Adoption Rates of Some Improved Technological Practices of Dairy Cattle Milk Production among Smallholder Farmers in Nahir Atbara Locality-Kassala State –Sudan

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Abstract: **This study was conducted in Nahir Atbara locality it is the one of the largest locality of Kassala State characterized by big sector of livestock irrigated and rain fed areas selection of big three villages 5-6-7 located in the western side adjacent to the Butana postural areas randomly 20 owners from each village the total sample size 60 respondents questionnaire interviews was designed to collect data by SPSS (statistical package of social science) analyzed the data by using descriptive statistics percentage and frequencies and person correlation to determine the significant relationship between some dependent variables and awareness of some best technological practices affect on milk production. The study indicated that, majority of respondents in middle age 35-50 years 58.3% they have high illiteracy rates 36.6% majority of them have 1-10 cows small scale size produced milk for family consumption commercial scale 10% owed more than 30 cow 55% of them depended on self credit 26.6% of them depended on micro finance srvices53.3% of respondents have low level of improved technologies increase milk production 41.7% of respondent have low level of knowledge of awareness of best management technologies of milk production also the study conducted that, significant correlation between some dependent variables and awareness level of improved technologies e.g age- education level-credit-herd size significant at 0.05 and 0.01 the study conducted that provided of qualified extension cadre to trained prarvits and extension agents on the village level to increase the awareness of best management practices of the owners, Genetic improvement of important indigenous livestock breeds shall be through selective breeding as per State Breeding Policy ,insert of dairy cooperative system in dairy production by establishment of milk collection centers and distribution.**

Keywords: **SPSS (statistical package of social science), cattle milk production.**

1. INTRODUCTION

Adoption of innovation refers to the decision to apply an innovation and to continue to use it (Rogers and shoemaker,1971).The decision to adopt an innovation is behavioral response arising from a set of alternative and constraints facing the decision maker .Literature provides different definition and explanations about adoption .Getahunet et al (2000) defined adoption as the degree of use of a new technology in a long term equilibrium when a farmer has all of the information about the new technology and it's potential . Arnon (1989) stated that adoption of a new technology must be preceded by technology diffusion ,for example ,the act of making new technology known to the potential adopters ,and stated that diffusion is therefore ,the link between research and development and adoption .Different literatures indicated

that the different agricultural technologies are developed and disseminated to the farming community in different parts of the region : however only small portion of the small- scale farmers adopt some of the technologies.

Rogers (1962) describe the model of diffusion of a new technology within a farming community, where adopters were categorized with respect to earliness or lateness in adoption . He classified them innovators , early adopters, early and late majority and laggards .Some generalization about innovations and their rate of adoption by Rogers and Shoemaker (1971) are : 1- Innovations perceived as most economically rewarding and less risky were adopted most rapidly, 2-Innovations most compatible with farmers, value were adopted more rapidly , Small farmers were slower to adopt new ideas than larger farmers , Small farmers were quicker to adopt those innovations they perceived as decreasing discomfort where as large farmers rapidly adopted the new ideas they perceived to be economically profitable It is important to identify the opinion leaders in the villages / farming community, There is a positive relationship between the relative advantage and rate of adoption of new idea however advantage can be in the form of degree of economic profitability ,low initial cost, lower perceived risk ,decrease in discomfort ,saving in the time and cost, immediacy of the reward etc .Economic profitability may be less important for peasant farmers in less developed countries, if they are oriented to subsistence living . Other non economic dimensions of relative advantage like social prestige , social approval ,etc may be more important , Relative economic advantage of the new idea must be at least 25-30percent higher than existing practice for economic factors to affect adoption (some would suggest that to induce farmers to change , the potential payoff must be high – not by 5-10 percent but 50-100 percent) .When an innovation promises only 5-10 percent advantage the peasant farmer probably cannot even distinguish that is advantageous.

An innovation should be compatible with farmers, existing values and beliefs, and needs, The complexity of an innovation as perceived by members of social system is negatively related to its rate of adoption . Special care should be taken when the innovation is a package where the farmers must adopt all practices at once to get the interaction effects of each. Efforts of modernization in livestock sector starts with technological improvement of the rural areas .Therefore producers of this sectors must be oriented to use new technologies and adopt innovations in order to improve the economy .The level of adoption depends on the structure of the society ,the standard of life and economic contribution of those innovations .If the innovation has an economic contribution ,the speed of its distribution increases .Communication facilities also positively affect the spread of the innovations .In order to evaluate this process of improvement more efficiently ,the consequence of the individuals in rural areas and the importance of the socio-economic factors which seem to be effective on adopting and practicing (education, age, work experience ,and participation in social life).

To more efficiently utilize parlors and increase in production per cow, some farmers milk cow three times a day. Studies have shown a 6 to 19% increase in production associated with a third milking (Amos et al, (1985). Feeding the dairy herd includes management decision. Because nearly 50%of the cost of production milk is for feed, a balance ration is important for efficient use of protein and energy, Loper, (1989). Disease is important constraint on all forms of livestock production an especially for calves which frequently suffer from respiratory and enteric disease. Chronic disease such as dermatophilosis greatly depress milk production ,Oduye (1975) and increase mortality in all age groups .Several studies have demonstrated that high- producing cows are at increased risk of infectious diseases among those diseases ,clinical mastitis is the most costly diseases of the dairy production .Cost associated with clinical mastitis include decreased production cost ,cost of treatment ,extra labor ,and an increased rate of cow replacement Bartlett et al (1990) McCauley, (1983) indicated that Vaccination requirement, financial support, and well trained technicians mainly supports vaccination process. Several studies have demonstrated that high- producing cows are at increased risk of infectious diseases among those diseases, clinical mastitis is the most costly diseases of the dairy production Sreeja (1993) reported that AI is increasingly being adopted as the breeding technique and its success rate should be improved. Considering this theoretical back up, the study was carried out to find the correlation with socio-economic, socio-psychological and communication characteristics of the dairy farmers in relation to adoption of AI and also to find Contact with veterinarians has a positive influence on his level of consciousness of farmers . A positive relationship between veterinarian contact and adoption of innovation has been reported by all studies , Salamuel,(2001). found that a positive relationship between the contact with veterinarian and the adoption rate of improved dairy technological practices .The study objectives is to establish whether social, economic factors affect adoption of dairy cattle milk production technologies?, To measure the adoption rates of some selected practices affecting milk production including (feeding, vaccination ,milking frequency ,parasite control and artificial insemination technologies.) and To examine the influence of extension services provided on the adoption rates of selected variables.

Research problems:

The population of cattle in the State very high while the dairy cattle population breeders is high ,the productivity rate is shown to be lowest .The research question will be address ,why the dairy cattle breeders in the study areas adoption the recommended improved technological practices which can increase the dairy milk production **.**

Research Objectifies:

1- To examine some socio-economic factors that affect the adoption of some recommended practices.

2- To examine some recommended technological practices adopted by dairy cattle farmers.

3- To examine the influence of some information source on the adoption of dairy cattle recommended practices.

Research Hypothesis:

1- Personal characteristics has positive significant on the adoption rates of recommended practices.

2- Economical status has negative significant on the adoption rates of recommended practices.

3- Information source has positive significant on the adoption rate of recommended practices.

2. DATA COLLECTION AND ANALYSIS

Study sample 60 respondents 20 respondents of each selected village Data collected by questionnaire was developed to obtain information at farm level consist of three sections first one contain personal characteristics of respondents ,the second contain the major information sources used , third contain some technological practices .Data collected analyzed by using statistical package of social science SPSS percentage and frequency person correlation to find relation between dependent and independent variables

3. RESULTS

Table (1) Frequency distribution of respondents according to age categories

Age categories	Frequency	%
Less than 35 years	14	23.3
35-50 years	35	58.3
Above 50 years	11	18.3
Total	60	100

Source survey data (2014)

Table (1) shows that, majority of respondents 35-50 years (58.3%) younger farmers are more dynamic in the adoption of new farming technologies .

Table (2) Frequency distribution of respondents according to educational level

Education level	Frequency	%
Illiterate	22	36.6
Khalwa	15	25
Primary	11	18.3
Secondary	9	15
Graduate	3	5
Total	60	100

Source survey data (2014)

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Table(2) reveal that, majority of respondents in illiterate level (22%) many studies indicates that education level has positive and significant relation with farmers adoption rates.

Table (3) Frequency distribution of respondents by herd size

Herd size	Frequency	%
1-10 cows	26	43.3
11-19	15	25
20-29	13	21.6
Above 30	6	10
Total	60	100

Source survey data (2014)

Table (3) indicates that, majority of respondents in small scale farmers have 1-10 cows, they produce milk for family consumption.

Table (4) Frequency distribution of respondents by financial services

Financial services	Frequency	%
No. source	33	55
Dairy cooperative	0	0
Micro finance service	16	26.6
Relatives financial	7	11.7
NGOs	4	6.6
Total	60	100

Source survey data (2014)

Table (4) shows that, majority of respondents self financing (55%) they kept their operation cost low dairy sector constrained by financial problems.

Table (5) Frequency distribution of respondents by dairy production knowledge level

Knowledge level	Frequency	%
High level	7	11.6
Medium level	21	35
Low level	32	53.3
Total	60	100

Source survey data (2014)

Table (5) shows that, majority of respondents in low knowledge level of production (53.3%) adoption rate affected by availability of knowledge.

Table (6) Frequency distribution of awareness of new technologies

Awareness of innovation	Frequency	Percentage
Lower level 4-11	25	41.7
Medium level 12-20	31	51.7
High level 21-28	4	6.7
Total	60	100

Source survey data (2014)

Table (6) indicates that majority of respondents have medium level about awareness of new technologies (51.7%) may be due to lack of dairy extension centers in the study area.and unavailability of knowledge

Table (7) Different source of dairy technologies

	Sources	New technologies						Total	
		AI	Vaccination	Parasite control	Concentrate feeding	Milking frequency	Milking cow feeding	No.	%
1	Extension centers	23	42	32	41	41	46	136	38
2	Veterinary units	61	43	56	26	11	29	134	37
3	Relatives and neighbors	7	10	9	26	26	14	55	15.3
4	Radio and TV.	5	5	2	7	21	11	31	8.6

Table (8) Frequency distribution of respondents according to their awareness, adoption and continuous of adoption of some dairy technologies

	New technologies	Awareness		Adoption			Continuous of adoption	
		No.	%	No.	%	Rank	No.	%
1	Artificial insemination	55	91.6	8	13.3	5	4	6.6
2	Vaccination	60	100	60	100	1	60	100
3	Milking frequency	41	68.3	18	30	3	18	30
4	Concentrate feeding	28	46.6	11	18.3	4	6	10
5	Milking cow feeding	19	31.6	8	13.3	5	8	13.3
6	Parasite control	60	100	47	78.3	2	33	55

Table (8) shows that, majority of respondents (91.5%) highly awareness of AI may be its ckeck reproduction diseases transmission, (100%) of respondents adopted vaccination process its keep the herd healthy. (78.3%) adopted parasite control its subjected to many risk from diseases.

Table (9) Correlation coefficient between dependent variables and awareness of improved dairy technologies

	Dependent variables	Correlation coefficient		Dependent variable	Correlation coefficient
1	Age	0.131**	4	Financial services	0.168**
2	Educational level	0.138**	5	Knowledge level	0.126*
3	Herd size	0.014 NS			

Significant at p≤ 0.05 * Significant at p≤ 0.01** NS- non significant

Table (10) Person correlation coefficient between dependent and independent variables

Independent variables	Dependent variables				
	Age	Education level	Herd size	Credit services	Knowledge level
AI	0.019**	0.084	0.0124*	0.168**	0.281*
Vaccination	0.069	0.047	0.059	0.086	0.112*
Milk frequency	0.o76	0.004	0.043	0.009	0.046
Concentrate	o.086	0.039	0.059	0.141*	0.095
Milking cow feeding	0.066	0.043	0.056	0.0131*	0.002
Parasite control	0.063	0.023	0.034	0.120**	0.108*

Significant at P≤ 0.05* Significant at P≤ 0.01** Ns non-significant

4. DISCUSSION

Majority of respondents in middle age between 35-50 years(58.3%) older age above 50 years (18.3) they have high experience in dairy management and take up cattle farming as a traditional occupation. More than half of the farmers in productive age 35 -50 year their educational level more of them in high illiteracy rates (36.6 %) religious education (25%) formal education were lower (38.35%) many studies found that farmer's education level has positive and significant relationship with farmer's adoption rates of best management practices their herd size, less than half of respondents in small category (43.3%) they produce milk for family consumption commercial scale (10%) in some localities the number of herd more important than milk production because the large herd size makes owners featured tribe about the credit services the study indicated that , majority of respondents were self financing and they kept their operational cost low (43.3). Respondent s received financial credit by micro finance services were in large farm size, high milk yield, and better economical status. (26.6%)the study indicated that the most important barriers in adoption of improved dairy technologies are the financial aspects at other time the cost of technology make it difficult to adopt as being economically not viable , .Freeman, (1996) observed the influence of credit on farmer's investment and production decision among small holder dairy producers in Ethiopia this finding in line with my study results. dairy cooperatives not seen in the study area their knowledge level ,majority of respondents in low knowledge level (53.3%). Call for designing strategies and planning of development programs in order up-grade small holders dairy system in the study area was needed lack of institutions to provide relevant information on the recommended dairy practices may also contributed to the lower level of access. According to the awareness of new technologies categories the table indicates that 41.7 in low level of awareness high percentage in medium level 51.7 only 6.7 in high level .There are 4four source of information the extension centers and veterinary units provided high score than relatives and neighbors and radio and TV. This mean that the extension centers and veterinary units have high communication level in the local societies play a high role in the development of livestock sector adoption of AI technologies was lower about 14 farmer 23.3% of the total sample size may be the technology characters unacceptable to the local community. The table indicates that all dairymen adopted vaccination technologies 100% its necessary to keep the herd healthy farmers think that, their animal are not susceptible to the different diseases. this agree with the finding of McCauley (1983) majority of respondents aware about AI but only 13.3%adopted may be it is required will-trained operations and special equipment. This finding agree with of Saimi et al (1981). Majority of respondents continuous adopted of internal and external parasite control may be it is the loss of even one animal to diseases may have a substantial impact on the household economy of small scale dairy producers with limited resources.18.3 of respondents adopt concentrate feeding may be it is more expensive but increasing milk production only 30% of respondents adopt the milking frequency technology as general rule ,herd lactation yield will rise as the frequency of milking is increased this agree with the finding of King (1992) In conclusion , correlation at 0.01 level between socio-economic of farmers and adoption rates of the improved technological practices of dairy production.

Yitaye (2008) who mentioned that rural dairy farmers had little access to extension services while infrastructure investments still remain problematic in Kassala State. Teferi (2003) showed that extension contact affect adoption of new technologies positively and significantly this finding in line with my results.

5. RECOMMENDATION

1- To Veterinary hospitals and diagnostic laborites should be established in the locality to provided health care services (Dairy Cattle health**).**

2- To Training is necessary for success in dairy cattle production .The training center to trained the producers best management practices of milk production public extension staff needs.

3-To the dairy sector, genetic improvement of the local dairy herd by using AI technologies

4-To the dairy sector establishment of dairy cooperatives for mill collection and distributions

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