

AN ANALYSIS OF TECHNOLOGY GAP AND ITS ADOPTION IN MILK PRODUCTION: A CASE STUDY OF SUNDARBAZZAR MUNICIPALITY, LAMJUNG

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ABSTRACT

A purposive survey was conducted in Sundarbazar Municipality in Lamjung district in 2018 to be acquainted with farmer's existing knowledge and trend on technology adoption in milk production by randomly selecting 60 farmers from different locations in the locality. Analysis of responses was carried out to identify and document gaps between the optimized and existing allocation levels of milk production technologies. The respondents were interviewed with semi structured questionnaire. A gap of 41.49% was found between allocation and current allocation levels of technology adoption regarding milk production in the study area. Among the respondents, 45% were highly literate and 66.67% were engaged in agriculture as a primary source of income. Moreover, 46.67% of respondents reported being highly influenced by mass media for information about technology adoption and 40% reported selling of crops as a monetary source for new technologies. The research revealed that financial risk was the major risk involved and the primary obstacle was lack of awareness. Preference ranking of problems showed that farmers considered inadequate government support as the major problem and awareness of technology as the prime factor affecting the adoption of milk production technologies. The study recommends re-training of the extension service providers to enable them to disseminate relevant technologies to the farmers. There is also a need for an evaluation of various milk production technologies against agro ecological zones, farming systems and farmers resource bases.

Keywords: Adopters, Demographic, Gap analysis, Livestock, Non-adopters, Technology

Introduction:

Gap refers to the space between "where we are" (the present status) and "where we want to be" (the expected situation). The technology gap ratio is a fundamental tool to determine the ability of a group of firms to compete with other group within the industry. This ratio also delivers an approximate of the technology gap between the groups and the industry as a whole. (Battese and Prasada Rao 2002). A stochastic metafrontier model was adopted by Gunaratne and Leung (2001) and Sharma and Leung (2000) in studies of the efficiency of aquaculture farms in several countries. After the discussion of the principles of gap analysis in Scott et.al., 1987, the conceptual, technical, and organizational foots needed for the execution this work have been developing.

Gap analysis identifies gaps between the optimized allocation and integration of the inputs (resources), and the current allocation-level, which aims to discover the difference between the policy makers in bureaucracy and the milk producers. Technological change has resulted rapid structural change in US Dairy industry with the commencement of new technology, management practices and alternate production (Khanal *et.al*, 2010). Average milk production per cow in the United States has increased from 12,505 lbin 1984 to 17,192 lbin 1998 (U.S. Department of Agriculture, 1996 and 1999a). With the technological advancement farms grow bigger and the cost remains low due to gain in productivity; vaporize small farms reducing number of farms (Johnson and Grabanski). Increase in productivity due to technological advancement is not strange in dairy sector, since sustained productivity increases in other sector of U.S. agriculture have been assigned to the acceleration of technical change as well (Huffman and Evenson).

In Nepal, the livestock subsector of agriculture contributes 24 percent of the total agricultural GDP (ADS, 2012), and also plays important roles in human food and nutritional security, livelihood, regional balance, gender mainstreaming, and rural poverty alleviation (IOL, 2004). Among these different livestock products, milk has the largest shares of 39% among the livestock GDP. The dairy sector in the country is in the increasing trend and the growth will reach to 5.5% from the current 2.9 % by 2015 (APP, 1995). Now it is increasing at 3.6% (MoAD, 2012). livestock farming and Gap in adopting technology is imperfect due to malpractices of intermediaries, Inadequate government support services, depletion of animal feeding base due to forest deterioration and Weak farm advisory services and training from DLS and other reason.

This study mainly focuses on accessing the farmer milk production; compare it with national production level including the practices and gap of technological adopt by farmers in vicinity of Sundarbazar, Lamjung for increasing the milch animal production capacity. Since the level of milk production is lower than the government's target caused due to several feeding and technological factors. This gap can be reduced or even overcome by digging out the problems on farmer's technology adoptions through gap analysis. Hence, this case study was performed to analyze current technology adopted by farmers collecting relevant data on performance levels and to identify and document the gap: it is a difference of current and future target which may ultimately develop and prioritize technology requirements to bridge the gap.

Materials and Methodology:

The study was conducted in Sundarbazar municipality of Lamjung district, stretching between latitudes and longitudes of 28.13°N 84.42°E. Different villages were selected randomly from Lamjung District where information data was collected from the respondents through the use of a questionnaire, and with administered to sixty respondents using face-to-face interviews. Both closed and open ended questions incorporated in the questionnaire. Moreover, Focus Group Discussion and personal observation was done to supplement information. The quantitative data collected from questionnaire were coded and summarized prior to analysis by using the Borda Method, MS Excel 2007 and the Statistical Package for Social Sciences (SPSS) version 16.1 the researchers employed descriptive statistics, such as frequencies, percentages in data analysis. Qualitative data was analyzed using content analysis. The Borda count for Kelly is given by: (no. 1st place votes)³ + (no. 2nd place votes)² + (no. 3rd place votes).

Results and Discussion:

1. Demographic characteristics of Sample Household:

The survey revealed that only 34 households (56.67%) were male headed household while, 43.33% were female headed households. The survey result shows that 45% of sampled household heads were literate. However, 30%, 18.33% and 6.67% were SLC pass, illiterate and Bachelor respectively. This is supported by; the coefficient of years of schooling was positively significant, which implies that the adoption increases with the increase in years of schooling. Income source of the majority of the households comes from agriculture (66.67%), i.e. Majority of the family had at least a person engaged in agriculture. While taking about technology

adaptation, Majority of the respondent for source of information of technology adoption of sample were from Mass media (46.67%). Others source (25%), government extension staff (18.33%) and Insurance company (10%) respectively, were the least sample source of information of technology adoption.

2.Modern Technology and their Adoption Practices:

From the table 1, we revealed that people from the study area, colostrum feeding, Hand milking, Pre-milking udder preparations were the mostly adopted respectively. While solution for manure disposal and management, Manger and cultivation of legume and non-legumes were partially adopted respectively. And Milk replacer, machine milking and dipping were least adopted respectively. This might be because of inaccessibility of milk replacer. During the lactation period people used machine milking but while in lean period people felt convenient in hand milking. Due to lack of knowledge and lack of land accessible for dipping, it was not used as mostly. And also due to lack of subsistence farming people were inconvenient for adoption technology in milk production commercially

Table 1. Some Adoption of Modern Technology Practices in Milk production

Technology	Not Adopted	Partial Adopt	Fully Adopted
Colostrums Feeding	0	0	60
Hand Milking	0	1	59
Pre Milking Udder Preparation	0	3	57
Solutions for Manure Disposal and Management	18	40	2
Manger	5	31	24
Cultivation of Legumes and Non-legumes	16	31	13
Milk replacer	60	0	0
Machine Milking	59	1	0
Dipping	57	3	0

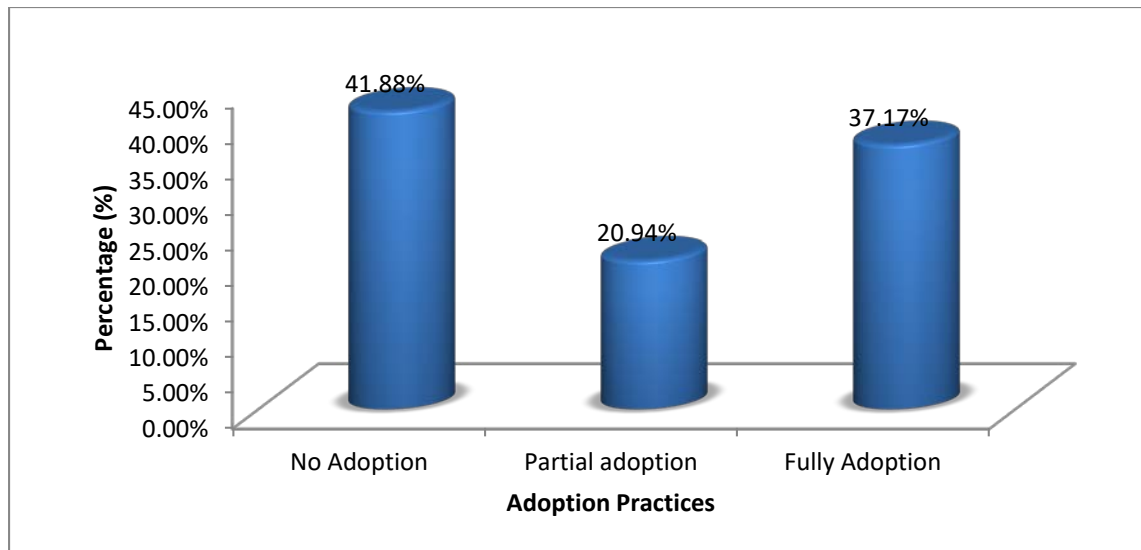


Fig 4.5: Source of Investment of Adopting Modern Technology

3. Gap Analysis:

From the table 2, we divulged that 37.17391% of the people adopted fully of modern technology where 20.94203% of the people adopted partially and 41.88406% of the people were not adopted any technology. This imparted that People from the 60 households, 57.93478% of the people had adopted the modern technology whereas 42.06522% had the gap. This might be because of inconvenience in training, low subsistence farming, less faith towards dairy and dairy products, inappropriate government policy, etc.

Table 2. Gap Analysis between Adopters and Non-adopters

Not Adopted	Partially Adopted	Fully Adopted	Adoption	Gap
41.88406%	20.94203%	37.17391%	57.93478%	42.06522%

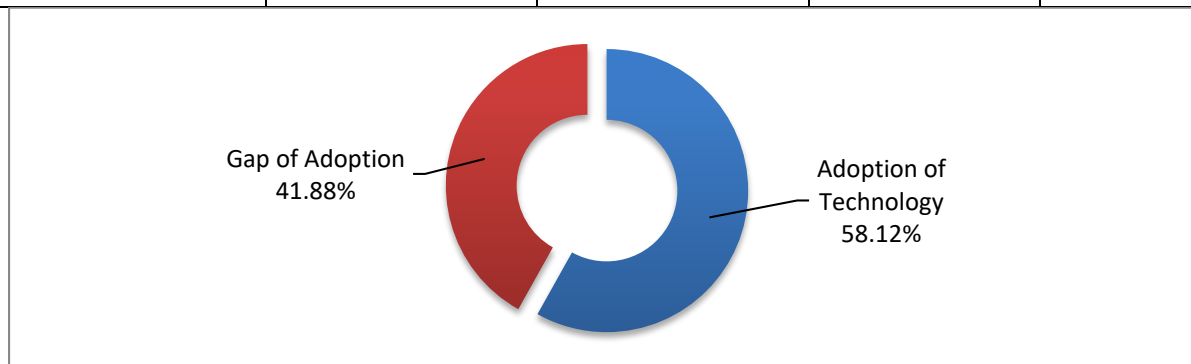


Fig 4.7: Gap Analysis of Adoption of Modern Technology

4. Risk, Problems and Motivational Factors analysis in Milk Production:

The study revealed that the most sensitive phase, adopting technology in livestock farming for milk production, was during phase with highest observed value (29). From the Chi-square test, it is highly significant (0.000). The information is revealed in Table 3.

Inadequate government support was the major problem during adopting modern technology in milk production. Which is then, followed by Lack of modern technology (B), Lack of credit (C), Technical advice (D), Subsidy (E), Insufficiency laboratory (F), Coordination Between farmer and dairy (G), Poor market access (H), Lack of forage cultivars (I), Low milk price (J), Lack of transportation (K) respectively which is revealed in Table 4.

From the table 5, Awareness of adopting technology in milk production (A) was the most factor affecting the adoption of technology in milk production. Then, following by Training (B), Subsidy (C), Accessibility to credit (D), Risk minimization (E), Timely payment to farmers in dairy (F), Contact of external agent (G), Membership association (I) and Access to transportation (J) respectively. This is supported by; according to the Balinski M. and Laraki R. 2007, to use the common language of Balinski and Laraki, to identify grade Excellent with the number 5, grade Very Good with 4, Good with 3, Accept with 2, Poor with 1 and Reject with 0, and to add the numbers assigned to a candidate c, calling the result the Borda Majority Count of c. According to the Zahid, M.A. and H.D. Swart. 2015.

Table 4. Major Risk involved in Technology Adoption

Risk involved in technology adoption	Observed N
Labor risk	9
Financial risk	19
Market risk	11
Management risk	16
Fear of failure	5
Total	60
Chi-square	10.33333
Significant	0.35

Table 5. The Major problem during Adopting Modern Technology in Milk Production

Problems	No problem	Slightly problem	Moderate problems	Severe problem	Rank	Score
Insufficiency laboratory	11	4	7	38	192	F
Subsidy	5	9	8	38	199	E
Technical advice	3	6	17	34	202	D
Poor market access	5	15	30	10	165	H
Low milk price	13	23	20	4	135	J

Coordination Between farmer n dairy	6	11	32	11	168	G
Lack of transportation	22	25	9	4	115	K
Lack of forage cultivars	4	17	34	5	160	I
Inadequate government support	0	22	32	26	244	A
Lack of credit	0	4	22	34	210	C
Lack of modern technology	1	0	5	54	232	B

Table 5. Motivational Factors affecting the Adoption of Technology in Milk Production

Factors	Strongly motivated	Fairly motivated	Low motivated	No motivation	Ranking	Scoring
Awareness of adopting technology in milk production	56	0	0	4	228	A
Subsidy	39	19	1	1	216	C
Risk minimization	13	37	0	10	173	E
Access to transportation	8	15	23	14	137	J
Faith of dairy	11	24	18	7	159	I
Timely payment to farmers in dairy	13	30	11	6	170	F
Contact of external agent	10	27	21	2	165	G
Membership association	4	37	17	2	163	H
Training	46	13	0	1	224	B
Accessibility to credit	23	32	0	5	193	D

Conclusion:

Among the interviewed households, Majority of the respondent for source of information of technology adoption of sample were from Mass media (46.67). People with Selling crops (40%) were the first priority source kept for adopting technology. Similarly, people with service wages (23.33%), Loan (13.33%), Selling assets (11.67) and Banks (11.67%) respectively, were the least priorities sample of source for technology adopting. We divulged that 37.17391% of the people adopted fully of modern technology. Where, 20.94203% of the people adopted partially and 41.88406% of the people were not able to adopt any kinds of technology. This imparted that People from the 60 households, 57.93478% of the people had adopted the modern technology whereas 42.06522% of respondents had the gap. Chi-square test was done to determine the most delicate phase and the main reason behind no adopting technology in livestock farming for milk was during phase and lack of awareness program with highest observed value 29 and 22 respectively which is significant. Similarly, the major risk involved in adopting technology was financial risk with observed value 19 which was insignificant. The major problem, inadequate government support was ranked first followed by others, doing ranked and scored by the Borda Majority Count Method. Lastly, awareness of adopting technology in milk production was the

most factor affecting the adoption of technology was ranked and scored by A. Then, followed by other expects like training, Subsidy and so on.

Hence, Milk production is the valued on account of its growing to the nation GDP and expending areas with dairy and dairy products, rural employment and poverty reduction. Such potentials of livestock farming especially milk production in smallholders of Lamjung could be harnessed only through improved performance of milk production and technology adoption

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