

Characterization of drudgery of women in dairy production system

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ABSTRACT

A study was conducted on the characterization of drudgery of women in dairy production system in Dharwad district of Karnataka comprising 150 respondents. The results depicted that milking was exclusive activity of women among majority of respondents (76.00%). More than 15 kg of weight was carried by women while performing fodder collection activity. The distance of carrying load was observed to be maximum in fodder collection (1.75 km). While doing milking activity more than ninety per cent women had pain in fingers, upper legs and lower legs with rating of 3.66, 3.49 and 3.48 respectively. More than 70 per cent women experienced postural discomfort in lower back, upper back and lower legs in most of the activities. Maximum rating of physiological workload was given to cleaning of cattle sheds (3.66) followed by fodder collection (3.53) which were performed by women. Maximum drudgery index was scored in cleaning of cattle shed (31.59%). Factors causing drudgery differed significantly and among six factors postural load, musculoskeletal disorders, repetitive strain and physiological load influenced variations.

Keywords: Postural discomfort; drudgery; posture; physiological workload; repetitive strain

INTRODUCTION

Women contribute to nearly 60 per cent of labour in farm production in India. They form the backbone of agriculture comprising the majority of agricultural labourers. Women play a significant and crucial role in agriculture and animal husbandry development. Despite the fact that women in India share most of the work in animal production their work remains

mostly invisible. This may be carried out within the confines of homesteads.

In Asian countries animals have formed an essential role in the family farming system and rural women have been involved in livestock farming since time immemorial (Akhtar and Khan 2000). Women located in rural areas play a significant role in agriculture and livestock rearing. They have been involved in animal

production under small holder farming system to enhance the family income as well as to meet household food needs. Nearly half of the rural population consists of women who contribute 60 to 80 per cent of labor required for animal rearing (Younas et al 2007). They are the first to rise and last to go to bed (Siddique et al 2009). Rural women carry out both domestic and livestock related activities. Their routine household activities include cleaning of the home, cooking, stitching and raising children while livestock management practices include cleaning of animal sheds, taking care of sick animals, calf rearing, feeding, watering to animals, milking and making dairy products like Ghee, yogurt, butter etc. General observations concerning rural family life and available studies show that male members are mainly responsible for agricultural practices while besides the household responsibilities the females are said to actively participate in livestock care and management (Zubair et al 1999). Some of the activities like fodder production, cutting and transportation are mostly performed by male family members (Amin et al 2010) but in many cases the women are also involved in these additional duties.

The available dairy tools and technologies are not women friendly and not designed as per the ergonomic consideration of women in dairy production. In this context keeping the drudgery of women in dairy in focus the study was aimed at knowing characterization of drudgery of women in dairy production system.

METHODOLOGY

The sample households (50) for the present study were selected from the operational villages of AICRP- Home Science Dharwad, Hullambi and B Gudihal villages of Kalagatagi Taluka of Dharwad district. The questionnaire was used to collect the information on characterization of drudgery of women in dairy production system through personal interview method. The characterization of drudgery was made by using parameters namely gender participation, physical loads carried, postural discomfort, physiological workload, body pain and musculoskeletal disorder by using different scales.

Gender participation was analysed by using the following scale of participation of women in each activity:

- WE - Women exclusive only (1)
- WD - Women dominated and supported by men (2)
- ME - Men exclusive only (3)
- MD - Men dominated and supported by women (4)
- EP - Equal participation of men and women (5)

The physical load carried while performing the dairy activity was recorded in feet and kilometers. Based on all these three aspects women were asked to rate the drudgery of carrying load by using the five point scale as below:

Very heavy- 5, Heavy- 4, Moderately heavy- 3, Low- 2, Very low- 1

The posture used while performing the selected activities in each production system was recorded (sitting, standing, bending, squatting and kneeling). The postural discomfort in each body part was rated by using the five point scale by the women as below:

Very severe- 5, Severe- 4, Moderate- 3, Mild- 2, Very mild- 1

Repetitive strain was recorded in two forms ie whether the activity was continuous or cyclic and the strain rating was recorded on five point scale given below:

Very exhausted- 5, Exhausted- 4, Moderately exhausted- 3, Mildly exhausted- 2, Comfortable- 1

Depending on the time of performance of the activity the respondents were asked to rate the workload as per time on the five point scale given as under:

Very high duration- 5, High duration- 4, Moderate- 3, Less duration- 2 Very less duration- 1

The overall physiological workload rating was recorded by using the following five point scale:

Very light- 1, Light- 2, Moderately heavy- 3, Heavy- 4, Very heavy- 5

The Corlet and Bishop's body map was used to locate pain by the respondents for musculoskeletal disorder and pain rating (Very painful- 5, Painful- 4, Moderate- 3, Mild pain- 2, No pain- 1). Then the pain and disorder were recorded as per the body part and symptoms or disorder experienced and the rating of pain was done on five point scale.

The data on pain in different body parts were summarized by adding the rating of pain in all parts and dividing it by the number of body parts to get pain rating. The frequency of pain was also recorded by using a 5 point scale ie:

Never- 1, Very often- 2, Not very often- 3, Quiet often- 4, Always- 5

Information on the type of technology used and whether the respondents were satisfied by the technology was also collected.

Estimation of load factor

After collecting information on all the above parameters the maximum contributing factor for drudgery was estimated by comparative selection from the following combinations and asking the respondents to express the loading of each factor against the other factors as listed below:

Physical load x posture	Physical load x repetitive strain	Physical load x time	Physical load x MSD	Physical load x physiological load
Posture x repetitive strain	Posture x time	Posture x MSD	Posture x physiological load	Repetitive strain x time
Repetitive strain x MSD	Repetitive strain x physiological load	Time x MSD	Time x physiological load	MSD x physiological load

There were 15 combinations enlisted in 15 boxes, the opinion of the respondents was elicited for every box of combination for each activity, only one variable from each of the combinations listed was tick marked in every box as per the response of the subjects, the frequencies were summated as per the tick marks given in every box against each variable and the sum obtained against each variable was mentioned as load factor in the questionnaire.

RESULTS and DISCUSSION

Table 1 shows the socioeconomic characteristics of rural women in dairy production system. Maximum percentage of the households belonged to the forward caste category (58.00%) followed by backward caste (20.00%), having joint family system (52.00%) and belonged to low income group (46.00%) followed by 30.00 per cent families belonging to middle income group. Maximum percentage of households had more than 10 years of farming experience (66.00%) followed by 24.00 per cent having 5-10 years of farming

experience; belonged to more than 50 years of age group (36.00%) and were from small land holdings (44.00%). More than fifty per cent of the selected households were having buffaloes (82.00%) followed by cows (68.00%) and Jersey cow (24.00%).

Dairy farming (animal husbandry) was the major source of income for all households. Other than dairy about 50 per cent had income from agriculture and 3.00 per cent had income from employment/service as depicted in Table 2.

Women were actively involved in dairy activities like feeding, watering, management, breeding, healthcare, processing and marketing. Feeding and watering involved preparation of food, feeding the animals, watering the animals, taking animals for grazing, fodder collection, chaffing the fodder, storage of feed and fodder and mixing green fodder with roughage. Under management they did milking, cleaning of animal sheds, disposal of cow dung, construction of animal sheds, washing and grooming animals and

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Table 1. Socio-economic characteristics of the sample selected for the dairy production system (n= 50)

Variable	Frequency	Percentage
Caste		
Backward caste	10	20.00
SC	6	12.00
ST	5	10.00
Forward caste	29	58.00
Family type		
Nuclear	24	48.00
Joint	26	52.00
Age (years)		
<39	16	32.00
40-50	16	32.00
>50	18	36.00
Land holding		
Marginal	13	26.00
Small	22	44.00
Medium	9	18.00
Large	6	12.00
Type and average number of animals		
Buffaloes	41	82.00
Cows	34	68.00
Jersey cow	12	24.00
Duration of farming (years)		
<5	5	10.00
5-10	12	24.00
>10	33	66.00
Annual family income (Rs)		
Low (<103337)	23	46.00
Medium (103338-163124)	15	30.00
High (>163124)	12	24.00

Table 2. Average income of the selected households from various sources in dairy production system (n= 50)

Source	Percentage	Amount (Rs)
Agriculture	50.00	50900.00
Dairy	100.00	80650.94
Services	3.00	61333.33
Total average income		135230.94

maintaining farm and dairy records. Under breeding and healthcare the activities involved were taking animals for artificial insemination, care of pregnant animals, care of new born, care of sick animals and taking animals for treatment/vaccination and in case of processing and marketing they did sale of milk and milk products, processing of milk livestock products, purchase of feed and fodder and sale and purchase of animals. They also performed miscellaneous works like getting loans/credit from banks/cooperatives.

Table 3 presents the details of gender participation and technology usage in dairy production system. Milking was women exclusive activity among majority of respondents (76.00%). Maximum percentage of women (80.00%) expressed that feeding was the women dominated activity followed by fodder collection, watering the animals and cleaning of cattle shed wherein women participation was found to be 72.00, 64.00 and 60 per cent respectively. The women respondents were in the practice of performing all dairy production activities in conventional manner.

Gayatri and Satmoko (2010) reported that in all the communities the roles of women and men at the various stages of dairy cattle farming management are almost similar. Women not only work in the fields as much as or more than men but they also have the major role in housework and caretaking. Women have almost equal

access to all inputs required for dairy cattle farming (breeds, land, labour, feeding practices etc). The findings are also supported by the work of Batool et al (2014).

Table 4 depicts the physical load carried and load rating perceived by the respondents. More than 15 kg of weight was carried by women while performing fodder collection activity followed by watering the animals (10.78 kg), cleaning of cattle shed (9.82 kg), feeding activity (5.78 kg) and milking (2.11).

The distance of carrying load was observed to be maximum in fodder collection (1.75 km) followed by cleaning of cattle shed (34.58 ft), watering the animals (28.4 ft), milking (27.9 ft) and feeding of fodder (27.1 ft). The height of carrying load ranged between 3.43 and 5.11 ft. All women gave maximum load rating to fodder collection activity (3.93) followed by cleaning of cattle shed (3.12), watering the animals (2.52) and feeding of fodder to the animals (2.46).

Fodder collection was rated as heavy activity by all women. The main body parts which had pain while working as reported by them were lower legs, upper legs, lower back, lower arms, shoulders, upper back, fingers and knees (Table 5). Milking was the activity in which all body parts had pain followed by cleaning of cattle shed wherein pain was observed

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Table 3. Gender participation and technology usage in dairy production system (n= 50)

Activity	f	Gender participation					Technology usage
		WE	WD	ME	MD	EP	
Feeding fodder to animals	50	4 (8.00)	40 (80.00)	-	-	6 (12.00)	Manual
Watering the animals	50	8 (16.00)	32 (64.00)	-	-	10 (20.00)	Manual
Fodder collection	50	6 (12.00)	36 (72.00)	-	-	8 (16.00)	Manual
Milking	50	38 (76.00)	8 (16.00)	-	-	4 (8.00)	Manual
Cleaning of cattle shed	50	10 (20.00)	30 (30.00)	-	-	10 (20.00)	Manual

Figures in parentheses indicate percentage values, f= Frequency, WE= Women exclusive only, WD = Women dominated and supported by men, ME= Men exclusive only, MD= Men dominated and supported by women, EP= Equal participation of men and women

Table 4. Physical load carried and load rating perceived by women in dairy production system (n= 50)

Activity	Weight of the load (kg)	Distance carried	Height (ft)	Physical load rating
Feeding the animals	5.78	27.1 ft	3.42	2.46
Watering the animals	10.78	28.4 ft	3.34	2.52
Fodder collection	15.87	1.75 km	5.11	3.93
Milking	2.11	27.9 ft	3.14	1.3
Cleaning of cattle shed	9.82	34.58 ft	4.37	3.12

in upper back, lower back, lower legs, upper legs, lower arms, upper arms and shoulders.

While performing milking activity more than ninety per cent women had pain in fingers, upper legs and lower legs with pain rating of 3.66, 3.49 and 3.48 respectively. More than 3.5 pain rating was given to lower back (50.00%), lower and upper legs (86.00%), lower back (88.00%) and more than 3.00 pain rating was given to knees, upper back, upper arms and shoulders while performing cleaning of cattle shed activity.

Fig 1 shows that maximum pain rating was given to lower arms and lower back while performing almost all listed activities in dairy production system as expressed by maximum percentage of women.

The overall physiological workload rating and repetitive strain rating of the activities performed by women in dairy production system are presented in Table 6. Maximum rating of physiological workload was given to cleaning of cattle shed activity (3.69) followed by fodder collection activity (3.53).

Table 5. Body pain rating while performing various activities in dairy production system (n= 50)

Activity	Shoulder	Upper arms	Lower arms	Finger	Upper legs	Lower legs	Upper back	Lower back	Knees
Feeding	2.14 (44.00)	2.63 (28.00)	2.22 (64.00)	1.78 (18.00)	-	-	2.00 (2.00)	2.00 (4.00)	
Watering the animals	-	2.00 (2.00)	2.60 (60.00)	2.29 (14.0)	2.50 (32.00)	2.56 (18.00)	-	2.57 (92.00)	-
Fodder collection	3.00 (6.00)	2.50 (8.00)	2.67 (12.00)	3.31 (26.00)	3.50 (12.00)	3.50 (28.00)	3.21 (28.00)	3.14 (28.00)	3.50 (16.00)
Milking	2.83 (70.00)	3.28 (36.00)	3.12 (52.00)	3.66 (92.00)	3.49 (94.00)	3.48 (96.00)	3.50 (4.00)	3.17 (70.00)	3.21 (56.00)
Cleaning of cattle shed	3.25 (48.00)	3.29 (48.00)	3.76 (50.00)	-	3.60 (86.00)	3.60 (86.00)	3.46 (92.00)	3.55 (88.00)	3.50 (16.00)

Figures in parentheses indicate percentage values

Pain rating: Very painful- 5, Painful- 4, Moderate- 3, Mild- 2, No pain- 1

In case of repetitive strain rating, maximum value was given to cleaning of cattle shed (3.28- moderately exhaustive) followed by fodder collection (3.00) (women considered these activities as moderately exhaustive) and milking activity (2.89- towards moderately exhaustive).

Table 7 shows the posture used and postural discomfort experienced in various body parts while performing dairy production system activities. Standing and bending were the main postures used in feeding and watering the dairy animals, fodder collection and cleaning of cattle shed whereas milking activity was performed in squatting posture. Highest postural discomfort rating was given to lower back (3.79) while performing fodder collection followed by cleaning of cattle shed (3.72). The study is in line with that of Lundqvist et al (1997).

It is observed from Table 7 that lower back, upper back and lower legs were the sites wherein postural discomfort was experienced by maximum of women in most of the activities in dairy production system. As high as 96.00 per cent women expressed severe discomfort in upper back while performing cleaning of cattle shed followed by 94.00 per cent expressing moderate discomfort in lower legs while performing milking activity. In fodder collection women expressed severe pain in lower back, upper back and lower and upper legs.

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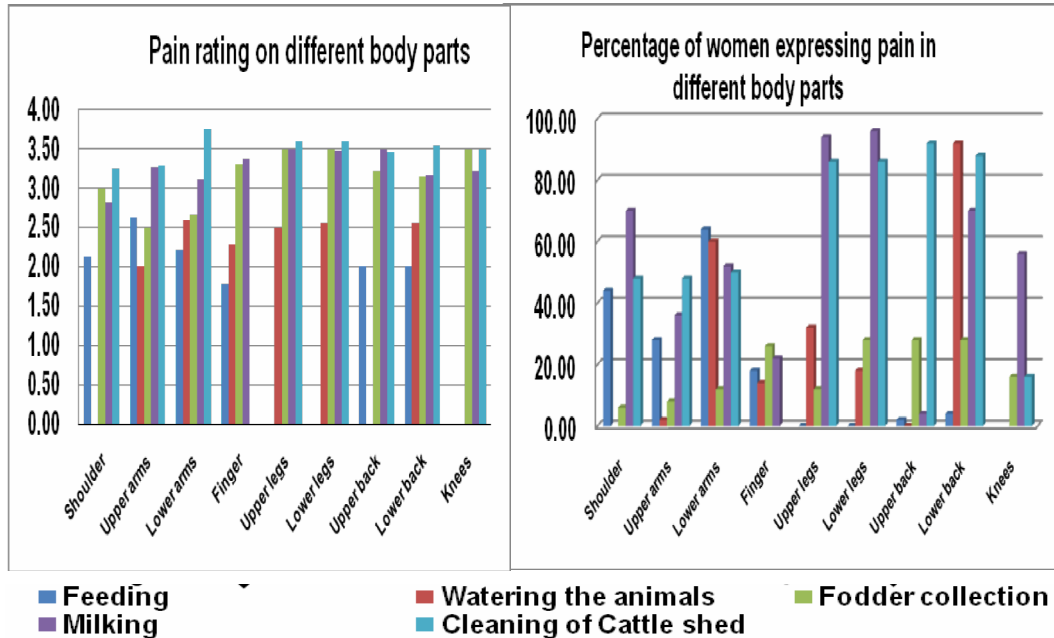


Fig 1. Body pain rating while performing various activities in dairy production system

Table 6. Overall physiological load and repetitive strain rating given by the selected women while performing various activities in dairy production system (n= 50)

Activity	Overall physiological load rating	Repetitive strain rating
Feeding	1.94	1.44
Watering the animals	2.06	2.27
Fodder collection	3.53	3.00
Milking	2.92	2.89
Cleaning of cattle shed	3.69	3.28

Physiological load rating: Very light-1, Light- 2, Moderately heavy- 3, Heavy- 4, Very heavy- 5

Repetitive strain rating: Very light- 1, Light- 2, Moderately exhaustive- 3, Exhaustive- 4, Very exhaustive- 5

Among all the activities fodder collection was done for maximum number of days (131.77 man days) followed by cleaning of cattle shed (110.64 man days) and watering the animals (60.45 man days). The work load against time duration was

highest for cleaning of cattle shed followed by milking and fodder collection and feeding of fodder to the animals as shown in Table 8.

Most drudgery prone activities were the women exclusive and women

Table 7. Posture used and postural discomfort experienced in various body parts while performing various activities in dairy production system (n= 50)

Activities	Posture used	Shoulder	Upper arms	Lower arms	Wrist	Chest	Upper legs	Lower legs	Knee	Upper back	Lower back
Feeding	Standing & bending	1.48 (50.00)	1.88 (34.00)	1.63 (54.00)	1.33 (24.00)	2 (2.00)	-	-	-	-	-
Watering the animals	Standing & bending	-	2.67 (6.00)	2.24 (68.00)	2.83 (12.00)	-	2.44 (32.00)	2.46 (26.00)	-	-	2.24 (100.00)
Fodder collection	Standing & bending	3.00 (2.00)	2.50 (12.00)	2.20 (10.00)	3.00 (26.00)	3.00 (2.00)	3.5 (12.00)	3.57 (28.00)	3.63 (16.00)	3.57 (16.00)	3.79 (28.00)
Milking	Squatting	2.78 (72.00)	3.00 (36.00)	3.19 (52.00)	3.4 (78.00)	-	3.00 (46.00)	3.15 (94.00)	3.14 (100.00)	3.00 (2.00)	2.91 (68.00)
Cleaning of cattle shed	Standing & bending	3.54 (54.00)	3.42 (48.00)	3.55 (44.00)	-	-	3.43 (88.00)	3.57 (88.00)	3.67 (12.00)	3.67 (96.00)	3.72 (92.00)

Figures in parentheses indicate percentage values

Discomfort rating: Very severe- 5, Severe- 4, Moderate- 3, Mild- 2, Very mild- 1

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Table 8. Time duration of the activities performed by women and the workload as per time in dairy production system (n= 50)

Activity	Duration			Work load as per duration
	Time (min)	# days	# man days	
Feeding	28.5	365	54.17	1.48
Watering the animals	31.8	365	60.45	1.6
Fodder collection	92.00	275	131.77	2.44
Milking	41.8	240	52.25	2.48
Cleaning of cattle shed	58.2	365	110.64	2.6

dominating activities namely milking, fodder collection, feeding of fodder to the animals and watering the animals.

Table 9 and Fig 2 present the drudgery parameters and drudgery index as perceived by women in dairy production system. Maximum drudgery index was

scored by cleaning of cattle shed (31.59%) followed by milking (28.28%) and feeding of water to the animals (21.23%). All these activities can be classified as moderately heavy activities. Significant differences were found within the activities compared and it can be said that activities are dependent on drudgery load in dairy production system.

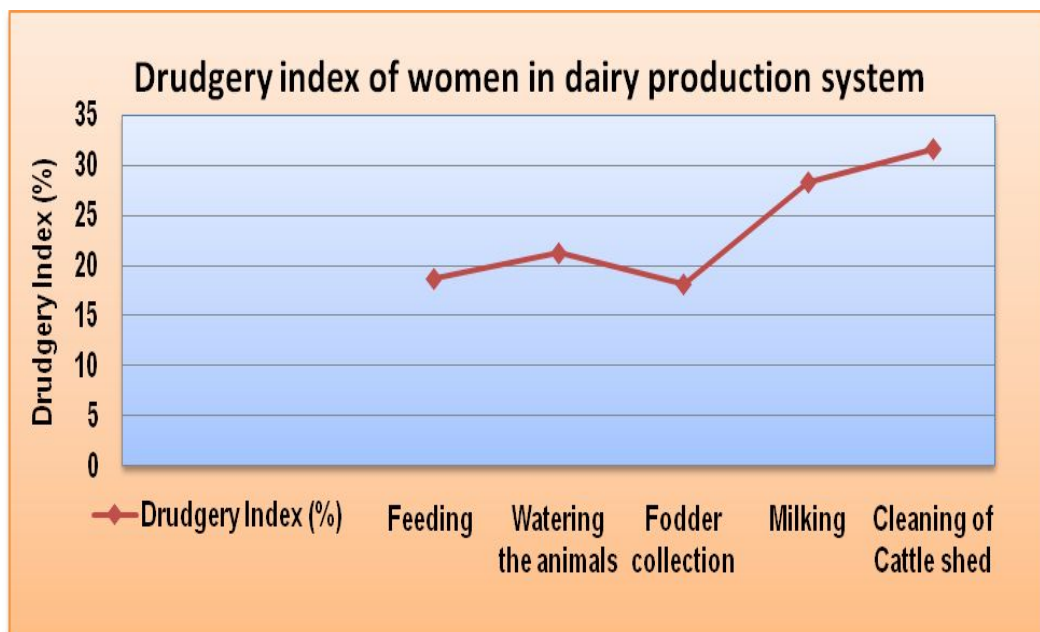


Fig 2. Drudgery index of women in dairy production system

Table 9. Drudgery parameters and drudgery index in dairy production system (n= 50)

Farm activity	Physical load (25)	Posture load (25)	Repetitive strain load (25)	Physiological load (25)	Time load (25)	MSD load (25)	Total drudgery (150)	Drudgery index (%)	Drudgery level
Feeding	5.48	4.16	3.98	6.3	1.96	6.14	28.02	18.68	Low
Watering the animals	7.18	5.58	2.18	7.8	1.46	7.65	31.85	21.23	Low
Fodder collection	4.72	5.25	1.68	7.14	2.14	6.28	27.22	18.15	Low
Milking	2.00	14.16	7.6	7.38	2.48	8.80	42.42	28.28	Low
Cleaning of cattle shed	13.12	9.848	6.08	8.92	2.6	6.82	47.39	31.59	MH

Drudgery level= <15: Very low, 15-30: Low, 30-45: Moderately heavy, 45-60: Heavy, 60-80: Very heavy, >80: Unacceptable

ANOVA

Source of variation	SS	df	MS	F	P-value	F-critical
Activity	54.49	4	13.62	2.30	0.09	2.87
Drudgery factors	124.31	5	24.86	4.20	0.01	2.71
Error	118.46	20	5.92			
Total	297.26	29				

The factors causing drudgery were significantly different and among six factors pasture load, musculoskeletal disorders, repetitive strain and physiological load influenced variations.

CONCLUSION

Rural women in the study area were actively involved and played a vital role in dairy extension system. They were actively involved in the dairy activities like milking, cleaning of cattle shed, fodder collection, watering and feeding the animals in addition to their domestic responsibilities. Milking was the women's exclusive activity among majority of the respondents and they perceived severe postural discomfort in this activity. They also perceived severe postural discomfort in upper back while performing cleaning of cattle shed. Hence there is need to invent the drudgery reducing technology in milking and cleaning of cattle shed activities.

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