating cow, willing fullness to participate, active and innovative in accepting new technologies and extension processes.

2.2.2. Training

The training was undertaken on JICA type plastic milk churner in two selected AGP-II districts which were Bursa and Bule 15 women farmers from each district which is total 30 farmers. The training mainly focuses on promotion of technology and awareness creation among farmers and participant stakeholders. Moreover, the training was given to farmers focusing on how to use the technology, advantages of technology over the traditional ones.

Finally field day was conducted to disseminate the technology and promote to other farmers and other stakeholders.

3. Result and Discussion

Both theoretical and practical trainings were the main approaches that have been used to create awareness about the technology being demonstrated among farmers to capacitate the farmers, DAs and experts' knowledge and skill.

Total 58 participants on trained from these 30 were women farmers 10 were district agricultural experts female 3 and male 7 and 18 researcher and TA from Hawassa research Centre female 6 and male 12.

Table 1. Participant list on training.

Location	Participant list in training												Grand Total
	Farmer			Agri- expert			researcher			TA			
	M	F	Total	M	F	Total	M	f	Total	M	F	Total	
Bursa		15	15	4	1	5	4	1	5	2	2	4	29
Bule		15	15	3	2	5	4	1	5	2	2	4	29
Sub-total		30	30	7	3	10	8	2	10	4	4	8	58

*Figure 1. Training session at Bursa and Bule district.*

3.1. Field Day

Field day is a method of motivating people to adopt new practices by showing what has already achieved under field conditions. In other words, it is to show the performance and profitability of new technologies and to convince them about

the applicability. Besides, it is a way of facilitating people to visit innovation to bring mass mobilization. At both locations (Bursa and Bule) field day was conducted with inclusive participation of all stakeholders (zone, districts and PA extension personals, farmers, SARI, and HwARC researchers and management members).

*Figure 2. Field day session at Bule district.**Table 2. Field day participants.*

Location	Participant lists												Total
	Farmers			Agri-experts			Researchers			Other officers			
	male	female	total	male	female	total	male	female	total	male	female	total	
Bule		38	38	5	2	7	10	2	12	1	1	2	59
Bursa		36	36	5	2	7	10	2	12	1	1	2	57
Sub-total		74	74	10	4	14	20	4	24	2	2	4	116

3.2. The Efficiency of Both Milk Churner in Time Consuming and Butter Yield

The efficiency of both churners was evaluated by using five-liter milk obtained from local breeds. The volume of both of churning equipment is 10 liter. In this activity to make comparison of traditional clay pot milk churner and the new technology, assessment was made through interviewing the participating farmers during the training time and on average to churn a five liter of milk it took them up to 1 hrs while using the new technology, to churn the same amount of

milk, the average time taken was around 30 minutes (half of the traditional clay pot). The result reveals, longer churning time is required in traditional milk processing churner (60 minute) than improved churner (30 minute).

Similar result was also reported [13] that traditional processing by using traditional equipment takes longer period than the improved churning equipment. Additionally study reported [15], that milk processing by using traditional equipment (clay pot) takes longer time (59min) duration than the improved churning equipment (27min). Additionally, the study was conducted [11]. Indicated that using improved plastic milk churner reduced the time required for butter

making by 26 minutes for the same volume of milk.

On other hand, time of this demonstration period, significantly, higher quantity of butter (0.39kg/5liter) was obtained from improved churner than traditional clay pot

(0.27kg/5liter). Similar result was also reported [15], butter (0.41kg/5liter) was obtained from improved churner than traditional clay pot (0.26kg/5liter).

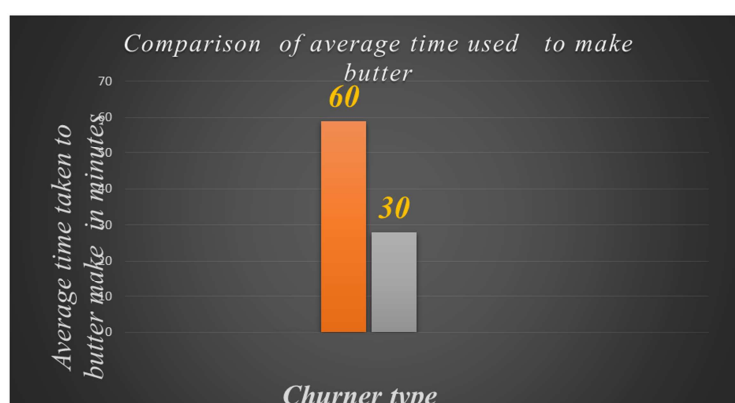


Figure 3. Average time costing.

Table 3. Farmers preference.

Preference list	Very good	Good	Poor	Very good	Good	Poor
Time saving	25	5			4	26
Durability	20	7	3	5	8	17
Simplicity	17	8	9	6	10	14
Accessibility	19	6	5	18	5	7
Butter yield	20	8	2	17	8	5
Butter quality	18	8	4	15	9	6
Milk quality	15	8	7	14	10	5
Mean score value%	63.38	23.8	12.39	35.7	25.7	38.6
Rank	1 st					

3.3. Farmers Preference Towards Technology

The most important evaluation criteria for participant farmers were easy of operation (simplicity), milk quality, time reduction, butter yield and accessibility of parts. Accordingly, the newly introduced improved plastic milk churner was preferred in terms of all criteria set by the farmers. Improved milk churner ranked first in all criteria set by participant farmers.

4. Conclusion and Recommendation

- 1) The result of demonstration is reveals that, the improved milk churner was reduced (saved) churning time by 50%, than the traditional churning equipment (clay pot) with equal amount of fermented milk used.
- 2) Significantly, higher quantity of butter (0.39kg/5liter) was obtained from improved churner than traditional clay pot (0.27kg/5liter).
- 3) Beneficiaries farmers were preferred improved plastic milk churner by criteria set by them very good (63.38%), good (23.8%) and poor (12.39%).
- 4) Furthermore, the study has been created demand for the hosted and surrounding female farmers on the improved milk churner.
- 5) As hosted and invited farmers at field day expressed and

livestock experts approved, farmers interested on improved plastic churner at both demonstration locations.

- 6) Thus, Promotion of this technology should be expanded in pre-scale up form in other dairy cattle populated areas.
- 7) Also, sealing of improved milk churner is not tight well, so there is continues dropping of milk, thus design of sealing part needs further improvement.

References

- [1] Abebe B, Zelalem Y, Ajebu N. Handling, processing and utilization of milk and milk products in Ezha district of the Gurage zone, Southern Ethiopia. *J Agric Biol Sust Dev*. 2013; 5: 91-98.
- [2] Gebremedhin B, Tegegne A, Hoekstra D, et al. Developing the butter value chain in Ethiopia. *LIVES Working Paper*. 2014. *Sci*. 2017; 11: 95-105.
- [3] Azage T, Berhanu G, Hoekstra D, et al. Smallholder dairy production and marketing systems in Ethiopia: IPMS experiences and opportunities for market-oriented development. IPMS (Improving Productivity and Market Success) of Ethiopian Farmers Project- International Livestock Research Institute (ILRI), Addis Ababa, Ethiopia. Working Paper 31. 2013.
- [4] Ahmed MAM, Ehui S, Yemeserach A. Dairy development in Ethiopia. Washington, DC, USA: IFPRI (International Livestock Research Institute). 2004.

- [5] CSA. (20014/15). Agricultural sample survey 2014/2015. Vol. II. Report on livestock and livestock characteristics. Statistical Bulletin 578. Addis Ababa, Ethiopia.
- [6] CSA 3 CSA. (2015b). Agriculture sample survey 2014/2015 (2007E.C.) (Septmber-January 2014/2015), Volume VII. Report on crop and livetsock product utilization (Private peasant holdings, Meher Season). Central Statistical Agency (CSA): Addis Ababa, Ethiopia.
- [7] Debela B, Lemma F, Alganesh T. Assessment of traditional butter production and preservation techniques in West Shewa Zone, Oromia Regional State, Ethiopia. 2016; 6: 23.
- [8] FAO. (2019). Dairy market review, Overview of global dairy market developments in 2018, March 2019.
- [9] Felleke, G., M. Woldearegay and G. Haile, (2010). Inventory of Dairy Policy – Ethiopia, Target Business Consultants Plc, Netherlands Development Organization (SNV), Addis Ababa, Ethiopia.
- [10] Fetiya Mohammed, Estefanos Tadesse and Tesfaye Gemechu, (2014): On-farm demonstration and evaluation of improved plastic milk churner in West Arsi zone of Oromia regional state, Ethiopia. In: Proceedings of review workshop on completed research activities of socioeconomics and agricultural extension directorate held at Adami Tullu agricultural research center, Adami Tullu, Ethiopia 17-21 November, 2015 part 2. Pp 233-237. Oromia Agricultural Research Institute (IQQO), Finfinne, Ethiopia.
- [11] Getachew F. A Review of the small scale dairy sector in Ethiopia. FAO prevention of food losses programme. Milk and milk products, post-harvest losses and food safety in Sub-Saharan Africa and near East. 2003.
- [12] O'Connor C. B., Mezgebu S and Zewdie Z. (1993). Improving the efficiency of butter making in Ethiopia.
- [13] Tsadkan Z, Amanuel T. Assessment of post-harvest loss of milk and milk products and traditional mitigation systems in mekelle milk shed, Northern Ethiopia. Food Sci & Qual Manage. 2016; 48: 27-34.
- [14] Nahusenay A. An investigation of gender division of labor: The case of Delanta district, South Wollo zone, Ethiopia. J Agric Ext Rural Dev. 2017; 9: 207-214.
- [15] Tsedey A, Bereket H. Assessment of post-harvest loss of milk and milk products and traditional mitigation systems in Southern Ethiopia. Food Sci & Qual Manage. 2016; 48: 85-96.